

# Kainai Reserve – St. Paul, Alberta, Canada

Treatment of well water to remove iron and arsenic using MEL type filters as polishing sand filters (PSF's) and provide pretreatment for removal of dissolved solids using reverse osmosis.



Kainai Reserve – St. Paul Water Treatment Plant

## Design constraints and objectives:

- First Nations Community.
- Well water with iron, arsenic and high total dissolved solids.
- Iron and most arsenic removed by MEL filters.
- Remaining arsenic and dissolved solids removed by reverse osmosis.
- MEL polishing filters intended to reduce suspended solid load to reverse osmosis (minimize membrane maintenance and extend membrane life by several years).
- Two MEL filters each with minimum operating capacity of 6,000 L/h or 144,000 L/day. (Maximum operating capacity of each filter is 8,000 L/h or 192,000 L/day)
- Manual operation.
- Minimum complexity – Local operator with minimum training or experience.
- Minimum backwash. Wastewater disposed of in sewage lagoon.
- No media replacement.
- Performance verified using pilot testing on site.

## Treatment Process

- Wells to treatment plant in response to water storage requirements.
- Addition of sodium hypochlorite (oxidize iron).
- Contact tanks (adsorb arsenic to oxidized iron).
- MEL polishing filters to remove iron and arsenic.
- Filtered water storage.

- Reverse osmosis to remove dissolved solids.
- UV disinfection.
- Chlorination.
- Treated water storage and distribution.



**MEL filters**



**Reverse osmosis**

- Two (prefabricated stainless steel 2m x 4m x 2m) MEL-PF filters.
- Each filter can treat a maximum of 8,000 L/h. (Surface loading of 1000 L/m<sup>2</sup>/h when used as polishing filters).



**Pilot testing treatment method.**



**Filters and tanks being transported to site.**