Going to the Next Level Together

Operation, Engineering and Maintenance Support for Nitrogen Fertilizer Plants
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1 ABOUT US

AmmoniaKnowHow.com and UreaKnowHow.com (AKH & UKH) are an independent group of nitrogen fertilizer specialists with an impressive number of years of experience in designing, maintaining and operating nitrogen fertilizer plants. Our mission is to improve the safety and performance of all nitrogen fertilizer plants worldwide.

We are specialized in ammonia, urea, methanol, nitric acid, UAN and NPK technologies covering process, mechanical, instrumentation and process safety disciplines. Our services include plant commissioning and start-up, operation and maintenance support, process safety optimisation, ammonia tank de-commissioning and inspection, plant revamp and turnaround support, project management consultancy and training services.

2 REVAMP AND COMMISSIONING FOR NITROGEN FERTILIZER PLANTS

Execution of revamps and brownfield modification projects is a complex task due to the integration challenges with existing facilities and systems.

AKH & UKH multi-disciplinary engineering teams are therefore formed to meet the needs of your project and develop technical definition at the appropriate level of detail.

Commissioning support focus areas include:

- Development of commissioning procedures and plan
- Consulting (project controls development, project certification)
- Provision of technicians (process field, mechanical, instrumentation, electrical)
- Supervision and engineering (all disciplines)
- Plant testing and commissioning

3 PMC SUPPORT

Specific process technologies like ammonia, urea, methanol and other nitrogen syngas processes require specialised skills and experience for delivering a successful project. Understanding the unique challenges of the fertilizer technologies, for example how the new revamp urea plant units will work and interact with the existing facilities or what the challenges are during commissioning of a new type of ammonia process, requires specific plant operation and commissioning knowledge and experience within the fertilizer industry.

Large EPC contractors are looking for our specialist expertise during engineering and commissioning of large-scale grass root and revamps projects worldwide.

As support team for Project Management Consultancy (PMC), we help our clients to achieve their investment objectives and deliver their projects, by offering consultancy services from the early phase of engineering to the operational phases. We understand that the success of a project depends upon the project management team and how it integrates with both the EPC contractor’s project team and the Client’s own representatives.

We offer the following support services for PMC ammonia, urea and methanol projects:

- Engineering and design consultancy
- Plant commissioning and start-up support
4 OPERATIONAL EXCELLENCE PROGRAM FOR NITROGEN FERTILIZER OPERATORS

What is Operational Excellence?
Companies pursuing operational excellence are continuously managing costs and optimising business processes across functional and organisational departments to allow them to operate extremely efficiently and effectively.

What does it take to achieve Operational Excellence?
To develop specific competences related to cost management, quality management and process excellence. Also, to create a set of structures, systems, values and cultures that support these competences.

How long it takes the journey to Operational Excellence?
Based on industry best practice the timeframe to achieve Operational Excellence compliance is 5 years.

Figure 1: Timeframe for Operational Excellence Design and Deployment

The purpose of Phase 1 is:

- Develop the Engineering Guidelines and Procedures,
- Develop Maintenance and Reliability deliverables,
- Perform HAZID, HAZOP, LOPA and risk assessment studies to understand operational issues
- Develop HAZOP close action plan including engineering support for effectively closing the action,
- Develop a QA/ QC plan and deliverables,
- Implement and secure the mindset towards Process Safety and Safety in Operation.
The purpose of **Phase 2** is:

- Maintenance support activities,
- Technical support for HAZOP actions close-out and ALARP demonstration,
- Cost Benefit Analysis for future CAPEX projects related with HAZOP actions,
- Finding cost effective and engineering sound technical solution for future projects,
- Selection of technical solution for future improvements in line with licensors technology,
- Development of a training program for all personnel involved in operations and maintenance.

[Click here for more information](#)

### 5 PROCESS SAFETY FOR NITROGEN FERTILIZER TECHNOLOGIES

AKH & UKH support Nitrogen Fertilizer plants to implement 17 Elements from total of 20 elements of Process Safety Management (PSM) that was initiated by the US Occupational Health & Safety Administration (OHSA) as per **Figure 2** below.

The elements marked with red dotted line require technical knowhow and experience in the fertilizer industry.

![Figure 2. The 17 elements of PSM program covered by AKH and UKH support (red dotted line)](image-url)
6 PROCESS OPTIMIZATIONS

Operating at optimum process parameters in the ammonia, nitric acid and urea plant leads to maximum profit.

AmmoniaKnowHow.com and UreaKnowHow.com have the know-how and experience to support you in establishing the right and optimum key process parameters, perform troubleshooting exercises and propose innovative revamp steps.

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Figure 3. Optimising process parameters

7 TROUBLESHOOTING CORROSION PROBLEMS

Ammonia, nitric acid and urea plants suffer from very specific corrosion issues, which can be caused by operating at off design process parameters, non-optimum design aspects, applying non-optimum materials of construction or conditioning issues of steam and cooling water.

We have abundant know how and experience to support you in troubleshooting corrosion problems finding the optimum solutions for you. We also have abundant expertise and know how available in defining corrosion inspection programs based on Risk based Inspection Principles.

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Figure 4. Troubleshooting corrosion problems
8 LEAK DETECTION SYSTEM FOR UREA HIGH PRESSURE EQUIPMENT

UreaKnowHow.com developed for the high pressure urea equipment an active, vacuum based leak detection system, with an accurate and reliable ammonia detector. The UreaKnowHow Leak Detection System is the best system available in the market and meets the Probability of Failure on Demand requirement of maximum 0.01.

The DCS operator will be warned in case there is 1) a lack of vacuum pressure, 2) clogging, 3) malfunctioning of the ammonia detector and of course 4) a liner leak is present.

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Figure 5. UreaKnowHow Leak Detection System

9 AMMONIA STORAGE TANKS DECOMMISSIONING

We provide a detailed inspection plan, followed by a HAZOP study and risk assessment at the beginning of activity. A detailed commissioning procedure is developed covering all steps required for ammonia storage tank de-commissioning and re-commissioning:

- Options for decommissioning process
- Emptying the tank
- Tank heating up process with hot nitrogen vapours
- Key process parameters
- Tank valve isolation for heating purpose
- Inerting of system and purging with nitrogen
- Key process parameters
- Tank blinding location and specifications
- Over-rides
- Purging the tank with air
- Etc.

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Figure 5. Ammonia storage tank inspection
10 TRAINING PROGRAMS

More than 800 engineers, managers and shift supervisors have already participated in the UreaKnowHow.com Training Programs.

Our training programs for ammonia, nitric acid and urea plants include process, operational, mechanical, maintenance, corrosion, safety topics and practical workshops.

We organise these at a central location or at your facilities. We can customise its content to your wishes.

Click for more information about:

Basic Urea Training, Advanced Urea Training, SHE Training for ammonia and urea plants and Process Safety in Operation of Ammonia plants

11 AKH & UKH TEAM

<table>
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<tr>
<th>Name</th>
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<tr>
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<tr>
<td>Alex Toma</td>
<td>Engineering &amp; Technical deliverables and project implementation</td>
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Detailed CVs for each team member can be provided on request.
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