

Upstream Oilfield Water Management Services



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Stantec

MWH, now part of Stantec, brings 30 years of experience in the oil and gas industry to ensure the most innovative and sustainable solutions for the upstream sector.

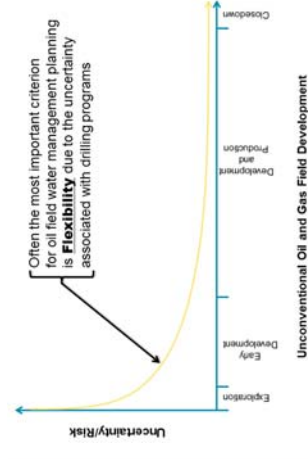
Our team provides water management, planning, permitting, engineering and construction services for the upstream oil and gas (O&G) industry.

Our focus on developing partnerships with O&G operators allows us to incorporate **unique water management and planning tools** with operations data to build flexible yet sustainable water solutions that provide measurable improvement in capital and operational efficiencies.

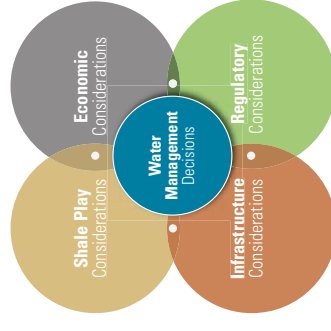
Water management and reuse strategies play a critical role in minimizing the costs and risks associated with upstream O&G operations. An effective water management strategy is essential to maintain a social licence to operate. We address water challenges by providing water management expertise that achieves the following:

- Reduces capital expenditure and long-term operational expenditure
- Optimizes well field development related to water logistics
- Manages and minimize risks – environmental, safety, communities, seismicity, trucks (noise, emissions, damage to infrastructure, public safety etc.)
- Provides a reliable, consistent, sustainable water supply that is available on demand which meets volume, water quality goals, and regulatory criteria
- Provides water solutions that incorporate flexibility.

For the upstream O&G market including unconventional oil & gas (UCOG) plays, our team provides comprehensive oilfield water management services that include: water management planning, regulatory compliance, water infrastructure permitting, water sourcing, water conveyance, water storage, treatment/beneficial reuse, and salt water disposal (SWD) solutions to meet the lifecycle needs of the project.



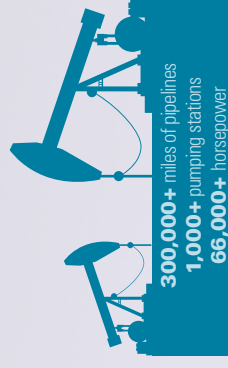
Flexibility in water planning is essential due to the high uncertainty/risk in early development.



Water management is a critical component in the development and operation of a UCOG play.



We bring global expertise and services to assist O&G operators in all phases of the project water life-cycle.

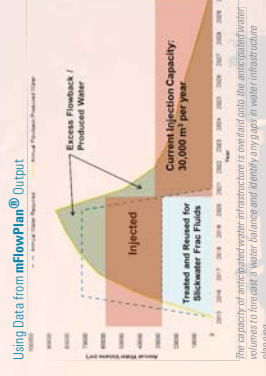


Specialized Software Tools for Oilfield Water Management Planning

Our company has invested in specialized software tools that automate the analytical processes for estimating water yields from UCOG wells to support the optimization of oilfield water management. Our software tools, mFlowPlan, mVIPER, and WBER provide the following:

- mFlowPlan incorporates water decline curve analysis of producing wells to accurately predict flowback/produced water volumetrics to prepare an oilfield water balance. It also addresses water demand and supply issues by incorporating both freshwater sources and recycling alternatives to properly allocate water resources in the field to ensure that water is available at the volume required at the time needed and at the lowest cost.
- mVIPER is a computer-aided design and geographic information system based on the Autodesk InfraWorks™ platform that supports the efficient planning, layout, and visualization of oilfield water management schemes, and is a 5D tool that allows cost databases to be linked to engineering designs for efficient updates as revisions are made.

