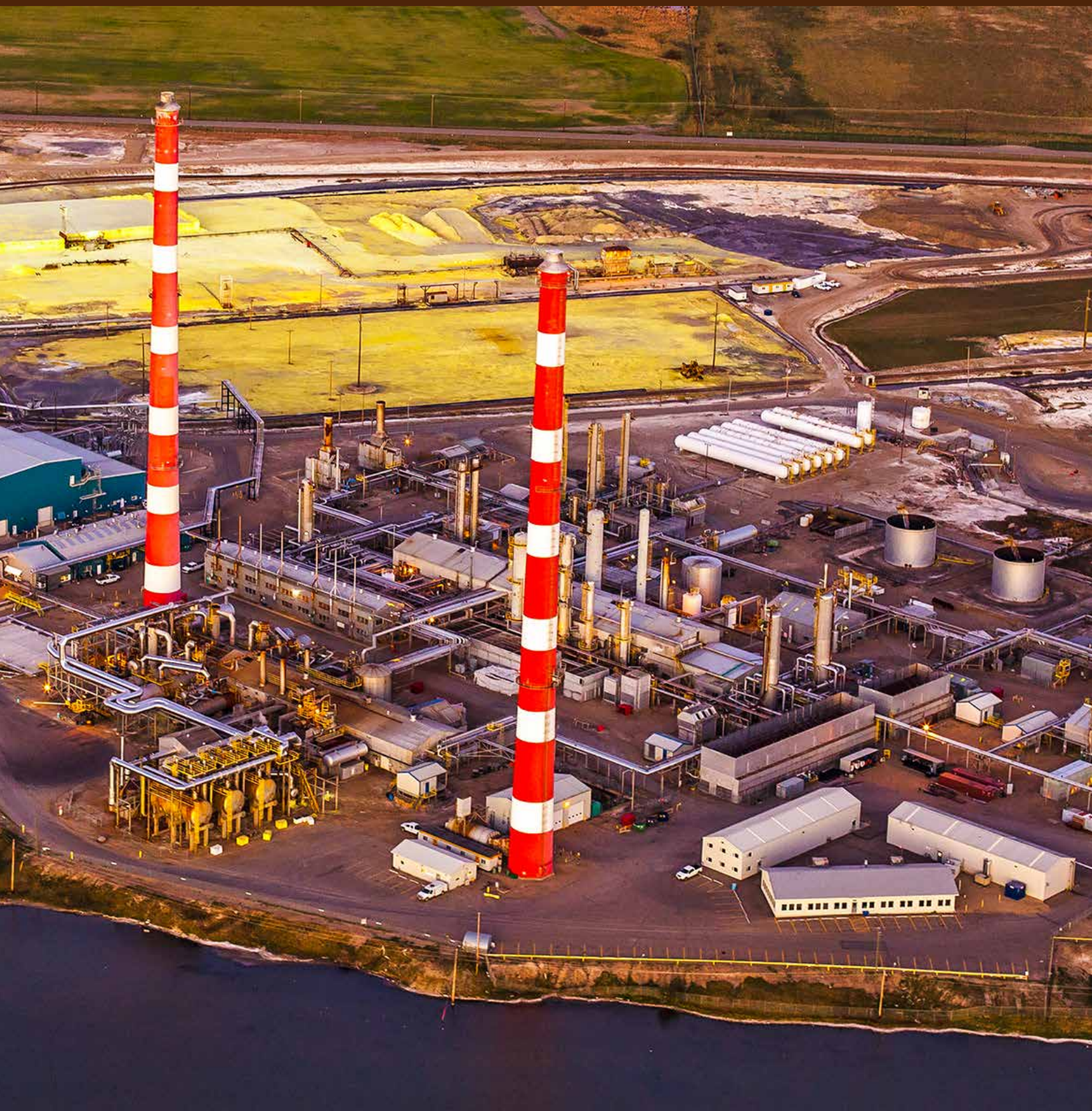
EQUINOX® Engineering

BROWNFIELD PROJECTS



Brownfield Projects

EQUINOX Engineering Ltd

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

Founded in 1997, Equinox has successfully executed over 5,000 significant projects around the world including North America, Australasia, Middle East, Europe and Asia.

Equinox has industry leading expertise in Conceptual and Front End Engineering Design (FEED), Detailed Engineering Design, Procurement and Construction Management.

We have extensive experience in brownfield projects including expansions and optimizations, debottlenecking, operations and maintenance engineering, sustaining capital and Management of Change projects.

