Petrogenium. Academy

Training Brochure

- Safety
- Renewables
- Performance Improvement
- LNG
- Process Technology
- Asset Management
- Project Management

For further information, please contact:
training@petrogenium.com
www.petrogenium-academy.com

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Petrogenium. is a global independent consultancy, founded in 2015, that supports Asset owners with world-class industry experts. We support clients in Downstream Oil, Petrochemicals, Gas Processing & Renewable Resources.
Our teams provide consultancy, advice, knowledge, support and coaching in strategic, operational, commercial, and technical challenges, from improving margins, reducing waste and optimising operating and energy costs in a safe manner to decarbonisation, digitization and the energy transition.
Our consultants are independent, world-class experts with many years of industry experience in asset owner management, business unit responsibility, and expert roles. Our consultants work at mastery level and support clients on an individual basis or in project teams.
Because our clients value the transfer of knowledge and best practices - ***because experience matters*** – we set up the **Petrogenium.** Academy to offer training courses run by those same expert consultants. By sharing their practical experience, our courses deliver immediate value, with the learnings directly applicable in the field.
We hope you enjoy glancing through this Course Catalogue and look forward to your contact with our Training Academy at training@petrogenium.com or www.petrogenium-academy.com for further questions.

This Catalogue consists of two groups of 'training courses' whereby **Petrogenium.'s** Consultant's many years of expertise are transferred to the client.

The first, the **'Premium'** Courses, are available to all clients. Although they can be fine-tuned for a client's specific needs, they are well-researched and complete. And in general can be delivered face-to-face on location or remotely via e-learning sessions.

The second, our **'Exclusive'** courses, are made-to-measure, developed in a fit-for-purpose way for a specific client. These obviously require more preparation and can also be part of a wider consulting project.

Given the broad range of deep expertise that our Consultants possess, a third possibility is for us to create a **'New'** course for you that is currently neither in our 'Premium' or 'Exclusive' ranges. Do not hesitate to ask about any topics that interest you.

Introduction to the Petrogenium. Academy Course Brochure

All **Petrogenium.** courses can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore courses can be customized for a specific refinery, plant or unit. The option for post-course consultancy/held-desk support is also available.

Our courses can be experienced in different ways
On-site at your location:
Historically our most common way, where our experts come to your site and hold face-to-face training for your company, either with an internationally standard content or tailored specifically for you and your units.
Online remotely:
Many of our courses can be adapted for online, VILT (virtual instructor led training), saving travel costs and offering flexibility
Open courses at our Petrogenium. Headquarters in Haarlem (near Amsterdam) The Netherlands:
We are running more and more courses at our HQ, which are then open to participants from different companies. This increases efficiency if you only have one or two or a small number of participants and facilitates learning and networking between similar engineers in different sites.
Open courses at our hubs in for example Singapore or Thailand:
We are beginning to run open courses in locations outside of our HQ, to increase efficiency and lower th costs through regional travel.

How to Register:

- Scan the QR code to be directed to the **Petrogenium.** Academy Website
- Visit the **Petrogenium.** Academy website at www.petrogenium-academy.com
- Contact training@petrogenium.com
- Or contact us at +31 (0) 23 583 0891

Safety

Safety in Process Design

Consultant / Trainer:
Ronald Holleboom & Louk Kuijten

The **Petrogenium.** Safety in Process Design course is an indispensable course for all engineers in the oil refining, petrochemical and gas-processing (LNG) industry. This very popular course addresses all basic issues involved in technical safety and operability of a process plant. The course provides awareness on the implementation of basic technical safety principles into a process, awareness in applying and supporting company QHSSE policies and regulations already at the (process) design stage. (Given the course content this is only available face-to-face rather than online).

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: engineers or technologists who recently joined the industry but can be also highly beneficial to experienced engineers or selected operations staff

Learning Objectives

Types of risks related to oil and gas; Assess and quantify risks; How to manage risks; Familiarisation with safety related equipment; How to conduct a plant change procedure.

Programme

Day 1

- Kick off, introductions, course objectives and expectations
- Process Safety versus personal safety; history of process safety developments and industry major incidents
- Process safety Management Processes including risk management
- Hazard identification, Bowtie, LOPA, ALARP, Hierarchy of Controls, process safety Critical Elements, Activities, Positions.
- Group Exercise

Day 2

Codes and standards for Safe Design, active protection

- Safe Design: pressure and temperature
- Overpressure protection, flare systems
- Overtemperature protection: emergency depressuring
- Material selection and degradation

Day 3

Continue active protection, Passive protection / escalation control

- Safeguarding Instrumented Functions
- Release Detection Systems, ROV, TSO
- Fire protection
- Area Classification/ATEX/Site Lay out
- Exercise (optional)
- Safeguarding Memorandum

Day 4

Static electricity, reactive hazards, fire and explosions

- Static electricity
- Reactive hazards
- Flammability, Ternary Diagrams
- Exercise(s)
- Types of fires/explosions (VCE, BLEVE, Flash, Pool), dispersion, toxicity
- Process and Operational Safety/MOC/ Transient conditions

Day 5

Management of Change, Process safety culture

- MOC exercise(s) - Risk Screening Form
- Getting the right Process Safety Culture
- Process Safety Fundamentals
- Measuring the health process safety: leading, lagging indicators (pyramid)
- Process Safety Reviews
- Discussion of client specific subject(s)

A Critical Review of Renewable Resources

Consultant / Trainer:

Dr. Colin Schaverien & Charu Ehrenreich

This **Petrogenium.** Renewable Resources course will increase understanding and awareness on the state of the art in this rapidly changing area and increase knowledge on new technologies and routes, in first generation, and especially, advanced biofuels, Renewable Refining, green chemicals and plastics.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: Scientists and technologists from oil & gas, petrochemical and pulp & paper industries, business managers, government departments interested in Renewables. Investors from Venture Capitalists and financial institutions will also highly benefit from this course. The course can be tuned to your requirements and interests.

