Questions & Answers

Session 1 - Monday, 19 September 2016, 8:00 – 11:30 AM

1A – Safe Operation in Chemical Plants with Stop Work Authority
Kawal Maraj, Raghava Nayak, Venkat Pattabathula

No questions recorded.

1B- Field Experience from Fiber Optic Ammonia and LNG Leak Detection Systems Installations
Daniele Inaudi, Roberto Walder, Todd Roberts

Q: Dorothy Shaffer, Baker Risk:
Please confirm if the SIL 2 rating requires the fully redundant option.
No, SIL 2 rating only requires the use of the ATTS system (Automated Trip Testing System). Redundancy is recommended to increase availability in case of maintenance on the system or to implement a 2oo2 voting system to further reduce false alerts.
Q: Michael Sicinski, Air Products:
Have these fiber optic systems been used on hot systems such as internally refractory lined transfer lines?
Yes. It has been used on pipelines at higher temperatures, up to 110°C in Yara plants. You can also find an example of monitoring reaction vessel isolation here: http://www.sensornet.co.uk/yara-case-study (Sensornet is a sister company of the Nova Metrix group)
Q: Michael Sicinski, Air Products:
What is the maximum service temperature of the system?
For cables: Normal temperature up to 80°C, standard High Temperature cables up to 300°C, higher temperatures up to 600°C and down to -200°C possible with special fibers/cables. For Readouts: -40°C to +65°C for DiTemp Harsh (http://www.smartec.ch/Prod/DiTemp-Harsh-Reading-Unit)

1C – Welding problems on ammonia plant primary reformer hot collectors
John Hallett

Q: David Firth, Quest Integrity:
Was the cracking due to carbide formation a G phase liquation cracking? (see draft API Publication - Materials, Fabrication, Repair for Hydrogen Reformers)
A: Reply pending. Please check back later.
Q: David Firth, Quest Integrity:
Was a post weld heat treatment applied to prevent stress relief cracking?
A: Reply pending. Please check back later.

1D – Topsoe Furnace Manager Technology Benefits for Ammonia Producers
Scott W. Sexton

Q: Harrie Duisters, OCI:
Is the system suitable for top-fired furnaces?
A: Yes, most existing installations are on top fired SMR's.
Q: Harrie Duisters, OCI:
Does the refractory have to be modified when the cameras are installed on the furnace wall?
A: Not in all cases. If the furnace has existing peep doors located in a good location for coverage with adequate size to mount the TFM image unit, then those doors can be utilized. In other cases, the best views are seen from new doors cut into the furnace wall. Expected image unit views are modelled prior to furnace wall modifications so that the owner can decide if new doors are preferred. New furnace doors require refractory removal in the area where the new TFM refractory block and image unit will be installed.
Q: Satyajit Mahapatra, OCI:
Provide reference in ammonia plant.
A: A reference list is available from Haldor Topsoe.
Q: Satyajit Mahapatra, OCI:
What is the reliability of this system?
A: Reliability of the system is equivalent to the utilities supply (instrument air and power) of the plant. Multiple TFM image units are installed on a furnace so that if a single unit is offline, the other units continue to provide views of the furnace firebox.
Q: Satyajit Mahapatra, OCI:
Are you going to extend this to convection section of the reformer?
A: TFM detects flame energy, therefore, in convection sections with auxiliary firing TFM provide image coverage.
Q: Richard Holder, Potash Corp:
How often do clients clean the lens of the camera?
A: With normal scheduled outages, the sightglass typically requires cleaning about every 6 months. If there are plant upsets or unscheduled outages, cleaning can be more frequent.
Q: Richard Holder, Potash Corp:
How much drift do you find after calibration?
A: The software correlation does not change. If the sightglass on the image unit becomes dirty or fouled, then the temperature will drift downwards over time. Field calibration utilizing other measurement techniques such as pyrometers or Gold Cup can be implemented at any time.

Session 2 - Monday, 19 September 2016 1:30 – 5:00 PM

2A – Failure of Secondary Reformer Dome and Its Repair
Nia Aliabadi, John McGrath, David Keen, Venkat Pattabathula, David Firth

No questions recorded.