Equinox provides brownfield expertise from our Canadian and Australian offices, complimented by high value engineering resources from the Equinox India office.

Equinox Engineering provides world class expertise, technical solutions and execution strategies for brownfield projects.

Equinox has successfully executed brownfield projects throughout the world, both onshore and offshore, within gas plants, oil processing facilities, refineries, upgraders and field facilities.

Our experience includes Sustaining Capital programs, Management of Change (MOC) programs, debottlenecking, plant expansions and optimizations, facility modifications, plant support, maintenance engineering and annual turnaround support.

Facility Expertise

Equinox has executed well over one thousand brownfield projects within live operating environments to expand, upgrade or optimize facilities for gas processing, oil production, refineries, upgraders and power generation.

GAS PROCESSING PLANTS

Equinox is an industry leader in natural gas processing facilities. Our expertise includes inlet separation, gas sweetening, condensate, liquids removal (refrigeration, cryogenics), mercury removal, compression, dehydration, NGL recovery and fractionation, storage, measurement and transport.

Equinox specializes in sour gas treating. Our brownfield expertise includes amine sweetening facilities, CO2 membranes, H2S scavengers, and biological regeneration as well as acid gas handling (compression, pipelines and injection).

This also includes Sulphur Plants, both Claus and SuperClaus, and all areas of sour water stripping, sulphur recovery, tail gas treating, thermal oxidizer, sulphur degassing, sulphur storage, forming and loading facilities.

LNG FACILITIES

Brownfield projects within LNG Liquefaction Plants and Loading Terminals and the supply of engineering personnel to execute plant projects is a key area for Equinox.

We provide expertise in all phases of the LNG value chain including upstream facilities, stabilization, gas pre-treatment (CO2, H2S, mercury removal, sulphur recovery), refrigeration, liquefaction, storage and loading, etc.

HEAVY OIL PRODUCTION

Our experience within SAGD and CSS Central Processing Facilities includes upgrades, optimizations debottlenecking and sustaining capital projects regarding oil treating, diluent recovery, produced water de-oiling, water treatment, steam generation, evaporators, boilers and power cogeneration.

This includes many of the largest thermal heavy oil production facilities in Canada, as well as cyclical steam operations in the Middle East and Asia.

REFINERY & UPGRADER

Our experience with brownfield projects within refineries and heavy oil upgrading facilities is significant. Our corporate and personnel expertise includes crude upgrading and primary separation (atmospheric distillation, vacuum Distillation), primary upgrading (coking, hydro-conversion), secondary upgrading (hydro-treating, hydro-cracking) as well as process support units such as the sulphur recovery unit, tail gas treating, hydrogen production unit, etc.

OIL BATTERY

Equinox has significant experience in the design and installation of oil batteries and satellites, including light, medium and conventional/heavy oil, sweet and sour. Our experience with original design as well as brownfield troubleshooting, debottlenecking, expansion and optimizing includes inlet separation, emulsion treating, crude stabilization, multiphase metering, water treatment, water injection, de-sanding and sand disposal, custody transfer, truck loading and rail loading.

Brownfield Capabilities

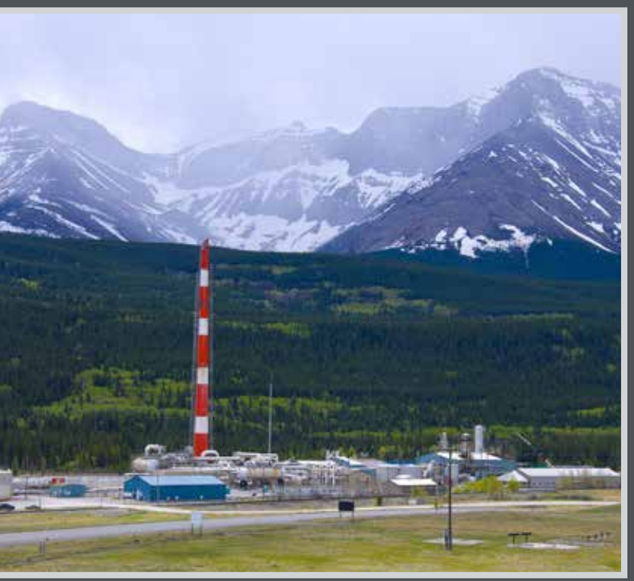
Equinox Engineering has extensive experience in “live” operational environments, executing Sustaining Capital and Management of Change (MOC) programs. Typical projects include troubleshooting, performance testing, capacity optimization, and debottlenecking on hydrocarbon processing facilities, wellsites, field facilities and related assets.


