

Session I



Chairperson:

Sami AMARNEH

QES Manager - The Arab Potash Company



1 *DAP & Phosphoric Acid Plant Improvement*

Mr. John Wing - Phosphate Consultant

John Wing, P.E.

USA



2 *Phosphate Plant Yield Comparisons*

Mr. Richard D. Harrison – Process Supervisor / Fertilizer Consultant

PegasusTSI Inc.

USA



3 *Novel Large Scale Energy Efficient Technology for Urea Production*

Mr. Rinat Anderzhanov, Deputy Technical Director of Innovations

R&D Institute of Urea

Russia



4 *Guaranteed (Risk Free) Energy Savings in Water and Steam Systems through Avanceon's Proprietary "iwater" & "iboiler"*

Mr. Armaghan Yusuf – Business Manager

Avanceon

Pakistan



5 *Utilization of Satellite Image To Improve Solar Ponds Production*

Mr.: Zaid Halasah - Senior Chemist

APC

Jordan



DAP & PHOSPHORIC ACID PLANT IMPROVEMENTS

Mr. John Wing - Phosphate Consultant

John Wing, P.E. - USA**Abstract:**

A selection of attractive modifications are described, based on successful projects.

DAP innovations include:

- Dual Mole Reactor-Granulator Acid Scrubbing
- BFL Vaporizer/Scrubber - Vaporizes all ammonia with free heat from air leaving the reactor-granulator acid scrubber. This unit provides a 3rd stage of scrubbing – potentially eliminating need for any tail-gas scrubber.
- Product Screen Diverter Systems – easy capacity increase
- Automated Recycle Control - continuously monitors recycle particle size and adjusts process to keep size in mid-range.
- Dual diameter reactor (pre-neutralizer)
- Pipe Reactor
- Cooler Air Chiller
- Tran-Tech Product Cooler

Phosphoric Acid plant projects to consider include:

- Conversion from Dihydrate to Hemi: Makes acid at 42% concentration vs. ~27%
- No need for most evaporation. Usually no rock grinding is needed.
- Conversion to Hemi-Di – similar benefits plus 98.5% recovery & clean gypsum
- Utilize gypsum – many ways to make gypsum an asset rather than liability
- Recover uranium – major investment with high profit potential
- Recover fluosilicic acid – high-purity grade for AlF₃ feed
- A variety of profitable uses for phosphogypsum
- Advances in dry gypsum stacking
- Purify phosphoric acid to technical or food grade

Project management and start-up issues are discussed

Phosphate Plant Yield Comparisons

Richard D. Harrison – Process Supervisor / Fertilizer Consultant
PegasusTSI Inc. - USA



Abstract:

Introduction - PegasusTSI Core Business Activities

Estimated Range of P₂O₅ Losses to Gypsum Stacks

Process Changes to Reduce Phosphate Losses:

- Eliminate off-site discharges
- Reduce phosphate flow to gypsum stack
- Identify opportunities to recycle process water
- Redirect fresh water make-up to gypsum stack

Process Alternatives

1. Site selection and climate conditions - typical plants, Florida and N. Africa
2. Open Circuit Processes – no recovery of pore moisture P₂O₅
3. Closed Circuit Processes – some recovery of pore moisture P₂O₅
4. Process Water Recycling
5. High Strength Fluoride Recycle
6. Improved Washing and/or Double Filtration
7. Non-Contact Evaporator Condenser Cooling
8. Calcination

Novel Large Scale Energy Efficient Technology for Urea Production

Mr. Rinat Anderzhanov, Deputy Technical Director of Innovations

R&D Institute of Urea – Russia**Abstract:**

R&D Institute of Urea is a leading engineering company focused on the development of advanced production technologies that help our customers to cut their energy and feed-stock costs, improve safety and ecology efficiency. R&D Institute of Urea is an owner of proprietary licenses and “know-hows” for the majority of urea technologies allowing us to offer state of the art solutions to increase plant productivity.

By the present moment we have developed technologies for construction of low-scale (URECON 2006®) and average-scale (URECON 2007®) urea plants.

To be able to provide complete service and to be on the edge of modern trends in urea industry we've developed an energy-efficient technology for construction of large-scale urea plants (capacity over 2000 tpd) that corresponds to the present environment and operational effectiveness requirements.

The key features of our advanced technology are:

- Synthesis reactor operates at 200 bars and is equipped with a set of internal devices, including Vortex Mixer, Longitudinal Sectioning Element and Trays.

- Urea melt separation at several stages during the synthesis reaction helps to reduce heat losses and increase the efficiency of distillation process.