2B – Failures in Aging Ammonia Plants
Jack Stoffels

Q: Ken Wohlgeschaffen, Chevron:
You mentioned you switched water treatment programs to an amine based one to form a thin, denser magnetite layer. What water treatment program were you using before you changed?
A: Congruent Phosphate treatment, by dosing Tri Sodium Phosphate (TSP) for the boiler and ammonia (NH3) for the steam/condensate treatment
Q: Ken Wohlgeschaffen, Chevron:
Under what conditions of operation do you form a thick, less dense magnetite layer?
A: With the phosphate treatment we got a thick and less dense (porous) magnetite layer. Above 200 ^{0}C water reacts with Iron and forms magnetite. With the right water treatment you will from a thin/dense layer. Our experience is that with a film forming amine we get a better magnetite layer than with the TSP treatment.
Q: Dorothy Shaffer, Baker Risk:
Was there cracking or damage found on the other risers?
A: We inspected all the other three risers (welds) by ultrasonic inspection (phased-Array). No indications were found. The reason that these risers were not damaged is probably because of the difference in diameter and wall thickness. The cracked riser had a smaller diameter and wall thickness (10 mm, 0.4 inch) compared to the other three risers (36 mm, 1.4 inch). This results in more tensile stresses from the start/stop cycles.
Q: Dorothy Shaffer, Baker Risk:
In the paper body, it was indicated that the yield strength of the material played a role in the damage. Was it replaced in kind?
A: It was decided to use the same material (1.6368, WB36)
Q: Mohsin Ahmad, Koch Industries:
What was the process upset which caused the failure?
A: We had to shut down the plant very quick due to a power failure. This caused conditions which were not expected in relation to high process conditions in the equipment which resulted in the end to high mechanical stresses on the welds.
Q: Mariano Reves, Fertinitro:
Normally corrosion fatigue problems are related to design problems (mechanical stresses). Was it considered a redesign of the HRSG riser tube?
A: No, because of the fact that the conditions which took place are not normal and must be considered as an incident.
Q: Mariano Reves, Fertinitro:
What is the frequency of the inspection plan and details of the inspection method?
A: The normal frequency is every 4 years. The inspection method that we added in the inspection plan was phased array (Ultrasonic NDT)
Q: Naveed Ahmed Khan, Fauji Fertilizer Co. LTD:
Have you experienced any external corrosion in the riser?
A: There was no external corrosion found on the risers.

Q: Oscar Olatte, BD Energy Systems:
Figure 20 shows the cracking in the weldolet weld connection. The extensive cracking observed looks like creep cracking. Was creep damage evaluated as part of the mechanism of failure together with LCF? If so, what is its impact on the failure?
A: We noticed also this creep cracking but the amount of the creep cavities were such that we concluded that this failure mechanism was secondary and the main cause of the failure was LCF

2C – Successful Project Execution and Commissioning of Largest Capacity KRES Ammonia Unit
Tim Kearns, Kim Taniguchi, Tim Rembold

Q: Esben Sorensen, Haldor Topsoe:
How did the revamp affect methane slip from the reforming section?
A: The panel operator was under the assumption that he was in a stable situation with steam flowing thru the reformer tubes – similar to a start-up condition where he is warming up the
Q: Hal Cain, Cain and Associates:
Concerning transportation and fabrication of equipment, could it be fabricated closer to Lima?
A: The panel operator was under the assumption that he was in a stable situation with steam
Q: Michael Sicinski, Air Products:
Was the catalyst loading dP rechecked after erecting the KRES unit into its final position?
For cables: Normal temperature up to 80°C, standard High Temperature cables up to 300°C,
Q: Michael Sicinski, Air Products:
How long did it take to load 1800 tubes?
For cables: Normal temperature up to 80°C, standard High Temperature cables up to 300°C,
Q: Shahbaz Ali, Fatima Fertilizer Co.:
The capacity increase is significant. Please share revamp considerated on air compressor and syngas machine.
For cables: Normal temperature up to 80°C, standard High Temperature cables up to 300°C,
Q: Vinod Arora, Kinetics Process Improvements, Inc.:
How was the new steam reformer different from the existing one and its justification?
For cables: Normal temperature up to 80°C, standard High Temperature cables up to 300°C,
Q: Vinod Arora, Kinetics Process Improvements, Inc.:
Any reason why KRES expansion limited to only 16% increase. I guess KRES could provide much higher capacity increase. Any other limitations and major changes done?
For cables: Normal temperature up to 80°C, standard High Temperature cables up to 300°C,
Q: Vinod Arora, Kinetics Process Improvements, Inc.:
What was the energy consumption before and after installation of KRES?
For cables: Normal temperature up to 80°C, standard High Temperature cables up to 300°C,

2D – Failure of Level Bridle in Benfield Service
Rodney Babwah, Kamla Balgobin

Q: Ken Wohlgeschaffen, Chevron:

UOP is the Benfield technology provider. To what extent were they involved in the incident investigation?
A: UOP is kept up to date with issues we have on the plant and any benfield chemistry concerns. This incident was sudden and they were not specifically asked to review or take part in our internal investigation.
Q: Ken Wohlgeschaffen, Chevron:
Had they seen this type of corrosion in absorber level bridles in any other Benfield plants?
A: Had they seen this type of corrosion in absorber level bridles in any other Benfield plants? UOP was not asked but with YARAs contact, investigation were done and there was no indication of this type of failure in any other sites.
Q: Ken Wohlgeschaffen, Chevron:
When did Benfield plants start being built with stainless steel level bridles?
A: When did Benfield plants start being built with stainless steel level bridles?
In early 2000's it would appear based on newer plants in Trinidad having SS. This was not confirmed with licensors.
Q: Joseph Simon, PCS Nitrogen Trinidad, LTD:
Did you notice any change in the iron content of the Benfield solution?
A: No, chemistry was within specification limits. No abnormal excursions in parameters to indicate corrosion. Note however, this appears to be over an extended period and a small surface area so it may not be noticed in the system.
Q: Joseph Simon, PCS Nitrogen Trinidad, LTD:
Did you notice any change in the vanadium content?
A: No, vanadium was within specification.