Photo courtesy of Cenovus

SUSTAINING CAPITAL

Within central processing facilities, Equinox has a long history of successful Sustaining Capital projects to extend lifespan, expand capacity, increase throughput and improve safety of a plant.

Equinox executes Sustaining Capital projects up to $100 MM TIC and has worked in many of the largest gas plant and oil production facilities in Canada.



PLANT EXPANSION

Equinox has an extensive history of gas plant expansion projects, as well as oil production facility expansion projects – to increase throughput and plant capacity.

This includes adding complete processing trains to existing gas plants, as well as adding liquids recovery (refrigeration, cryogenics) or sour gas processing (amine sweetening) to facilities to accommodate changing feed streams. Within heavy oil facilities, this includes expansion of steam generation, water treatment as well as oil treatment modules.

MANAGEMENT OF CHANGE

For large programs of small projects (i.e. MOC programs) Equinox has a customized workflow program to address specific client requirements. Equinox understands that small operational projects have unique execution requirements and cannot be executed as though they are large Capital projects.

Our ‘MOC Work Flow’ program works efficiently to address the fast paced requirements of in-plant maintenance and MOC projects. Working as a team with our clients, Equinox will embed personnel onsite to facilitate project execution.


Photo courtesy of Cenovus

DEBOTTLENECKING & OPTIMIZATION

Equinox has worked with numerous clients to increase production capacities of large facilities, through modification of existing equipment and removing any throughput restrictions.

Our process engineering team regularly delivers Concept and FEED studies, leading to complete debottlenecking project executions by Equinox for gas processing and oil production facilities.

3D LASER SCANNING

Equinox utilizes 3D Laser Scanning technology to create exceptionally accurate 3D models of operating facilities – rapidly and cost effectively.

When as-building older vintage gas plants or oil batteries, our 3D scanning reduces field time required to accurately as-build a facility. Compared to traditional, labour intensive methods, 3D scanning captures digital information to create a point cloud image to be directly converted to a 3D model, with great accuracy.

Selected Projects


Photo courtesy of SemCAMS

KAYBOB SOUTH (K3) GAS PLANT
Debottlenecking & Optimization

The K3 Gas Plant (commissioned in 1970) has inlet capacity of 675 MMscfd and 3,561 t/d of sulphur.

In the past decade, Equinox has executed over fifty (50) brownfield projects within the facility including debottlenecking, upgrades and optimizations including Plant Inlet, Amine Sweetening trains, Sulphur Plant, Liquids Handling, Compression, Metering, as well as maintenance engineering and annual turnaround support.


Photo courtesy of SemCAMS

KAYBOB AMALGAMATED (KA)
Debottlenecking & Optimization

The KA Gas Plant (commissioned in 1968) has inlet capacity of 397 MMscfd and 1,100 t/d of sulphur.

Equinox has executed over thirty (30) Management of Change (MOC) and Sustaining Capital projects including major plant optimization and debottlenecking studies, and upgrades to Plant Inlet, LPG storage and loading, Condensate area, etc. as well as maintenance engineering and annual turnaround support.


Photo courtesy of SemCAMS

WEST WHITECOURT (WWC)
Debottlenecking & Optimization

The WWC Gas Plant (commissioned in 1961) has inlet capacity of 424 MMscfd and 1,333 t/d of sulphur.

Equinox has delivered a major study and evaluation to reconfigure the entire facility, as well as several other Sustaining Capital projects such as Water Line Upgrade, Glycol Still Emission Control and plant compliance projects. Equinox has also provided turnaround support and delivered general maintenance engineering support projects.

EMPRESS STRADDLE PLANT
Management of Change

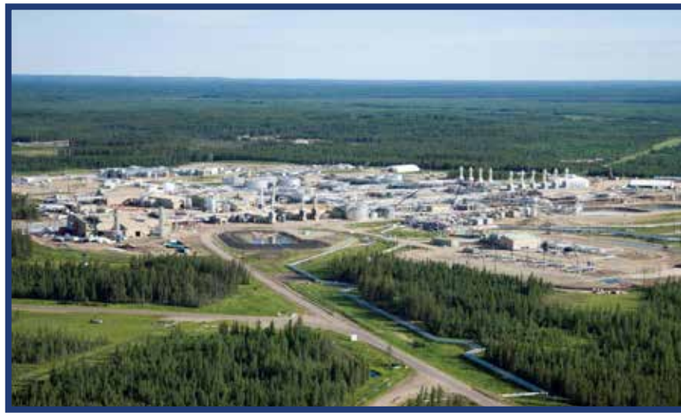
The Empress NGL Complex (commissioned in 1971) has inlet capacity of 5.6 bcf (including 75,000 bpd of ethane and 55,000 bpd NGL).

