Event I: Kiln Pier #1 Oil Temp - Lubrication

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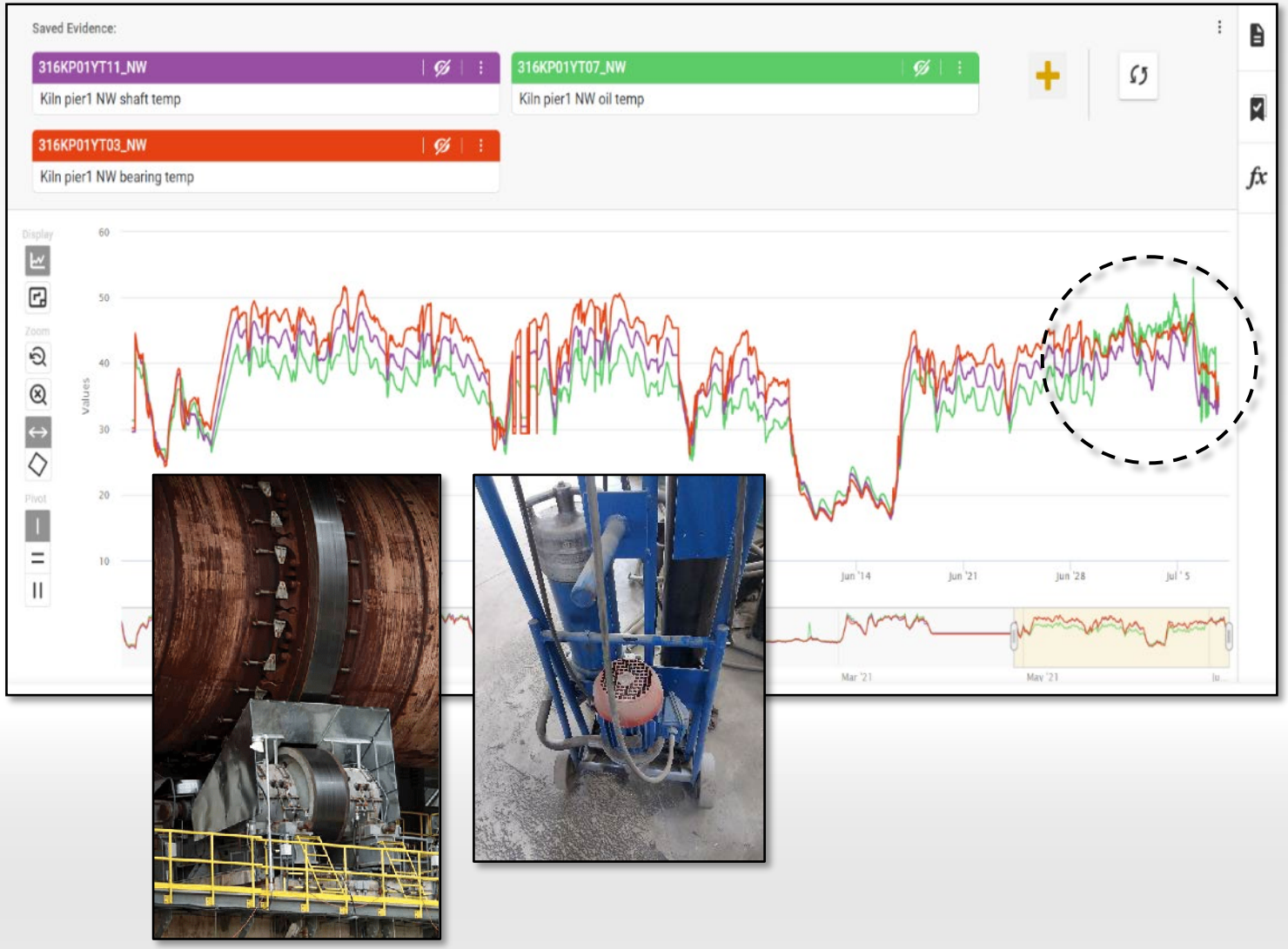
Event
- Temperature increase in Pier #1 of kiln (still within limits)
- No indications nor alarms in the plant control room

CemAI Event Feedback
- Field inspection of lubrication system and cooling system for leakages, flow or potential contamination issues. On-site inspection of instrumentation.