- Stripping distillation in CO₂ flow at 90 bars allows achieving higher process performance and prolonging the operating period of the stripper due to less wearing service conditions.

- Submerged carbamate condenser operating at 90 bars provides efficient recuperation of the process internal heat to generate 3 Bar steam.

- Double-stage melt distillation reduces the equipment costs compared with other technologies.

- Simplified equipment lay-out as a result of the synthesis and HP distillation units working at different pressure. Thus, the HP equipment can be positioned at a lower height that reduces investment and construction and assembly costs for the erection of a urea unit.

Innovative R&D Institute of Urea technology can be used for the construction of a new urea unit as well as for the rehabilitation of an existing plant with total liquid recycle process, but for it to be the most rational investment there should be at least 2 units at a plant. Capacity increases up to 60% and energy costs deplete sufficiently (reaching 50% for steam).

R&D Institute of Urea universal technology for large capacity units is a competitive solution for urea production providing perfect operational and economical performance

Guaranteed (Risk Free) Energy Savings in Water and Steam Systems through Avanceon's Proprietary "iwater" & "iboiler"

Mr. Armaghan Yusuf – Business Manager
Avanceon – **Pakistan**



Abstract:

Water and steam systems are big energy cost centers in a fertilizer plant. Every facility takes necessary measures to minimize the energy consumption in order to better align with corporate objectives of improved quality, profitability and environment sustainability.

However certain questions do arise while initiating energy savings projects, some are;
Who guarantees the savings and what if savings are not achieved?

Will my manufacturing process be disturbed?

Project Involves high capital investment!!!

I need a specific ROI or IRR to invest; Energy optimization is not my business and am not sure if I can manage it to achieve my financial goals.

Avanceon, a US based system integrator and energy management company, offers a unique partnership to reduce energy consumption in water and steam systems with absolutely no financial risk to customers.

The paper briefly describes Avanceon's "iwater" and "iboiler" packages, the concept of guaranteed (no risk) savings, and details of projects at Engro Fertilizer Limited and Nestle Pakistan respectively.

Utilization of Satellite Image to Improve Solar Ponds Production

Mr. Zaid Halaseh/ Senior Chemist
APC – **Jordan**



Abstract:

The use of satellite images is widely used in many applications all around the world. This paper reviews the usage of satellite imagery to improve the efficiency of the control and increase the productivity of the solar ponds system at the Arab Potash Company that used to produce Carnallite (the raw martial of potash).

Satellite images were processed using special software like Infogragh and Irdass to have density, thermal and depth profiles which used to improve the process control and predict for future actions. The data and the final images were saved in special software as an archiving and comparison system (ArcMap GIS)

Infrared layer of the image was used to check for seepage of the brine from the solar ponds and to locate the areas of any suspect sink holes.

The main benefits of processing the satellite images for the Arab Potash company are:

1. Improve the process control of the solar ponds system.
2. Plan the salt dredging works in the solar pond system by calculating the salt growth in each subarea, locating any closed area around high density brine and evaluate the dredged areas.
3. Locating any suspected sinkhole (coordinates) and the risk of these sinkholes on the system and the dikes.
4. Locating the reverse flow of the brine in the solar ponds system and set the right solution for this phenomenon.

Session II









Chairperson:

Mr. John Wing

Phosphate Consultant - John Wing P.E. - USA



1	<i>The major research activities of the Research Institutes for Fertilizers (JSC “NIUIF”)</i> <i>Mr. Yuri Chernenko – General Director</i>	JSC “NIUIF”	Russia	
2	<i>FSA Neutralization with Calcium Compounds</i> <i>Mr. Salah Albustami - Process Engineer</i>	JACOBS	USA	
3	<i>Catalysts for Sulphuric Acid and Ammonia Plants</i> <i>Mrs. Ayten Y. Wagner – Arae Manager – Catylest Devision</i> <i>Mr. Henrik Larsen - General Manager, Marketing & Sales Synthesis</i>	Haldor Topsoe	Denmark	 
4	<i>IJC Experience on Revamping of Sulfuric Acid and Phosphoric Acid Plants</i> <i>Mr. AWINASH PESHWE, PLANT HEAD</i>	IJC	Jordan	
5	<i>Replacement of High Pressure Scrubber in SAFCO-II Urea Plant</i> <i>Mr. Bellary Muhammad Usman – Maintenance Superintendent</i>	SAFCO	S. Arabia	

The major research activities of the Research Institutes for Fertilizers (JSC “NIUIF”)