2E – Failure of Methanator F/E Exchanger Tubes Due to Benfield Solution Carry Over from CO_2 Absorber
Anwar Mahmood Shahid

Q: Harrie Duisters, OCI:
Do I understand it correct that Benfield solids caused the corrosion of the methanator tubes in spite of the tubes being stainless steel? Isn't stainless resistant to Benfield?
A: Under-deposit corrosion phenomena can occur at the outer surface of Stainless Steel tubes due to Benfield Solution deposition. Stainless steel is not resistant to Benfield
Q: Harrie Duisters, OCI:
Where does the ammonia come from that formed the carbamate?
A: Ammonia comes with recycle gas entering at the final casing (HP casing) of synthesis gas compressors containing 7.5-8.5 mol% Ammonia, a part of process scheme. Carbamate formation was observed on tube sheet of synthesis loop chiller (E-303) where CO2 coming from leaking Methanator feed effluent heat exchanger (E-209) reacted with this Ammonia.
Q: Maqsud Khan, IHI E&C:

Your presentation showed that in addition to change of the KO drum internals and process side to tubeside of heat exchangers, the schematic of the first two exchangers was also changed. Did it improve temperature approaches of these exchangers also? Especially the first heat exchanger?

A: No significant change was observed in the temperature approaches in both heat exchangers

Q: Maqsud Khan, IHI E&C:

I was wondering if improved cooling/heating curve with higher/better delta T approach helped alleviate the problem of carbamate deposition was well?

A: This is our first year of operation with modified scheme, inspection of heat exchanger is planned in forth-coming Turnaround in Jan 2017. Purpose of scheme change was to enable tubes cleaning with respect to any deposition of Potassium Carbonate, which was not possible in previous scheme.

Q: Nevia Maraj, Point Lisas Nitrogen:

Do you monitor the dP on the E-20 A/B exchangers?

A: Yes, but no significant pressure drop was observed.

Q: Nevia Maraj, Point Lisas Nitrogen:

What is the philosophy for washing the exchangers?

A: With new scheme, washing of heat exchangers tubes will be carried in every Turnaround. However, in the previous scheme, washing was being carried out from shell-side for removal of Potassium Carbonate deposits which was not effective due to BEM design.

Q: Vinod Arora, Kinetics Process Improvements, Inc.:

Just a comment about similar carryover issues in two ammonia plants using Benfield systems in Trinidad. Methanator F/E exchanger dP will increase by 1 psi in 3 months. Plants were regularly shut down for a shift to clean them. The main cause of carryover was lack of disengagement space. Modifications were carried out by KPI but without any addition of wash trays. This was done in 2009 and worked very well.

A: Thank you for your feedback. Similar information may be helpful for comparison between different plants regarding same

Q: Shamik Bhattacharya, KBR:

When did you last replace the methanator trim heater?

A: Methanator trim heater was replaced in February, 2007 as a part of Ammonia Plant BMR.

Q: Shamik Bhattacharya, KBR:

Do you use the methanator trim heater during normal operation?

A: Yes, methanator trim heater is used during normal operation to maintain Methanator inlet temperature.

Q: Ken Wohlgeschaffen, Chevron:

You mentioned that after modifications were made (continuous wash water, new demisters, exchanger configuration) that you now clean the tubes every shut down. So, do you still see carryover of Benfield solution?

A: Yes, Benfield Solution carryover still persists; but it is minimized to acceptable range.

Q: Ken Wohlgeschaffen, Chevron:

Did you consider upgrading the absorber K. O. drum (make it larger, install high efficiency demister) to solve the problem?

A: Yes, it was considered. However, Koch Glitch evaluated and recommended to upgrade demister design only without any need to increase the vessel size.

2F – Integrated Safety Concepts for Rotating Machinery
Hans-Juergen Essl, Leonhard Werner, Georg Zimmer

Q: Dorothy Shaffer, Baker Risk:
Could you clarify the term "pumping" for compressor hazards?
A: In literature this phenomenon is more referred as surging
Q: Dorothy Shaffer, Baker Risk:
How do you treat axial displacement (thrust)?
A: Axial displacement of the steam turbine and synthesis gas compressor initiates a trip of the steam turbine and syngas compressor. Out of the risk of financial losses of damaging bearings or static parts of turbine or compressor the respective is treated as "business critical" and classified as SIL 1 equivalent according Borealis internal risk matric.

