Shift Handover Report

Refinery: Sandy Point Refinery (150,000 bpd capacity)

Date: September 26, 2024

From: Sarah Chen (Night Technician)

To: Jack Martinez (Day Technician)

Subject: Optimization of Crude Preheat Train Equipment H-117 (Shell and Tube Heat Exchanger)

Good morning Jack,

I hope you're well-rested and ready for another day shift. We've made significant progress on the H-117 optimization project during the night shift. Here's a detailed breakdown of our activities, findings, and recommendations:

Night Shift Activities and Findings:

1. Completed thermal modeling in HTRI Xchanger Suite:

- Finished model setup using current operating parameters

- Ran simulations with various flow rates (80%, 90%, 100%, 110% of current) and inlet temperatures (±5°C, ±10°C)

- Key results:

a) Current efficiency: 82%

b) Optimal flow rate: 105% of current (increased from 450 m³/h to 472.5 m³/h)

c) Optimal inlet temperature: +7°C (increased from 95°C to 102°C)

d) Projected efficiency improvement: 6% (new efficiency 88%)

2. Analyzed pressure drop data:

- Reviewed 6-month historical data

- Current pressure drops:

a) Shell side: 0.68 bar (spec: 0.5 bar)

b) Tube side: 0.92 bar (spec: 0.8 bar)

- Both sides showing higher than spec pressure drops, indicating potential fouling

3. Performed fouling analysis:

- Last three cleaning cycles: March 15, 2024; June 22, 2024; September 1, 2024

- Current fouling factor: 0.00043 m²·K/W

- Design fouling factor: 0.00035 m²·K/W

- Fouling factor 22.8% higher than design, suggesting cleaning may be needed soon

4. Prepared preliminary report on findings:

- Identified bottlenecks:

a) Suboptimal flow rates

b) Excessive fouling

c) Non-optimal inlet temperature

- Immediate efficiency improvements:

a) Increase flow rate to 472.5 m³/h

b) Adjust inlet temperature to 102°C

- Long-term modifications:

a) Install online cleaning system

b) Upgrade tube inserts for improved heat transfer

c) Consider replacing with a plate heat exchanger for easier maintenance

5. Drafted implementation procedures:

- Safety precautions:

a) Perform LOTO before any physical adjustments

b) Monitor for any pressure spikes during flow rate changes

c) Use proper PPE for high-temperature work

- Required equipment adjustments:

a) Recalibrate flow control valves FCV-117A and FCV-117B

b) Adjust set point on temperature control loop TIC-117

- Monitoring parameters:

a) Outlet temperatures (TI-117C, TI-117D)

b) Pressure drops (PDI-117A, PDI-117B)

c) Heat transfer coefficient (calculated hourly)

6. Coordinated with maintenance:

- Scheduled inspection of tube bundle for next maintenance window (October 15, 2024)

- Requested quotes for online cleaning system installation

7. Updated PFDs and P&IDs:

- Added new sensor locations for improved monitoring

- Updated flow rates and temperatures based on optimization findings

8. Prepared briefing for day shift:

- PowerPoint presentation created with key findings and recommendations

- Stored in shared drive: X:\Optimization\H-117\2024-09-26\_Briefing.pptx

Additional Notes:

- Consulted with Dr. Elena Rodriguez at 02:30 AM regarding fouling mitigation strategies. She suggested exploring the use of anti-fouling additives in the crude feed.

- DCS alarm occurred at 23:45 for high differential pressure on tube side (PDI-117B). Alarm cleared after 10 minutes. Suspect momentary surge in feed pump. Please monitor closely during your shift.

- Lab results from midnight sample show increased salt content in crude feed (3.5 PTB, up from 2.8 PTB yesterday). This may contribute to accelerated fouling.

Next Steps for Day Shift:

1. Review and validate night shift findings, especially thermal modeling results.

2. Begin implementation of immediate improvements (flow rate and temperature adjustments).

3. Coordinate with operations to gradually increase flow rate, monitoring all parameters closely.

4. Contact crude supply team regarding increased salt content and discuss potential pre-treatment options.

5. Continue drafting long-term optimization plan, incorporating night shift findings.

6. Schedule meeting with refinery manager to present optimization project progress and get approval for long-term modifications.

Please let me know if you need any clarification on the above information. Good luck with your shift!

Best regards,

Sarah