

# The PCS Story

## “Process Safety Management... getting it right”

Rodney Bhagwandass

Helping  
**nature**  
provide.

 PotashCorp



## The Presenter

# Rodney Bhagwandass

- Proud employee of PCS Nitrogen Trinidad Ltd for the past twelve (12) years
- Ten (10) years in Operations: 04 Ammonia Unit
- Process Safety Management Coordinator since 2013



# **PCS Nitrogen Trinidad Ltd**

# PCS Nitrogen Trinidad Limited

A subsidiary of PotashCorp



PotashCorp

## PCS Nitrogen Trinidad Limited

- Four (4) ammonia plants with a annual production capacity of 2.2 million tons
- One (1) Urea plant producing up to 0.7 million tons of granular Urea





## Brief History

## PCS Nitrogen Trinidad Limited

- Originally Fertrin - a joint venture between the State and Amoco and commissioned in 1981 with just two Ammonia Plants.
- In 1993 Arcadian Partners LP acquired 100% shareholding of Fertrin
- In March 1997, Potash Corporation of Saskatchewan (PCS) acquired the interests of Arcadian







# Process Safety Management

# Process Safety Management

The PSM regulation became effective May 26, 1992 in response to continued US and foreign workplace accidents (the Bhopal Gas Disaster, Flixborough Explosion etc)

The application of management principles, methods, and practices for the prevention and control of releases of hazardous chemicals or energy

→ *As low as reasonably practicable (ALARP)*

“KEEP IT IN THE PIPES”



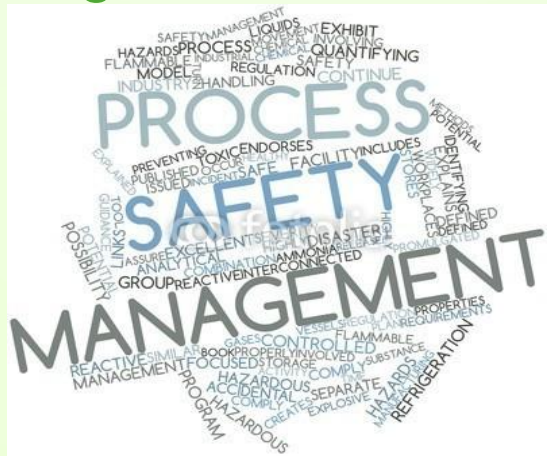
# PROCESS SAFETY MANAGEMENT 29CFR1910.119

There are sixteen (16) parts with part (a) The application of the Standard and part (b) the definitions of the Standard, followed by the 14 Elements of the Standard

- |                               |                                    |
|-------------------------------|------------------------------------|
| c) Employee Participation     | j) Mechanical Integrity            |
| d) Process Safety Information | k) Hot Work Permits                |
| e) Process Hazard Analysis    | l) Management of Change            |
| f) Operating Procedures       | m) Incident Investigation          |
| g) Training                   | n) Emergency Response and Planning |
| h) Contractors                | o) Compliance Audits               |
| i) Pre-startup Safety Review  | p) Trade Secrets                   |

# PCS and PSM

# Were we not implementing Process Safety Management all these years?



**Operating procedures, training, testing and inspection  
for our aging plants, approval processes for new  
equipment...**



PSM

## PCS and PSM

As a Corporate entity and a responsible Company we embarked on an aggressive PSM campaign at all of our PSM-regulated sites to meet with the OSHA PSM Standard



# PCS and PSM

Then came our first PSM Compliance Audit in 2008



# PCS and PSM

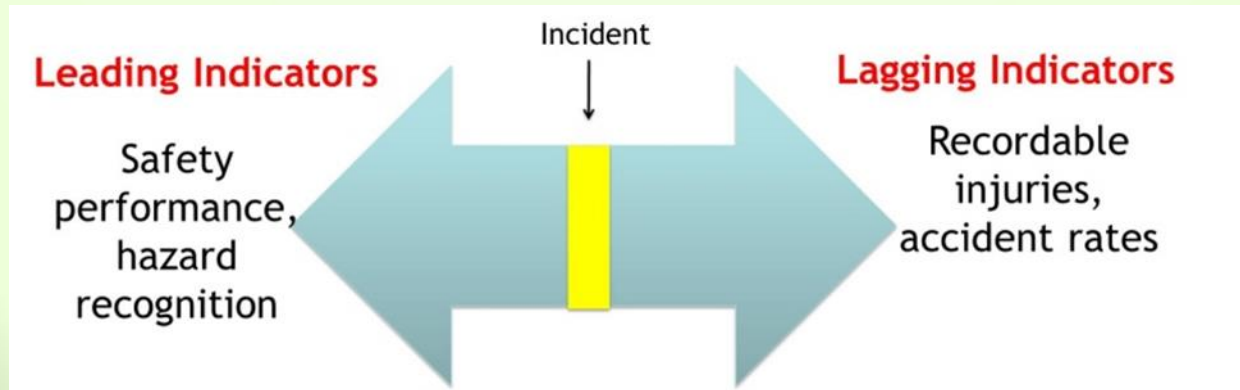
We were committed then as we are now in achieving 100% compliance with the Audit recommendations





