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The high technology Sentro's Chemicals (SENTRO–HCOX, SENTRO–OX) reach four main objectives:

- Transforms all pyrophoric products into unreactive compounds, avoiding any type of fire during the opening of the vessels.
- Reaches zero L.E.L, eliminating the light and heavy hydrocarbons content.
- Eliminate H₂S and Benzenes below 1 ppm
- Warrants the reliability of the vessels metallurgy and its internal components, avoiding any type of corrosion forms during the chemical cleaning.
Special formulated Chemicals are injected into saturated steam.
Continuous injection of fresh chemical.
Continuous monitoring of hydrocarbon levels.
De-oiling, degassing & Sulfide oxidation (transformation of all Pyrophoric compounds).
Minimal changes in operational steam-out procedures.
The Barrel Pumps should be capable of overcoming the Steam pressure. Remember that the Tower will be Vented so that the steam should be open ended.

Crude Distillation Unit
Crude Column Decontamination

Samples

Air Operated Barrel Pump

Crude Column

To Drain Condensate

150 # Steam

Barrel Pump

150 # Steam

To Drain Condensate

To Relief

Finish to Drain

Overhead Accumulator

Steam

Stove

Diesel
What is the Challenge?

- Clean, decontaminate with reliability
- Minimize the risk exposure of fire and toxic effects
- Keep high level of safety during the opening of vessels
- Apply engineering on variables control

### Vapor Phase Decontamination

<table>
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<tr>
<th>Sample Point</th>
<th>Sample Number</th>
<th>Date</th>
<th>Accumulated Time</th>
<th>Sample Time</th>
<th>Temperature (°C)</th>
<th>pH</th>
<th>H₂S ppm</th>
<th>LEL %</th>
<th>CO ppm</th>
<th>SENTRO's chemicals ppm</th>
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Vapor Phase Injection Manifold
Minimizes Down Time
- Reduces Steam Out Duration
- Warrants the reliability of the vessels metallurgy and its internal components, avoiding any type of corrosion forms during the chemical cleaning
- Reduces Maintenance Activity Before and After Decontamination Process

Environmentally Friendly
- Biodegradable
- Extremely Low Chemical Oxygen Demand (COD) Waste
- Does not make Stable Emulsions
- Minimizes the amount of waste generated
Picture of Coker Gas Plant, Amine Absorber & Crude tower cap tray (Vapor Phase Only)
Pre Flush & Post Flush Advantages

**Pre Flushing**
- Helps reduce surface tension and remove free solids.
- Penetration and softening of Atmospheric Resid.
- Assures chemical contact of solids in packed sections and dead spots.

**Post Flushing**
- Assures chemical saturation and neutralization of pyrophorics in large packed sections.
- Helps to carry out free solids.
- Will rinse out residual chemical and reduce odor.
- Oxidized rinse water helps with effluent disposal.
Steam is travelling upward. This carries chemical throughout the equipment, even to the underside of trays. Condensation is constantly working downward—also carrying chemical. This promotes penetration and oxidation everywhere in the unit.

Pre-flushing and post-flushing with chemical allow additional oxidizing and washing treatment.

It is possible still to have untreated deposits deep within some zones, but everything that can be reached WILL be reached.
Picture of vacuum column LVGO packing and HVGO packing section (Vapor Phase with rinse)
Vapor Phase/Circulation Combination

- Bottom section of process equipment is liquid filled and circulated with either process pumps if possible or diesel driven high volume circulation pumps.
- Top section or OVHD is vapor phased through side stripper or temporary steam connection.
Vapor Phase/Circulation Combination Advantages

- **Effective**
  - Penetration and softening of heavy residuals and asphaltines.
  - Assures chemical contact and reduces the possibility of channeling.
  - Will suspend and remove coke scale and particulates.

- **Efficient**
  - Results are equal to a cascade or full circulation but with less effluent volume.
  - Fewer mechanical connections and less maintenance time.
Vacuum Column Bottoms & Bottom Resid. Exchanger (Combination Circulation & Vapor Phase)
The vessel is flood filled with chemical and water.
Steam is added to heat the solution and agitate sludge or solids.
A Typical Boil-Out Method

Vapor-Phase Area

Water Layer - 15~20% Fill

Sludge Layer

Steam

Vent

Water & Chemical Fill

Vapor-Phase Area

Water Layer - 15~20% Fill

Sludge Layer

Steam and Drain

Water & Chemical
Effective

✓ Covers all sludge layers and assures chemical contact.
✓ Immediately reduces odor concerns.
✓ Great application for Mercaptan storage vessels and Fuel Gas KO Drums.

Efficient

✓ Works well in vessels that have limited Tie-in locations or steam connections.
✓ Allows fewer temperature restrictions.
The best solution for the project. 
Sentro Technologies believes that taking an open approach to the project at hand can increase efficiency and effectiveness. Our selection of chemistries gives us the ability to change our planning procedure providing the customer with the best result as safely and effectively as possible.
Major Clients in:
- USA
- Latin America
- Europe
This concludes our presentation
Thank you for your time

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