Mr. Yuri Chernenko – General Director

JSC “NIUIF” - Russia**Abstract:**

The paper describes the main research activities of Russian Research Institute for Fertilizers (JSC “NIUIF”) and shows technological processes developed by this Institute that have been implemented at Russian mineral fertilizers plants and plants located in the former Soviet Union states

FSA Neutralization with Calcium Compounds

Mr. Salah Albustami - Process Engineer

JACOBS – USA**Abstract**

As environmental regulations continue to restrict chemical processing emissions, phosphate plant operators will eventually be required to neutralize fluoride waste materials. Most phosphate plants currently use direct contact barometric condensers with recirculating cooling pond water that is saturated with fluoride salts. Most of this fluoride is allowed to precipitate as the recirculating water cools in large cooling pond systems. When forced to treat fluoride contaminated water, phosphate producers typically use lime or limestone neutralization prior to discharging effluent. A better environmental alternative is to use scrubbers to remove fluorides as fluosilicic acid prior to condensing the vapors in barometric condensers. If a market cannot be found for the fluosilicic acid, it can then be neutralized with phosphate rock to produce a weak phosphoric acid. This technique is not currently used because it is not profitable. This paper discusses Fluosilicic Acid neutralization with several calcium compounds such as phosphate rock, lime and limestone.

Catalysts for Sulphuric Acid and Ammonia Plants**Mr. Henrik Larsen – General Manager , Marketing & Sales Synthesis****Mrs. Ayten Y. Wagner – Area Manager – Catylest Devision****Haldor Topsoe – Denmark****Abstract:**

The first Part of this paper describes case stories disclosing some of the operating experience we have gained on VK69 and VK-701 LEAP5TM.

For many sulphuric acid plants the bottleneck for prolonged operating time between plant shutdowns is the screening requirement of Bed 1 due to increased pressure drop build-up caused by plugging by dust present in the feed gas.

An improved protection against pressure drop build-up can be obtained by the use of a dust protection catalyst in the top of Bed 1. In 2007 Topsee introduced a new dust protection catalyst in the shape of a 25-mm Daisy. Installation of a 15 cm top layer of this unique VK38 dust protection catalyst results in a doubling of the operating time between screenings compared to the 12 mm Daisy. Consequently, the number of time-consuming and expensive shutdowns for catalyst screening is reduced and at the same time significant savings in blower energy result from the lower pressure drop. Today, 4 years later, close to 80 installations with 25 mm Daisy dust protection catalyst are in operating around the world.

The second part of this paper discloses actual operating experience obtained from one of our 25-mm daisy dust protection installations.

Advanced Reforming Technology for Ammonia Plants

Haldor Topsoe AfS (Topsoe) supplies a full range of reforming technologies which also includes heat exchange reforming technology. The Haldor Topsoe Exchange Reformer (HTER) technology is applicable to many technologies such as syngas, hydrogen, methanol, and ammonia.

This paper describes how the HTER technology is adopted in an ammonia plant and what benefits can be offered to the ammonia industry. For a new ammonia plant, implementing the HTER reduces the size Of the primary reformer and due to high reforming temperature still retains a low methane slippage, which is crucial for ammonia production.

Various options are available for a capacity increase in the front-end of an ammonia complex. Out of these convective gas heated reforming stands out as an attractive option from both a technical as well as a cost effective perspective. The Haldor Topsisie exchange reformer (HTER) technology is a proven revamp option where a capacity increase of 20 -25 % can easily be achieved, while the methane leakage is retained at a low level.

The HTER teleology has now been in successful commercial operation since: early 2003. A full size industrial unit has been revamped with an HTER installed downstream of an Auto thermal Reformer (ATR), this has resulted in a 33% increase in reforming capacity.



Mr. Henrik Larsen



Mrs. Ayten Y. Wagner

IJC EXPERIENCES ON REVAMPING OF SULFURIC ACID AND PHOSPHORIC ACID PLANTS

Mr. AWINASH PESHWE, PLANT HEAD

IJC – Jordan



Abstract:

Frequent failure of High Pressure Scrubber in SAFCO-II Urea Plant caused continuous production loss.

After several shut downs and repairs equipment reliability could not be achieved to operate the plant at designed parameters.

In order to overcome the challenge on plant reliability, SAFCO Management decided to take the challenge to replace the equipment with upgraded material in May 2011.

Manufacturing of new Scrubber, Air lifting of 65 T new Scrubber and replacement was done successfully in short time to put the plant back in operation. Paper Content (not limited to the below, few more points may be added)

- | | |
|----------------------|-------------------------|
| 1. OBJECTIVE | 4. PRE-SD PREPARATIONS |
| 2. PROJECT SCOPE | 5. EXECUTION (SD PHASE) |
| 3. CHALLENGE IN HAND | 6. SUCCESS VALUE |
| | 7. SUCCESS STORY |

of any process is limited by the lowest capacity steps in the process.

