

## Discussion Group P05 - Centrifugal Pump Operation, Maintenance, and Reliability

### Leaders:

- David DePaolis (Flowserve)
- Richard Donley (PBF Energy)
- Adam Gottlieb, (Celanese Clear Lake Plant)
- Calvin Stevenson (Flint Hills Resources)
- Paul Paimore (Flint Hills Resources)
- Arun Kumar (HPCL - Mittal Energy Ltd., India)
- Katie Whaley (ARMS Reliability)
- Marc Heggemann (Sulzer Pumps)

### Top Voted for Discussion in 2017:

- MI Inspections of pumps - (casing thickness) UT, on-line, shops
- Methods for preventing reverse rotation, detecting reverse rotation
- Hot alignment is there benefits, what temperature
- Predictive maintenance how is info recorded, also condition based how it is working
- What oil are we using for lubrication bearing housings (oil type, replacement frequencies)
- Motor greasing and use of UT
- Pump swapping program - Frequency
- Pump monitoring how are we doing this and how do we want to do this, wireless,
- Craft training precision maintenance

### Additional Possible Discussion Topics:

- Pump maintenance practices pull all pump vs just back pullout assy.
- Vertical Canned Pumps (VS6 Pumps)
- Parallel pumping practices, pump switchover
- Practices for Mothballed Pumps
- Repair Specs, use, in house repair specs
- Lube oil storage and usage
- Mechanical seals and bearings issues
- Best practices for pump maintenance; Back pullout vs. pulling entire pump:
- Open bearing housings vs sealed wet sump
- Seal plan which was not expected wrong for the application
- Preventive/predictive technologies
- Off design operation
- Mean time between failure (MTBF), other KPIs how do we measure, and how do we use the metrics
- How to create pump reliability in an unreliable plant
- Seal-less versus sealed pump reliability, canned motor pumps versus mag drive pump reliability
- Mechanical Integrity Inspections of VS 6 pumps in hydrocarbon service
- Seals in light hydrocarbon service operations, risk, leak response, maintenance

- Pump predictive/preventive maintenance program elements philosophy, frequencies.
- Measures of effectiveness of preventive and predictive programs for pumps
- Roles of operations and maintenance/reliability in improvements and data collection
- Reliability experience with liquid versus non contacting gas seals applications
- Maintenance philosophy for pumps what constitutes best practices
- Spare parts OEM versus non-OEM
- Repairs OEM versus non-OEM service facilities
- Pump foundation, alignment and pipe strain influence of reliability
- Impact of corporate purchasing alliances on pump reliability
- Repair facilities alliances
- New equipment purchasing alliances
- Repair techniques and material improvements
- Portable and on-line monitoring impact on reliability
- Wireless monitoring impact on reliability and risk of failure
- Optimization of thrust bearings configuration
- Lubrication system impact on reliability oil mist versus flood, oil selection
- Mechanical Seals
- Use of non-metallic vs metallic materials for stationary wear rings
- LLDS (Look Listed Feel Smell) how to build effective daily surveillance by operators and maintenance
- Epoxy coating of pump foundations
- Bearing isolators what is the best practice (magnetic vs. others)
- Hot alignment how applied, when needed, application with the current LOTO procedures.