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## **Question 64: What are acceptable makeup water streams that can be used for coke cutting which will not affect the coke quality?**

**MAYO** (CITGO Petroleum Corporation)

With regard to coke quality, a lot of the available streams are acceptable. A few of the additional considerations to take into account are: Is this makeup water stream going to add overall load to my wastewater treatment facility? Is this new water? Is this water that I can recycle? Streams that are acceptable are: stripped sour water. If you are not reusing this water at your desalters or FCC wet gas scrubbers, then it would be an acceptable stream.

Refinery effluent water: If you have treated water that is nice and clean, consider hydraulics which allow you to bring it back to the front, if that is feasible. Waste heat boiler blowdowns and cooling tower blowdowns are the streams that are wasted from other processes and typically just sent to the wastewater treatment facility. So, after you look at your recycles, you can obviously go with well water or river water systems, if your water quality allows.

From a quality standpoint, refiners should be monitoring the TSS (total suspended solids) on their cutting water. This comment is just a reminder to people to make sure they consider the TSS of their makeup stream to ensure it does not cause the TSS of the overall stream to increase above the manufacture's recommendation. Make sure that the stream you bring in will not cycle up that cutting water system. Most of the cutting tool manufacturers suggest staying under 2,000 ppm TSS to minimize the erosion on your cutting nozzles. So that is a consideration to take into account. And then naturally, any of the bad contaminants in your water stream should be evaluated and reviewed with your Environmental group: You do not want to bring in any makeup streams with hydrocarbons or any other contaminants that will give you air quality issues.

**EBERHARD LUCKE** (CH2M)

The answer to this question depends on the type of coke that is produced in the unit. Anode grade coke and needle coke production have much higher requirements regarding coke quality than fuel grade coke production.

For fuel grade coke production, I have seen many units using stripped sour water as makeup water for the cutting system. In some cases, there were more concerns regarding the impact on the hydraulic cutting system itself (corrosion) than on the coke quality. The quality of the sour water also depends on the type of crude oil that is being processed in the refinery. In some cases, stripped sour water was rejected as cutting water makeup due to the high level of contaminants that were not stripped out of the water.

For anode-grade coke production, stripped sour water may still be suitable as makeup water, depending

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on the type and quantity of contaminants that can be expected.

**VILAS LONAKADI** (Amec Foster Wheeler)

The selection of makeup water streams for coke cutting is made based on the quality of the streams. Traditionally, non-phenolic stripped sour water or utility/raw water has been used as makeup water. In terms of quality, the H<sub>2</sub>S Content, pH, chloride levels, total solids content, CaCo<sub>3</sub>, in terms of hardness and alkalinity, need to be monitored for the makeup water and decoking water to the required levels. These qualities of the makeup water affect more – in terms of the material selection for the downstream equipment such as coke cutting pumps, quench water pumps, pipelines, odor, and environment – rather than the quality of coke itself.

**BRENT MAYO** (CITGO Petroleum Corporation)

With regard to effects on coke quality, most available makeup water sources are acceptable. The makeup water stream should be evaluated to determine if the source would create “additional” water that would increase hydraulic load on the wastewater effluent treatment facility. Next, prioritize the available streams based on your facilities’ quality, starting with the cleanest options. Examples are:

1. Stripped sour water [if not already in use at desalters or FCC WGS (wet gas scrubber)]
2. Refinery effluent,
3. Waste heat boiler blowdown,
4. Cooling tower blowdown, and
5. Well/river water.

When evaluating available water sources, quality concerns can include:

1. Low Solids: Ensure that the makeup source keeps the overall cutting water TSS below 2000 ppm (typically recommended by the cutting tool manufacturer to minimize erosion of cutting nozzle).
2. The Absence of Hydrocarbons: Potential oily water sources should not be used to avoid emissions and downstream emulsions that may be difficult to separate. Prior to making any changes, verify your coke product specifications to ensure that changes in coke quality will not

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affect your ability to sell the coke.

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