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AFA WORKSHOP

Health, Safety & Environment
in Fertilizers Industry:

Time for Excellence

Program by:



4-6/9/ 2018

Bahrain

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DAY 1: September 4, 2018

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Welcome and Introduction

Barry Wilkes, NEBOSH Director of Strategy, UK

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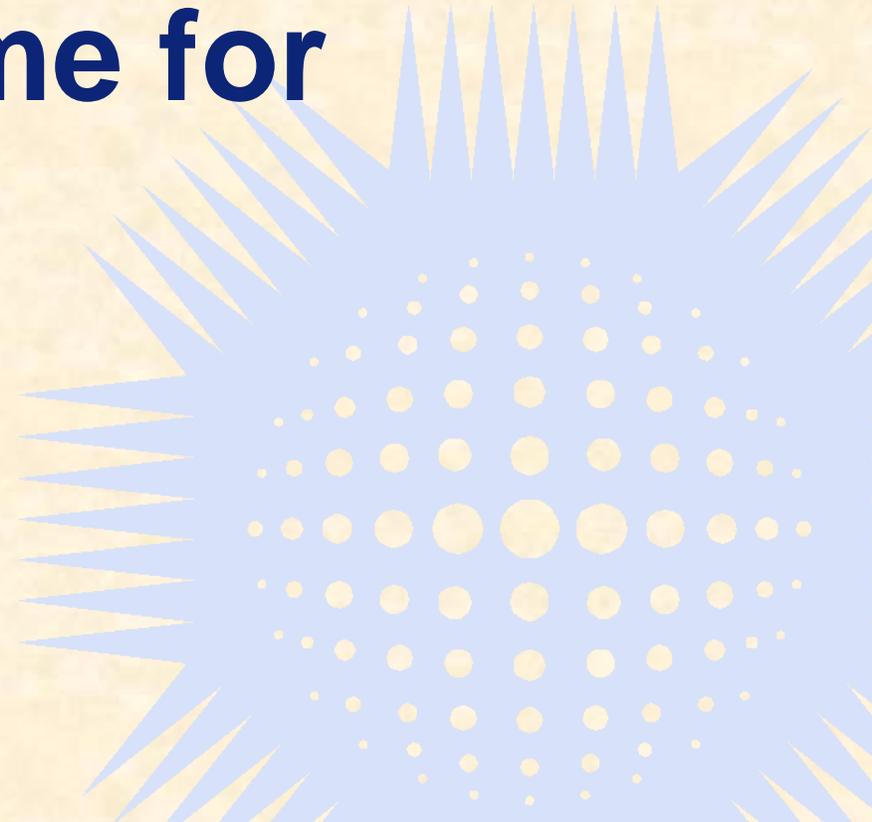
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Health, Safety & Environment in Fertilizers Industry: Time for Excellence

04 September 2018

Barry Wilkes – Director of Strategy



Agenda

- This Morning

09.15 Welcome and introduction – Barry Wilkes

09.45 Organisational learning and the management of process change – Hasan Alaradi, RRC

10.45 Coffee

11.15 Contractor safety management, Hasan Alaradi,

12.15 Lunch

Agenda

- This Afternoon

1315 Process safety leadership - Hasan Alaradi,

**1415 Asset management and maintenance strategies - Barry
Wilkes**

1445 30 minute coffee break

1515 Focus on occupational health - Dr. Maha Al Shehabi,

1600 Male mental health - Dr. Maha Al Shehabi



About NEBOSH

- National Examination Board in Occupational Safety and Health
- Established by UK Professional body in 1979 to provide qualifications for Safety and Health Practitioners
- Non-profit charity





About NEBOSH

Charitable Aims

We aim to deliver our vision by raising competence in health, safety and environmental management in the workplace through a framework of qualifications, rigorous awarding procedures and promotion of high quality education.



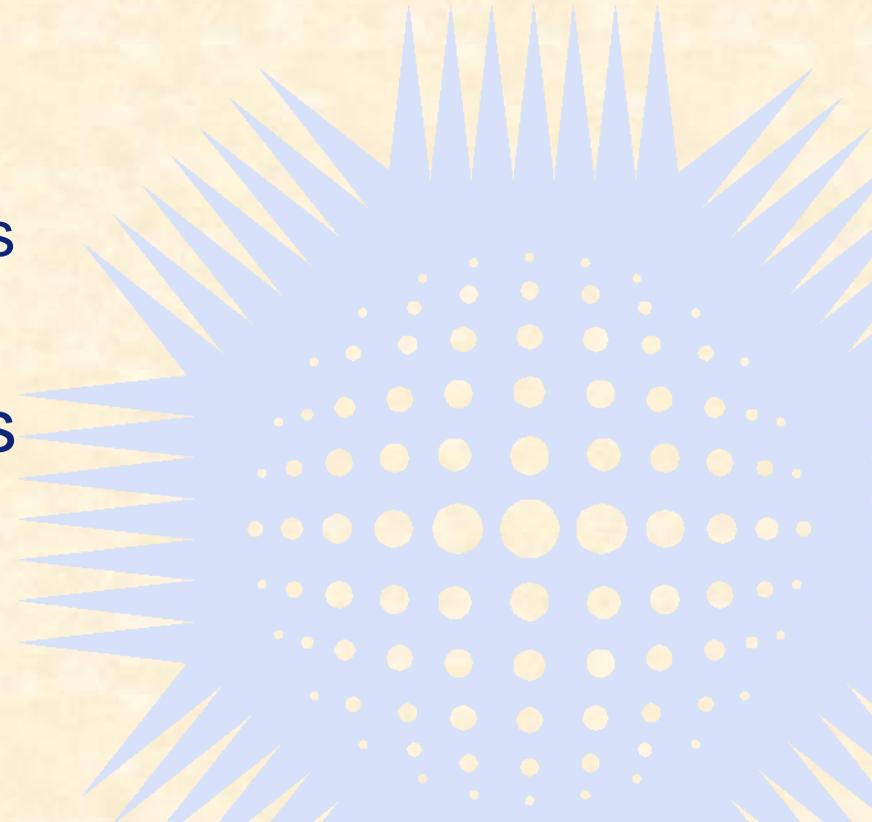
About NEBOSH

- Is accredited by the British Government as an “Awarding Body”
- Develops syllabuses
- Accredits course providers to deliver courses
- Sets and marks examinations
- Issues Qualifications to successful students



About NEBOSH

- Accredited by the Scottish Qualification Authority (SQA)
 - SQA regulate all qualifications offered in Scotland, except degrees
 - UK-wide regulatory remit
- Awarding Organisation:
 - Develop syllabuses
 - Accredit course providers to deliver courses
 - Set and mark examinations
 - Issue Qualifications to successful students

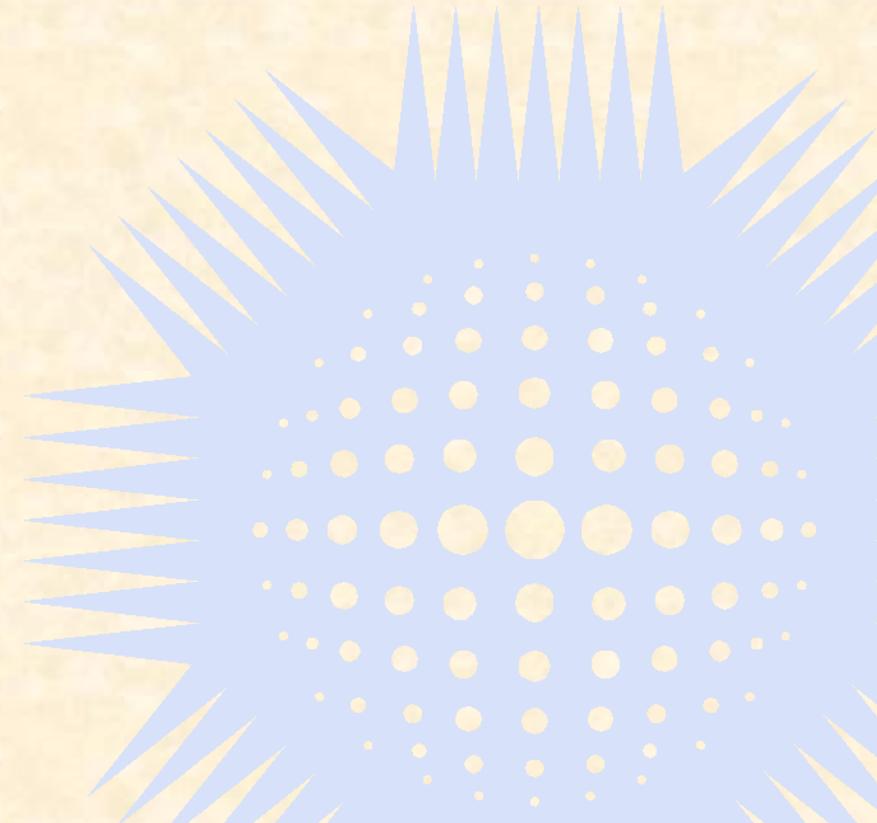




Our Global Reach

In 2017/18:

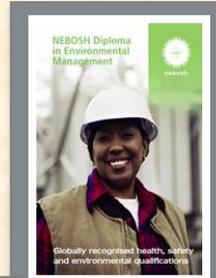
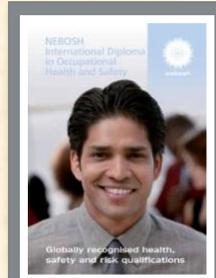
- 623 course providers
- Ran 160,000 assessments
- For 17 qualifications
- Taken by around 50,000 people
- In 132 countries
- In one of 8 languages



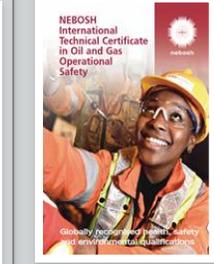
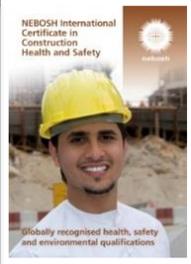
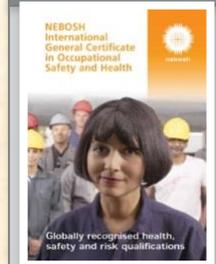


Our Qualifications

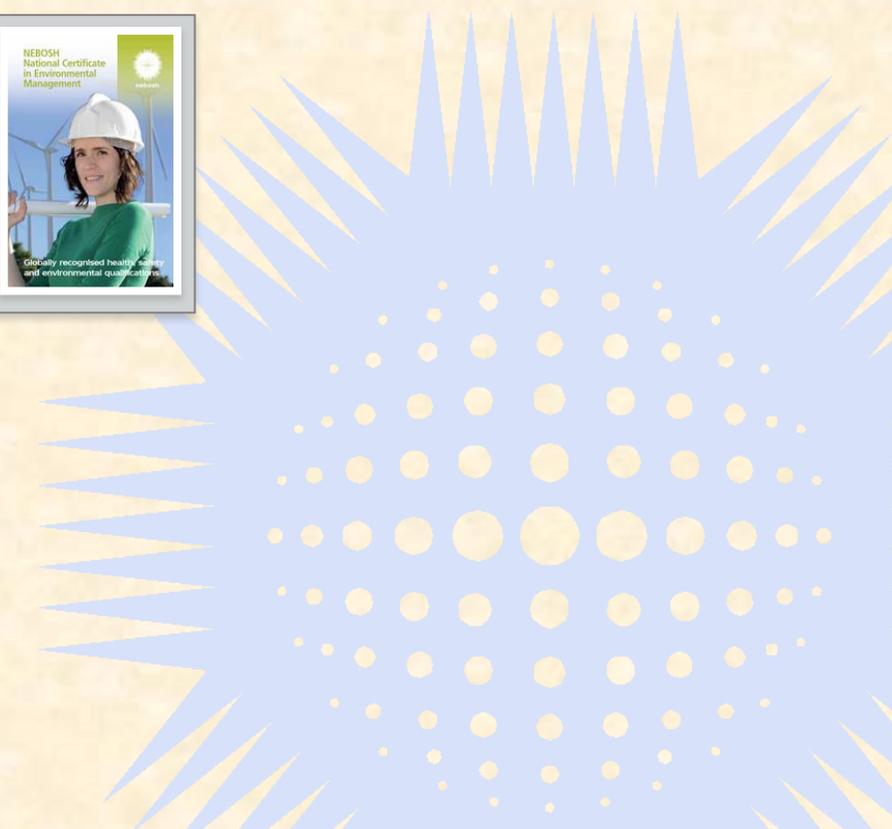
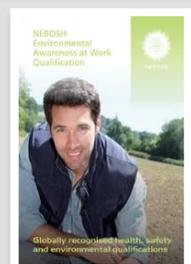
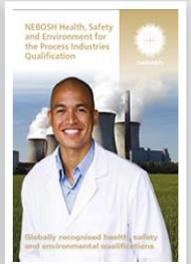
Diploma



Certificate

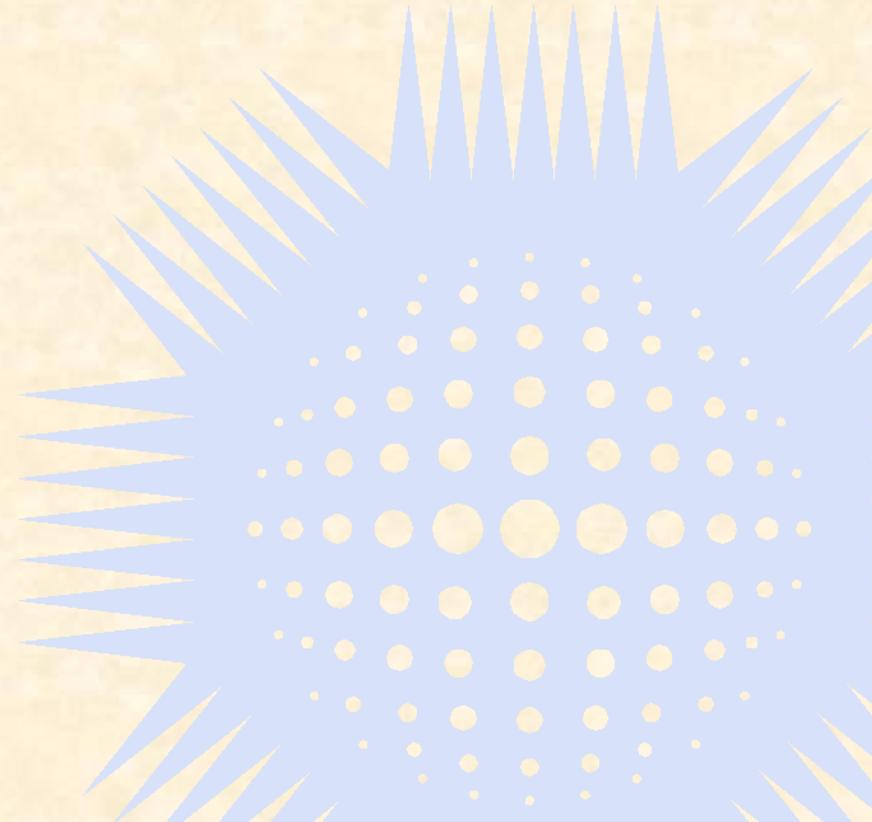


Award



Highlights of 2017/18

- Joint qualification development with UK Labour Inspectorate
- Launched:
 - Process Safety management
 - Leadership excellence
- In development:
 - Incident investigation



Our Qualifications

HSE Certificate in Process Safety Management (PSM)

- Process safety leadership
- Management of process risk
- Process safety hazard control
- Fire protection and emergency response
- 34 hours tuition time / 20 hours private study
- 40 question multiple choice exam



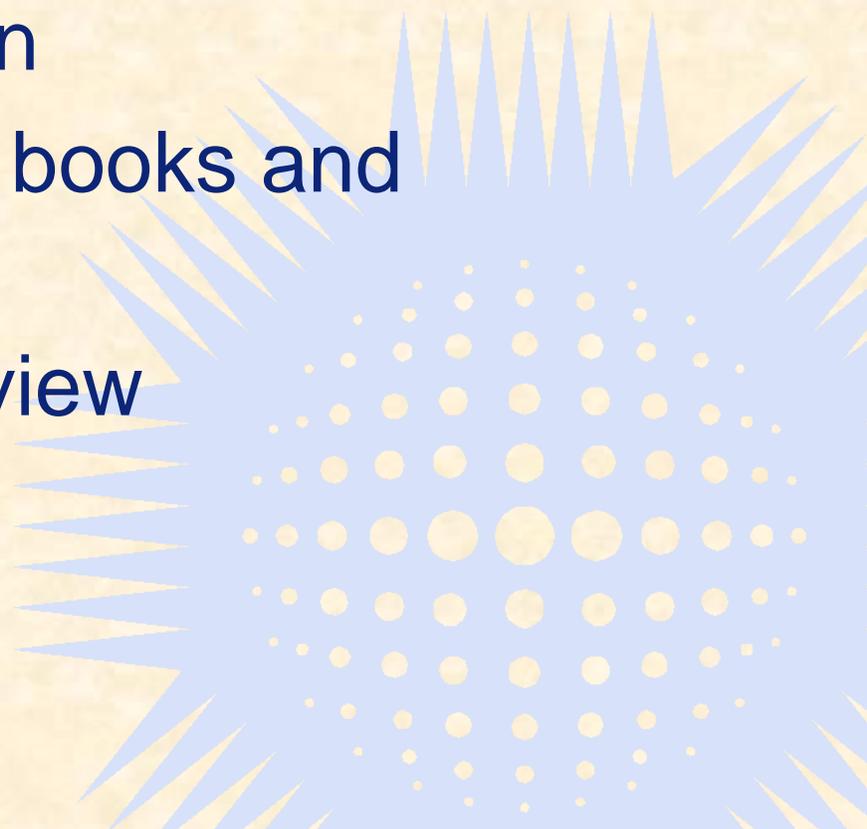
Our Qualifications

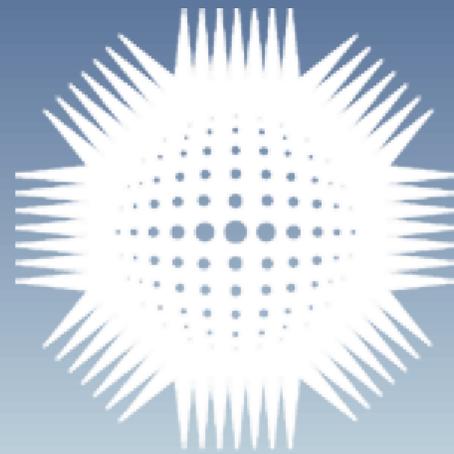
HSE Certificate in Health & Safety Leadership Excellence

- Leadership behaviours
- 1 Day
- Reflective learning assessment



Plans for 2018/19

- Launch of new IT system
 - New types of assessment possible
 - On line marking pilot and evaluation
 - Broader range of NEBOSH course books and supporting materials
 - Implementing the Qualifications review
 - New CEO
- 



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Organisational Learning and the Management of Process Change

Hasan Alaradi, Managing Director RRC, Middle East

Time for Excellence

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Contractor Safety Management Selection and Ongoing Quality

Hasan Alaradi, Managing Director RRC, Middle East

Time for Excellence

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Process Safety Leadership and an Introduction to the Health and Safety Executives 'Health and Safety Leadership Values'

Hasan Alaradi, Managing Director RRC Middle East

Time for Excellence

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PSM Assurance Through Asset Management and Maintenance Strategies

Barry Wilkes, NEBOSH Director of Strategy

Matt Powell-Howard, NEBOSH Qualification Development Manager, UK

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PSM assurance through asset management and maintenance strategies

Barry Wilkes
NEBOSH Director of Strategy



Consequences of failing to manage the integrity of assets



- Damaged, wearing or defective equipment can fail and cause leaks.
- Equipment failure can impact plant safety and productivity.
- Safety systems may fail to operate.
- Breakdown maintenance is expensive and less effective than preventative maintenance.

Key terms

Asset



An item of equipment or an area of production plant

Asset integrity



The ability of an asset to operate as intended effectively and efficiently over its entire lifespan whilst ensuring the health and safety of those exposed to it, including the environment.



Integrity standards

- Consideration of relevant standards at design stage.
- Standards ensure safety and integrity.
- For example:
 - EN ISO standards;
 - welding standards;
 - pressure ratings.



Group discussion

An organisation doesn't currently have a process to manage and maintain the integrity of plant and process equipment.



- What arguments could you use to convince the management that such a system is needed?



Asset integrity through the lifecycle

Phases

1. Design

Designed to be safe.

2. Procurement, construction installation and testing

Build completed correctly.

3. Commissioning

Standards checked and signed off.

4. Operations

Operate within design intent; maintenance and inspection.

5. Modifications

Planned and assessed first.

6. Decommissioning

Safe removal from operations.

Selection of equipment for the operating environment

Considerations include:

- flammable atmospheres.
- wet conditions;
- harsh environments (eg, salty atmospheres);
- corrosive chemicals.

For example, in potentially flammable atmospheres where vapour or dust can result in fire or explosion, ATEX approved equipment must be used:





Plant maintenance documentation

- Maintenance records retained.
- Some are legally required, eg, the statutory records of pressure systems.
- Can be paper or electronic, must be traceable.



Risk-based maintenance and inspection strategies

Three types

- Breakdown maintenance.
- Condition monitoring.
- Planned preventive maintenance.

MUST retain records for all!



Group discussion

Which maintenance activities are carried out in your organisation?



Fit them into the three maintenance types.



Risk-based calibration of instrumentation

- An essential activity in the process industries
- The consequences of neglecting to maintain calibration can cause:
 - failure to meet the quality system;
 - safety risks for employees and customers;
 - poor product quality and loss of reputation;
 - failure to comply with legislation, causing the loss of the license to operate;
 - unexpected downtime;
 - economic losses.

Risk-based calibration of instrumentation

- The accuracy of measurement instruments drift over time.
- Users must check instruments periodically to see if they have drifted and make adjustments as necessary.
- Process owners should take a risk based approach (SFARP) to establishing calibration and inspection criteria.





Group discussion

Give some examples of essential instrumentation in your workplace.



Would workers die or be injured if the instrument did not read correctly? (Confined Space Entry)



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OCCUPATIONAL HEALTH

Maha Al Shehabi, RRC, Middle East

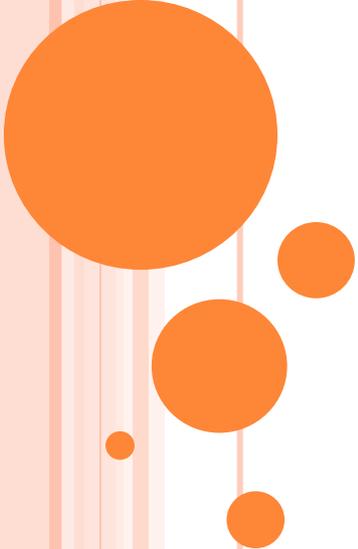
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OCCUPATIONAL HEALTH

Dr. Maha Al Shehab

**Health, Safety & Environment In Fertilizers
Industry. Time For Excellence**

WHAT IS HEALTH?

Health is defined as:

- **“Health is more than the absence of sickness!
It is a state of spiritual, mental and physical well-being, which enables a person to face any crisis in life”**
 - **Pericles, 430 B.C.**



WHAT AFFECT YOUR HEALTH

Health Issues are affected by

- **Your Lifestyle and its contributing factors** such as your eating habits, exercises, alcohol & drugs, stress, etc
- **The Environment such as work**, type of activities conducted, materials handled, protection provided and level of risk awareness, etc

Your Health is Your Responsibility don't leave it to others



OCCUPATIONAL HEALTH (ILO/WHO)

- ✓ **Promote and maintain** the highest degree of physical, mental & social well-being of workers of all occupations
- ✓ **Prevent** workers from departures due to health caused by their working conditions
- ✓ **Protect** workers in their working environment from hazards and risks usually causing adverse health effects
- ✓ **Place & maintain** a worker in an occupational environment adapted to his/her physiological ability



DEFINITION

- The modern definition of Occupational Health (ILO and WHO) is:
 - *“The promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations – total health of all at work”*



OCCUPATIONAL HEALTH AIM

- ✓ **Ensure the highest possible degree of physical, mental and social well-being of workers in all occupations;**
- ✓ **Prevent occupational illnesses and exposure to hazardous Substances**
- ✓ **Eliminate or Control hazardous working condition**
- ✓ **Periodic Conduct Health Surveys and Assessments**
- ✓ **Protect employees from adverse Occupational health Hazards**
- ✓ **To ensure that employees are aware of Health Hazards at their work**
- ✓ **Ensure that employees are provided with the required tools so that they are protected from any work related Health issues**
- ✓ **Conduct Analyses that help predict health outcomes**



HAZARD AND RISK

HAZARD

- any source of potential damage, harm or adverse health effects on something or someone under certain conditions at work

RISK

- the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard.



WORKPLACE HAZARDS

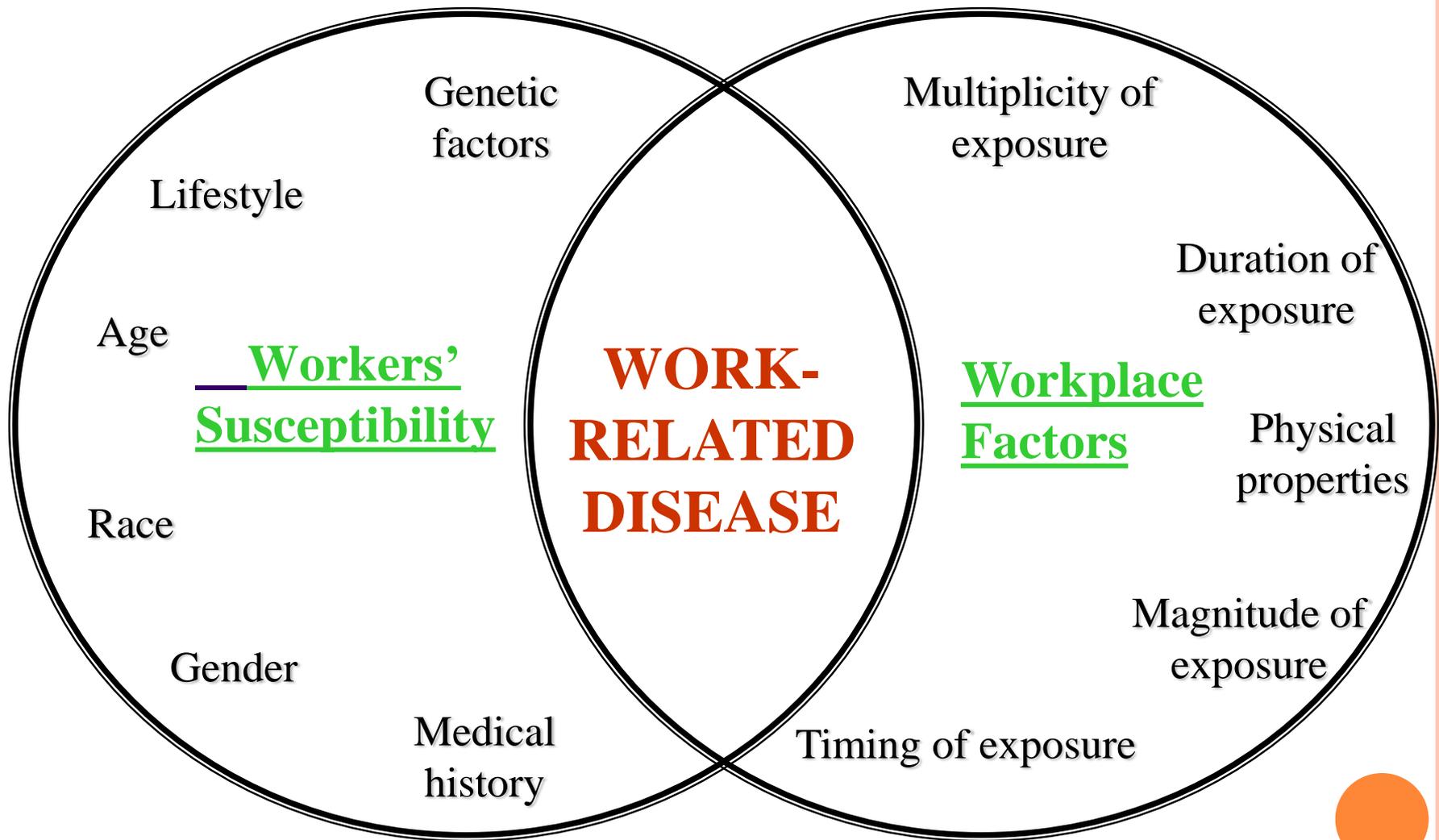
Safety Hazards

- working conditions where harm to the workers is of an immediate and violent nature
- result in broken bones, cuts, bruises, sprains, loss of limbs, etc.
- the harm results in some kind of injury to the worker
- associated with poorly guarded or dangerous equipment and machinery

Health Hazards

- working conditions which result in an illness
- exposure to dangerous substances or conditions, such as chemicals, gases, dusts, noise etc.
- often, latency between exposure and disease





HAZARDS

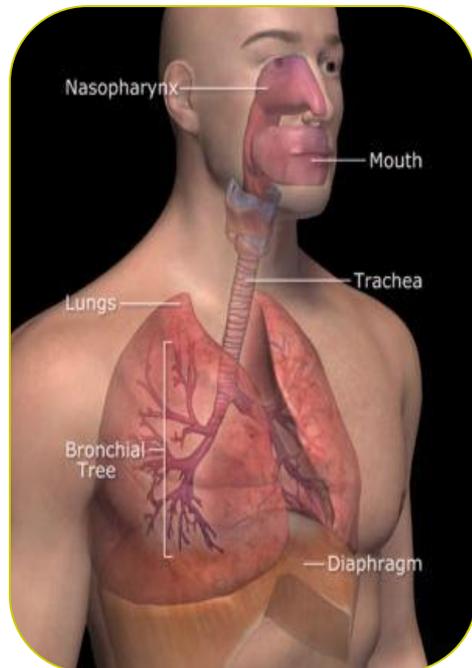
- Chemical Hazards
- Physical Hazards
- Biological Hazards
- Ergonomic Hazards



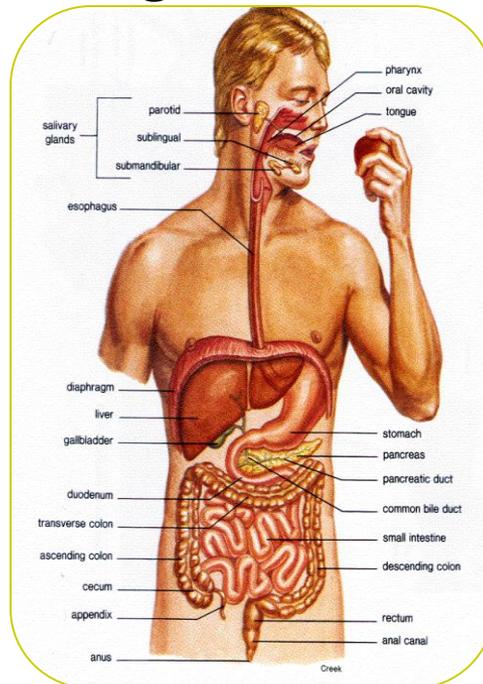
CHEMICAL HAZARDS

○ Routes of entry into the body

Inhalation



Ingestion



Skin contact



CHEMICAL HAZARDS

Classification of Toxic Effects

- Local toxicity- occurs at the site of chemical contact
- Systemic toxicity- occurs distant from point of contact, may involve many organ systems
- Acute toxicity- occurs almost immediately (hours/days) after an exposure
- Chronic toxicity- represents cumulative damage to specific organ systems; occurs many months or years to have recognizable clinical disease



PHYSICAL HAZARDS

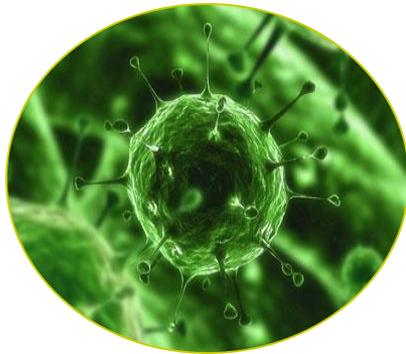
- Noise
- Vibration
- Extreme Temperature
- Illumination
- Radiation



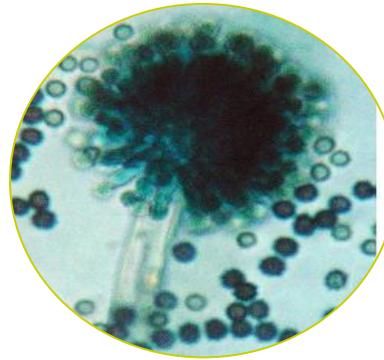
BIOLOGICAL HAZARDS

- Diseases or illnesses can occur from biological sources:

VIRUSES
(Influenza)



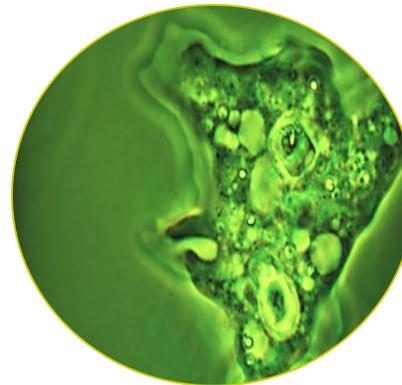
FUNGI
(Histoplasmosis)



BACTERIA
(Mycobacterium
Tuberculosis)



PARASITES
(Hookworm)



ERGONOMIC HAZARDS

- Ergonomic hazards can cause work-related musculoskeletal disorders (MSDs).
- MSDs are injuries and illnesses that affect muscles, nerves, tendons, ligaments, joints or spinal discs.

Some jobs include tasks which can cause injuries, such as:

- Lifting
- Awkward postures
- Forceful gripping or pinching
- Repetitive motions
- Hand-arm vibration
- Prolonged sitting or standing



GROUP EXERCISE



GROUP EXERCISE



Workplace accidents, illness and incidents

are **preventable**

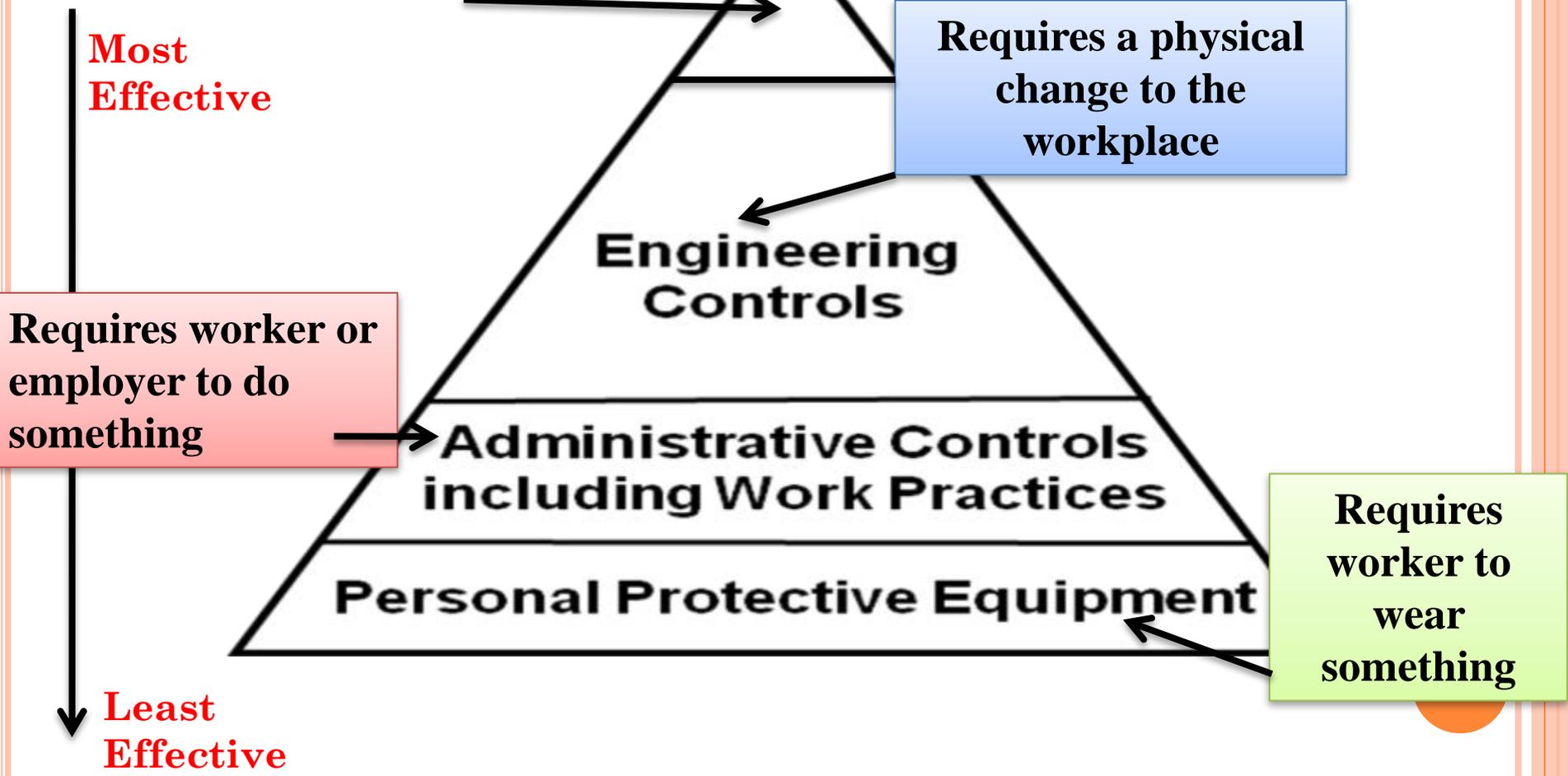
provided that

Health and Safety
is **Managed**



HIERARCHY OF CONTROLS

Elimination/Substitution



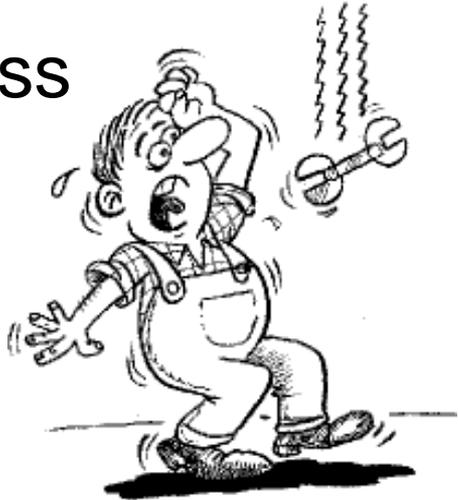
GROUP EXERCISE

- What are the causes of accidents at the workplace?
- What are the consequences of a workplace accident?



WHAT COULD HAPPEN?

Near-miss



Minor injury



Major injury



Death



RISK ASSESSMENT

- **Identify the hazards**
- **Identify who might be harmed**
- **Evaluate the risks**
- **Record your findings**
- **Review the assessment**



CONTROLLING THE RISK

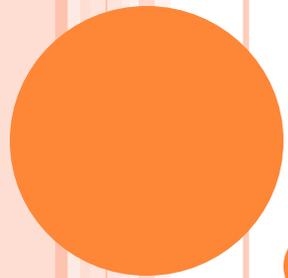
- If the assessment of risk shows that further action is necessary, then control measures should be selected according to the hierarchy of risk control



HIERARCHY OF RISK CONTROL

- Elimination of the risk. This can be achieved through redesigning the activity or equipment to eliminate the release of the hazard.
- Reduction of the risk at source through engineering controls. This can be achieved by enclosing the activity or equipment to capture and/or absorb the hazard, dilute the hazard or release it into a safer place.
- Minimising the risk through procedural controls. This involves implementing systems and procedures so that work is carried out in a particular way that limits exposure to the hazard.
- Use of appropriate personal protective equipment (PPE).





HEALTH SURVEILLANCE

HEALTH SURVEILLANCE

Health surveillance means having a system to look for early signs of ill-health caused by work in order to:

- Detect adverse effects early.
- Prevent further harm being caused.



HEALTH SURVEILLANCE

The criteria for carrying out occupational health surveillance are:

- There is an identifiable disease or condition associated with the work.
- There are valid techniques to detect the condition at an early stage.
- There is reasonable likelihood that the disease or condition will occur in the particular circumstances of the exposure.
- That health surveillance will be of benefit to individuals or groups of workers.



WHY YOU NEED HEALTH SURVEILLANCE

- If you are exposed to risk, by working with tools, or in an area where you are exposed to any hazardous material, noise or vibration, then you need health surveillance.
- Your employer is legally required to provide health surveillance.



HOW OFTEN IS THIS CARRIED OUT

- Pre-employment/pre-placement assessment
- Periodic assessment:
 - Annually for the first 2 years, then as appropriate:
 - 3 yearly for hearing
 - Yearly for lung function/skin assessment
 - Yearly for HAVS



HEALTH SURVEILLANCE WILL

- Provide a baseline for future tests to be compared against
- Will show if the measures put in place to are working efficiently
- Show early signs of the effects of work on health
- Allow steps to be taken to prevent further damage



HEALTH SURVEILLANCE

- Your health surveillance is mandatory, and you cannot opt out.
- There are other types of health screening (not surveillance) which are voluntary – night workers for example



ADVANTAGES OF OCCUPATIONAL HEALTH CARE

- **Investigates and assesses load factors and hazards and gives expert assistance for eliminating them**
- **Gives information and advice**
- **Estimates employees' working ability and monitors their health condition**
- **By its knowledge and skills supports action for maintaining working ability in the development of individuals, working environment and working community, in this way also affecting productivity continued**



ADVANTAGES OF OCCUPATIONAL HEALTH CARE

- **Prevents occupational diseases and other work-related illnesses**
- **Prevents premature incapacity for work, reduces pension costs**
- **Reduces absenteeism due to sickness**
- **Can make calculations of the profitability of occupational safety and health and occupational health care in cooperation with workplaces or encourage workplaces to make these themselves.**



GROUP EXERCISE

- What are the functions of Occupational Health Services?



FUNCTIONS OF OCCUPATIONAL HEALTH SERVICE

- 1. Pre-employment medical examination.**
- 2. First Aid and emergency service.**
- 3. Supervision of the work environment for the control of dangerous substances in the work environment.**
- 4. Special periodic medical examination particularly for the workers in dangerous operations.**
- 5. Health education for disseminating information on specific hazards and risks in the work environment.**



FUNCTIONS OF OCCUPATIONAL HEALTH SERVICE CONT...

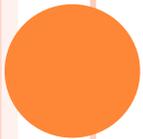
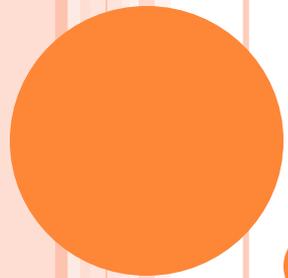
- 6. Special examination and surveillance of health of women and children**
- 7. Advising the employer or management for improving working conditions, and placement of hazards.**
- 8. Monitoring of working environment for assessment and control of hazards.**
- 9. Supervision over sanitation, hygiene and canteen facilities.**
- 10. Liaison and cooperation with the safety committees**



FUNCTIONS OF OCCUPATIONAL HEALTH SERVICE CONT...

- 10. Liaison and cooperation with the safety committees**
- 11. Maintenance of medical records for medical check-up and follow-up for maintaining health standards and also for evaluation.**
- 12. To carry out other parallel activities such as nutrition programme, family planning, social services recreation etc., Concerning the health and welfare of the workers.**





THANK YOU

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Mental Health

Dr. Maha Al Shehab

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Learning Outcomes

On completion of this element, you should be able to demonstrate understanding of the content through the application of knowledge to familiar and unfamiliar situations. In particular you should be able to:

- Outline the common types of mental-health disorders
- Outline the principles of managing and supporting individuals with mental-health problems
- Explain the effects on employees of stress in the workplace





'Businesses that don't take mental health seriously will not be successful.....the capabilities that companies require now centre more on innovation, communication & emotional intelligence than just the more straightforward requirements of strength, dexterity & intellect that characterized previous eras.'

- Dr Paul Litchfield

Common themes

- Work is good for people
- Positive mental well-being brings benefits for organizations and individuals
- A strategic approach is required
- Key workplace factors influence psychological well-being
- Management behavior is important



The beneficial effect of work on people's lives

- Money and material well-being
- Social identity and status
- Structure and purpose
- Sense of personal achievement
- Social contacts and support

90% of people with mental health problems wish to work





What is Mental Health?

What Is Mental Health?

- Put your hands up if..



Mental Health

- We all have mental health.
- Mental health relates to how we think, feel, behave
- and interact with other people.

Just as we can develop problems with our physical health, mental health problems will be experienced by many of us over the course of our lives.

One in four people will experience a mental health problem each year



Mental Health

- Anxiety and depression are the most common problems, with about 1 in 10 people affected at any given time.
- 1-2 people in every 100 will experience a serious mental health problem such as bipolar disorder, psychosis or schizophrenia in their life.





Mental-Health Condition

“This term describes all mental disorders or illnesses that meet generally accepted criteria for clinical diagnosis, treatment or interventions. They include common conditions, such as depression and anxiety, as well far less common conditions such as schizophrenia or bipolar disorder.”

Source: *Working our way to better mental health: a framework for action*, DWP/DH, December 2009 (<http://www.official-documents.gov.uk/document/cm77/7756/7756.pdf>)

What is mental health?

Mental health is defined as a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his own community.

World Health Organization 2011



Incidence Rate

- One in four people will experience mental health problems in the course of a year
- Confederation of British Industry (CBI) data suggest that:
 - Around 48% of long-term absence from work is caused by mental-health problems
 - The annual cost to employers can total £28 billion
- Depression affects around one in 12 of the whole population
- Rates of self-harm in the UK are the highest in Europe



Stigmatisation

- *“Setting people apart, denouncing them, branding them as different in a condemnatory way”*



Stigmatisation

- For many years, mental health has been stigmatised
- People with mental-health conditions often suffer discrimination
- Contrary to what people may think, most people with mental health problems can continue to work effectively
- It is illegal to discriminate against people with mental-health problems



Stigma

- Diabetes
- Epilepsy
- Asthma.....

-
- Depression
 - Alcoholism
 - Schizophrenia



Group Discussion - Stigmatisation

- Why do people stigmatise individuals with mental-health problems?
- What effects can this have on an individual?



Why Do People Stigmatise?

- Negative and judgmental attitudes; prejudice
- Misconception that people with mental-health problems are violent or aggressive (stereotyping)
- Lack of knowledge about mental-health problems
- It has become the norm; general misconception that it is acceptable to fear and ridicule mental illness



Effects on Individuals

- Restricts normal day-to-day activities:
 - Shopping
 - Making new friends
 - Having long-term relationships
- Can impede recovery
- Could make the condition worse
- Social exclusion



Mental-Health Conditions

Mental-health conditions are divided into two groups:

- Mild to moderate:
 - Neuroses, which are the more common types of mental-health problems
- Severe to long-term:
 - Psychoses are considered to be the more severe forms of mental-health problems



Common Types of Mental-Health Conditions

Neuroses:

- Anxiety and depression
- Phobias
- Obsessive compulsive disorder (OCD)
- Panic attacks

Psychoses:

- Bipolar disorder (manic depression)
- Schizophrenia



Effects of Anxiety

Effects on the individual:

- Physical effects:
 - Increased heart rate
 - Muscle tension
 - Stomach upsets
 - Pins and needles
- Mental effects:
 - Fear
 - Irritability
 - Inability to relax or concentrate



Effects of Long-Term Anxiety

- Weakened immune system
- Lower resistance to infection
- Increased blood pressure, which can increase the risk of:
 - Heart or kidney problems
 - Stroke
 - Digestive problems
- Anxiety may also affect a person's ability to hold down a job, maintain relationships or even enjoy their leisure time



Effects of Depression

- Lowers a person's mood; can make them feel hopeless, worthless, and unmotivated
- Disrupts regular sleep patterns and affects appetite
- Interferes with everyday activities
- Individuals may feel restless, agitated, tired
- Use of tobacco, alcohol or drugs may be increased
- Loss of sex drive
- Thoughts of self-harming and suicide

Mild depression may not stop a person continuing everyday activities, but more severe depression can be life-threatening



Group Discussion- Warning signs

- What are the warning signs of Mental Health disorders?



Warning Signs

- An increase in unexplained absences or sick leave.
- Poor performance.
- Poor-time-keeping.
- Increased use of alcohol, drugs, tobacco or caffeine.
- Frequent headaches and backaches.



Warning Signs

- Working slowly
- Missing deadlines
- Difficulty concentrating
- Appearing numb or emotionless
- Withdrawing from work activity
- Overworking
- Forgetting directives, procedures and requests
- Having difficulty with work transitions or changes in routines



Effects of Medication on Work

Some medication prescribed to manage mental-health conditions can:

- Cause drowsiness
- Affect a person's ability to focus or concentrate
- Slow down reaction rates
- Increase the risk of accidents

It is important for employers to be aware of such effects and the impact they can have on work





Managing and Supporting Individuals with Mental-Health Problems

Key Principles of Managing Mental-Health Problems at Work

- Non-discriminatory policies and procedures
- Effective recruitment procedures
- Positive approach to mental health
- Active management of sickness absence
- Competent managers (competency framework)
- Confidentiality
- Access to support
- Workplace adjustments



Dealing with Cases

- Early intervention
- Maintain regular contact
- Return-to-work interviews and plans
- Access to occupational health supports
- Referral to external support agencies
- Reasonable adjustments
- Regular reviews after return to work



What is Stress?

- Stress can be defined as our mental, physical, emotional, and behavioral reactions to any perceived demands or threats

HSE:

- *'the adverse reaction people have to excessive pressure or other types of demands placed upon them'*

Psychologists:

- *'stress is a feeling which results from excessive pressures and environmental stimulation'*



What is Stress?

“Stress is what happens when the pressure you’re under is more than you think you can cope with”

(The Samaritans 2001)

“Stress is about too many demands and a lack of control. But it also depends on how the person perceives the situation”

(Centre for Stress Management 2003)



Key Definitions

- **Stressor** – environmental conditions that cause individuals to experience stress
- **Eustress** – positive stress that results from meeting challenges and difficulties with the expectation of achievement
- **Dystress** – negative stress; often referred to simply as stress. Often results in overload.
- **Job strain** – function of workplace demands and the control an individual has in meeting those demands.





Facts

An HSE survey stated that:

- One in six people reported that their job was very or extremely stressful
- Just over half a million people in the same period reported experiencing work-related stress at a level that they believed was making them ill
- A total of nearly 11 million working days were lost to stress, depression and anxiety in one year

The scale of the problem

- Over half of European workers report that stress is common in their workplace.
- Stress is thought to contribute to about half of all lost working days, along with other psychosocial risks.
- Around 4 in 10 workers think that stress is not handled well in their workplace.



What does WRS cost?

- HSE Estimates
- 6.5 million working days lost in 1995
- Average of 16 days per person
- Costs around £370 million to employers
- £3.75 billion to society



What does WRS cost?

- From 3000 managers surveyed, 90% stated WRS was affecting the health and performance of employees:
- Decreased productivity
- Poor judgement
- Poor quality
- Poor customer care
- High personnel turnover
- Low morale
- Increased accidents
- Psychological and physiological effects



Group Exercise

- Why stress is increasing?



Why stress is increasing

- Changes in the workplace
 - Frequency in changing jobs and roles
 - Short-term funding
 - Job insecurity
 - Ageing workforce
- Work-life balance
 - Long-hours culture
 - Working mums
 - Working from home
- Modern technology
 - e-Society



Group Exercise - Causes and Effects of Stress

In groups indicated by the tutor, discuss the following questions and prepare feedback for the main group:

- What are the causes of stress in the workplace?
- What are the effects of stress on work performance?
- What are the effects of stress on individuals?



Causes Of Stress

- Demands
- Control
- Support
- Relationships
- Role
- Change
- Bereavement
- Separation or relationship problems
- Family illness
- Debt issues
- Moving house



Environmental Factors

- Noise, vibration
- Lack of (or poor) equipment
- Inadequate lighting, temperature
- Inadequate welfare facilities
- Cramped, dirty and untidy workplaces
- Lack of privacy or security
- Threat of violence



Individual Consequences of Stress

- **Physiological**
- High blood pressure
- Muscle tension
- Headaches
- Ulcers, skin diseases
- Impaired immune systems
- Musculoskeletal disorders
- Heart disease
- Cancer



Individual Consequences of Stress

Psychological

- Anxiety
- Depression
- Low self-esteem
- Sleeplessness
- Frustration
- Family problems
- Burnout

Behavioral

- Excessive smoking
- Substance abuse
- Accident proneness
- Appetite disorders
- Violence



Effect on Work Performance

- Reduced and inconsistent performance
- Lack of concentration
- Poor decision-making
- Lateness and regular periods of absenteeism and presenteeism
- Increased accident and injury rates
- Loss of commitment and motivation
- Health insurance
- Direct medical expenses



Role of the Stress Policy

- Demonstrates commitment to manage workplace stress
- Provides a framework to combat stress at work
- Outlines roles and responsibilities
- Supports managers and employees in managing stress
- Outlines methods of identifying and minimising workplace stress



Typical Contents of the Stress Policy

- Introduction
- Definition of terms
- Roles and responsibilities
- Risk assessment
- Consultation
- Training
- Support programmes
- Proactive controls
- Procedures for reporting and handling cases
- Monitoring and review
- Appendices





Application and Use of the HSE Stress Management Standards in the Management and Control of Stress at Work

Managing Stress at Work

Three levels of intervention:

- Primary
- Secondary
- Tertiary



Primary Intervention

Involves identifying and assessing the risk using the HSE Stress Management Standards:

- Demands
- Control
- Support
- Relationships
- Role
- Change



Assessment Techniques

- Stress audits:
 - Formal and detailed
 - Covers large numbers
 - Questionnaires
 - Used to establish a baseline
- Stress surveys:
 - Smaller than audits
 - Used to identify areas of concern within teams or departments
 - Used to monitor interventions



Focus Groups

- Groups of employees with shared interests
- Discuss workplace stressors
- Develop possible solutions
- Ideal for small organisations
- Good way to involve the workforce



Secondary Interventions

Concerned with increasing ability to cope through training and education which may include:

- Effective job training
- Time management
- Assertiveness training
- Anger management
- Stress avoidance techniques and how to recognise the signs and symptoms of stress
- Health promotion activities



Tertiary Interventions

Includes the provision of support such as:

- Counselling (Talking Therapy)
- Cognitive behaviour therapy (CBT)
- Employee assistance programmes
- Reasonable adjustments





**THANK YOU
QUESTIONS ...?**

afa

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Arab Fertilizer Association

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Since 1975



Behavioral Safety Through Mindset Change

Harald Jorritsma, Senior HSE Engineer Stamicarbon, The Netherlands

Time for Excellence

Program by:



4-6/9/ 2018

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Stamicarbon
pure knowledge

**BEHAVIORAL SAFETY
THROUGH MINDSET
CHANGE**

AFA

HSE workshop

Harald Jorritsma

Sept 5th 2018

Bahrain

Health, Safety & Environment in Fertilizers Industry
Time for Excellence

The innovation & license
company of Maire Tecnimont



ABOUT US: INTRODUCTION

- We are world leaders in the **licensing and design of urea plants** and related services, including the supply of **proprietary equipment**.
- A **pioneering company** with a single-minded **vision** to help enable the world to feed itself and improve quality of life.



Outstanding technology, materials & high quality standards

- Inventor of CO2 stripping process
- Highly corrosion-resistant material for HP synthesis: Safurex[®]
- Granulation technology with the lowest emissions and longest on-stream times

Our full life cycle philosophy

- Deliver continuous support during the entire life cycle of your urea plant
- Safurex[®] equipment supply

Renowned reputation worldwide

- Largest number of references: licensed over 250 urea plants worldwide with a 50% world market share in urea licensing.
- Realised more than 100 revamp projects in all kinds of urea plants.
- Licensing subsidiary of Maire Technimont SpA, a highly integrated international Engineering and Contracting group.
- More than 70 years of proven experience in designing and innovating the urea manufacturing process.

OUR FULL LIFE CYCLE PHILOSOPHY

Stamicarbon provides tailored advice to create new plants, optimize existing plants and upgrade older plants.



Creating your plant

Launch a new plant with all technologies, products and services needed for successful and profitable urea production

Optimizing your plant

Advance your plant performance with products and services to support and train plant staff and improve equipment and product quality

Upgrading your plant

Evolve your plant to the next level with revamp and debottlenecking to increase production capacity and reduce energy consumption

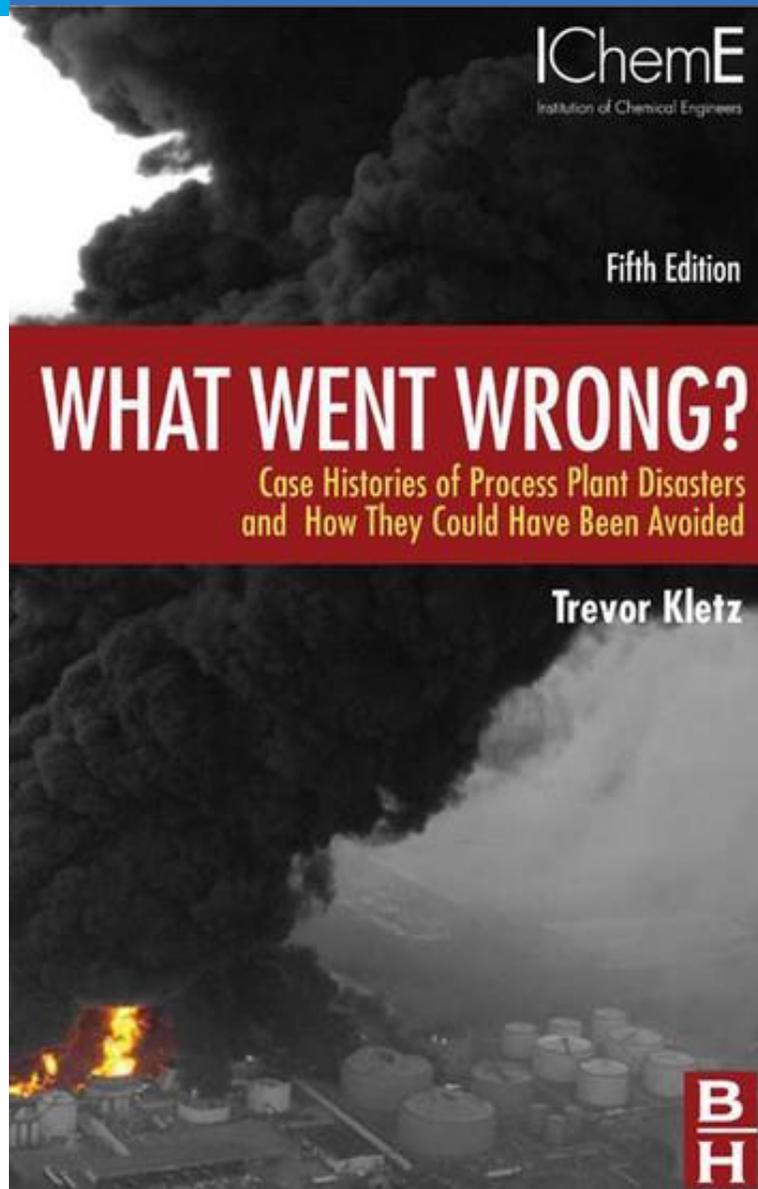
The strive for ZERO harm

- Safety should be everyone's concern, not only because of statutory legislation but also as a moral duty.
- Aligned with the vision of the International Fertilizer association (IFA) we believe that injuries and occupational illnesses, as well as safety and environmental incidents, are **ALL** preventable.
- The impact of an accident is significant, both from a personal and business perspective. 40% of companies who have faced a severe process safety incident (fire /explosion) are now out of business.
- Safety is a key component for any organization that wants to have a sustainable profitable operation.

TODAY'S PROCESS SAFETY CHALLENGES

- The consolidation of small companies into larger ones.
- The decentralization of corporate functions.
- Reductions in work forces, stretching manpower is causing a loss of corporate memory.
- Frequent merging and demerging of companies.
- The increasing age of many facilities and the extension of asset life beyond the original design intent.
- Strong focus on personal safety (behavior) not automatically improving process safety performance.

INHERENT SAFETY AND HUMAN ERROR



- Trevor Kletz
- The ‘founding father’ of inherent safety.
- The catastrophic at Flixborough UK in 1976 laid the foundations of Trevor’s thinking around what has become known as inherent safety.
- Trevor Kletz was often disagreeing when companies attempted to attribute accidents to “human error”.
- **“Try to change situations, not people...”**

BEHAVIORAL BASED SAFETY (BBS)

The missing link?

- Focusses on the human side of safety
- Defines safe and unsafe behaviors
- Encourages safe behavior and discourages unsafe or destructive behaviors
- Involves employees in safety
- Lots of introductions failed as people perceived it as “blaming the worker”
- Always examine what drives employees to be in a hazardous situation.”

WHY UNSAFE BEHAVIOR?

- “Safety first” slogans and mission statements like “all incidents are preventable” are sometimes considered not real; politically correct or just to please the regulator.
- Perception: The employer expects you to do the work fast and efficient with the help of sometimes bypassing procedures.
- “Nothing serious happened” gives you the impression that the probability of something bad to happen is acceptably low.
- Procedures and practices are perceived disproportional to the risk.
- Safe behavior is not enforced (e.g. PPE use and compliance with (LOTO)procedures)

LEARNING FROM INCIDENTS ENABLING SAFE BEHAVIOR

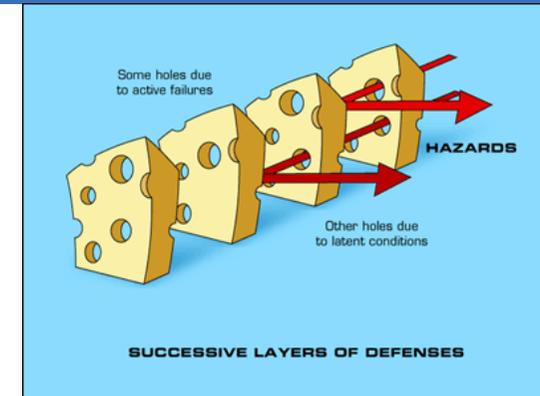
- All our knowledge and experience comes through the correcting of our mistakes.
- Our personal experiences will strongly shape our safety mindset and behavior.
- Companies using the mistakes of the past to avoid future errors, have a good chance of staying in business.

As also major events will become forgotten with the passage of time it is key to translate learnings into design practices and operational practices.

LEARNING FROM INCIDENTS

Why should we record and investigate accidents and near-misses ?

- To identify and strengthen key barriers between hazards and people which are less than adequate and allowed the incident or near miss to happen.
- Only when we know the broken barriers, we can improve!



Definitions:

- An Accident is when a barrier is penetrated and the hazard affects people.
- A Near Miss occurs when a barrier is penetrated but people are not present or affected.

2.7 LEARNING FROM INCIDENTS

Why should we record and investigate near-misses ?
Nobody got hurt nor was there any significant damage !



continuous improvement



Lagging indicators.

After the facts !

Limited number of events to learn from
The standard in the “old days”

Leading indicators.

Enabling to “predict” the occurrence of
severe incidents

High number of events to learn from
What are the broken barriers ?

LEARNING FROM INCIDENTS

- In our Stamicarbon database we have recorded major process safety incidents in urea facilities over the last 48 years.
- The database contains 25 incidents

Will this limited number of datapoints give us sufficient input to learn and improve?

LEARNING FROM INCIDENTS

Stamicarbon's sources to populate the incident pyramid:

- Fertilizer industry associations: IFA, AFA, AIChE Ammonia safety, UreaKnowHow.com, Fertilizers europe.
- Internet news Channels
- Governmental Investigation boards
- Close contact and good relations with our customers via symposia, LinkedIn, internet etc.