Learning Objectives

- Gain an overview of the Renewables space, including an understanding of the routes, their timelines, chances of success and profitability so as to make your own informed judgement and choices.
- Understanding of their technoeconomic challenges and benefits
- Critical appreciation of the different routes to first generation and advanced biofuels, their pros and cons, and impact on refinery processes
- Understanding of technology maturation and the timelines towards commercialisation of the various routes
- Understanding how CO2 emission abatement can be optimised. We touch upon government policies, hybrid technologies and future technologies

Programme

Day 1

- Kick off, introductions, course objectives and expectations
- Introduction to Renewables including drivers such as CO2 emission abatement and mandates
- Introduction to 1st generation and advanced biofuels – routes, processes, products
- Biorefining – processing and co-processing in refinery units including AGO HDS, HVO, and FCC. Background, feed pretreatment, conversion technologies, manufacturers, challenges and benefits, technology and refinery implications
- Advanced biofuels from e.g. lignocellulosic biomass including wood chips, pyrolysis oil, algae, municipal solid waste. State of the art, technical maturation, timeines to commercialisation. Pro and cons of the different routes and conversion technologies
- Feedstock supply chain considerations

Day 2

- Brief re-cap and any questions from Day 1
- Routes to biojet
- Renewable hydrogen, green chemicals and plastics
- Product value, blending consequences and benefits
- Decarbonisation by CCU versus CCS
- Other renewables - wind and solar
- Economic comparison of routes – cost estimates, Capex, Opex
- CO2 emission abatement optimisation through smart strategy of policy makers.
- Brief summary and any questions from Day 2

Biofuels & e-Fuels

Consultant / Trainer:
Dr. Colin Schaverien

The **Petrogenium.** Biofuels & e-Fuels course provides a comprehensive overview of both first generation, and especially, advanced biofuels, and the processes for producing them. It also gives an overview of e-fuels or synthetic fuels technologies & technology routes starting from renewable electricity to make green hydrogen and conversion to e-fuels by the FischerTropsch process, to e-based methanol and e-based ammonia. The course can be five half-days or 2-3 full days dependent on the client.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized to your specific requirements and interests. The option for post-course consultancy/help-desk support is also available.

Participants may include: scientists and technologists from oil & gas, petrochemical and pulp & paper or other bio/e-fuel industries; business managers; government departments interested in renewables; investors from venture capitalists and financial institutions will also highly benefit from this course.

Learning Objectives

The course participant will gain a deep and thorough understanding and critical comprehension of biofuels and e-fuels, their promise for the future as well as an appreciation of the technical and economic challenges and the role of government legislation, mandates & subsidies and feedstocks. In particular the pros and cons of the various biofuels and e-fuels processes, their scaling up towards commercialisation, their chances of success looking to 2025, 2030 and beyond, are presented.

Programme

1st half day: Introduction to biofuels

- 1st generation biofuels such as ethanol and FAME, the current default solutions for blending in gasoline and diesel.
- Hydrotreated Vegetable Oils (HVO) for diesel
- Coprocessing of vegetable oils in refinery units such as HDS units

2nd half day: Advanced biofuels

Practical and technology aspects of the hydrotreating processes and coprocessing of VO

- Cellulosic ethanol and butanol, asification of biomass to methanol
- Gasification Fischer Tropsch to BTL
- Introduction to e-fuels from FischerTropsch processes, to methanol, and to ammonia
- Renewables legislation and subsidies, especially in USA and EU

3rd half day: Advanced biofuels (cont.)

- Sustainable Aviation Fuels, Lanzatech's conversion process, alcohol routes to renewable jet and diesel, pyrolysis oil from biomass and from waste plastics, hydrothermal liquefaction and algae as a CO2 sink to produce lipids
    - Practical examples

4th half day: E-fuels - in depth discussion of the various e-fuels and routes

- Technology maturity assessment, scale-up risks, TRL
- Integration of technologies into existing production routes
- Green electricity: basic options, cost projections, associated risks & uncertainties
- Sourcing of (green) CO2 feedstocks (options, issues & technologies)
- Basic economic assessments, projections and costs
- Projected market potential of products in e-fuels

5th half day:

Mandates and biofuels incentives

Feedstock availability

Technology readiness levels (TRL)

Carbon intensity of routes

Essentials of Refining

Consultant / Trainer:
Danny Peferoen

The **Petrogenium.** Essentials of Oil Refining course is a basic skill course for professionals starting to work in the refining business. The course is taught on awareness level and will be invaluable to all professionals, who started their career in or recently joined the refining industry. The course can be given remotely in 6 half-days or face-to-face in 3 days.

Participants

All **Petrogenium.** courses can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore courses can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: new oil refining personnel and professionals who work in the downstream Supply & Trading, Marketing, IT, Legal, Finance and Human Resources functions. Staff from other industries (e.g. catalyst manufacturers, equipment manufacturers, IT service suppliers, business consultants) who have business interface with the oil refining sector will also highly benefit from this course.

Learning Objectives

After completion of the course participants will have solid understanding of:

- who refinery customers are and what products they require
- to identify the main and specialty products manufactured and describe their main characteristics, composition, etc.
- understand the flow of oil/gas from well via manufacturing plants to finished products in the market
- to explain various refinery types/configurations and be able to construct a refinery flow scheme by clearly indicating product flows to and from the process units
- the origin of crude oil, characterize the different types of crude oils, explain the concept of crude oil valuation and identify different types of crude oil pricing.
- explain the concepts of refinery costs and margins and be able to give indications of these costs and margins
- identify the main refinery processes (which include distillation, treating, reforming, cracking and product blending), explain the main interfaces between these process units and identify the main elements which may have an impact on the quality of the manufactured products
- determine and explain the influence of feedstock and refinery configuration on product yields, margins (Hydrocarbon and Gross Refining Margin) and product qualities by using a Refining Simulation Model

Programme

1st half day
- Introductions
  - Welcome, safety, arrangement
  - Introduction of participants
  - Programme & course objectives
- Products, Markets & Customers
- Crude and Feedstocks