Maintenance Team Findings
- External oil leakage was found at the oil cooler.
- Bearing still not dry and oil level still in operational range (no level alarm triggered)
- Plant team isolated the cooler and refilled oil tank.
- Oil cooler replaced and full operation was restored

Value
- Up to $250k to replace kiln roller and bearing and kiln roller shaft repairs
- 4 days of kiln downtime



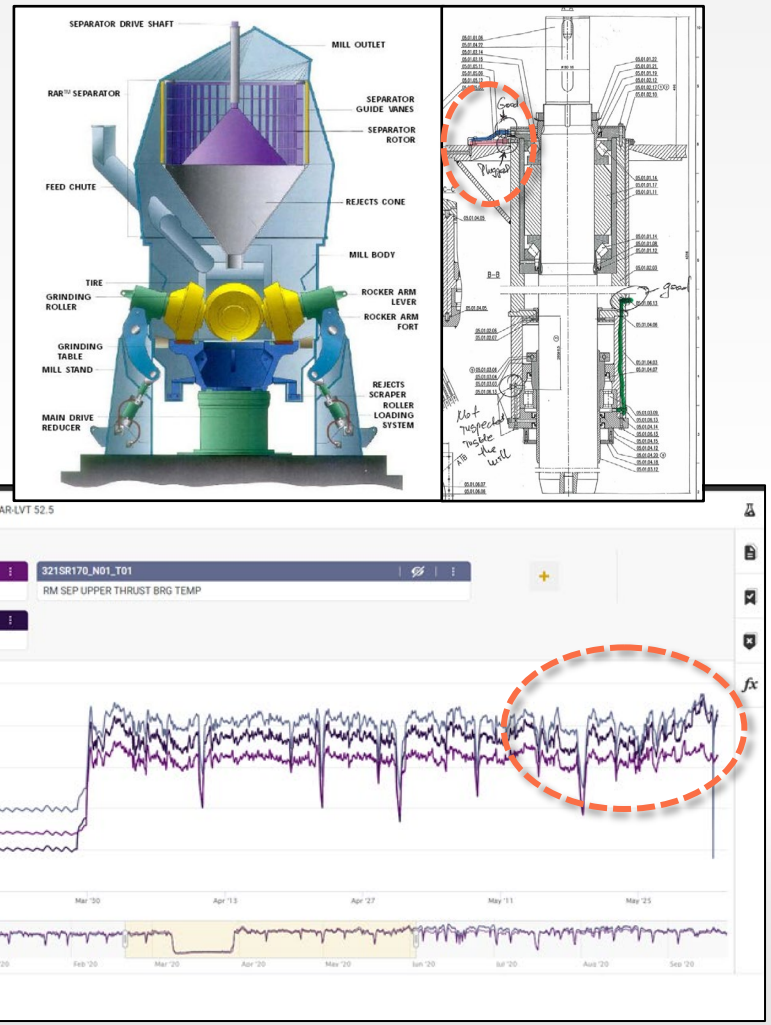
Event II: Vertical Roller Mill Separator

Event
- Moderate temperature increase in separator shaft bearings
- No indications (alarms) in the plant control room

CemAI Event Feedback
- Inspect automatic lubrication system
- Check for unusual vibration levels or noise

Maintenance Team Findings
- Grease distributor was found clogged and was replaced
- Temperature still elevated so it was suggested to disconnect all lines and check if lubricant is flowing
- One of the grease lines was found clogged and cleaned
- Bearing temperature back to normal levels
- Bearing damage avoided b/c event was captured at very early stages

Value
- **Up to $500k** to replace bearing cartridges and possible shaft repairs
- **2 days** of kiln **downtime**



Event III: High Speed Bearing - Vibration

Event
- Vibration increase on main reducer of kiln drive
- No indications nor alarms in the plant control room

CemAI Event Feedback
- Field inspection of drive and reducer.

Maintenance Team Findings
- Loose pinion bolts connecting one drive on the reducer