Session 3 - Tuesday , 20 September 2016 , 8:00 – 11:30 AM

3A –Syngas Compressor hydrodynamic thrust bearing failure
Ibrahim AbdAl-Wahab, Hatem Abdel-Rahman

Q: Joseph Simon, PCS Nitrogen Trinidad, LTD:
Does the compressor have a dedicated anti-surge system?
A: It already had anti surge system but as we describe the compressor had two separate stages even the ant surge system works and anti-surge valves open , it will increase the differ national pressure between stages again as well
Q: Joseph Simon, PCS Nitrogen Trinidad, LTD:
Was the HV valve taken into consideration during the initial plotting of the anti-surge curve?
A: As explained in point no 1, the HV valve is adjusted to fully open during trip and start up only, its duty to equalize the pressure between the two stages during trip
Q: Naveed Ahmed Khan, Fauji Fertilizer Co. LTD:
The diaphragm is provided between recycle and makeup stage. As the differential pressure was very high, what happened to the diaphragm during this accident?
A: The diaphragm had not been affected as the compressor tripped at axil 0.7 mm, the axial clearance between rotor and diaphragm actual is 1.6 mm so the diaphragm is ok
Q: Anil Kumar Singh, IFFCO:
Do you have a differential pressure relief valve between recycle discharge and make-up discharge?
A: No, we don't have one, just the HV valve. There are no any safety relief valves
Q: Alfredo Medina Vilar, Jacobs Consultancy:
Was the compressor with 2oo3 instrumentation?
A: Yes it was.

Q: Alfredo Medina Vilar, Jacobs Consultancy:
Was not the axial displacement and other controls activated to shutdown and prevent the damage?
A: The axial displacement was activated, it was what because machine trip but this occurred when axial reached to 0.7 mm (axial trip set point) but due to late opening of HV valve the differential pressure between stages was two high, and the accident was already done
Q: Alfredo Medina Vilar, Jacobs Consultancy:
Was a HAZOP performed after the analysis?
A: Yes it done.

3B – Ammonia Converter Reaction Loss followed by Fire Incident
Rizwan Majeed, Shahbaz Ali

Q: Joseph Simon, PCS Nitrogen Trinidad, LTD:
Was the specific operations (DCS) procedure amended for this incident and included in the simulator training?
A: Yes, the specific operations (DCS) procedures have been amended for this incident and we have revised our emergency handling work instructions accordingly to avoid recurrence of reaction loss. As far as the simulator training is concerned we are in process for procurement of simulator & currently it is not available with us. Please feel free to contact if you have any more questions.

3C – Ammonia Synthesis Loop Water Exposure: Identification and Re-reduction of AmoMax®-10
Kevin Turner, Carrie Schaffer

Q: Neelakantan Rajasekaran, QAFCO:
How long did the process of re-reduction (to activate the catalyst) to remove the moisture take place?
A: A dry out flush with nitrogen was performed for 2.5 days, followed by approximately 30 hours of the modified reduction procedure. The delay caused by issues with the Ascarite apparatus as discussed in the paper and presentation increased this duration by approximately 8 hours.
Q: Satyajit Mahapatra, OCI:
What are the preventative actions taken to prevent re-occurring the incidents?
A: Two main preventative actions include: (1) checking for water in the Synthesis Loop at startup, especially if the steam system may be ran without the loop running; and (2) repairing the source of the leak and confirming the leak is repaired by hydrotest.
Q: Naveed Ahmed Khan, Fauji Fertilizer Co. LTD:
How much water was generated and have you sent it to the ammonia tank or drained this water?
A: After the loop was flushed with dry nitrogen, the re-reduction procedure appeared to generate only a small amount of water with some ammonia content. Due to the limited amount of water generated, this was directed to the cold storage ammonia tank. Virtually no change in storage tank water content was noted due to the inventory at the time.

Q: Filip Raeymaekers, OCI:
Did you consider the risk for caustic stress corrosion cracking due to leaching of the potassium promotor?
A: We did not find evidence of bulk wetting of the catalyst, but believe we primarily had exposure to steam. Clariant has also reached out to their engineering partners who feel that, in general, the low concentration of potassium found in the catalyst results in a low risk of reaching the concentrations required for CSCC (caustic stress corrosion cracking). Please reach out to Clariant for more details.
Q: Filip Raeymaekers, OCI:
Did you see an exothermic reaction during the flooding incident?
A: A small increase in temperature of approximately 40°F (22°C) was see at the on the bottom bed of the converter nearest the source of the water. Our belief is that this temperature rise was primarily due to steam exposure from the hot water, rather than from an exothermic reaction due to oxidation.
Q: Nevia Maraj, Point Lisas Nitrogen:
When the ammonia synthesis loop comes offline, do you have procedures for leak testing of the boiler feed water exchangers?
A: We are continuing to work to develop improved procedures for leak testing. We have added additional isolation that has allowed us to hydrotest the BFW exchanger once the unit is down.