Our IJC's experiences on debottlenecking like waste heat boiler limitation, sulfur flow restrictions, inadequacy in cooling systems & proposal of capacity enhancement with improved efficiency are discussed.

Replacement of High Pressure Scrubber in SAFCO-II Urea Plant

Mr. Bellary Muhammad Usman – Maintenance Superintendent

SAFCO - S. Arabia



Abstract

The Indo Jordan Chemicals Company is committed for its continual improvements in both operational and safety field at its Eshidiya complex comprising of sulfuric acid and phosphoric acid plants.

IJC is having 2000 MTPD sulfuric acid plant based on Monsanto's Double Conversion Double Absorption process and 700 MTPD of P₂O₅ phosphoric acid plant based on Hydro Agri's single stage hemihydrate process. Both the processes are in operation with full capacity since its commissioning.

Normally the process plants will have 10-15% extra margin than the nameplate capacities. We see lots of plants are expanded to higher capacities through modernization and optimization. Debottlenecking for incremental capacity costs less than the new plant and only it requires correct evaluation studies.

Debottlenecking is like removing the weakest link in a chain, maximum production capacity of any process is limited by the lowest capacity steps in the process.

Our IJC's experiences on debottlenecking like waste heat boiler limitation, sulfur flow restrictions, inadequacy in cooling systems & proposal of capacity enhancement with improved efficiency are discussed.

Session III







Chairperson:

Mr. Saed BOKISHA

**Plant Manager - Ruwais Fertilizer Industries (Fertil)
UAE**



1	Meeting environmental issues facing new and existing urea Fluid-bed Granulation with Plants <i>Mr. Harald Franzrahe – Process Manager</i>	Uhde Fertilizer Technology B. V.	Netherlands	
2	Revamping of a Conventional Total Recycle Urea Plant <i>Mr. Narayansamy Selvaraj – Head of Urea -1 Plant</i>	QAFCO	Qatar	
3	Best-practice on RBI driven Integrity Assurance from Concept to Implementation <i>Mr. salah Abdulaziz Zainaldin - Senior Inspection Engineer (Designated).</i>	GPIC	Bahrain	
4	Health, Safety and Environment in Fertilizer Industry Story behind APC Success in achieving 4000000 MHW Free of LTI-s <i>Mr. Sami Amarneh/ QES Manager</i>	APC	Jordan	

Meeting environmental issues facing new and existing urea Fluid –bed Granulation with Plants

Mr. Harald Franzrahe – Process Manager
Uhde Fertilizer Technology B. V. – Netherlands



Abstract:

In recent years many environmental regulations have been amended by the regulatory bodies. This has led to a significant reduction in the permissible emission levels for ammonia and urea dust for new urea fluid-bed granulation plants. But existing plant operators are also faced with the demands from their environmental authorities to reduce their emissions to the environment.

While the reduction of dust emissions can be achieved by using scrubbing systems with higher separation efficiency, reducing ammonia emissions in a urea granulation plant is more complicated. In principle significant ammonia reductions can be achieved by installing acidic scrubbing systems well known in the fertilizer industry.

In NPK or AN plants the resulting bleed stream from the acidic scrubber can be reintroduced into the process without any difficulty, as in these plants the bleed contains components which are already present in the plant and the product. For a urea fluid-bed granulation plant the situation is more complicated. In this case the bleed from the acidic scrubber contains components which cannot be processed in a standard urea synthesis and evaporation plant and which until now are usually not part of the product specification.

The bleed from the ammonia scrubber must be processed in some way. This processing can be done in various ways.

In accordance with our commitment to improve our fluid-bed granulation process UFT has developed options for achieving ammonia emission reductions from urea fluidbed granulation plants.

With UFT's Ammonia Convert Technology the acidic bleed from the ammonia scrubber has been successfully integrated into the granulation process.

In this paper various available and industrially proven options for granulation plant operators are presented. In especially UFT's proprietary Ammonia Convert

Technology, which combines minimized ammonia emissions with reduced production cost will be discussed.

Revamping of a Conventional Total Recycle Urea Plant

Mr. Narayansamy Selvaraj – Head of Urea -1 Plant

QAFCO – Qatar**Abstract:**

In July 2007 Qatar Fertilizer Company (QAFCO) and Urea Casale (USCA) signed a contract for revamping of the Total Recycle urea plant (Toyo technology) located in Mesaieed, Qatar. The original capacity of the QAFCO Urea-1 plant was 1000 MTD; the plant used to run, before revamping, at a capacity of 1320 MTD.