- WBER is a water balance, efficiency, and reuse software tool that allows for the efficient evaluation of water treatment processes and their effectiveness relative to treatment requirements.



Water Supply and Conveyance

Our services are focused on the core areas of fresh water management, water sourcing and transmission design, permit and build.

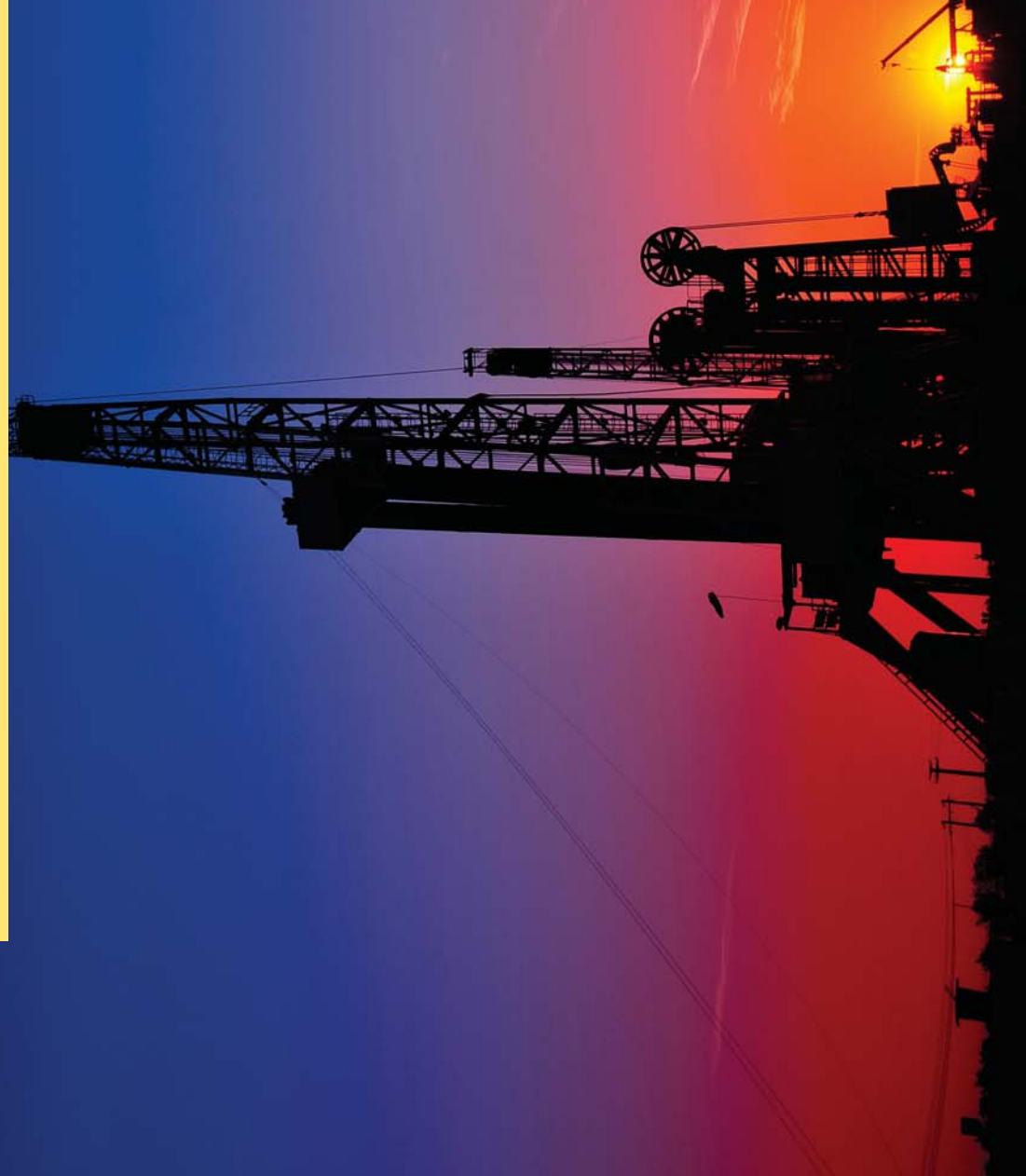
Our water transmission engineering services encompass a wide range of activities from new design, permit and construction to inspection and refurbishment of existing infrastructure. Our expertise includes:

