

Ethanol Recovery from CO₂ Scrubber Bottoms

ICM offers economical method of capturing ethanol potentially lost in the CO₂ scrubber bottoms

One of the more frequent questions ICM fields about the production process is "Are we losing ethanol through our scrubber bottoms? And if so, how much?"

That answer depends a lot on your specific plant.



BACTERIAL BUILDUP

Bacterial infection and Methanator overflow are commonly seen in the cook water tank. While cook water batches can be treated, the temperature and feed streams are ideal for ongoing infection with ethanol-consuming organisms.

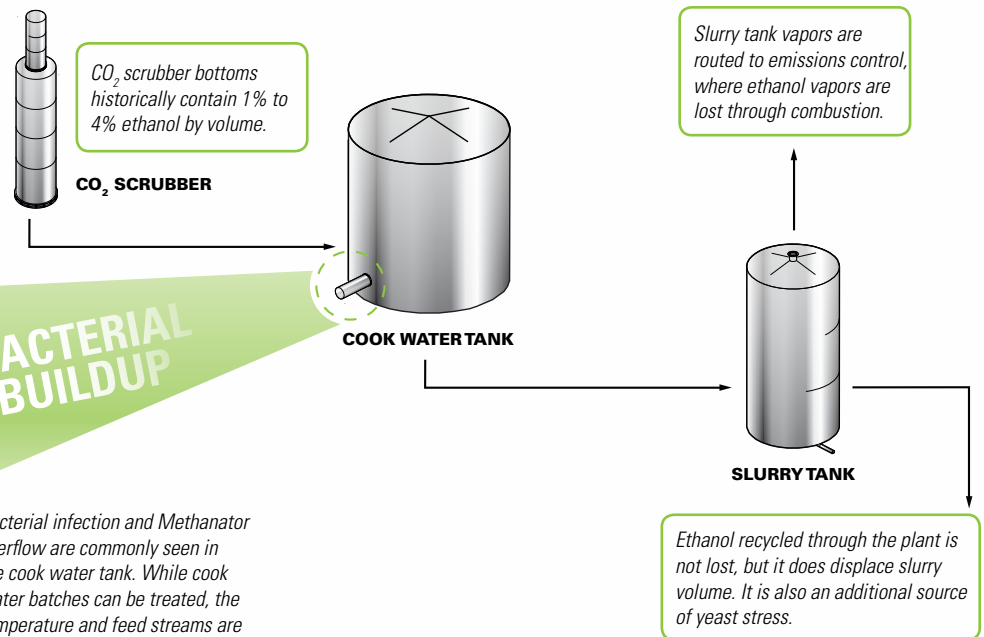
This photo shows the bacterial buildup/sludge being cleaned from a cook water tank.

Is it lost? Is it reclaimed?

Scrubber bottom water contains between 1% and 4% ethanol by volume. Significant ICM field research has shown that not all ethanol is reclaimed when the scrubber bottom water is recycled through the plant. Our ICM-designed plant flows show that this ethanol is either:

- **Recycled through the plant** as part of cook water makeup
- **Consumed by ethanol-eating bacteria** within the cook water tank
- **Consumed as organic material by methanator** overflow within the cook water tank
- **Lost within vent/vapor flows** from the slurry vent to the emission control system

Common sources of ethanol loss from CO₂ scrubber bottoms





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Contact us for a quote!

Learn more about this and other services ICM offers to meet your plant's needs! Call our Customer Service department today.

877.456.8588

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Lost ethanol is lost opportunity

Ethanol that is either consumed by bacteria in cook or incinerated in your emission control equipment is money that doesn't contribute to your bottom line. And even the ethanol that is recycled through the plant has a cost – it displaces space that otherwise would be occupied by slurry or mash. Based on field research and testing, ICM has compiled data to help quantify potential loss. At a plant running near 55 MMGPY:

- **Overall ethanol flow through CO₂ scrubber bottoms** can be as much as 150 gal/hr, or more than 1.25 million gal/yr. That equates to more than \$3 million of ethanol (assuming \$2.40/gal) running through your scrubber bottoms annually that has potential for loss.
- **Cook water tank bacteria** – Should your plant have an issue with this common contaminant, as much as 60 gal/hr (500,000 gal/yr) could be consumed through bacterial activity. That could be \$1.2 million worth of ethanol that won't be loaded out at your facility.
- **Loss through venting** – Ethanol that is vented through the slurry tank is another potential drain on your production. Loss can be as high as 3.5 gal/hr, or nearly \$72,000 per year combusted in emissions control equipment rather than sent out to your buyers.
- **Ethanol recycled through Cook Water Tank** – Even if it's not eaten or burned, ethanol recycled through the cook water tank (and therefore displacing slurry makeup) can be as high as 100 gal/hr, or more than one full fermenter's worth at nearly 850,000 gallons annually.

Reclamation rates of 99%

ICM offers a simple, straightforward, cost-appropriate solution to address this potential for ethanol loss. For around \$150,000 (or nearly a 2-year ROI in relation to slurry vent loss), ICM can provide a new system that has been shown to reclaim more than 99% of all ethanol in the CO₂ scrubber bottoms.

Improved water balance control

ICM's solution removes CO₂ scrubber bottoms from the cook water tank makeup, so CO₂ scrubber feed water can be adjusted to meet only emissions/scrubbing needs. ICM also adds a new control valve to the cook water tank feed so that the plant still has the necessary water control.

Not convinced?

Not a problem. ICM can evaluate your process to quantify your ethanol loss, helping you decide the value of this service to your facility. Evaluation work is done on a T&M basis, and may require some pre-preparation from your maintenance staff, such as the addition of a few sample ports.



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