Campaign 14

Operations Summary

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Cellulosic Research and Demonstration Plant

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Operations - Campaign 14
05/05/2015 – 05/09/2015

Operation problems & resolutions:

1. Liquefaction sterile sample port
    a. Problem:
        i. While filling the liquefaction tank with UV water prior to the start of liquefaction we noticed that the sample port was leaking water. We believe the reason for the leak was excessive wear on the diaphragm from the method used to take a sample, which involves mixing steam and slurry at the face of the diaphragm. The cavitation likely induced wear which eventually led to failure.
    b. Resolution:
        i. We cannot avoid using the current sampling method, so we purchased and installed a diaphragm made of a stronger material.
    c. Status:
        i. Resolved.
2. Liquefaction pH Probes
    a. Problem:
        i. Both pH probes were reading high impedance faults once inserted into the empty tank. They both calibrated fine, but for some reason the atmosphere inside the tank was causing high impedance.
    b. Resolution:
        i. Once they were covered with liquid they read fine.
    c. Status:
        i. Resolved.
3. Xylose utilization
    a. Problem:
        i. Very little xylose was consumed during fermentation.
    b. Resolution:
        i. We are not quite sure what the reasoning is, but we believe it might be one of the following reasons:
            1. Inadequate or inaccurate air supply.
                a. An informal calibration was performed on the spargers after the campaign but the results varied greatly. It was decided that another test was not necessary.
            2. A weak seed due to sugar depletion.
            3. A high glucose/xylose ratio in the slurry.
                a. The liquefaction tank was on stand-by for over 12 hours prior to fermentation. This led to total sugar concentrations of over 80 g/L.
    c. Status:

        i. Not yet resolved.

4. Propagator 3B sparger
    a. Problem:
        i. The indicator for the sparger was stuck at the top of the graduated column prior to the start of the campaign. There is something geometrically off which causes the indicator to get stuck to the column walls, which might affect the accuracy.
    b. Resolution:
        i. A procedure was established to avoid high flow rates of air through the sparger, such that the indicator stays in the bottom half of the flow meter column. It was decided that a calibration was not necessary.
    c. Status:
        i. Resolved.