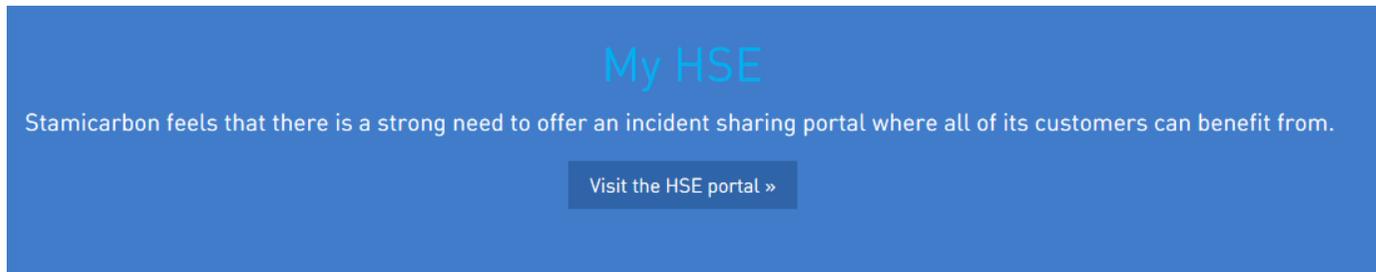
However not to forget the most important source

YOU !!

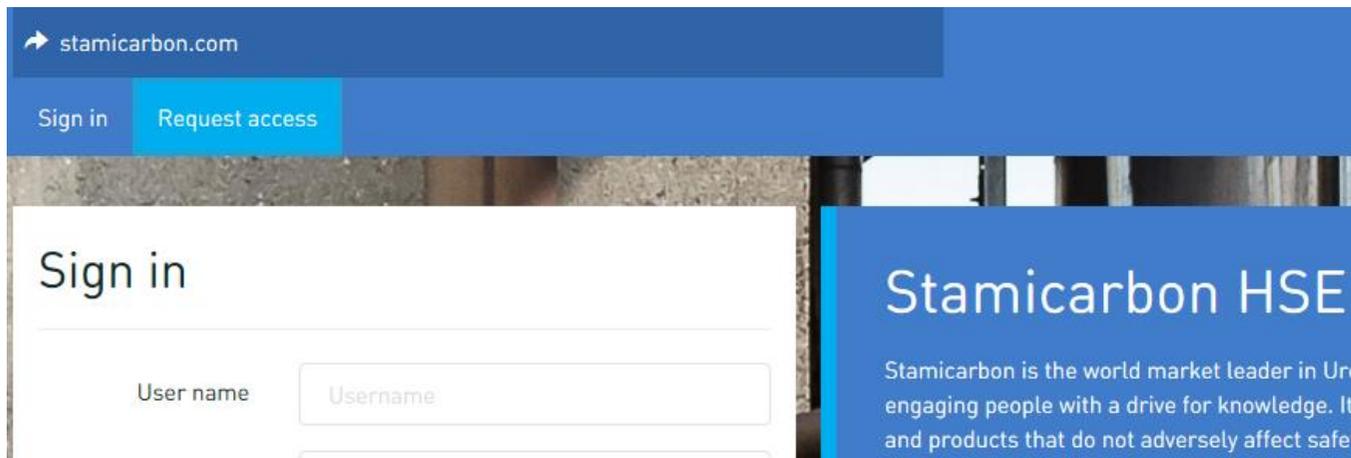
You are the ones operating the urea facilities.
Please be invited to share incident information via the Stamicarbon HSE portal

HSE INCIDENT SHARING PORTAL

First thing is to subscribe to the HSE portal. You can do that at our site www.stamicarbon.com under “My Stamicarbon – Downloads”

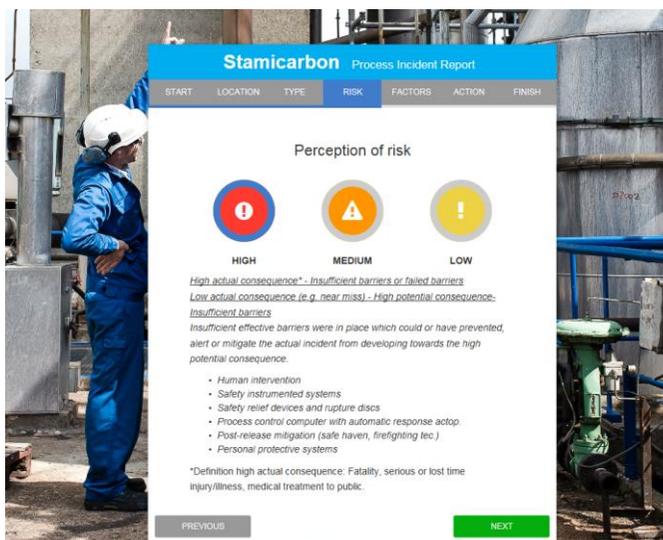
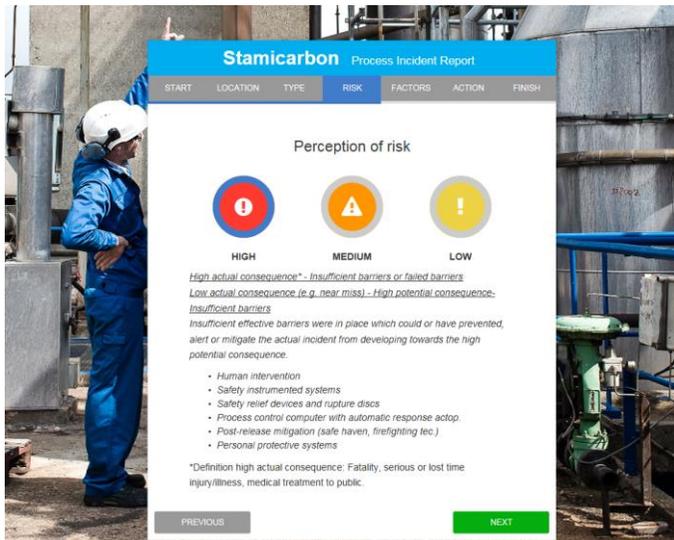
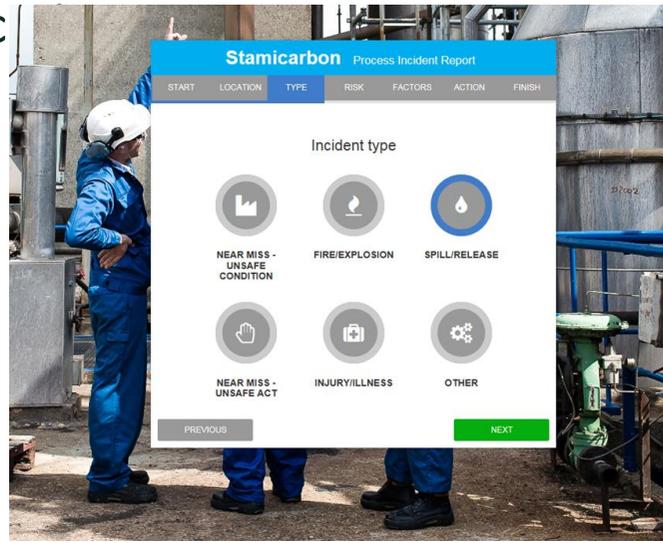
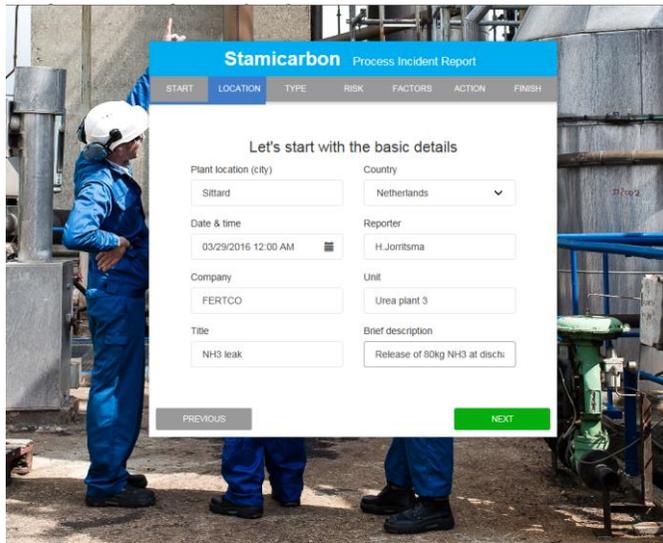


Then go to My HSE and visit the HSE portal
Under “Request Access” you can fill in your personal information and you will be granted access after I have received your request and approved it.



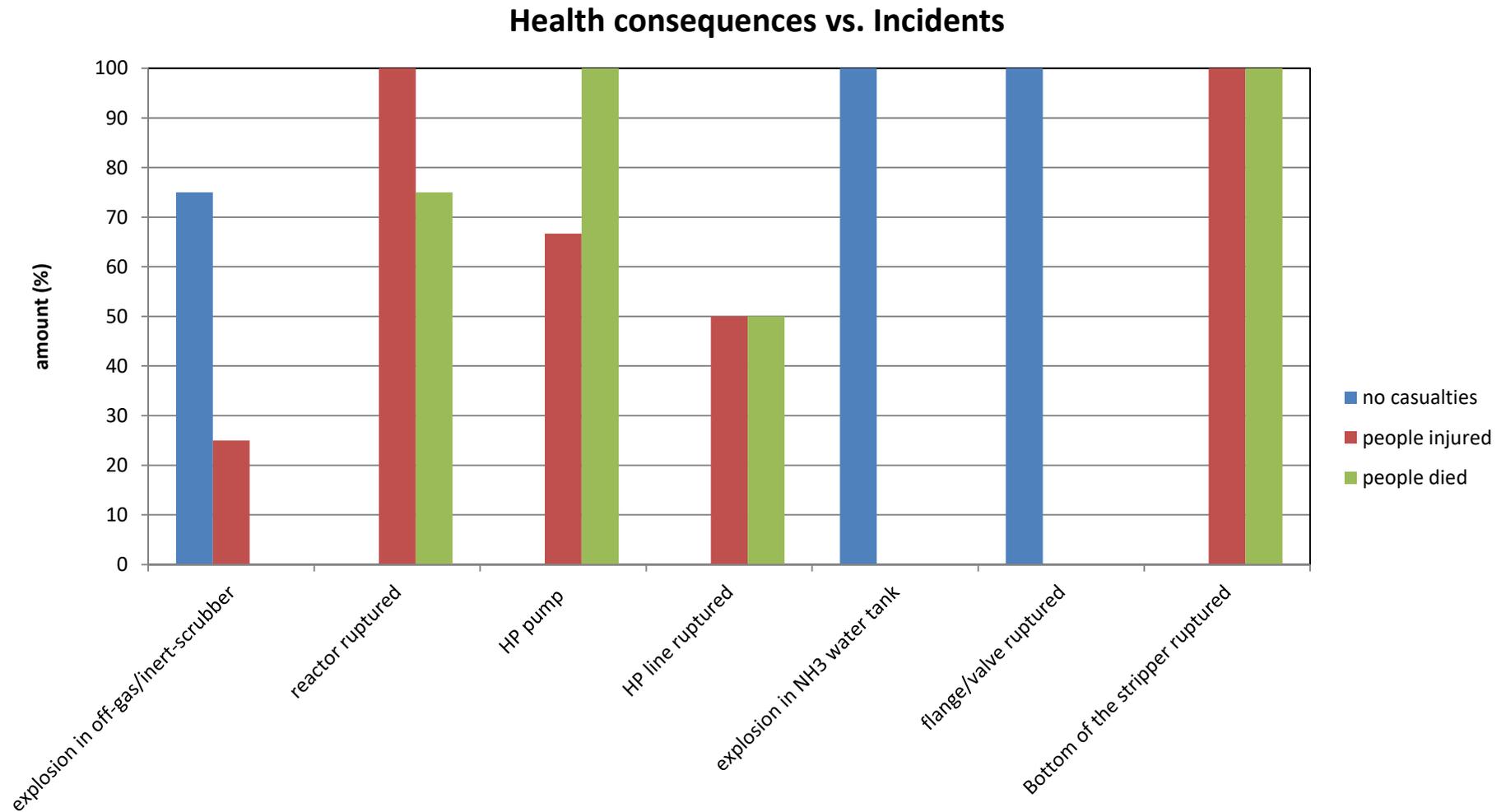
HSE INCIDENT SHARING PORTAL

HSE portal lay out to report process safety incidents by customers as being



UREA CASUÏSTIC

Impact of major process safety incidents



UREA CASUÏSTIC

- 8 of the 20 incidents were related to hydrogen explosions in the period 1967 to 1981
- Learning was to replace pure oxygen dosing by air dosing and to provide the CO₂ supply with a hydrogen removal unit.

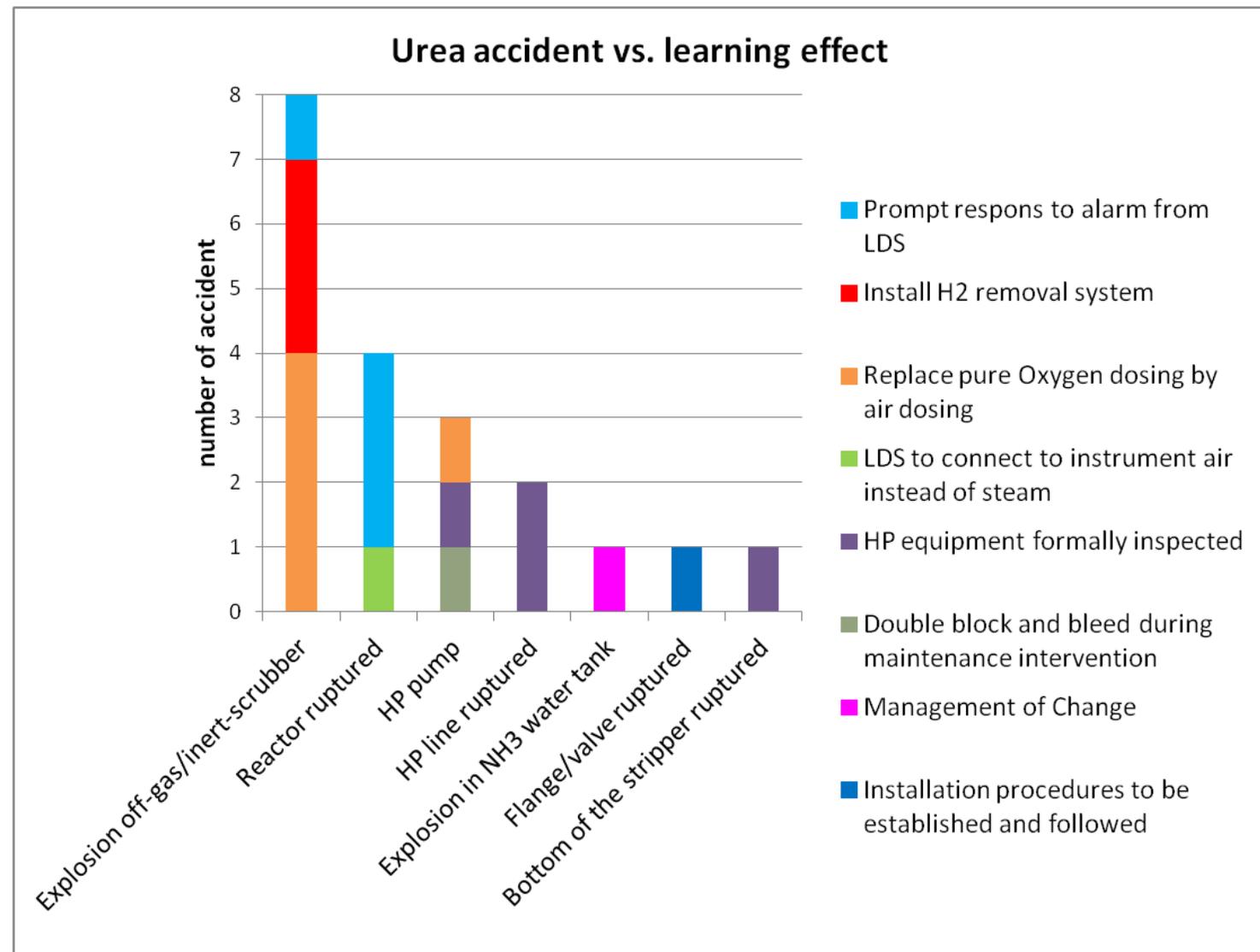
In plants where both control measures were implemented no explosion took place ever again

Learning from past incidents pays off !

UREA CASUÏSTIC

Urea casuistic and common causes.

How have learnings been incorporated in the current design ??



Based on list of major incidents in Urea plants of Stamicarbon and other licensors over the last 43 years.

HOW?

- Strong management commitment to advocate the believe that all incidents are preventable.
- Sharing of incidents with plant population to develop risk perception (your working environment contains realistic risks!).
- Sharing of major risk scenarios from PHA's
- Always examine what drives employees to be in a hazardous situation (unsafe behavior).
- Peer to peer observations to surface unsafe behavior and define corrective actions
- Enforcement of safety procedures and -practices by supervision

Next to all of the above do not loose attention for the required elements of process safety (OSHA PSM) !

OSHA PSM Required Elements
Employee Participation
Process Safety Information
Process Hazard Analysis (PHA)
Safe Operating Procedures
Training
Contractors
Pre-startup Safety Review
Mechanical Integrity
Hot Work Permit
Management of Change
Incident Investigation
Emergency Planning and Response
Compliance Audits
Trade Secrets




Stamicarbon
pure knowledge

**PROCESS HAZARD
ANALYSIS &
RISK MANAGEMENT**

AFA

HSE workshop

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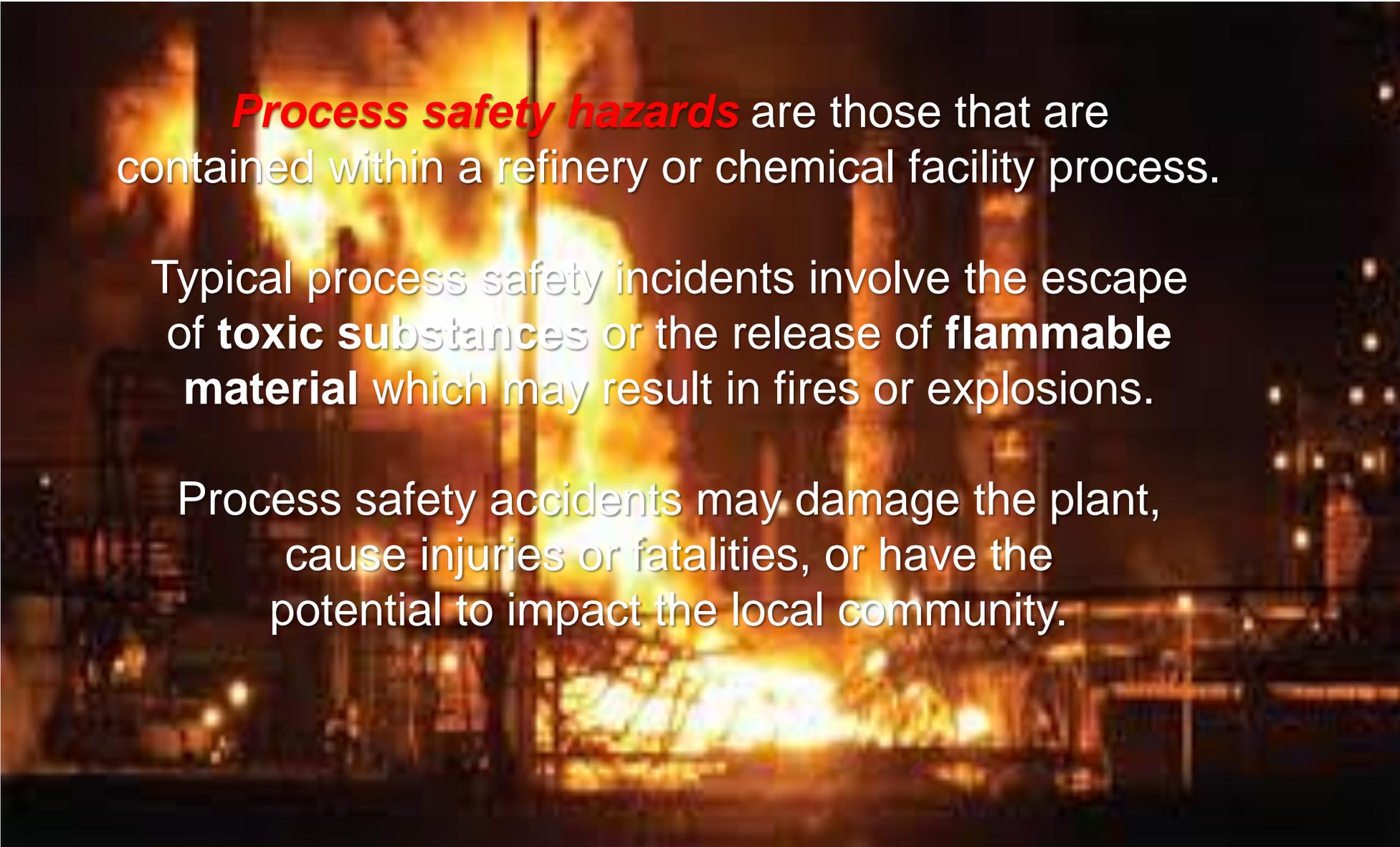
The innovation & license
company of Maire Tecnimont



Hazard (≠risk)

- A chemical or physical condition that has the potential for causing harm to people, property or the environment
- A serious hazard is not necessarily representing a high risk !

2.1 DEFINITIONS



Process safety hazards are those that are contained within a refinery or chemical facility process.

Typical process safety incidents involve the escape of **toxic substances** or the release of **flammable material** which may result in fires or explosions.

Process safety accidents may damage the plant, cause injuries or fatalities, or have the potential to impact the local community.

2.1 DEFINITIONS

Personal safety hazards are those that may affect individuals but have little to do with the processing activity of the plant.

Typically they can lead to incidents such as slips, trips, falls, electrocutions, or vehicle accidents.



PERSONAL SAFETY HAZARDS



Hazard (≠risk)

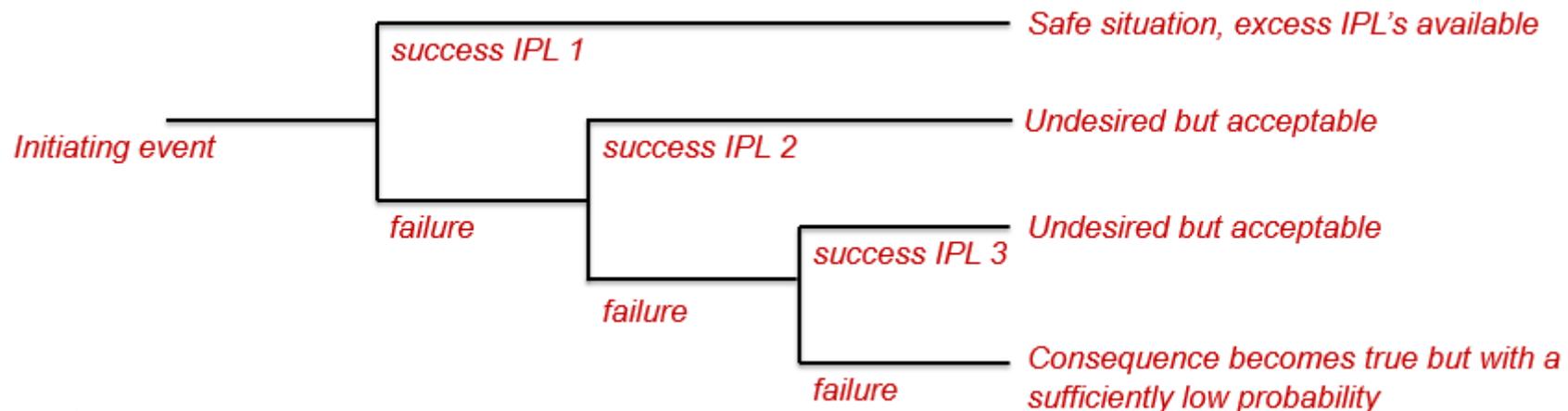
- A chemical or physical condition that has the potential for causing harm to people, property or the environment
- Typical process hazards in urea plants
 - ✓ High synthesis pressure
 - ✓ Presence of explosive mixtures (H₂, NH₃)
 - ✓ Presence of oxygen depleting substances (CO₂)
 - ✓ Large volumes of toxic, corrosive and hot materials
 - ✓ Moving parts of heavy machinery (e.g. in granulation)
- Non process hazards
 - ✓ Working at high elevations
 - ✓ High ambient temperatures

Consequence

- A measure of the expected impact of a hazard
- Possible consequences in urea plants
 - ✓ Toxic gas exposure leading to severe or fatal injury
 - ✓ Gas explosion leading to vessel rupture
 - ✓ Suffocation caused by accumulated CO₂
 - ✓ Burns caused by contact with steam/condensate
 - ✓ Falling from height
 - ✓ Public complaints from ammonia smell
 - ✓ Amputation of limb after contact with bucket elevator

Probability

- The expression for the likelihood of occurrence of an event sequence (scenario) during an interval of time, or the likelihood of success or failure of an event on demand (Ref. event tree).



Risk

1. What could happen, considering the hazard
2. What are the consequences?
 - ✓ Health and safety
 - ✓ Environmental consequences
 - ✓ Financial loss
 - ✓ Public complaints
3. What is the probability of the event happening?

Risk is the product of probability and consequence.

RISK SCENARIO

Contains:

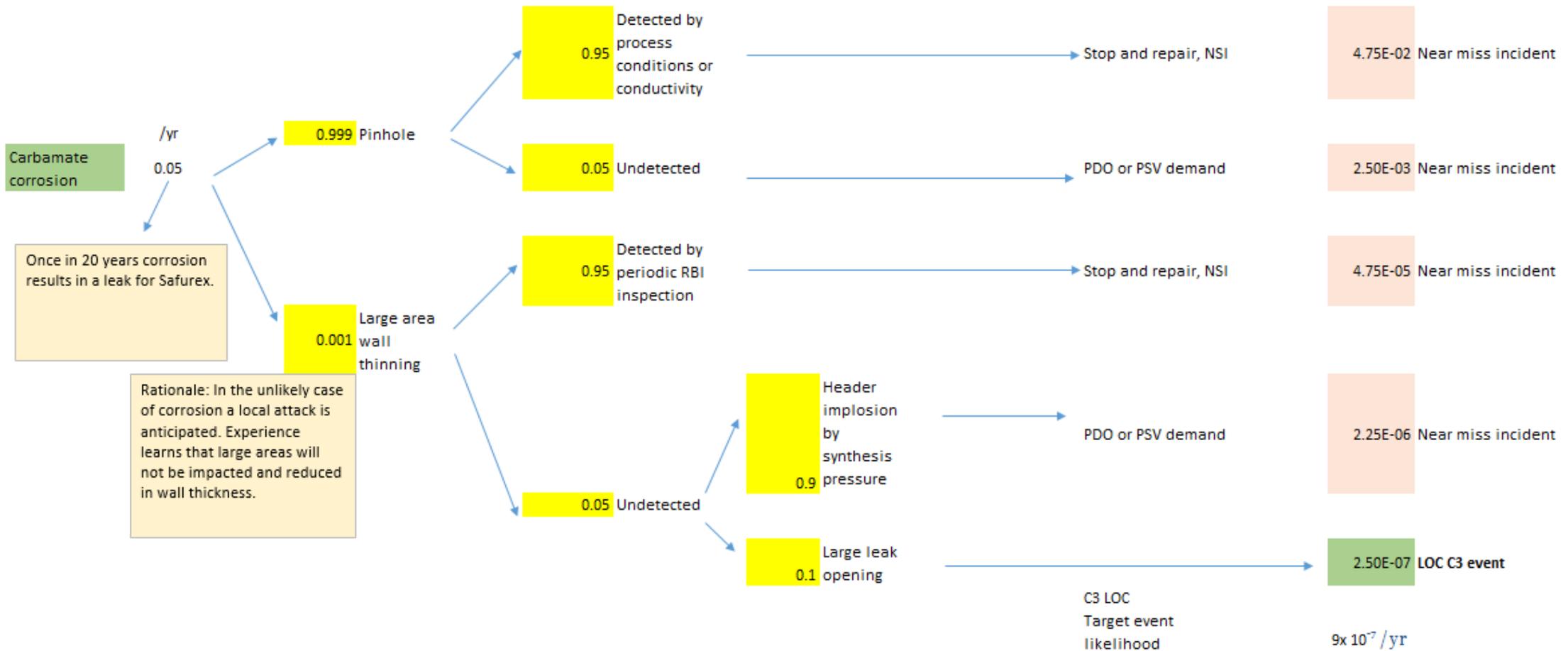
The initiating event, cascading events, contributing factors, and outcome

Example from melt plant Design Hazard Study

Stamicarbon bv Design Hazard Study Confidential information			
Installation Equipment	STD-UR. - Standard Stamicarbon Melt Plant E702 (First stage evaporation condenser), E703 (Second stage evaporation condenser), J702 (First ejector at first stage evaporation condenser), J704 (First ejector at second stage evaporation condenser), V703 (NH3 water tank), V705 (Seal vessel at NH3 water tank)	Document Node Page Drawing	A4-73936 rev A 19 5 of 16 73304 rev. B (P&ID: 701 14/4/2011) 73303 rev. B (P&ID: 401 12/4/2011) 73300 rev. B (P&ID: 301 12/4/2011) 73301 rev. B (P&ID: 302 12/4/2011) 73305 rev. B (P&ID: 801 14/4/2011) 73306 rev. B (P&ID: 802 4/4/2011)
<div style="border: 2px solid red; padding: 10px; display: inline-block;"> <i>Risk scenario</i> </div>		Session date Participants	23 May 2011 GDJ, PME, GEV, BSN, JDI, Jos Villevoeye

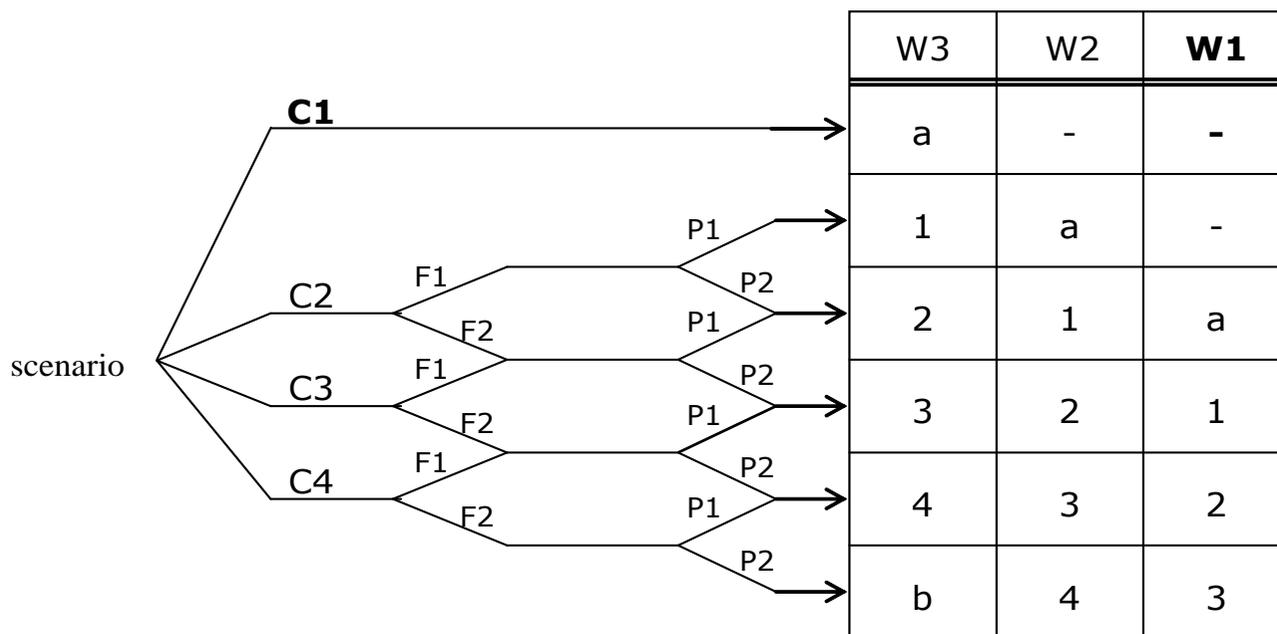
Check	Description	Causes	Effect and consequences	RL	Safety provisions	Remarks	Actions
1.1o	Too high P in V703	Backflow from C801 via liquid line through P703A/B if pump fails and non-return valve fails.	Initially liquid flows back to V703 within a few second followed by gas-flow from C801 to V703. FPV-8202 controls open. The gas flow is only restricted by the FPV-8202 in fully open position. Pressure in V703 rises. $P_{max} > 2 * P_{design}$. Vessel ruptures. LOC	RL 1	Manhole with water seal. Vent line to stack X801		PA137

EVENT TREE



RISK GRAPH

Using the risk graph to determine the risk level (RL)



Consequence

- C1: Minor injury
- C2: serious injury
- C3: Death(s)
- C4: Catastrophe

Frequency people present

- F1: <3h/day
- F2: >3h/day

Frequency of the event

- W1: once every 10-100
- W2: once every 1-10
- W3: more than once a year

Possibility to escape or anticipate

- P1: Possible escape
- P2: No possible escape

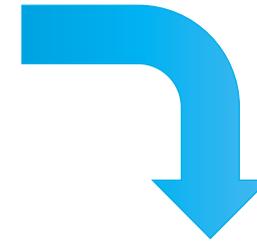
CALIBRATION

- Stamicarbon is applying a calibration of risk parameters for specific events which is based on major accidents and experiences of start-up engineers.
- This does not cover all possible scenarios but will narrow down the spread in risk level determination.
- Reproducibility of risk level determination is of outmost importance to avoid applying extensive safeguarding in one project and leaving it out in another project.
 - Insufficient layers of protection may lead to an unacceptable high residual risk.
 - Excess layers of protection are costly (CAPEX) and may jeopardize the reliability of the plant as complexity and likelihood of nuisance trips will increase (OPEX).

RISK MATRIX

Consequence

		A	B	C	D	E
		Negligible	Minor	Moderate	Significant	Severe
E	Very Likely	Low Med	Medium	Med Hi	High	High
D	Likely	Low	Low Med	Medium	Med Hi	High
C	Possible	Low	Low Med	Medium	Med Hi	Med Hi
B	Unlikely	Low	Low Med	Low Med	Medium	Med Hi
A	Very Unlikely	Low	Low	Low Med	Medium	Medium



Slips, trips and falls

Major process safety incidents



RISK MATRIX

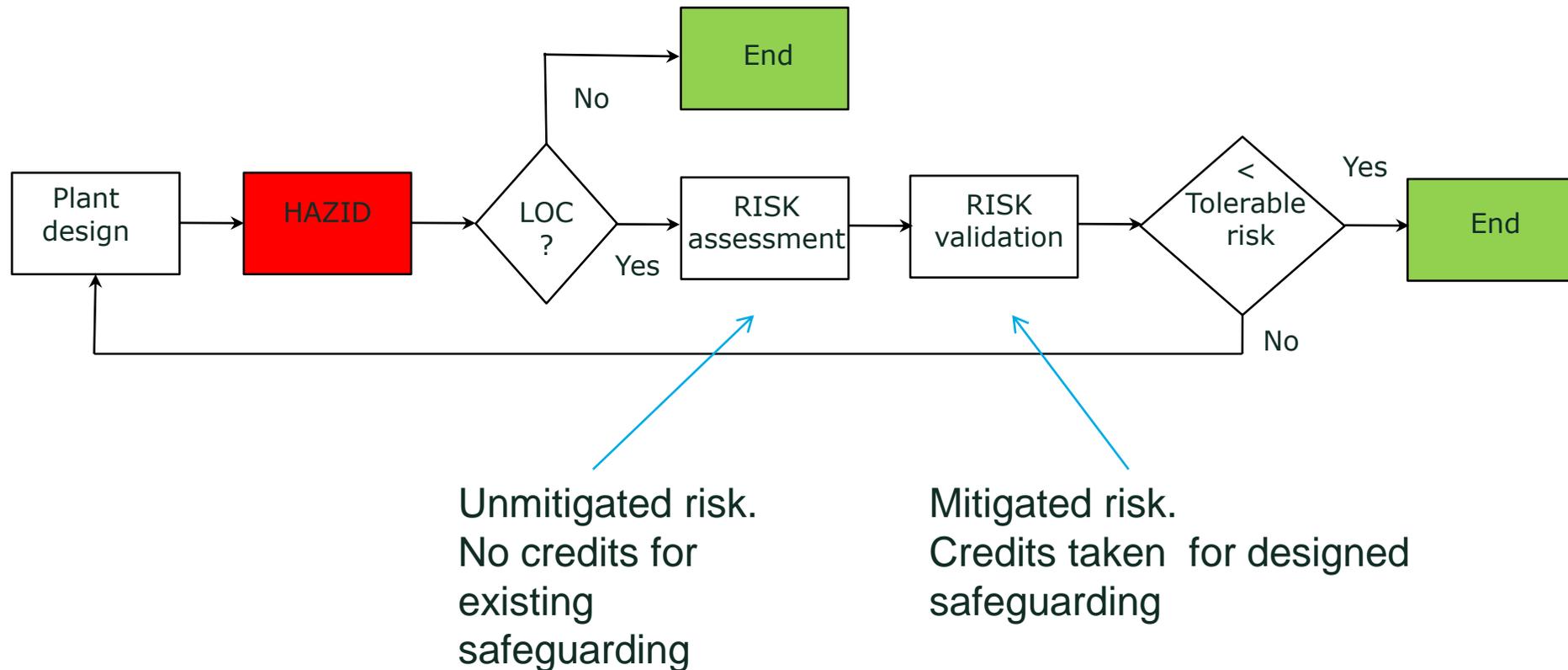
- The low probability, low severity area that indicates the risk of an event is low, or that it is sufficiently controlled. Major hazards in the process industry don't fall into this category.
- The high probability, high severity which indicates a scenario that is unacceptable and needs redesign or additional control measures to reduce the probability or consequence.
- The medium category is in between these two areas. Any event that falls in this area is usually judged to be an area where further risk reduction is recommended if low cost solutions are available.

Limitations of the risk matrix

- The risk matrix by itself makes for a poor decision making tool. It is best suited for ranking events. There is not enough granularity in a risk matrix to use it for anything other than saying that some events are really bad, and others are less so.
- The risk matrix is not a quantitative tool. In theory, it can be, but in practice, it is not. The risk matrix is made up of two ordinal rating scales, with mostly qualitative descriptions along its axes.
- For a quantitative risk evaluation of an individual scenario a LOPA study, event tree or QRA is recommended

Design Hazard Study (DHS) = integrated approach:
HAZID + Risk Assessment + Risk Validation

- DHS starts with HAZard Identification (HAZID)
- HAZOP includes operability risks as well



RISK ASSESSMENT, DHS/HAZOP

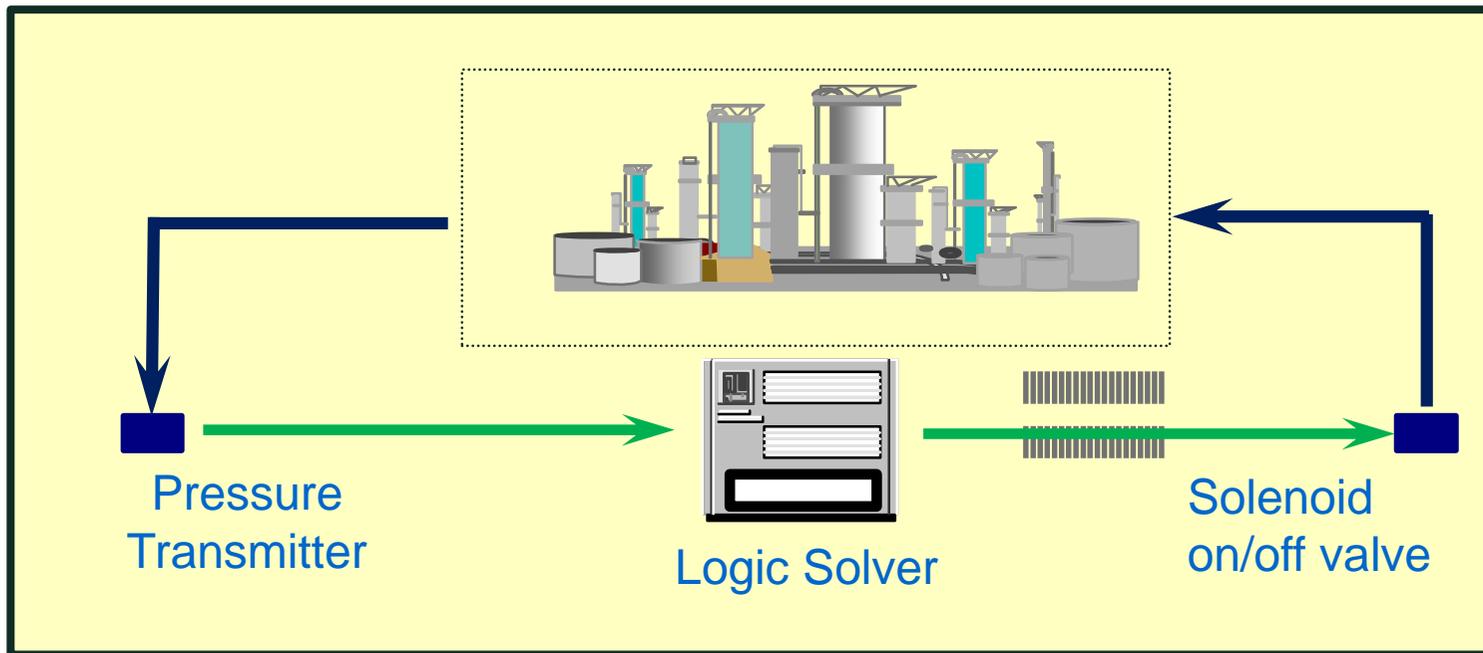
- Combining HAZOP, RL assessment and validation of safeguarding is an effective way to evaluate urea plant safety.
- The risk analysis is only as good as the skill, expertise and experience of those doing it.
- There is a strong tendency for engineers to design solutions as soon as new problems come to light. This practice should be avoided as the primary purpose is **hazard identification and classification**.

Base equation:

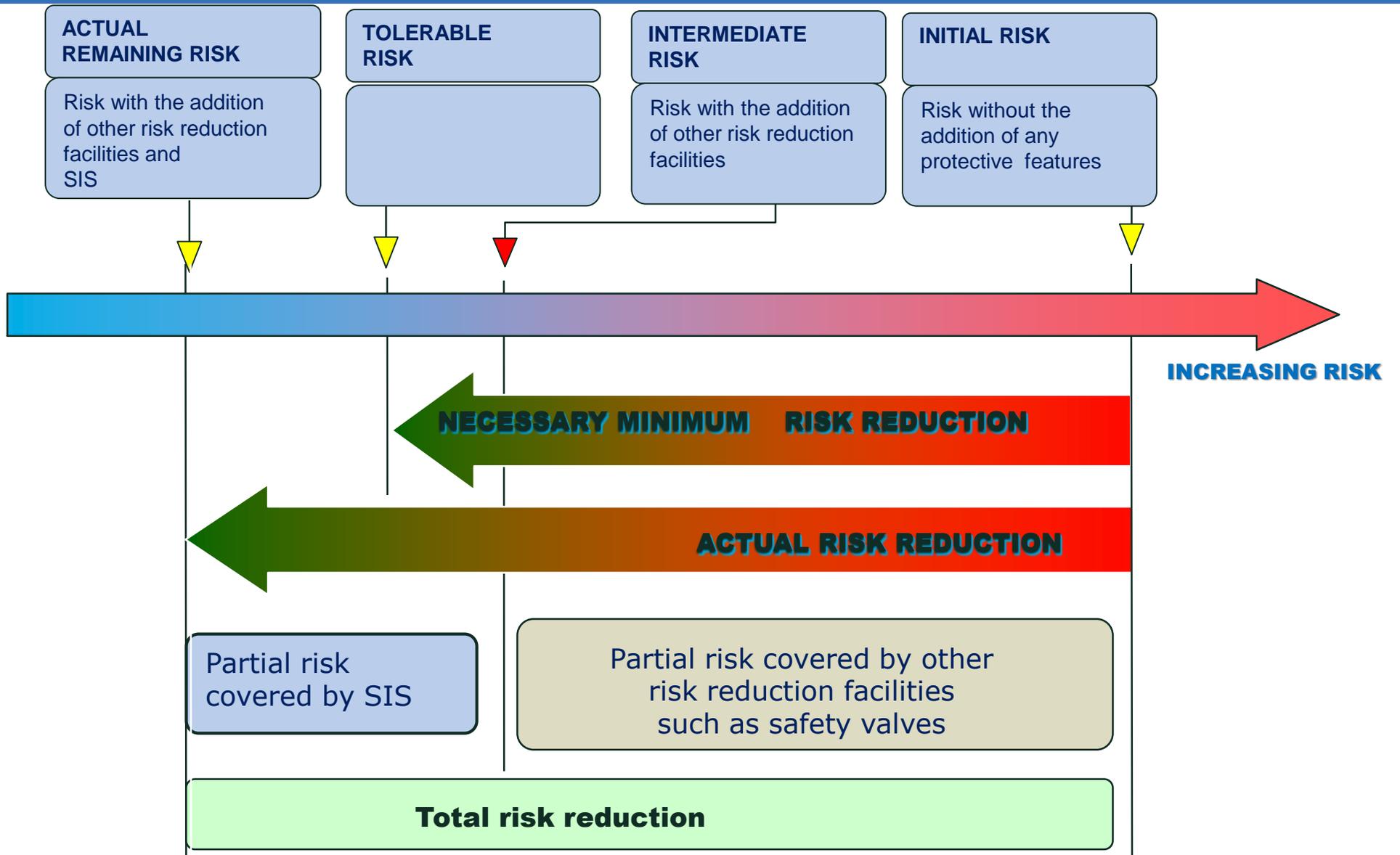
$$\text{Risk Reduction Factor}_{(\text{safety valve} + \text{SIS})} \geq \text{Risk Level}_{\text{scenario}}$$

Example:

$$\begin{array}{l} \text{RL}_{\text{scenario}} \\ \text{RRF}_{\text{safety valve}} \end{array} \begin{array}{l} = 3 \\ = 2 \end{array} \left. \vphantom{\begin{array}{l} \text{RL}_{\text{scenario}} \\ \text{RRF}_{\text{safety valve}} \end{array}} \right\} \text{SIL}_{\text{SIS}} \geq 1$$



RISK ASSESSMENT, DHS/HAZOP



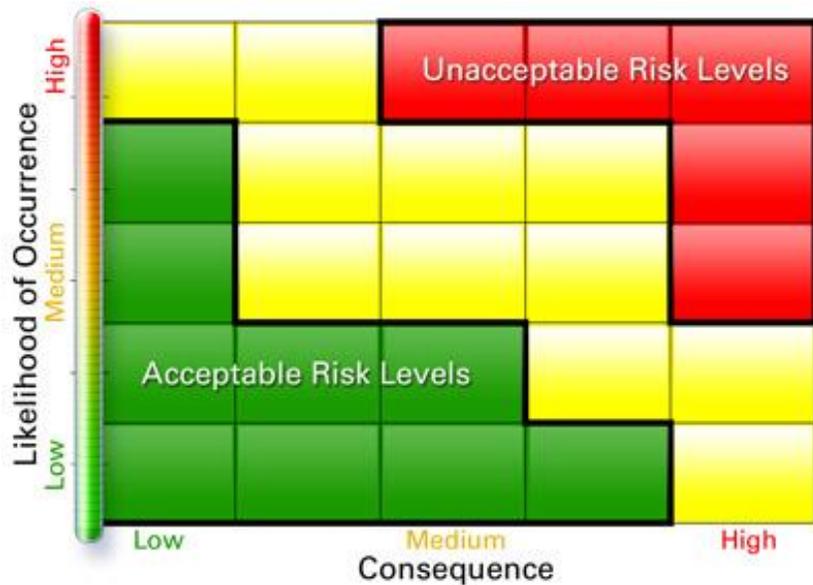
RISK REDUCTION BY SAFEGUARDING



Typically process safety risk in the petrochemical industry have a high consequence but very low probability. This makes them an acceptable residual risk

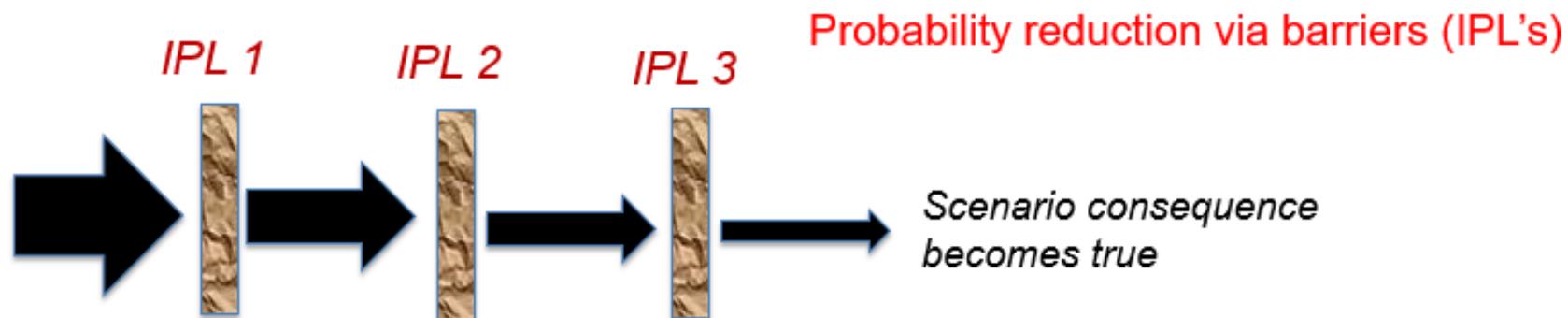
Mitigated risk scenario's in the petrochemical industry

RISK REDUCTION BY SAFEGUARDING



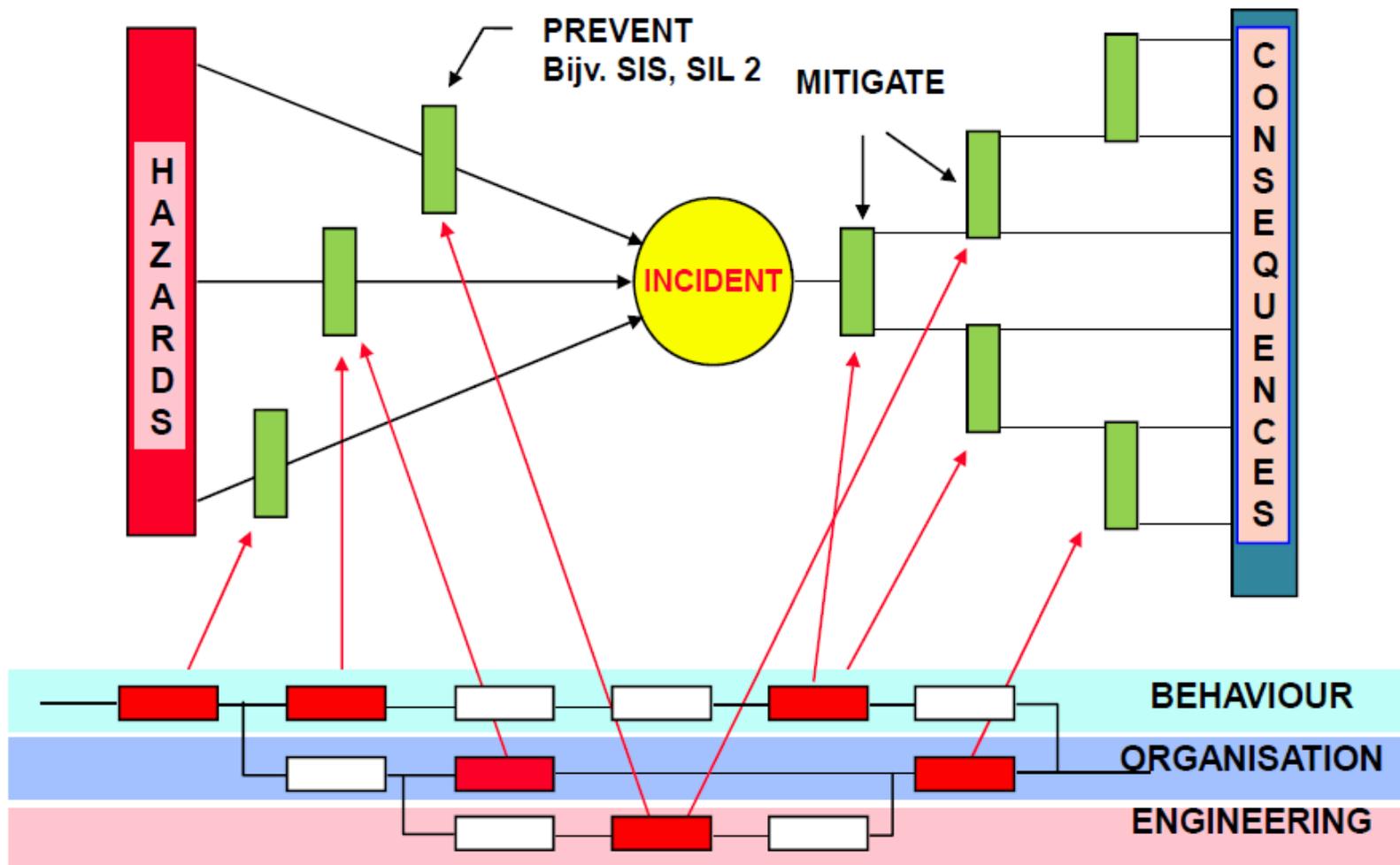
This low probability is achieved by safeguarding (mechanical, instrumentation and procedures)!

These typical risk scenario's should not be parked and forgotten. Periodic verification of the effectiveness of the considered safeguarding is essential!



RISK REDUCTION BY SAFEGUARDING

Barriers (IPL's) in Bow-tie model



RISK MANAGEMENT

- Only those risks which you identified can be controlled
- To build a safety mindset and healthy risk perception communicating (major) risk scenarios by means of staff training is essential
- Communication will also create understanding and awareness of the contribution of specific safeguarding to mitigate the risk



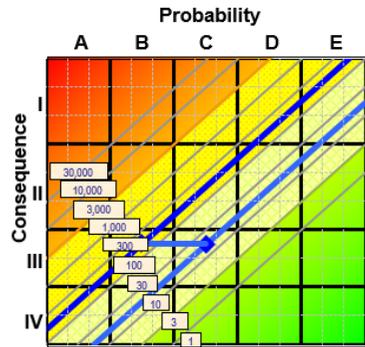
RISK MANAGEMENT

- It is impossible to protect everyone from every threat to their health and safety. The resources to eliminate all risks do not exist.
- We have to choose to mitigate some hazards and accept the (acceptable low) risk of others.
- Risk Management requires prioritization and making choices as there are limitations to resources (people/money)

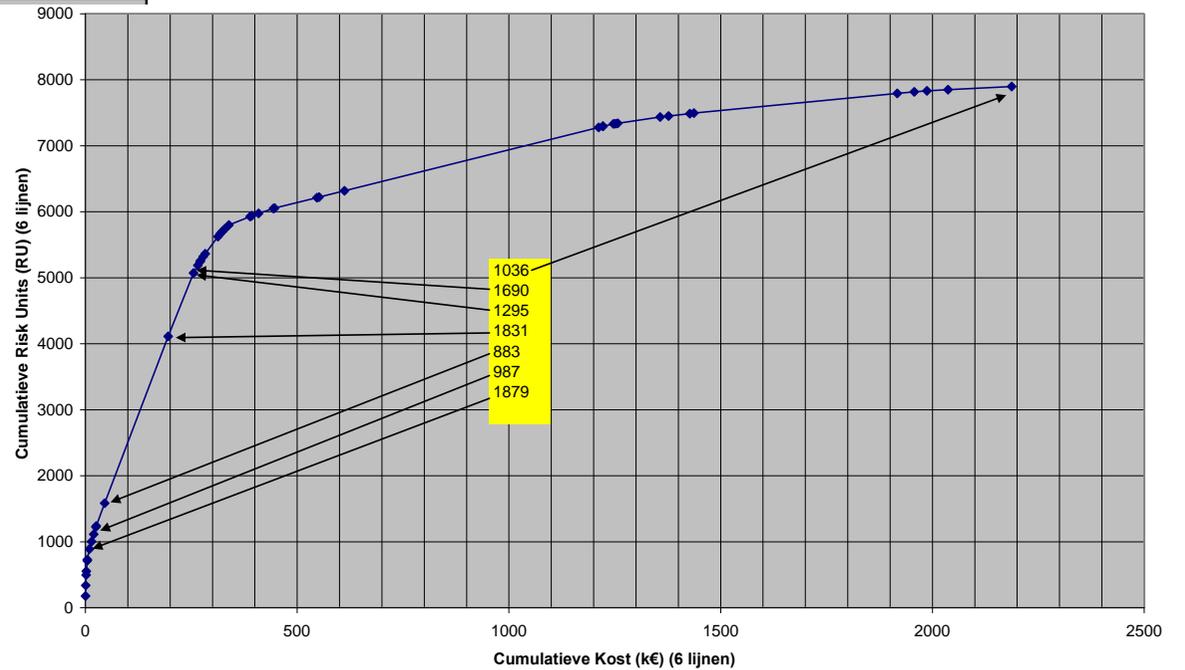


2.6 RISK MANAGEMENT

Project: HDK interlock/trip op reactor PAHH op A-lijn			
Location: APP		Project Date: 7-Jan-2010	
Decision by: H.Jorritsma			
"BEFORE" RISK SCENARIO			RISK UNIT BENEFIT 160
Consequence	Probability	Risk Units	
III-High	B- Med	178	
"AFTER" RISK SCENARIO			RISK UNIT BENEFIT 160
Consequence	Probability	Risk Units	
III-High	C- Med	18	
RISK REDUCTION EXPENDITURE GUIDANCE			
Project Cost	17,000	USD	
Cost in 2008 currency	17,000	USD	
Benefit to Cost Ratio	0.0094144		
Status	PENDING		



Tools - IsoRisk Plotter 2007 ver CM.xls



Question

A close-up photograph of a person's hands, wearing a blue jacket, holding a large quantity of small, white, spherical granules. The granules are piled in the palms and are beginning to fall from the fingers. The background is dark and out of focus.

THANK YOU!



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Arab Fertilizer Association
Since 1975



Process Hazard Analysis and Risk Management

Harald Jorritsma, Senior HSE Engineer Stamicarbon, The Netherlands

Time for Excellence

Program by:



4-6/9/ 2018

Bahrain

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Arab Fertilizer Association

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Global Emission Legislation

Harald Jorritsma, Senior HSE Engineer Stamicarbon, The Netherlands

Time for Excellence

Program by:



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Bahrain



Stamicarbon
pure knowledge

**GLOBAL EMISSION
LEGISLATION IN RELATION
TO UREA PLANTS**

**AFA
HSE workshop**

Harald Jorritsma

Sept 5th 2018

Bahrain

**Health, Safety & Environment in Fertilizers Industry
Time for Excellence**

THE STRIVE FOR A ZERO-EMISSION PLANT

As Stamicarbon is caring for the environment, continuing efforts are undertaken to reduce the environmental footprint of our process design.

Stamicarbon can offer the best available techniques to reduce Ammonia vapors, Urea dust and GHG (CO₂) emissions.

- For **new plants**; pollution prevention is achieved by feedstock improvement and in-line solutions
- For **existing production units**; pollution prevention is usually obtained by revamps or end-of-pipe solutions

OPERATIONAL PRACTICES AND THE ENVIRONMENT

Next to investing in emission control technologies we have to bear in mind that also operational and maintenance practices can largely influence the emissions of a plant. Operational and maintenance practices need to be formalized to obtain the full benefits of emission control technologies.

Below some examples of emissions caused by operational and maintenance flaws:

- Leaking PSV's connected to stack; no early detection and delayed maintenance intervention
- Blowing water seals of tanks
- Suboptimal synthesis draining & flushing operations
- Sampling points connecting to chemical sewer open funnels
- Seal leaks at carbamate and ammonia HP pumps
- Seal leaks at ammonia water pumps
- Inadvertently left open sampling points
- Inadvertently left open ammonia flushing connections to stack

Limits as set by regulators and (fertilizer) associations

Sources

- Worldbank Group , IFC (International Finance Corporation)
- World Health Organization (WHO)
- Environmental Protection Agency (EPA) in the USA
- UNEP International Cleaner Production Declaration
- Fertilizers Europe (Former EFMA)

In general: The above mentioned regulators and agencies have a strong focus on the Phosphate Fertilizer industry, emissions from industrial burners and automotive combustion engines.

On a more local/regional level the Basis Of Design of the most recent Stamicarbon revamp and grassroots projects is providing us with emission limits currently set by regulators.

Philosophy of control as defined by IFC

- Emissions should not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards by applying **national legislated standards**, or in their absence, the current **WHO Air Quality Guidelines**, or other **internationally recognized sources**.
- Legal requirements for **continuous emissions** are mostly well known; EFMA and IFC provide clear guidelines. For emissions released **intermittently or as a result of upset conditions**, the guidance is less clear. The limit values depend on the customer's rules and on the regulations stipulated by local authorities.

NORMAL AND UPSET OPERATING CONDITIONS

Following IFC guideline : “All of the maximum levels should be achieved for at least 95% of the time that the plant or unit is operating, calculated as a proportion of annual operating hours”.

- As a result 5% of the time can be considered as an upset event such as start-up conditions or a demand on a pressure relief valve.
- Although emissions during upset conditions are regulated less strictly, the regulator expects that the utmost is done to prevent a demand on a pressure relief valve.

EMISSION LIMITS PER REGION



National legislation

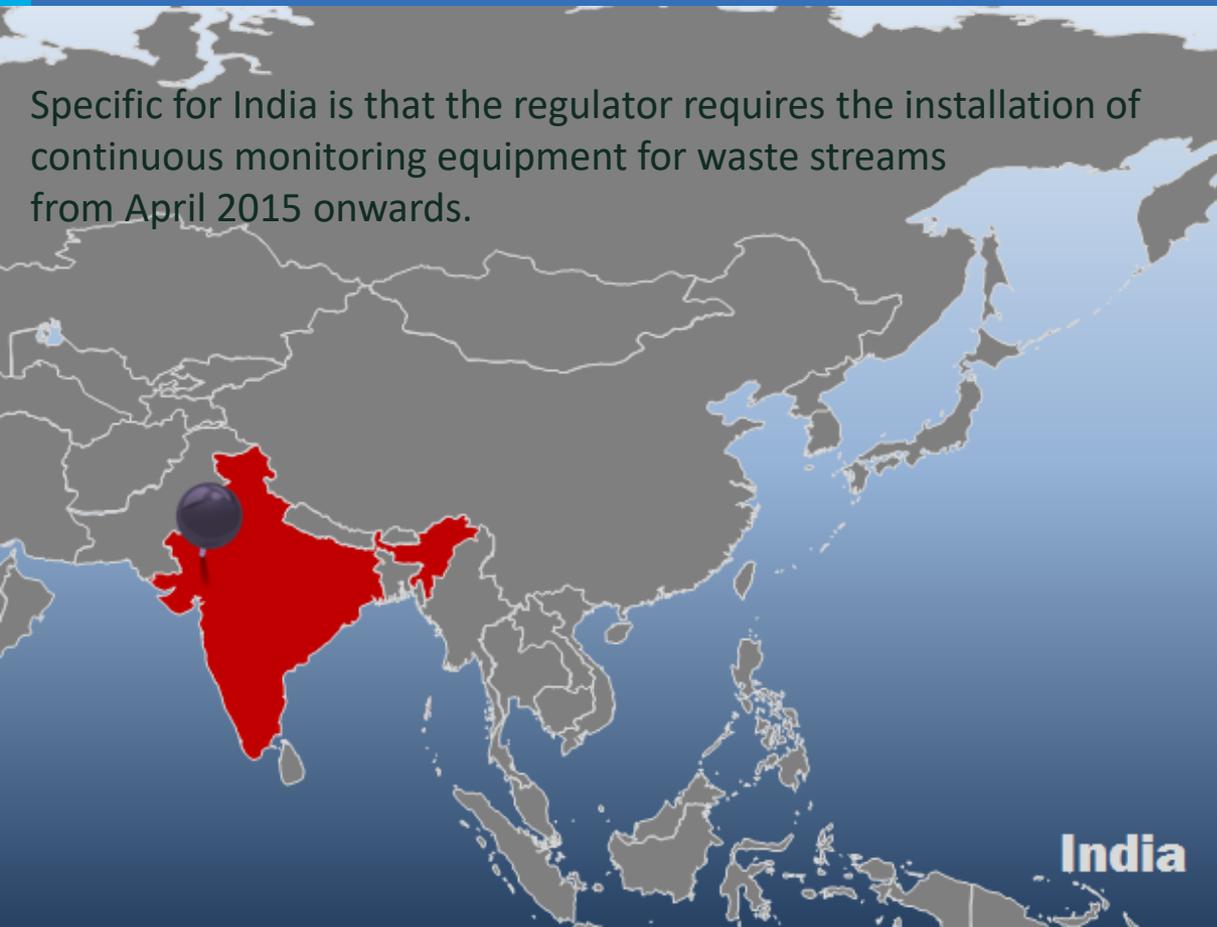
- China controls PM2.5 intensity in ambient air (2016 standard)
- Annual 15 (sens. area), 35 (rest) $\mu\text{g}/\text{Nm}^3$
- 24hr 35/75 $\mu\text{g}/\text{Nm}^3$

Limits set in recent projects

- Urea dust outlet prilling 1.0 kg/Ton load
- NH_3 outlet prilling 0.65kg/Ton load
- NH_3 melt plant vent 30 mg/Nm^3

EMISSION LIMITS PER REGION

Specific for India is that the regulator requires the installation of continuous monitoring equipment for waste streams from April 2015 onwards.