2nd half day
- Refinery Configurations
- Strategy, Costs & Margins

3rd half day
- Distillation
- Utilities & Energy Management
- Thermal Cracking & Coking
- Fuel Oil Blending

4th half day
- Fluid Catalytic Cracking & Alkylation
- Hydrocracking
- Hydrotreating

5th half day
- Reforming & Isomerisation
- Refinery Costs and Margins
- Refinery Yield & Expense Case Study

6th half day
- Benchmarking
- H_2 Manufacturing & Purification
- Refinery Simulation Case Study
- Course review & close out

Introduction to Oil Refining

Consultant / Trainer:
Selwyn Maduro

The **Petrogenium.** Introduction to Oil Refining course is a basic skill course for professionals starting to work in the refining business. The course is taught on awareness level and will be invaluable to all professionals, who started their career in or recently joined the refining industry.

Participants

All **Petrogenium.** courses can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: new oil refining personnel and professionals who work in the downstream Supply & Trading, Marketing, IT, Legal, Finance and Human Resources functions; staff from other industries (e.g. catalyst manufacturers, equipment manufacturers, IT service suppliers, business consultants) who have business interface with the oil refining sector will also highly benefit from this course.

Learning Objectives

After completion of the course participants will have solid understanding of:

- who refinery customers are and what products they require
- to identify the main and speciality products manufactured and describe their main characteristics, composition, etc.
- understand the flow of oil/gas from well via manufacturing plants to finished products in the market
- to explain various refinery types/configurations and be able to construct a refinery flow scheme by clearly indicating product flows to and from the process units
- the origin of crude oil, characterise the different types of crude oils, explain the concept of crude oil valuation and identify different types of crude oil pricing
- explain the concepts of refinery costs and margins and be able to give indications of these costs and margins
- identify the main refinery processes (which include distillation, treating, platforming, cracking and product blending), explain the main interfaces between these process units and identify the main elements which may have an impact on the quality of the manufactured products
- determine and explain the influence of feedstock and refinery configuration on product yields, margins (Hydrocarbon and Gross Refining Margin) and product qualities by using a Refining Simulation Model
- identify different Health, Safety and Environmental (HSE) aspects in a refinery

Programme

Day 1

- Products
- Developments in main fuel qualities
- Overview on refinery configuration
- Yield/expense statement
- Refinery costs and margins
- Exercise: Refinery Simulation
- Introduction to crude quality
- Valuation of crude oil

Day 2

- Distillation theory
- Primary and vacuum distillation
- Conversion technologies
- Crude oil blending
- Exercise: Crude oil blending
- Reforming / Isomerisation
- Alkylation
- Exercise: Refinery Flow scheme
- Visbreaking / Thermal Cracking / Coking
- Exercise: V50

Day 3

- Fluid Catalytic Cracking
- Hydrocracking
- Gas and Liquid treating
- Hydrotreating
- Sulphur Recovery / Claus / Off gas treating
- Exercise: Optimum Refinery Programme
- Utilities and Energy Management
- Lubricating oils

Performance Improvement

Crude Oil Fundamentals, Acceptance, Valuation & Flexibility

Consultant / Trainer:

Danny Peferoen & Dr. Frans van den Berg

The **Petrogenium.** Crude Oil Fundamentals course explains the basics of crude oil characterization (crude assay), and how this impacts Product slate and Processing of crude. It describes relevant activities along the supply chain: Trading, Supply & Refining and explains the use of crude assay for different roles and responsibilities of those in the crude acceptance and valuation process. Finally it covers the importance of Crude Flexibility and its impact on improving margins. The course can be given remotely in 4 half-days or face-to-face in 2 days.

Participants

All **Petrogenium.** courses can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore courses can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: the course is ideally suited for anyone who needs a better understanding of how the world of crude oil works. It is particularly useful for people involved with the crude oil supply chain (Traders, Schedulers, Economists, Modelers, Crude Unit Engineers, etc.). It can also be appropriate for additional roles (Upstream, Process Engineering, Laboratory, etc.) that need and use knowledge concerning crude oil characterization and how that characterization is utilized for decisions within Refining.

Learning Objectives

After completion of the course participants will have solid understanding of:

- Explain the general principles of crude oil origin, composition and relevance to processing
- Discuss the most significant issues related to exploration and production
- Describe the impact of crude composition and properties on transportation and storage
- Explain the significant of crude composition and properties on valuation
- Describe the main principles and practices related to crude oil trading
- Explain how crudes are characterised, the uses and pitfalls of crude assays, and how crude data should be managed and used
- Identify the most significant crude oil properties and discuss their implications on refinery processing and product quality
- Describe measurement, custody transfer and loss management in relation to crude oil
- Identify the most significant HSE issues related to crude oil

Programme

1st half day

- Introductions
  - Welcome, safety, arrangement
  - Introduction of participants
  - Programme & course objectives
- Crude Oil and other fossil fuels origin and evolution.
- Exploration and Production

2nd half day

- Transport and Storage of Crude Oil
- Crude Oil Characterisation
- Crude Oil Assay

3rd half day

- Crude Oil in the Refinery
- Crude Oil Trading and Supply Planning
- Crude Oil Scheduling

4th half day

- Crude Oil Valuation
- Loss Abatement, Measurement & Custody Transfer
- HSE Aspects
- Course review & close out

Refinery Performance & Cost Improvement

Consultant / Trainer:

Dr. Eric-Hans Wolff

The **Petro**genium**.** Refinery performance & cost improvement course provides a solid and broad awareness of the refinery business by providing basic technical information on refining processes, the place of the refinery in the value chain and future trends. Planning and optimisation of your refinery margin is included as is the gaining of awareness of the basic tools and techniques used for economic evaluations in refineries.

This course can be given face-to-face or remotely. The presentations are interactive, supported with slides that also serve as a dedicated course manual (PDF file). The course includes interactive discussions and participant topics (on demand, aided by short videos, exercises and a Q&A session). Learning assessment is through a written examination (if required).