The scope of the Revamp project was to integrate the Urea-1 plant with a new 60,000 t/y Melamine plant designed with Eurotecnica technology. The revamping was aimed at increasing the urea synthesis capacity up to 1610 MTD (about 30% increase in capacity)

The increase in plant capacity was achieved by utilizing the recycle Carbamate flow coming from the Melamine plant (about 50% increase in Carbamate flow to the synthesis loop compared to the stand alone plant). Casale opted for revamping the synthesis unit with its High Efficiency Combined (HEC) process to improve the CO₂ conversion and minimize the modifications in the downstream sections. This involved installing Four new high pressure equipments i.e Secondary reactor, Stripper, Carbamate condenser and Mixing Tee. In addition to this, the HP Carbamate pumps were replaced from reciprocating pumps to Centrifugal pumps, to cope with the increased Carbamate flow.

Beside the Melamine integration, the other major objective of the Urea-1 revamp project was environmental improvement to eliminate the ammonia and urea emissions from Urea-1 plant to the sea. To achieve this, the crystallizer was replaced with an evaporation section and a brand new process condensate treatment unit of capacity 65 MT/h was installed. The treated condensate from this unit is suitable for use as Boiler Feed Water (after passing through Polishing Unit)

The project was executed using EP & C strategy. Urea Casale was responsible for the Basic & Detailed Engineering, Procurement part of the Project. Another contract was signed with a local construction contractor Qatar Construction Company (Qcon), for executing the construction part. Urea Casale provided site assistance during construction and also Supervision during commissioning and start up of the plant.

The project involved making around 450 Tie-ins. 80% of the construction work was carried out with the Urea-1 plant was running. The remaining 20% job was completed in a shutdown lasting 26 days. The complete project was executed with a very good safety record.

The performance test of the revamped Urea-1 plant is over. This is a successful revamp project, having met all its revamp objectives.

***Best-practice on RBI driven Integrity Assurance from
Concept to Implementation***

Mr. Nader A.Rahim - Inspection Superintendent
GPIC – Bahrain

**Abstract:**

In recent years, the applicable Legislation in a number of countries permits greater flexibility in the setting of inspection strategies (inspection intervals, methods and coverage) for pressure equipment and other static plant items, through the use of RBI (Risk Based Inspection) technology. It is a technology process which, when correctly applied, is used to formally optimize inspection efforts for each static equipment items of plant, whilst minimizing equipment failure risks caused by the relevant deterioration mechanisms. This paper outlines a reliable and proven RBI driven equipment integrity assurance process best-practice in RBI technology application and. The paper also describes the challenges faced by GPIC during the implementation and actual integration of the same into the existing systems, together with the RBI benefits which have been achieved to date. When this technology is implemented at any plant site, it has been shown to deliver

- _ Enhanced integrity
- _ More focused inspection strategies
- _ maintenance control strategies to reduce equipment failure risks
- _ Improved 'working together culture'
- _ Capture technical corporate memory

Health, Safety and Environment in Fertilizer Industry
Story behind APC Success in achieving 4000000 MHW Free of LTI-s

Mr. Sami Amarneh/ QES Manager
APC – Jordan



Abstract:

1. **Paper Summary:** achieving 4000000 MHW in APC free of LTI-s during the period from Feb-02- 2011 till September-08 by applying Safety Leadership and Management methodologies which significantly contributed in elevating the level of safety performance to a world class level.
2. **Detailed Slides Coverage:**
 - 2.1. Applying a safety management system according to the best and recent international safety standard-(OHSAS-18001:2007).
 - 2.2. Instilling , growing and sustain a vibrant safety culture that employs all APC employees in a continuous proactive safety dynamics by applying the concept of „Council driven Safety Management” by conducting „so far” 5 safety forums out of 8 scheduled forums for 2011. These forums are attended by 200 employees at each forum from management employees and non-management employees. The GM, DGM-s and the departments” managers attend these employees and they are heavily involved in them through robust designed presentations that enhance the safety culture in the company. The presentations in each forum are published in a booklet and a copy is distributed to each employee after each forum.
 - 2.3. Using the safety culture in Islam to serve the safety culture in the company by preparing a speech presented by the Company Religious Guidance Head and presenting it at each forum. This practice is unprecedented and it is exclusively applied by APC.
 - 2.4. Applying the concept of “Incident Recall Technique” at the safety forums designed for our Trucking drivers (3 out of 4 have already been conducted in 2011); at these forums we ask those drivers who encountered dangerous driving situations, in which *they have done something* to control the risk and accordingly they have succeeded to prevent the incident from occurrence, to present these situations in front of others” drivers (about 200 attendees). Through this practice; the hazards and risks are effectively communicated to other drivers as well as the operational ways of effectively controlling them.
 - 2.5. Using the randomness principle in selecting those few superintendents to present their safety presentations at the superintendents” safety forums (2 out of 4 have already been conducted in 2011). This practice creates the needed motivation at each superintendent to be up to his responsibilities as each of them will expect that may be he will be one of those who will be selected to give the presentation. The superintendent presentation addresses the actual performance on his annual safety objectives and the actions he took to eliminate the gap between the actual performance and the set objectives.
 - 2.6. Developing and implementing an effective safety procedure to monitor, control and improve the safety performance of our service providers.
 - 2.7. Applying a World Class Safety Incentives Scheme.
 - 2.8. Effective Management Review Meetings.