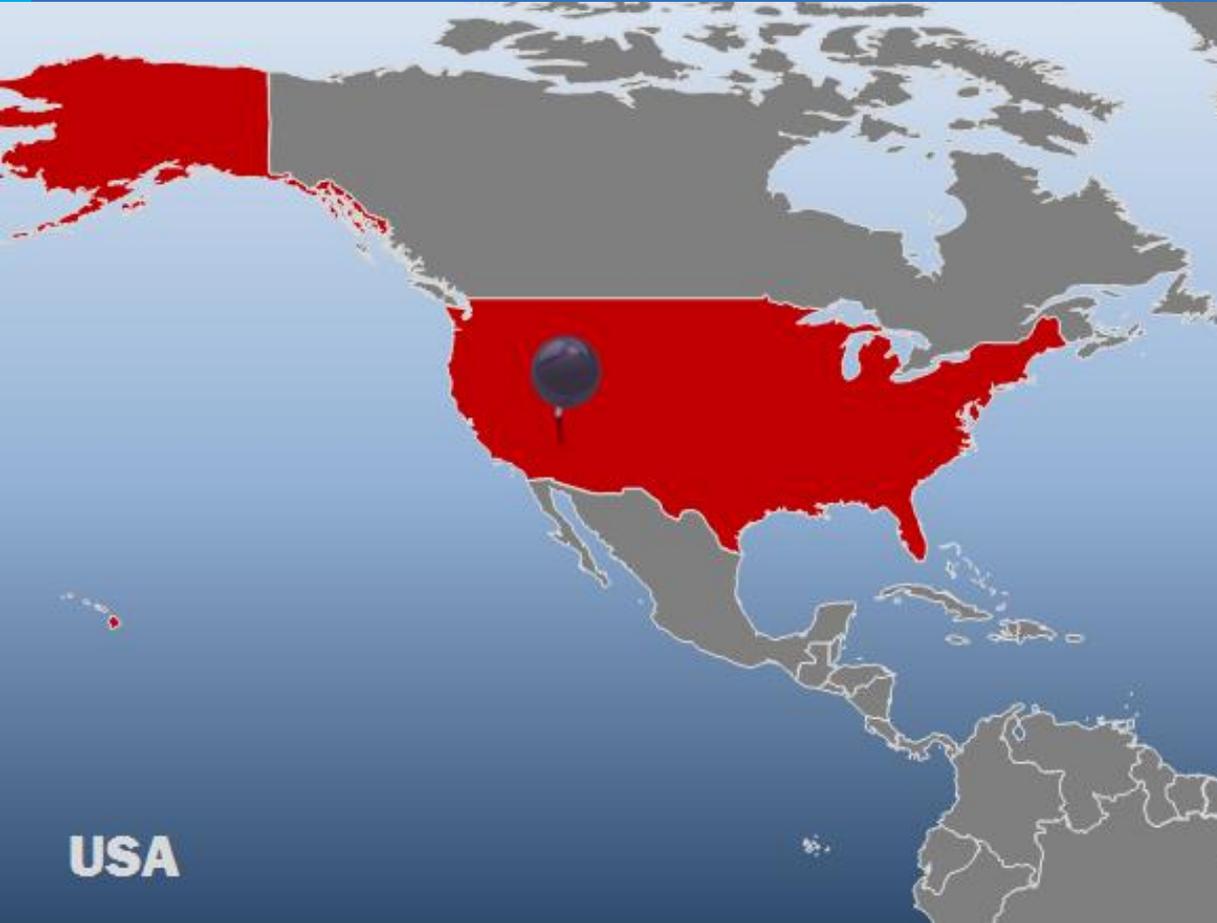
National legislation

- Urea dust 50*mg/Nm³
- *Facilities before 1982 limit set at 150 mg/Nm³
- NH₃ 100 µg/Nm³ in ambient air

Limits set in recent projects

- No reference

EMISSION LIMITS PER REGION



National legislation

- Urea dust 23 mg/ Nm³
- NH₃ 50mg/Nm³ (IFC)
- EPA not including NH₃

Limits set in recent projects

- Urea dust 10-20mg/ Nm³
- NH₃ 20-30 mg/Nm³

USA

EMISSION LIMITS PER REGION



Saudi Arabia

National legislation

- PM15 Annual 80 $\mu\text{g}/\text{Nm}^3$
- Urea dust 23 mg/Nm^3
- NH_3 50 mg/Nm^3 (IFC)

Limits set in recent projects

- Urea dust 10-20 mg/Nm^3
- NH_3 20-30 mg/Nm^3

EMISSION LIMITS PER REGION



Russia

National legislation

- PM10: 150 $\mu\text{g}/\text{m}^3$ (20-min.)
50 $\mu\text{g}/\text{m}^3$ (24-hrs)

Limits set in recent projects

- Urea dust 0.06 kg/Ton load value from granulation
- Urea dust 25-30mg/ Nm³
- NH₃ 0.2 kg/Ton load value
- NH₃ 110-150 mg/Nm³

European union



National legislation

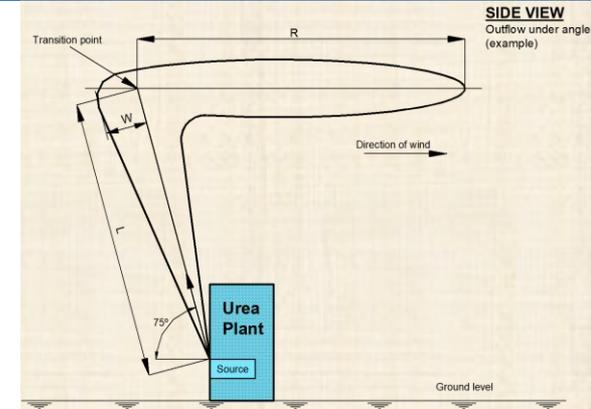
- PM2.5 Annual 24 $\mu\text{g}/\text{Nm}^3$
- NH_3 50 mg/Nm^3
- Urea dust 50 mg/Nm^3

Limits set in recent projects

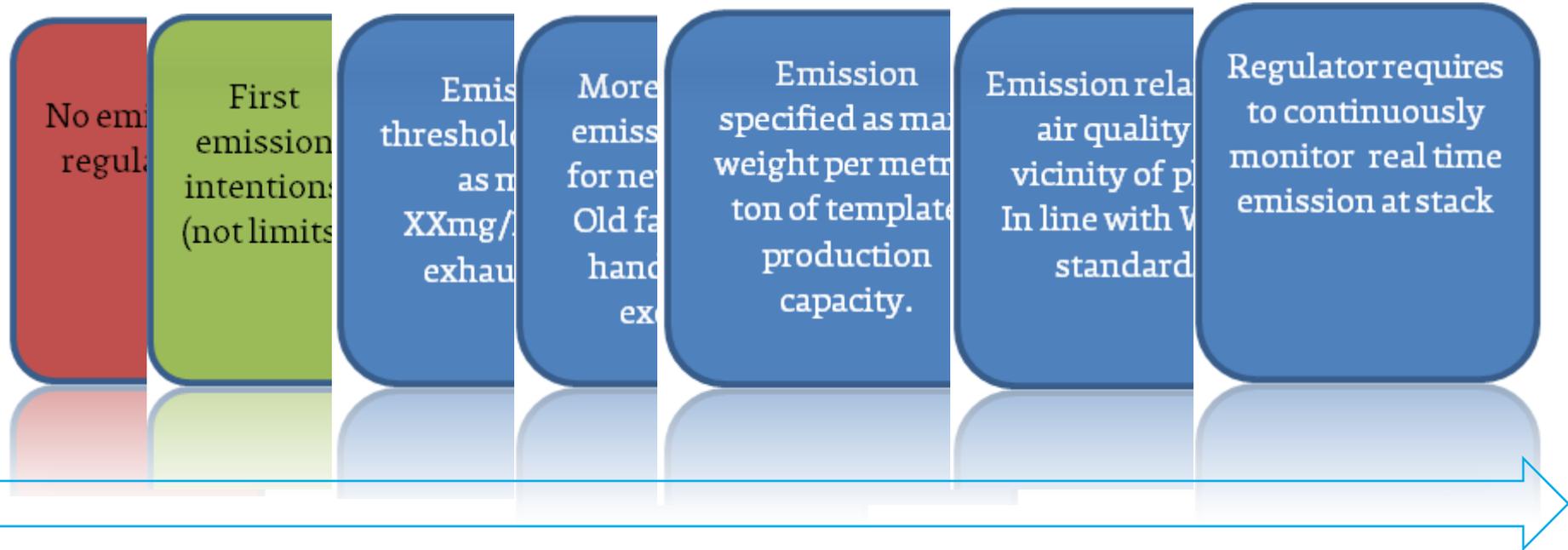
- $\text{NH}_3 < 30 \text{ mg}/\text{Nm}^3$
- Urea dust $< 30 \text{ mg}/\text{Nm}^3$

UPSET OPERATING CONDITIONS

- Despite the fact that there are no strict international requirements for upset emissions, local rules may need to be observed. In all cases where people live in the vicinity, the ammonia smell originating from upset conditions should be minimized.
- Dispersion modeling and risk analyses for upset conditions may be requested by local authorities or the customer's safety policy to find the optimum solution for these emergency scenarios. This may involve investing in process in-line solutions (e.g. avoiding a release from a pressure relief valve by incorporation of a high-pressure interlock) or secondary safety measures, such as collection/absorber systems or incinerators.



TIMELINE OF GLOBAL TRENDS IN EMISSION LIMITS



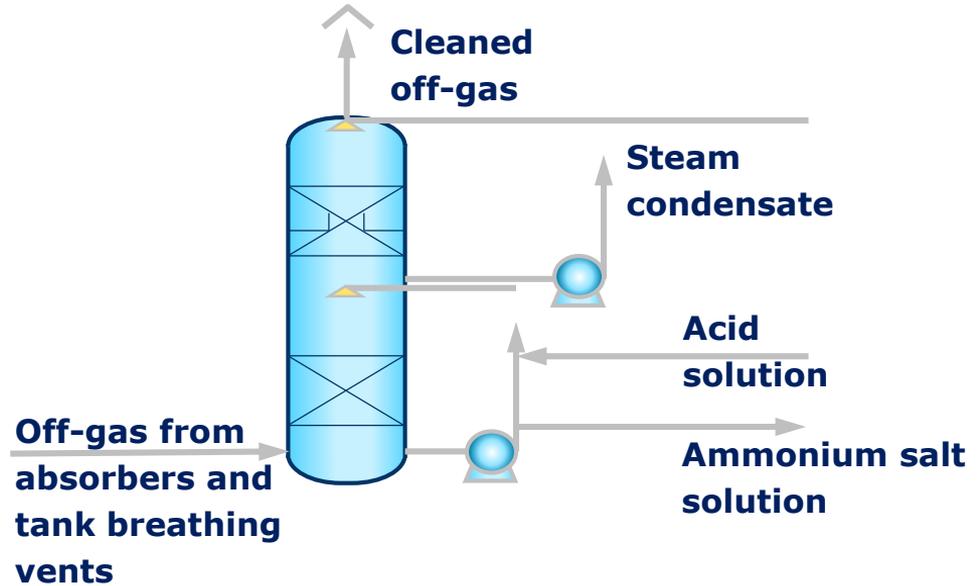
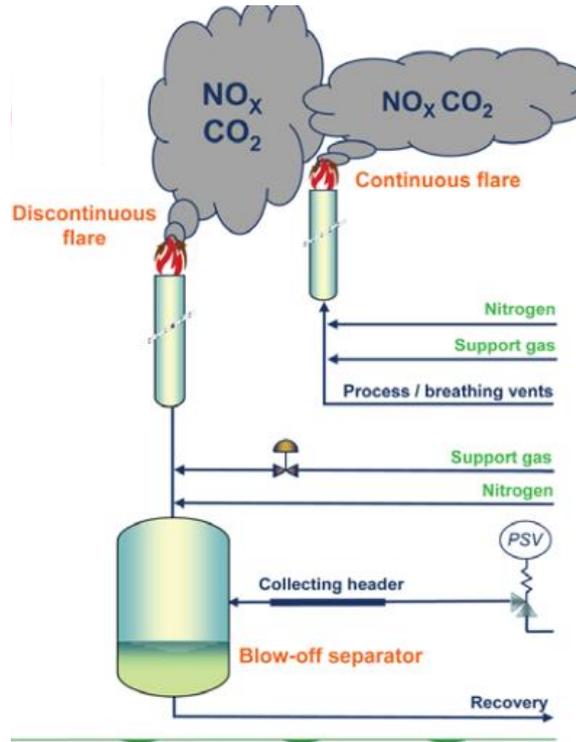
For a licensor it is of outmost importance to be able to prepare the best possible offer to the customers with regard to CAPEX and OPEX performance. As there is no line in the sand indicating when to stop investing, always tailor-made solutions need to be selected.

Final design solutions need to be developed in close cooperation with the customer, regulator and engineering contractor.

The selected prevention and control techniques are depending on:

- Regulatory requirements
- Significance of the source
- Location of the emitting facility relative to other sources (base level pollution)
- Location of sensitive receptors
- Existing ambient air quality, and potential for degradation of the air shed from a proposed project
- Technical feasibility and cost effectiveness of the available options for prevention, control, and release of emissions (BAT)

TECHNICAL SOLUTIONS



CONCLUSIONS ON EMISSION LIMITS WORLDWIDE

- **Based on limits set by federal regulators or (fertilizer) associations there might not be a problem, however; local authorities set the (lower) standard!**
- There is not a fixed list of worldwide emission limits, they differ per region.
- Acceptable limits are being subsequently lowered by the regulator.
- A shift can be observed from pollutant concentration at the plant stack towards a broader impact to the environment (air quality and absolute quantity released to the environment).
- Technical solutions are readily available to comply with the most restrictive emission limits.

For the licensor this means that every new project either grass root or revamp will ask for a tailor-made approach in close cooperation with the engineering contractor, owner of the facility and local authorities.

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GPIC

Low Energy Concept

Leon Heijnen, Sales & Solutions Manager Stamicarbon, The Netherlands

Time for Excellence

Program by:



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**INNOVATIONS IN UREA
TECHNOLOGIES**

**FROM CONVENTIONAL TO
ULTRA LOW ENERGY
TECHNOLOGY**

AFA workshop
*Health, Safety & Environment in Fertilizers
Industry*

Leon Heijnen

Bahrain Sep 5, 2018

INTRODUCTION:

Innovations:

- Passivation with air
 - CO₂ Stripping technology
 - Pool condenser and Pool reactor
 - Safurex[®] Material
 - AVANCORE[®] low elevation plant design
-
- **Innovations driven by:**
 - Improving safety
 - Lowering investment cost
 - Reducing emissions
 - Improving energy efficiency

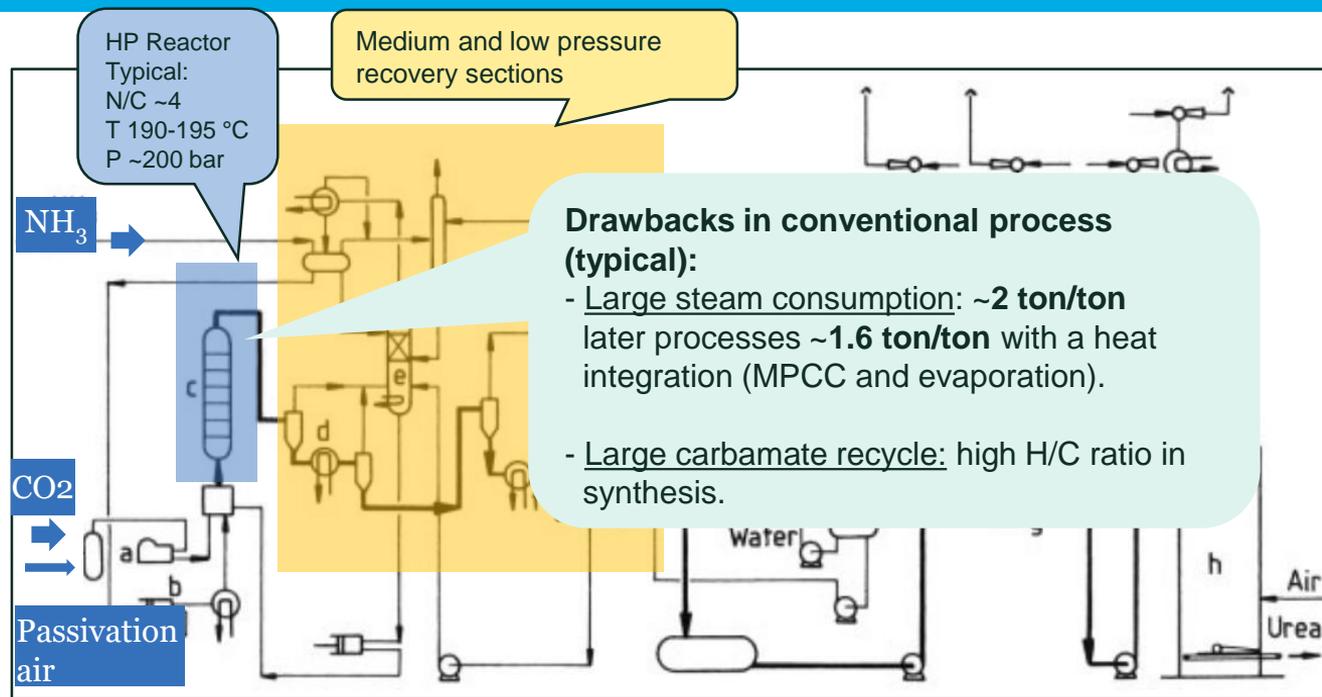
SOME RECENT DEVELOPMENTS:

- Adiabatic flash technology
- Ultra low energy technology

Focus is on lowering Total Cost of Ownership

INNOVATIONS

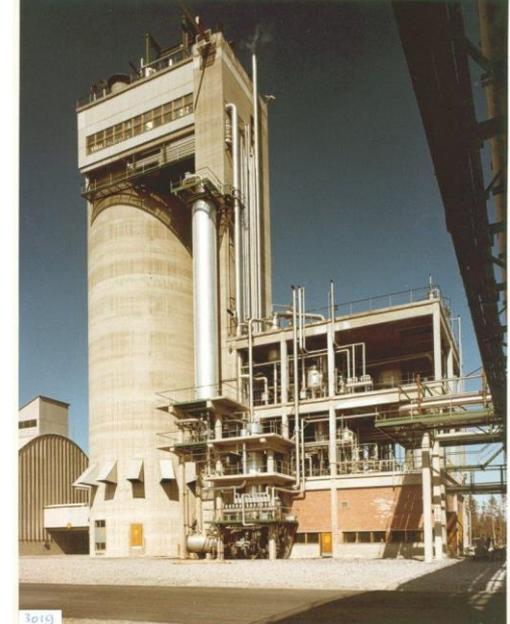
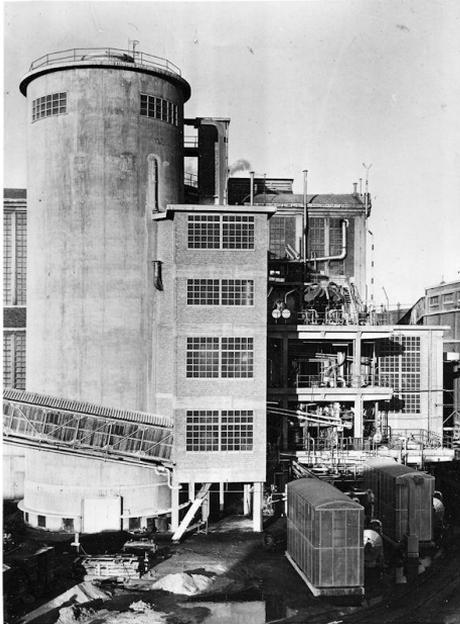
USE OF AIR FOR PASSIVATION IN CONVENTIONAL UREA PROCESS



Conventional Urea Process Typical

In 1960, Passivation with air was introduced to enable use of stainless-steel for urea synthesis

CONVENTIONAL TECHNOLOGY PLANTS



Year of license	1957
Capacity MTPD	70
Contractor	Werkspoor, NL
Client	Société Carbochimique, Belgium

Year of license	1965
Capacity MTPD	317
Contractor	Braun, USA
Client	Terra Chemicals, USA

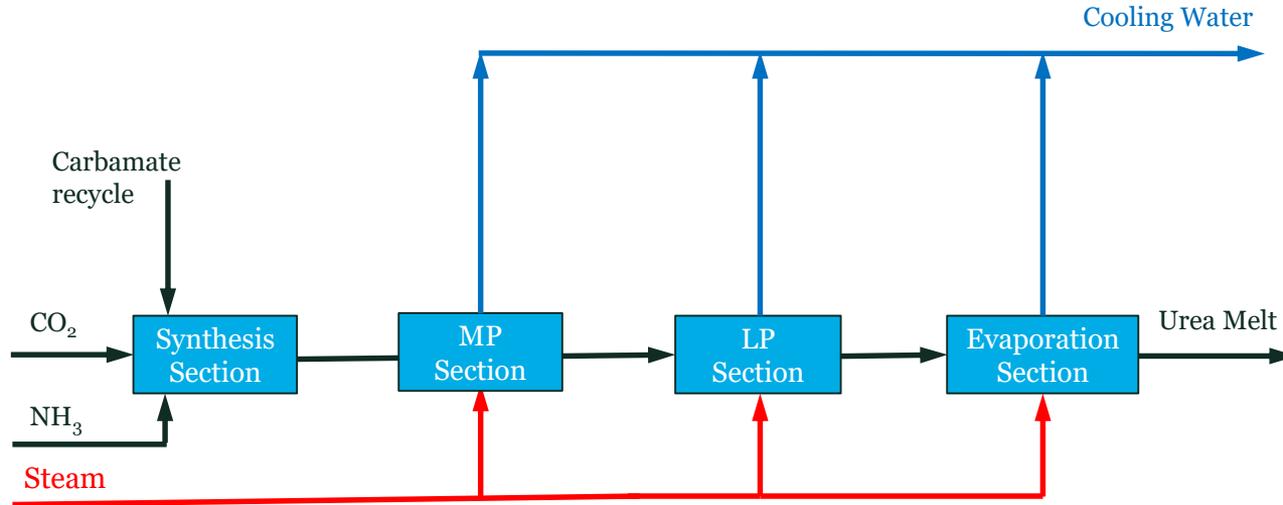
Year of license	1966
Capacity MTPD	300
Contractor	Uhde, DE
Client	Kemira Oy, Finland

The innovation & license company of Maire Tecnimont



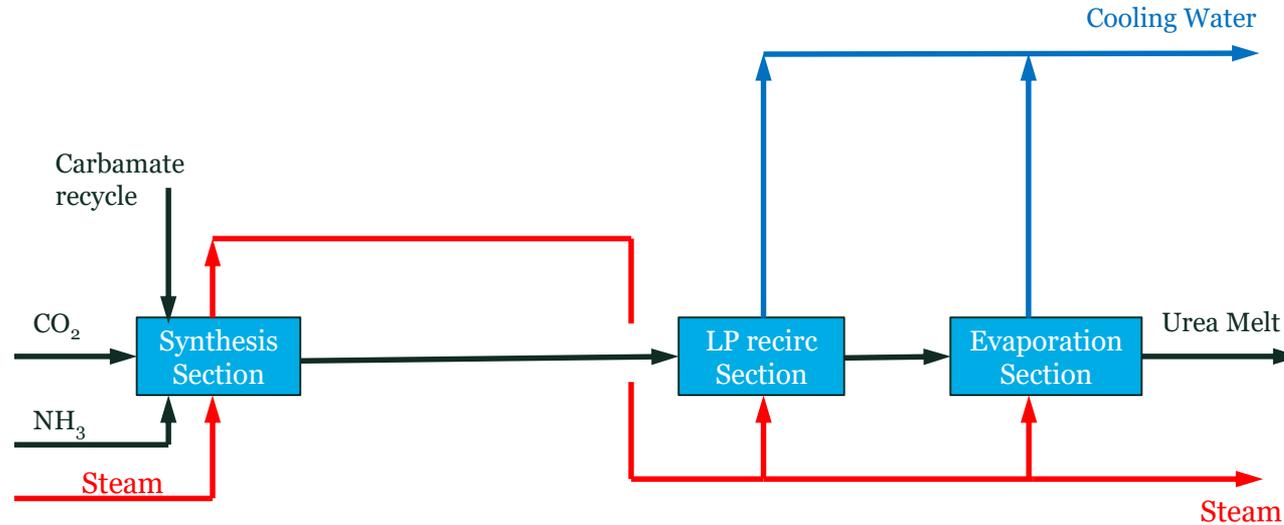
CONVENTIONAL PROCESS (TYPICAL) ENERGY FLOW DIAGRAM SIMPLIFIED

The “N = 1” process

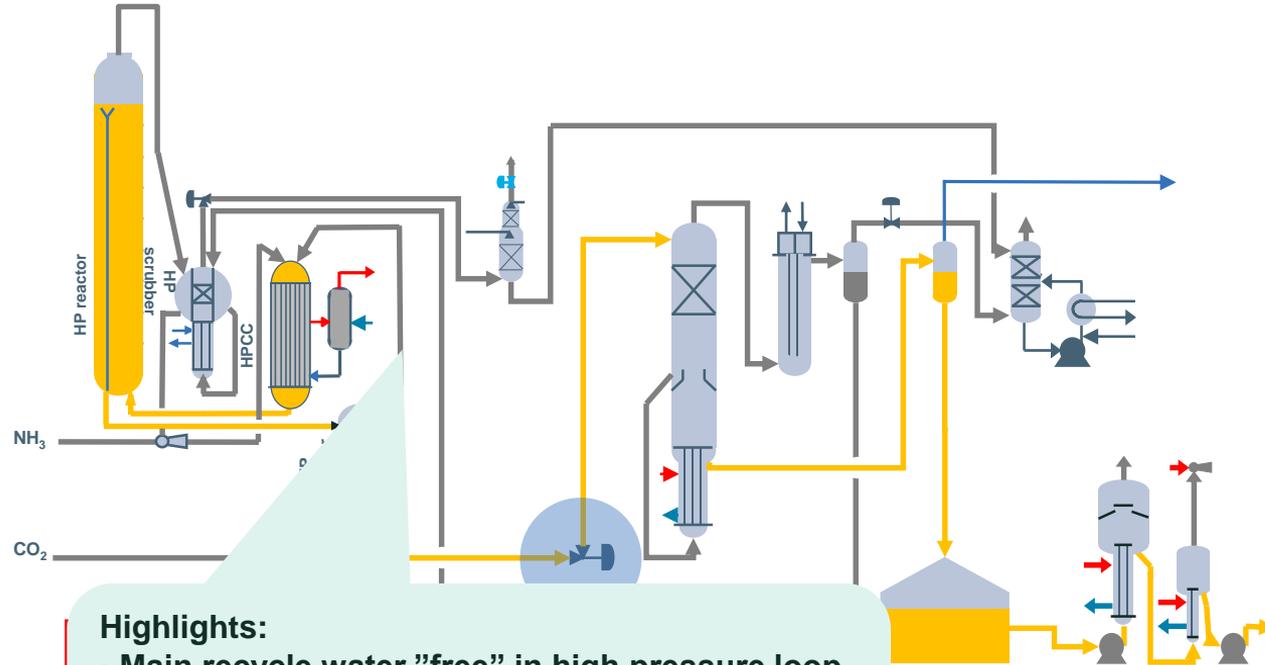


STAMICARBON CO₂ STRIPPING PROCESS; A GIANT BREAKTHROUGH ENERGY FLOW DIAGRAM

The “N = 2” process



STAMICARBON CO₂ STRIPPING TECHNOLOGY BEFORE UREA 2000PLUS® (SHOWN IS 2ND GENERATION CO₂ STRIPPING TECHNOLOGY)



Highlights:

- Main recycle water "free" in high pressure loop
- Full re-use of heat of condensation of vapors

Result:

- Steam consumption reduced to ~0.9 ton/ton

CO₂ STRIPPING TECHNOLOGY PLANTS (2ND GENERATION)



Year of license	1995
Capacity MTPD	2000
Contractor	Uhde, DE
Client	CFI, Donaldsonville

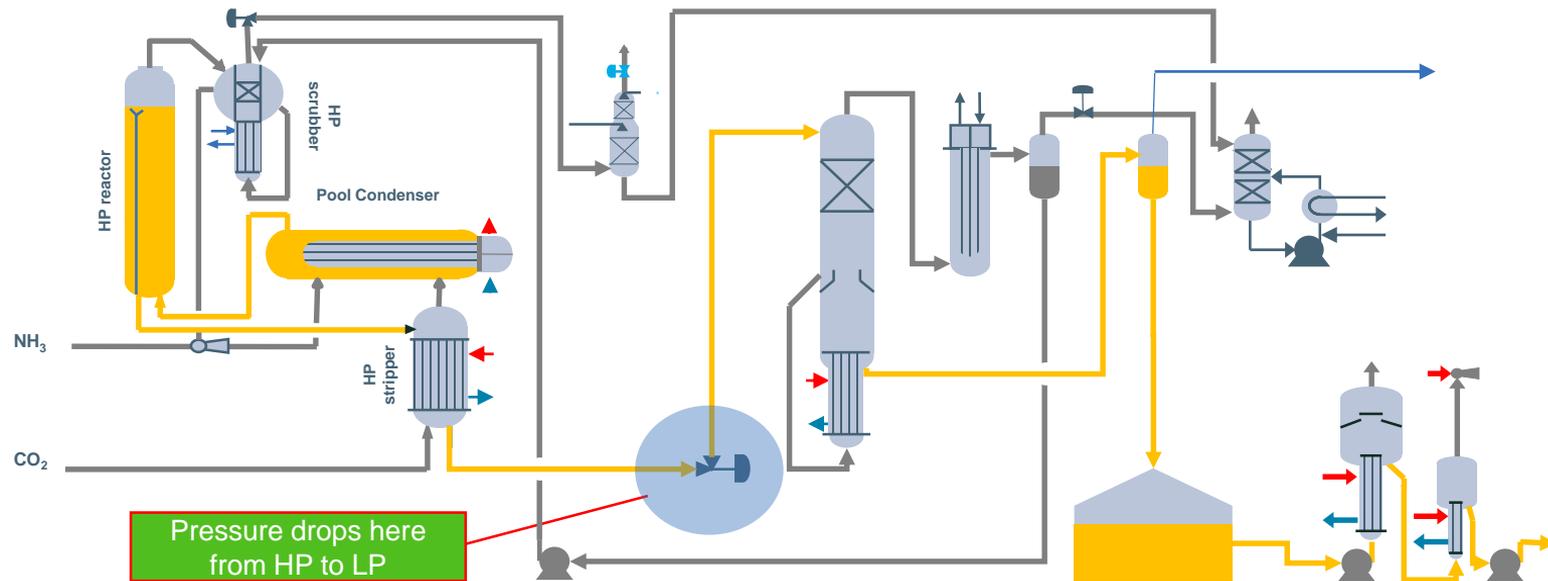


Year of license	1996
Capacity MTPD	1750
Contractor	Uhde, DE
Client	Abu Qir, Egypt

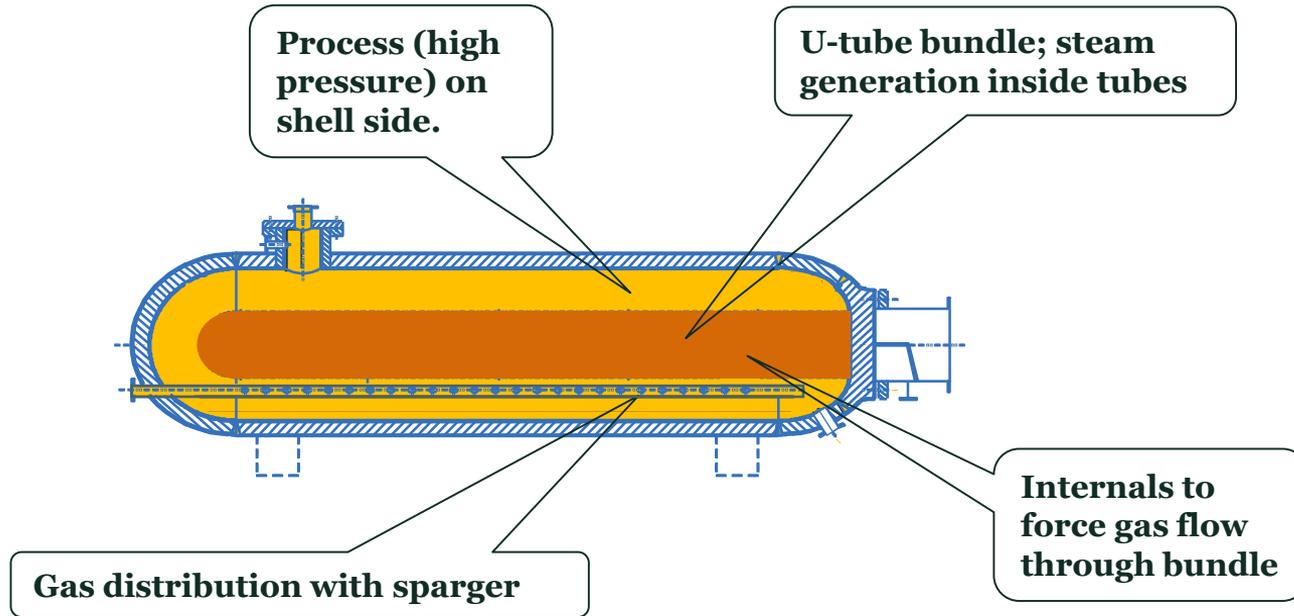


Year of license	2003
Capacity MTPD	2000
Contractor	Uhde, DE
Client	EFC, Egypt

UREA 2000PLUS® PROCESS



IN 1990 INVENTION OF POOL CONDENSER



- About 60% of reaction in pool condenser
- Heat transfer area reduced by 37% compared to HPCC

IN 1994 INVENTION OF POOL REACTOR (REACTOR+POOL CONDENSER)

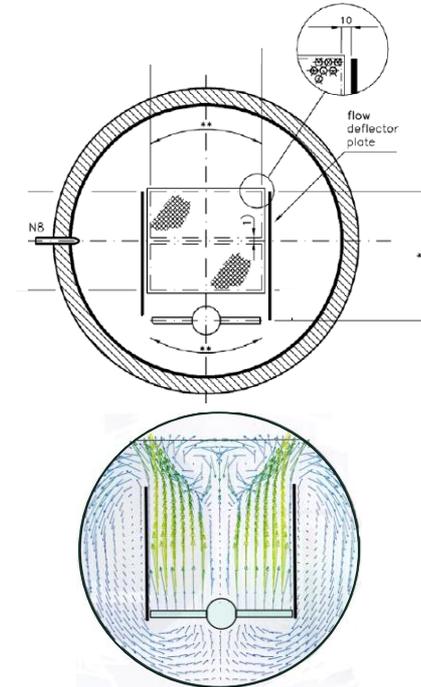
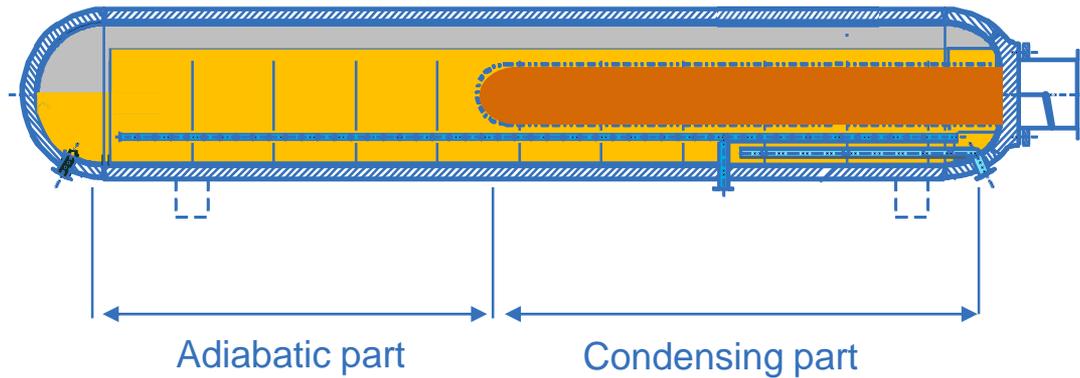


FIGURE : FLUID MIXING PROFILE IN THE
CROSS-SECTION OF POOL REACTOR

UREA 2000PLUS® (POOL CONDENSER DESIGN)



Year of license	2007
Capacity MTPD	3450
Contractor	Uhde, DE
Client	Sorfert, Algeria

Year of license	2008
Capacity MTPD	2860
Contractor	Wuhan, CN
Client	Hulunbeier, China

Year of license	2008
Capacity MTPD	3500
Contractor	Uhde, DE
Client	Yara Sluiskil, Netherlands

UREA 2000PLUS® (POOL REACTOR DESIGN)

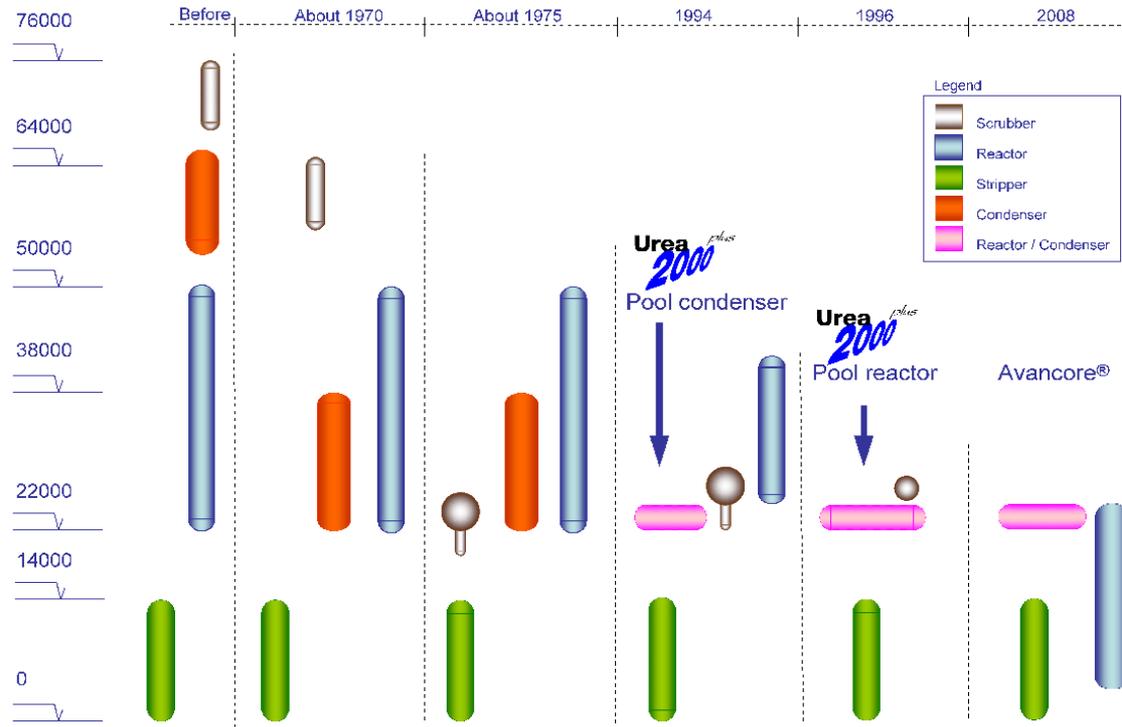


Year of license	2002
Capacity MTPD	1050
Contractor	Uhde, DE
Client	Tedjen, Turkmenistan

Year of license	2008
Capacity MTPD	1500
Contractor	Chemoprojekt, CZ
Client	Cherepovetz, Russia

Year of license	2012
Capacity MTPD	1760
Contractor	Chengda, CN
Client	Shahjalal, Bangladesh

ELEVATION COMPARISON OF ALL CO₂ STRIPPING PROCESSES



UREA 2000PLUS® BENCHMARK

Urea 2000Plus® process for prilled urea

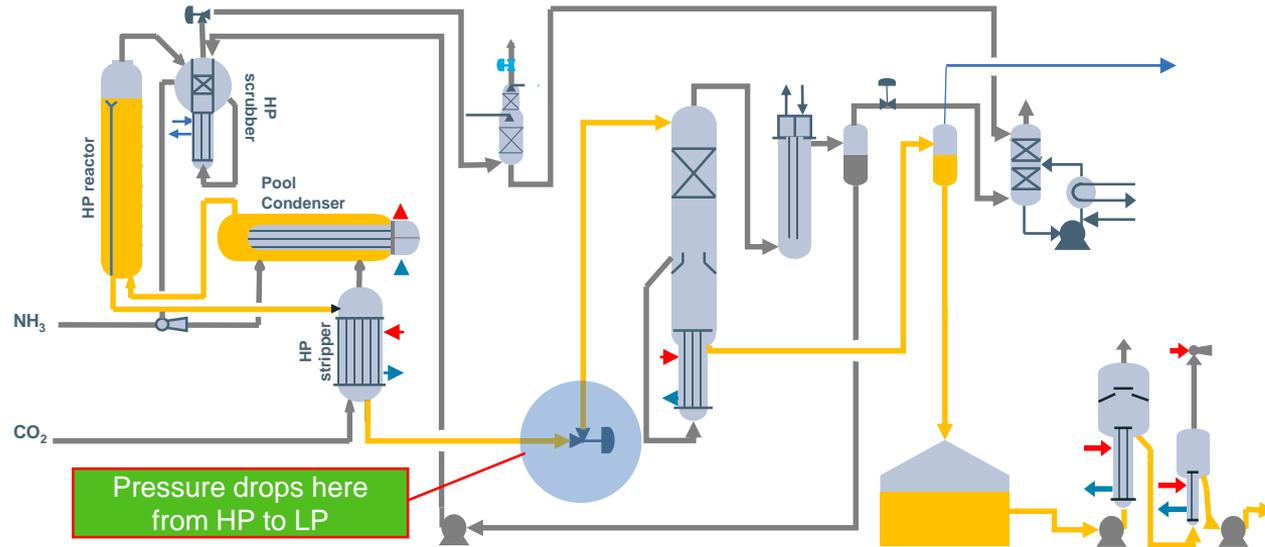
- Synthesis (Pool condenser, vertical reactor, HP scrubber and HP stripper).
- LP recirculation
- Evaporation & condensation
- Waste water treatment

Extraction steam consumption 868 kg/ton (23 bara, 330°C)

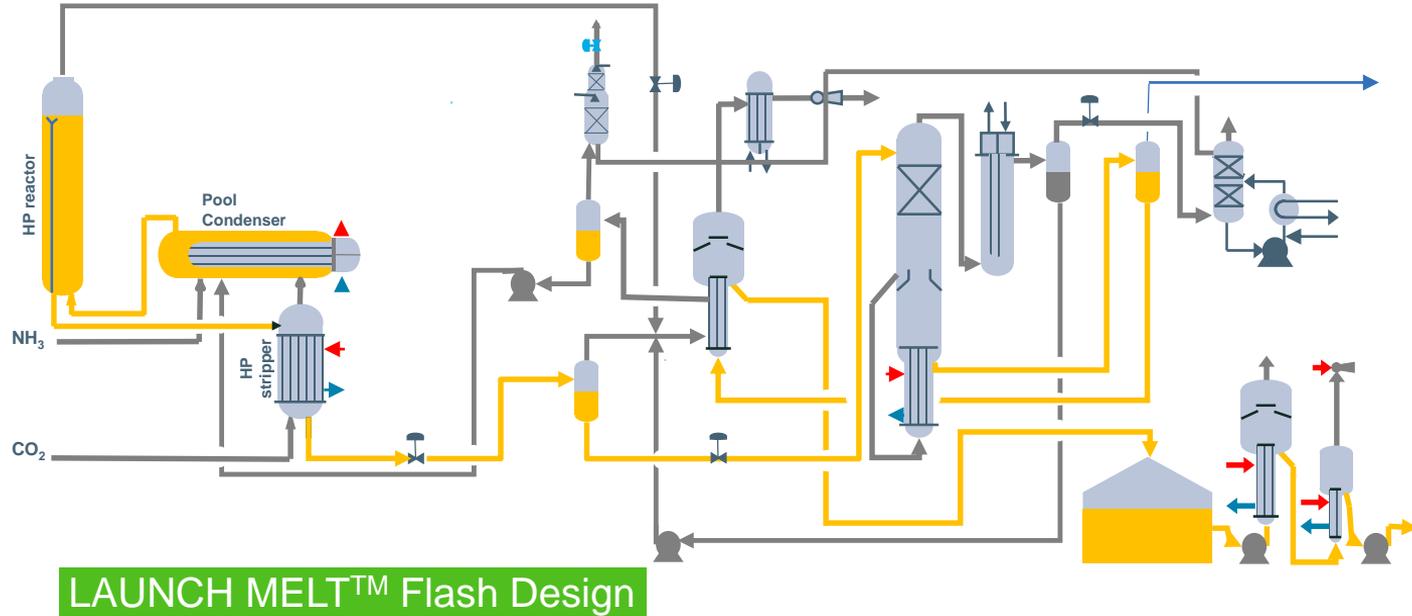
Results:

- More than 40 units licensed
- Extreme operability
- Extreme reliability
- Units in operation up to more than 4200 MTPD
- Max capacity well above 6500 MTPD with MEGA concept

LOOKING FOR MORE ENERGY REDUCTION

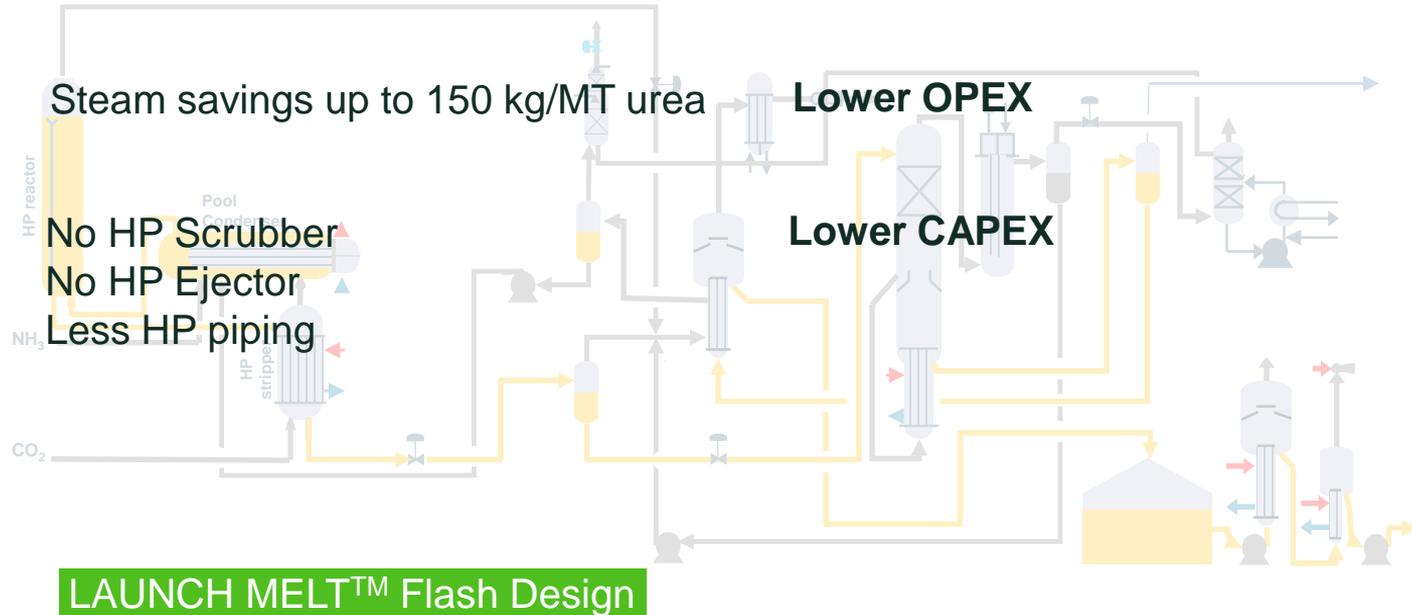


UREA 2000PLUS® PROCESS INCL. ADIABATIC FLASH



UREA 2000PLUS® PROCESS INCL. ADIABATIC FLASH

LAUNCH MELT™ FLASH DESIGN: ADVANTAGES

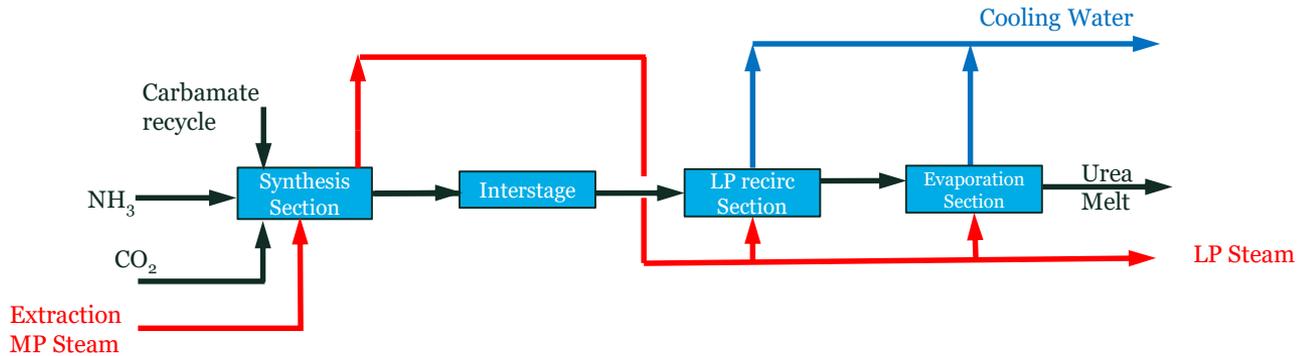


UREA 2000PLUS® PROCESS WITH “ULTRA-LOW ENERGY DESIGN”

ULTRA-LOW ENERGY DESIGN

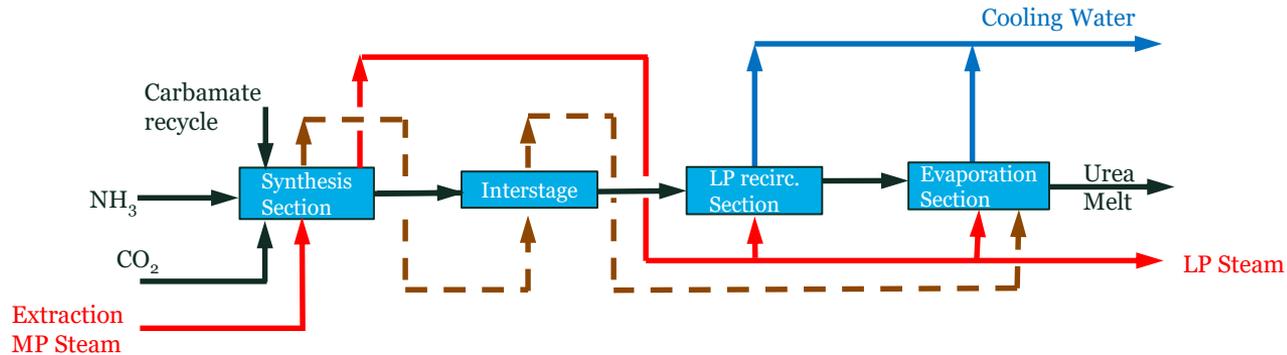
ENERGY FLOW DIAGRAM IN UREA 2000PLUS® PROCESS

The “N = 2” process

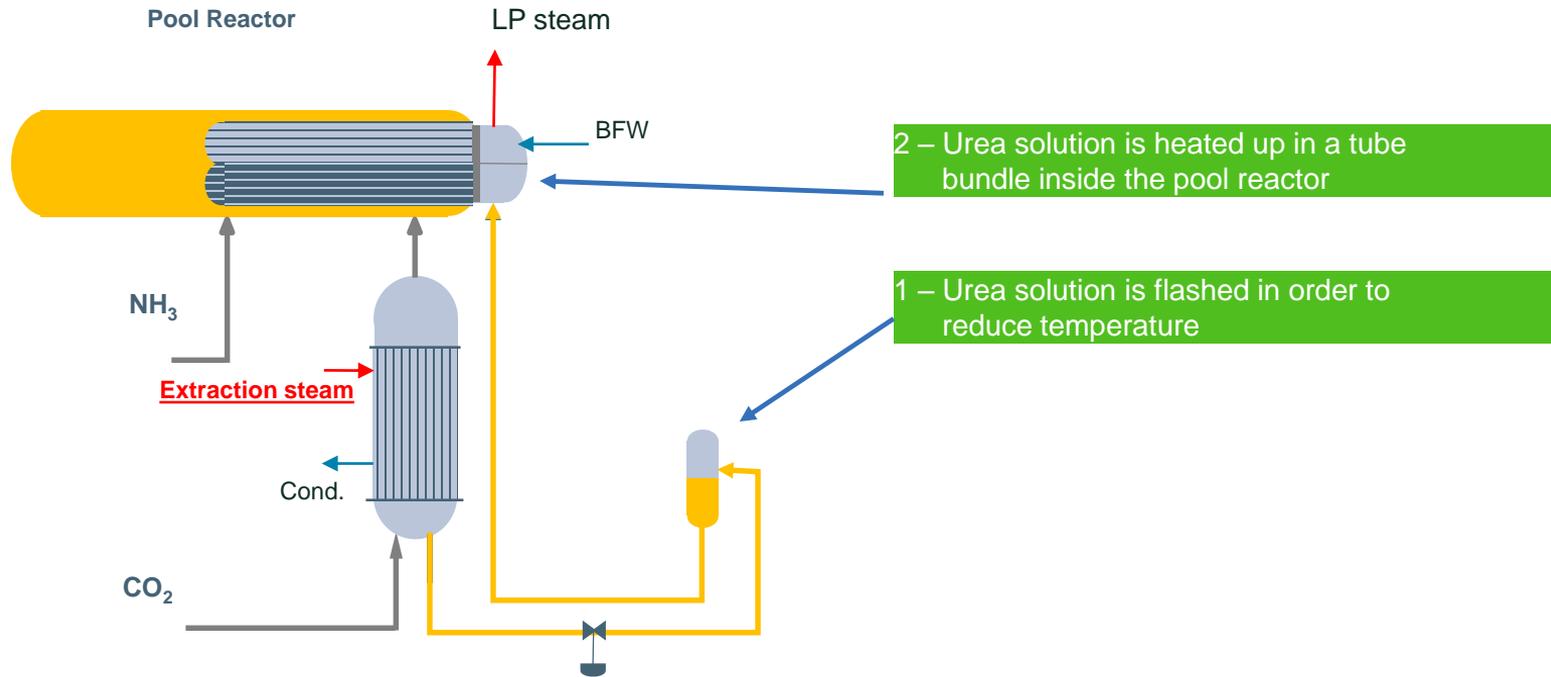


ENERGY FLOW DIAGRAM IN ULTRA-LOW ENERGY DESIGN

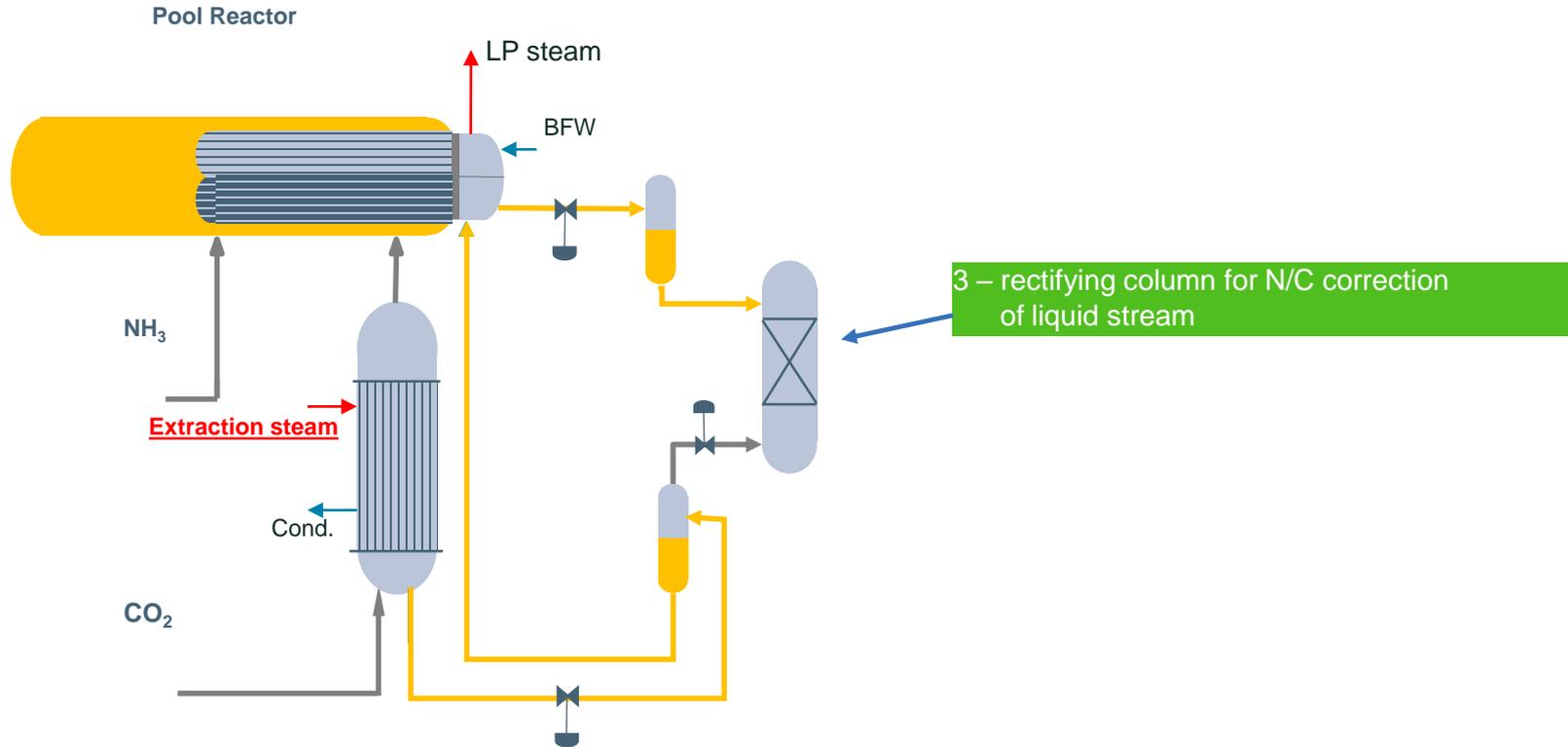
The “N = 3” process



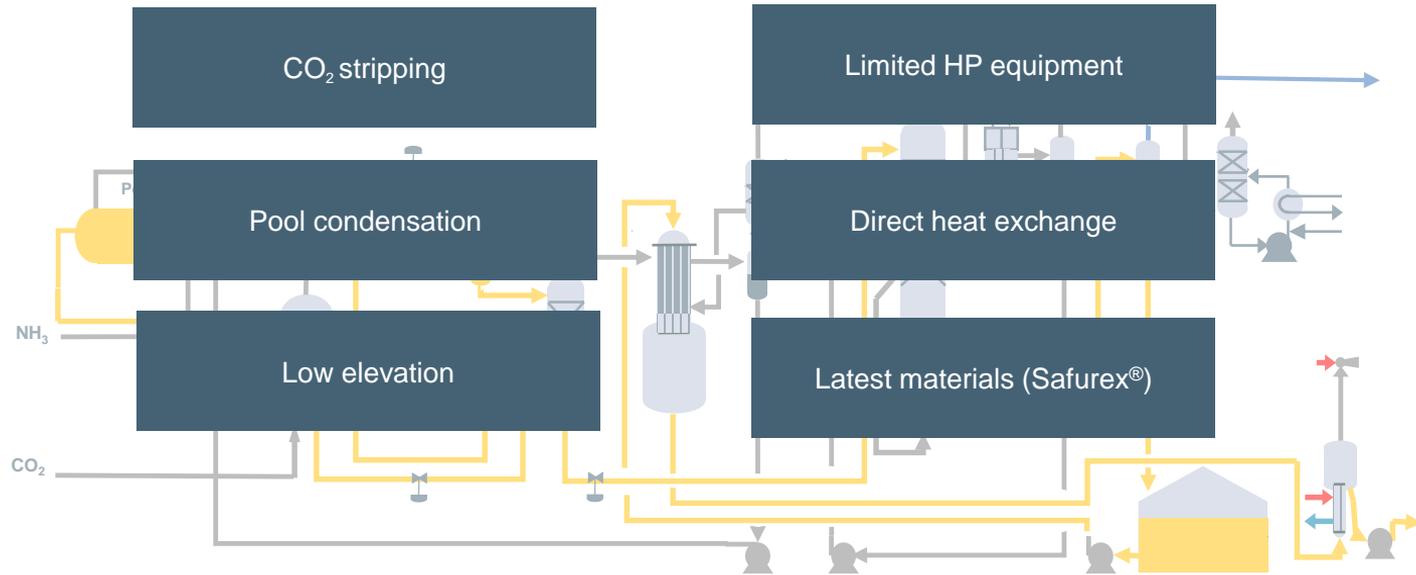
THE ULTRA-LOW ENERGY DESIGN



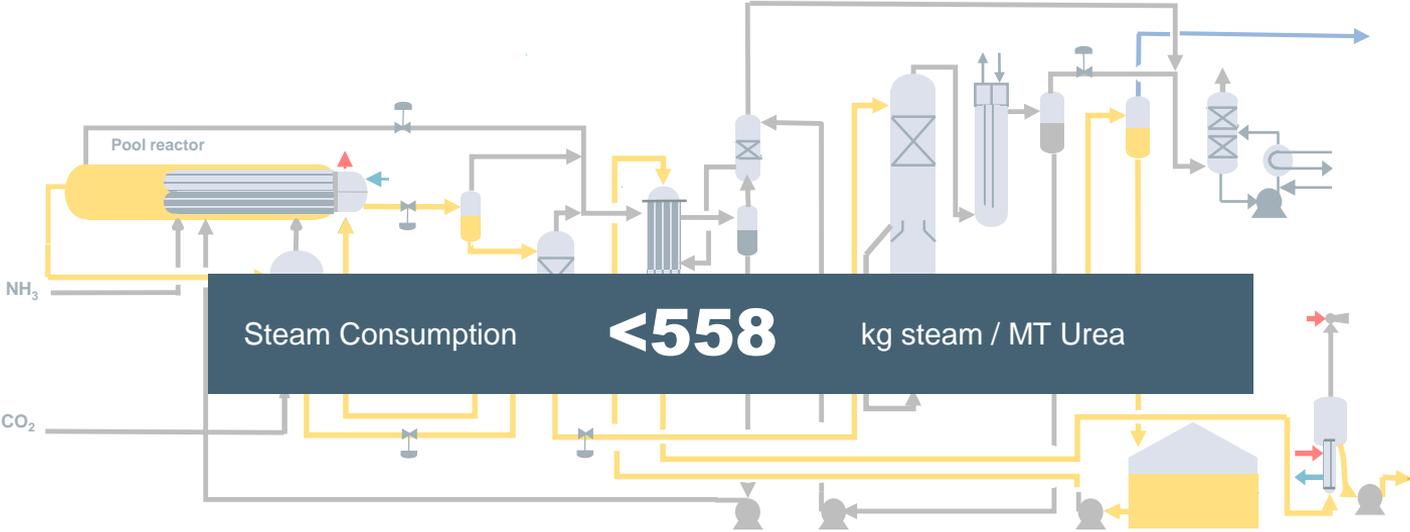
INTRODUCING A SIMPLE MP SECTION



LAUNCH MELT™ ULTRA-LOW ENERGY DESIGN



STAMICARBON'S LOWEST OPEX DESIGN



➤ **Ultra low energy urea melt plant :**

- extraction steam consumption as low as 558 kg/ton (23 bara, 330 °C)
- Maximum use of proven technology (pool condensation, falling film evaporation, pressure levels)
- Minimizing equipment and loops, retaining ease of operation and reliability
- Equipment integration and HP equipment elimination balances additional equipment MP section. CAPEX comparable with benchmark

REFERENCES

Grass Root projects:

- ❖ Jiujiang XinLianXin Fertilizer Co. Ltd
 - Type: Ultra low energy concept Pool reactor
 - Capacity: 2334 mtpd
 - Date of contract: January 2017
 - Project phase: Detailed engineering and procurement

- ❖ Hubei Sanning Chemical Industrial Co. Ltd.
 - Type: Ultra low energy concept Pool reactor
 - Capacity: 2334 mtpd
 - Date of contract: February 2018
 - Project phase: Process design phase

CONCLUSION

- Stamicarbon is a leading and innovative Urea Technology licensor since 1960's.
- Latest innovation in Urea technology “Ultra-Low Energy design” provides the lowest **Total Cost of Ownership** till date.