Participants

This **Petro**genium**.** course can be tailored for awareness or inexperienced staff, for intermediate and for experienced personnel. Furthermore, the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: analysts working in a supply environment or a refinery planning department; linear programming (LP) modelers; employees of private equity firms, trading firms and other investors interested in the refinery business; those involved with Mergers & Acquisitions (M&A); non-refinery professionals in the oil & gas industry or related sectors, semi-technical personnel who require introductory training to acquire the broader perspective; environmental professionals, insurance representatives, government officials, energy industry journalists & reporters and other professionals who desire a better understanding of the subject matter.

Learning Objectives

Upon completion of this course, participants will be able to:

- State the role of the main refining processes, operating characteristics, crude and products quality parameters, planning and economics
- Describe the place of the refinery in the value chain from ‘well to wheels’, including petrochemicals
- Recognize the need for performance monitoring, Quality & Assurance
- Explain the challenges (including environmental), opportunities and future trends in the refining industry
- Understand and use the crude oil refining terminology

Programme

Day 1

- Introduction
  - Global demand
  - Crude oil reserves (incl. video)
  - Refinery - value chain position
- Crude Oil and Products
  - Crude oil origin & types
  - Oil products & specifications
  - Crude oil & product pricing
- The Refinery
  - Refinery segments
  - Simple, Semi-complex and Complex refineries (incl. exercise)
  - Main refinery units (incl. videos, exercise)
  - The role of catalysts
  - Utilities / Refinery Fuel / Steps
  - Refinery layout

Day 2

- Refinery Economics
  - Refinery Margin
  - Linear Programming model
  - Crude Oil Selection
- Refinery Planning
  - Long term / short term planning
- Environmental Regulations
  - Restriction & opportunities
- Hyrdrocarbon Mass Balance and Loss

Day 3

- Maintenance, reliability & turnarounds
- Oil Chemicals interface
- Refinery Process Control
- Performance monitoring
- Quality & Assurance
- Management System & Auditing
- Trends: Future of Fossil Fuels
- Questions & Answers
- Examination

Refinery Economics

Consultant / Trainer:
Dr. Eric-Hans Wolff

The **Petrogenium.** Refinery Economics course will provide insight into many aspects of operating the modern refinery as a business, including technical information on refining processes, crude oils and processing options, the place of the refinery in the value chain, refinery cost structure and management, optimization and profit margin, energy and oil loss reduction, management tools and techniques used for economic evaluations in refineries and future trends.

Participants

Participants may include: all refinery technical personnel; operations' process engineers and process managers; technical services engineers and managers; refinery planners; newly-hired refinery personnel and current semi-technical personnel who require introductory training to acquire the broader perspective; non-refinery professionals in the Oil & Gas industry or related sectors, such as consultants, contractors, suppliers and other interrelated companies interested in the oil refining business; employees of private equity firms and other investors interested in the refinery business; environmental professionals, insurance representatives, government officials, energy industry journalists & reporters and other professionals who desire a better understanding.

Learning Objectives

State the role of the main refining processes, operating characteristics, crude choice, processing options and desired products, crude and products quality parameters, refinery economics and planning; describe the place of the refinery in the value chain from 'well to wheels', including petrochemicals; methodology of optimization & product improvement; recognize the need for performance monitoring, Quality & Assurance; apply analytical tools to refinery management; explain the challenges (including environmental), opportunities and future trends in the refining industry; understand and use the crude oil refining terminology.

This course includes presentations, short videos, exercises, interactive sessions (participants can propose relevant topics upfront to discuss in class) and an (optional) examination with certification.

Programme

Day 1

- Introduction
  - Global energy, crude oil and products demand
  - Crude oil reserves (incl. video)
  - Refinery position in the value chain
- Crude Oil and Products
  - Crude oil origin, types and movements (incl. video)
  - Crude oil products, specifications
    - Crude oil (and product) pricing (incl. video)
- The Refinery
  - Refinery segments
  - Simple, Semi-complex and Complex refineries (incl. exercise)
  - Main refinery units (incl. videos, exercise)
- The role of catalysts

Hydrocarbon Economics and Upgrading

Consultant / Trainer:

Selwyn Maduro

The **Petrogenium.** Hydrocarbon Economics and Upgrading course is centered on raising awareness of all aspects related to refinery margin and profitability. It is important for analysts, schedulers, accountants and sales to refiners and of refined products, to understand the refinery building blocks, how they are interrelated, and how they might impact product quality and overall refinery economics. The course looks at the refinery through a high-level master planning lens.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel, but is designed for non-engineers who will benefit from a knowledge of refinery processes, such as distillation, cracking and chemical treatment. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: those assigned in upstream, mid-stream, analysts, schedulers, accountants, sales, marketing, tax, finance, legal, HR and IT functions.

Learning Objectives

After completion of the course participants will have solid understanding of:

- the properties of crude oil and refined products
- the refinery types and their complexity in relation to the different crude oils
- the role of heavy oil upgraders and the effect of shale oil and shale gas
- to explain the various refinery types/configurations and be able to construct a refinery flow scheme by clearly indicating product flows to and from the process units
- petroleum chemistry (awareness) and processing
- the typical products of refining and their specifications (both performance and regulatory)
- product blending and tank farm operation
- how to manager sulphur in the refining process
- how to understand the impact of refinery operation on the environment (SO2, CO2) and the drive and impact of biofuels
- how costs, volumes, proceeds, investments and product qualities affect refinery economics
- the role of LP modeling and refinery economics: the economic drivers that refinery, tank farm/blending profitability and why the price at the pump is set where it is set
- how the supply chain is constructed and how logistics and shipping can mitigate price fluctuations (e.g. contract form, hedging)
- the role and importance of Master planning

Programme

Day 1

- What is Downstream
- Crude supply and demand
- Regulatory and specification changes
- Overview of the refining processes and product blending
- Oil refinery and petrochemical integration
- Refinery economics and margins
- Crude and product costs
- Operating costs
- Capital charges
- Freight rates and fiscal duties
- Working capital
- Capital investment

Day 2

- The importance of Master planning
- The strategic view
- Scenario development
- Scenario analyses
- LP models and other tools
- Economics and sensitivity analyses
- Important auxiliaries (utilities, environmental protection)
- Cost estimates
- Project execution
- Master planning results presentation

Refinery & Supply Economics

Consultant / Trainer:
Danny Peferoen

The **Petrogenium.** Refinery Economics course will provide insight into many aspects of operating the modern refinery as a business, including technical information on refining processes, crude oils and processing options, the place of the refinery in the value chain, refinery cost structure and management, optimization and profit margin, energy and oil loss reduction, management tools and techniques used for economic evaluations in refineries and future trends.