Session IV



Chairperson:

Mr. Mejbel ALSHAMMERI
HSE Manager - PIC
Kuwait



1	<i>10 Years of Safurex Experiences in Stamicarbon Urea Plants Mr. Joost Roes – Acquisition Manager Mechanical Engineer</i>	Stamicarbon	Netherlands	
2	<i>Capacity Increase of Urea Plants Mr. Thomas Krawczyk – Senior Process Engineer</i>	Uhde GmbH	Germany	
3	<i>M.P. Boiler Super Heater Coil Failure and Replacement Mr. Adel Mohammad Al Wahedi - Mechanical Engineer</i>	FERTIL	UAE	
4	<i>Carbon Dioxide Recovery Plant at GPIC – A Sustainable Option Mr. Jamal Ali Al Shawoosh - Methanol Plant Superintendent</i>	GPIC	Bahrain	
5	<i>Latest improvements in Indirect Cooling Technology for Granular Fertilizer Ms. Marietta Mansvelt - Technical Service Manager</i>	Solex Thermal Science Inc.	Canada	

10 Years of Safurex Experiences in Stamicarbon Urea Plants

Mr. Joost Roes – Acquisition Manager Mechanical Engineer
Stamicarbon – Netherlands

**Abstract :**

To combat the severe carbamate corrosion conditions prevailing in the synthesis section of urea plants, Stamicarbon started to develop in 1992 together with Sandvik Sweden a new stainless steel grade named Safurex[®]. Safurex[®] is a super duplex material having superior corrosion resistant properties, even at very low content of passivation air. The material is proprietary and solely intended for

Stamicarbon urea plants. The material was introduced in the market in 1996 and in 1998 the first Safurex[®] equipment were installed in existing urea plant to replace depreciated equipment. In 2006 Safurex[®] became the standard construction material and since then several Stamicarbon grass root urea plants have been commissioned or are under construction having a complete synthesis section in Safurex[®] material. This allows to reduce the passivation air from 0.6 vol % (which is advised for non Safurex[®] plants) to as low as 0.1 %.

During the past 10 years over 190 pieces of Safurex[®] equipment have been manufactured or are under construction varying from high pressure vessels like Urea Reactor, Pool Condenser, Pool Reactor, HP Carbamate Condenser, HP Scrubber, including HP piping and accessories such as (control) valves, HP ejector and safety valves.

Several inspections have been performed by Stamicarbon on Safurex[®] equipment since 1998 and experiences will be shared and compared with the corrosion behavior of the traditional stainless steels used in urea synthesis sections like 316L UG and X2CrNiMo 25-22-2.

First an overview will be presented on typical corrosion forms which occur in the synthesis section observed over the past 40 years in non Safurex[®] plants. Subsequently the corrosion behavior observed in more than 40 inspected Safurex[®] vessels will be discussed. The Superior corrosion resistance of Safurex[®] is clearly demonstrated, even at very low concentration of passivation air the synthesis section.

Capacity Increase of Urea Plants

Mr. Thomas Krawczyk – Senior Process Engineer
Uhde GmbH – Germany

**Abstract :**

In a typical natural-gas based ammonia / urea complex, there is a surplus of ammonia which is not converted to urea due to a limited availability of CO₂. Often, the desire for an increase of the urea production capacity comes together with the requirement to convert all ammonia to urea. Thus also modifications in the ammonia plant are necessary. The presentation discusses several options for urea plant revamps, including the modifications on the ammonia and CO₂ side. It provides examples for the technical solutions, making reference to actual projects under implementation.

