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# **Mine Tailings Dewatering Polymer Hydration**

**Alberta Oil Sands Client**

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# Alberta Oil Sands Client

## Mine Tailings Dewatering - Polymer Hydration

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### BACKGROUND:

ClearBakk has expertise in polymer hydration and water treatment design / package construction with a proven track record serving a wide range of clients in Western Canada and across North America.

ClearBakk was approached by a major client in Alberta to design and provide a polymer hydration plant for accelerated mine tailings dewatering. ClearBakk successfully delivered the largest polymer hydration plant in the world in terms of dry polymer throughput .



### CHALLENGES:

- The largest polymer hydration plant capacity in the world.
- Shipping restrictions on maximum building weight and dimension posed a unique challenge during equipment selection and system design.
- High required plant turndown ratio.
- Difficulties of handling and hydration polymer due to its unique physical and chemical characteristics.
- Schedule constraints, just over a year for design, construction and commissioning.
- Climate challenges of Alberta / Canada as well as the regulatory requirements.

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### **SOLUTIONS:**

- Compact design to meet the transportation restrictions, minimizing the footprint and transportation cost.
- Optimized use of trains allows for a very low minimum plant output while still being able to achieve a high maximum output.
- Polymer wetting, dissolving, mixing, ageing and solution feeding are done under very specific, controlled conditions to avoid system plugging, process control issues or hydration failure.
- Executed projects fast while maintaining the easy and fast line of communication with the client.
- Minimum on-site work and time. Considered climate and regulatory requirements factors during design and schedule planning.

### **ADVANTAGES:**

#### **System:**

- Modularized packages, easy transportation, minimized work on site.
- Compact design, minimize the foot print.

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## SYSTEM OVERVIEW:

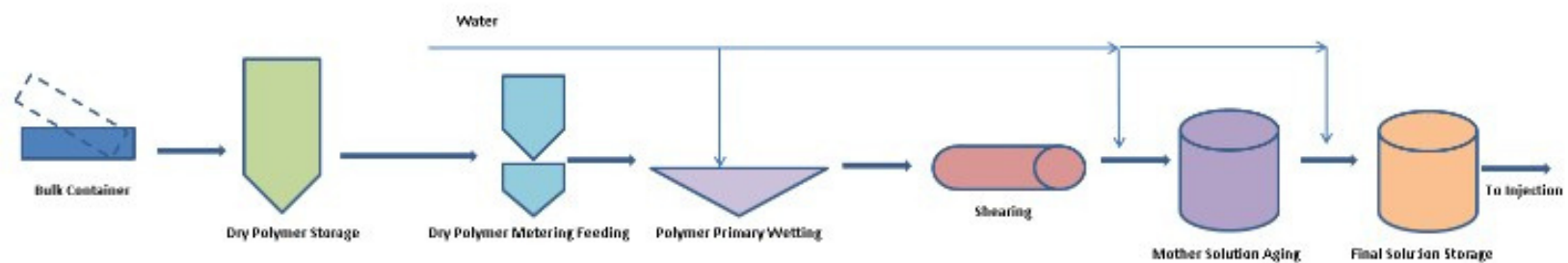
### Design Criteria:

- Final Solution Injection Flow Rate: 400 to 1500 m<sup>3</sup>/day
- Final Solution Concentration: 0.45-0.65 w%
- Final Solution Discharge Pressure: 800 - 3200 kpa
- Footprint: around 9270 m<sup>2</sup>



## ADVANTAGES:

### Process Schematic:



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### PLANT OVERVIEW:

Polymer wetting, dissolving, mixing, aging and solution injection were engineered to provide a consistent supply of homogeneous polymer solution at the desired concentration. Uptime is maintained through proper system design, preventative process monitoring, automated flushing, and proprietary dust capturing technology.

### 7 Modularized Indoor Packages:

- Dry polymer transfer blowers ( with electrical room)
- Polymer wetting and shearing package (with electrical room)
- Mother solution dilution and transfer package (with electrical room)
- Final solution injection package
- Instrument compressors ( with electrical room)
- Injection electrical room
- Diverter valves kits package

### 4 Outdoor Process Units:

- Blower dehumidification and heat exchanging
- Dry polymer unloading and storage
- Mother solution tankage
- Final solution tankage

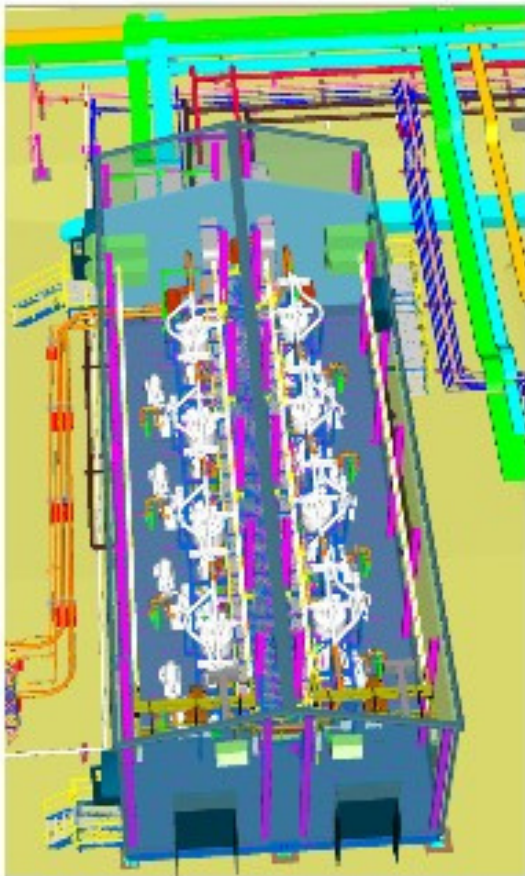
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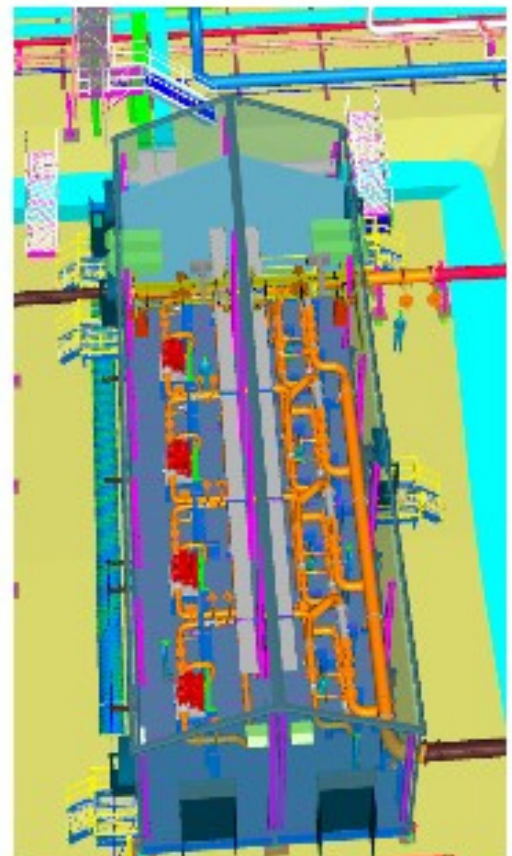
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### MODULARIZED PACKAGES:

- Easy to install, minimal inter-module connections, minimal site work.
- Optimized design, and minimized footprint, and transportation cost.
- Numerous safety and operator-friendly features.
- Innovative solutions for oversized buildings (one building spits into two, see the diagram below).



**Primary Wetting and Shearing Package**



**Mother Solution Dilution and Transfer Package**