LOWEST TCO DESIGN TILL DATE

**THANK YOU
FOR YOUR
ATTENTION**



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Arab Intl. Organization
هيئة عربية دولية
Arab Fertilizer Association
Since 1975



Case Studies (Reactor- and HP-Scrubber Failure)

Roel trijnes, Sales & Solutions Manager Stamicarbon, The Netherlands

Time for Excellence

Program by:



4-6/9/ 2018

Bahrain



Stamicarbon
pure knowledge

SCRUBBER NEAR-MISS

Learnings from incidents

Roel Trijnes Mechanical Engineer
Aftersales & Solution manager

2018

Bahrain

AGENDA

- 1. High risks carbamate corrosion**
2. Incident
3. Root cause
4. Repair
5. Consequences
6. Recommendations

HIGH RISKS AMMONIUM CARBAMATE CORROSION

Ammonium-carbamate:

- Intermediate process step in synthesis of urea
- Highly corrosive



- Catastrophic failure urea reactor (100 MTPD)
- Unnoticed leakage through stainless steel barrier
- Affected the carbon-steel pressure shell
- Break-Before-Leak Scenario

AGENDA

1. High risks carbamate corrosion
2. **Incident**
3. Root cause
4. Repair
5. Consequences
6. Recommendations

INCIDENT

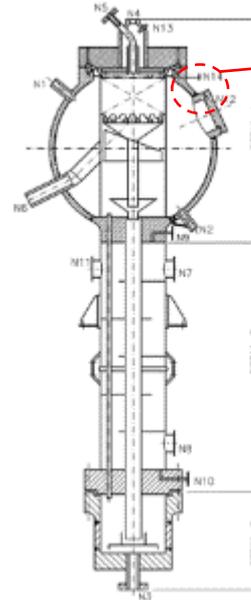
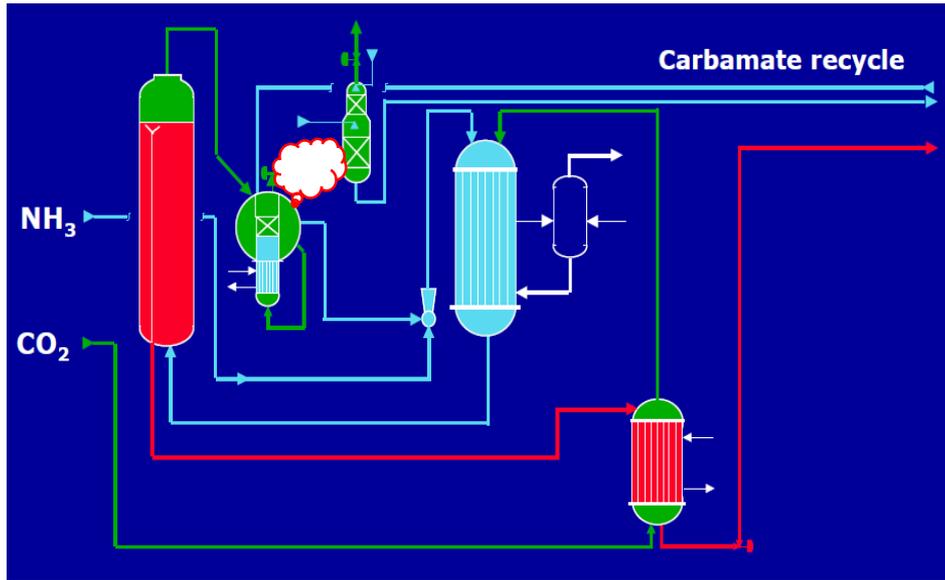
Event location

- Abu Qir -III
- Commissioned in October 1998
- Ammonia plant 1200 MTPD (Uhde)
- Urea plant 1750 MTPD (Stamicarbon)



INCIDENT

- A leak to the atmosphere was observed in the top part of the HP scrubber sphere.
- Fortunately a “leak before break” scenario occurred and the plant could be stopped in time to prevent a catastrophic failure.



INCIDENT

- Leak in the stainless steel liner which resulted in corrosion of the carbon steel behind the 316L UG liner.
- Dye penetrant examination revealed a large number of cracks in the carbon steel pressure bearing wall.
- Leak through stainless steel barrier unnoticed by leak detection system

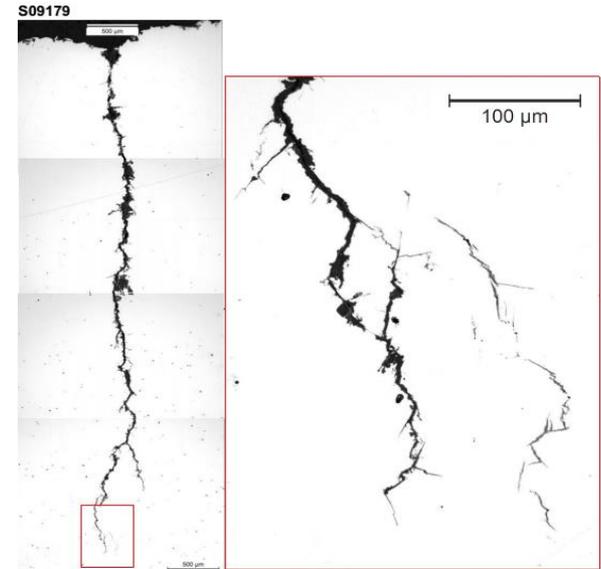
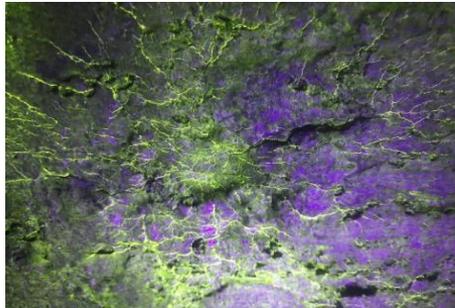


AGENDA

1. High risks carbamate corrosion
2. Incident
3. **Root cause**
4. Repair
5. Consequences
6. Recommendations

ROOT CAUSE

- Root cause investigation concluded that the liner had failed due to condensation corrosion.
- The corrosion of the carbon steel pressure bearing wall was a result of carbamate leaking through the liner.
- The hydrogen which developed during this corrosion reaction has subsequently caused intergranular cracks in the carbon steel.



AGENDA

1. High risks carbamate corrosion
2. Incident
3. Root cause
4. **Repair**
5. Consequences
6. Recommendations

REPAIR

Structural integrity of the HP sphere was temporary restored by an extensive repair method.

Total time needed: 8 weeks



AGENDA

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CONSEQUENCES

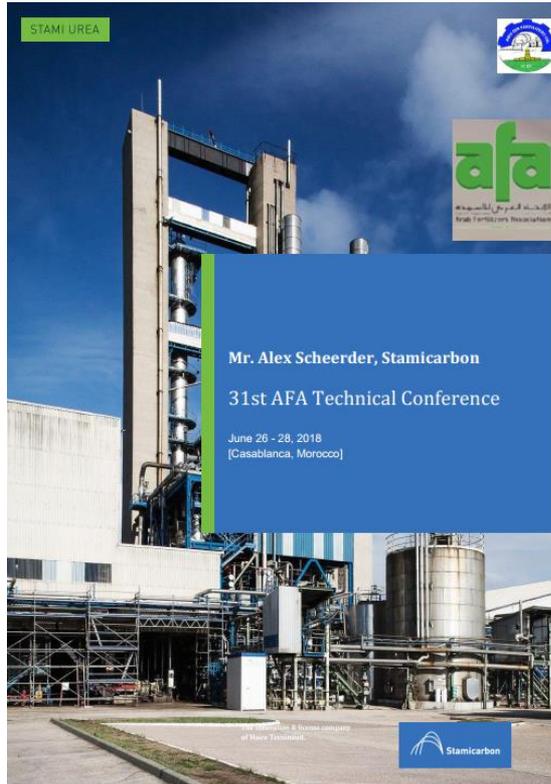
- Release of ammonia/carbamate close to the HP scrubber
- Fortunately no personal injuries
- 8 weeks of plant shutdown
- Production loss
- Cost for temporary repair
- New scrubber must be ordered immediately

AGENDA

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Mitigation actions to avoid recurrence of a similar incident

- Reliable and robust online leak detection monitoring system
 - State-of –the Art analyzer systems connected to DCS
- Act immediately upon leak in the stainless steel barrier
- Apply Safurex[®] as protective barrier:
 - Resistant to Strain Induced Intergranular Cracking (SIIC)
- Apply low strength steel for pressure shell (in case of mono-wall design)
 - Lower risk for Hydrogen Induced Cracking (HIC)
- Improve steam tracing to keep temperature above dew point



- Detailed paper presented during Technical AFA in Casablanca June 2018 is available on request
- Send your request to:

roel.trijnes@stamicarbon.com

THANK YOU

شكرا



Stamicarbon
pure knowledge

SCRUBBER NEAR-MISS

Learnings from incidents

Roel Trijnes Mechanical Engineer
Aftersales & Solution manager

2018

Bahrain

AGENDA

- 1. High risks carbamate corrosion**
2. Incident
3. Root cause
4. Repair
5. Consequences
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HIGH RISKS AMMONIUM CARBAMATE CORROSION

Ammonium-carbamate:

- Intermediate process step in synthesis of urea
- Highly corrosive



- Catastrophic failure urea reactor (100 MTPD)
- Unnoticed leakage through stainless steel barrier
- Affected the carbon-steel pressure shell
- Break-Before-Leak Scenario

AGENDA

1. High risks carbamate corrosion
2. **Incident**
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INCIDENT

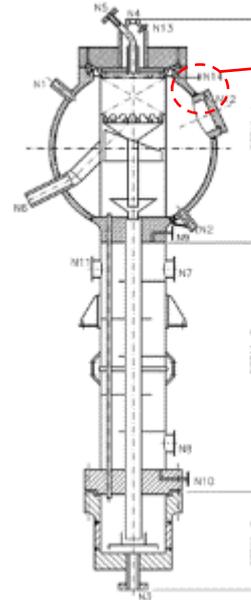
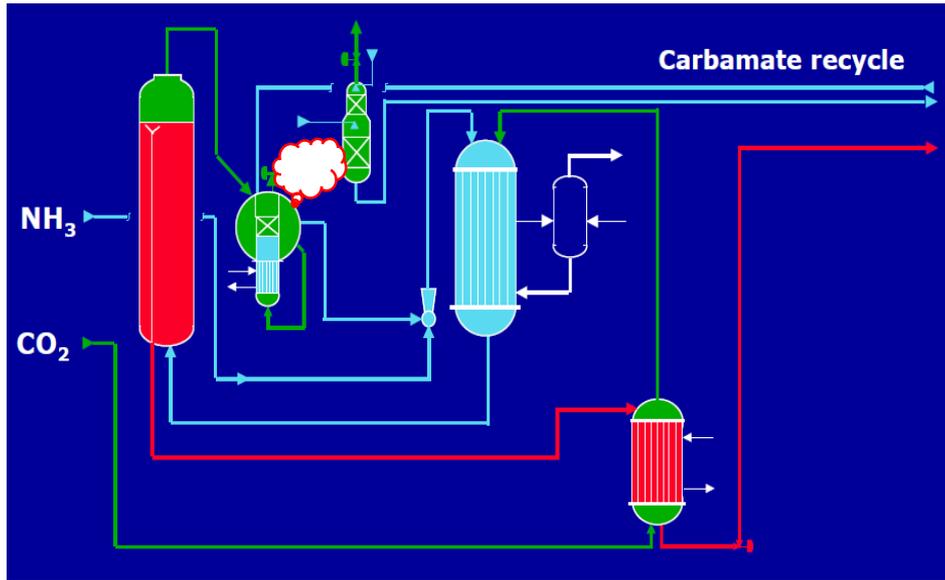
Event location

- Abu Qir -III
- Commissioned in October 1998
- Ammonia plant 1200 MTPD (Uhde)
- Urea plant 1750 MTPD (Stamicarbon)



INCIDENT

- A leak to the atmosphere was observed in the top part of the HP scrubber sphere.
- Fortunately a “leak before break” scenario occurred and the plant could be stopped in time to prevent a catastrophic failure.



INCIDENT

- Leak in the stainless steel liner which resulted in corrosion of the carbon steel behind the 316L UG liner.
- Dye penetrant examination revealed a large number of cracks in the carbon steel pressure bearing wall.
- Leak through stainless steel barrier unnoticed by leak detection system

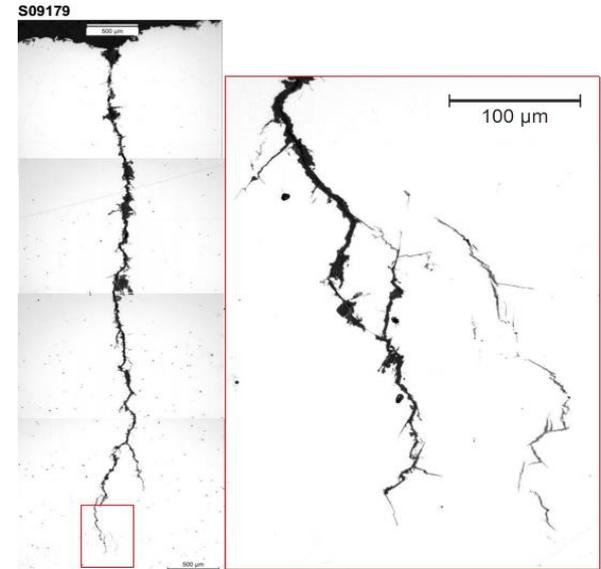
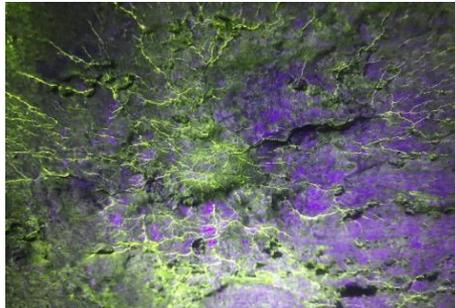


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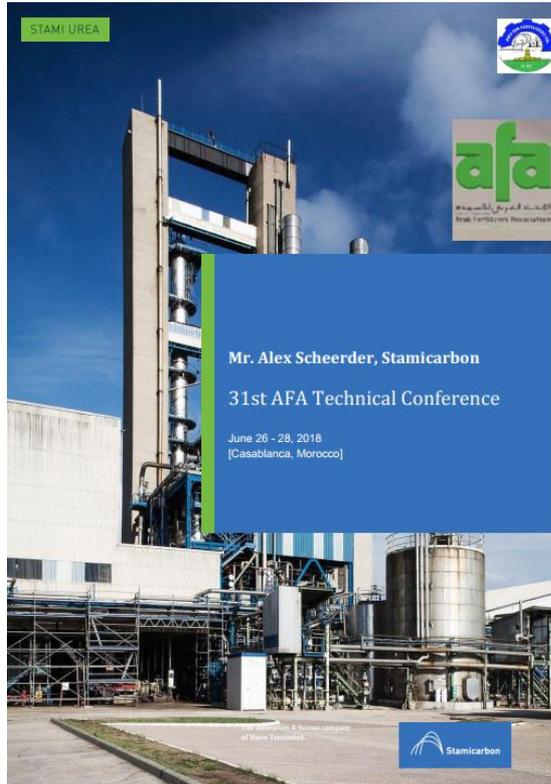
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THANK YOU

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Arab Fertilizer Association
Since 1975



Process Safety Measures (Leak Detection Monitoring System)

Roel trijnes, Sales & Solutions Manager Stamicarbon, The Netherlands

Time for Excellence

Program by:



4-6/9/ 2018

Bahrain



ADVANCE MONITOR

LEAK DETECTION MONITORING SYSTEM

By Roel Trijnes
Aftersales & solution manager

Bahrain

2018

CONTENT

- Why installing LDMS
- Possible leakage locations
- Leak detection methods
- Passage ways: pressurized system
- Operating principle
- Advantages and features of continuous online monitoring
- Operation and maintenance of LDMS
- Stamicarbon supply and services for your LDMS

WHY INSTALLING LDMS

Stamicarbon Urea synthesis conditions:

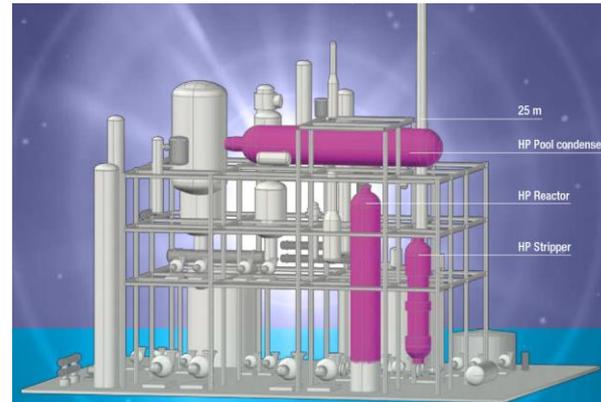
Pressure : 145 bar (2200 PSI)

Temperature : 183 °C (360 °F)



Synthesis equipment → outer shell carbon steel (~ 100mm) for strength / pressure bearing part

- HP stripper
- HP (pool) condenser
- HP (pool) reactor
- HP scrubber



WHY INSTALLING LDMS

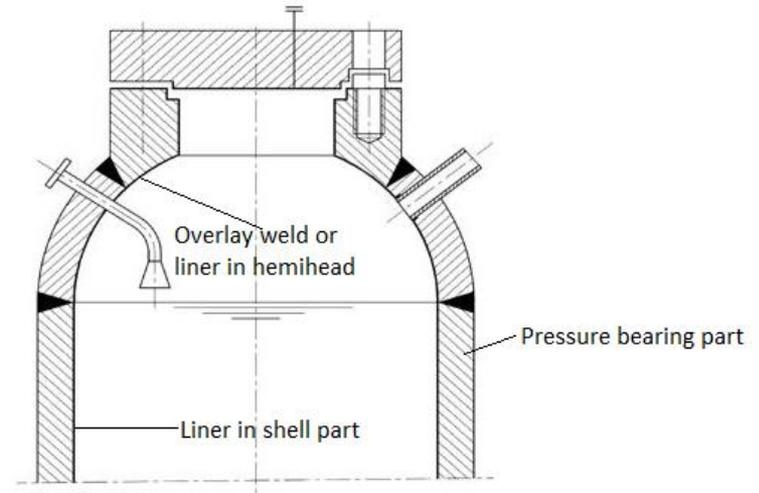
To protect the carbon steel pressure bearing shell against corrosive Carbamate →

Protection by:

1. Overlay welding (CS tube sheets, hemi-heads, nozzles)
2. Loose liners (shell HP vessel, large area → economical)

Special attention to:

1. Material of resistance layers → SAFUREX®
2. Welding (HAZ) and design



WHY INSTALLING LDMS

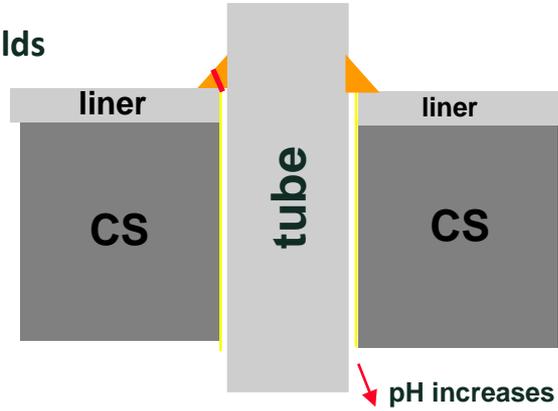
Leak detection monitoring systems are installed to prevent the following:

1. Unsafe situations
2. Non scheduled plant shutdowns
3. Environmental damages
4. Decreased lifetime HP equipment

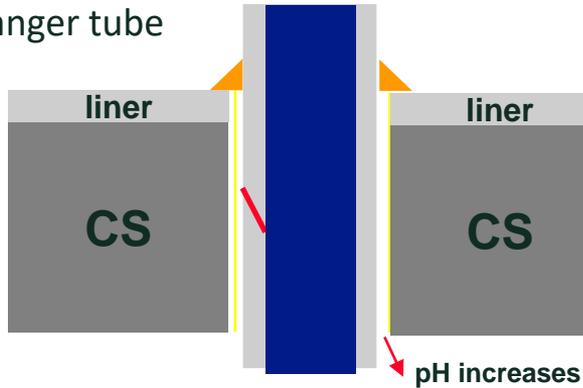


POSSIBLE LEAKAGE LOCATIONS

- **Tube to tube-sheet welds**



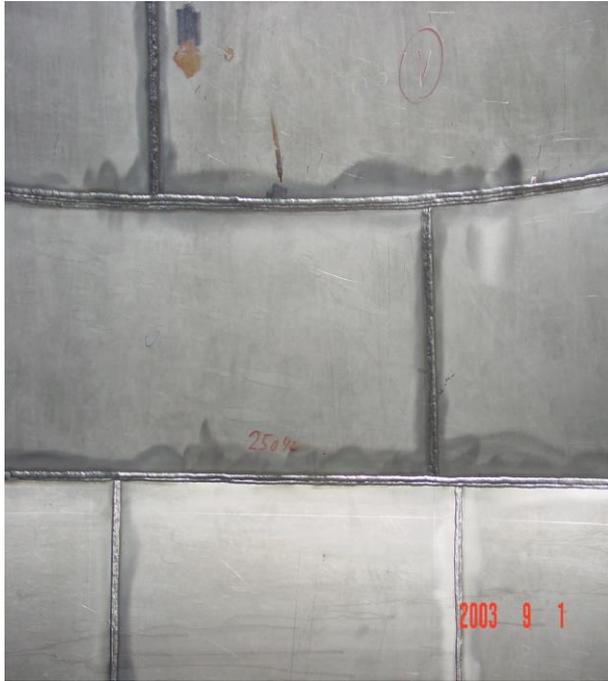
- **Heat exchanger tube**



Leaking from process side to steam side →
Conductivity and pH measurements

POSSIBLE LEAKAGE LOCATIONS

- Liners welds



POSSIBLE LEAKAGE LOCATIONS

- Liners weld leakages → Process fluid enters free space between liner & carbon steel shell

Early & reliable detection mandatory

Leak detection monitoring system (LDMS)

**In the event of a leak
stop plant immediately!**



In case of leakage without LDMS installed → pressure bearing part corrodes → **break before leakage**

LEAK DETECTION METHODS

- Pressurized system
- Vacuum system
- Combined pressurized/vacuum system
- Non automated system

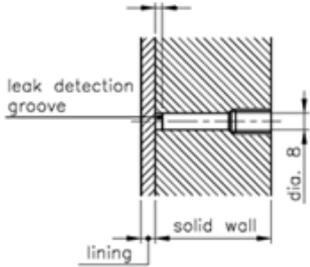
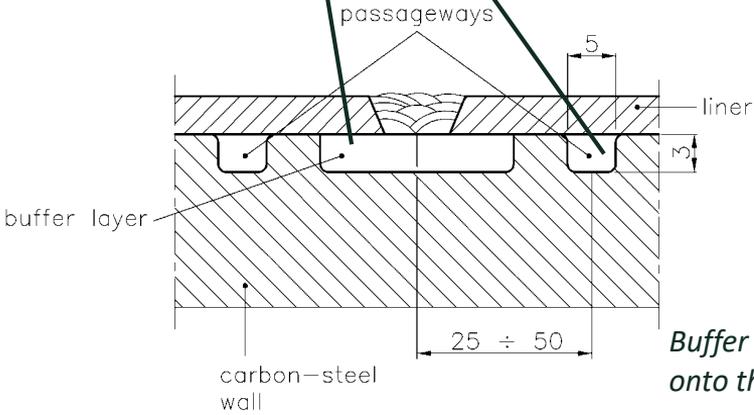
Stamicarbon recommends pressurized system → refer methods comparison

LEAK DETECTION METHODS

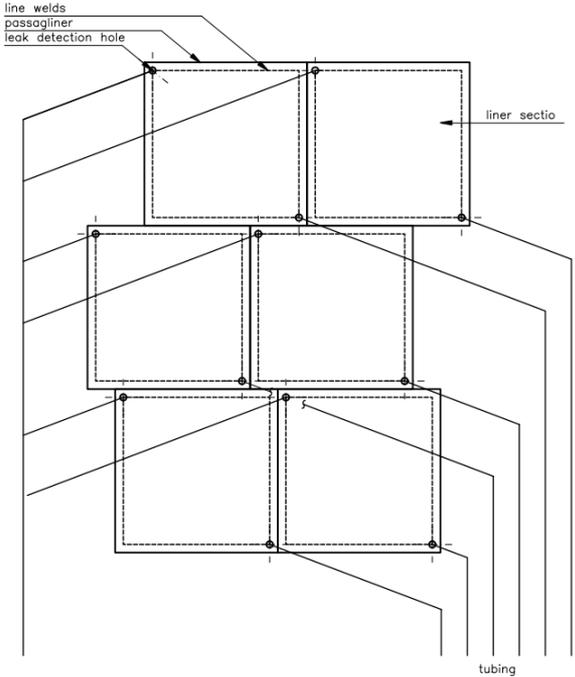
Comparison leak detection methods

	Pressurized type	Vacuum type	Non automated type (colour, bubble, paint)
Application	Vessel with passage ways in carbon steel pressure bearing part	Vessel with leak detection holes only (approx. before 1980)	Minimum flow through lines is required
Reliable measurement	Most reliable, not sensitive for coupling leakages of tubing	Reliable however special attention to coupling leakages of tubing (effect on analyzer accuracy)	Limited reliability
Measurement each compartment	Possible with dedicated flow meter	No flow meter, limited diagnostics	Not possible
Continuous monitoring	Included	Included	Not available
DCS reading	Available	Available	Not available
Accuracy	High	High	Ambient ammonia??
Response time	Quick	Quick	Depending on operator shift performance check

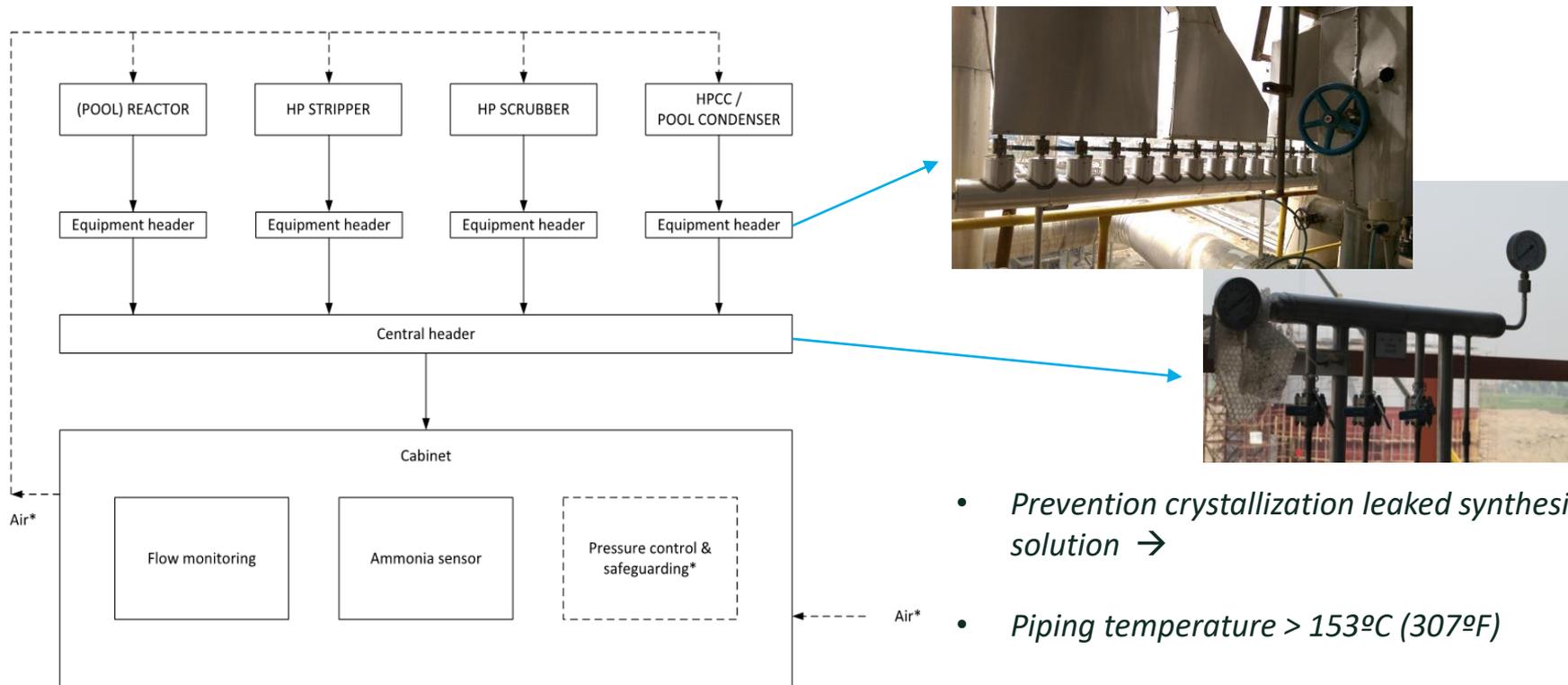
PASSAGE WAYS: PRESSURIZED SYSTEM



Buffer layer only needed to weld liner onto the c-steel shell



OPERATING PRINCIPLE



* Applicable for pressurized systems

- *Prevention crystallization leaked synthesis solution →*
- *Piping temperature > 153°C (307°F)*
- *Piping insulation required*

FEATURES & ADVANTAGES OF CONTINUOUS MONITORING

Features

- Continuous monitoring
- Ammonia = leak agent → present in whole synthesis section & carbamate decompose in ammonia
- Accurate detection and quick response time
- No drift nor aging of analyzer
- Leakage traceability (on compartment level)
- Leak rate estimation
- All HP equipment connected to common analyzer
- Stand alone each HP equipment as optional

Accuracy

- Accurate detection (from 1 ppm NH₃)
- Gas leak of $\sim 1 \cdot 10^{-7}$ STD.cc/sec detectable
- Response time < 60 min.



OPERATION & MAINTENANCE OF LDMS

- Frequently check for blocked lines → crystallization of leaked synthesis solution
- Special attention to over pressurizing the system (max. 0.5 barg)
- In case of blockages → do not use steam or condensate (chloride)
- Finding leaks → bubble or ammonia leak test → avoid Helium (cannot pass through moisture so no virtual detection) and Freon (chloride SCC)



Bulged liner due to over pressurizing LDMS system (commissioning \pm 6 barg)



Stress corrosion cracks in C-steel shell due to contaminated steam condensate cleaning

STAMICARBON SUPPLY & SERVICES FOR YOUR LDMS

- Supply new leak detection monitoring systems
- Assistance with installation, commissioning & start-up
- Training personnel: how to maintain and operate your LDMS
- Inspection: checking the status of your LDMS
- Assessment of your existing LDMS
 - Required replacement (or upgrade)
 - Proper operation / maintenance
 - Ensure proper flow communication of each lining segment
 - Safe & reliable operation
 - Etc



THANK YOU FOR YOUR ATTENTION

QUESTIONS?



afa

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Arab Intl. Organization
هيئة عربية دولية
Arab Fertilizer Association

Since 1975

جيبك
GPIC

DAY 3: September 6, 2018

Time for Excellence

Program by:



4-6/9/ 2018

Bahrain



الإتحاد العربي للأسمدة
Arab Intl. Organization
هيئة عربية دولية
Arab Fertilizer Association
Since 1975



Global Overview Around the Zero Incident Program

Wafaa Talemsi, Responsible of management health
and safety Ocp jorf lasfar site, OCP. Morocco

Time for Excellence

Program by:



4-6/9/ 2018

Bahrain



الإتحاد العربي للأسمدة
Arab Fertilizer Association
Since 1975

AFA Workshop:

Health, Safety and environment in fertilizers industry:

OCP Jorf Lasfar.. Our journey toward HSE Excellence

Bahreïn, September, 6th 2018



HSE Contact

Definition:

- Informal conversation about an HSE topic (on the job and off the job)



Objectif:

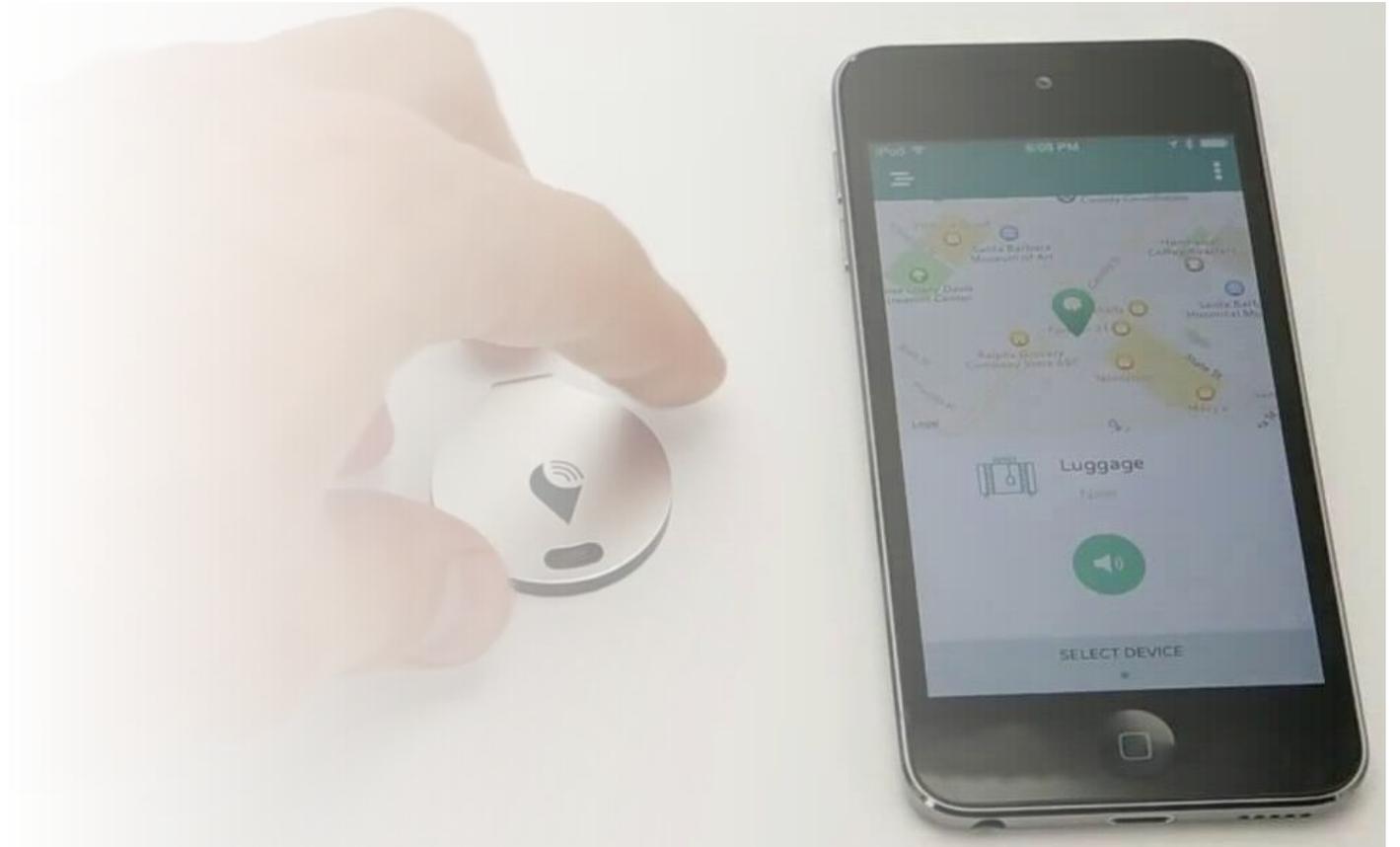
- Increase everyone's knowledge and sensitivity about safety by speaking out

Contexte:

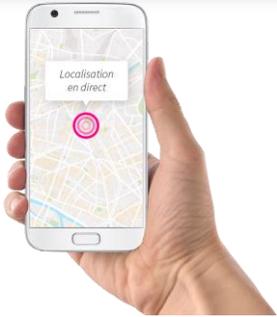
- It's a management commitment
- The HSE Contact takes place at the beginning of each meeting
- The HSE Contact does not usually exceed 5 min

HSE Contact

- You have all probably heard about **Tracking** applications
- What if we manage to use this technology to enhance our **Safety Performance** ?
- For example, to make the **Injury Evacuation** more precise and more efficient !



HSE Contact



* Smartphone Application
(rescuers, firefighters)



Data Localization
Warning information SOS

OCP Connected PPE



Micro GPS Tracking Chips



OCP contrôle room

*Access with authorization



HSE Contact

Examples of benefits that can be derived from this innovation:

- Accurately locate people to evacuate
- Reduce the time of evacuation operations
- Find out if everyone left the platform in case of a disaster

•



Evacuated employees



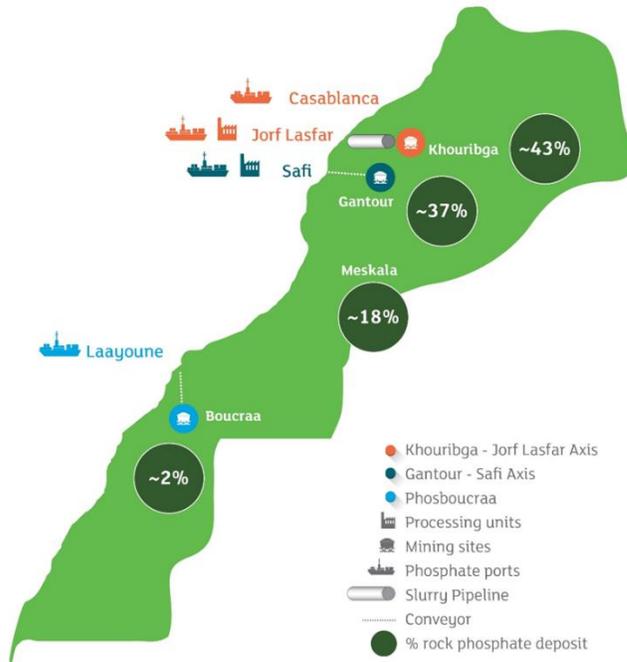
- Employees to be evacuated
- Potential Injuries



OCP at a glance

First Moroccan mining group and leading player in the international market

OCP IN MOROCCO



Mining assets

KHOURIBGA (1921)

- 3 mines
- 120 kms from Casablanca and 200 kms from Jorf
- Reserves : 53%

GANTOUR (1931)

- 3 mines (Benguerir et Youssoufia)
- 90 kms from Safi
- Reserves: 45%

BOUCRAA (1976)

- 1 mine
- 100 kms from Laayoune
- Reserves: 2%

OCP KEY FIGURES

Founded in

1920

Legal form

limited company
since 2008

Employees

More than 21 000

Production

- Phosphate Rock
- Phosphoric Acid (PA)
- Fertilizers

Chemical assets in Morocco

Maroc Phosphore III & IV* (1986)

- Phosphoric acid
- DAP/MAP

Jorf Fertilizer Company I, II, V

- Phosphoric acid
- MAP, DAP, TSP

EMAPHOS (1998) - JV

- Purified acid

IMACID (1999) - JV

- Phosphoric acid

Pakistan MP (2008) - JV

- Phosphoric acid

Maroc Chimie* (1965)

- Phosphoric acid

Maroc Phosphore I* (1976)

- Phosphoric acid

Maroc Phosphore II* (1981)

- Phosphoric acid

Maroc Phosphore I* (2011)

- DCP/MCP

DuPont OCP Operations
Consulting (2013) - JV



- Industrial Perf. JV

JESA (2010) - JV



- Engineering JV with Jacobs Engineering

TEAL (2017) - JV



- IT JV with IBM

None core business JVs



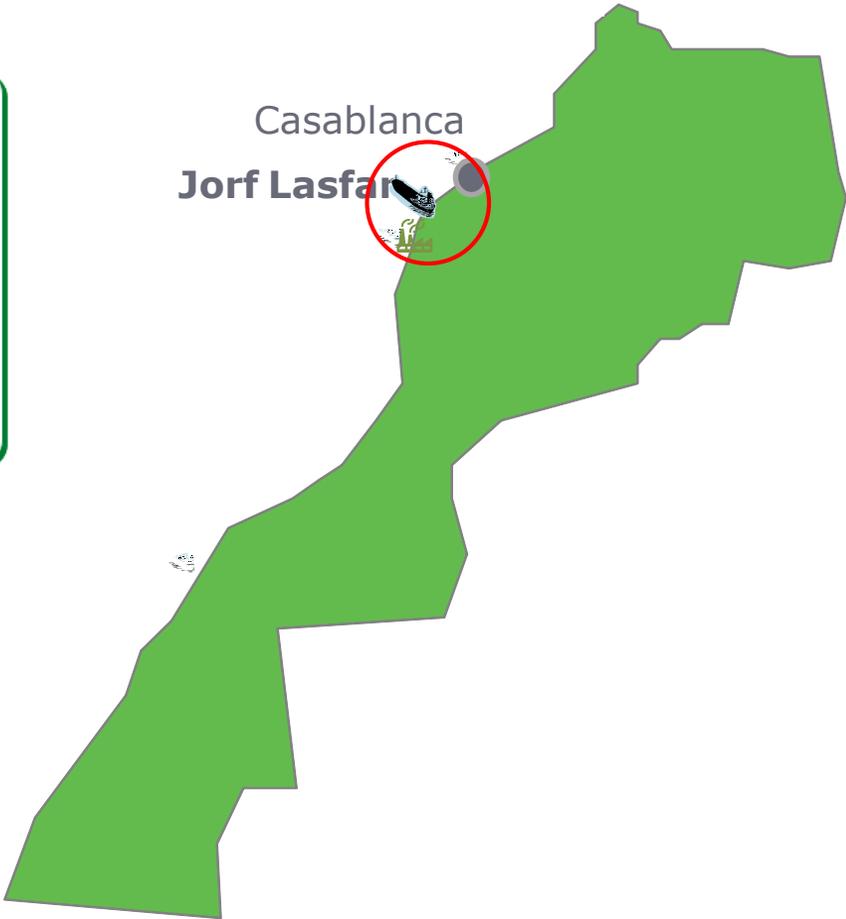
JORF LASFAR Site is the main transformation platform of the group

OCP JORF LASFAR

PLATFORM KEY FIGURES

JORF LASFAR

- Maroc Phosphore III & IV* (1986)**
 - Phosphoric acid
 - DAP/MAP
- Jorf Fertilizer Company I, II, V**
 - Phosphoric acid
 - MAP, DAP, TSP
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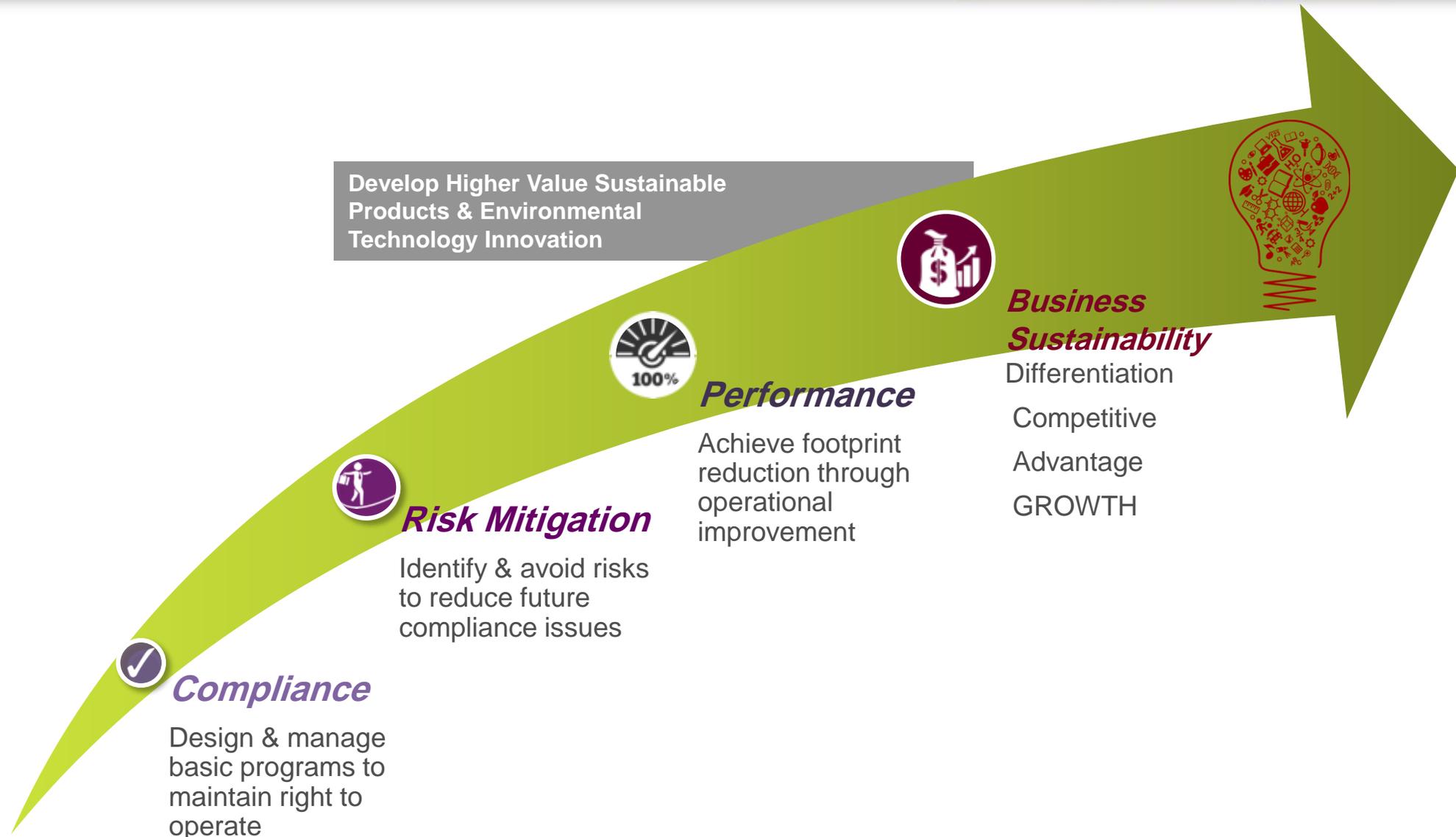
Location	120 km south-west from Casablanca
Area	1800 ha
Start date	1986
Current capacity	<ul style="list-style-type: none"> More than 11 MT of fertilizers More than 30 different quality grades
Employees	<ul style="list-style-type: none"> More than 5400 OCP employees More than 15 000 of contractors
Production	<ul style="list-style-type: none"> Phosphoric Acid (PA) Fertilizers



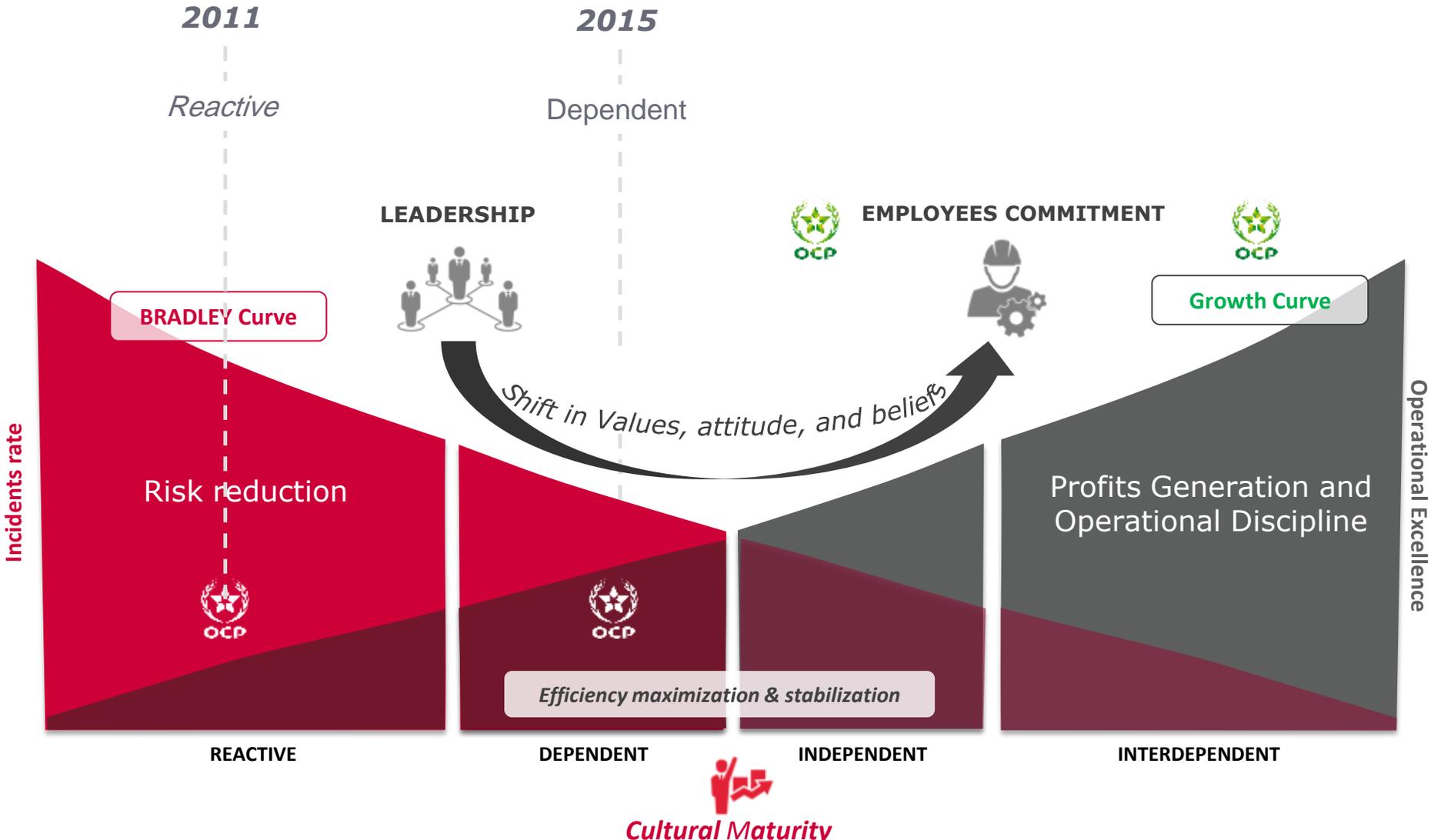
An ambitious strategy: reinforcing OCP's leadership in the industry



.... With the HSE excellence as an ENABLER



OCP is in the middle of a Safety Excellence journey

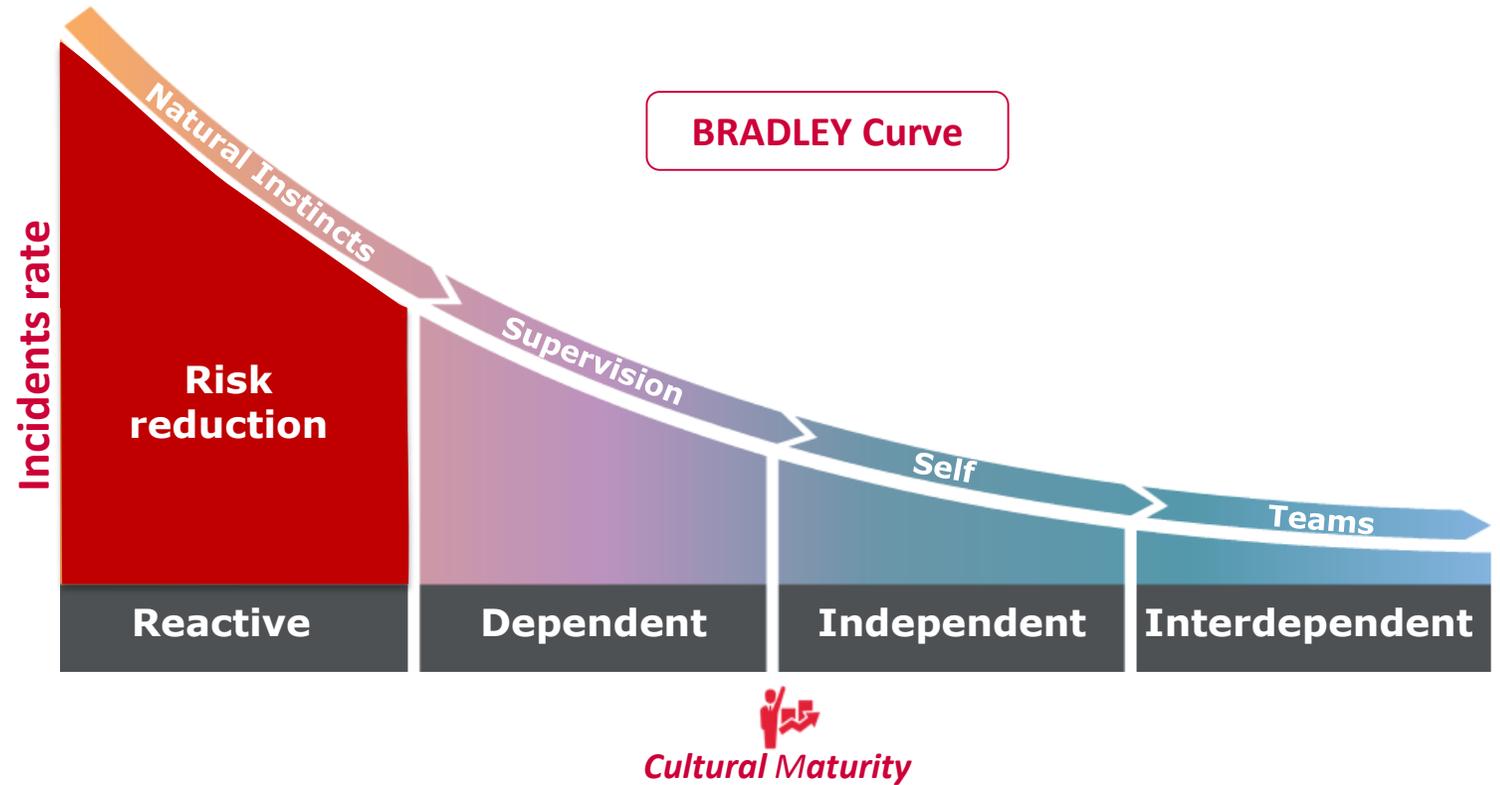


Reactive mode



Natural Instincts

- Safety by Natural Instinct
- Compliance is the Goal
- Delegated to Safety Manager
- Lack of Management Involvement

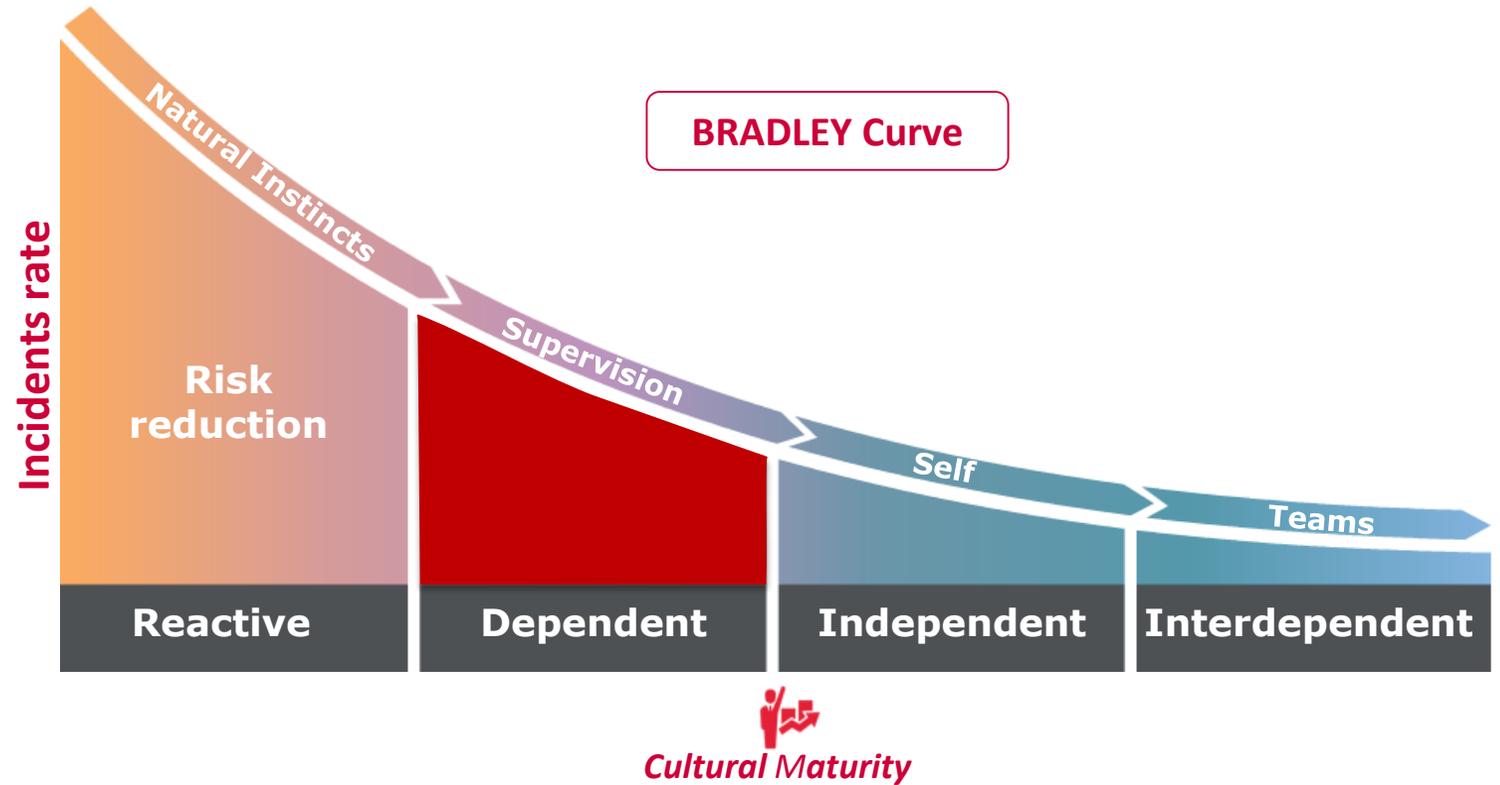


Dependent mode



Supervision

- Management Commitment
- Training
- Rules Procedures
- Supervisor control, emphasis, and goals
- Condition of Employment
- Fear/Discipline
- Expectations
- Value all people

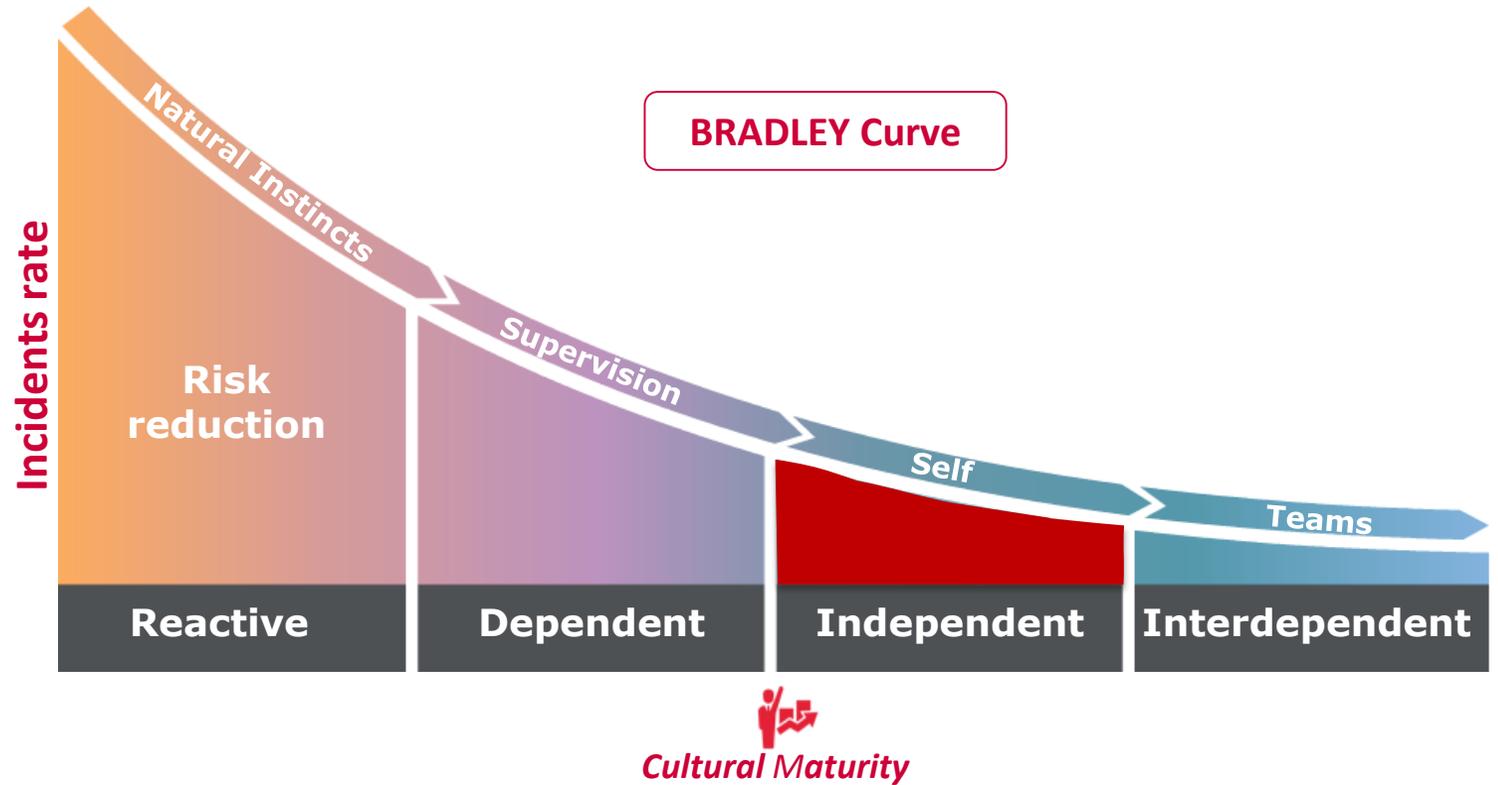


Independent mode



Self

- Personal knowledge, Commitment & Standards
- Internalization
- Personal Value
- Care of Self
- Practice, Habits
- Individual Recognition

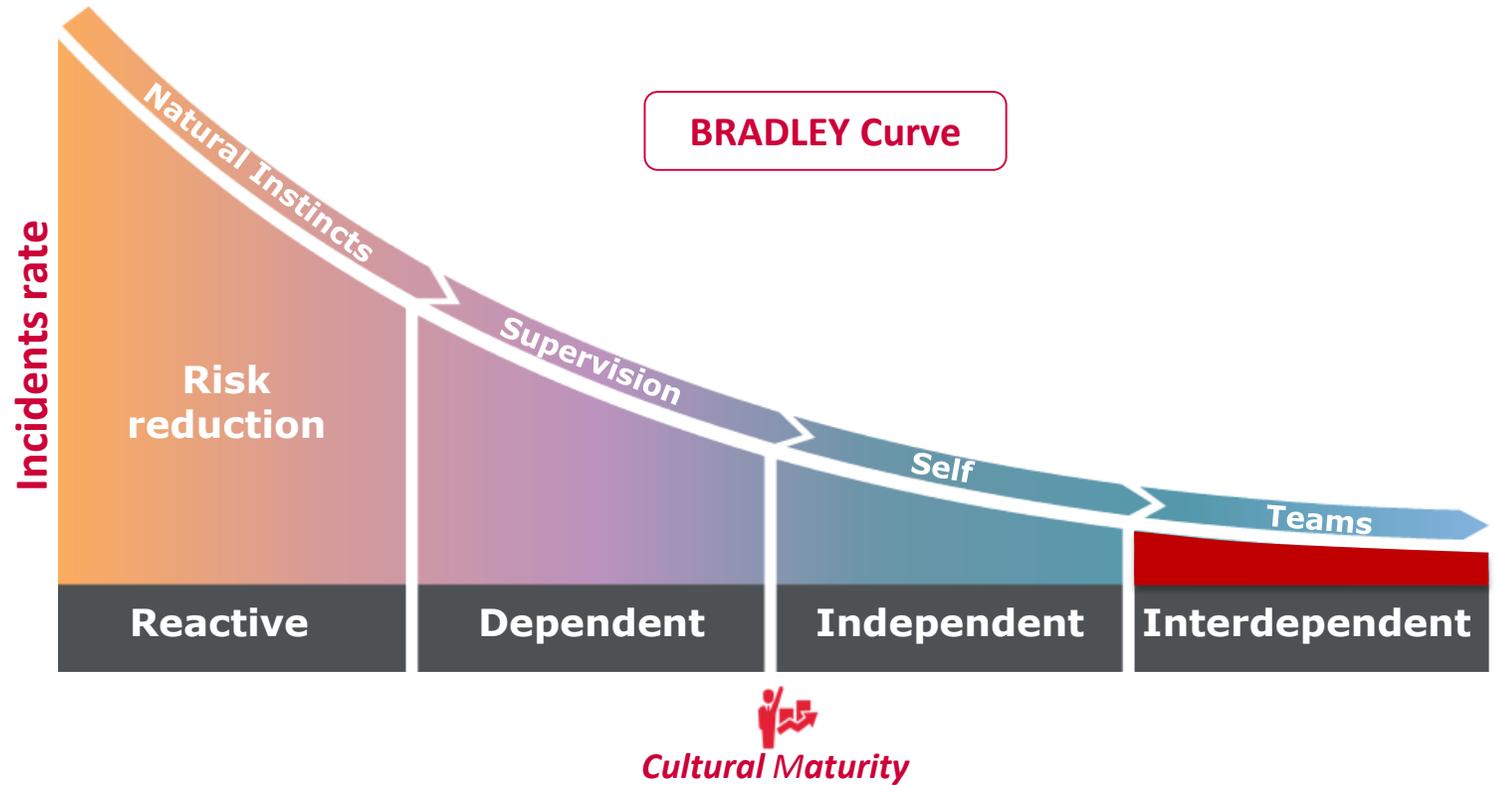


Interdependent mode

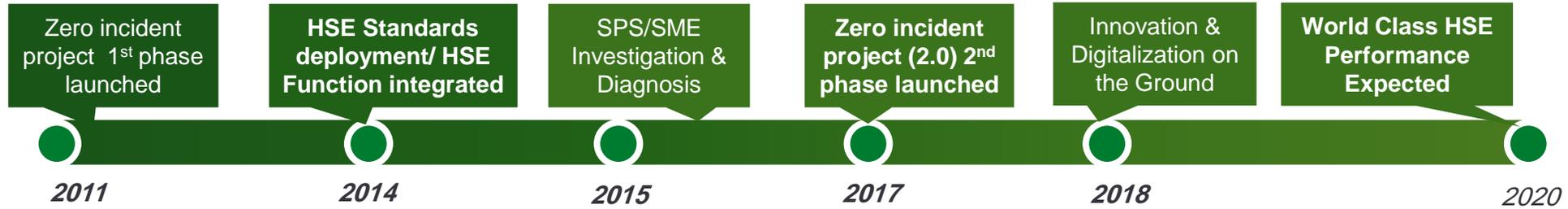


Team

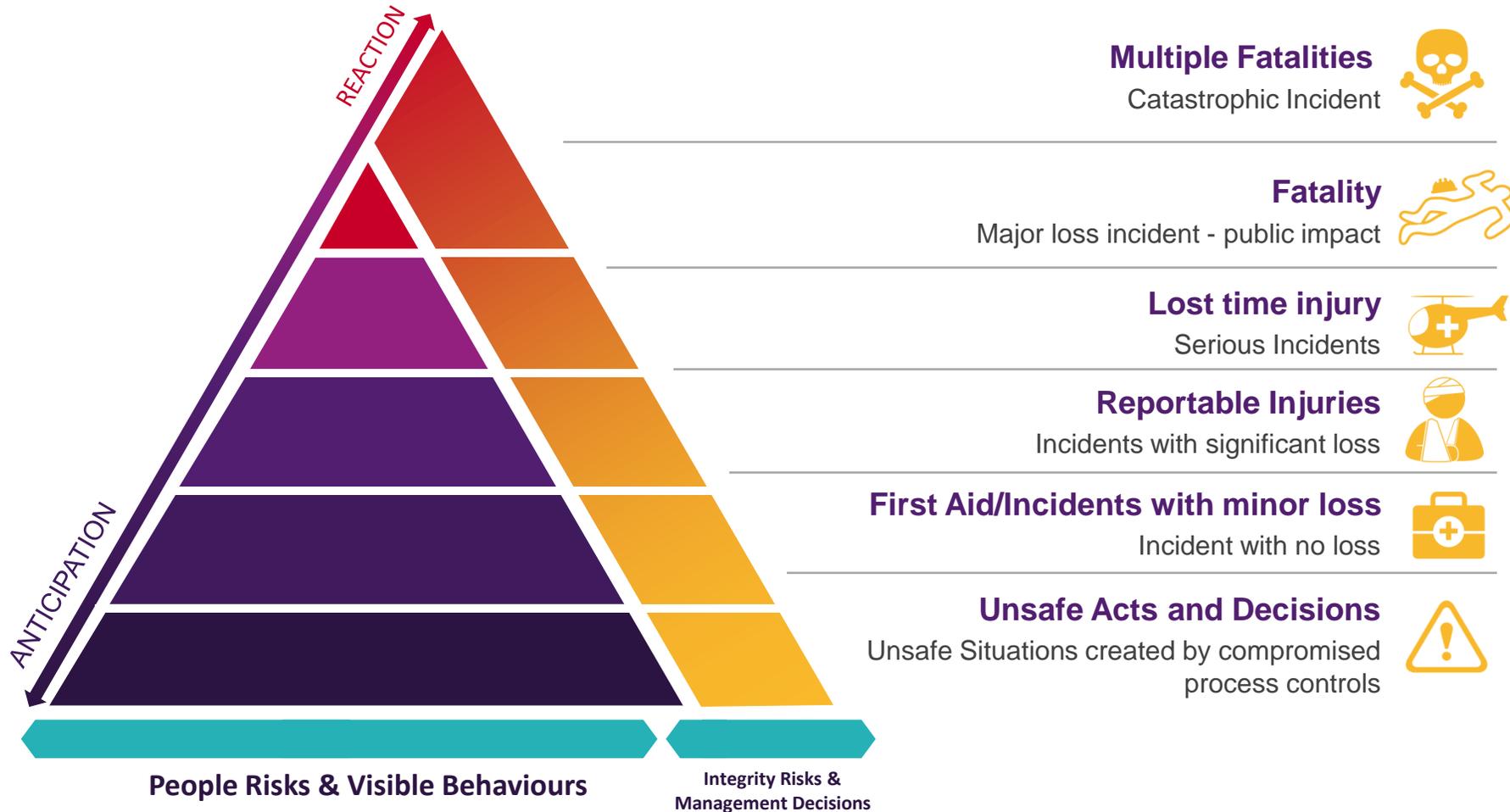
- Help Others Conform
- Other's keeper
- Networking Contributor
- Care for Others
- Organizational Pride



OCP's safety journey snapshot



Culture of anticipation (Bird's Pyramid)



One of the key projects we have been working on is the **incident / accident investigation**, with the vision of **creating a culture of anticipation**



Culture of anticipation (Bird's Pyramid)



At the beginning of our journey, our statistics were mostly accidents and incidents, so we were mainly focused on addressing the causes of accidents without guaranteeing they would not happen again.