Participants

This **Petrogenium**. course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: all refinery technical personnel; operations' process engineers and process managers; technical services engineers and managers; refinery planners; newly-hired refinery personnel and current semi-technical personnel who require introductory training to acquire the broader perspective; non-refinery professionals in the Oil & Gas industry or related sectors.

(This course can also be offered as 5 half days.)

Learning Objectives

State the role of the main refining processes, refinery configurations, operating characteristics, crude choice, processing options and desired products, crude and products quality parameters, refinery economics and planning; costing & valuation; trading; petrochemicals; methodology of optimization & product improvement; apply analytical tools to refinery management; supply chain; economic drivers; explain the challenges, opportunities and future trends in the refining industry.

This course includes presentations, simulations, trading game, exercises, interactive sessions (participants can propose relevant topics upfront to discuss in class).

Programme

Day 1

Safety & Introductions

- Welcome, safety, arrangement
- Introduction of participants
- Programme & course objectives

Refinery configurations

Costing and Valuation: YES

Costing and Valuation: Marginal costing

- Valuation of Furfural Extract

Costing and Valuation: Refinery Fuels

- Valuation of Refinery Fuel

Margin optimisation: Crude valuation

- Crude valuation
- Crude processing deal

Day 2

Cost of Critical Gasoil spec (simulation)

Cost of Critical Gasoil spec (LP)

Margin optimisation: Linear Programming

- Analysis of a Refinery programme
- Trading game

Investment economics

Day 3

Chemical investment group exercise

Supply chain planning & execution

- Implementing economic drivers

Course review & close out

Refinery Planning

Consultant / Trainer:

Anwar Tatariya

The **Petrogenium.** 3 day Refinery Planning and Optimization course is designed to train the participants in the detailed aspects of Refinery Planning system and its complexities, along with an overview of the key features of different LP software available in market.

Participants

This **Petrogenium.** training can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel, although it has originally been designed as an advanced course. Furthermore the course can be customized for a specific refinery / plant or multiple sites. The option for post-course consultancy/help-desk support is also available.

Participants may include: Strategic Planners, Long term Planners, Short Term Planners, Investment decision makers.

Learning Objectives

To provide a detailed view of how Refinery Planning Business Processes as structured; what are the typical interactions and the challenges for planners; Participants will also understand and acquire a good knowledge of Refinery Planning best practices, knowledge about key roles and responsibilities of planner in the organization that gives insight on key factors that can impact overall Gross Refinery Margin; not limited to optimization of different variables, single-period LP models, multi-period & multi-location modelling, Crude & Product opportunity evaluation, etc.

Programme

Day 1

- Fundamentals of Linear Programming
- Refinery Planning Process overview
- Crude Assay Data management

Day 2

- Insight to Planning processes
  - Long Term / Strategic Plan
  - Annual / Budgetary Plans
  - Monthly / Weekly Operating Plans
  - Special case studies
- Planning model - best practices
- Process submodel building - best practices

Day 3

- Multi-period & multi-site planning model
- Planning model update - best practices
- Back casting using LP
- Crude indifference value analysis

Refinery Scheduling & Logistics

Consultant / Trainer:

Anwar Tatariya

The **Petrogenium.** 3 day Refinery Scheduling & Logistics course is designed to train the participants in the detailed aspects of Refinery scheduling and logistics system and its complexities, along with an overview of the key features of different refinery scheduling software available in market.

Participants

This **Petrogenium.** training can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel, although it has originally been designed as an advanced course. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: Refinery Schedulers, Blend optimization team and logistics team.

Learning Objectives

To provide a detailed view of how Refinery Scheduling and Logistics Business Processes are structured, what are the typical interactions and the challenges faced; participants will also understand and acquire a good knowledge of Refinery Scheduling and Logistics best practices, knowledge about the key features of off-the-shelf scheduling and blending applications, including practical issues and complexities; insight on key factors that can impact on planning and scheduling integration for optimized plan execution.

Programme

Day 1

- Refinery scheduling system overview
- Refinery Logistics System Overview
- Inventory management and Optimization
- Crude Scheduling

Day 2

- Process Units and Intermediate stream Scheduling
- Product Scheduling
- Product Blending and Product Specifications
- Jetty / Dock Scheduling

Day 3

- Jetty / Dock Scheduling
  Overview of key features of refinery scheduling software
- Scheduling Best Practices
- Tanks and Offsite requirements
- Performance Monitoring

Operational Readiness Workshop

Consultant / Trainer:
Han Gesink

The **Petrogenium.** Operations Readiness Workshop is a customized, high intensity workshop for owner's representatives (i.e. the future Operator of a facility), the Commissioning and Start Up team, but also Engineering and Construction contractors aimed to ensure the transition from a project to operations is achieved without any flaws.

Participants

Although many **Petrogenium.** courses can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel, this workshop is specifically for leadership & senior contractors and will be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: Senior Staff and professionals, members of the site leadership team but also Managing (Engineering & Construction) contractors.