Equinox has executed several Sustaining Capital projects, including upgrades to the turbo-expander facility including replacement of process equipment regarding the compressors and heat exchangers, coolers, condensers, pumps etc. The diverse program of projects at Empress includes upgrade, modification, optimization and debottlenecking projects.

CHRISTINA LAKE SAGD CPF
Sustaining Capital

The Christina Lake Heavy Oil CPF has a production capacity of 138,000 bpd.

Equinox has executed Sustaining Capital projects to upgrade compression and cooling modules as well as Management of Change (MOC) projects that include upgrade optimization and maintenance of all types of equipment including water treatment, steam generation and oil treating facilities, as well as for DCS / PLC software.



MINA ABDULLAH REFINERY
Refinery Expansion

The Mina Abdullah facility (commissioned in 1958) owned by KNPC has a refining capacity of 270,000 bpd. Refined products include naphtha, kerosene, diesel and gas oil.

Equinox successfully executed an EPC lump sum ($50 MM TIC) brownfield upgrading project within the refinery to design and install Moisture Control and De-hazing facilities for the gas oil and diesel products via utilization of Electrostatic Coalescer within the operation.

Selected Projects - Plant Expansions

SIMONETTE GAS PLANT
Plant Expansion (150 MMscfd)

The Simonette Gas Plant was originally a sweet gas plant with inlet capacity of 25 MMscfd. The Equinox scope included FEED and Detail Design to expand the facility to 150 MMscfd in several phases.

The Phase 2 Expansion adds 50 MMscfd sweet inlet capacity (2 x 25 MMscfd trains) and provides incremental 2,700 bpd LPG production and 9,000 bpd stabilized condensate production.

In parallel, the Phase 3 Expansion adds 75 MMscfd (3 x 25 MMscfd) sour gas processing capacity and provides incremental 4,000 bpd LPG production and 13,500 bpd stabilized condensate production.

Photo courtesy of ARC Resources

DAWSON GAS PLANT
Plant Expansion (120 MMscfd)

The Dawson Gas Plant was originally designed and installed by Equinox as a sour plant with capacity of 60 MMscfd. The Equinox plant expansion scope included FEED and Detail Design to expand the facility to 120 MMscfd.

The Phase 2 Expansion included inlet separation Inlet separation, inlet compression, amine sweetening, refrigeration, liquid fractionation and stabilization, acid gas compression, acid gas blending, vapour recovery, recycle system & final sales compression as well as 9.2 MW of power generation. Also contains storage for produced water, condensate and NGL with truck-out facility.

KAKWA RIVER GAS PLANT
Plant Expansion (200 MMscfd)

The Kakwa River Gas Plant was originally designed and installed by Equinox as a sweet compression facility with capacity of 50 MMscfd.

Equinox expanded the facility including a liquids recovery train and amine sweetening plant sized to 200 MMscfd. The Phase 2 Expansion included inlet separation, mole sieve dehydration, turbo-expander (17,500 bpd C2+ recovery), condensate stabilization (5,900 bpd), three reciprocating compressors – 14,205 hp, two centrifugal compressors – 26,440 hp, amine sweetening as well as 11.2 MW of power generation.

GLACIER GAS PLANT
PLANT EXPANSION (260 MMSCFD)

The Glacier Gas Plant was originally a 140 MMscfd sour gas plant. Equinox delivered FEED, Detail Design and construction support to expand throughput to 260 MMscfd.

New equipment added includes an NGL recovery refrigeration (2 x 130 MMscfd) system as well as a new condensate stabilization package with supporting utilities and vapor recovery. Other brownfield modifications were made within the inlet separation, compression, amine plant, dehydration and acid gas compression areas.

GLACIER GAS PLANT
PLANT EXPANSION (400 MMSCFD)

The subsequent phase of the Glacier project was to expand the throughput from 260 MMscfd to 400 MMscfd capacity, and an additional 6,800 bpd of liquids.

Equinox FEED, Detail Design and construction support to add a large (160 MMscfd) NGL Recovery Refrigeration Plant along with two new (2 x 200 MMscfd) amine sweetening plants. Four new (4 x 133 MMscfd) inlet slug catchers were added. Significant brownfield upgrades to the existing infrastructure were made.

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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