Culture of anticipation (Bird's Pyramid)

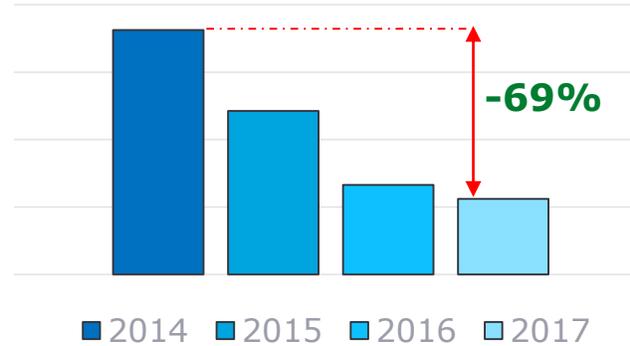
Then with **the Zero Incident program**, we started to extend the incident investigation standard (GIASE) to all the near misses, we improved our incident reporting all the while focusing on unsafe acts and dangerous situations, and as a result we were able to develop a **culture of anticipation** that is reflected today on our safety statistics



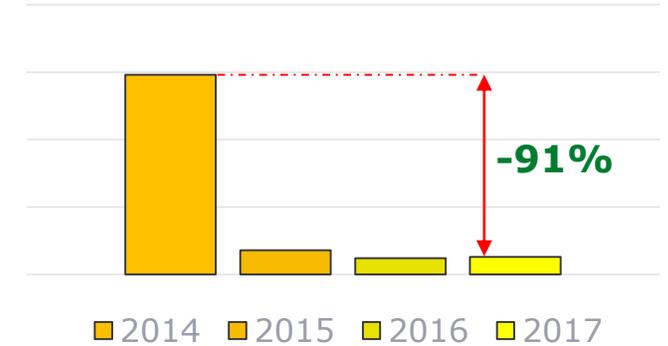
HSE Achievements



Frequency rate



Lost Time Injury Rate



Life Saving Rules

100% of the population trained on the Life saving rules

Life Saving Standards

100% Of the population trained on the Life saving standard (LOTO, EC, TH, AT, Circulation)

Coaching of Managers

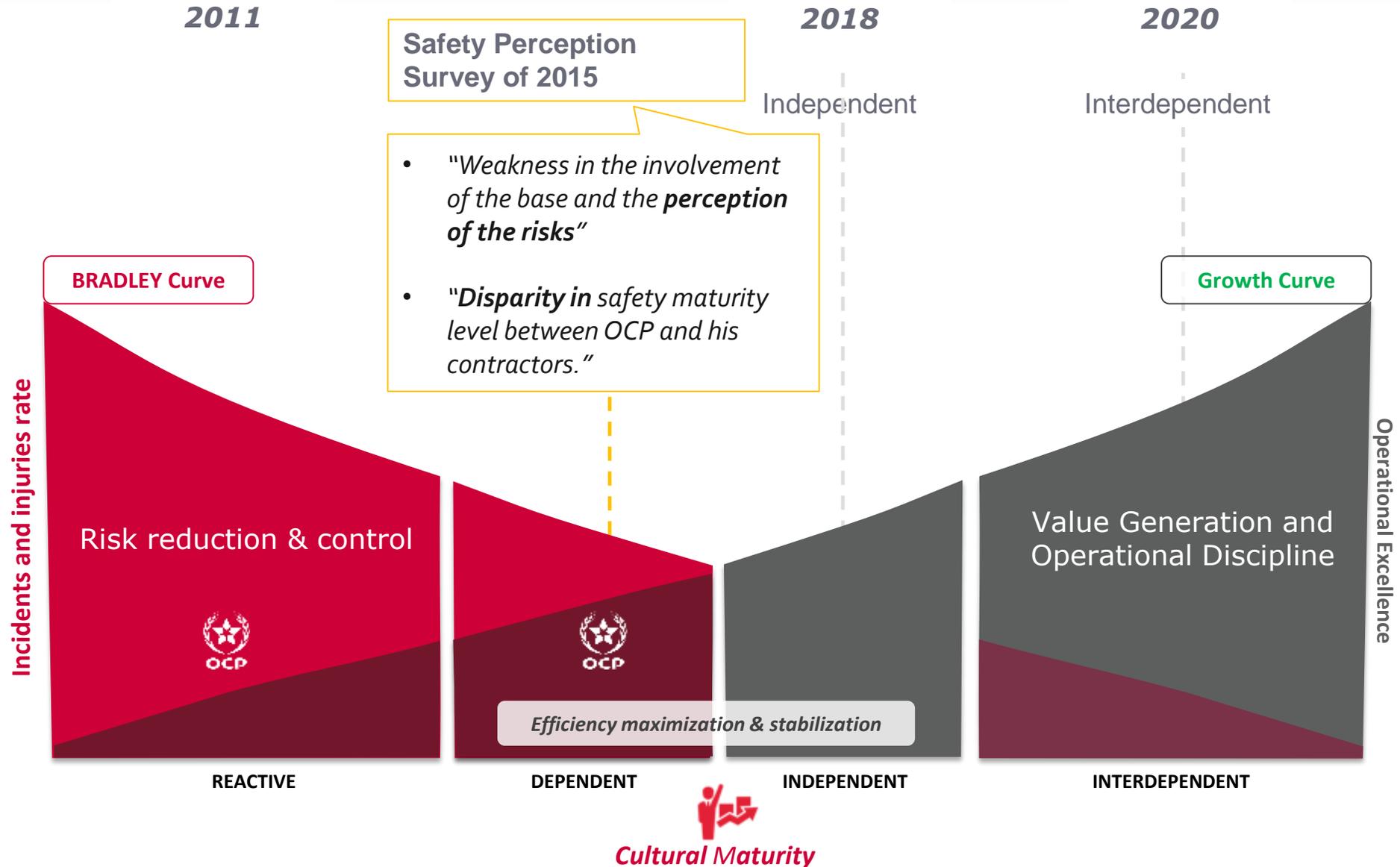
100% of managers individually coached

The Risk Factor

100% of managers trained on The Risk Factor

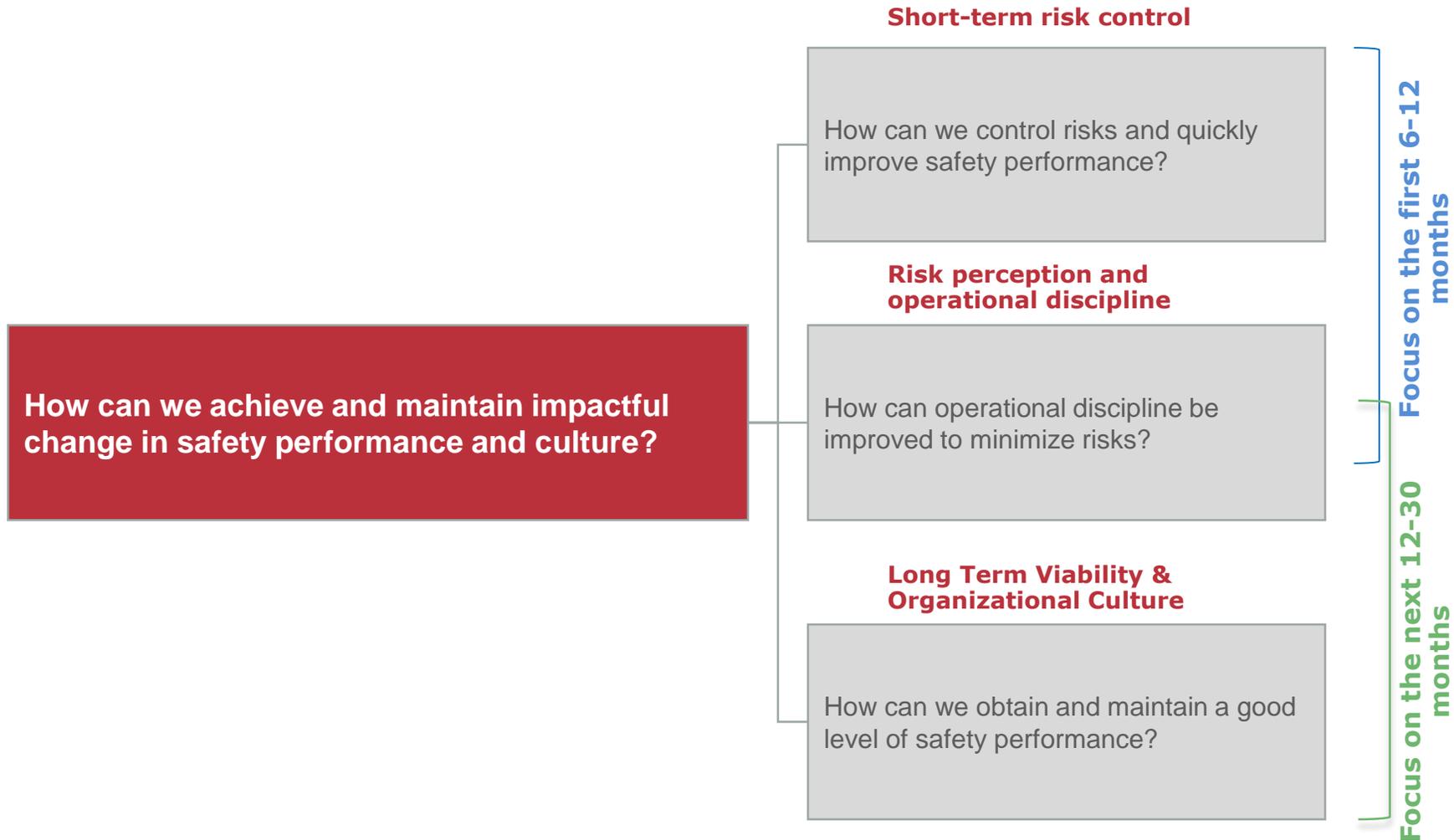


OCP is in the middle of a Safety Excellence journey



Program construction is based on a risk control philosophy

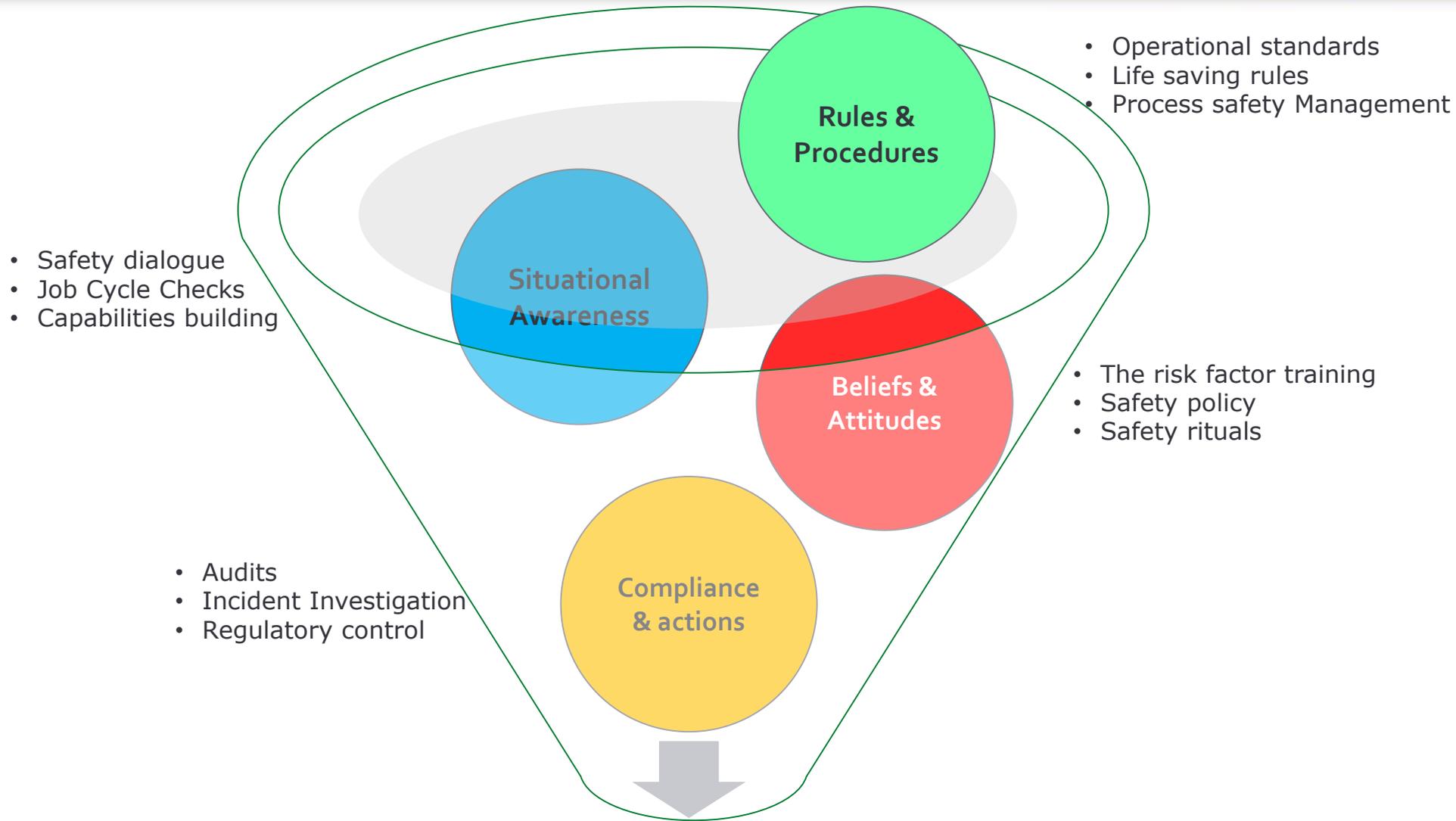
...



Following the results of the SPS, we have based our HSE program "The Zero Incident" to focus more on the RISK control.



... working simultaneously on multiple dimensions targeting human behaviors



Agile Management of Safety



Current program contains detailed roadmap and 17 workstreams for the next 3 years

Roadmap Zéro Incident 2.0 – Focus 2017

Le Programme workstreams re

Une approche basée sur le pilotage de la transformation et la perception des risques

Workstream

- Gestion des Risques
- Standards & Procédures
- Qualité PSA
- MOC & LPI
- PSR
- MCA
- Leadership
- Pilotage de la Performance
- Audit Evaluation de la Sécurité
- Organisation, M&M
- Engagement des employés
- Qualité de l'analyse des risques
- Qualité des audits
- Qualité des observations
- Communication
- Pilotage de la Transformation
- Formation & Développement

Techniques

- Gestion des Risques
- Standards & Procédures
- Qualité PSA
- MOC & LPI
- PSR
- MCA

Supports

- Pilotage de la transformation (PMO)
- Communication
- Formation & Développement
- Qualité des Observations
- Communication efficace
- Observations et audits
- Analyse des incidents et accidents
- Analyse des risques à long terme
- Gestion du changement - Technologie
- Analyse des risques à haut potentiel

1. Gestion des Risques

Description: Il s'agit d'identifier les dangers potentiels selon priorités, systèmes dynamiques.

Activités:

- Créer une liste exhaustive et à jour des risques potentiels.
- Collecter les données pour les activités Standards & Procédures.
- Par ailleurs, réaliser les recommandations PSR.
- Construire le plan des permis, etc.
- Faire une analyse.

2. Variables

- Matrice des activités à hauts risques chimiques
- Matrice des activités à hauts risques Mine
- Liste des SIP
- Rapport coaching des unités
- Sur demande
- Sur demande
- Sur demande
- Multiple
- Formule pour le maintien des risques et exemples pour la mine et la chimie
- Matrice des risques pour chaque unité
- Nombre d'experts associés aux activités à hauts risques
- A mettre à jour après la phase conception



This year's focus is on 4 main pillars



THE RISK FACTOR®

An innovative approach form "DuPont" to **LOWER our threshold of acceptable risks** through conscious and deliberate efforts in daily decisions and actions.



CONTRACTORS HSE MANAGEMENT

Harmonize the ecosystem in HSE for contractors & Develop regional leadership of local companys



4
PILLARS

INNOVATION



Adopt an innovative approach in HSE for better performance and solve problems

DIGITALIZATION



Adopting IT solution to support and facilitate our HSE transformation and build a sustainable HSE culture.



AIM



“How can we get our employees to stop taking unnecessary risks ?”



DEPLOYMENT

Main steps :

1. Training sessions for top and middle managers with DuPont
2. Contextualization of the program for first line managers and shop floor workers
3. Launching of a training program for our 5400 employees to be completed by the end of 2018.





The Risk Factor®

CHANGE IT

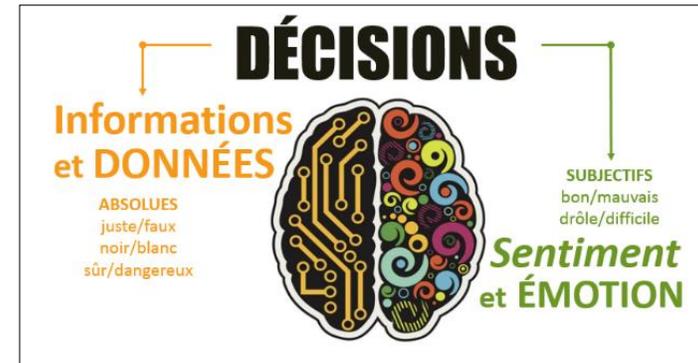
We acknowledge we can reduce our levels of risk involving our safety, health and well-being by using conscious and deliberate actions. The power of change is available to us

CHOOSE IT

We choose the risks we take and it is within our power to choose less risky options after understanding what influences our decisions.

OWN IT

We are all risk takers. While risks vary from person to person, we all have to consider the risks involved in our situations and decisions





The Risk Factor®

In addition, our managers and supervisors have been trained on the 4th module about LEADERSHIP



Le leadership

est la **CLÉ**



CHAMPION IT



How to authentically engage employees to persuade change and influence their decision making process in order to reduce unsafe decisions and behaviors.



Innovative solutions to promote HSE Culture

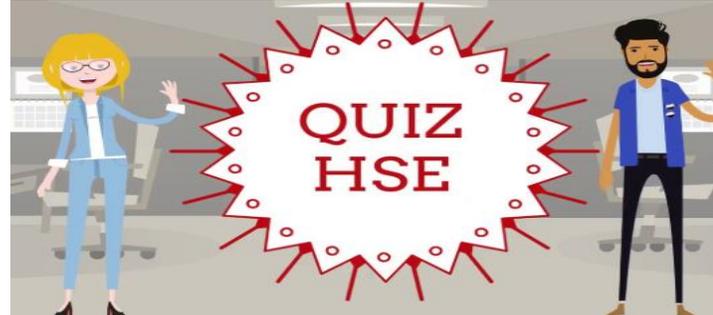
Innovative solutions to promote HSE Culture

HSE Expert TV Show



- The TV Show allow us to have and raise awareness about the five standards that save life by targeting a maximum of audience.

Quiz HSE



- Different Quiz are designed to encourage participation and motivate the audience.
- The quiz has another objective which is to validate and ensure the good understanding of HSE rules and standards

HSE Mobile Apps



- Mobile applications that could be used on by the totality of our employees.
- It contains a set of information in HSE, facilitate follow-ups , treatment of data, access to latest news related to HSE areas...



Contractors HSE Management

As a leader in Phosphate and fertilizer industry, we are committed to :

- **Promote safety and health within contractors activities**
- **Support the ecosystem to comply with regulatory requirements**
- **Onboard and coach contractors to be aligned with OCP's HSE requirements**
- **Empower the Ecosystems to become actively involved with safety on a daily basis**





Contractors HSE Management

Thus, to improve our contractors HSE performance, we have worked on 3 streams:





Action

A 4 days training course for local contractors staff on safety requirements and culture, the must-have safety topics are a prerequisite for having the access badge to the Jorf site

A Course of 7 days of certification training for HSE professionals and site managers; this course took place in OCP training center, the topics are:

- HSE fundamentals
- HSE culture and risk perception
- standard contractor management (& practical case study)
- HSE operational standards

Illustration

اختبار القدرات

Test de compétence

السورة 12 La photo 12

هل يمكن للتخصيص بصعود السلم في نفس الوقت؟

نعم لا

اختبار القدرات

Test de compétence

السورة 18 La photo 18

هل هذا القفاز يقي من المواد الخطيرة؟

Ce gant protège-t-il contre les substances dangereuses?

نعم لا

اختبار القدرات

Teste de compétence

السورة 19 La photo 19

هل هذا القفاز يقي من الحرارة؟

Ce gant protège-t-il contre la chaleur?

نعم لا





Action

- Integration of HSE requirements (Appendices of the contractors management standard) in the specifications for subtracted projects
- Update of contractors HSE requirements to comply with regulatory requirements
- Selection of new contractors (bidder) based on HSE performance of previous projects
- Update of the contractors HSE staffing requirements according to the HSE ranking of projects
- Reorganization of the contractors HSE function
- Evaluation of contractors HSE performance :
 - Standardization of criteria,
 - Centralization of information,
 - Digitalization of the audit tools

Illustration

EXIGENCES STAFFING HSE DES EE	PROJET NIVEAU A	PROJET NIVEAU B	PROJET NIVEAU C
Effectif total inférieur à 25	1 Professionnel HSE (Bac+3 en HSE) avec 5 ans d'expérience	1 Professionnel HSE (Bac+3 en HSE) avec 3 ans d'expérience	1 Animateur HSE (Bac+2) Avec 2 ans d'expérience
Effectif entre 25 et 50	Professionnels HSE (Bac+5 en HSE) avec 5 ans d'expérience 1 Animateur HSE Avec 2 ans d'expériences	1 Professionnel HSE (Bac+3 en HSE) avec 3 ans d'expérience	1 Animateur HSE (Bac+2) Avec 2 ans d'expérience
Plus de 50	Professionnels HSE (Bac+5 en HSE) avec 5 ans d'expérience 1 Animateur HSE (bac+2) Avec 2 ans d'expérience Pour chaque 30 personne de plus	Professionnels HSE (Bac+5 en HSE) avec 5 ans d'expérience 1 Animateur HSE (Bac+2) Avec 2 ans d'expérience Pour chaque 30 personne de plus	Professionnels HSE (Bac+5 en HSE) avec 5 ans d'expérience 1 Animateur HSE (Bac+2) Avec 2 ans d'expérience Pour chaque 30 personne de plus



Action

- Assessment of contractors hygiene conditions in construction sites (cartography of existing base camps)
- Study of different scenarios for the development of life bases
- Launch of the deployment of the new OCP standard of Hygiene
- Scheduling of the life bases audits
- Establishment of a strategy of the new base camps

Illustration



Entité	Localisation base de vie	Effectifs prévus	Superficie en m2
JLN&MG	En face des anciens locaux Tekfen	1000 pour JLN 380 pour MG	5000
JPH Usine	Fusion soufre coté I21 Zone phosphate Engrais	250 250	
JPH Port	A coté du stockage du soufre solide H2 côté ensachage	350 250	
IMACID	Existant	100	190
PMP	Existant	100	220
JFC5	L'entrée à droite a coté du hall phosphate	100	200
JFC1&3	Entre JFC1et JFC3	300	260
JFC2&4	Entre JFC2 et JFC4	300	260
Emaphos	Existant	60	200
DownStream	A coté de l'unité de séchage	200	5000



Contractors HSE Management

Some achievements



Action

- Customization with an easy-to-use format of HSE Standard requirements
- Coaching Project Managers on the notion of HSE responsibility
- Communication workshops with the Contractors Top Management

Illustration





Action

- Evaluation of the HSE performance of contractors during major maintenance shutdowns
- Safety excellence Awards :
 - Best HSE Performance
 - Best HSE Animator
 - Best Operator

Illustration



Implementing a digital solutions to improve HSE performance

As for the Digitalization pillar, we have developed a set of IT solutions:



Mobile application which is accessible by everyone on cell phones giving access to HSE Videos, Standards and procedures and sharing best-practices and promoting HSE events

An IT application that allow to share the flash Incident/Accident to communicate a brief information about incident and first learnt lessons. This IT application will help also to follow actions that needs to be taken

An IT solution to report the safety behavior audit and to follow actions. Managers could also analyze statistics easily and make the necessary decisions

Many IT solutions that facilitate the evacuation of employees in case of emergencies

Conclusion



OCPGROUP.MA

**FEEDING THE SOIL
TO FEED THE PLANET**



OCP, a world class company; Mindful of our noble mission of feeding the planet, we have made the choice of a strong commitment to sustainable development & environmental responsibility.

Today we are convinced more than ever that HSE excellence is an enabler to our operational excellence.

In OCP, we are all committed to Zero
Zero Incident, Zero Accident, Zero Injury

Committed to ZERO





الإتحاد العربي للأسمدة
Arab Intl. Organization
هيئة عربية دولية
Arab Fertilizer Association
Since 1975



GPIC 's contribution to the SDGs through Environmental Best practices

Mohammed Salem , Chief Medical Officer, GPIC, Bahrain

Time for Excellence

Program by:



4-6/9/ 2018

Bahrain



GPIC's contribution to the SUSTAINABLE DEVELOPMENT GOALS through Environmental Best practices

*AFA Workshop
Health, Safety & Environment in Fertilizers
Time for Excellence
4-6 September, Kingdom of Bahrain*

Nadeem Rana
Safety & Environment Superintendent
GPIC



AGENDA

- LEADERSHIP COMMITMENT
- GPIC's SNAP SHOT
- GPIC's BUSINESS MODEL
- SUSTAINABLE DEVELOPMENT GOALS(SDGs)
- 11 STEPS GPIC HAS TAKEN TO CONTRIBUTE TO SDGs
- EXAMPLES OF GPIC 's CONTRIBUTION TO SDGS THROUGH ENVIRONMENTAL BEST PRACTICES
- THE WAY FORWARD

GPIC's Snap shot



- Established in December 1979 – JV between NOGA, SABIC and PIC
- Produces: Ammonia, Methanol and Urea
- Production capacity: 1,600,000 tonnes annually
- Manpower: 444 employees
- Paid up capital : US \$ 159 Million
- Dividends : US \$ 2.250 Billion
- Net worth : US \$ 2.500 Billion

GPIC BUSINESS MODEL

GPIC's Business Model is based on the three pillars of Sustainable Development; **People, Planet, Profit**
And hence this ethic is strongly embedded in what ever we do; right from daily actions to strategic decisions.



People



Planet



Profit

GPIC BUSINESS MODEL

Sustainability is strongly embedded in GPIC's Vision, Mission and Values



GPIC Vision, Mission and Corporate Values



Sustainable Development Goals- Transforming our World

2015 saw groundbreaking advances when it comes to the environment and human development.

The United Nations formally adopted the 17 [Sustainable Development Goals \(SDGs\)](#), a set of 169 targets and 230 indicators to end poverty and boost growth while caring for people and the planet.

The new goals are part of an ambitious, bold sustainable development agenda that will focus on the three interconnected elements of sustainable development: **economic growth, social inclusion and environmental protection.**



SUSTAINABLE DEVELOPMENT GOALS



What are the elements underpinning the Sustainable Development Goals?

The Goals and targets will stimulate action over the next 15 years in areas of critical importance, called the **5 Ps: people, planet, prosperity, peace and partnership.**

People utilize the **Planet** to achieve **Prosperity**, which cannot be achieved without **Peace**. And all of this is not possible without **Partnerships**.



Steps Companies can take to contribute to SDGs

Steps companies can take to contribute to the SDGs



11 Steps GPIC has taken to Contribute to the SDGs

1-LEADERSHIP COMMITMENT

We have entered a new era where we are engaging more with leading global corporate sustainability initiatives such as the UN Global Compact and focusing more on Leadership, Collaboration and Innovation and Youth empowerment so that we can serve the people of this nation and the world in a better way”

Dr. Abdulrahman Jawahery
GPIC President



11 Steps GPIC has taken to Contribute to the SDGs

2-GPIC employees took part in the
Participatory process through MY
WORLD survey in 2013



11 Steps GPIC has taken to Contribute to the SDGs

3-GPIC promotes awareness of SDGs within the Organization

GPIC Sustainability Reporting committee are conducting awareness presentations to GPIC Employees and also send flashes through Company's intranet as part of SDGs Knowledge platform

SUSTAINABLE DEVELOPMENT GOALS



Tuesday 1 November – (13:00 -14:00) hrs. – ALL

With Compliments of the Environment and Youth Committees

11 Steps GPIC has taken to Contribute to the SDGs

4- Proactively, GPIC compared its business practices with the SDGs and its targets in 2016



2 ZERO HUNGER

Goal 2 Zero Hunger

*"End hunger, achieve **food security** and improved **nutrition** and promote **sustainable agriculture**"*

GPIC'S contribution

- Work with IFA and AFA on **trainings on fertilizer use** to increase food production
- **Since 1998 GPIC has produced and exported more than 11 MILLION Tons of granular urea globally**
- Promoting the UN "International Year of **Pulses**" 2016 campaign and integrating pulses into the GPIC canteen menu



11 Steps GPIC has taken to Contribute to the SDGs

5-GPIC aligned its Corporate sustainability goals with the SDGs and its targets in 2017.

GPIC has mainstreamed SDGs in its business and has shown alignment with its Corporate Goals for 2017 and beyond



Corporate Sustainability Goals, Targets & Indicators 2017

Performance Area	Goal	Indicator Name	Indicator Owner	Target (Year)	SUSTAINABLE DEVELOPMENT GOALS	Programme(s)/Remarks
Safety, Health & Security	To attain the target level of SHE incidents during the reporting period and maintain a high level of safety (personal and environment) at GPIC site at all times.	1. SHE incidents (LTAr)	SSHEM	Zero		<ul style="list-style-type: none"> Participate in international SHE awards, ReSPA and BSC awards. Enhance SHE by re-developing the BBS program and safety during the Termover. Further enhance Process Safety Management (PSM) by quarterly updates & monitoring of PSM KPIs by PSM committee and yearly presentations on lessons learned. Support and contribute to local, regional and international. Participate in SHE activities through sponsorship, membership and voluntary engagement & beach marking.
	To ensure the target level of reduction in sick leave taken by GPIC employees is attained during the reporting period.	2. Sick Leave Days (SLD)	HRM	3,499 Sick Leave Days (Excluding Surgeons)		<ul style="list-style-type: none"> Conducting Periodic Medical Examination for employees. Publishing the Health Committee Newsletter. Conducting Health Awareness Lectures. Conducting Blood Donation Drives.
	To ensure availability and readiness of security system at 100% all the time	3. Security readiness %	SSHEM	100%		<ul style="list-style-type: none"> Security readiness will be tried and tested through exercises held throughout the year. Communication with national bodies MSA, Police and Traffic Directorate.
	To review and update the 13 ERM Risks	4. Update ERM Risks	GMM	13		<ul style="list-style-type: none"> Effective and streamlined review process of the ERM risk through the fully automated system. Conduct at least 4 meeting to review the ERM risks. Issue an annual final report to the Board Audit Committee.
Corporate Social Responsibility	To ensure that a targeted number of environmental awareness lectures are delivered at Local Schools.	1. Environment Awareness Lecturer at Local Schools	PHES	32		Through communication with the Ministry of Education, the lecturer programme are coordinated and planned. List of schools to be visited with programme schedule are circulated to all GPIC graduate engineers to conduct the lectures as planned.
	To ensure distribution of contribution money to worthy organizations and their helping the local community	2. Number of contribution, sponsorship to charities, NGOs and other worthy causes	CCM	100%		Donation and sponsoring funds is distributed as per the approved sponsoring and donation list by the GPIC or approved by GPIC board of director and in responding to other projects and appeals received from various Parties.
	To ensure that the target number of educational visits to the GPIC complex during the reporting period is fully achieved.	3. Social and Educational visits to GPIC Complex	CCM	30 Visits		Based on requests received from schools, Universities and WIPS visits schedules plan are developed
Learning & Growth	To maintain compliance with GRI Sustainability Reporting and UN Global Compact Principles by: a. Commitment to UNGC sustainability 10 principle commitment. b. Commitment to UNGC Fund and Agriculture 4 principles. c. Commitment to UNGC Women Empowerment Principles (WEPs)	4. GRI Sustainability and UN Global Compact Reporting	GMM	Issuing of the report		<ul style="list-style-type: none"> Making sustainability reporting an integral part of the business through ensuring the full engagement of the relevant stakeholders via means such as surveys, meetings, presentations etc. Comply with G4 requirements in terms of engaging with internal and external stakeholders in identifying and focusing on reporting the material aspects from the stakeholders' point of view. Sustainability Committee to ensure the required data is gathered on time and in the correct format to meet GRI and UNGC requirements.
	To ensure the target percentage of Bahraini citizens is attained at GPIC during the reporting period.	1. Bahrainization levels %	HRM	90%		<ul style="list-style-type: none"> Targeting more Bahraini nationals for recruiting in various vacant positions. Retention of implementing employee retention plan to replace expatriate with Bahraini national.
	To ensure the target percentage of hours of training is attained during the reporting period.	2. Total Training Hours	HRM	20,000		<ul style="list-style-type: none"> Developing and execute the Competency based Training plan for all GPIC employees. Making effective use of a learning initiative for training employees.
People	To ensure the target percentage of employee retention is maintained for the reporting period.	3. Employee Retention %	HRM	95%		<ul style="list-style-type: none"> Providing the employees better development through career progression & training and development. Investing in developing and maintaining a competitive compensation, reward and benefits package.
	To ensure that every reliable tonne of product (Ammonia, Methanol and	1. Energy Consumption per	COM	3,700		<ul style="list-style-type: none"> Carry out Daily unit cleaning, inspection and maintenance.

11 Steps GPIC has taken to Contribute to the SDGs

6-GPIC aligned its Departmental sustainability goals with the SDGs and its targets in 2017.

GPIC has mainstreamed SDGs in its business and has shown alignment with its Departmental Goals for 2017



Marketing Department Goals, Targets & Indicators 2017

Performance Area	Goal	Indicator Name	Indicator Owner	Target (Year)	Target (1st Quarter)	Target (2nd Quarter)	Target (3rd Quarter)	Target (4th Quarter)	SUSTAINABLE DEVELOPMENT GOALS	Programme(s)/Remarks
Safety, Health & Security	To ensure that the department housekeeping remains in immaculate shape	Internal housekeeping Inspection	MKM	Twice a year	0	1	0	1		Checklist will be filled which will in various aspects related to the Saf and Security.
	Ensure that the MKT staff adheres to Safety, Health, and environment rules and policies preventing accidents at work & at home	Attending SHE events & lectures	MKM	1 event/ lecture per employee per year	25%	25%	25%	25%		Involvement of MKT staff in SHE
Corporate Social Responsibility	Providing Industrial Trainees with the required training as per the MKT training plan.	Industrial Trainees	MKM, MKS	2	0	1	1	0		<ul style="list-style-type: none"> Develop training program. Ensure full use of the training p
Learning & Growth	Providing the MKT staff with the required training to ensure the excellent day to day work	No of courses attended	MKM, MKS	1 Training Course or Conference or Workshop per employee per quarter	25%	25%	25%	25%		Develop and execute internal Cor Based Training plan for MKT staff.
Economic Sustainability	To ensure that the actual export of products (Ammonia, Methanol and Urea) equals to or exceeds the budget export quantities	Actual Export Quantities (MT)	MKM	1,193,010	295,300	384,300	308,000	305,410		<ul style="list-style-type: none"> Conduct Quarterly Economics of operations/ Contribution Margin to achieve the best sales mix for (products. Monitor International Market Ph and negotiate for improved market placements' and netbacks for GPI with Marketers. Monitor Inventory status for th GPIC products and achieve optimi levels by close coordination with I and arrange timely shipments. Participate in Quarterly Coordin Meetings with Marketers to keep the International Market situatio formulate Marketing Strategies.
	To ensure that the actual netback equals to or exceeds the budget netback	Actual Netback (US\$/MT)	MKM	215.00	215.00	215.00	215.00	215.00		

Page 1

11 Steps GPIC has taken to Contribute to the SDGs

GPIC SUSTAINABILITY REPORT 2018
LINKING THE SDGS, UNGC, GRI AND GPIC'S CONTRIBUTION

24

7-GPIC aligned GRI indicators with the SDGs in its GRI Sustainability Report 2016 and 2018 and also engaged GRI for SDG alignment check for its 2018 report.

SDGs	UNGC PRINCIPLES	GRI DISCLOSURES /INDICATORS	GPIC'S CONTRIBUTION
 <p>14 LIFE BELOW WATER</p>	UNGC Principle #7,8,9	GRI 304-1, 304-2, 304-3, 304-4, 305-1, 305-2, 305-3, 305-4, 305-5, 305-7, 306-1, 306-3	<p>LIFE BELOW WATER: Seawater outfall monitoring to protect sea life; Maintaining the Fish Farm;</p> <p>Following strict marine standards for shipping products internationally;</p>
 <p>15 LIFE ON LAND</p>	UNGC Principle #7,8,9	GRI 304-1, 304-2, 304-3, 304-4, 305-1, 305-2, 305-3, 305-4, 305-5, 305-7, 306-3, 306-5	<p>LIFE ON LAND: Engaging with Supreme Council for Environment on developing Bahrain's Biodiversity Strategy and online biodiversity database; Increasing employee awareness on biodiversity.</p> <p>Biodiversity related projects at GPIC (Bird sanctuary, fish farm, mangroves plantation, date palm trees etc.).</p> <p>Participating in UN 's Green Wave Campaign since 2015, distributing 2,000 saplings in 50 schools over the past three years.</p>
 <p>16 PEACE, JUSTICE AND STRONG INSTITUTIONS</p>	UNGC Principle #1,2,3,4,5,6,10	GRI 102-16, 102-17, 102-21, 102-22, 102-23, 102-24, 102-25, 102-29, 102-37, 103-2, 205-1, 205-2, 205-3, 206-1, 307-1, 406-1, 408-1, 410-1, 414-1, 414-2, 415-1, 416-2, 417-1, 417-2, 418-1, 419-1	<p>PEACE, JUSTICE AND STRONG INSTITUTIONS: Aligned with human rights and labour laws; Working with National Institute of Human Rights (NIHR) and Judicial Council to train and develop their staff.</p>
 <p>17 PARTNERSHIPS FOR THE GOALS</p>	UNGC Principle #1,2,3,4,5,6,7,8,9,10	GRI 203-2	<p>PARTNERSHIPS FOR THE GOALS: Ongoing partnerships (e.g. UN Environment, Ministry of Education, InJaz, universities); founding of GPCA; working with the National Institute of Human Rights NIHR, Judicial High Council, IFA, AFA and encouraging other companies to do the same.</p>

11 Steps GPIC has taken to Contribute to the SDGs

8-GPIC provided its SDG related Industry Matrix best practice to UNGC based on UNGC Survey

To solicit examples of how companies are positively contributing to the SDGs through their core business operations and to capture ideas on future opportunities for shared value. GPIC has provided a number of best practices and one is the carbon dioxide recovery project that addresses SDG #12 and 13



SDG Industry Matrix

The Sustainable Development Goals (SDGs) represent an unprecedented opportunity for companies to align their own sustainability goals with global sustainable development priorities. To help facilitate this process, the United Nations Global Compact and KPMG are partnering to develop a series of matrices that provide brief industry specific examples and ideas for action related to all seventeen upcoming SDGs. By highlighting bold pursuits and decisions made by diverse companies, these industry matrices are intended to inspire other businesses to pursue opportunities where they can create shared value for shareholders, as well as for society.

This request for input is being distributed to UN Global Compact issue area experts and participant companies, as well as industry associations, to solicit examples of how companies are positively contributing to the SDGs through their core business operations and to capture ideas on future opportunities for shared value. These responses will be consolidated into concise (75-200 word) summaries, which will then be presented at regional multi-stakeholder roundtable meetings where the most compelling examples will be selected for the final publication.

To view the draft SDG Industry Matrices, as well as the recently published Financial Services matrix, please use the following link: <https://www.unglobalcompact.org/fora/3111>

We kindly request that you provide your insights by Monday, 11 January 2016.

Thank you in advance for your time and consideration.

For more information on the role of business in supporting the SDGs, please review: A Global Compact for Sustainable Development - www.unglobalcompact.org

*** Required**

Response 1

Company Name *: Gulf Petrochemical Industries Company (GPIC)

Industry *

For more details, please visit <http://www.kpmg.com/au/indus>

Please select only one industry.

- Transportation
- Infrastructure
- Financial Services
- Energy, Natural Resources, Chemicals
- Industrial Manufacturing
- Food, Beverage, Consumer Goods
- Healthcare & Life Sciences

A. Are you submitting a core business example or an opportunity for shared value? *

- Core Business Example - Existing innovative company practice that creates shared value and advances the SDGs
- Opportunity for Shared Value - Future leading practice by companies that will create shared value and advance the SDGs

B. Brief description of either a core business example or an opportunity for shared value. (Word Limit: 75-200) *

GPIC takes a thorough approach to measuring and taking responsibility for its environmental impacts. We have been working on implementing projects to contribute in the mitigation of climate change by reducing our Greenhouse gas emissions and carbon footprint. One of the major initiatives launched by GPIC in the year of 2009 is the commissioning of Carbon dioxide recovery unit (CDR).

The objective of this project is to recover 450 tonne per day of carbon dioxide from being released directly into the atmosphere. The Carbon dioxide from the flue gas of the methanol plant reformer is recovered to make up for the shortage of carbon dioxide for the synthesis of methanol. In addition, urea plant utilizes the carbon dioxide from the CDR unit to increase urea production. The commissioning of the project has resulted in the recovery of 0.12 million tonnes of carbon dioxide on annual basis. The CDR unit alone have managed in the reduction of approximately 0.70 million tonnes of carbon dioxide since 2009 up to date.

11 Steps GPIC has taken to Contribute to the SDGs

9-GPIC promotes awareness of SDGs within the Community

GPIC Sustainability committee and the Youth committee are conducting awareness presentations to Bahrain's School children and Industrial students and also during the summer camp in 2018 and the SHE family evening where SDGs was the main theme.

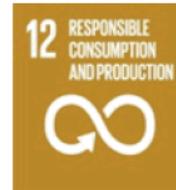


11 Steps GPIC has taken to Contribute to the SDGs

10-GPIC has started to link its initiatives, technical reports with the SDG's

GPIC has started to show linkage to SDGs in technical reports. For example the Company's waste recycling report is linked to target 12.5 of SDG 12 "Responsible Consumption and Production"

Please be informed that waste reduction and enhanced recycling is one of the targets of the Sustainable Development Goal SDG # 12 Responsible Consumption and Production and GPIC ,by enhancing its recycling programme is contributing to target 12.5



Target 12.5

By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse

11- Steps GPIC has taken to Contribute to the SDGs

11-GPIC has linked its technical and non- technical projects with the SDG's

GPIC has introduced SDGs in its Management of Change Work flow and all the project's electronic request form is provided a drop down list to choose the relevant SDGs.

- 1- The Engineering project leader identifies the relevant SDG.
- 2- It is routed through work flow to the SDG administrator, who verifies if the SDG identified is correct, if NO then he provides the correct one and submits back to Engineering for further processing.

Request For Change (RFC)
Modifications / Capital Projects

Status With Planning

Modification No. 24/01/2018
M-7217
Initiator Ref.No. CVL/01/2018

Request Details

Assigning RFC leader by ENS

Inspection Section Comments

Engineering Section

Modification Type Routine

Type of RFC MODIFICATIONS CAPITAL PROJECTS
 MINOR MODIFICATIONS

Project Leader	Engineering Reports	Attachments (Eng. rpt. doc. links can also be attached)	Studied Date	Estimated Cost	Drawing Nos.
kurien jacob/ENG/TEC/GPIC	PJ/039/18			0.000	94-CC-D-05518
Sr.Enginers / Engineers	Engineering Reports	Attachments (Eng. rpt. doc. links can also be attached)	Studied Date	Estimated Cost	Drawing Nos.
Reem Alotaibi/ENG/TEC/GPIC				0.000	
sam mathew/ENG/TEC/GPIC	PJ/039/18		29-Apr-2018	1250.000	94-CC-D-05518
				0.000	
				0.000	
Total Estimated Cost (BD.)				1250.000	

also be attached)

kurien jacob/ENG/TEC/GPIC	PJ/039/18			0.000	94-CC-D-05518
Sr.Enginers / Engineers	Engineering Reports	Attachments (Eng. rpt. doc. links can also be attached)	Studied Date	Estimated Cost	Drawing Nos.
Reem Alotaibi/ENG/TEC/GPIC				0.000	
sam mathew/ENG/TEC/GPIC	PJ/039/18		29-Apr-2018	1250.000	94-CC-D-05518
				0.000	
				0.000	
Total Estimated Cost (BD.)				1250.000	

Comments by Sr.Eng. (if required)

Contribution to Sustainable Development Goals 12. Responsible Consumption and Production

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Relevant Maint Sect CIVIL

RFC Approval by ENS

For Unit Supd

For ENS

Is the identified contribution to various Sustainable Development Goals acceptable? YES NO

IF NO, please update the list of contributions to SDGs: 12. Responsible Consumption and Production

Technical Committee

Project Leader / Sr. Engineers

Planning Section

Post Evaluation

Comments

GPIC's Corporate Sustainability Goals ALIGNED TO THE SDGs

Performance Area	Goal	Indicator Name	Indicator Owner	Target (Year)	Target (1st Quarter)	Target (2nd Quarter)	Target (3rd Quarter)	Target (4th Quarter)	SUSTAINABLE DEVELOPMENT GOALS	Programme(s)/Remarks	
Safety, Health & Security	To attain the target level of SHE incidents during the reporting period and maintain a high level of safety (personal and environment) at GPIC site at all times.	1. SHE incidents (LTAs)	SSHEM	Zero	Zero	Zero	Zero	Zero		<ul style="list-style-type: none"> Participate in international SHE awards, RoSPA and ESH awards. Enhance SHE by re-developing the SBS program and safety during the Turnaround. Further enhance Process Safety Management (PSM) by quarterly updates & monitoring of PSM KPIs by PSM committee and yearly presentations on lessons learned. Support and contribute to local, regional and international. Participate in SHE activities through sponsorships, memberships and voluntary engagement & bench markings. 	
	To ensure the target level of reduction in sick leaves taken by GPIC employees is attained during the reporting period.	2. Sick Leave Days (SLD)	HRM	3,500 Sick Leave days (Excluding Surge/ies)	950	950	950	950		<ul style="list-style-type: none"> Conducting Periodic Medical Examination for employees. Publishing the Health Committee Newsletter. Conducting Health Awareness Lectures. Conducting Blood Donation Drives. 	
	To ensure availability and readiness of security systems at 100% all the times	3. Security readiness %	SSHEM	100%	100%	100%	100%	100%		<ul style="list-style-type: none"> Security readiness will be tried and tested through courses held throughout the year. Communication with national bodies RSA, Police and Traffic Directorate. 	
	To review and update the 13 ERH Risks	4. Update ERH Risks	GMM	13	3	3	3	4		<ul style="list-style-type: none"> Effective and streamlined review process of the ERH risk through the fully automated system. Conduct at least 4 meeting to review the ERH risks. Issue an annual final report to the Board Audit Committee. 	
People	Corporate Social Responsibility	To ensure that a targeted number of environmental awareness lectures are delivered at Local Schools.	1. Environment Awareness Lectures at Local Schools	PHES	32	9	9	32	9		Through communication with the Ministry of Education, the lectures programme are coordinated and planned. List of schools to be visited with programme schedule are circulated to all GPIC graduates engineer to conduct the lectures as planned.
		To ensure distribution of contribution money to worthy organizations and thus helping the local communities	2. Number of contributions, sponsorships to charities, NGOs and other worthy causes	CCM	100%	20%	30%	30%	20%		Donation and sponsoring funds is distributed as per the approved sponsoring and donation lists by the GPIC as approved by GPIC board of directors and in responding to other projects and appeals received from various Parties.
		To ensure that the target number of educational visits to the GPIC complex during the reporting period is fully achieved.	3. Social and Educational visits to GPIC Complex	CCM	30 Visits	7	9	9	5		Based on requests received from schools, Universities and VEPS visits schedule plans are developed
		To maintain compliance with GRI Sustainability Reporting and UN Global Compact Principles by: a. Commitment to UNGC sustainability 10 principle commitments. b. Commitment to UNGC Food and Agriculture 6 principles. c. Commitment to UNGC Women Empowerment Principles (WEPs).	4. GRI Sustainability and UN Global Compact Reporting	GMM	Issuing of the report	-	100%	-	-		<ul style="list-style-type: none"> Making sustainability reporting as integral part of the business through ensuring the full engagement of the relevant stakeholders via means such as surveys, meetings, presentations etc. Comply with G4 requirements in terms of engaging with internal and external stakeholders in identifying and focusing on reporting the material aspects from the stakeholders' point of view. Sustainability Committee to ensure the required data is gathered on time and in the correct format to meet GRI and UNGC requirement.
Learning & Growth	To ensure the target percentage of Bahrainization levels is attained at GPIC during the reporting period.	1. Bahrainization levels %	HRM	80%	85%	80%	80%	86%		<ul style="list-style-type: none"> Targeting more Bahrainis nationals for recruiting in various vacant positions. Reviewing/Implementing employees succession plan to replace expatriates with Bahraini nationals. 	
	To ensure the target percentage of hours of training is attained during the reporting period.	2. Total Training Hours	HRM	20,000	6,000	6,000	4,000	4,000		<ul style="list-style-type: none"> Developing and execute the Competency based Training plan for all GPIC employees. Making effective use of a learning initiatives for training employees. 	
	To ensure the target percentage of employee retention is maintained for the reporting period.	3. Employee Retention %	HRM	98%	98%	98%	98%	98%		<ul style="list-style-type: none"> Providing the employees better development through career progression & training and development. Investing in developing and maintaining a competitive compensation, rewards and benefits package. 	
Planet	Environmental Sustainability	To ensure that every saleable tonne of product (Ammonia, Methanol and Urea) is attained within the target level of energy consumption.	1. Energy Consumption per saleable product tonne (Gcal/MT)	PDM	7.755	7.749	7.76	7.761	7.748		<ul style="list-style-type: none"> Carry out Diesel tools cleaning, inspection and maintenance. Carry out regular monitoring of energy and review and take actions to minimize losses.
		To ensure implementation of identified significant energy use projects related to reduction of consumption of HH steam and fuel natural gas.	2. Significant Energy use projects	YSM	100%	25%	25%	25%	25%		<ol style="list-style-type: none"> The project to line up of surplus LSU in Urea Plant to CDR unit is under implementation under RFC M-6433. The project to integrate all Auxiliary Boilers discharge headers vide RFC M-6794 there is a potential to optimise LS consumption and its loss through venting after integrating the BPW header. The extent of saving is estimated to be 5 MT/h of HH steam.
		To ensure 100% compliance of Bahrain Environmental Legislations at all times	3. Compliance to Bahrain Environmental Legislations	SSHEM	100%	100%	100%	100%	100%		<ul style="list-style-type: none"> Environmental law will be reviewed and level of compliance assessed. Meetings with Supreme Council for Environment will be attended. GHG inventory reporting as per IPCC guidelines on annual basis as mandated by NOGA and SCC.

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Corporate Sustainability Goals, Targets & Indicators 2017

	Performance Area	Goal	Indicator Name	Indicator Owner	Target (Year)	Target (1st Quarter)	Target (2nd Quarter)	Target (3rd Quarter)	Target (4th Quarter)	SUSTAINABLE DEVELOPMENT GOALS		Programme(s)/Remarks
										8	12	
Profit	Economic Sustainability	To ensure the company remains profitable	1. Actual Net Profit (US\$)	FM	3,140,765	964,600	1,878,550	325,950	771,665			<ul style="list-style-type: none"> Monitoring and analyzing the Individual and overall Production Cost Statements reported through Monthly Management report. Any Variances in the cost elements will be reported to the concerned departments for control purposes on monthly basis. Utilization of raw materials to ensure optimal usage and efficiency of the plant. Minimize cost of materials procurement through application of aggressive purchasing strategies. Monitor and control contractor's expenditure. Warehouse inventory holding cost Optimization. Operation energy consumption Optimization.
		To ensure that the total cost of production (Ammonia, Methanol and Urea) does not exceed the budget cost	2. Actual Production Cost (US\$/MT)	FM	212.79	208.72	214.61	215.11	212.64			<ul style="list-style-type: none"> Conduct Quarterly Economics of plant operations/ Contribution Margin calculation to achieve the best sales mix for GPIC products. Monitor International Market Prices closely and negotiate for improved market placements' and netbacks for GPIC products with Marketors. Monitor Inventory status for the three GPIC products and achieve optimal inventory levels by close coordination with Marketors and arrange timely shipments. Participate in Quarterly Coordination Meetings with Marketors to keep abreast of the International Market situation and formulate Marketing Strategies.
		To ensure that the actual export of products (Ammonia, Methanol and Urea) equals to or exceeds the budget export quantities	3. Actual Export Quantities (MT)	MKH	1,193,010	295,300	284,300	308,000	308,410			
		To ensure that the actual netback equals to or exceeds the budget netback	4. Actual Netback (US\$/MT)	MKH	215.00	215.00	215.00	215.00	215.00			
		Maintaining the financial Health of the Company	5. Total Debt / Total Equity (Ratio 1:3)	FM	1 : 3	1 : 3	1 : 3	1 : 3	1 : 3			<ul style="list-style-type: none"> Reviewing the Statement of Financial Position (Balance sheet) reported through Monthly Management report every month.
Business Process Excellence		To ensure that the targeted level of combined production (Ammonia, Methanol and Urea) is attained during the reporting period.	1. Actual Production (MT)	POH	1,582,890	387,580	396,330	395,100	403,880			Produce saleable products in order to achieve the agreed production targets by maintaining overall average daily production rates for the operating days as follows: Ammonia 1,360 t/d, Urea 1,600 t/d, Methanol 1,230 t/d..
		To optimize plants (Ammonia, Methanol and Urea) availability	2. Actual On-Stream Factor / Budget On-Stream Factor	POH	98.81	98.21	99.26	97.81	100.00			<ul style="list-style-type: none"> Carry out corrective and preventive maintenance rigorously to maintain the desired plant reliability.