Learning Objectives

- Critical involvement of the Owner/Operator in all phases of the Project, from the definition phase to Commissioning/Start Up (CSU) and Production
- Engagement between Engineering and Construction contractors for both preparation of Commissioning, Start Up and Production
- Mitigation of risks to successful CSU / key success areas

Major Deliverables of the workshop are:

- In depth understanding of requirements to bring the project to operations
- Development of plans (as appropriate) to ensure a start-up without surprises
- Methods to mitigate risks to successful commission and start up, critical owner involvement in all project phases.

Programme

Typically, the workshop programme will take 2 to 3 days and will be developed jointly with the Customer to tailor it to the specific needs and character of the project.

Operational Excellence

Consultant / Trainer:

Han Gesink

The **Petrogenium.** Operational Excellence course is a high intensity workshop for members of the leadership of a refinery or petrochemical plant who are aiming for better performance and control within their operations. Both with respect to Safety, Health and Environment as and Production performance. Since the workshop aims at jointly developing a view on what Operational Excellence can potentially bring to the company, participants should be in the position to develop a follow up to the workshop. Operational Excellence is all about competent people, working together in teams with an 'enterprise first' mind-set in a structured way with truly committed leadership.

Participants

Although many **Petrogenium.** courses can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel, this workshop is specifically for leadership and will be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: Senior Staff and professionals, members of the site leadership team.

Learning Objectives

The principles and key success factors for Operational Excellence,; to make an inventory of opportunities to improve and develop a way forward; we will discuss the status of implementation of Operational Excellence in the Company.

Programme

Day 1

- Introduction to Operational Excellence
- Establish the status of Operational Excellence in Company

Day 2

- Develop a view on potential improvements
- Discuss and prioritise, develop and follow up on opportunities for improvement

Opportunity Framing for Technology Projects

Consultant / Trainer:

Andreas Nowak

Framing is the process of defining premises of an opportunity at the start of any project. The **Petrogenium.** Opportunity Framing for Technology Projects workshop focuses on technology opportunities. It is a facilitated, structured process involving the key players driving the opportunity and external experts, where required. The premises document remains 'live' for the duration of the project and should be updated during all stages of project development. It ensures that all project members are aligned and will help in on-boarding new project members. A summary of the premises forms an overview of the opportunity for management. This course can also be used to train future framing facilitators in–house.

Participants

Although many **Petrogenium.** courses can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel, this workshop is specifically for more senior leaders and project staff and will be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

This **Petrogenium.** course can be tailored as follows:

a. explain the elements for good project premises and the best way to hold the sessions required (1/2 day)

b. same a) using an example relevant to the client and capture the basis for framing (1 day)

c. same as a) by facilitation of a framing session on an actual opportunity (2-3 days, depending on the opportunity)

d. same as c) plus the draft Premises Document by **Petrogenium.** consultant (2-3 days plus 2 days consultant time)

Participants would be future facilitators for option A. For the other options, selected project staff for B, a team representing strategy, Technology, Operations and Maintenance, Safety and Environment, Finance as many areas mentioned below as possible for options C and D would be present.

Participants may include: Senior Staff and professionals, members of the site leadership team but also managing (Engineering & Construction) contractors.

Learning Objectives

Participants will learn to describe all angles of an opportunity. They will understand how to work through strategic, technical, operational, economic, legal, safety and environmental aspects of the opportunity:

1. Strategy: fit with company, local, national and international current and long-term ambitions
2. Technical: process technology, proven or new and associated risks to operability, feedstock flexibility, tie-ins with other processes and utilities
3. Operational: control strategy, reliability, maintainability
4. Economic: premises, Capex and Opex estimates, development of economic project indicators (e.g. NPV, VIR) as project progresses
5. Legal: changes in legal framework, regulations, permits (timing, risks), subsidies
6. Safety: process safety philosophy versus process risks, personal safety in execution and operation
7. Environmental: CO2 foot print, energy efficiency in design, emissions, waste

Programme

During the process the team coins the *Opportunity Statement*, a short pitch summarizing the intent of the opportunity. This is followed by defining *Value Drivers, Boundaries, Givens, Assumptions, Stakeholders, Risks* (high-level and the basis for the project risk register) and Opportunities (to improve the project). The final step is the drafting of a *Road Map* for the opportunity. Information is recorded during the meeting in a spreadsheet and can be converted into a Word document or PowerPoint presentation.

Fuel Oil & Fuel Oil Blending

Consultant / Trainer:

Dr. Frans van den Berg

The **Petrogenium.** Fuel Oil & Fuel Oil Blending course will provide an introduction into marine fuel oil, its uses, specifications & components. In addition numerous best practices on blending product, guidelines to optimize product quality, assure stability and minimize give-away are covered. Various case studies will address real-life problems.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: technical staff, supervisors and managers in refining, marketing, trading, economic planning and laboratories who need better technical understanding of bunker fuel and bunker fuel blending; it is also highly suited for Fuel oil traders as well as bunker operators.

Learning Objectives

Increase participants knowledge on the fuel oil business. Understand ISO standards, blending rules, and compatibility of blend components. How to optimize bunker fuel blending and control fuel oil quality. Understand the role of sampling and lab testing. Introduction to fuel oil economics. Discuss typical fuel oil complaints and complaints handling.

The course can be given as a 2-day training or as 4-5 half days.