M.P. BOILER SUPER HEATER COIL FAILURE AND REPAIR

Mr. Adel Mohammad Al Wahedi - Mechanical Engineer

FERTIL – UAE**Abstract:**

FERTIL operates a 1300 MTPD Ammonia Plant and 2300 MTPD Granulated Urea Plant with related utilities in Ruwais, Abu-Dhabi, UAE. The Utilities Plant has two Medium Pressure steam boilers (B-5501 A&B) fabricated and supplied by M/s Mitsubishi, Japan. The boiler was in service for 25 years without any problem.

Boiler details:

- Type of Boiler : Mitsubishi 36VP-18W
- Tag number: B-5501 A & B
- Evaporation (MCR) Capacity : 140 MT per hour
- Design Pressure : 48 Kg/cm²G
- Operating pressure: 40 Kg/cm²G
- Steam Temperature: 420 Deg C
- Feed water Temperature : 120 Deg C
- Fuel Fired: Natural Gas
- Number of Burners- 2 (front side)
- Commissioning Year : 1983

In the past 28 years during all turnarounds, the boilers were inspected by third party inspection agency and during the year 2005 boiler integrity study were carried by M/s MHI, Japan the Original Equipment Manufacturer, and concluded that boiler is in satisfactory condition.

During April 2008, while utilizing the plant shut down opportunity, routine inspection of the Medium Pressure Boiler (B-5501A) was carried out. Water dripping was seen from its super heater tube bank. Subsequent hydro-test of the boiler revealed leakage from the super heater coils. The leak was from three coils out of the total 28 coils. The leak was from the inner side of bend in the coil assembly. Generally, the inspection of the coils at this leak location is not possible by conventional NDT methods due to in-accessibility.

Due to non-availability of spare coils / resources, and to minimize the down time, the leaky coils were cut, removed and plugged at the headers. Final hydro-test was done and the boiler was taken in to service and kept at 50% load. Additional monitoring facility was provided to ensure the safe operation of the boiler.

Based on the failure, and long service life of the boilers, it was decided to replace the super heater coils in both boilers and accordingly the materials were procured from the Original Equipment Manufacturer, M/s Mitsubishi, Japan and replacement was done during the year 2009.

This paper describes the sequence of activities during the leak repair, action plan for procurement of the coils, super heater coil replacement jobs, the failure investigation of the leaky coil carried out, usage of advanced inspection techniques to inspect in-accessible

locations. Material of the super heater: 2¼ Cr 1 Mo steel. Detailed study and analysis indicated that the leak was due to internal thinning caused by caustic attack

Carbon Dioxide Recovery Plant at GPIC – A Sustainable Option

Mr. jamal Ali Al Shawoosh – Methanol Plant Superintendent

GPIC – Bahrain



Abstract:

The Gulf Petrochemical Industries Co. (GPIC) owns and operates an integrated petrochemical processing complex comprising 1200 MTPD each of single stream

Ammonia and Methanol plants, commissioned in 1985 and 1700 MTPD of single stream Urea plant, commissioned in 1998. In the original design philosophy of 1985, 275 MTPD of Carbon Di-oxide (CO₂) from Ammonia plant was utilized to produce 120 MTPD of methanol (total being 1200 MTPD) and the balance CO₂, 1015 MTPD from Ammonia Plant was vented to the atmosphere.

However, after the commissioning of the Urea plant in January 1998, all the CO₂ produced in the Ammonia plant was utilized for urea production. This led to the reduction in methanol production by about 120 MTPD as no further CO₂ was available to achieve design capacity of 1200 MTPD of methanol.

Purely for environmental considerations and in order to bring the methanol production back to 1200 MTPD level and also to test maximum capacity of Urea plant that can be achieved above its normal capacity with additional CO₂ from CDR plant and at the same time cut down on green house gas release to the environment; GPIC installed a Carbon

Di-oxide Recovery (CDR) plant (450 MTPD capacity of CO₂) as it was seen as a very viable and sustainable option to enhance methanol production without the need for additional natural gas.

Latest improvements in Indirect Cooling Technology for Granular Fertilizer

Ms. Marietta Mansvet- Technical Service Manager

Solex Thermal Science Inc. – Canada



Abstract:

Since more than 20 years, Solex indirect cooling technology has found it's place in the fertilizer industry and proven it's reliability in more than 120 installations for all types of fertilizer.

During the last few years new developments have been made based on intensive research work to improve the operation performance with the target of “no caking – no cleaning”. Installations in Middle East, India and other countries are the living proof of Solex's capability to model the operating conditions to meet the reality.

Solex wants to share this experience and present their latest technology, which ensures operator friendly equipment as well as providing the most cost effective solution to cooling fertilizer.