Executive Management Team Signatures:

Signature: Marketing Manager Date: 9/11/2017	Signature: Safety, Security, Health and Environment Manager Date: 12.01.17	Signature: Corporate Communication Manager Date: 9/11/2017
Signature: Finance Manager Date: 21/11/2017	Signature: Information Technology and Knowledge Manager Date:	Signature: Human Resources Manager Date: 9/11/2017
Signature: Technical Services Manager Date: 12/11/2017	Signature: Plants Operation Manager Date:	Signature: Maintenance Manager Date: 08/11/2017
Signature: General Manager Manufacturing Date: 8/11/2017		
Signature: President Date: 8/11/2017		

Examples of GPIC's contribution to the 17 SDGs

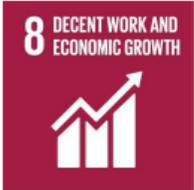
Linking the SDGs , UNGC ,GRI and GPIC’s contribution

The following table links the Sustainable Development Goals (SDGs) to GRI standards relevant disclosures/ indicators, UNGC principles and GPIC ‘s contribution. These linkages are based on a more detailed analysis available on the SDG Compass website (www.sdgcompass.org) and also the document from UNGC “

SDGs	UNGC Principles	GRI Disclosures/ Indicators	GPIC’s contribution
	<u>UNGC Principle #1,2,3,4,5,6</u>	<u>GRI 103-2, 202-1, 203-2, 413-2</u>	NO POVERTY: Contributing to economic growth, job creation and trade; Producing fertilizer that increases income of farmers worldwide.
	<u>UNGC Principle #1,2,7,8,9</u>	<u>GRI 201-1, 203-1, 203-2, 411-1, 413-2</u>	ZERO HUNGER: Work with IFA and AFA on trainings on fertilizer use to increase food production; issued use of Urea fertilizer booklet to Bahraini Farmers ;In continuation to Promoting the UN “International Year of Pulses” 2016 campaign and integrating pulses into the GPIC canteen menu, GPIC celebrated the Global Pulses Day on January 18 2017 encouraging employees to make pulses part of their food habits; GPIC & IFA President promotes Pulses Day in schools in Bahrain and sponsors UNESCO schools exhibition in 2016; GPIC has produced more than 12 million tonnes of granular urea since 1998 and a total of more than 39 million tons of ammonia, methanol and granular urea since 1985. Our latest initiative for 2017 is as below; GPIC has partnered with UN

			<p>Environment for the first of its kind United Nations Health Awareness Campaign. UN Environment would seek to establish a nutritional concept amongst students, educate them on how to benefit from and to stop the wastage of healthy food. Through this campaign, entitled "Let's put an end to the waste of healthy food and promote the health of our children in public schools", UN Environment would like to establish a partnership with MOE Bahrain and cooperate with various government agencies and private institutions in order to achieve the goal. GPIC's generous initiative will provide financial support through media coverage and contribute in helping the largest number of students wishing to improve their nutrition. UN Environment Regional Director West Asia</p>
 <p>3 GOOD HEALTH AND WELL-BEING</p>	<p>UNGC Principle #1,2,3,4,5,6,10</p>	<p>GRI 203-2, 305-1, 305-2, 305-3, 305-6, 305-7, 306-1, 306-2, 306-3, 306-4, 403-2, 403-3</p>	<p>GOOD HEALTH AND WELL BEING: Health and Safety for employees, their families and contractors; Full health insurance and health campaigns; Health training and lectures. • GPIC's First Aid training and Community outreach programme with National Safety Council(NSC)-USA which started in 2012 is continuing and to date we have trained more than 400 employees, contractors, industrial and university students, summer camp children, employees' wives and others. Defensive driving training, campaigns on " Mobiles free driving" to save lives.</p>

 <p>4 QUALITY EDUCATION</p>	<p><u>UNGC Principle #1.2</u></p>	<p><u>GRI 102-27, 404-1</u></p>	<p><u>QUALITY EDUCATION:</u> Training opportunities for employees and industrial trainees; Supporting InJaz and Ministry of Education programs; Providing scholarships and honoring high achieving students; Giving international lectures and presentations to other industries and institutions.</p>
 <p>5 GENDER EQUALITY</p>	<p><u>UNGC Principle #1,2,3,4,5,6</u></p>	<p><u>GRI 103-2, 201-1, 203-1, 401-1, 401-3, 404-1, 404-3, 405-1, 405-2, 406-1, 414-1, 414-2</u></p>	<p><u>GENDER EQUALITY:</u> Women are represented in training, events, committees, audits, etc... Equal opportunities council includes equal remuneration and promotion of women in the workplace; GPIC committed to UN Global Compact Women’s Empowerment Principles WEPs in 2014. Latest initiatives for 2017 include showing support to Government’s initiative of declaring 2017 as the year for Bahraini Women working in the Engineering field. To contribute to this initiative GPIC has included a number of women engineers in all the phases of its new project” the installation of a UF 85</p>

			plant” GPIC has elevated the Equal opportunities committee to the Equal opportunities council.
	UNGC Principle <u>#1,2,7,8,9</u>	<u>GRI 303-1, 303-2, 303-3, 304-1, 304-2, 304-3, 304-4, 306-1, 306-2, 306-3, 306-5</u>	CLEAN WATER AND SANITATION: GPIC’s Long Term Sustainability Goals include water conservation; Energy efficiency (water+energy nexus); Campaigns to reduce water use.
	UNGC Principle <u>#1,2,7,8,9</u>	<u>GRI 201-1, 203-1, 302-1, 302-2, 302-3, 302-4, 302-5</u>	AFFORDABLE CLEAN ENERGY: GPIC’s Long Term Sustainability Goals include increasing renewable energy and energy efficiency; ISO 50001 certification; Ongoing projects and campaigns to save energy; Installation of Energy efficient lighting LEDs. In 2016/2017 690 LEDs have been installed with a total energy saving of 461 MWH/Year and CO2 emission reduction by 230 tons.
	UNGC Principle <u>#1,2,3,4,5,6</u>	<u>GRI 102-41, 102-8, 103-2, 201-1, 202-1, 202-2, 203-2, 203-2, 301-1, 301-2, 301-3, 302-1, 302-2, 302-3, 302-4, 302-5, 303-3, 401-1, 401-2, 401-3, 402-1, 403-1, 403-2, 403-3, 403-4, 404-1, 404-2, 404-3, 405-1, 405-2, 406-1, 407-1, 408-1, 409-1, 414-1, 414-2</u>	DECENT WORK AND ECONOMIC GROWTH: Providing jobs, contribution to Bahrain’s economy and supporting local contractors; Sponsoring events in the community to boost economic growth. GPIC has injected since inception US\$ 4.498 billion in the national economy.

	<p><u>UNGC Principle #3.4.5.6.7.8.9</u></p>	<p><u>GRI 201-1, 203-1</u></p>	<p>INDUSTRY, INNOVATION & INFRASTRUCTURE: Innovation Committee campaigns and activities; Support innovation in the community (e.g. university research, InJaz innovation camp). Latest initiative is the departmental innovative projects. In acknowledgement of its great strides towards innovation, GPIC has won the first Mohammed Rashid bin Maktoum Business Innovation Award in 2016</p>
	<p><u>UNGC Principle #1.2.3.4.5.6.10</u></p>	<p><u>GRI 203-2, 405-2</u></p>	<p>REDUCE INEQUALITIES: Responsible Care protects wellbeing of all people involved with the company’s business; Sharing expertise with all industry regardless of size or position; equal employment opportunities; Injaz – working with all schools to develop skills and knowledge. Since most of the world’s poor are subsistence farmers, fertilizers help farmers to increase their incomes.</p>
	<p><u>UNGC Principle #1.2.7.8.9</u></p>	<p><u>GRI 203-1</u></p>	<p>SUSTAINABLE CITIES AND COMMUNITIES: GPIC’s Long Term Sustainability Goals are in line with Bahrain’s Vision 2030; Contributing to Bahrain’s community and events (exhibitions, farmers’ market, etc.).</p>
	<p><u>UNGC Principle #7.8.9</u></p>	<p><u>GRI 204-1, 301-1, 301-2, 301-3, 302-1, 302-2, 302-3, 302-4, 302-5, 303-3, 305-1, 305-2, 305-3, 305-6, 305-7, 306-1, 306-2, 306-3, 306-4, 417-1</u></p>	<p>RESPONSIBLE CONSUMPTION & PRODUCTION: Resource efficiency; Energy conservation and efficiency, high on-stream factor resulting in less venting and flaring. Maintaining air and water quality. Continuously increasing recycling and reuse (e.g. cardboard recycling began in 2015); Ongoing campaigns to reduce waste and encourage recycling; currently</p>

			underway with several optimization projects around sustainable resource efficiency. Sustainability Reporting and advocating it as part of target 12.6.
	<p><u>UNGC Principle #7.8.9</u></p>	<p><u>GRI 201-2, 302-1, 302-2, 302-3, 302-4, 302-5, 305-1, 305-2, 305-3, 305-4, 305-5, 305-6, 305-7</u></p>	<p>CLIMATE ACTION: Bahrain committed to reducing its CO2 emissions at the UN COP 21 conference in Paris (2015).; GPIC shared its CO2 emission reduction initiatives at the National level and the same were included in Bahrain's INDC submitted to UNFCCC prior to COP21 agreement. Post COP 21, GPIC is working with NOGA on measuring and managing its CO2 emissions; GPIC has issued two reports on GHG inventory based on IPCC guidelines in 2016 and 2017. Carbon Dioxide Recovery (CDR) and Urea plants are main contributors to CO2 emission reduction at GPIC.</p>
	<p><u>UNGC Principle #7.8.9</u></p>	<p><u>GRI 304-1, 304-2, 304-3, 304-4, 305-1, 305-2, 305-3, 305-4, 305-5, 305-7, 306-1, 306-3</u></p>	<p>LIFE BELOW WATER: Seawater outfall monitoring to protect sea life; Maintaining the Fish Farm ; Following strict marine standards for shipping products internationally;</p>
	<p><u>UNGC Principle #7.8.9</u></p>	<p><u>GRI 304-1, 304-2, 304-3, 304-4, 305-1, 305-2, 305-3, 305-4, 305-5, 305-7, 306-3, 306-5</u></p>	<p>LIFE ON LAND: Engaging with Supreme Council for Environment on developing Bahrain's Biodiversity Strategy and online biodiversity database; Increasing employee awareness on biodiversity. Biodiversity related projects at GPIC (Bird sanctuary, fish farm, mangroves plantation, date palm trees etc.).</p> <p>Participating in UN 's Green Wave Campaign since 2015 , distributing 2,000 saplings in 50 schools over the past three years.</p>

 <p>16 PEACE, JUSTICE AND STRONG INSTITUTIONS</p>	<p><u>UNGC Principle #1.2.3.4.5.6.10</u></p>	<p><u>GRI 102-16, 102-17, 102-21, 102-22, 102-23, 102-24, 102-25, 102-29, 102-37, 103-2, 205-1, 205-2, 205-3, 206-1, 307-1, 406-1, 408-1, 410-1, 414-1, 414-2, 415-1, 416-2, 417-1, 417-2, 418-1, 419-1</u></p>	<p><u>PEACE JUSTICE AND STRONG INSTITUTIONS:</u> Aligned with human rights and labour laws; Working with National Institute of Human Rights(NIHR) and Judicial Council to train and develop their staff.</p>
 <p>17 PARTNERSHIPS FOR THE GOALS</p>	<p><u>UNGC Principle #1.2.3.4.5.6.7.8.9.10</u></p>	<p><u>GRI 203-2</u></p>	<p><u>PARTNERSHIPS FOR THE GOALS:</u> Ongoing partnerships (e.g. UN Environment, Ministry of Education, InJaz, universities); founding of GPCA; working with the National Institute of Human Rights NIHR), Judicial High Council, IFA, AFA and encouraging other companies to do the same.</p>

GPIC's Environmental Best Practices contributing to the SDGs





How GPIC contributes to Environmental Sustainability

- GPIC's Sustainability Strategy
- Our environmental strategy looks at the bigger picture and ensures environmental sustainability is adequately covered in all phases of our operations.

Environmental review at design stage

Reliable operations with minimum business interruption

Monitoring and control of emissions ,effluents and waste

Resource Efficiency and conservation

Strict Compliance to Legislative and regulatory requirements

Benchmarking for continual improvement

Regular Audits

Environmental awareness

Biodiversity and protection of natural habitats

Environmental care beyond borders

Climate Change Commitments



How GPIC contributes to Environmental Sustainability

- Our Environment Related Policies
- Integrated Quality, Health, Safety and Environment Policy
- Responsible Care Policy
- Energy Management Policy



سياسة الموحدة للجودة والصحة والسلامة والبيئة



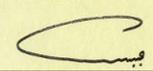
Integrated Quality, Health, Safety, and Environment Policy

GPIC is a producer of Methanol, Ammonia and granulated Urea. GPIC embraces Quality, Health & Safety, and Environmental Care as core business values and is committed to pursuing these values as follows:

- To produce, in a timely, efficient and safe manner, consistent products in accordance with our customers' requirements.
- To strive for the highest standards of quality in all activities, including health & safety, and environmental matters.
- To give due attention to quality, health & safety, and environmental issues by enhancing awareness and taking all reasonable and practical steps to prevent and eliminate the risk of injury, occupational illness, health hazards and/or damage to property or the environment.
- To identify significant quality, health & safety, and environmental elements and set appropriate objectives, thus eliminating or minimising the impact of such elements.
- To conduct our business in accordance with appropriate local legislative requirements, industry standards and, as far as practicable, follow international best practices.
- To provide the necessary organisational resources, communication and training to employees, contractors, visitors, customers, suppliers and the public with regard to matters related to quality, health & safety, and the environment.
- To ensure that contingency plans are maintained to deal with emergencies.
- To periodically review the integrated management systems and practices to ensure their continual improvement and compliance with the standard's requirements.
- To ensure that all employees and contractors strictly implement and adhere to this policy at all times.



عضو مجلس الإدارة للتب
Managing Director



الرئيس
President

POL-EXM-04-01 Issue 1 Rev 1 2005/2016



سياسة الرعاية المسؤولة



Responsible Care Policy

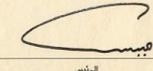
GPIC is committed to adopting Responsible Care initiatives and to conducting its business of product manufacturing and marketing responsibly. We are dedicated to providing and maintaining a safe, healthy, environmentally-friendly and secure workplace for all employees, contractors, visitors and the local community. We also recognise the importance of our role in the environmental stewardship of the company's facilities.

To assure such commitment, we adopt the following principles:

- To comply with all current and applicable environment, health, safety and security (SHES) legislation of the government of the Kingdom of Bahrain, and the Responsible Care guiding principles of the Gulf Petrochemical and Chemicals Association.
- To design and operate our facilities in a safe, secure and environmentally-sound manner.
- To build an enduring culture at all levels of our organisation and to continuously identify, reduce and manage process safety risks.
- To promote pollution prevention, the minimisation of waste, and the conservation of natural resources in our manufacturing process.
- To identify significant quality, health & safety, security, and environmental and responsible care elements and set appropriate objectives, thus eliminating or minimising the impact of such elements.
- To work with customers, suppliers, transporters, distributors and contractors to foster the safe and secure use, transport and disposal of our products and provide hazard and risk information that can be applied to their operations and products.
- To communicate product and process risks to our stakeholders and listen to and consider all feedback from their perspective.
- To make continuous progress towards our goal of no accidents, injuries or harm to human health or the environment from our products and operations, to support our SHES objectives and targets by means of proper security performance.
- To regularly assess response potential.
- To provide the necessary organisational resources, communication and training to employees, contractors, visitors, customers, suppliers and the public with regard to matters related to quality, health & safety, and the environment.
- To ensure that contingency plans are maintained to deal with emergencies.
- To periodically review the integrated management systems and practices to ensure their continual improvement and compliance with the standard's requirements.
- To ensure that all employees and contractors strictly implement and adhere to this policy at all times.



عضو مجلس الإدارة للتب
Managing Director



الرئيس
President

POL-EXM-04-01 Issue 1 Rev 1 2005/2016



سياسة إدارة الطاقة



Energy Management Policy

GPIC produces Methanol, Ammonia and Granulated Urea. GPIC is committed to make efficient use of energy at its facilities and during its activities, with the purpose of preserving natural resources, reducing atmospheric emissions and helping to mitigate the effects of climate change. GPIC fosters sustainable development goals concepts, design, and enhances the latest state of the art technologies in terms of energy optimisation and efficiency. GPIC Energy Policy provides the framework for setting and reviewing energy goals and targets which is committed to achieving energy performance improvements by setting goals and targets through an Energy Management Plan whilst:

- Striving for continual improvement in energy performance.
- Periodically reviewing the Energy Goals, Targets and Energy Performance Indicators.
- Ensuring availability of information and necessary resources to achieve energy goals and targets.
- Ensuring compliance with applicable legal requirements and other requirements related to energy use, consumption and efficiency.
- Encouraging and motivating GPIC employees and contracted workforce to optimize their energy use.
- Enhancing awareness and knowledge of Energy Saving for employees; contracted workforce; and employees' families.
- Supporting the purchase of energy-efficient products, services and design to improve energy performance.
- Where ever possible, expand the use of renewable energy.
- Regularly reviewing and updating the GPIC's Energy Policy as necessary.



عضو مجلس الإدارة للتب
Managing Director



الرئيس
President

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How GPIC contributes to Environmental Sustainability

- Our Corporate Goals and Targets focusing on our priorities
- Long term goals
- Annual Corporate Goals
- Annual Departmental Goals

Corporate Sustainability Goals, Targets & Indicators 2017

Performance Area	Goal	Indicator Name	Indicator Owner	Target (Year)	Target (1st Quarter)	Target (2nd Quarter)	Target (3rd Quarter)	Target (4th Quarter)	SUSTAINABLE DEVELOPMENT GOALS	Programme(s)/Remarks
Safety, Health & Security	To attain the target level of SHH incidents during the reporting period and maintain a high level of safety (personnel and environment) at GPIC sites at all times.	1. SHH Incidents (LTAs)	SSHEM	Zero	Zero	Zero	Zero	Zero		<ul style="list-style-type: none"> Participate in International SHH awards, RoSPA and ESC awards. Enhance SHH by re-developing the SHH program and safety during the Turnaround. Further enhance Process Safety Management (PSM) by quarterly updates & monitoring of PSM KPIs by PSM Committee and yearly presentations on lessons learned. Support and contribute to local, regional and international. Participate in SHH activities through sponsorships, memberships and voluntary engagement & bench marking.
	To ensure the target level of reduction in sick leaves taken by GPIC employees is attained during the reporting period.	2. Sick Leaves Days (SLD)	HRM	3,600 Sick Leave days (Excluding Surgeals)	900	900	900	900		<ul style="list-style-type: none"> Conducting Periodic Medical Examination for employees. Publishing the Health Committee Newsletter. Conducting Health Awareness Lectures. Conducting Blood Donation Drives.
	To ensure availability and readiness of security systems at 100% all the times	3. Security readiness %	SSHEM	100%	100%	100%	100%	100%		<ul style="list-style-type: none"> Security readiness will be tried and tested through exercises held throughout the year. Communication with national bodies NSA, Police and Traffic Directorate.
	To review and update the 13 ERM Risks	4. Update ERM Risks	GRM	13	3	3	3	4		<ul style="list-style-type: none"> Effective and streamlined review process of the ERM risk through the fully automated system. Contact at least 4 meeting to review the ERM risks. Issue an annual final report to the Board Audit Committee.
People	To ensure that a targeted number of environmental awareness lectures are delivered at Local Schools.	1. Environment Awareness Lectures at Local Schools	PHES	32	8	8	22	0		Through communication with the Ministry of Education, the lecture programme are coordinated and planned. List of schools to be visited with programme schedule are circulated to all GPIC graduate engineer to conduct the lectures as planned.
	To ensure distribution of contribution money to worthy organizations and thus helping the local communities	2. Number of contributions, sponsorships to charities, NGOs and other worthy causes	CCM	100%	20%	30%	30%	20%		Donation and sponsoring funds is distributed as per the approval awarding and donation lists by the GPIC as approved by GPIC board of directors and is taking actions for other projects and appeals received from various Parties.
	To ensure that the target number of educational visits to the GPIC complex during the reporting period is fully achieved.	3. Social and Educational visits to GPIC Complex	CCM	30 Visits	7	9	9	5		Based on requests received from schools, Universities and VIPS visits schedule plans are developed
	To maintain compliance with GRI Sustainability Reporting and UN Global Compact Principles by: A. Commitment to UNICEF sustainability 10 principle commitment. B. Commitment to UNGC, Food and Agriculture & principles. C. Commitment to UNGC Women Empowerment (Principle 10).	4. GRI Sustainability and UN Global Compact Reporting	GRM	Issuing of the report	-	100%	-	-		<ul style="list-style-type: none"> Making sustainability reporting an integral part of the business ensuring the full engagement of the relevant stakeholders via means such as surveys, meetings, presentations etc. Comply with GRI requirements in terms of engaging with internal and external stakeholders in identifying and focusing on reporting the material aspects from the stakeholders' point of view. Sustainability Committee to ensure the required data is gathered on time and in the correct format to meet GRI and UNGC requirements.
Learning & Growth	To ensure the target percentage of Bahrainization is attained at GPIC during the reporting period.	1. Bahrainization levels %	HRM	80%	80%	80%	80%	80%		<ul style="list-style-type: none"> Targeting more Bahraini nationals for recruiting in various vacant positions. Reviewing/implementing employee succession plan to replace expatriates with Bahraini nationals.
	To ensure the target percentage of hours of training is attained during the reporting period.	2. Total Training Hours	HRM	20,000	6,000	6,000	4,000	4,000		<ul style="list-style-type: none"> Developing and execute the Competency based Training plan for all GPIC employees. Making effective use of e learning initiatives for training employees.
	To ensure the target percentage of employee retention is maintained for the reporting period.	3. Employee Retention %	HRM	98%	98%	98%	98%	98%		<ul style="list-style-type: none"> Providing the employees better development through career progression & training and development. Investing in developing and maintaining a competitive compensation, rewards and benefits package.
Environment	To ensure that every calculable tonne of product (Ammonia, Methanol and Eth) is obtained within the target level of energy consumption.	1. Energy Consumption per calculable product tonne (Gcal/MT)	POH	7,735	7,749	7,76	7,761	7,748		<ul style="list-style-type: none"> Carry out Deal units checking, inspection and maintenance. Carry out regular monitoring of energy and review and take actions to minimize losses.
	To ensure implementation of identified significant energy use projects related to reduction of consumption of HH steam and fuel natural gas.	2. Significant Energy use projects	YSH	100%	25%	25%	25%	25%		1) The project to line up of surplus LSU in Urea Plant to CDH unit is under implementation under RCF H-6633. 2) The project to integrate all Auxiliary Bellows discharges headers vide RCF H-6794 there is a potential to optimize LS consumption and its loss through venting after integrating the BFW header. The extent of saving is estimated to be 5 MT/yr of HH steam.
	To ensure 100% compliance of Bahrain Environmental Legislations at all times	3. Compliance to Bahrain Environmental Legislations	SSHEH	100%	100%	100%	100%	100%		<ul style="list-style-type: none"> Environmental law will be reviewed and level of compliance assessed. Meetings with Supreme Council for Environment will be attended. SHH inventory reporting as per IPCC guidelines on annual basis as mandated by MOGA and SCE.

17/8 08/11/2017

 08/11/2017

 08/11/2017

 08/11/2017



Conserving Biodiversity at the Heart of GPIC - Green Areas



Mangroves plantation



Green areas demonstrating the eco- friendliness of its operations highlighting that nature and technology can co-exist





Conserving Biodiversity at the Heart of GPIC-Bird Sanctuary

The evident improvement in the environment around GPIC has encouraged GPIC's to further enhance its special focus on the surroundings and especially Bahrain's bird life. The bird sanctuary was commissioned on 9th September 2001 .

Over 70 species have been recorded visiting the island.





Conserving Biodiversity at the Heart of GPIC- Fish Farm

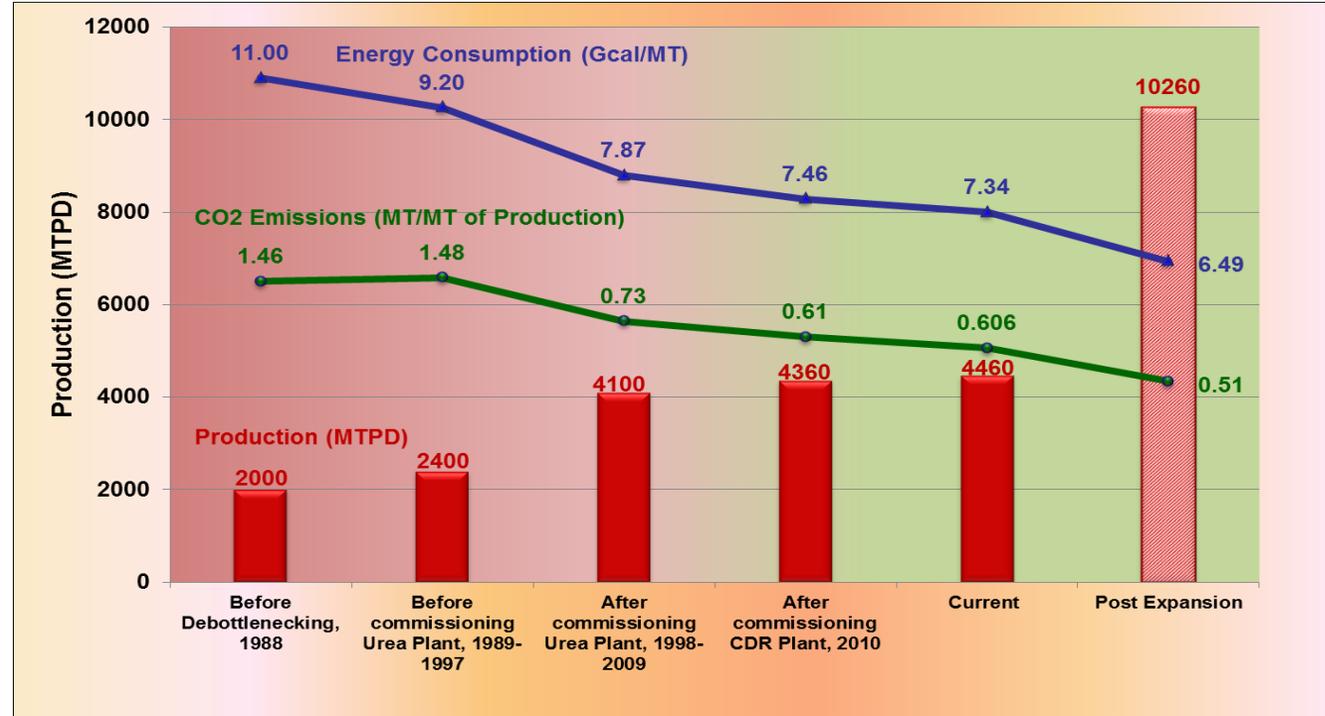
With the aim of demonstrating environmental accountability, setting a good example to other industries and replenishing dwindling fish reserves in regional waters, the company embarked on constructing a fish farm close to the sea water outlet in November 1996

So far more than **one million** fish have been released to the sea





GPIC efforts to reduce its greenhouse gas emissions.



Carbon Dioxide Recovery plant commissioned in 2009
 Reduces carbon dioxide emissions to atmosphere by 0.12 million tons per year



Energy conservation through LEDs



Since 2013 we have installed 1731 LEDs within our complex, replacing conventional lights, resulting in an energy saving of 746.50 MWH/Y, a cost saving of US\$ 55,148 and a CO2 emission reduction of 371.76 tons/ year.



Clean Energy through Solar

GPIC installed its first solar heater in 2011 as a pilot project with a saving of 5KW load. In line with its long term sustainability goals on renewable energy GPIC will be expanding the solar power to all the buildings outside process areas in a phased manner





Recycling to reduce carbon foot print and the burden on landfill



2017 Recycling Statistics							
Type of waste	KG	KG CO2 e reduced	Landfill space saved Cubic meter	Energy Saved kWh	Trees Saved	Water Saved Gallons	Recycling Contractor
Cardboard	6222	8710.8	7.992	2428.1	-	-	Nidduki
Paper	3732	5224.8	4.794	15114.6	62.2	25,788	Universe Environment
Shredded Paper	3370	4718	4.329	13648.5	56.16	23,287	Mother and Child Care Society
Aluminum Cans	335	3015	0.422		-	-	Universe Environment
Plastic	1422	3555	1.820	8176.5	-	-	Universe Environment
Total	15081	25223.6	19.358	40721.1	118.4	49,074.82	



Bore wells for ground water monitoring

As a continuation of the environmental protection program designed by GPIC for monitoring the underground water and possible leakage from sub soil piping and bottom base plates of storage tanks ,which may affect the quality of water, 8 bore wells are dug across the complex and periodic sampling is done.





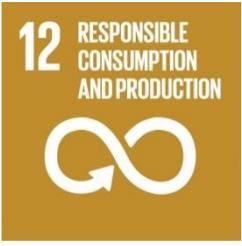
Continuous Emission monitoring system

State of the art ABB CEMS are installed on 5 boilers and reformer stacks in GPIC with real time monitoring of parameters such as SOX, NOX, CO,CO₂, O₂

Benefits

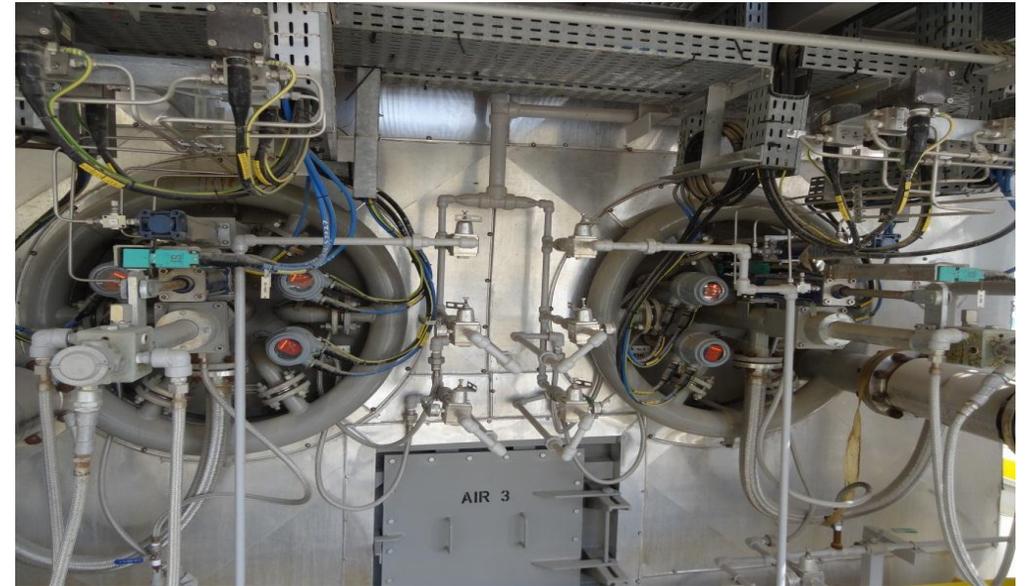
- Easy to monitor the combustion efficiency.
- Assists in Compliance to Legislation.
- Effective diagnostic tool.





Ultra low NOx burner for less pollution

Ultra low NOX burners are used in the new HP steam boiler B-5301 resulting in a NOX emission level of 25 mg/ NM³ which is 50% lower than the typical NOX levels in the older boilers.





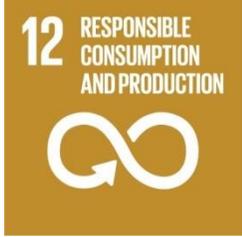
Refrigerant gas leak detection by using portable leak detectors

A highly sensitive and reliable Refrigerant leak detector CEM GD-3303 enables leak detection of even very minor leaks. The detector is used on air conditioning refrigerant units and also on the nitrogen plant units.

Benefits

- Less wastage of refrigerants.
- Early detection & rectification of high Global Warming potential and Ozone Depleting potential refrigerant gases is a positive for climate change.

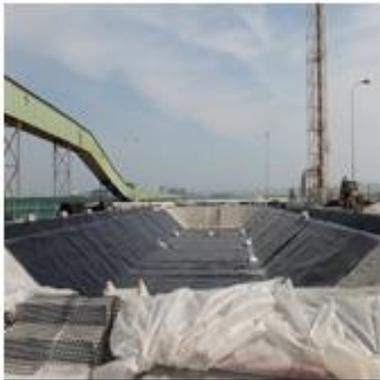




Evaporation ponds to handle liquid waste

Evaporation ponds have been constructed at GPIC to handle on temporary basis hazardous liquid waste generated in the process areas in an environmentally friendly way.

The evaporation ponds comprise of two small ponds and a larger single pond with a total capacity of 1000 cubic meters. The ponds are provided with double layer of HDPE liners. Ground water monitoring bore wells have been provided near the ponds to ensure timely detection of liner leaks.





Mobile air quality monitoring unit

Continuous monitoring of ambient air quality to ensure compliance to Bahrain Environmental Legislation

GPIC has stationed a mobile air quality monitoring unit at the south west zone of the complex. The monitoring unit measures 10 parameters in ambient air including SOX, NOX, PM10, H2S, Ammonia etc etc. and transmits it to monitors in main control room.





Phasing out of Ozone depleting HCFC's

After the replacement of CFC's GPIC is proactively phasing out refrigerants such as R-22 from its facilities. In line with GPIC's long - term sustainability goals a road map has been put in place and GPIC will be R-22 free by 2023.





Acoustic emission (AE) valve leak detection

To quantify valve leaks through acoustic emission technique so that the leak rate can be monitored regularly before it becomes an environmental or a process issue.

GPIC uses acoustic emission testing devices such as the MIDAS Meter® which is the next generation in Acoustic Emissions (AE) valve leak detection equipment designed and manufactured by Score Group plc.





LDAR program for fugitive emissions

GPIC has a structured program to periodically check for gas leaks, steam leaks through leaking flanges, passing valves, PSVs etc. This enhances the safety, environmental protection as well as resource efficiency.

Moreover every quarter all the steam traps are checked for functionality through temperature monitoring and the defective traps are attended.





Oil Spill Containment Kits

GPIC has procured oil spill containment Kits in mobile containers that can be put in potential areas inside the process plants. The kits have absorbent pads & sheets of different shapes and sizes that be effectively used for minor oil spills.



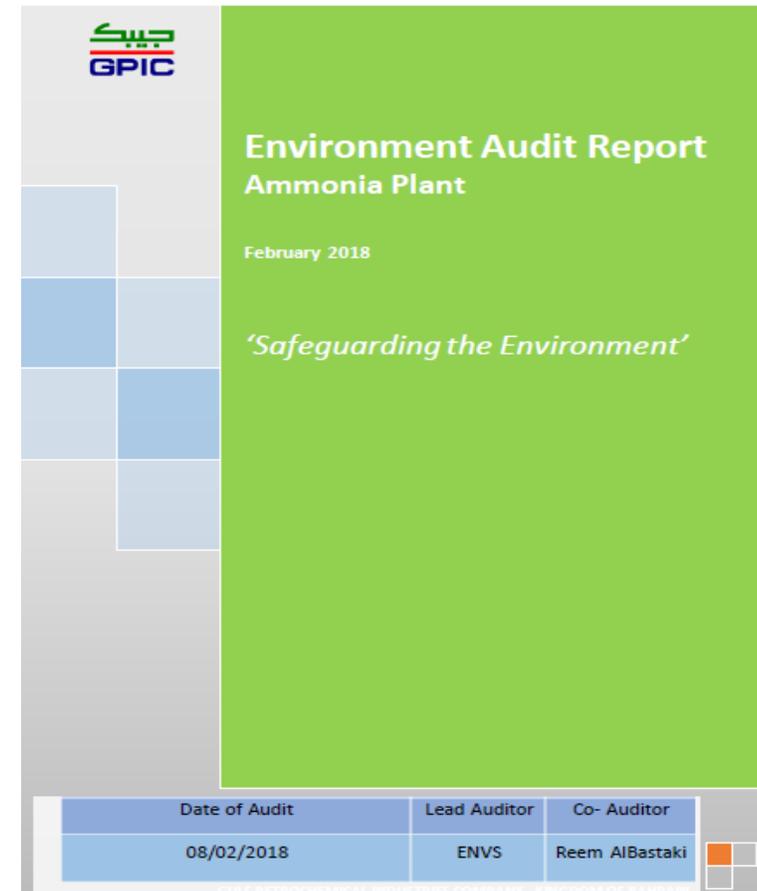
Further more there are oil leak containment trays that can be used to place oil drums and minor oil leaks and spills will be contained in the tray which can be safely collected and disposed off.





Environmental Inspections

To ensure all the operational and maintenance activities including waste management and regulatory compliance are as per the procedures and guidelines, regular environmental inspections are carried out by the environment section and all the findings are uploaded as actions on the SHE inspection electronic data base for ease of tracking and close out.





Environment related Committees

GPIC has more than 40 cross functional committees covering all business functions and the following are directly related to the Environment;

- Environment Activities Committee
- Energy Management Committee
- Climate Change Committee
- Bird Sanctuary and Fish Farm Committee
- Sustainability Reporting Committee
- Responsible Care Committee

	General Management Guidelines	QQS No. : GL-GEN-00-12 Issue No.: 1 Rev. No. : 8 Date : 04/04/2018 Page : 42 of 45
GPIC Councils & Committees Goals and Charter		Copy No.:
37. Environment Activities Committee (EAC)		
<p>GOAL: To oversee all Environmental issues and activities in the complex.</p> <p>CHARTER:</p> <ul style="list-style-type: none"> • Promote internal and external environmental awareness. • Manage internal and external environmental projects. • Discuss and recommend issues pertaining to the environment. • Coordinate with external organizations all issues related to the environment. <p>FREQUENCY OF MEETINGS: Bimonthly (every two month)</p>		



Compliance Reporting

GPIC strictly adheres to mandatory compliance reporting as required by the Regulatory Authorities.

In addition to Compliance reporting, internal environment reports are generated and circulated to all. This includes waste management, recycling, air quality monitoring etc.


KINGDOM OF BAHRAIN
 Supreme Council For Environment
 Directorate of Assessment & Environmental Control

Half Yearly Environmental Compliance Report
 As per Ministerial Order No. (10) Year 1999 (Air-water)
 Form: July 2018 To: December 2018

A) General

1) Name of Organization/Industry- Gulf Petrochemical Industries Company

2) Location / Industrial Area: Sitra

3) Address: P.O. Box 26730, Manama, Bahrain

Web Site: WWW.gpic.com Tel: 17751777 Fax: 17751047

4) Details of contact person submitting the report:
 Name: Fadhil Al Anesi Designation: General Manager- Manufacturing
 Tel: 17753592 Fax: 17751047 Mobile: 36481256 E-mail: f.alanasi@gpic.net

B) Air Emissions

1) Type of fuel (please tick) Gas Oil NA

2) No. of air emission stacks/outlets Eight
 Please specify locations: 1) Ammonia reformer stack, 2) Methanol reformer stack, 3) Auxiliary boiler (B 5201A& B) stack, 4) Urea boiler (B 5203) stack, 5) Gas turbine stack, 6) Urea granulator stack, 7) CDR boiler stack, 8) New boiler (B 5301) stack.

3) Other sources of air emissions: NA
 Please give detailed informations: NA

4) Air Emission Analysis Result (Please tick as appropriate)

#	Source (Location/Stack)	Type of emissions treatment	Av. Volumetric flow rate (m ³ /hr)	Parameters monitored				
				CO	SOx	NOx	PM10	Others
1	Ammonia reformer stack	None	155,400	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	CO ₂
2	Methanol reformer stack	None	263,070	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	CO ₂
3	Auxiliary boiler stack	None	151,885	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	CO ₂
4	Urea boiler stack	None	67,315	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	CO ₂
5	CDR boiler stack	None	23,801	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	CO ₂
6	New boiler	None	78,313	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	CO ₂
7	Gas turbine stack	None	300,407	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	CO ₂
8	Urea granulator stack	None	540,362	Not applicable	Not applicable	Not applicable	Not applicable	NA

5) Monitoring Frequency: Daily Weekly Monthly Quarterly

6) Source of Analysis: In House Private Lab
 Name of Lab: GPIC LABORATORY

7) Sampling technique:

8) Remarks / observations: Separate analysis sheet is attached below.

شئون البيئة طيفون : 17875175 (00973) فاكس : 17876102 (00973) من ب : 32657 مدينة جيسى - مملكة البحرين
 Environmental Affairs TEL: (00973) 17875111 FAX: (00973) 17786102 P.O. Box: 32657 SA TOWN - KINGDOM OF BAHRAIN
 1 of 8 Web Site: www.environment.gov.bh الموقع على الانترنت: MS/2005



Reporting our Sustainability Performance

To publicly share our economic, environmental and social performance for benchmarking and continual improvement through enhanced transparency and accountability.

Since 2012 GPIC has been issuing Sustainability reports based on the Global Reporting Initiative(GRI) guidelines. The reports are issued on biennial basis and they cover our material aspects and also include the UNGC Communication on progress, WEPs and FAB 6 principles. Moreover we have shown our alignment to the 17SDGs in these reports.



Contributing to the 17 SDGs

Aligning GPIC business priorities with the SDGs and as part of this journey have shown contribution to a number of SDGs including the ones related to the Environment

Environment domain is expanded in the SDGs: environmental dimension of sustainable development is fully fleshed out in the goals on oceans and marine resources, ecosystems and biodiversity, land degradation and desertification, and are also mainstreamed/embedded under all other goals. Almost half of the SDGs are directly related to the Environment.





Partnership projects with the Ministry of Education to spread environmental awareness and environmental research amongst Bahrain's School children

To spread Environmental awareness amongst school children in Bahrain GPIC has launched a number of partnership projects;

1- The first, an Environmental Lectures program (since 2001) has been a platform for increasing environmental awareness of more than 40,000 school students to date.

2- The second is an Environmental Research program (since 2004) in which 20 student groups are selected from a wide range of applicants to compete for best research project.

3- Finally, in 2015 we launched the third program, under the UNEP Greenwave for Biodiversity Campaign, through which various local fruit trees were planted in schools around Bahrain, engaging students in the physical tree planting





Environmental Awareness of employees

GPIC Environment Section, Environment Activities Committee(EAC), Energy Management Committee, Climate change committee enhance employee environmental awareness through presentations, newsletters and flashes etc..

Environment Committee Newsletter
Issue 39
April 2015

Celebrating Earth Day: April 22nd 2015

We depend on a healthy earth for nutritious and delicious food, but in Bahrain food makes up 65% of municipal waste. As environmental degradation increases, food availability will be more limited, especially of meat.

- 30% of food is wasted which is more than the required to feed the world's hungry 900 million people
- 20% of all cultivated land is being degraded
- 30% of marine fish stocks are overexploited

"Imagine all the food mankind has produced over the past 8,000 years... we need to produce that same amount again — but in just the next 40 years"

— Paul Polman, CEO of Unilever

almond trees
rice grass
pineapple plants

Environment Committee Newsletter
Issue 36
December 2014

Recycling Initiatives at GPIC

GPIC currently recycles paper, plastic, metals, is in the process of introducing cardboard recycling in addition to its waste reduction initiatives.

Since 2005, GPIC has recycled 50 tons of paper. Between 2012 and 2013, paper consumption fell by 14%, saving over 500,000 papers. In 2013, the plants department saved 2000 papers by suspending the printing of daily shift logs.

GPIC was the first company in the gulf to embark on CO₂ recovery in 2009. The company also promotes recycling to local youth through the Environmental Awareness lectures that have reached 27,000 students over the last 13 years.

Recycling one ton of paper saves

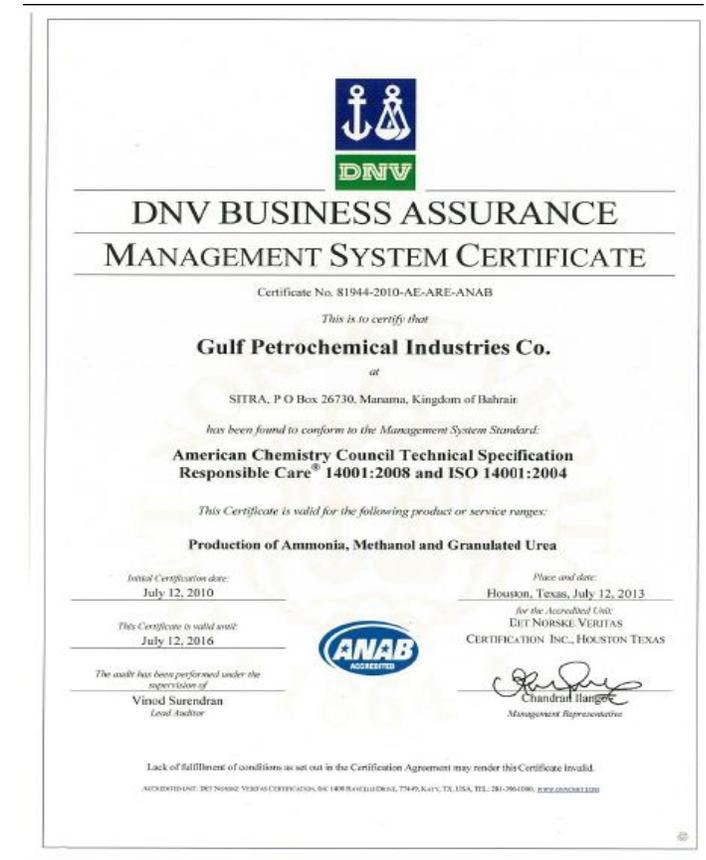
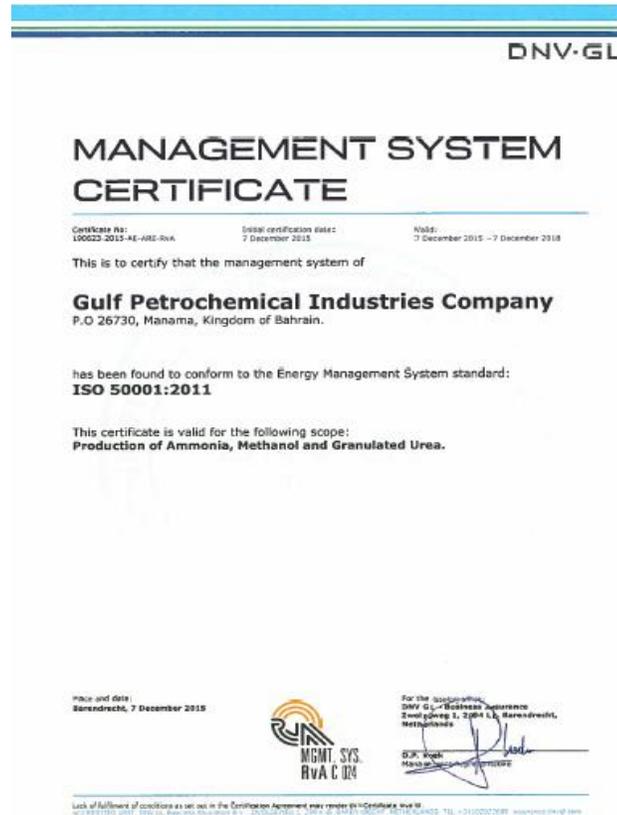
Energy to power a house for 6 months	26,000L of water	12-24 trees	2.5 m ³ in landfill

Prepared by Mashaal Fakhro



Continual Improvement through Management system certifications

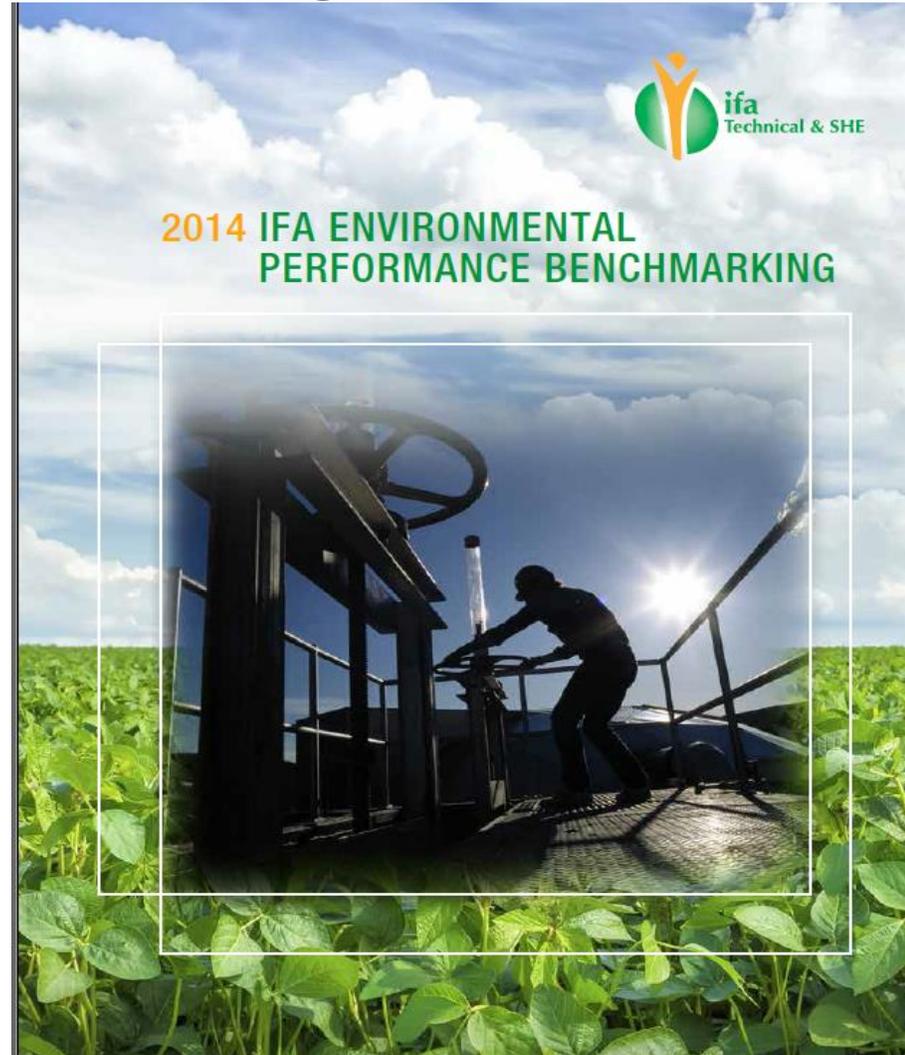
Continual Improvement through Management Systems related to Environment
ISO 14001, RC 14001 , ISO 50001





Continual Improvement through Benchmarking Surveys

Continual Improvement through Benchmarking Surveys such as IFA Environment and Energy Benchmarking etc.





Continual Improvement through Awards Submissions

Continual Improvement through Awards submissions such as the Arabia CSR Awards, KSA Environmental Excellence Award and others.





Engaging with UN Environment

- The United Nations Environment Program (UNEP) is the **voice for the environment** in the United Nations system, provides leadership and encourages partnerships.
- By GPIC being involved in global policy discussions, we are made **aware of policies that will affect industry and bring up industry concerns**.
- Partnering with UNEP on local environmental projects (e.g. Sponsoring a local tree planting project under the “Greenwave Campaign” umbrella) gives the projects structure, exposure and more significant impact.



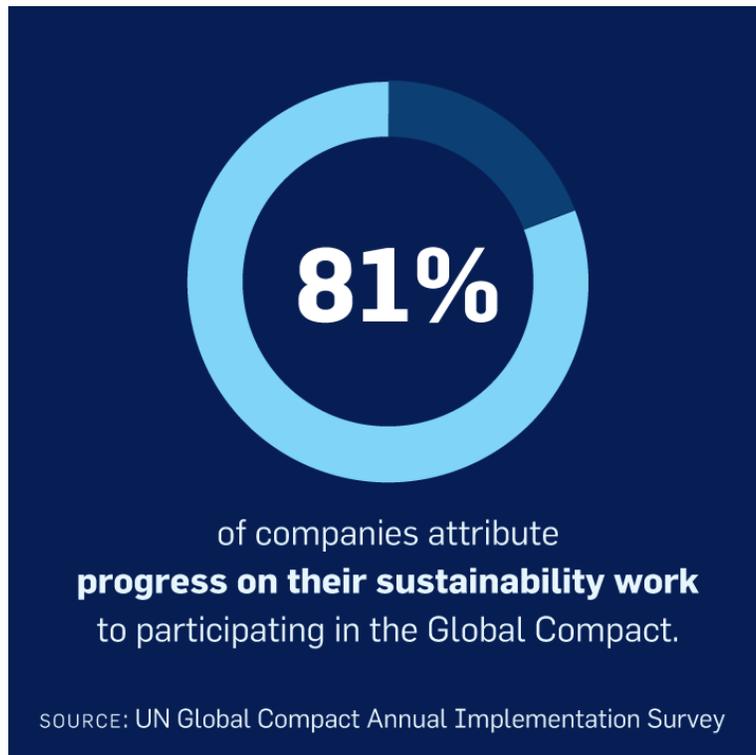
HEALTHY
PLANET
HEALTHY
PEOPLE

- As part of UNEP’s 6th Global Environmental Outlook:
 - President is member of **GEO 6** High Level Intergovernmental and Major Groups and Stakeholder Group
 - The group oversees the production of an environmental **Policy Summary which informs UN decision making**



Commitment to UN Global Compact

GPIC a member of UN Global Compact since 2012



2012 - Committed to 10 Principles in:

- Human Rights
- Labor Standards
- Environmental Protection
- Anti-Corruption

2014 - Committed additionally to:

- Food and Agriculture Business Principles (FAB 6)
- Women's Empowerment Principles



Community environmental projects

Bahrain Japan Friendship Garden: one of the latest projects established outside the company compound to demonstrate the eco-friendliness of its operations. Opened in February 18 2015 in Al-Areen Wildlife Park. The exquisite garden is funded by GPIC and is a testimony of Company's unwavering commitment towards corporate social responsibility and environmental sustainability.



The way forward

Be part of the global transformation by Continuing to expand and reinforce contribution to the SDGs.

- Align your business priorities to the national level prioritized SDGs.
- Go down to the target and the indicator level for each selected SDG
- Engage Youth
- Out reach to young children on SDG awareness.



Thank You

GPIC 'S CONTRIBUTION TO THE SUSTAINABLE DEVELOPMENT GOALS THROUGH ENVIRONMENTAL BEST PRACTICES

AFA Workshop
Health, Safety & Environment in Fertilizers
Time for Excellence
4-6 September, Kingdom of Bahrain

Nadeem Rana
Safety & Environment Superintendent
GPIC



September 2018



الإتحاد العربي للأسمدة
Arab Int'l Organization هئية عربية دولية
Arab Fertilizer Association
Since 1975



IMPROVEMENT OF SUSTAINABILITY INTENSITIES BY UTILIZING EXCESS LP STEAM

MESHAL AL-RASHEEDI, Sabic, Saudi Arabia
Talal Al-Ansari, Engineer, Process (SEED), SFV Urea, SAFCO, S. Arabia

Time for Excellence

Program by:



4-6/9/ 2018

Bahrain

CHEMISTRY THAT MATTERS™



IMPROVEMENT OF SUSTAINABILITY INTENSITIES BY UTILIZING EXCESS LP STEAM

Author's Name : MESHAL AL-RASHEEDI

Health, Safety & Environment in fertilizer Industry, AFA workshop, Bahrain, September 4-6, 2018

GENERAL BUSINESS USE

CONTENTS

- Problem statement
- Process description
- Approach to resolve the problem
- Source of excess LP steam identification
- Action Implementation
- Sustainability impact

SAFCO COMPANY PROFILE

Saudi Arabian fertilizer co(SAFCO), national Fertilizer Company(IBB) and Al-Jubail fertilizer Company(Albayroni) located in Al-Jubail industrial city, Kingdom of Saudi Arabia are jointly engaged, integrated & Committed to operate our facilities in the manufacturing of Urea, Ammonia, 2-Ethyl Hexanol(2-EH), Di-Octyl phthalate(DOP), Iso-Butyraldehyde (I-Bal), Technical grade urea(TGU) & compound Agricultural Nutrients.

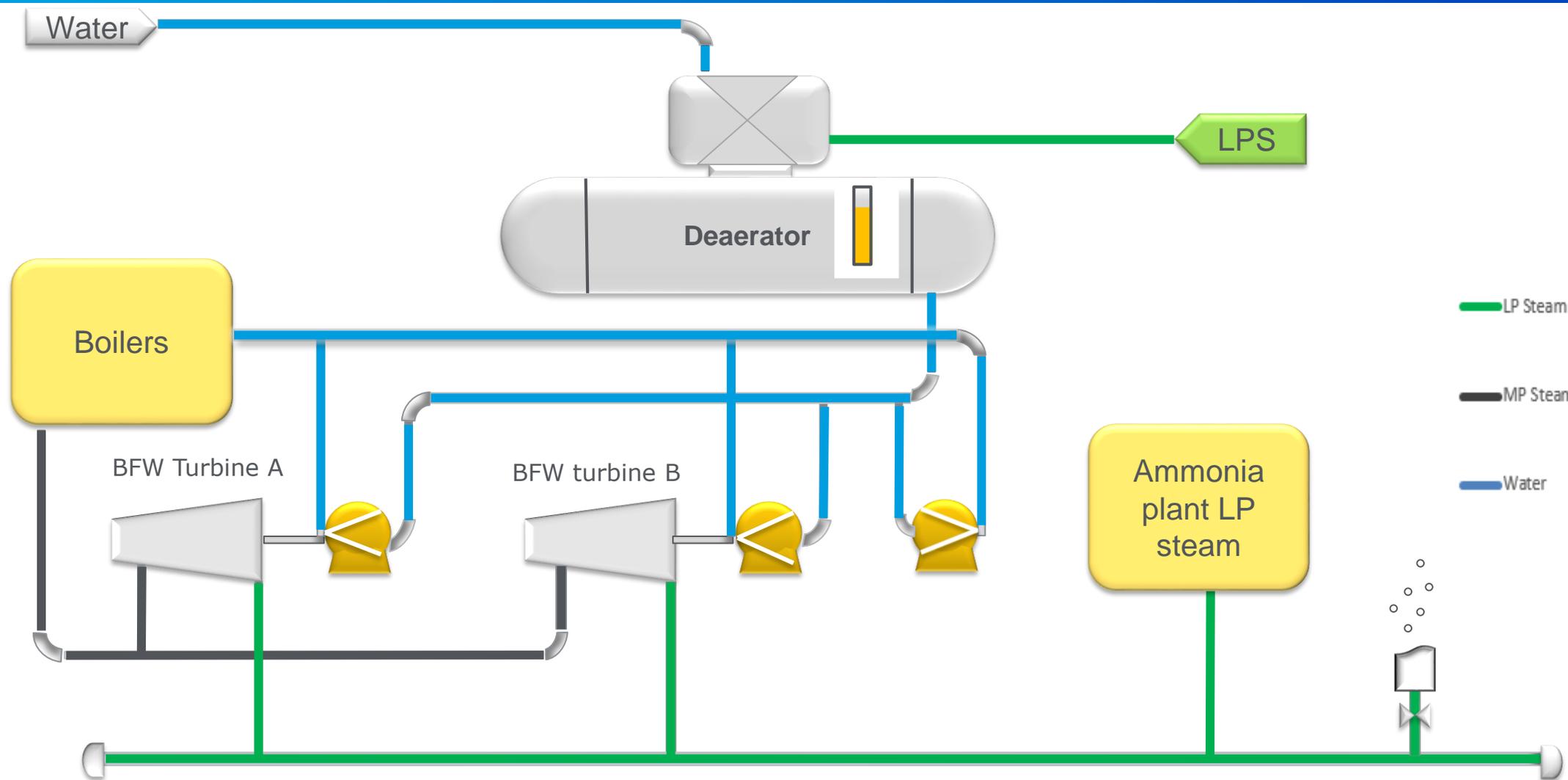
BACKGROUND

At SAFCO manufacturing facility four Ammonia, Urea and Utility mega size world class Plants are operational, Low Pressure steam of 3.5 Kg/cm²g at 250 DegC is generated during the process . To optimize GHG, energy and Water intensity to meet sustainability KPI, the excess steam is being utilized. Quantity of LP steam saved is 127,504 MT/year. 2.23 MSR/year

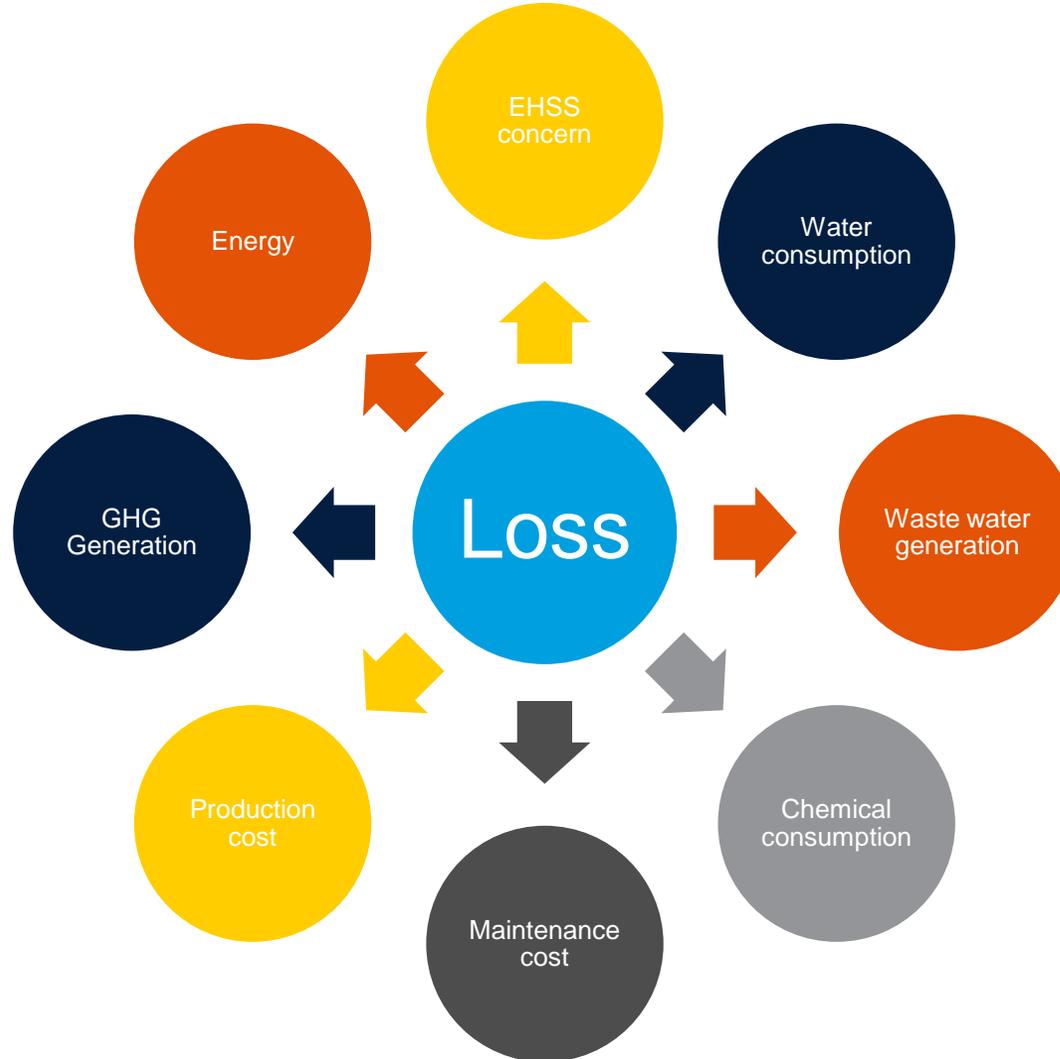
PROCESS DESCRIPTION

LP steam at 3.5 Kg/cm²g and 250 DegC is being produced from back pressure turbines and letdown from MP to LP steam header. Produced LP steam is being consumed as induction steam in compressors / turbines, deaerators, heaters and steam tracing lines. The remaining LP steam was not utilized.