Value
- Downtime to repair (loss of clinker) and lead time for replacement parts

Event IV: Raw Mill Motor

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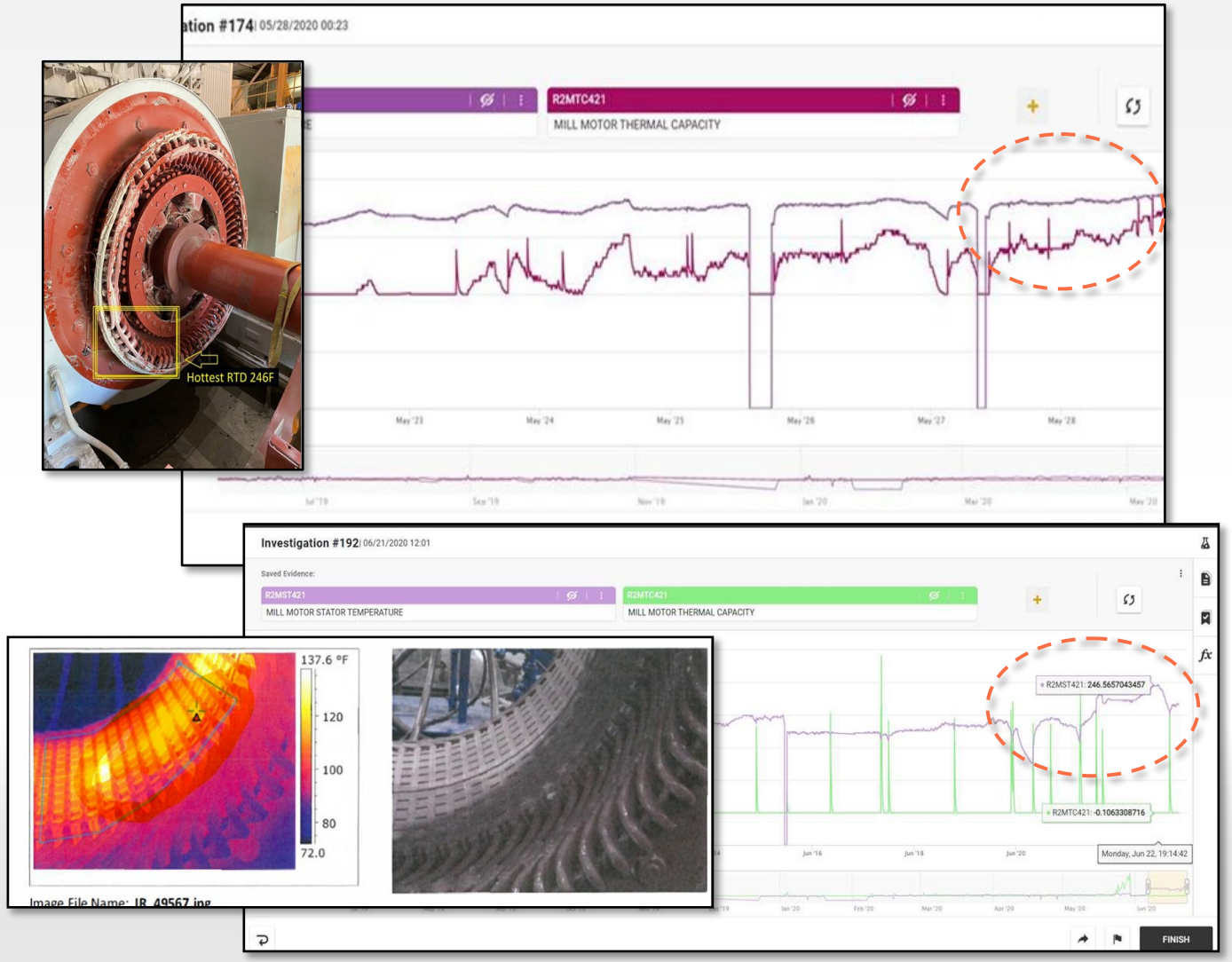
Event
- Temperature Increase in the mill motor windings
- No alarms in the MCC or the plant control room

CemAI Event Feedback:
- Plant electrical dept was alerted of the change with a recommendation to inspect the motor and recommended a thermal scan of the motor while in operation to identify any hot spots on the housing

Maintenance Team Findings:
- After thorough inspection it was found that one of the stator RTDs was failing and was scheduled for replacement. No issues were identified with the motor windings.
- Found that signals from the motor RTDs were not transferred to the control room screens so the operator would have no knowledge of motor temperature issues. Connections were established with proper interlocks for motor protection

Value:
- **Up to $300k** to replace/repair a damaged motor
- **Up to 7 days of mill downtime (**spare availability**)**
- Kiln would run at half capacity for the entire time



Event V: Finish Mill Blaine Deviation

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Event
- Cement Blaine deviation increased significantly
- No indications nor alarms in the plant control room

CemAI Event Feedback
- Field inspection of Feeding process and Separator operation.
- Data investigation on process parameters

Process Team Findings
- Feed clinker mix had been changed. Increased ground clinker percentage had resulted to feeding flowability issues and eventually to increased Blaine deviation

Value
- Avoid quality issues and restore proper feeding by reviewing clinker mix and optimizing with respect to feeding flowability and Blaine deviation targets

Event VI: Tertiary Duct Air Temperature Drop

Event
- Gradual Tertiary duct drop
- No alarms in the plant control room because there is no interlock

CemAI Event Feedback
- Field inspection of TA damper operation
- Process data investigation on Clinker Cooler operation and NOx

Process Team Findings
- Clinker cooling process reviewed (Cooler fans dampers) & TA damper position. Signal is not interlocked.
- Efforts to reduce NOx by reducing Oxygen have been taken

Value
- Clinker Cooling and Emissions optimization

Event VII: PH Stage 3 Cyclone Exit Draft Drop

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Event
- PH stage 3 cyclone exit draft dropped
- No alarms in the plant control room because there is no interlock

CemAI Event Feedback
- Field inspection for cyclone build ups at Stage 2 & Stage 3
- Process data analysis comparing with temperatures and blockage nuclear indications

Maintenance Team Findings
- Pressure indication was faulty due to instrument plug. Instrument cleaned and proper indication was restored.

Value
- Restore CY monitoring and required alarms against possible cyclone blockage. Non-planned failure and premature shutdown of kiln