3D – Severe Cracks on a New Duplex Syngas Loop Cooler
Richard Bosselaar

Q: Shamik Bhattacharya, KBR:
Do you experience variation in ammonia conversion outlet of your converters under normal operation?
A: The leakage was discovered just after startup of the plant. It's difficult to say if there was a variation in the conversion outlet because the plant was not yet running in a stable condition. We did see an increase of the synloop temperature. Even when we tried to increase the water flow over the exchangers, the temperature was still increasing.
Q: David Firth, Quest Integrity:
Did you consider delayed hydrogen cracking as a cause?
A: The tube to tube sheet welds were extensively tested during the construction phase with dye penetrant examination, helium leakage test and finally hydrostatic tested. The equipment was already approximately one year on site before installing in the plant. The exchanger was not directly leak after start up but after approximately a week. I don't think delayed hydrogen cracking was the cause.
Q: Nevia Maraj, Point Lisas Nitrogen:
Was the leak on the exchanger large enough to affect production?
A: We have seen an increase of the synloop temperature. Even when we tried to increase the water flow over the exchangers, the temperature was still increasing.
Q: Nevia Maraj, Point Lisas Nitrogen:

Did you consider acid addition to the cooling water system to reduce pH – to prevent fouling of cooling water exchangers?

A: The biggest issue with the leakage was the contamination of our cooling water with NH3 and H2. We have an once through cooling water system, the environmental impact of the leakage was our main concern. The fouling was only found on the leaking exchanger and after the shutdown of the installation.

3E – Ammonia Plants Compressor Room Fire: Prevention and Remedies

Alireza Orooji, S. Sajjad Hosseininia, Ehsan Askari Mahvelati

Q: Mark Jackson, FM Global:

What was the root cause analysis results on the casing damage? Given the type of fire, this damage would be due to the heat of the fire. Proper application of water would not damage this type of equipment based on an industry study. FM Global fire testing, research and industry loss experience indicates automatic sprinkler protection if properly designed, installed and maintained would control this type of fire (Reference FM Global loss prevention data sheets and the paper from the 2007 Ammonia Symposium)

A: Heat of fire for at least 30 minutes and then quick quench with high volume of water was the main cause of the casing damages. Sprinkler protection is appropriate for such as this fire case to prevent extending of fire in primary minutes of the incident before overheating the machine.

Q: Mark Jackson, FM Global:

What were the results from the HAZOP/HAZID to conclude application of a water mist system? Water mist systems are designed for enclosure applications, case by case. For this type of fire scenario, water mist would not be adequate, based on FM Global fire testing and research.

A: Water mist is not adequate for this type of fire based on this case study and could not extinguish the fire.

Q: Mark Jackson, FM Global:

What were the results from the HAZOP/HAZID on the shutting off of the lube oil supply? Detailed analysis is needed to determine when is the best time to shut off the lube oil. Operator training and involvement if the equipment manufacturer is required

A: Lube oil system optimum shut down time is based on the decision of incident command system (ICS) team after investigating all aspects of the fire and machine situation.

Q: Anwar Shahid, FFBL:

What was the extent of damage due to deformation of turbine casing, how was it rectified and how much time did the rectification take?

A: The method of repairmen of the casing was heating by torches and pulling by chain blocks and near 15 days was lengthening just for casing repairmen.

Q: Jason Schmaltz, Linde Hydro-chem:

This is the second presentation about scaffolding/scaffolding workers. Are you doing the right job checks and inspection for scaffolding installation and long tern scaffolding?

A: The scaffolding operation checking is extended by safety department after the incident and long term scaffolding permit is just done by HSE manager case by case.

Q: Nevia Maraj, Point Lisas Nitrogen:
Do you do orientation and job safety analysis with contractors – JSA to include identification of critical instruments and operator supervision of construction and demobilization of scaffolding?
A: Instruments tubes had replaced by piping in compressor room based on standards. Supervision on scaffolding operation is intensified by safety department.
Q: Shahbaz Ali, Fatima Fertilizer Co.:
The mentioned time for loop depressurization is 40 minutes, which is much higher. Has the company revised the block in and vent philosophy?
A: Yes. A motorized valve is installed for quick venting in synthesis loop now.
Q: Shahbaz Ali, Fatima Fertilizer Co.:
Is there any need to upgrade/upsize the vent valve?
A: Just gate and globe valves in the main venting line were replaced by motorized valve for quick action.

