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Crown Iron Works-Mortenson Site Tower Extension

It is Crown Iron Works's intention to construct a 100' tower on the proposed Mortenson site to provide pilot plant functionality for our Liquids group. Crown's current facility has neither capability nor space for piloting activities for Liquids, which is a main driver for Crown's relocation.

Activities Within the Tower

Crown Iron Works's Liquids group designs world class equipment that provides solutions to vegetable oil processors. The new Innovation Center will provide space for traditional vegetable oil processing:

- Refining
- Degumming
- Bleaching
- Winterizing & Dewaxing

The additional height is required to allow for proper processing of a variety of vegetable oils (soy, canola, sunflower, palm, palm kernel, etc.) in the fields of:

- Distillation/Deodorization
- Fat Splitting/Fractionation
- Biodiesel Production
- Glycerin Production

Distillation/Deodorization
Removes off-flavor components under high temperature and vacuum. This is an important technology in aiding developing countries feed their people in a cost-effective manner.

Fat Splitting/Fractionation
Separating high-melting and low-melting fractions of oils provides customers with their desired product characteristics.

Biodiesel Production
Converts triglyceride chains in the oil to biodiesel fuel.

Glycerin Production
Fat splitting byproducts are converted to glycerin utilizing vacuum distillation. Glycerin is used as a base in the soaps and cosmetics industries.

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Equipment Requirements

The equipment required for these processes must be 100’ tall as the technology relies heavily on gravity flow. Pumping the material through a series of smaller columns disrupts the processes and does not provide the desired results.

Throughput is a function of the column diameter. As such, Crown is looking at installing four (4) 18” diameter columns. This will provide considerably less capacity than an industrial plant, but still allow us to demonstrate what makes our equipment successful. The bulk of the space in this tower will be a stairwell that allows operator access to the tops of the columns as well as intermittent stages to view process conditions.

The interior of the tower will have steam space heaters similar to units used in garages for area heating. Building exhaust fans and venting will provide natural airflow. There will be no HVAC system installed.

It is not expected that workers will spend large amounts of time in the building. Outside of occasional maintenance, typical operations will require less than 15 minutes of building access. There will be no office spaces and equipment will be instrumented to allow for remote monitoring and datalogging of process conditions.

Materials Handled

Materials will be pumped from totes or small tanks into the tower area. The substances used are typically a vegetable oil and a solvent such as Hexane, Methanol, Ethanol, or Acetone. Less often, dilute caustic or acidic solutions or other solvents such as Ethyl Acetate, Butyl Acetate, Toluene, or Pentane may be used.

Vapor recovery and heat economization are used in these processes so no gas emission is expected.

Materials not consumed in the processes will be re-used. The final products are planned to be returned to the customer for their further analysis. These products are typically biodegradable and can often be sold to other processors as opposed to wasting them outright.

It is expected that we will have less than 50 gallons of solvent in process at any time and maximum tower-related solvent storage of two totes (~700 gallons).