

## Honey, Kelly

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**From:** Curtis, Jeff [Jeff.Curtis@safety-kleen.com]  
**Sent:** Tuesday, August 31, 2010 8:41 AM  
**To:** Honey, Kelly  
**Subject:** FW: "EC Information"  
**Attachments:** EG Recovery at S-K EC.pdf

Hi Kelly,

Attached is the information regarding the process for separating comingled ethylene glycol and used oil at our East Chicago Re-refinery. If you need any more info please do not hesitate to contact me. Also, when do you think we will receive your inspection report?

Thank you, Jeff

**Jeff Curtis**  
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**From:** Zawodni, Denny  
**Sent:** Friday, August 27, 2010 9:12 AM  
**To:** Curtis, Jeff  
**Subject:** RE: "EC Information"

Attached is a description of the distillation process for recovering EG.

In 2009, S-K EC recovered 1,330,162 gals of EG.

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**From:** Curtis, Jeff  
**Sent:** Thursday, August 26, 2010 4:03 PM  
**To:** Zawodni, Denny  
**Subject:** "EC Information"

Denny,

Do you have information that you could send me regarding East Chicago's distillation process for separation of Ethylene Glycol from comingled oil? Also if you have any information as to the volume recovered it may be helpful. This is for submission to the FDEP to address a question during a recent inspection at our Tampa, FL facility.

Thanks,

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Ethylene glycol and used oil commingled with ethylene glycol are collected by Safety-Kleen branches across the country and shipped to Safety-Kleen Systems, Inc. in East Chicago, IN (S-K EC). State regulations vary on the management of ethylene glycol. S-K EC does not receive any ethylene glycol except that which is already commingled with the used oil. Everything coming into S-K EC is received as used oil.

In the first step of the re-refining process, the used oil is heated and the pH is adjusted with caustic, prior to being fed into dehydration. Dehydration removes nearly all the water and light ends including solvents, gasolines etc. Since the temperature in the dehydration unit is above the boiling point of water, the water in the feed vaporizes upon entering the unit. Gasoline and other low boiling solvents and hydrocarbons which are present in the oil also vaporizes at this temperature. The oil in the dehydration unit is continuously drawn into the dehydration re-boiler circulation pumps. These pumps re-circulate the oil through the re-boilers and them back into the top of the dehydration unit. The oil exiting the process will be free of water (< 1%) and heated to a temperature of  $\approx 260^{\circ}\text{F}$ .

This oil is directed to a vacuum fuel stripper. Two streams are generated from this unit. As part of internal quality control and our ISO 9000 program, samples from these streams are analyzed by our laboratory on a regularly scheduled basis. While the analysis is not specifically for ethylene glycol, if it is detected in either of these streams (through visual observation or by the analytical results that would indicate the presence of ethylene glycol), the streams are put back into the used oil feed tank to be fed back into the dehydration unit. (All product, as it is generated, is put into a guard tank and analyzed, before being put in a larger tank with approved product that can be sold.)

The water/light ends are directed to the Light Ends Recovery Tower (LERT). Contaminants in these wastewaters are removed by fractionation. Non-condensables and light fuels (low boiling components) concentrate in the Trim (upper) Section of the LERT. The Trim Section is designed to concentrate the low boiling fuel components as they leave the top of the LERT. These vapors flow into an air cooled condenser and are typically a combination of water, low boiling hydrocarbons and solvents. The vapors form two distinct phases which separate in an accumulator. The two phases are decanted and the water phase is reintroduced to the LERT.

The lower section of the LERT is designed to remove the ethylene glycol and high boiling components of the wastewater. By design, the ethylene glycol is drawn to the Lower Stripping Section (bottom) of the LERT. Ethylene glycol is drawn from the bottom by circulation pumps and removed from the LERT. These LERT Bottoms are put into tanks on the S-K EC facility.

The purified water is removed from the LERT in the Rectification (middle) Section. A side stripper removes any trace contaminants prior to discharge to S-K EC's wastewater treatment plant (WWTP).

The LERT Bottoms are characterized as follows:

- 70% - ethylene glycol
- 15% - water
- 5% - other (i.e., oil, metals, trace VOCs). There may be trace quantities of gasoline in the LERT Bottoms.

The facility ships LERT Bottoms to third party facilities for recovery of the ethylene glycol, which is used as antifreeze.