3F – Construction and Commissioning of Kaltim-5 2500 mtpd, World's Largest Ammonia Purifier™ Plant
Luther Sirait, Jakub Tarigan, George Colman

Q: Sandeep Pawar, R.C.F. Ltd.:
Which type of catalyst loading techniques were adopted for primary reformer catalyst loading?
A: During the primary reformer catalyst loading, we used conventional method by using shock loading technique and follow Topsoe procedure as catalyst supplier. The main procedure is that loading divided in to some segment, vibration, and pressure drop measurement.
Q: Sandeep Pawar, R.C.F. Ltd.:
At low load of 30% reformer rate whether burner management was done by observing primary reformer outlet temperatures (process side) or flue gas temperature of primary reformer chambers?
A: At low load, Burner management was done while observing skin tube catalyst temperature by means of thermo-gun, Both side skin tube temperature has maximum of 40 degC, no red tube colour is allowed. Flue gas temperature was observed to meet coil temperature within range.
Q: Doug Little, Koch
Were you able to determine the cause of the foaming in the amine system?
A: The first foaming occurred mainly was caused by not sufficient rinsing in the final preservation stage. But the main reason of amine carry over was caused by some chimney in the LP Flash was damaged during chemical passivation/preservation due to low flow. The tangential low flow through being fed to LP Flash was falling down to the center of chimney not flowing through tangential of inner wall. So those chimneys were damaged.
Q: Maqsud Khan, IHI E&C:
Your paper indicates that the startup was done by Kaltim (owner) rather than licensor/contractor. May this be because you have experience in other reformers/ammonia plant? But if there are new technologies employed in a plant such as coal gasification and/or air separation, would you consider including the licensor/contractor actively participate in commission and startups?

A: Contractor was fully responsible during the commissioning stage. But in the contract, we specified that Owners skillful Operator is available to support Contractor. Even so, Licensor was present ensuring start up stage running well. Some part of the plant such as Dryer and Purifier, two ID Fans, and two FD Fans were new for Owner. But the Owner had the confidence to proceed with such activities. In another coal Boiler project, the Owner was carried out the start up under Licensor/contractor supervision.

Q: Maqsud Khan, IHI E&C:

Your milestone schedule shows contract award to FEED ending in 9 months. Was there a separate time schedule for PDP (Process Design Package) for the licensor or was it included within the 9 months?

A: Licensor design package was included in the EPC contract milestone. We completed basic design package (FEED) within 9 months and 12 months for detail design package. During FEED and detail design stage, some equipment was procured.

Q: Satyajit Mahapatra, OCI:

What is the root cause for so many problems?

A: The main problems were the Dryer and Purifier. Other problems were not significant. The dryer problem was caused by one control valve (HV-1023) mall-operation. It was "working correctly" but actually wrong. I had confirmed its wrong operation but contractor did not follow it. Finally we solved this problem within 2.5 months after 2 times dessiccant carried over. This Dryer problem was causing another problem. The 2nd Purifier problem was only caused by miss-calibration of Rectifier column in the manufacture. But Manufacture document said calibration was correct. Finally Contractor showed new calibration for the level transmitter. We solved it within 2 months due to "correct calibration document" (actually wrong). This problem was also causing other following problem such as second amine carry over.

Q: Satyajit Mahapatra, OCI:

How much was the participation of KBR in the project?

A: Only one KRB Supervisor was joining during commissioning stage.

Q: Satyajit Mahapatra, OCI:

Why was the expander casing vent connected to the flare?

A: In accordance with the original design (Contractor design), Expander casing vent was connected to the flare. When the condensate was back flow to the casing, the it was routed to atmosferic safe location. We also routed all primary seal vent from dry gas seal compressor to atmosferic safe location instead of to back-end flare.

Q: Vinod Arora, Kinetics Process Improvements, Inc.:

Perhaps you could also mention savings in plot space for larger capacity vs. two equal size units?

A: We did not plan to develop 2 equal size units. We designed one large capacity in one unit. It is about 8 ha size for all utility, Ammonia, and urea plant.

Session 4 - Wednesday , 21 September 2016 - 8:00 – 11:30 AM

4A – Toxic Gas Detection in Ammonia Plants for Shelter-In-Place

Murtaza Gandhi, Anthony Sarrack

Q: Mark Schroeder, Koch Fertilizer, LLC:
Have you seen scrubbing for air intakes?
A: I've been to facilities that have scrubbing systems on intakes, but in each case the people at the facility had no confidence that the system would function if needed. None have had details on the system that would allow the system to be credited for mitigation it may provide (efficiency, capacity, reliability, etc.). I think the systems were intended to be used in a recirculation mode.
Q: Mark Schroeder, Koch Fertilizer, LLC:
Can you comment on the effectiveness of water curtains?
A: For flammable gases, water curtains tend to push gas away from the location of the curtain, however, doesn't do much to help it dissolve into the air and reduce its impact. For smaller releases, this works better, for larger releases, the advantage is only slight. We don't have direct experience with water curtains in NH3. However, one of the speakers following our presentation did indicate water curtains were an effective safeguard to reduce impacts due to NH3 release.