Programme

Day 1

Introduction to Fuel Oil

- *What is fuel oil, brief history; Manufacturing routes*
- *Blendstock components & their properties; Supply & demand trends*

Specifications, Components & Test Methods

- *ISO 8217 & latest changes; Relevance of individual properties & test methods*
- *Fit-for-purpose vs on-spec; Developments & future changes*

Stability & compatibility of bunker fuel

- *Fundamentals of asphaltene stability, Current test methods; Prediction of stability & compatibility*
- *Exercise on fuel oil stability; Case studies on bunker oil stability problems*

Bunker fuel blending, components & tools

- *Why blending? Blending systems (in tank, in-line, in-line with ratio control)*
- *Blending rules; unusual blending components; blending software & equipment*
- *Exercise on viscosity blending*

Day 2

Blend control & quality management/assurance; MARPOL samples

Storage & handling of bunker fuel (tanks, mixing systems; additives)

Laboratory testing & on-line testing

- *Benefits laboratory testing & on-line testing; types of on-line testing methods*
- *Lab testing standards (ISO9001/17025, ASTM/IP/ISO test methodology)*

Blending economics

- *Blending tools & optimisation; single & multi-blend optimisation, Quality give-away*

Blending for 0.5% sulphur compliance (MARPOL)

- *Current status; components for 0.5% VLSFO blending; challenges & problems;*
- *Ensuring stability & compatibility; avoiding off-spec fuel from blending operations*

Bunker fuel complaints

- *Survey fuel oil complaints; examples of problem fuels*
- *ISO 4259 for dispute handling & Complaint handling exercise*

Liability & claims handling

- *Responsibilities for bunker fuel quality; warranties under bunker supply contract*
- *Contamination of bunkers & blend incompatibility; BIMCO bunker quality & liability clause; ISO 8217*
- *Potential legal claims and Bunker supplier defence*
- *Bunker fuel HSE aspects*

Project Management of Fuels

Consultant / Trainer:

Mae Ascan

The **Petrogenium.** Project Management of Fuels course will provide an overview on crude oil and the refining process but the focus will be gasoline fuels, diesel fuels and biofuels. This also includes how gasoline and diesel engines work including product performance differentiation.

Participants

This **Petrogenium.** course can be tailored for awareness of new hires with limited experience in the fuels industry and even for intermediate and experienced personnel who need to have a deeper understanding in this area. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: product quality leads, refinery personnel, technical service engineers, laboratory staff, procurement, product management, customer service and even sales and marketing.

Learning Objectives

- Obtain a basic understanding of crude oil composition and how this is processed in the refinery to produce main fuels
- Gain knowledge on the different fuel standards and specifications and how these relate to the different stakeholders across the supply chain
- An appreciation of how gasoline and diesel engines work
- Learn the key properties of gasoline and diesel fuels and impact on engine performance
- Understand the different fuel additives and product performance differentiation
- Learn about biofuels (fatty acid methyl ester and ethanol), their properties and impact when blended into main fuels
- Get an understanding of the different vehicle emission standards
- Acquire information on typical product quality issues and frequently asked questions

Programme

Day 1

Overview of Crude Oil and Refining

- Introduction to crude oil
- Crude oil and product quality
- Refinery processes
- Types of refineries
- Product quality issues for refineries

Day 2

Gasoline Fuels

- How a gasoline engine works
- Gasoline standards and specifications
- Main gasoline properties
- Frequently encountered problems
- Additives
- Differentiated gasoline fuels

Day 3

Diesel Fuels

- How a diesel engine works
- Diesel fuel standards and specifications
- Diesel fuel main properties
- Frequently encountered problems
- Additives
- Differentiated diesel fuels

Day 4

Biofuels

- UN Sustainable Development Goals
- Why use biofuels?
- Biofuels: Fatty Methyl Ester (FAME) and Ethanol
  - Production
  - Specifications
  - Handling
  - FAME in diesel and ethanol in gasoline
  - Blending limits
  - Product quality issues

Day 5

Fuel specifications

- Product quality and specifications
- Different types of specifications
- Emission regulations
- Reading and understanding a specification
- Participants' assessment
- Course evaluation

Fuels Quality Management

Consultant / Trainer:

Paul van Oers

The **Petrogenium.** Fuels Quality Management course will provide an introduction into and raise awareness of the importance of managing all aspects of the final product quality as delivered to your customer, including fuels quality management, products specifications, applications and release policy.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: all staff dealing with fuels quality e.g. operations, laboratory, economics & scheduling, process engineers and technical staff.

Learning Objectives

The properties of crude oil and refined products; awareness of refinery production processes and the link to final product quality; background of bio-fuels quality parameters in relation to application and the management of e.g. production, blending; managing product quality through the supply chain; balancing fuel quality and economics; will include a case study on an actual incident from a client.

Programme

Day 1

- Introduction and customer PQ (product quality) issues
- Crude Oil
- Oil movements
- Overview of the refining processes and product refining
- Product quality at the refinery
- Product quality giveaway & exercise
- Regulatory & specification changes
- Gasoline & application

Day 2

- Diesel & application
- Management of change
- Residual fuel oil & application
- PQ trends & developments
- Biofuels (FAME, ethanol, HVO)
- Product quality incident management & exercise

Day 3

- Aviation fuels
- Product contamination
- Data interpretation & decision making (& exercise)
- Sampling & testing
- Fit for purpose
- Product quality in the supply chain
- Course evaluation

Structured Problem Solving & Root Cause Analysis (RCA)

Consultant / Trainer:

Peter Bitter

The **Petrogenium.** Structured problem solving & root cause analysis (RCA) course is a customized, high-intensity workshop to understand and fix operational issues and find root causes of incidents effectively. **Petrogenium.** shares its operating experience and best practices to help identify and solve incidents and resolve operational problems using a tried and tested methodology.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available, as is the training of site RCA facilitators.

Participants may include: reliability engineers, maintenance and operations team-leads and engineers and selected operations staff and/or process technology staff.

Learning Objectives

This course will be tailored to client needs. The ideal course size is maximum 14 participants with one, or 24 participants with a two, lecturer course. Typically, the course is a 4 or 5-day programme.

