FQE Chemicals

TECHNICAL BULLETIN

FQE NORM-Precip

Effective removal of dissolved radioactive salts in aqueous streams

Product Data

<table>
<thead>
<tr>
<th>Property</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk density</td>
<td>9.22 lb/gallon (1105 kg/m³)</td>
</tr>
<tr>
<td>Solubility</td>
<td>Complete in Water</td>
</tr>
<tr>
<td>Flash point</td>
<td>&gt; 200°F (93°C)</td>
</tr>
<tr>
<td>Approximate storage life</td>
<td>1 year</td>
</tr>
</tbody>
</table>

Standard Package

55 US gallons (208 litre) closed head poly drum, tote bin, or bulk.

FQE® NORM-Precip functions by co-precipitation and enhanced coagulation of radio-toxic Radium, and other radioactive salts, as separated water-insoluble salts.

The water-insoluble salts can then be removed by gravity differential or other means of filtration. Radioactive-free water produced from FQE NORM-Precip application may then be recycled back to process or disposed of through normal waste water treatment facilities.

Application

As a water soluble product, FQE NORM-Precip is applied directly to water streams containing dissolved radioactive materials. It is recommended that FQE NORM-Precip be added to the affected water prior to the dewatering process. Depending on the amount of radioactive elements present, typical concentrations of FQE NORM-Precip to be added to the water stream will range from 1-2% of the volume being treated, upwards of 4% if required to clear the water of all radioactive presence.

Collection of the remaining radioactive solids removed from the water must be properly handled according to local statutory regulations.

Safety

FQE NORM-Precip is generally regarded as safe. FQE NORM-Precip is not teratogenic or carcinogenic and is not mutagenic in animal studies. FQE NORM-Precip is not biodegradable containing no organic compounds.
CASE HISTORY

**Rail Car Chemical Decontamination & Change of Service**

**Results Achieved**
- Over 20 times, saving thousands of dollars in manpower and equipment costs during the cleanout phase
- 50% reduction in down time
- Equipment was oil-free

**Chemicals Utilized**
- LEL-V
- H2S
- Solvent-H
- ASPHALTENES & WATER, SOLIDS
- UNDERFLOW
- VAPOUR
- PLATE
- FEEDWELL
- VERTICAL
- LIP
- LAUNDER
- 60˚
- FEED & SOLVENT
- BITUMEN
- PRIMARY SEPARATION SETTLE
- Solvent-H
- LEL-V
- ASPHALTENES
- WATER, SOLIDS
- UNDERFLOW
- VAPOUR

**Equipment Cleaned**
- Three Stripper Towers
- Coker Fractionator
- Refiner was looking to conduct a change of service on their rail cars
- Required a lot of manpower due to limitations in the cleaning application at petroleum refinery located in Delaware
- Needed to remove the crude oil in the rail cars to clear fluid (ethanol) service
- Previous turnarounds required a lot of manpower entry and de-oiling, and would end up delaying manpower entry an additional 12-24 hours
- A service company utilized FQE® Solvent-ME, ES, and FQE® Pyrophoric for their turnaround operations and saves 1 day of outage time

**Cases Studies**

**CASE HISTORY**

**Degassing of a Coker Fractionator**

**Results Achieved**
- Significantly reduced mechanical fouling
- Dissolving heavy sludge in the cleaning costs and timelines by 30% for fractionator bottoms cleaning

**Chemicals Utilized**
- LEL and H2S
- Solvent-H and FQE® LEL-V
- FQE® Pyrophoric
- Process saved 12-24 hours of outage time; manpower entry and de-oiling
- Equipment was oil-free

**Equipment Cleaned**
- Three Stripper Towers
- Coker Fractionator
- Coker Fractionator bottoms
- A large Canadian oil sands operator utilized FQE® Solvent-H and LEL-V in a new process
- Prior to chemical application, it was confirmed that there was a lack of fluid applications, a new process was chosen; the FQE chemical decontamination and change of service succeeded

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