Water curtains require a large water to toxin ratio in order to be effective. Because of the limited capacity of water curtain capacity (amount of water flow that can be generated for a given range that toxic stream will contact), they are generally only effective against relatively small release sizes (generally an inch diameter release size or smaller). The toxic lethal impact area for outdoor personnel for those "small" cases is generally small, and the amount of time it takes to get to a safe location is usually short. (Someone close enough to potentially be killed by the toxic gas does not have to move far to get to a safe location.) Therefore, an outdoor person who is at risk of lethal impact would be expected to safely evacuate or incur a lethal dose of the toxin by the time the water curtain was activated. As a result, water curtains are generally not very effective at reducing risk from a life safety perspective.
Q: Sachchida Nand, Fertilizer Association of India:
In the case study, did you use one of more models for dispersion of ammonia? If yes, were these models developed by your company?
A: Yes, we used SafeSite, a software developed by BakerRisk. These models use a dispersion model supported developed and confirmed by years of in-house testing and validation (with flammable gases only) to predict the steady state release distance, plume cloud vs LFL/toxicity and discharge rates. Our studies generally use a set of four different weather conditions that cover a wide range of stability and wind speed.

4B –Predicting Process Risks for Improved Safety and Operational Excellence: A Breakthrough Technology and Case Studies
Aslam Khan B Mohater Khan, Ankur Pariyani

Q: Reinhard Michel, Thyssenkrupp:
Is this system from the vendor of your DCS or does it work with other DCS's readily available on the market?

A: Reply pending. Please check back later.
Q: Reinhard Michel, Thyssenkrupp:
What is the cost of such a system?
A: Reply pending. Please check back later.
Q: Jason Schmaltz, Linde Hydro-chem:
Were you able to utilize calculated tags for exchanger/tower monitoring?
A: Reply pending. Please check back later.
Q: Jason Schmaltz, Linde Hydro-chem:
How much collaboration was necessary to develop the system?
A: Reply pending. Please check back later.
Q: Jason Schmaltz, Linde Hydro-chem:
How easy is it to add tags now?
A: Reply pending. Please check back later.

4C – Validating Multiple LOPA Credits from Your DCS…or Not
Peter Herena

Q: Harrie Duisters, OCI:
What is the difference between LOPA (often used in the U.S.) and SIL analysis (often used in Europe)?
A: LOPA is a semi-quantitative risk analysis tool that can be used to more objectively estimate the likelihood of an event. It can be used for many reasons, like any other tool in the safety "toolbox." SIL analysis is the establishment of the performance target needed for safety functions. One approach to completing that task is LOPA. There are others, like QRA, risk graph, event tree, etc… These methods balance two factors: Precision versus Speed. Risk graph tends to be faster but less precise (and therefore more conservative). QRA is highly precise but takes a lot of time (and by extension, money). LOPA is somewhere between risk graph and QRA.

4D- Ammonia Distribution and Handling Improvements
Peter McGrath, Scott Sandhoff, Ajay Joshi

Q: Eugene Britton, Mosaic:
It is sometimes challenging to determine where thermal expansion protection is required in ammonia systems, especially around control valve stations and check valves. Were you able to find guidance or a best practices document from an outside source?
A: Reply pending. Please check back later.
Q: Jim Evans, DuPont:
If I understand correctly, the 2011 incident was ground level impact one mile from a 48 meter stack source. This is unfortunate considering the expected buoyancy of vapor ammonia predicted by many dispersion models. Did anything contribute to the impact of the incident such as unusual weather or the presence of liquid ammonia in the release?
A: Reply pending. Please check back later.

4E – Ammonia Tank inspection findings and follow-up tank modifications at two 1967 ammonia tanks from OCI Nitrogen
Chiel Deij, Harrie Duisters