# PCS and PSM

We began compiling data and reporting on Leading and Lagging Key Performance Indicators



# Process Safety since 1992



PSM

## Lessons Learnt from Texas City:

- Normalization of deviance and human factors issues
- Process safety culture and accountability at all levels
- Key leading and lagging indicators for effective monitoring of process safety performance
- The need for facility siting assessments



## Some PSM Improvement examples at the Trinidad Site

- Purchased and installed blast resistant buildings for our Maintenance staff and Nested Contractors



## Some PSM Improvement examples at the Trinidad Site

- Re-located Contractor site offices outside of the blast radius
- Upgraded our Control Rooms which serve as safe havens
- Implemented a Management of Change procedure for the siting of Temporary Buildings on the Complex



# Some PSM Improvement examples at the Trinidad Site

Employee Participation and process safety culture:

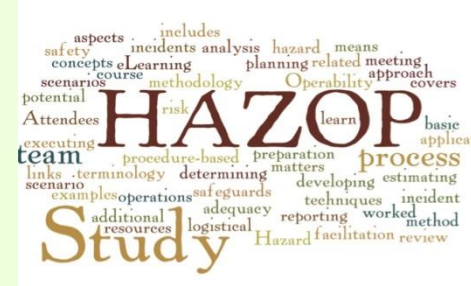
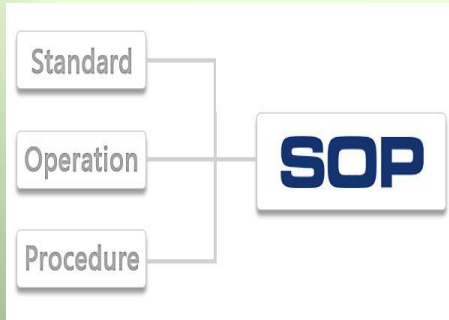
- We have initial and annual PSM engagement sessions with all staff including Nested Contractors





# Some PSM Improvement examples at the Trinidad Site

- A cross-section of employees and contractor representatives are involved in HAZOP studies, Incident Investigations, Management of Change and Pre-startup Safety Reviews



## Some PSM Improvement examples at the Trinidad Site

- Each Unit has a PSM Steering Team comprising employee and contractor representatives who meet monthly on PSM related issues





# Some PSM Improvement examples at the Trinidad Site

## Incident Investigations:

- Increased employee training in Incident Investigations, Root Cause Analysis and High Potential Incident analysis
- Use of the TapRoot root cause methodology for investigating PSM Incidents, Events and Near Misses (as defined in the API RP 754) and Serious Injury and Fatality SIF potential incidents



## Some PSM Improvement examples at the Trinidad Site

Noteworthy:

PSM incidents have significantly reduced over the years, but investigations have increased.



## Some PSM Improvement examples at the Trinidad Site

Emphasis has been placed in correcting the root causes and precursors in the near misses, small events, and SIF potentials, so that a major incident leading to a catastrophic release or toxic exposure does not occur.



## Some PSM Improvement examples at the Trinidad Site

## Mechanical Integrity:

## A healthy Risk Based Inspection program:

- Identify critical process equip.
- Identify the equipment's inherent failure mechanisms due to relevant factors and
- the formulation of specific inspection plans for each equipment.



## Some PSM Improvement examples at the Trinidad Site

A healthy ODR, Operator Driven Reliability program which rosters multi-discipline teams including contractor representatives to walk the Units and highlight equipment and Plant deficiencies needing improvement.



PSM

# PCS and PSM

We have since had PSM Compliance Audits in 2012 and earlier this year in April 2015



PSM

## PCS and PSM

Our management and implementation scores of our PSM program have moved from Grade I and II (unsatisfactory) back in 2008

To Grades IV and III in 2015 (satisfies the regulation)



# PCS and PSM

All in line with our Corporate goal of being one of the safest resource companies in the world.



PSM



# PCS and PSM

Reason to celebrate?



**PCS and PSM**

**NOT IN THE LEAST!**



PSM

# PCS and PSM



# Normalization of Deviance

# So have we got it Right?

We have improved!

But there is much more that we have to do!



# **There are always lessons to be learnt!**

Tesoro Refinery, Anacortes Washington  
Catastrophic Failure of an Exchanger in the  
Naphta Hydrotreater Unit due to  
High Temperature Hydrogen Attack HTHA  
April 2 2010  
7 Fatalities



## But why PSM?

Why should I invest in a facility siting study?

Why have a Risk Based Inspection Program?

Why report and measure Leading and Lagging performance indicators?

# WHY?



If you think Safety is expensive

Think about the cost of an ACCIDENT



## Why not?

- Union Carbide, Bhopal, India 3000+ fatalities
- Piper Alpha, UK 167 fatalities
- BP, Texas City 15 fatalities
- Tesoro, Anacortes WA 7 fatalities





Why not PSM?



PSM

# Thank you

There's more online:



**PotashCorp.com**

Visit us online



**Facebook.com/PotashCorp**

Find us on Facebook



**Twitter.com/PotashCorp**

Follow us on Twitter

Helping  
**nature**  
provide.





## Questions