Session V



Chairperson:

Dr. Abdelhak KABBABI

Head of Dept. Environmental - OCP

Morocco



1 *Port worker development programme*
Issa Awad HASAN - Business Development Manager -

JNSL

Jordan



2 *Analysis of Safety Performance of Indian Fertilizers Plants*
Mr. Manish Goswami - Dy. Chief (Technical)

FAI

India



3 *Commissioning and Revamping Fertilizer Plants Through an Objective Oriented Approach*
Mr. Gian Pietro Testa – Consultant for Saipem (Italy) - Business Development Manager O.V.S (Italy)

K&T

Monaco



4 *Environmental friendly way of spent catalyst recycling*
Mr. Clemens Kuhnert - Area Manager Middle East & Africa

**Nickelhütte
Aue GmbH**

Germany



5 *A new approach for Urea Plant Optimization using Advanced Process Control*
Mr. Christiaan Moons – Sales Director
Mr. Luc Dieltjens - Process Engineer

**IPCOS-
Stamicarbon**

Belgium



Analysis of Safety Performance of Indian Fertilizers Plants

Mr. Manish Goswami - Dy. Chief (Technical)

FAI - India



Abstract:

FAI has been conducting safety survey of fertiliser plants for the past several years to assess the status of the safety performance of the industry as a whole and to help

fertiliser plants improve their performance to establish a safe and healthy working environment. The present survey was carried out for 31 ammonia-urea and NP/NPK complex fertiliser plants for a period of five years for the years 2005-2010. The paper provides the results of analysis of accident data with respect to various safety parameters viz. incidence rate, severity rate and fatality rate. The analysis also identifies the causes of incidents and fatalities and plant areas prone to incidents so that plant management can address the issues to minimize the occurrence of incidents.

COMMISSIONING AND REVAMPING FERTILIZER PLANTS THROUGH AN OBJECTIVE ORIENTED APPROACH"

Mr. Gian Pietro Testa – Consultant for Saipem (Italy) - Business Development Manager
O.V.S (Italy)

K&T – Monaco



Abstract:

The paper brings out how the strategy and road map has to be developed to complete the very challenging world class projects along with the implementation of revamping ones.

Theoretical aspects and the straight implementations of the principles are focused and highlighted in order to provide tools to accomplish the different expectations that all the involved Entities have in mind to

make business and to fulfil commitments.

The framework, into which the activities are confined, is considered the base for getting results and its dynamic structure the main tool for preparing action plans and corrective ones.

Leadership's attitude and capability to carve out strategies and to provide a sure focal point for the Project's success are considered.

Examples are made available to make the issues more understandable and familiar.

Environmental friendly way of spent catalyst recycling

Mr. Clemens Kuhnert - Area Manager Middle East & Africa

Nickelhütte Aue GmbH – Germany**Abstract:**

Why it is important to recycle metal

- **Recycling Saves the Earth**
metals are precious natural resources of the Earth. Metal deposits are non renewable resources that will run out if exploited at the present rate.
Example: NHA recycled 3300 t of nickel instead of the deep impact in the environment to explore 230 000 t of ore. (average Ni 1,45%)
- **Recycling Saves Energy**
It takes less energy to melt down waste metal and recycle it than it does to produce new metal
- **Recycling Helps Mitigate Global Warming and Reduce Pollution**
Using recycled metal reduces CO2 emissions and air pollution. By saving energy in industrial production through recycling, the greenhouse gas emissions from factories and industrial plants are lessened.
- **Recycling Reduces Waste Products in Landfills**
By recycling, we can lessen the waste materials that are placed into landfills and we are able to make the most out of these materials Reduces the amount of metal going to landfill as despite a growing awareness of the value in recycling metal,
- **Recycling Helps you Save Money**
Recycling provides ways to save money. With selling spent catalyst you will benefit on the recycling system.

A new approach for Urea Plant Optimization using Advanced Process Control

Mr. Christiaan Moons – Sales Director

Mr. Luc Dieltjens - Process Engineer

IPCOS-Stamicarbon – Belgium**Abstract:**

Production managers of urea plants are under pressure to maximize profitability due to global competition, tightening legislation on ecosphere load, and fluctuation of oil/gas prices. The joint Stamicarbon-IPCOS Sirius@Max optimization solutions for urea plants

relieve these pressures and increase the plant efficiency. Optimizing urea plants often means maximizing the production and/or minimizing the energy consumption.

This paper describes how the combination of Stamicarbon's urea process know-how together with IPCOS' model predictive control technology is used to continuously push the plant operation to the limits.

Sirius@Max optimizes the operation of the Urea plant minute by minute, every hour of the day, resulting in improved reliability of the operation and guaranteeing that the highest possible production level can be maintained under all circumstances.