Q: Anwar Shahid, FFBL:
What is the material of construction for bottom plate and side plates (shell)?
A: ASTM A201 (year of build is 1967)
Q: Anwar Shahid, FFBL:
Why were cracks found on the bottom plate only?
A: We found only cracks in the bottom plate welds due to manufacturing defaults. In the shell we found no indications of manufacturing defects. The reason for that is use of bad material in combination with bad welding practices.
Q: Alfredo Vilar, Jacobs Consultancy :
What was the water content maintained in these storage tanks?
A: 0.2 % of water
Q: Maqsud Khan, IHI E&C:
After modification of the tank when you re-started/re-serviced the tanks, how did you cool the storage tank slowly to prevent any potential stress (thermal)? What was the cooling ramp down in C^o/min?
A: We cooled down the tank with 0.5 C^o/hr. We placed several PT100 thermo indicators at the outside surface of the shell to monitor the process. By purging very slowly at the bottom side of the tank, with ammonia gas, we drive the nitrogen out of the top of the tank.
Q: Mohamad Noueiri, QAFCO:
In your presentation, you mentioned a pump in added in the annular space. Please provide any details you can on this system. Please indicate if this pump was tested for the conditions in the annular space during a release incident.
A: The pump we use in case of an incident is a Blackmer pump,
http://www.psgdover.com/en/blackmer/home. *The type is a HXL sliding vane pump. We tested this pump by pumping the remaining ammonia (6000 cubic meters) out of one tank into the other tank. It worked very well. We can use this pump for pump the annular space empty in case of an incident or failure of the first containment. For connecting the pump we made several pump connections in the piping system around our tanks. With special Ammonia hoses we can connect the pump the way we want it. We can also use this pump for other ammonia services, emptying RTC's(Rail Tank Car), trucks and emptying big pipe lines.*
Q: Leonhard Werner, Borealis:
What safety precautions have you taken to prevent additional stress on the identified defaults on bottom welds during recommissioning/re-start of the tank?
A: What we did to prevent additional stress on the indicated manufacturing defaults is the following. We decreased the cool down process to 0.5 C^o/hr during recommissioning of the tank. Normally we used 1 C^o/hr. We also changed the minimal level of the tank to 1000 cubic meters of ammonia. With 1000 m^3 of ammonia remaining in the tank the thin bottom plates are not subject

to low cycle fatigue. So if there were any dynamic tensions in the bottom plates we eliminate them by taking these precautionary preventive actions.

4F – 4,500 mtpd Single-train Ammonia Plant Based on Proven Technology
Klaus Noelker, Christoph Meissner

No questions recorded.

Session 5- Wednesday , 21 September 2016 1:30 – 4:30

5A – Development and Commercial Success of Online SCR Catalyst Cleaning
David Graham, Paolo Brunello

Q: Jason Schmaltz, Linde Hydro-chem:
Are there any commonalities with the sites that have SCR foulings?
A: A number of potential mechanisms for fouling have been identified, so it's hard to know for sure which mechanisms are dominant at different sites.
Q: Jason Schmaltz, Linde Hydro-chem:
Do most foulings kick-off with an upset?
A: Upsets play a role, but not always.
Q: Ken Wohlgeschaffen, Chevron:
What is the approximate cost for this cleaning on a typical 100 MMSCFD hydrogen plant?
A: Cetek can provide a quotation based on the specifics of the plant.
Q: Ken Wohlgeschaffen, Chevron:
How effective is this technology for removing sublimated ammonium sulfate salts?
A: The method has proven to be effective at removing a wide variety of fouling materials. As along as the fouling material is adhered loose enough that it can be vacuumed, the method works.
Q: Chuck Nini, Koch Fertilizer:
Does this application also work for vertical flow?
A: Yes

5B – Catalyst Reactive Hazard Assessments in Ammonia Flowsheets
Marc Gilbertson, Julian Morris

No questions recorded.

5C – EHS & Technology Risk Assessments for the Nitrogen Industry
John Pach

Q: Joseph Simon, PCS Nitrogen Trinidad, LTD:

Has the production of methanol from the ammonia process been commercialized? Please provide references.

A: Reply pending. Please check back later.

Q: Harrie Duisters, OCI:

What is the methanol concentration after the methanol reactor? Is that high enough to process efficiently?

A: Reply pending. Please check back later.

5D – Increased Risks for Leakages in Aging HP Urea Gas Lines Due to Unexpected Failure Mode

Johan Thoelen, Vincent Duponchel, Alex Scheerder, Kirk Ofei

Q: Neal Barkley, CVR Partners:

Do you see the same corrosion in the 25-22-2 urea piping?

A: The corrosion issues in the 25-22-2 piping is less compared to the 316L UG materials, basically due to the better corrosion resistant properties. But also 25-22-2 is vulnerable for condensation corrosion, carbamate corrosion and chloride SCC, but in general one can state that the life time of 25-22-2 piping in longer.

With respect to the failure of high pressure gas lines in urea plants from strain induced intergranular cracking (SIIC), theoretically the 25-22-2 material is also susceptible because it is an austenitic grade. However, in practice we have not recorded SIIC in a gas line made from 25-22-2 material. It's susceptibility to the forms of corrosion mentioned by Alex, (especially condensation corrosion) means that after extended service time, SIIC should be included in the inspection plan of 25-22-2 HP gas lines as well.

5E – Fire Protection and Detection for Critical Rotating Machines

Ian Clarke

No questions recorded.