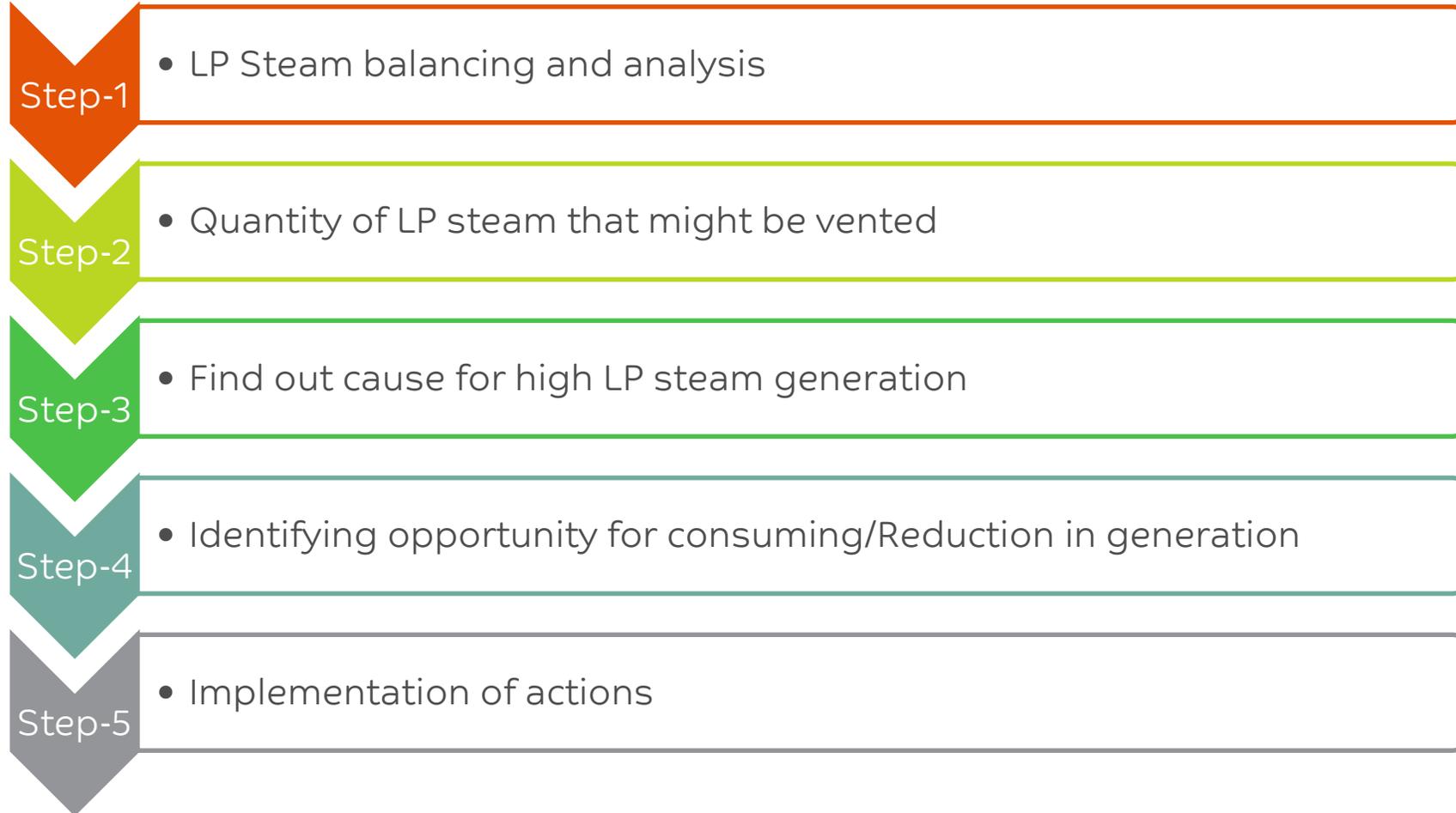
CONTINUED PAGE (1/2) PROCESS DESCRIPTION



LOSSES & BUSINESS IMPACT



APPROACH TO FIND SOLUTION



LP STEAM BALANCING AND ANALYSIS

Generation MT/hr.		Consumption MT/hr.
69		63
38		30
107		93
Excess / LP steam		14

IDENTIFYING OPPORTUNITY FOR CONSUMING/REDUCING GENERATION

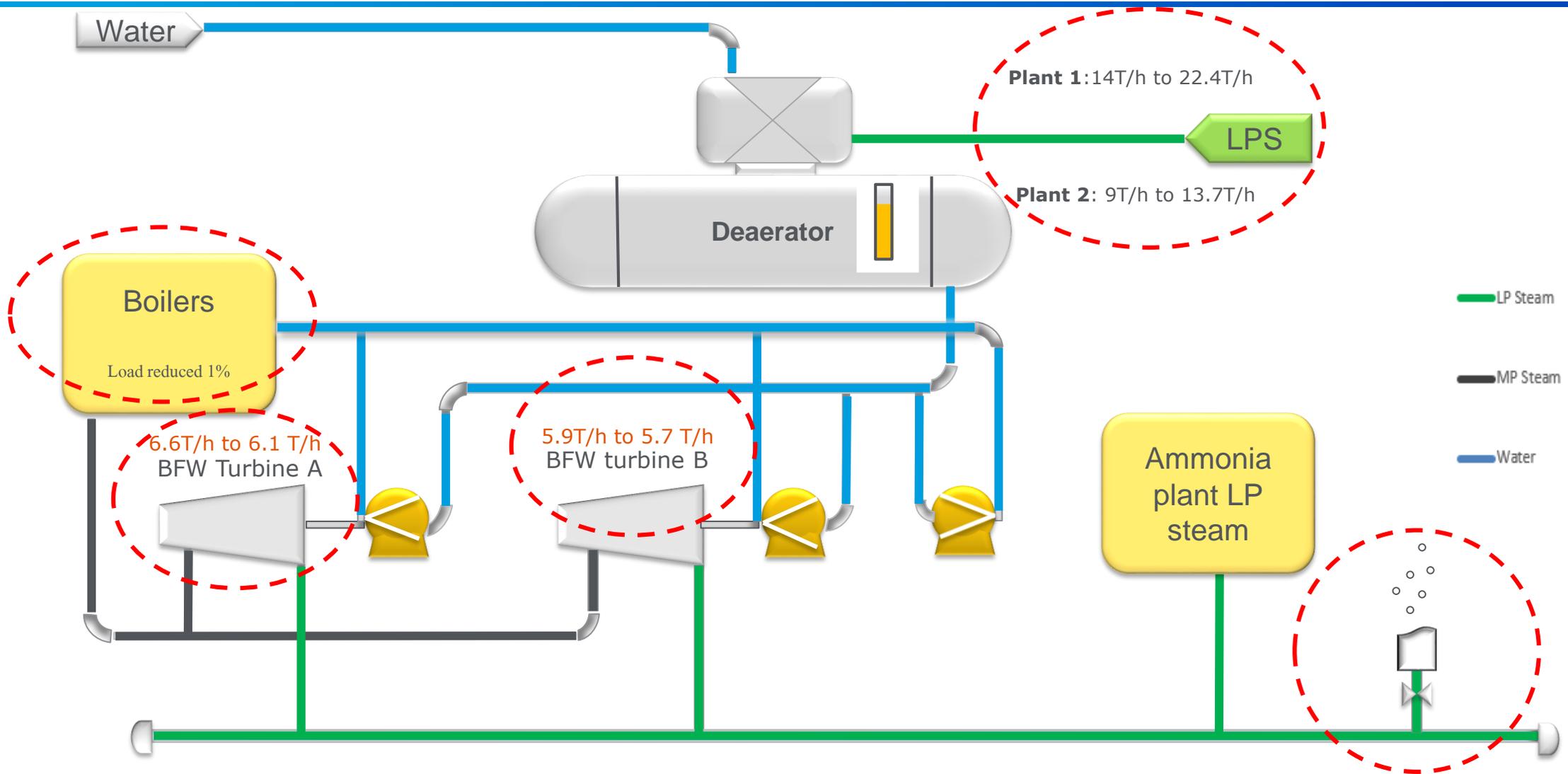
Generation
source

- Back pressure medium steam pressure turbines running on higher speed more than design.

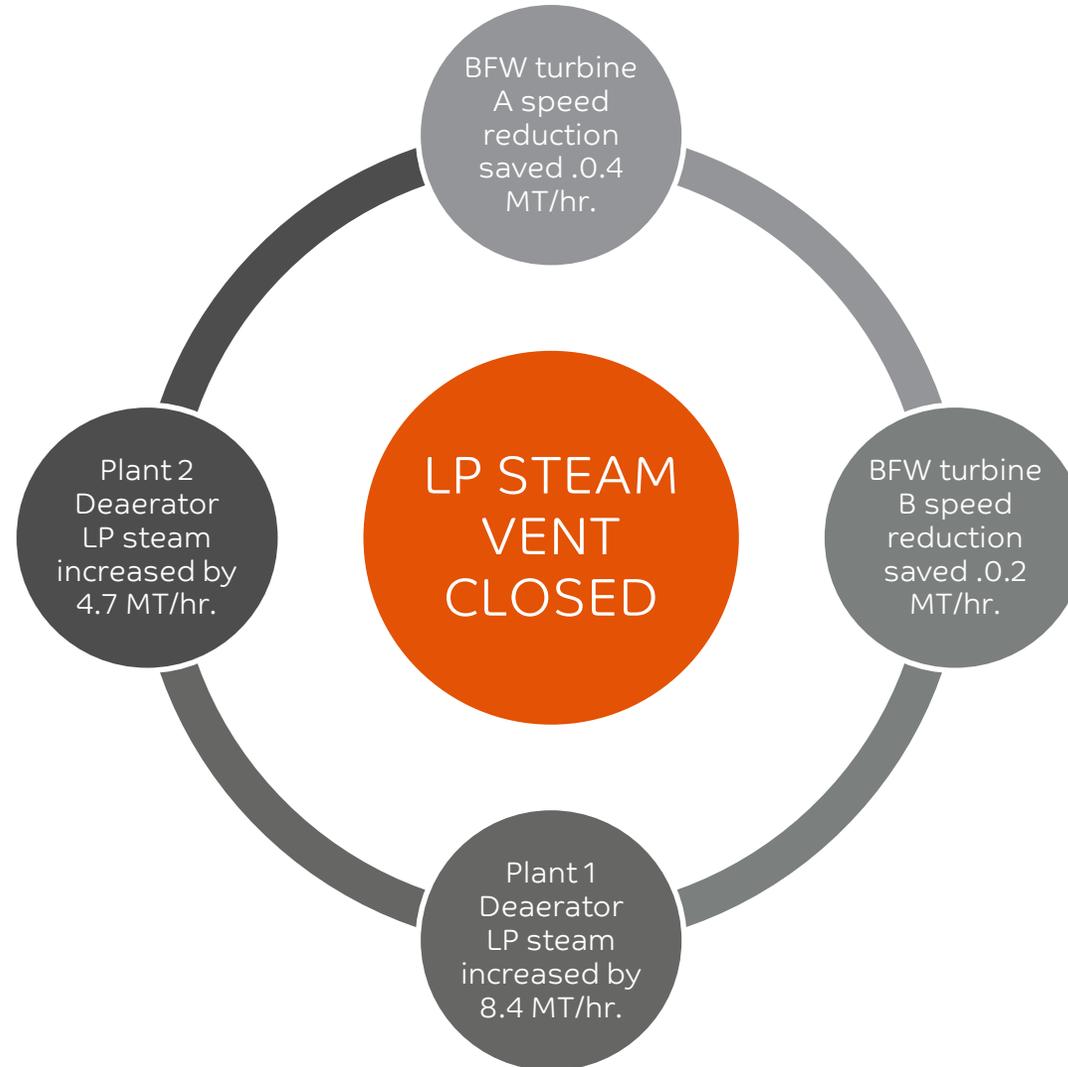
New opportunity

- More LP steam consumption in deaerators.

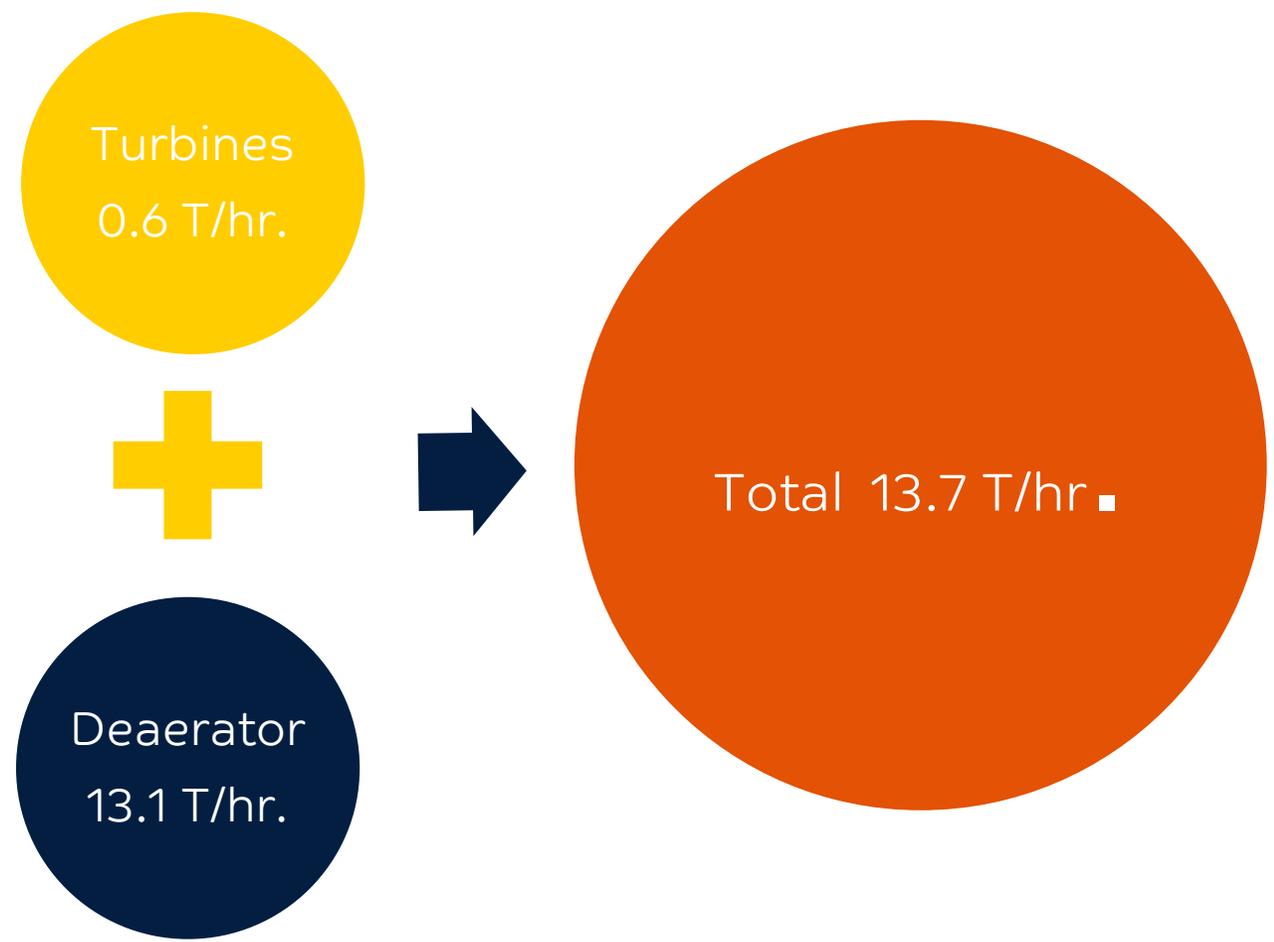
ACTIONS DONE TO CLOSE STEAM VENTING



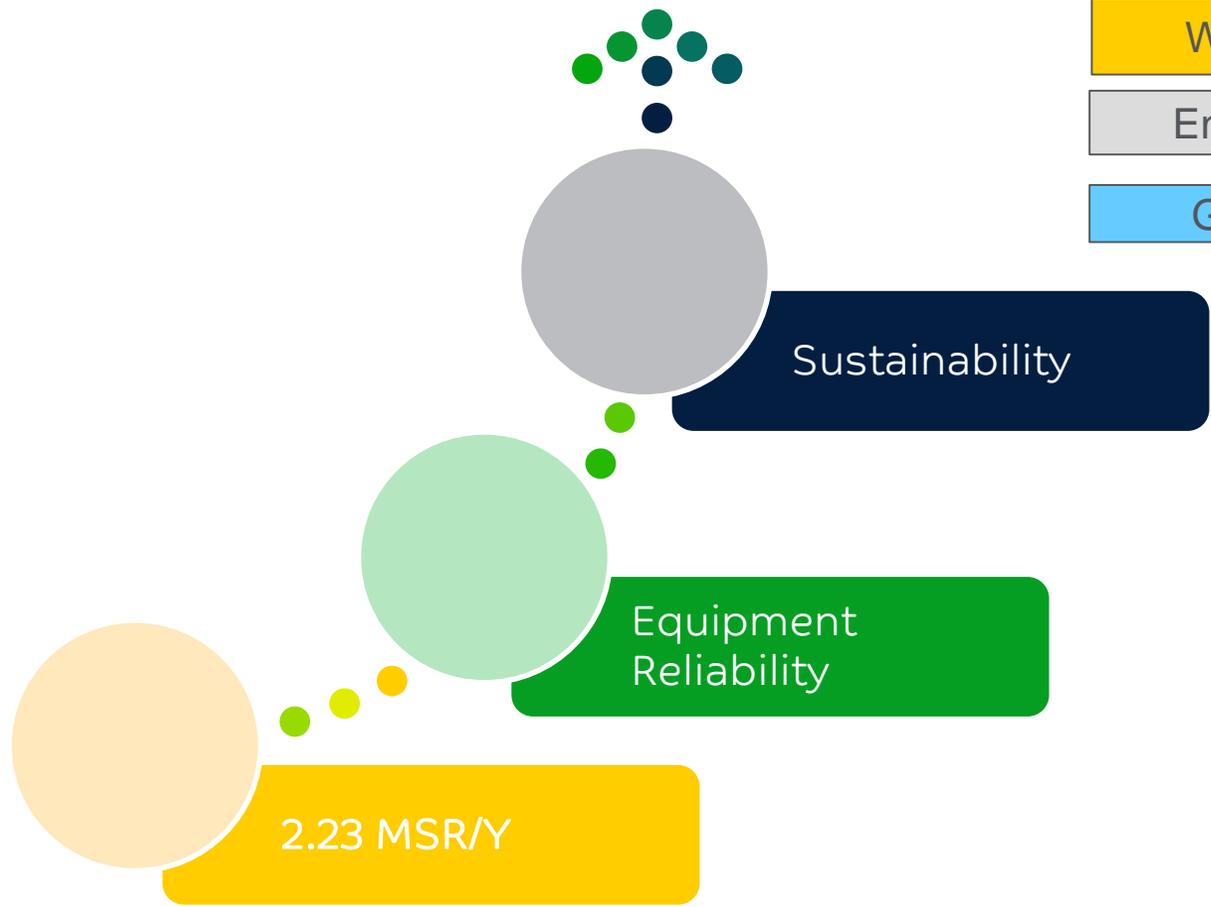
ACTIONS DONE



QUANTITY SAVED



ACHIEVEMENTS



Water	114,756 M3/Y
Energy	387,437 GJ/Y
GHG	21,624 MT/Y



THANK YOU





الإتحاد العربي للأسمدة
Arab Intl. Organization
هيئة عربية دولية
Arab Fertilizer Association
Since 1975



Safety excellence during turnarounds

Mohammed Alhashemi , SSHE Department, GPIC, Bahrain

Time for Excellence

Program by:



4-6/9/ 2018

Bahrain

Safety Excellence in Turnarounds the GPIC Way



Mohamed Al-Hashemi

CONTENT

• Introduction

- GPIC in brief
- Vision & Mission

• GPICs Journey to Safety Excellence

- Definition
- History, where it all started from
- GPIC & Safety
- How Safety becomes a Culture in GPIC

• Safety Excellence in Turnarounds

- How did we achieve it ?
- Case study



Introduction

GPIC in brief

- Established in December 1979
- A Joint-Venture
- Utilizes Natural Gas as raw material
- Produce: Ammonia , Methanol and Urea
- Started production in 1985



Introduction



GPIC Vision, Mission and Corporate Values

Vision

To be a world-class petrochemical and fertilizer company of choice, recognized for excellence

Mission

- To produce high quality petrochemical and fertilizer products
- To grow through successful partnerships and joint ventures
- To optimize the business in a safe, sustainable and cost effective manner
- To embrace knowledge, harness innovation and utilize best applicable technologies and practices
- To boost Stakeholders share value
- To train and develop the Human Capital to realize their full potential

Values

Excellence

Integrity

Respect

Transparency

Safety

Professionalism

Social Responsibility

Creativity

Team Work

GPIC journey with Safety Excellence

Safety ... What is Safety Culture ?

- Collection of the beliefs, perceptions and values that employees share in relation to risks with in an organization
- Safety Culture is part of an Organization Culture
- Commitment of Senior level management is a fundamental part of Safety Culture
- Commitment at all levels essential

Safety Culture – most popular definition

“The Product of individual & group VALUES, ATTITUDE, PERCEPTIONS, COMPETENCIES & PATTERN OF BEHAVIOUR that determine the commitment to & the style & proficiency of an organization Health & Safety Management”

U.K Health & Safety Commission



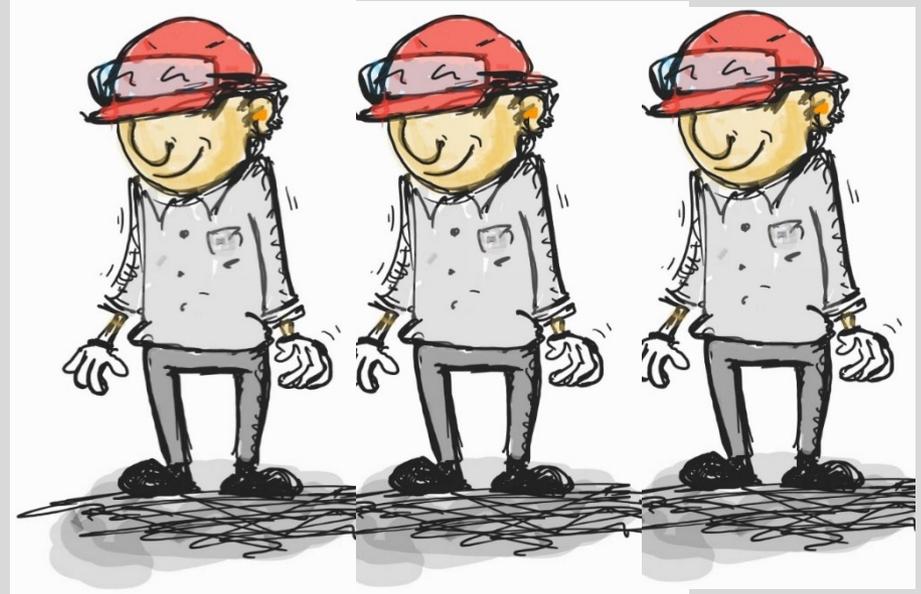
Safety Culture, from where it all started

History:

- In UK first safety act can be traced back to after the “Great fire of London” **1666**
- After that Factories Act **1833** / Mines Act **1843** / Quarries Act **1895**
- From **1900** the UK developed Safety Legislation to 1974 Safety At Work Act
- The USA started **1950s** and in **1968** first main legislation was signed
- Chernobyl Disaster.....

GPIC Safety Culture Journey . . .

- ❑ Safety & GPIC relationship
- ❑ How Safety Culture is been implemented in GPIC ?



GPIC Culture Journey to Safety Excellence

- ❑ GPIC we are committed in **SAFETY** in **ALL** our aspects and activities
- ❑ Safety had always been part of the **day to day** activities and ensuring **safety culture** within the organization is one of the main goals we seek to achieve and maintain.
- ❑ Creating a **SAFETY CULTURE** requires continual communication and commitment from every level of the organization.
- ❑ Sustaining and improving the **SAFETY CULTURE** within GPIC had always been one of the prime objectives

How Safety became a Culture in GPIC ?

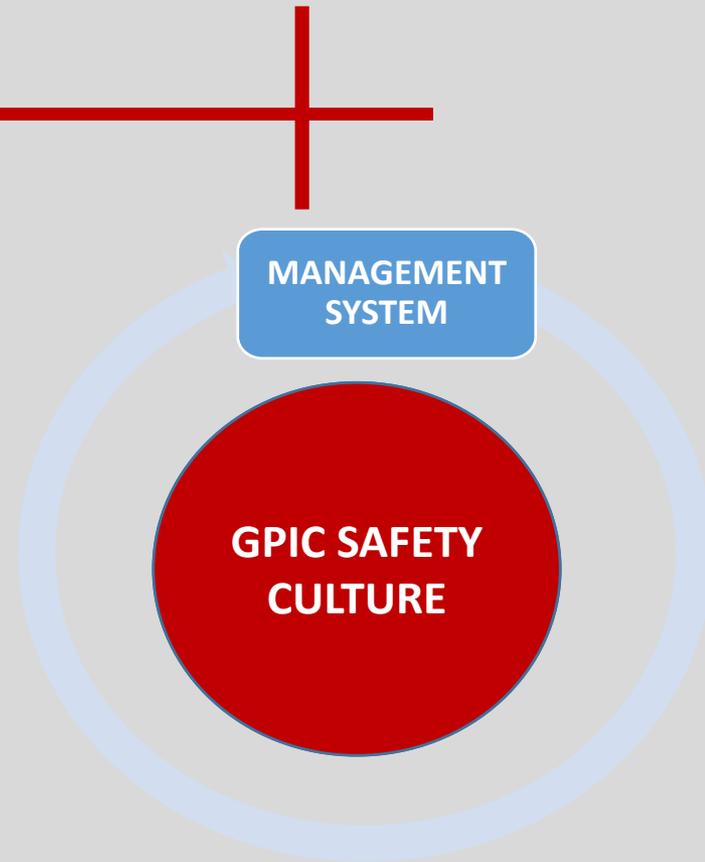


MANAGEMENT SYSTEMS . . .

- Top Management Commitment
 - SHE Policy

- Quality Documents
 - GL, SI's, SOP's

- MANAGEMENT SYSTEM
 - ISO 9001 – Quality Management System
 - OHSAS 18001 – Occupational Health & Safety Management System
 - ISO 27001 – Information Security Management System
 - ISO 14001 - Environment Management System
 - ISO 22301 – Societal Security Business Continuity Management System
 - ISO 31000 – Risk Management
 - RC 14001 – Responsible Care
 - PAS 99 – Integrated Management System



EMPLOYEE INVOLVEMENT. . .

SAFETY MEETINGS

COMITTEES

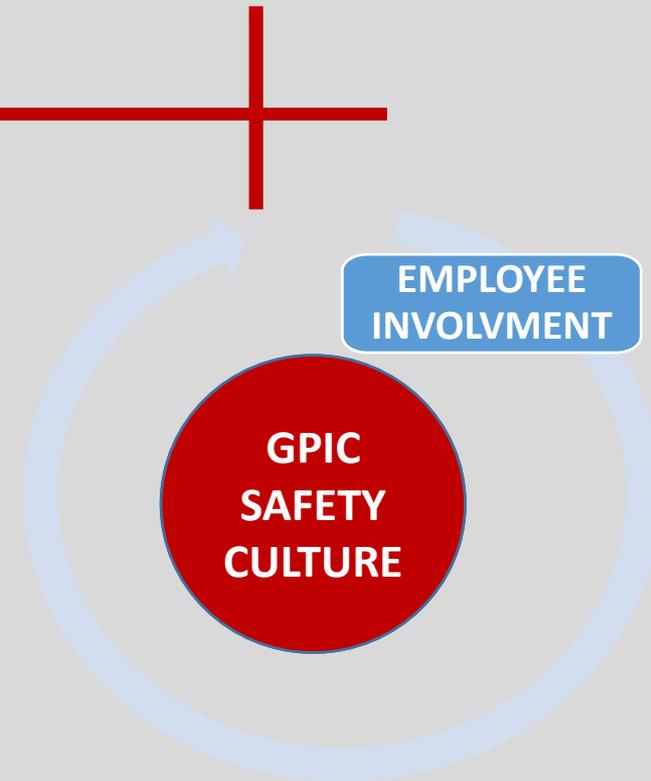
HAZOP SESSIONS

RISK ASSESSMENTS

RBI

ROOT CAUSE ANALYSES

PSM



COMPTENCE OF EMPLOYEE & CONTRACTOR. .

SAFETY INDUCTION

FAMILIRIZATION SESSIONS

SHE WEEK

PTW SYSTEM

COMPREHENSIVE ASSESSMENT THROUGH
WRITTEN EXAM

GPIC
SAFETY
CULTURE

EMPLOYEE &
CONTRACTOR
COMPETENCE

COMMUNICATIONS . . .

LOGBOOKS

SHIFT TALKS

DAILY MORNING REPORTS

MONTHLY REPORTS

SAFETY SURVEYS / INSPECTION REPORTS

MUTUAL AID

ONE STEP AHEAD CONCEPT

GPIC
SAFETY
CULTURE

EFFECTIVE
COMMUNICATION



استضافت شركة البها الاجتماع الاعتيادي السنوي للجنة الطوارئ المشتركة بين الشركات الصناعية الكبرى في البحرين وذلك من أجل متابعة الاستجابة الموحدة لحالات الطوارئ والحفاظ على مستوى التأمين بينها في مجال السلامة من الحريق. وافقت اللجنة على تعزيز التنسيق بين الشركات الكبرى وجهات الاستجابة لحالات الطوارئ في البحرين وذلك من خلال التعاون المباشر والفعال.

ترأس الاجتماع مدير أوى الصحة والسلامة والبيئة بشركة البها. عبدالله يعقوب ستان، وبحضره كل من مراقب الحريق في البها، محمد خليل سعيد، ومدير الحريق والسلامة بشركة بانكو، أحمد خليل، ومراقب الحريق بشركة جيبيك، ديفيد هيرلي، ومشراف الحريق بشركة جيبيك، عمر قرشي، ومراقب الحريق بشركة بانغاز، عماد محمد.

Alba hosted the quarterly regular meeting of Bahrain Major Industries Mutual Aid committee in order to follow up on integrated emergency response as well as maintain active interaction in the field of fire safety.

The committee agreed upon enhancing coordination between major companies and Bahrain's Emergency Response Authorities through direct and effective liaison and coordination.

The meeting was chaired by Alba Senior Manager HSE, Abdulla Yaqoob Stanan, and attended by Alba Fire Superintendent Mohd Khalil Saeed, BAPCO Fire & Safety Manager Ahmed Khalil, GPIC SHE Manager Jassim Darwish, GPIC Fire Superintendent David Fairly, GPIC Fire Supervisor Omar Qureshi and BANAGAS HSE Superintendent Enad Mohd.

البها تستضيف اجتماع لجنة الطوارئ المشتركة للشركات الصناعية الكبرى
ALBA HOSTS QUARTERLY MEETING ON FIRE SAFETY AND EMERGENCY RESPONSE

MONITORING SYSTEMS . . .

LOST TIME ACCIDENT (LTA)

INCIDENT / ACCIDENT REPORTING (GIMS)

NEAR MISS REPORTING

BBS AUDITS

PTW AUDITS

SHE INSPECTIONS (Formal and Adhoc)

SSHE Department

All Superintendents



TRAINING...

Auxiliary Firemen Training



2015 } Total of
2016 } 577
2017 } Participants
in 3 years

Emergency Mock Drills



2015 —→ 10/10
2016 —→ 12/14
2017 —→ 12/13

MERT Training



2015 } Total of
2016 } 389
2017 } Participants
in 3 years

Certified First Aiders

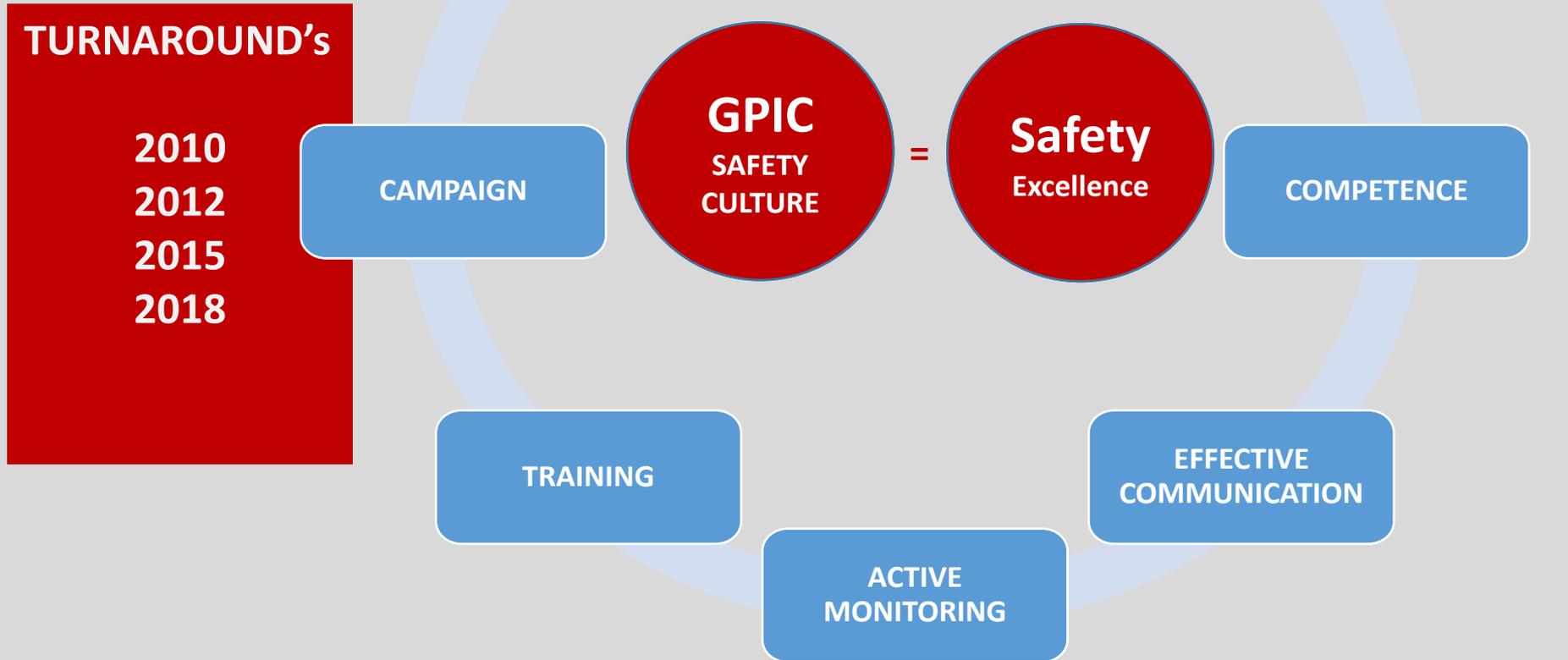


438 Total
in 6 years

TRAINING

GPIC
SAFETY
CULTURE

SAFETY EXCELLENCE DURING TURNAROUND's . . .



SAFETY EXCELLENCE DURING TURNAROUND's . . .

- ❑ Biggest achievements in the past years was to complete the maintenance Turnaround successfully in a Safe, Secure and Environmentally Friendly manner.
- ❑ With daily average man-power of ~ **4000** regional and international contractors / vendors along with GPIC
- ❑ Average of **3.6 million safe man-hours** were achieved during the period (TA 2010, 2012 & 2015)

SAFETY EXCELLENCE DURING TURNAROUND's . . .

- Zero Harm
- Zero Security Breaches
- Zero Environmental Incidents
- **Improving Safe Behaviour**
- Increase Auditing of all aspects regarding SHE
- **Enhancing our Communication and support effectively** with all Departments and Contractors

How did we achieve it ?



SAFETY EXCELLENCE DURING TURNAROUND's . . .

How did we achieve it ?

TURNAROUND



DAILY CONTRACTORS SAFETY MEETING
06:30 Hrs.

MANAGEMENT MEETING
10:00 Hrs.

OPERATION MEETING
13:00 Hrs.

MAINTENANCE MEETING
15:00 Hrs.

- Daily safety meeting with the Contractor Safety representatives provided an excellent medium to pass on information and exchange ideas.

- Daily Safety Newsletter

TURNAROUNDS

2010

2012

2015

2018

SAFETY EXCELLENCE DURING TURNAROUND'S . . .

How did we achieve it ?

Daily News letters

SAFETY MATTERS TURNAROUND 2018

EVERY DECISION I MAKE AFFECTS ME, MY TEAMMATES AND MY FAMILY

كل قرار أتخذه يؤثر عليّ، زميلاتي وزميلي، وأهلي

Dr. Jawahery initiate the start of TA 2018 "Urea Plant Shutdown"

ISSUE 1 - 1st APRIL

It gives me great pleasure to welcome you to GPIC Complex and pleased to see that during the time lead Employees and Contractors continue to work as "One Team". Special note for our contractors, we at professional and all your hard work. We are expecting over 4000 people to partake in this Turnaround making it one of largest for manpower i breaker by the number of jobs being carried out. As always, our aim is to carry out all the work safely & achieved. For each one of you, your safety and good health is paramount to us. We all must work together that may cause harm. Therefore, it is vital to identify hazards, inform people of the hazards and reduce the risk. All of us need to be PROACTIVE; I encourage reporting "Near Miss Incidents" as we learn from these it is Our environment is a prime priority and we ask everyone to do his or her bit to make a difference and safe recycle responsibly and correctly.

Remember, "Every decision you make, affects You, your Teammates and your People ensure to drink enough water and take sufficient rest in shade, this coming month expected to be God bless you all

Dr. Abdurrahman Jawahery - President

Turnaround 2018 Campaigns

HIGH FIVE

WEAR SAFETY GLASSES

PROTECT YOUR HANDS

PROTECT YOUR EYES

SAFETY MATTERS TURNAROUND 2018

EVERY DECISION I MAKE AFFECTS ME, MY TEAMMATES AND MY FAMILY

كل قرار أتخذه يؤثر عليّ، زميلاتي وزميلي، وأهلي

TOOLBOX TALKS LESSONS LEARNT— MAKING OTHERS AWARE OF CONCERNS, TEACHING BEST PRACTISE SHARING KNOWLEDGE.

ISSUE 14 - 14th April



by Team. From the 6:30 meeting they its reaching an audience of 7345 peo vered in these sessions.

SAFETY MATTERS TURNAROUND 2018

EVERY DECISION I MAKE AFFECTS ME, MY TEAMMATES AND MY FAMILY

كل قرار أتخذه يؤثر عليّ، زميلاتي وزميلي، وأهلي

CAUTION!!! - NATURAL GAS INTRODUCED PROCESS PLANTS

WARNING SIGNS OF A GAS LEAK

DANGER NATURAL GAS PRESENT

PROTECT YOUR HEALTH - WEAR YOUR MASK CORRECTLY

Protect Your Hearing

GOOD FIT: The plug is hardly visible. This will protect your hearing

POOR FIT: the more plug you see the less effective it is to protect your hearing

Towards a GREEN Turnaround 2018

Noise Pollution

With the plants in start - up phase the noise levels may increase hence please use ear plugs or ear muffs

There is always a risk of a sudden loud noise, especially during start up activities, which can cause instant permanent damage.

Earplugs	Work Activity Noise Level	Time Allowed (dB)	Time Allowed (dB)
0.1	Plant noises	8 hours	Indefinite
0.2	Small power tools	4 hours	84 hours
0.3	Welding & hydroblasting	1 hour	8 hours

Controls Required

For your protection, always use ear protection correctly. Earplugs are made to be convenient and comfortable for long-term wear in hot and humid weather.

DAY	Accidents				Near Miss				TOTAL NUMBER INCIDENTS SINCE DAY ONE
	Injury	Damage	Fire	Smoker	Near Miss	Violation	PTM		
DATE	None	None	None	None	None	None	None	0	
TOTAL	0	0	0	0	0	0	0	0	

SAFETY EXCELLENCE DURING TURNAROUND's . . .

How did we achieve it ?

SAFETY TRAINING

IMIST International Minimum Industry Safety Training

- This certified learning training tool is being used at GPIC to enhance the safety knowledge and capacity building of contractors.
- The certification is based on the OPITO (Offshore Petroleum Industry Training Organization) guideline, U.K.
- To-date **more than 200** number of contractors have been certified which includes all levels such as, safety officers, site engineers, site supervisors / foremen and different crafts to ensure that safety is well understood and implemented at all times.



SAFETY EXCELLENCE DURING TURNAROUND's . . .

How did we achieve it ?

SAFETY INDUCTION

- SHE INDUCTION COURSES FOR ~ 4000 CONTRACTOR WORKER - CONDUCTED
- IN-HOUSE OR AT CONTRACTORS FACILITIES
- SHE INDUCTION PROGRAMM WAS DELIVERED BY FIRE & SAFETY TEAM
- ASSESSMENT OF THE INDUCTION WAS CONDUCTED
- ASESED AND UPLOADED IN THE DATABASE FOR FUTURE REFERENCE AND RECORD.



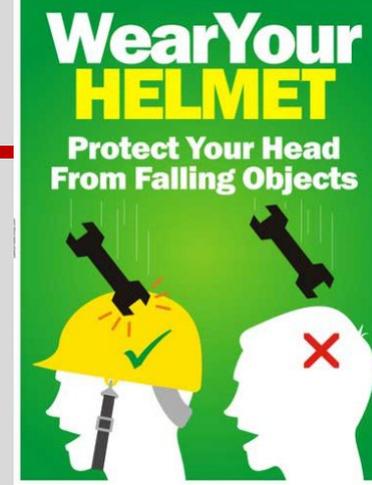
SAFETY EXCELLENCE DURING TURNAROUND's . . .

How did we achieve it ?

CAMPAIGNS

2018 Turnaround campaigns focused on

- Wearing Safety Glasses
- Hand Safety (wearing the correct gloves)
- Falling Objects
- Housekeeping
- Haste
- Parking
- Open floor protection
- A green and safe turnaround



SAFETY EXCELLENCE DURING TURNAROUND's . . .

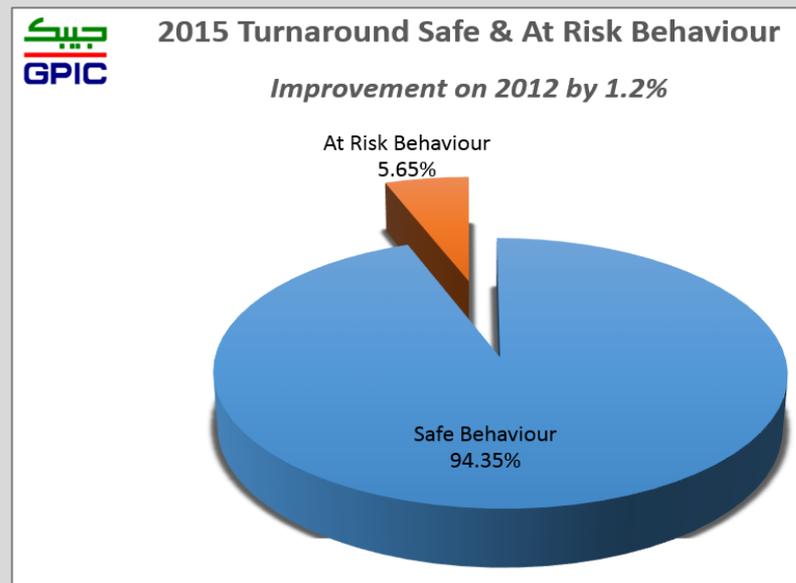
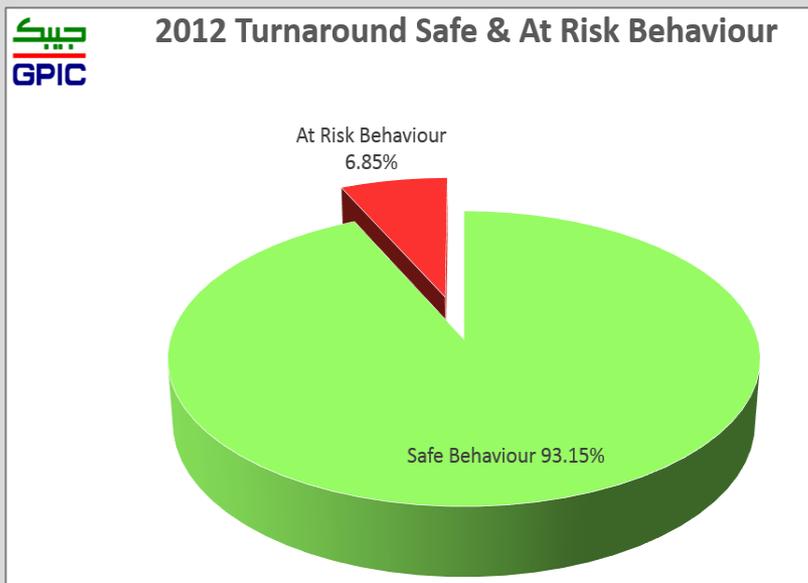
How did we achieve it ?

BBS audits

- T/A Behaviour Based Safety (BBS) program proved again to be highly successful.
- Data collected via the help of Safety Representatives and GPIC safety personnel.
- Identifies both positive and negative trends.
- Where negative trends were identified, these were brought to the attention of the safety reps in the morning meeting.
- The negative trend was discussed and a prepared Toolbox talk was given to each safety rep to aid the carrying out of the talk.

SAFETY EXCELLENCE DURING TURNAROUND's . . .

How did we achieve it ?

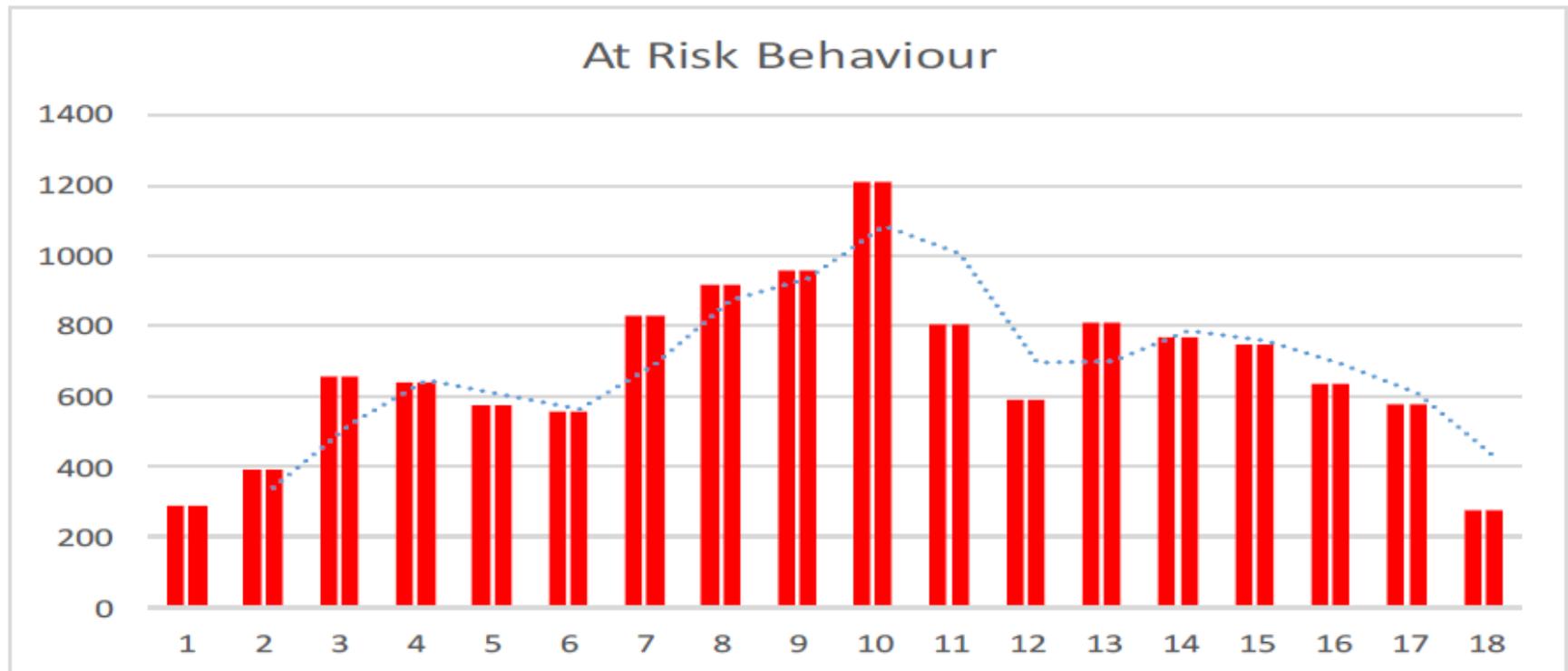


Year	Total Observations	Safe Behaviour	At Risk Behaviour	Highest Number of Workers /day
2007	29,204	25,218 (86.6%)	3986 (13.4%)	2439
2010	170,313	148,393 (87.13%)	21,920 (12.87%)	2722
2012	118566	111,629 (93.15%)	6,937(6.85%)	3698
2015	159,779	150,751 (94.35%)	9,025.5 (5.65%)	4080

SAFETY EXCELLENCE DURING TURNAROUND's . . .

How did we achieve it ?

BEHAVIOUR BASED SAFETY

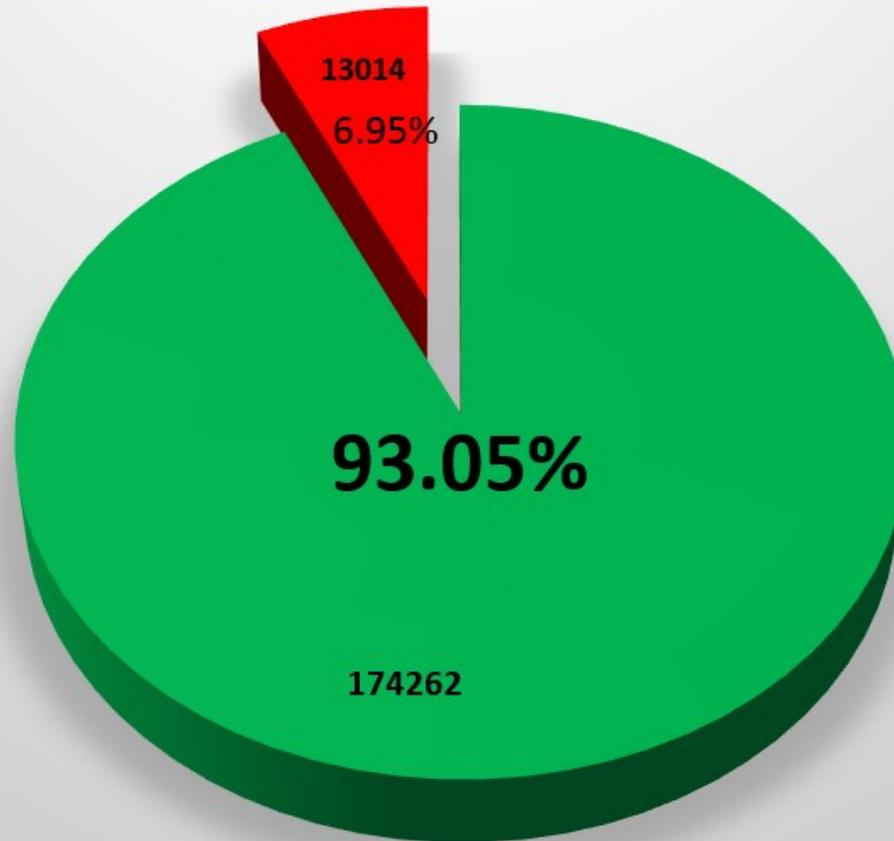


BBS results show that the work carried out by the safety team made a difference. As people arrived the at risk behavior rises. After 10th day the trend is downward and continues to go down.

SAFETY EXCELLENCE DURING TURNAROUND's . . .

How did we achieve it ?

T/A 2018

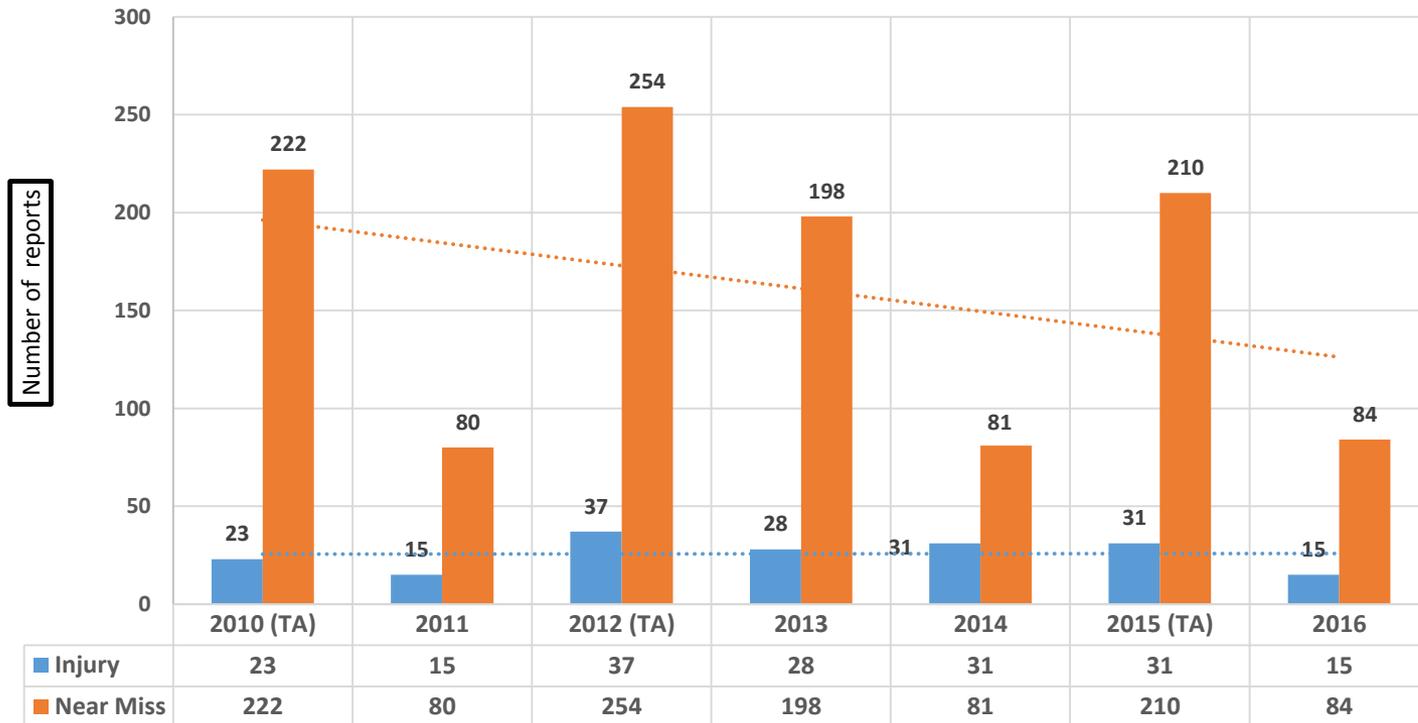


"Every Decision I Make.....Affects Me, My Teammates & My Family"

SAFETY EXCELLENCE DURING TURNAROUND'S . . .

How did we achieve it ?

Near Miss Vs Injuries

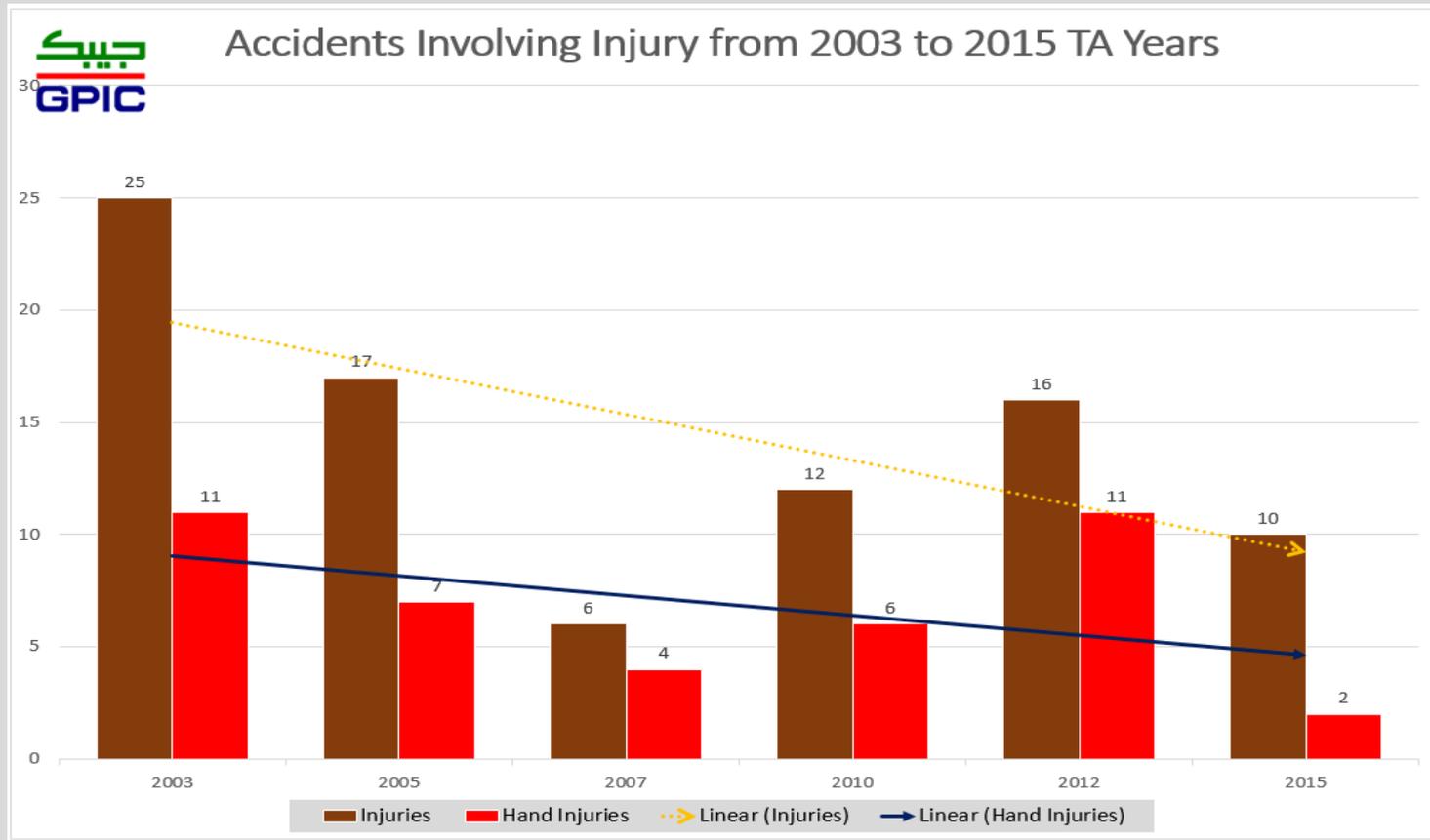


Zero Harm

Proactive safety measures such as reporting of "Near misses" are used to achieve the company's objectives of Zero Harm.

SAFETY EXCELLENCE DURING TURNAROUND's . . .

How did we achieve it ?



A significant success in reducing hand injuries

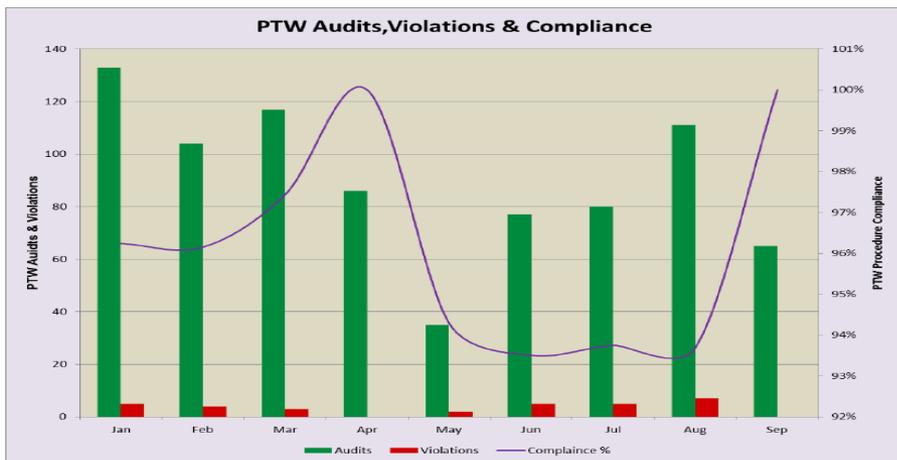
There is a downward trend on injuries as a whole and a big reduction on hand injuries. *Hand injuries have always been identified and trended as the highest type of injury sustained during TA.*

SAFETY EXCELLENCE DURING TURNAROUND'S . . .

PTW AUDITS

- PTW audits – are conducted on daily basis
- During TA – a dedicated Audit team is established
- PTW violation report – conducted quarterly

Analysis of PTW Violation Incidents



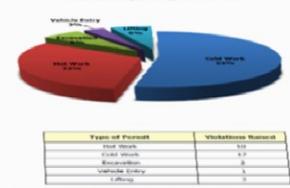
- ❖ More PTW audits have been instrumental to find more PTW violations.
- ❖ The compliance percentage to PTW procedure varies from 93.5% to 100% for the period from January to



PTW Violation Incidents

Analysis of PTW Violation Incidents

Violations against Type of Permits



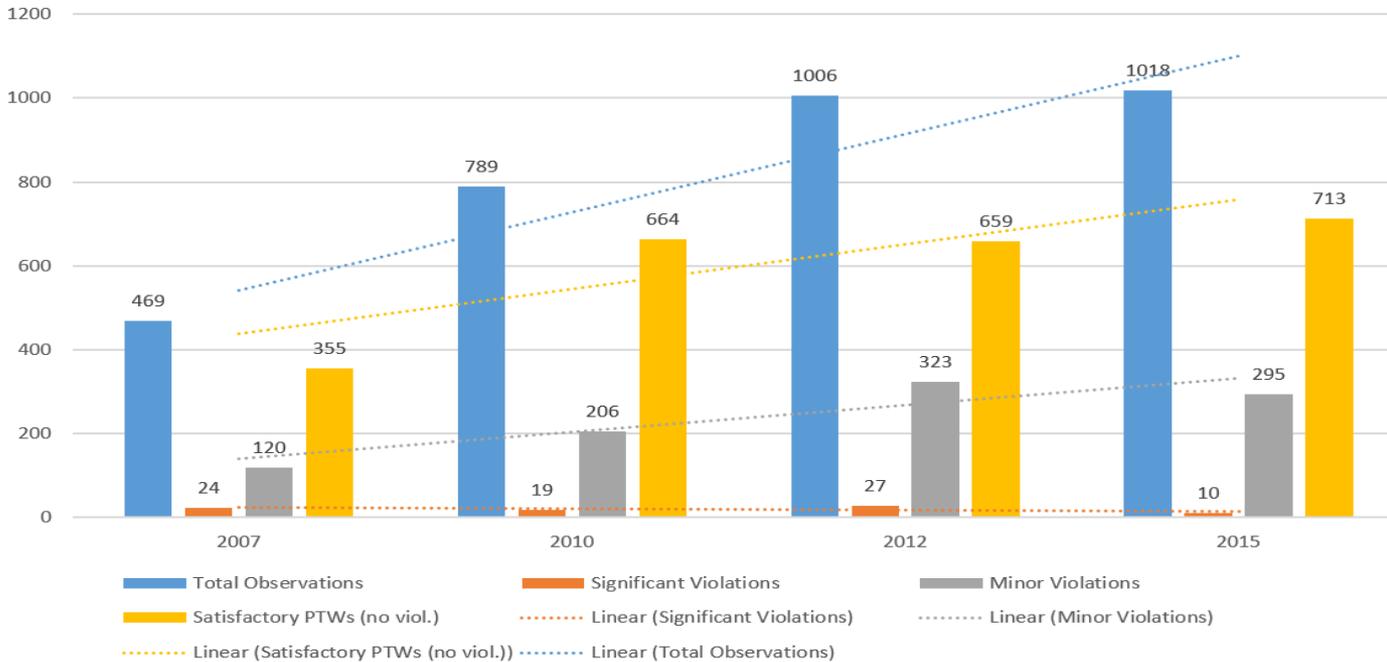
- Most PTW violations (17) were raised against the Cold Work Permits.
- Total 38 PTW violations were raised against Hot Work Permits where the data associated with the job is high.

SAFETY EXCELLENCE DURING TURNAROUND'S . . .

How did we achieve it ?