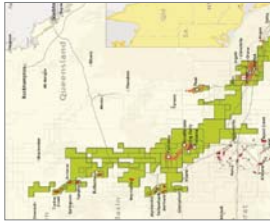
- Investigation and development of new groundwater and surface water sources
- Oil field water management planning
- Pipeline permitting, design, construction, commissioning, operation, and ownership
- Pump station design and improvements
- Transmission main extension or replacement
- Storage tank design and rehabilitation
- Reservoir and impoundment permitting, design, and, construction

Oilfield Water Treatment

Our company was founded as a water treatment design firm and has continued that emphasis with the design of more than 470 water treatment plants around the world. Our oilfield wastewater expertise includes:

- Hydrocarbon and solids removal
- Soluble organics removal
- Dissolved salts removal
- Emerging technologies
- Evaporation
- Water treatment facility upgrades and equipment improvements
- Beneficial reuse and surface discharge





Australian produced water treatment plant benefits from intelligent water management solutions

Our detailed design of two 40 Ml/d water treatment plants for Origin Energy resulted in reduced waste volumes and increased recovery of the water produced from the gas extraction process.



Produced water is reused for horticultural developments in Australia

We planned and designed solutions to utilize treated associated water from gas production activities. Water was reused by local farmers on various crops and will increase beef production in their land.



Husky exploration activities receive our permitting services in Canada

We obtained SLWB approval for eight land use permits (LUP), one LUP amendment, and five water license applications for these winter exploration programs.



Produced water management planning and treatment services for enCana, Wyoming

Short-term water management options included SVDs, evaporation ponds, and beneficial reuse. Long-term recommendations included the pilot testing of reverse osmosis membranes to allow for a surface water discharge.



Chukchi Sea Oil Exploration project gains comprehensive HSE compliance

We provided technical support for ConocoPhillips' offshore oil exploration program in this remote and environmentally challenging arctic area, with a high level of regulatory and political interest.



Assessing safety for a Dutch oil and gas company in Asia and Europe

We performed risk assessments on the FPSOs (Floating Production, Storage and Offloading) operated by the client for oil and gas producers worldwide to achieve country regulation compliance.



Anadarko seeks our produced water support in Utah

Our engineered and constructed produced water management and treatment systems at three locations in the Natural Burtes field, where injection wells have run out of capacity.



Risk-Based Corrective Action (RBCA) Study for Petrobras gas exploration in the Peruvian Amazonian forest

The characterization involved barite-bearing soils and waters coming in contact with spent drilling mud and cuttings during gas wells drilling. Based on human health and ecological risk analysis we recommended corrective actions.

Our Company is a Top Performer in All Things Water /

Engineering News-Record Global Sourcebook, December 15, 2014

#1 Top 50 International Design Firms in Sewer

#1 Top 15 International Design Firms in Sanitary and Storm Sewers

#2 Top 25 International Design Firms in Wastewater Treatment

#2 Top 25 International Design Firms in Water Treatment and Desalination

#3 Top 50 International Design Firms in Water Supply



We're active members of the communities we serve. That's why at MWH, now part of Stantec, we always **design with community in mind.**

Our community unites approximately 22,000 employees in over 400 locations across six continents. Our work as architects, engineers, and consultants from initial project concept and planning through design, construction, and commissioning begins at the intersection of community, creativity, and client relationships.

Our local knowledge and relationships, coupled with our global expertise, qualify us to go anywhere to solve clients' challenges in creative and personalized ways. Visit us at mwhglobal.com and stantec.com, or find us on social media.



We provide responsive service and expertise from offices around the globe:

North America, Latin America, Europe, Africa, India, the Middle East, Asia and the Pacific



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