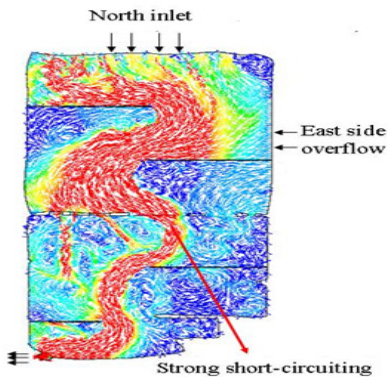


Sewer wastewater disinfection and outfall design and evaluation



Tailings pond design optimization to optimize sludge settling / re-suspension

Environmental Hydraulics and Dispersion Modeling

Protecting and improving the quality of our environment today requires innovative design solutions that establish compliance with ever-expanding and more stringent regulations. Modeling provides a cost effective means to optimize engineering design, and evaluate the performance of environmental structures and devices before they are constructed.

Hatch Specialized Engineering Analysis & Design Group (SEAD) has been extensively used the advanced computational fluid dynamics (CFD) modeling technology to provide accurate prediction of the flow hydraulics, pollutant transport and dispersion, and thermal dispersion for the environmental structures.

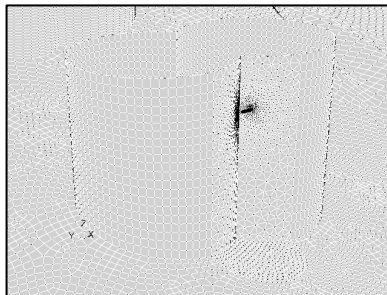
Hatch has a strong track record in performing one-, two-, and three-dimensional numerical modeling to provide engineering solutions in the following fields:

- Desalination plant Intake/outfall
- Power plant Intake/outfall
- Water/wastewater treatment
- Tailings and pond treatment
- Stormwater system
- Air dispersion and pollution control
- Pump station design
- Spillway and discharge systems
- Fish passage and protection

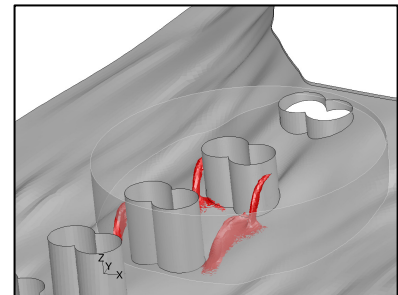
PROJECT EXPERIENCE

Reverse Osmosis Plant Effluent Discharge Dispersion Modeling & Diffuser Design Optimization for a South African Client

CFD modeling was used to ensure that an optimal diffuser design based on acceptable water quality target values was achieved thereby meeting the requirements of imposed risk mitigation measures



Length scales between 5mm and 2000mm accommodated within the 220m x 220m x 20m domain



Surface of 100x achievable dilution based on salinity assessed within a 50m radius of the principle brine discharge point

About Hatch CFD Solutions:

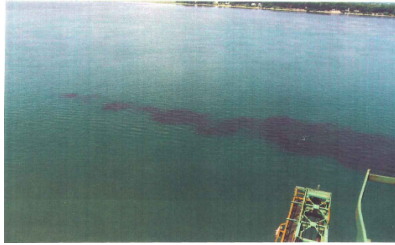
Hatch SEAD Group has a strong track record in applying Computational Fluid Dynamics (CFD), an advanced numerical modelling tool, to real engineering problems where simple analysis and "rule-of-thumb" engineering are inadequate. CFD also adds value by minimising the need for pilot plant testing and in-plant trials, increasing confidence, and reducing technological risk.

Over the last 15+ years, Hatch SEAD Group has been extensively applied CFD in the following areas:

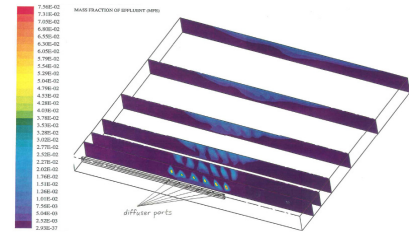
- Furnaces and Converting Vessels
- Fluidised Beds and Reactors
- Autoclaves and other pressure vessel equipment
- Off-gas Systems
- Liquid and gas mixing systems
- Fume Control Systems
- Mineral processing and handling equipment
- Water resources and water Treatment systems
- Environmental & atmospheric dispersion
- Burner/combustion system design
- Auxiliary Equipment
- etc.

Wastewater Effluent Discharge and Dispersion in River (QIT, Quebec, Canada)

The CFD modeling and experimental studies were performed to investigate the reasons of the buoyant effluent fume. Alternative discharge options were investigated to minimize environmental impacts.



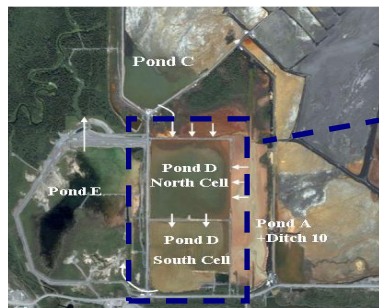
Effluent fume in River



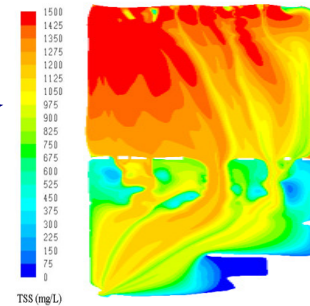
CFD simulated the effects of diffusers on effluent fume changes

Optimization of Tailings Pond Design to Improve Effluent Quality (Xstrata Copper- Kidd Metallurgical Site, Timmons, Canada)

3D CFD modeling was performed to investigate the Tailings Pond flow hydraulics, sludge settling and resuspension. Model output has been validated. The effects of coagulation treatment, flow control and baffling was evaluated to minimize environmental risk and operating costs.



Tailings Management Area (TMA) layout



Contours showing the Total suspended solid (TSS) concentration profile