Permit To Work Audits

Turnaround PTW Audit Findings

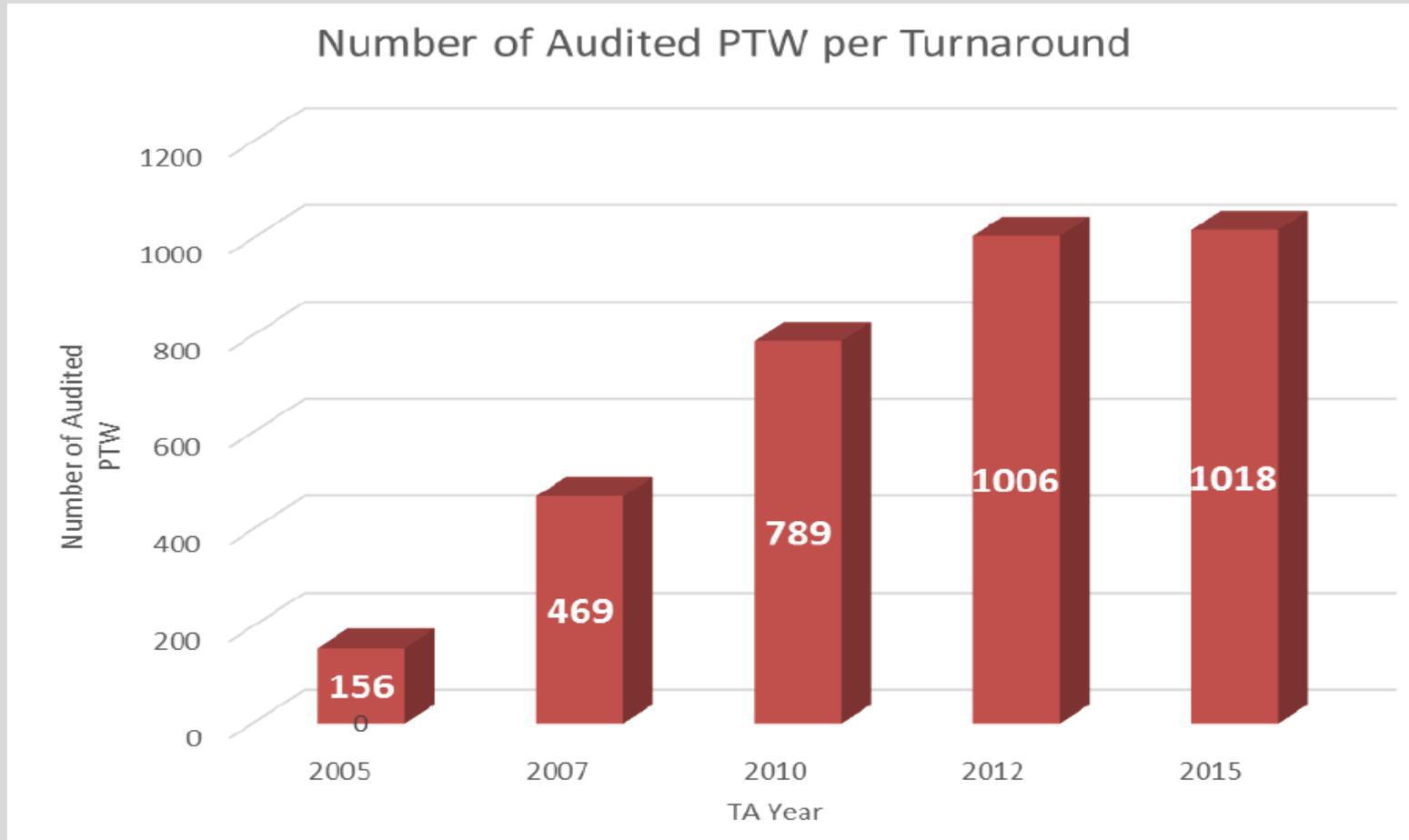


Year	Total Observations	Significant Violations	Minor Violations	Satisfactory PTWs (no viol.)
2007	469	24	120	355
2010	789	19	206	664
2012	1006	27	323	659
2015	1018	10	295	713

SAFETY EXCELLENCE DURING TURNAROUND'S . . .

How did we achieve it ?

Permit to Work audits



SAFETY EXCELLENCE DURING TURNAROUND'S . . .

How did we achieve it ?

Increase Number of Safety Personnel

Additional auditors and safety personnel were employed to supervise and collect data which resulted in a successfully supervised TA. All the data collected is highly useful and will assist in planning for the next turnaround

Year	Safety Specialist s	Contractor Safety Representativ es	Total Observer s
2007	11	51	62
2010	15	59	74
2012	16	33	49
2015	18	63	81



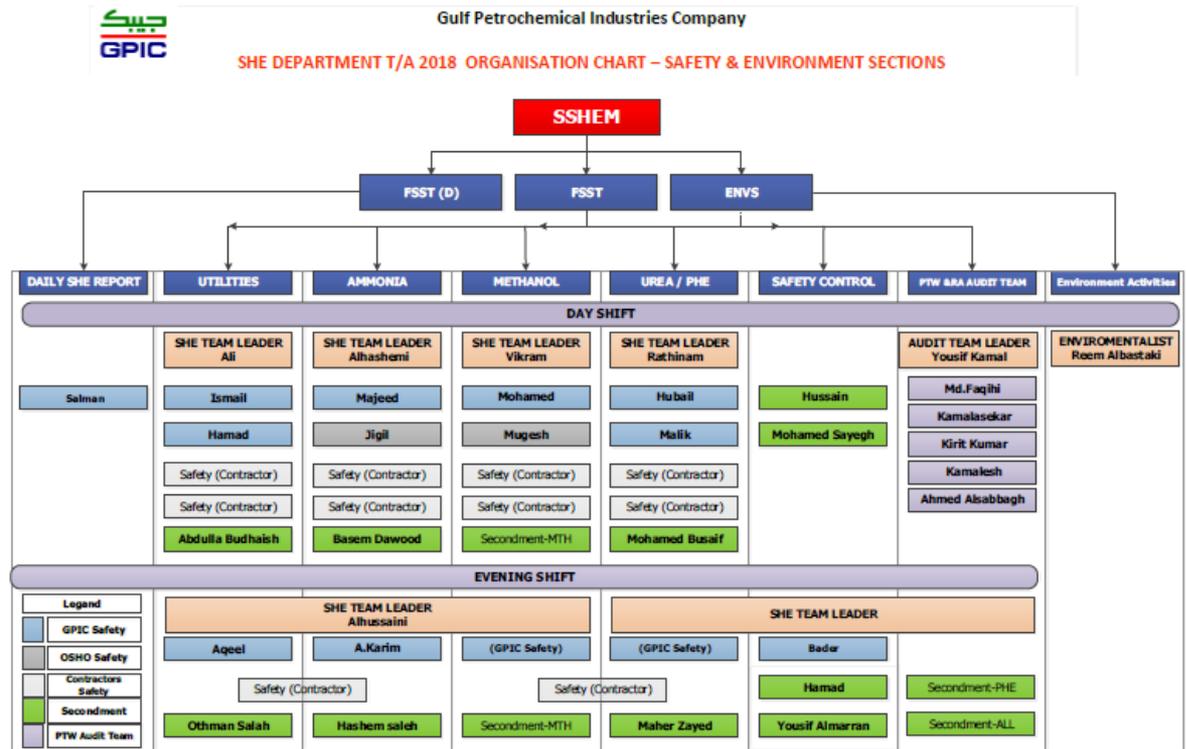
SAFETY EXCELLENCE DURING TURNAROUND's . . .

How did we achieve it ?

Increase Number of Safety Personnel

A dedicated Safety team allocated for each Plant to coordinate all SHE related activities

- Ammonia plant
- Methanol Plant
- Utilities plant
- Urea + PHE

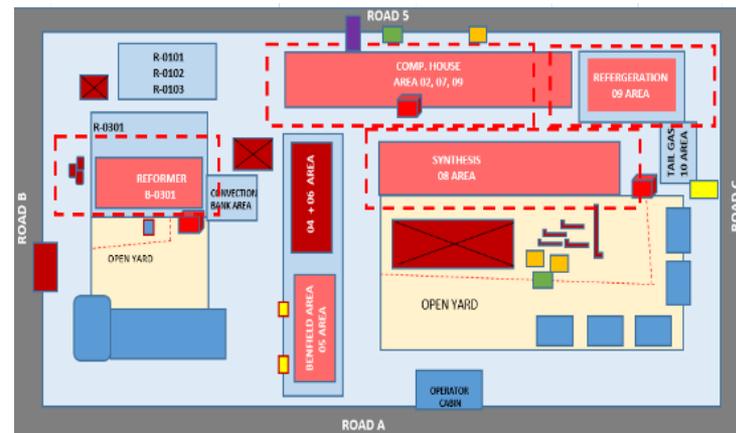
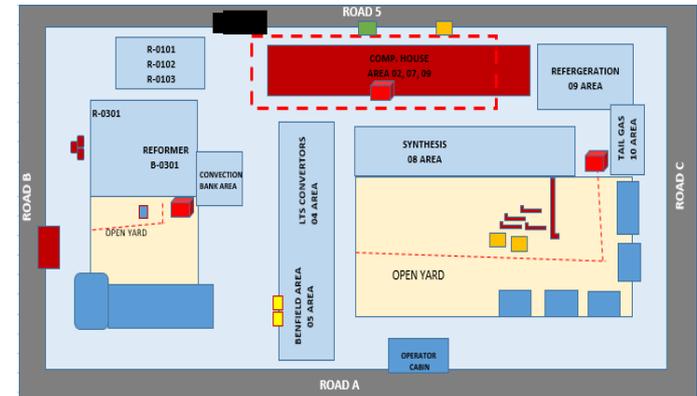
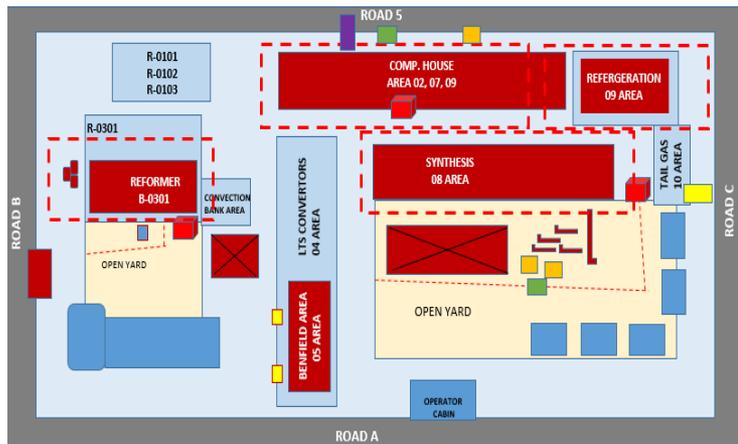


SAFETY EXCELLENCE DURING TURNAROUND'S . . .

How did we achieve it ?

48 hrs. look ahead schedule

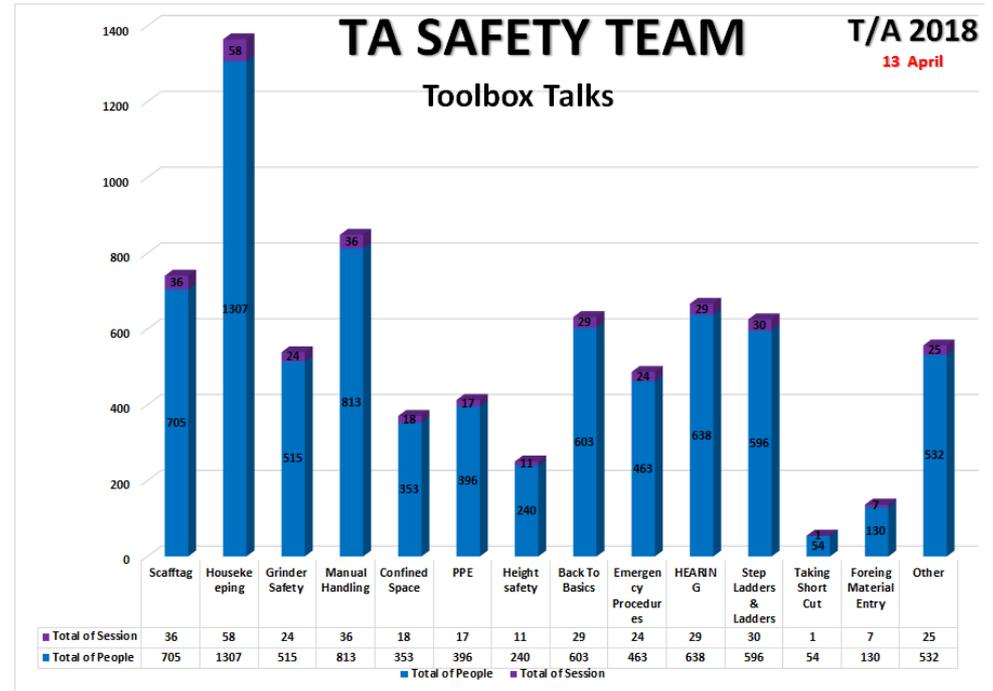
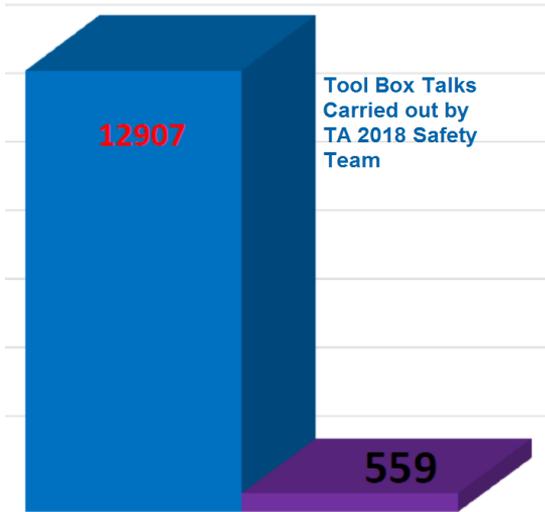
- Hot zoning – mapping / plotting – prepared and issued on daily basis (based on high risk work activity)



SAFETY EXCELLENCE DURING TURNAROUND'S . . .

How did we achieve it ?

Daily Statistics reports



DAY	ACCIDENTS				NEAR MISS		TOTAL NUMBER INCIDENTS SINCE DAY ONE
	Injury	Loss/ Damage	Fire	Environ	Near Miss	PTW Violation	
16	Y/day 1	Y/day 1	Y/day 0	Y/day 0	Y/day 0	Y/day 1	32
DATE 16/04/2018	Run Total 9	Run Total 7	Run Total 0	Run Total 0	Run Total 5	Run Total 11	

SAFETY EXCELLENCE DURING TURNAROUND'S . . .

How did we achieve it ?

Welfare facilities for contractors



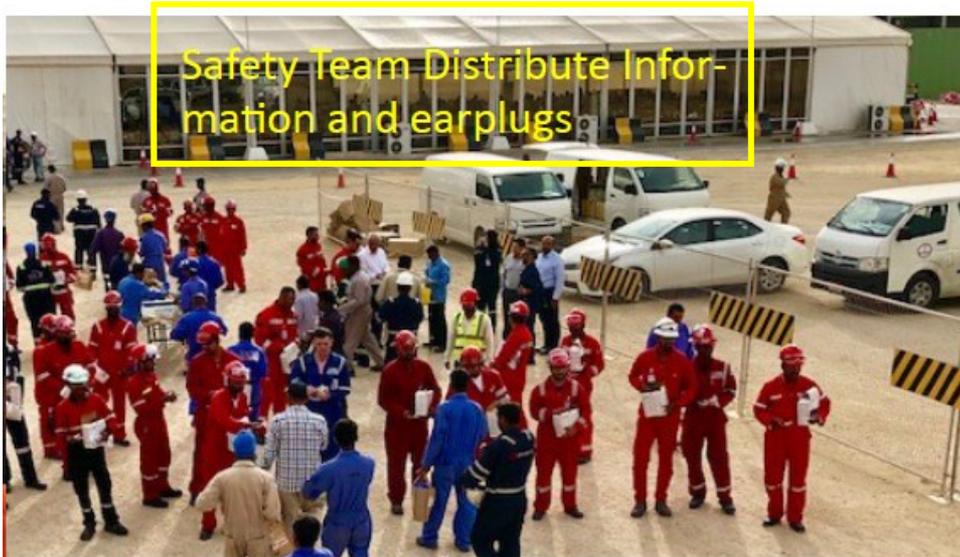
***“CONTRACTORS WELFARE
EXTREMELY ESSENTIAL FOR SAFE
TURNAROUND”***



SAFETY EXCELLENCE DURING TURNAROUND's . . .

How did we achieve it ?

Welfare facilities for contractors



SAFETY EXCELLENCE DURING TURNAROUND's . . .



CASE STUDY – AMMONIA PLANT TURNAROUND 2018

SAFETY EXCELLENCE DURING TURNAROUND's . . .

CASE STUDY – AMMONIA PLANT TURNAROUND 2018

Pre-Turnaround preparations activities

REVIEW OF:

- Rescue plans
 - Risk assessments
 - Major job method statements
-
- Site meeting conducted with the concern area leader and discussed the activities in-detail

 - Reviewing of the rescue plan done by implementing practical and safe approach in how the actual activity will be conducted



SAFETY EXCELLENCE DURING TURNAROUND's . . .

CASE STUDY – AMMONIA PLANT TURNAROUND 2018

- Meeting with Operation & Maintenance – Area leader
- Safety standby provided @ site
- Checking and inspecting of safety equipment located @ ammonia plant
- Inspection of contractor – rescue equipment
- Arrangement of safety signs and road cones – necessary – Withdraw of safety material from warehouse –
- Safety trolley + safety basket – preparation
- Storm channel – sand filling and compacting – done for ease of access

Pre-Turnaround preparations activities:



SAFETY EXCELLENCE DURING TURNAROUND's. . .

CASE STUDY – AMMONIA PLANT TURNAROUND 2018

Total Gas test + confine space entry authorization conducted during **TA 2018**
Ammonia Plant

- Total of **600** Confine Space entry authorization (+/- 5)
- Total of **800** Hot PTW (+/- 5)
- **Total 10** Radiation PTW (+/- 2)

Assistance provided during Start-up activities

- Leak checks conducted several location as per operation requests
- During backend loop pressurizing – leak check + fire & Safety standby provided

Turnaround activities



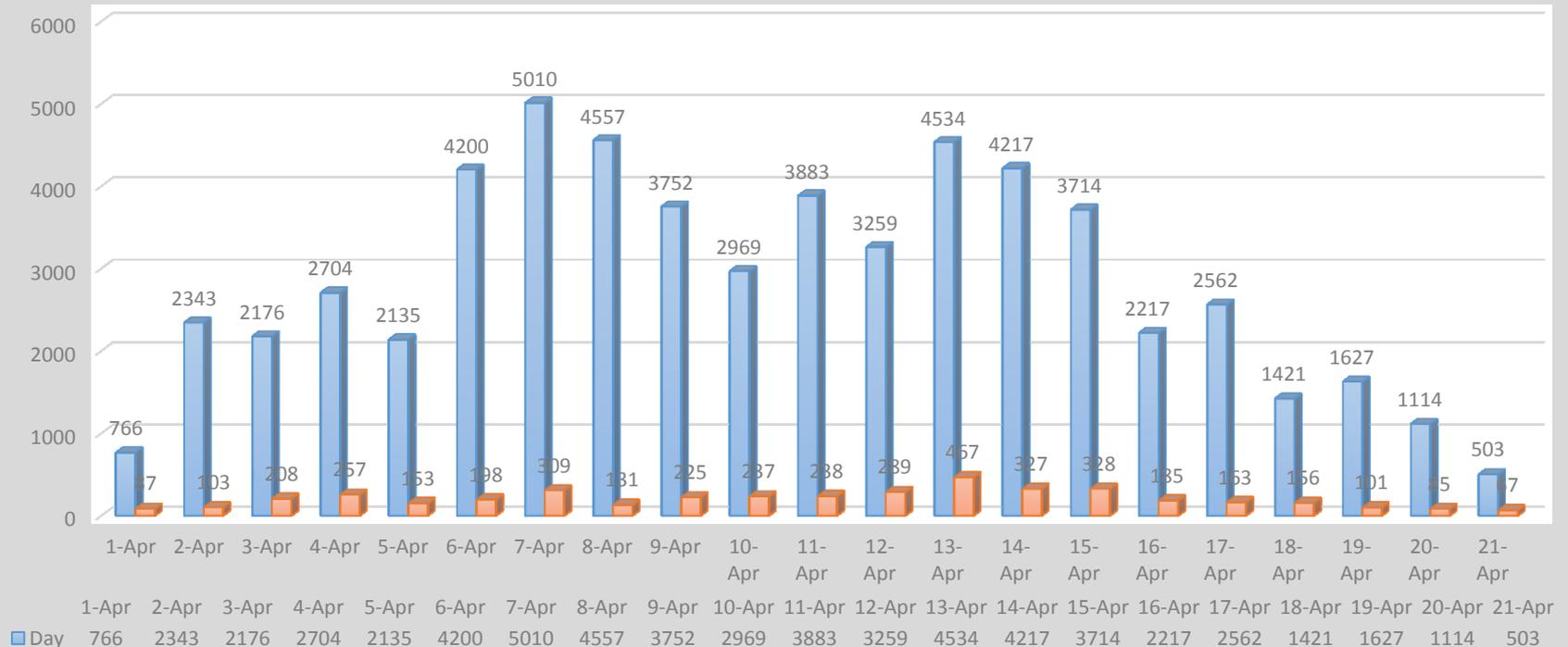
SAFETY EXCELLENCE DURING TURNAROUND's . . .

CASE STUDY – AMMONIA PLANT TURNAROUND 2018

- An increase overall rate of **safe behavior** when compared to overall **risk behavior** can be observed
- The risk behavior is present, yet been controlled and when compared to the total number of activities in the plant, the safe practices is more dominant, continuous monitoring and control been implemented accordingly throughout the TA.



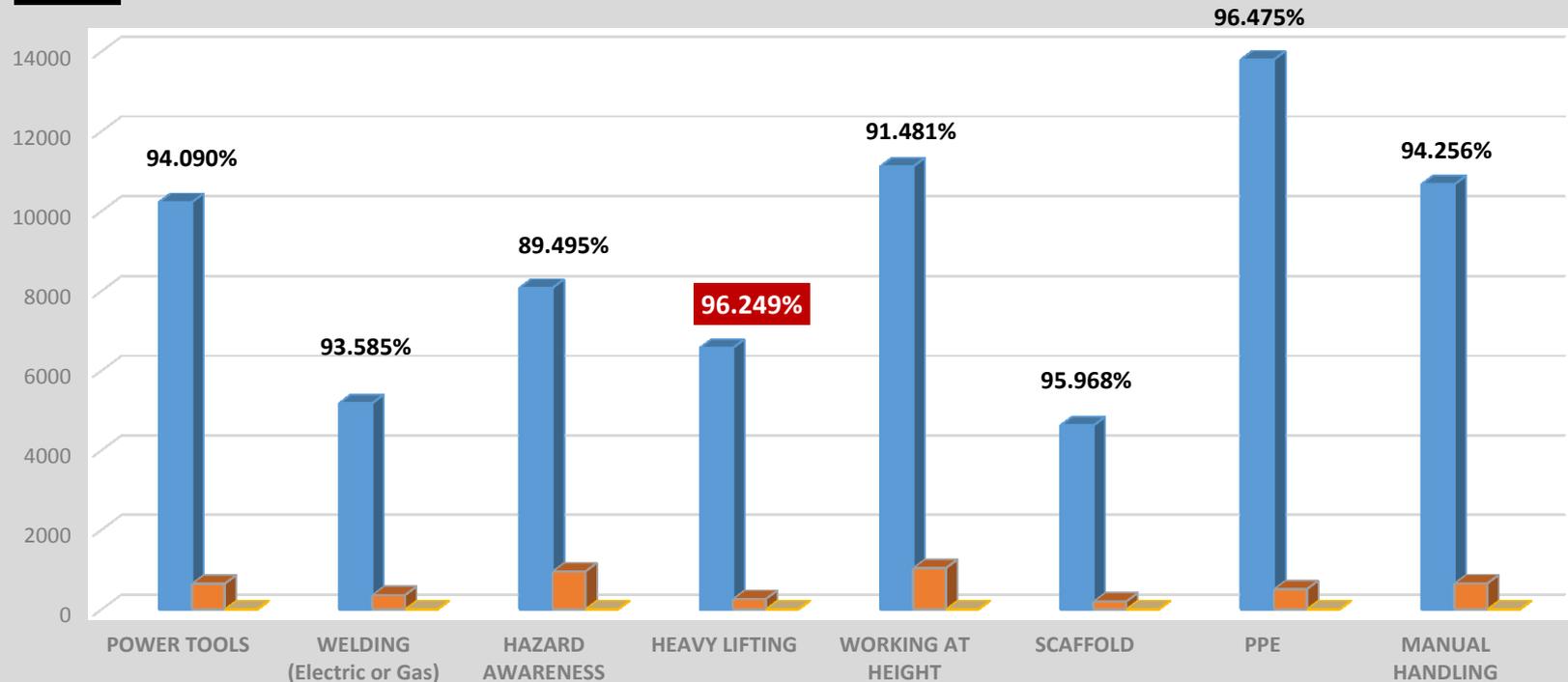
SSHE Department
BBS AUDITS FOR AMMONIA (FROM 07:00 TO 19:00)



SAFETY EXCELLENCE DURING TURNAROUND's . . .

CASE STUDY – AMMONIA PLANT TURNAROUND 2018

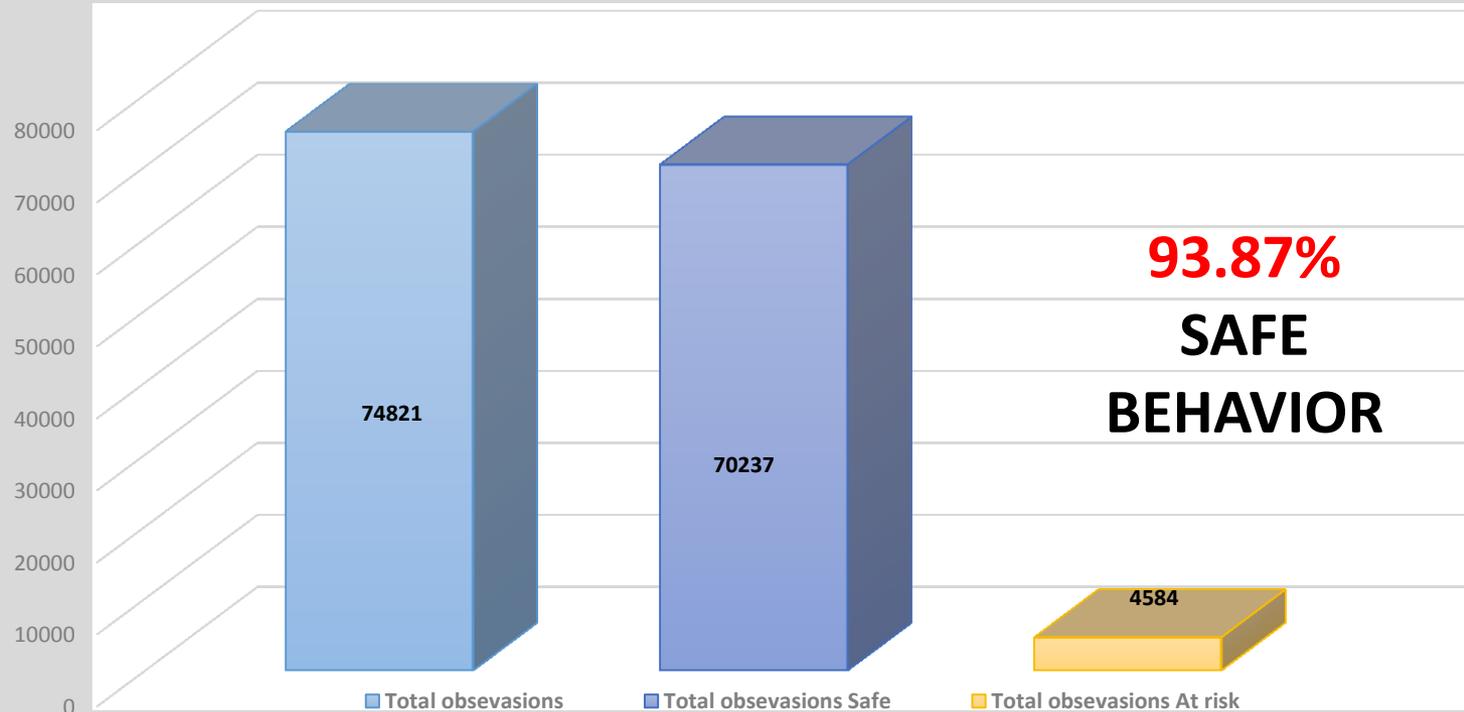
Different work activities audited in Ammonia Plant TA 2018



- All Heavy lifting activities conducted in Ammonia Plant was **96% safely conducted**

SAFETY EXCELLENCE DURING TURNAROUND's . . .

CASE STUDY – AMMONIA PLANT TURNAROUND 2018

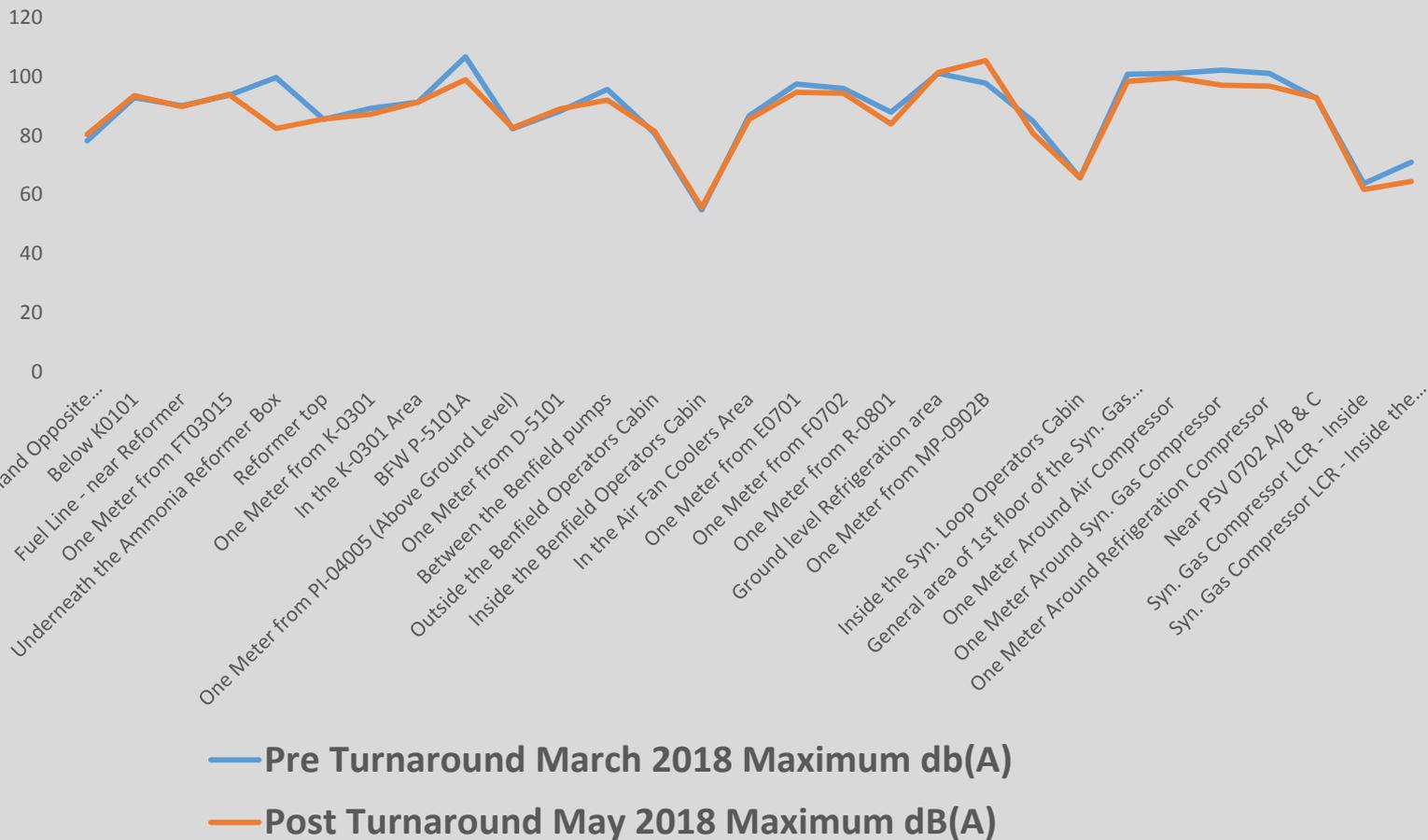


- With continuous safety monitoring and co-operation of Operation and Maint.Team
- Ammonia Plant reported overall **93.8% safe behavior**

SAFETY EXCELLENCE DURING TURNAROUND's . . .

CASE STUDY – AMMONIA PLANT TURNAROUND 2018

Noise survey – conducted pre and post TA



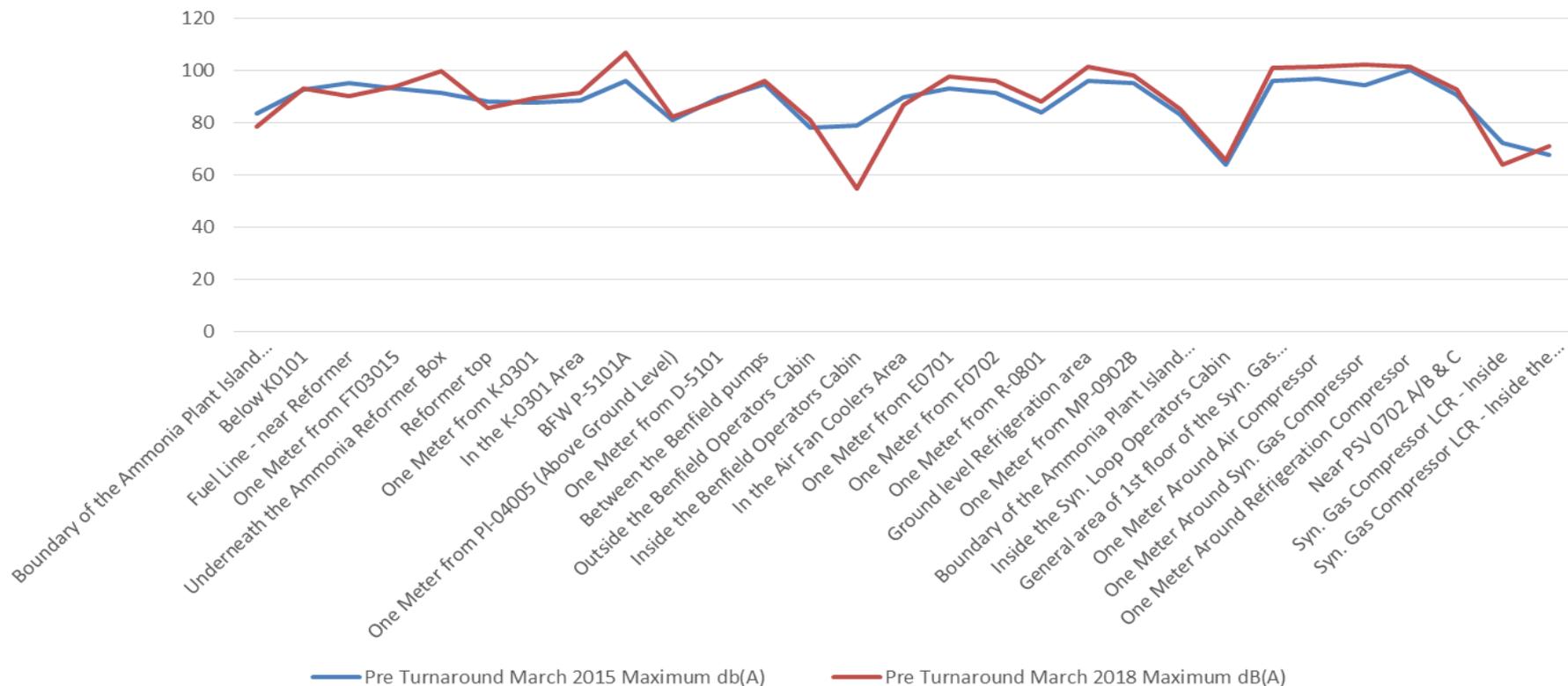
— Pre Turnaround March 2018 Maximum dB(A)
 — Post Turnaround May 2018 Maximum dB(A)

SAFETY EXCELLENCE DURING TURNAROUND's . . .

CASE STUDY – AMMONIA PLANT TURNAROUND 2018

Pre Turnaround Noise Survey graph March 2015 & 2018

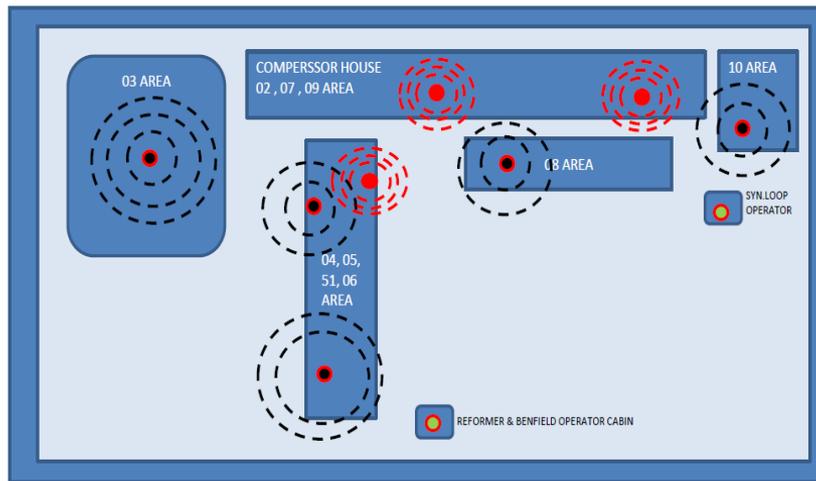
AMMONIA PLANT PRE-TURNAROUND NOISE SURVEY



SAFETY EXCELLENCE DURING TURNAROUND's . . .

CASE STUDY – AMMONIA PLANT TURNAROUND 2018

AMMONIA PLANT OVERVIEW PLOT



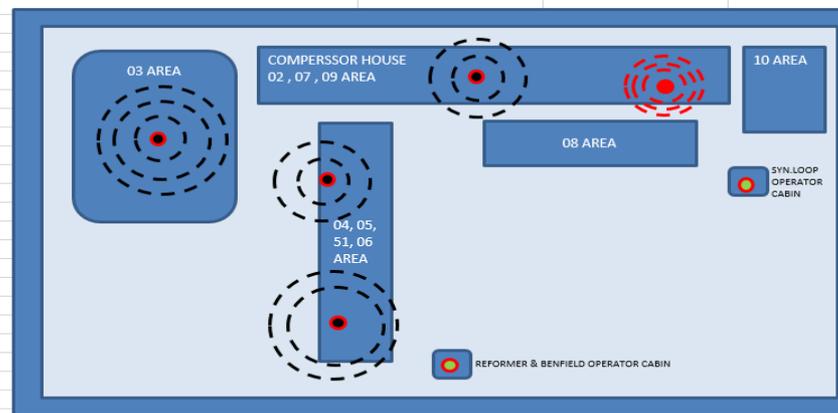
STATUS DURING THE NOISE SURVEY:

PLANT LOAD: FRONT END: 104% , BACK END: 105%
 WIND DIRECTION - NORTH
 TEMP: 26.9 c
 HUMIDITY: 39.9%
 WIND SPEED: 2.5 KM/HR (1.4 KNOTS)

- NOISE LEVEL > 100 dB(A)
- NOISE LEVEL > 85 dB(A)
- NOISE LEVEL < 85 dB(A)

(Pre Turnaround)

AMMONIA PLANT OVERVIEW PLOT



STATUS DURING THE NOISE SURVEY:

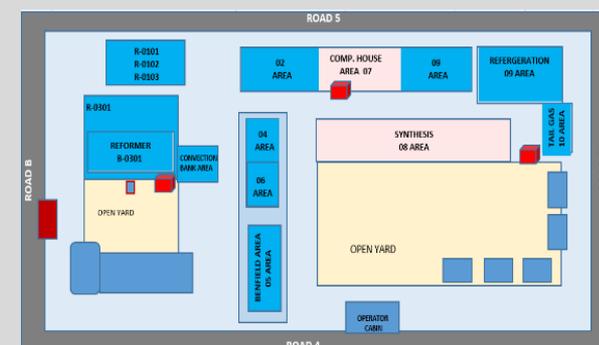
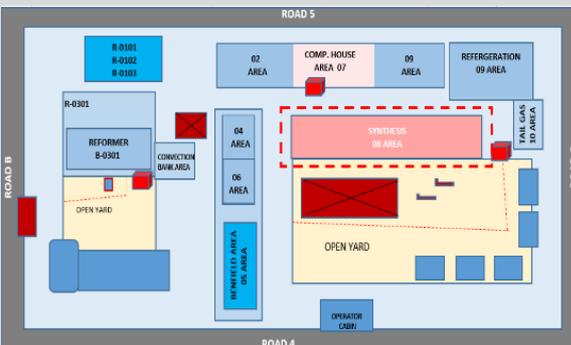
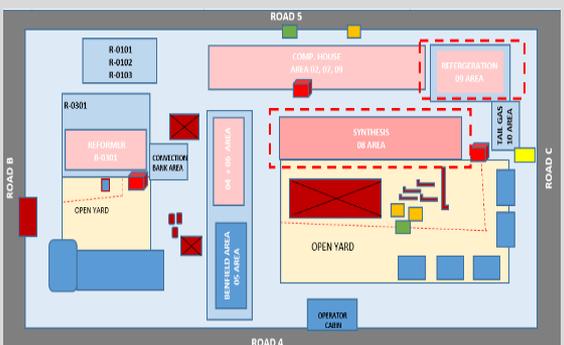
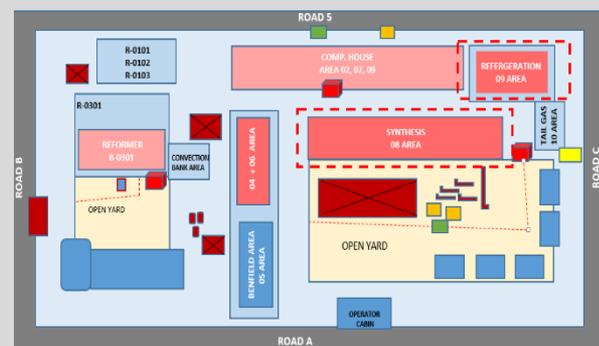
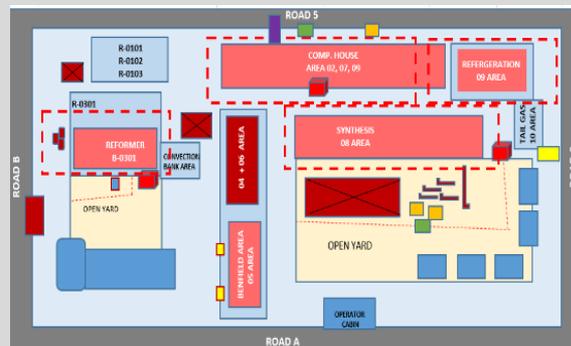
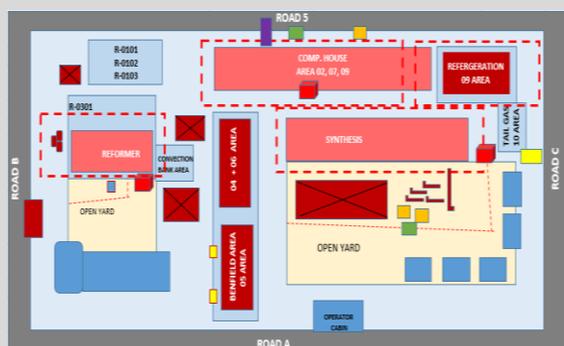
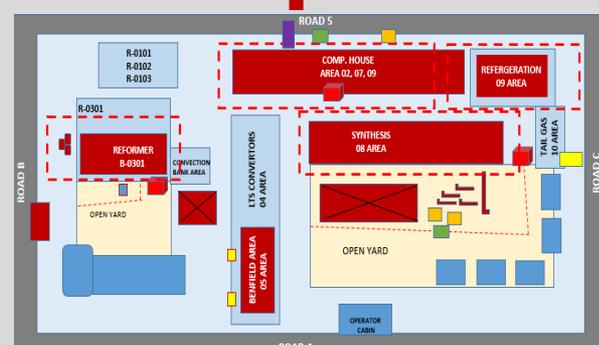
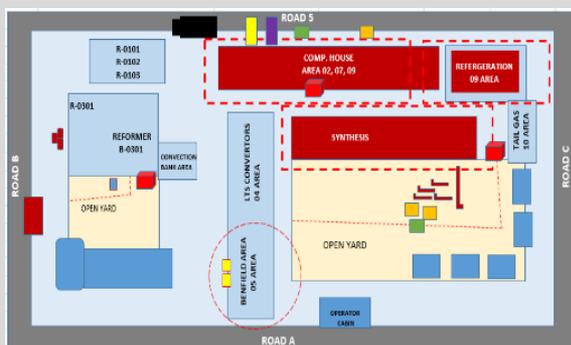
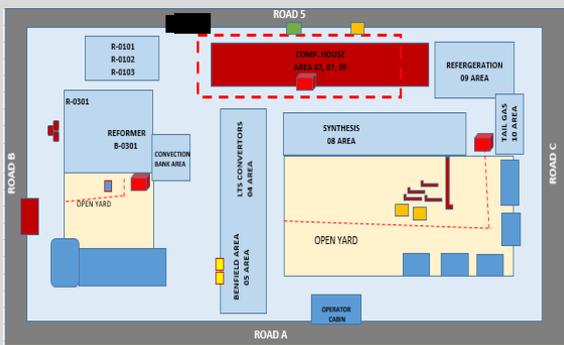
PLANT LOAD: FRONT END: 105.7% , BACK END: 103%
 WIND DIRECTION - NORTH WEST
 TEMP: 33.9 c
 HUMIDITY: 24.7%
 WIND SPEED: 11.2 KM/HR (6.0 KNOTS)

- NOISE LEVEL > 100 dB(A)
- NOISE LEVEL > 85 dB(A)
- NOISE LEVEL < 85 dB(A)

(Post Turnaround)

SAFETY EXCELLENCE DURING TURNAROUND'S . . .

CASE STUDY – AMMONIA PLANT TURNAROUND 2018



SAFETY EXCELLENCE DURING TURNAROUND's . . .

Passing on **GPIC Safety culture or safe behavior attitude to the Contractors or workforce** – is one of the main aims during this turnaround

With the cooperation of Operation team + Maintenance team (all crafts) we could say we had achieved it in Ammonia Plant TA 2018.

SAFETY EXCELLENCE DURING TURNAROUND's . . .

Work at Height - > Use of safety harness



SAFETY EXCELLENCE DURING TURNAROUND's . . .

Correct / proper use of barricading done during HP line hydro test activities @ 08 area



SAFETY EXCELLENCE DURING TURNAROUND'S . . .

Usage of correct warning signs



Use of new danger warning tape



SAFETY EXCELLENCE DURING TURNAROUND's . . .

Housekeeping is been done accordingly . .



SAFETY EXCELLENCE DURING TURNAROUND's . . .

Safety toolbox talk – conducted on daily



SAFETY EXCELLENCE DURING TURNAROUND'S . . .





Thank you. . . .

afa

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Drug and Alchohol at working place

Mohammed Salem , Chief Medical Officer, GPIC, Bahrain

Time for Excellence

Program by:



4-6/9/ 2018

Bahrain

شركة الخليج لصناعة البتروكيماويات (ش.م.ب.)
Gulf Petrochemical Industries Co. (BSC)

DRUG & ALCOHOL TESTING AT WORKPLACE

Dr. Mohamed Salem, MD, AFRCSI
Chief Medical Officer, GPIC, Bahrain



AFA Workshop , Bahrain - September 6, 2018

Disclaimer

- ❑ I have no conflicts of interest to declare related to the presentation of this material
- ❑ The main source of the presentation is the “Medical Review Officer Training Course” by the American College of Occupational and Environmental Medicine

Learning Objectives

- ❑ **After this session, the learner should have a better understanding of:**
 - **Purpose, Types and Steps of Drug Testing**
 - **Laboratory Reporting of Specimens and Verification of the Report**
 - **PROHIBITED DRUG AND ALCOHOL CONDUCT**
 - **CONSEQUENCES OF DRUG/ALCOHOL ABUSE**
 - **Components of a Drug-Free Workplace Program**
 - **Detection Windows and Reasons for Testing of Different Specimens**
 - **Alternative Specimens for Drug Testing**

Historical Context of Drug Testing

- ❑ **Substances long used by workers (e.g., Roman military fortifications, grog issued to sailors)**
- ❑ **In USA, adverse impact of illicit drugs and alcohol on workplace widely recognized in 1970s, especially after Viet Nam**

Purpose of Drug Testing

- ❑ Reduce use of illicit drugs among workers
- ❑ Educate Managers, supervisors and employees
- ❑ Remove Drug abusers from Safety sensitive Jobs
- ❑ Treat & rehabilitate drug abusers

Types of Drug Testing

- Preplacement = (Pre-)Employment**
- Post-Accident or Post-Incident**
- Reasonable suspicion**
- Random**
- Return to duty**
- Follow-up to treatment**
- Periodic**

Drug Testing – 3 Steps

- 1) Specimen collection
- 2) Specimen testing and confirmation
- 3) Review of results by Medical Officer

□ Test for:

- Illicit drugs (in urine)
- Alcohol (in breath)
- Other specimens (saliva and hair)

Laboratory Reporting of Primary Specimens

- Negative
- Negative – Dilute (Creatinine and SG values)
- Rejected for testing
- Positive with drugs
- Positive with drugs – Dilute
- Adulterated
- Substituted
- Invalid

Verification of Laboratory Report

- ❑ **Medical Officer must VERIFY laboratory-confirmed results as:**
 - **Negative**
 - **Positive**
 - **Canceled**
 - **Refusal to test (e.g., adulterated, substituted)**

Alcohol Testing

- ❑ **No Direct Medical Officer involvement**
- ❑ **“Confirmatory” testing performed by evidentiary breath instrument**
- ❑ **Trained technicians perform the test**

Americans with Disabilities Act (ADA) and Employee Testing

- ❑ **Alcohol:** As a medical test, pre-employment alcohol testing is prohibited by ADA; can only be performed after a job offer has been made.
- ❑ **Drugs:** The ADA does not impact an employer's ability to perform drug testing as part of the pre-employment tests.

PROHIBITED DRUG CONDUCT

- ❑ **Unauthorized use of illicit drugs at any time is prohibited**
- ❑ **Having a verified positive drug test is prohibited**
- ❑ **Refusal to take a drug test, including adulterating or substituting a specimen is prohibited**

PROHIBITED ALCOHOL CONDUCT

- ❑ **Result $< 0.02\%$ w/v is negative**
- ❑ **Result $0.02 - 0.039$; employee cannot perform safety-sensitive functions**
- ❑ **Result ≥ 0.04 is a violation of rule**
- ❑ **Results ≥ 0.02 should immediately be reported to the employer**
- **Alcohol concentration units**
 - ✓ **0.10% w/v = 1 mg/ml blood = 100 mg/dl blood = 0.10 g/dl blood = 1.0 g/l blood**

USA FEDERAL FIVE TARGET DRUGS OF ABUSE

- ❑ **Amphetamine/methamphetamines**
- ❑ **Cocaine**
- ❑ **Marijuana**
- ❑ **Opiates (Heroin, Morphine & Codeine)**
- ❑ **Phencyclidine (PCP)**

BASIC CATEGORIES OF PSYCHOACTIVE SUBSTANCES

- ❑ Opiates (Heroin, Morphine & Codeine)
 - ❑ Hallucinogens (Marijuana{THC}, Phencyclidine{PCP} & MDMA{Ecstasy})
 - ❑ Stimulants (MDPV, Methyldone & Mephedrone)
 - ❑ Sedatives (Alcohol, Benzodiazepines & barbiturates)
 - ❑ Inhalants (CNS depressants)
- THC = Tetrahydrocannabinol is the psychoactive constituent of Marijuana

Women metabolize alcohol slower than men due to 50% less Gastric Alcohol Dehydrogenase (GAD) Enzyme this will lead to increased alcohol absorption

CONSEQUENCES OF DRUG/ALCOHOL ABUSE

- ❑ **Employees who engage in prohibited conduct must be immediately removed from safety-sensitive functions by the employer and referred to Substance Abuse Professional (SAP) for evaluation**
- ❑ **Such employees cannot return to work until:**
 - **Evaluated by a SAP**
 - **Compliant with recommended treatment**
 - **Negative on a return-to-duty test**
 - **A follow-up testing program is established**

The Employer of a Discharged Positive Employee Has No Obligation To:

- ❑ **Facilitate referral to a SAP ,but must provide local SAP contact information including names and telephone numbers**
- ❑ **Ensure that the employee undergoes a SAP evaluation**
- ❑ **Pay for the employee's SAP evaluation**
- ❑ **Pay for the SAP-recommended treatment**
- ❑ **Reinstate a rehabilitated employee**

REHABILITATION AND COMPANY POLICY

- ❑ **In USA, Department of Transportation (DOT) rules do not require employers to provide rehabilitation of employees who violate DOT rules**
- ❑ **An employee who tests positive can potentially lose a job, unemployment compensation or disability benefits if he/she violates DOT rules or company policy**

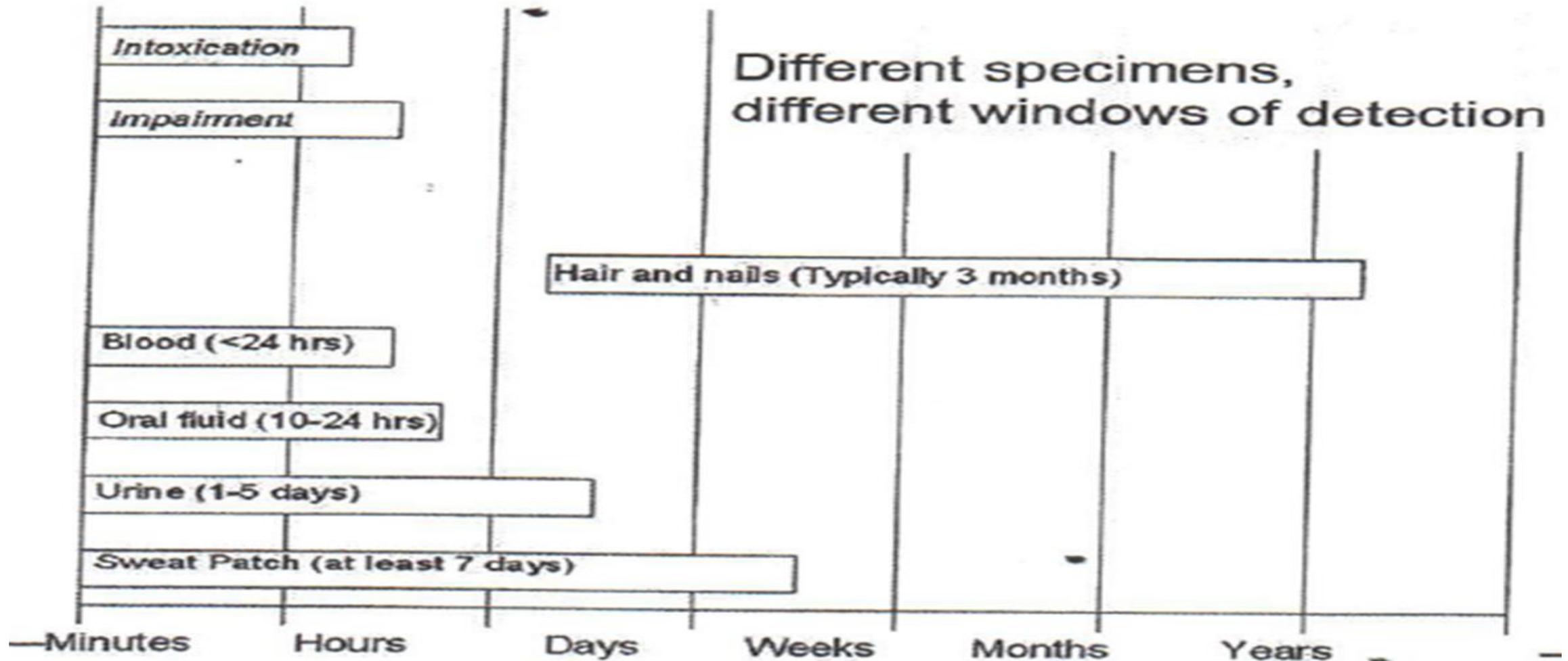
Components of a Drug-Free Workplace Program

- ❑ **Written policy for substance abuse**
- ❑ **Supervisor training**
- ❑ **Employee education**
- ❑ **Employee assistance**
- ❑ **Methods for identifying drug abusers**

EMPLOYEE ASSISTANCE PROGRAMS

Programs concerned with drug, alcohol and other problems that have an adverse impact on work performance

Detection Windows of Different Specimens



Specimens and Reasons for Testing

Specimen	Pre-employment	Random	Post-accident	Reasonable Suspicion	Return to Duty	Follow Up
Hair	X	X			X	X
Oral Fluid	X	X	X	X		
Urine	X	X	X	X	X	X

Interpretation of Alternative Specimens

<u>Specimen</u>	<u>Detection Window</u>	<u>Advantages</u>	<u>Disadvantages</u>
Urine	Days to weeks – dependant to some extent upon the drug	<ul style="list-style-type: none"> -Can be used as a measure of long-term drug use -Significant amounts of data available -Existing programs and knowledge based on urine programs -Technology tried and tested 	<ul style="list-style-type: none"> -Ability to dilute, adulterate and substitute -Collections cannot be easily observed -Shy-bladder syndrome
Hair	Months – depends to some extent upon the drug	<ul style="list-style-type: none"> -Can be used as a long-term measure of drug use -Relatively non-invasive collection -Can obtain a second specimen for retesting (if necessary) -Relatively resistant to adulteration 	<ul style="list-style-type: none"> -Not a suitable specimen for detecting recent use -May be an invasive collection if head hair is unavailable -Requires sensitive immunoassays and MSMS technology -Deposition of drug and/or metabolite in hair reported to depend upon hair color -Potential environmental contamination

Interpretation of Alternative Specimens

<u>Specimen</u>	<u>Detection Window</u>	<u>Advantages</u>	<u>Disadvantages</u>
Oral Fluid	Hours or days – depends to some extent upon the drug	<ul style="list-style-type: none"> -Relatively non-invasive collection -An “observed” collection and therefore resistant to adulteration and substitution -For some drugs correlate to free drug concentration in plasma -For “HHS Drugs” positive rates comparable to urine 	<ul style="list-style-type: none"> -Short detection window for some drugs -Requires sensitive immunoassays and MSMS technology -Collection methods can dilute the specimen, making drug detection more difficult -After cannabis use, THC is detected in the buccal cavity THCA present in very low concentrations due to transfer from plasma

Summary

- ❑ The purpose of drug testing is hopefully to eliminate the use of illicit drugs among workers
- ❑ We test for illicit drugs in urine & alcohol in breath
- ❑ Medical Officer must VERIFY laboratory-confirmed results as: Negative, Positive, Canceled or Refusal to test
- ❑ Pre-employment alcohol testing is prohibited by ADA; can only be performed after a job offer has been made
- ❑ The ADA does not impact an employer's ability to perform drug testing as part of the pre-employment tests

Summary

- ❑ **Unauthorized use of illicit drugs at any time is prohibited**
- ❑ **Alcohol result ≥ 0.04 is a violation of rule**
- ❑ **Employees who engage in prohibited conduct must be immediately removed from safety-sensitive functions by the employer**
- ❑ **The employer has no obligation to pay for the rehabilitation of a discharged positive employee or to reinstate him**



شركة الخليج لصناعة البتروكيماويات
Gulf Petrochemical Industries Company

DISCUSSION



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Delegates List

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Program by:



4-6/9/ 2018

Bahrain



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Health, Safety & Environment AFA workshop

Delegate Report

Country	Name	Position	Company
Bahrain	Mohammed AL-Hashemi	Fire & Safety Supervisor	GPIC
Bahrain	Nadeem Rana	Safety & Environment Superintendent	GPIC
Bahrain	Mohammed Salem	Chief Medical Officer	GPIC
Bahrain	Mohamed Alasaadi	Utilities Shift Supervisor	GPIC
Bahrain	Husam Alasadi	Senior Routine Planning Engineer	GPIC
Bahrain	Ahmed Alsabbagh	Graduate Engineer	GPIC
Bahrain	Reem AL-Otaibi	Civil Engineer	GPIC
Bahrain	Hasan AL-Ardadi	Managing Director RRC Middle East	RRC Middle East
Bahrain	Maha AL-Shehabi		RRC Middle East
Bahrain	Hessa Hasan	Student	University of Bahrain
Bahrain	Mohamed Jaber	Student	University of Bahrain
Bahrain	Aysha Adel	Student	University of Bahrain
Bahrain	Bader Yusuf	Student	University of Bahrain
Bahrain	Mohamed Ali	Student	University of Bahrain
Egypt	Maher Awad	Firefighting & civil defense Head sector	Abu Qir Fertilizers Company (AFC)
Egypt	Ahmed Rehima	Utilities Maintenance Senior Engineer	ALEXFERT
Egypt	Fekry Abdelhalim	Shift Head	ALEXFERT
Egypt	Amr Falah	HSE Senior Chemist	ALEXFERT
Egypt	Hazem Hassan	Inspection Senior Engineer	ALEXFERT
Jordan	Sultan AL-Jaafreh	Quality Superintendent	Arab Potash Company (APC)
Jordan	Issam Abuessa	Safety Inspector	Arab Potash Company (APC)
Jordan	Alaa Bawat	Safety&Quality Engg Supervisor	Arab Potash Company (APC)
Jordan	Salam Touqan	Plant Clinic&MED Commte SEC Head	Arab Potash Company (APC)
Jordan	Waleed Adaileh	Water Superintendent	Arab Potash Company (APC)
Jordan	Fatehi AL-Deghemat	Screening&IPP Superintendent	Arab Potash Company (APC)
Jordan	Saif Shawawreh	Compaction Plant Superintendent	Arab Potash Company (APC)
Jordan	Said ALHalasa	HLP Instruments Superintendent	Arab Potash Company (APC)
Jordan	Nidal Mohammad	Harvesters Nech Maint Supervisor	Arab Potash Company (APC)
Jordan	Murad Zuriekat	Laboratories Section Head	Arab Potash Company (APC)
Jordan	Sameer Megdadi	Quality Envirnmnt&Safety Dirctor	Arab Potash Company (APC)
Jordan	Anwar AL-Tamimi	Manager Operations	Indo- Jordan Chemicals Co.
Jordan	Oday Shgerat	Electrical Engineer	KEMAPCO



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Delegate Report

Country	Name	Position	Company
Jordan	Abd Alrazaq Alrahahleh	Civil Engineer	KEMAPCO
Jordan	Sakher Athameen	Shift supervisor	KEMAPCO
Libya	Hatim Farag		LIFECO
Libya	Faraj Mahmoud		LIFECO
Morocco	Wafaa EL-Telmesy		OCP
Netherlands	Harald Jorritsma	HSE Engineer	Stamicarbon
Netherlands	Leon Heijnen	Solutions Manager	Stamicarbon
Netherlands	Roel Trijnes	Sales&Solutions Manager	Stamicarbon
Saudi Arabia	Mashal AL-Rasheedi	Engineer, Operation, IBB Ammonia & Utility Operations	SAFCO
Saudi Arabia	Talal Jamal	Engineer, Process (SEeD), SFV Urea	SAFCO
Saudi Arabia	Ali AIGHamdi	Engineer, Operation Ammonia, SAFCO 4 Operation	SAFCO
UK	Barry Wilkes	Director Of Strategy	Nebosh
UK	Matt Powell	Qualification Development Manager	Nebosh
Egypt	Mohamed Zain	Secretary General	AFA
Egypt	Mohamed Ali	Studies Manager	AFA
Egypt	Ayman Fahmy	Head, IT Section	AFA
Egypt	Abdallah Taher	First Technician	AFA