Program

Day 1

- Kick off, introductions, course objectives and expectations
- Specifics of problem solving
- Summary of well-established investigation methods e.g. 5 Why, Tripod, RCA, Causal Reasoning, Structured Problem Solving.
- Various exercises to learn the methods by application: group work and report out

Day 2

- Structured problem analysis and problem resolution
- Why a structured approach
- Facilitation lecture
- Structured problem solving in 5 phases
  - Incident capture, risk assessment, ranking and prioritisation
  - Problem identification and problem statement
  - Data collection (timeline; drawings; trends; data assessment)
  - Cause and Effect Diagram and validation (verification and elimination)
  - Failure scenarios and cause selection
  - Solution development and selection decisions
- Implementation plans and learning sessions
- Various exercises: group work and report out

Day 3

- Full Day work on a case study to apply the structured problem analysis methodology, formulate the problem and produce timeline development and data analysis and reporting.
- Split in teams; exercise analysing and solving a problem
- Incident description and risk ranking
- Problem statement
- Timeline development and data analysis
- Cause and Effect Diagram
- Report out

Day 4

- Full Day work on a 2nd case study, solution development and implementation plan
- Split in teams; exercise analysing and solving a problem
- Incident description and risk ranking
- Problem statement
- Timeline and data analysis
- Cause and Effect Diagram
- Failure scenarios and cause selection
- Solution development and Implementation plans
- Report out

Day 5

Lessons learned & any site specific subjects

- Presentation of case studies
- Lessons learned session
- Any client specific subject(s)
- Evaluation

Root Cause Failure Analysis

Consultant / Trainer:

Ramon Publico & Francisco Amarra

Equipment failure is a recurrent industry problem and its mitigation is often a case of trial-and-error, even for experienced plant engineers - especially those engineers who presume common sense combined with rudimentary failure analysis skills may sail them through, only to meet the same problem soon again, perhaps in an evolved form. To overcome those shortcomings, this novel Root Cause Failure Analysis (RCFA) course reinforces traditional RCA methods with selected lessons from systems thinking, reliability engineering, and cognitive psychology, among other domains, to provide a deep, unique insight into how equipment failures and their root causes may be better understood, if not entirely eliminated.

Participants

This **Petrogenium.** course can be tailored for intermediate staff and for experienced personnel, including technical staff, supervisors and managers.

Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: Whilst highly suited for operations, maintenance, reliability, and safety engineers, its multi-disciplinary framework allows customization for non-technical personnel as well.

Learning Objectives

To equip participants with management and cognitive tools to promote a self-learning organization relating to failure investigations within an oil & gas context; to enable the participants to apply those tools on actual facility incidents, current and future.

Programme

Day 1 – morning session

Introduction - the Nature of Mishaps and their Investigation

Accident Capture

- Aligning failure investigations with plant risk matrix
- Incident Ranking – Accident investigation vis-à-vis Risk analysis
- Personal Accidents vs Process or System Accidents

Day 1 – afternoon session

Organizing and Managing Accident and Failure Investigations

Day 2 – morning session

Problem Framing

- Problem Identification – Problem Statement
- Problem Definition – Collect Facts to Determine “What” Happened
- Human Contribution to the Failure
- Investigator/Decision-maker Biases (and how to mitigate them)
- Accountability vs Blame

Day 2 – afternoon session

Root Cause Analysis

- The Fundamental Premise and Limitation of “Root”
- Common Problems with Traditional RCA Programs
- Failure Modes vs Failure Roots
- Levels of Roots – what is a root cause, exactly?
- Accident and Failure Models
- Core Analytical Met**hods**

Day 3 – morning session

Root Cause Analysis (cont.)

- Probable Cause Analysis - Sources of Failures, Accidents, and Incidents
- Cause Verification and Data Validation: Analysis of physical evidence to determine “how” it happened; analyze events & causal factor relationships to determine “why” it happened.
-

Day 3 – afternoon session

Solution Development

- When to STOP investigating
- Solution Criteria Selection – Musts / Wants
- Alternate/conceptual solutions

Elements of an Effective Investigation Report

Defect Elimination

Consultant / Trainer:

Ramon Publico & Francisco Amarra

Defect elimination is often seen as the little brother of root cause analysis. Or, is it? While RCA efforts are usually prioritized around big show stoppers — the most critical defects threatening plant operations — RCA has one fundamental flaw: it is reactive. Defect elimination involves a different team and a different culture in a parallel, supplemental effort to improve asset productivity by reducing the cumulative impact of hundreds, if not thousands, of minor defects before they grow bigger. In this sense, DE it is the smarter, faster little brother of RCA. This training course provides a unique, structured approach for a defect elimination culture to take hold within an organization.

Participants

This **Petrogenium.** course can be tailored for intermediate staff and for experienced personnel, including technical staff, supervisors and managers.

A pre-requisite is that participants have attended the Root Cause Failure Analysis course.

Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Learning Objectives

To equip participants with management and cognitive tools to promote a self-learning organization relating to defect elimination within an oil & gas context; to enable the participants to apply learnings on actual facility defects, current and future.

Programme

Day 1 morning session

- A review of the RCFA process
- Top-down RCFA vs bottom-up RCFA
- The defects elimination process
- Nature and Sources of Defects
- Defect elimination tools

Day 1 afternoon session

Organizing and Managing Defect Elimination Projects

- Technical, administrative, and logistical requirements

Case study 1

Day 2 – morning session

Creating a Culture of Improvements

- Elements of organizational culture
- Assessing your organizational culture
- Discovering best and worst practices
- Defect prevention practices
- Continual learning about the costs of defects
- Measuring success

Day 2 – afternoon session

Case study 2

Common pitfalls

- Scope
- Structure
- Culture

LNG Benchmarking Gap Closure Workshop

Workshop Faciliators:

Jannes Regterschot & Rene Verburg

Abstract

Benchmarking is an important methodology to set the base line performance of an LNG export facility. A benchmarking review establishes how well the facility performs in terms of production, safety performance, availability, operating cost, maintenance execution, energy efficiency etc. and highlights the gaps with the wider industry performance. For many operations it is difficult to translate the gained performance insights into an action plan that will form the backbone for performance improvements. They either lack the focus, time or coordination to produce a prioritized and coherent plan. This **Petrogenium.** workshop is designed to facilitate the framing process after a benchmarking exercise was completed and reported. In the various successive stages of the workshop, we first aim to have everyone accept the outcome/conclusions from the benchmarking review. We then help to extract the performance gaps that need prime attention for follow-up and apply a model to get to grips with the underperformance item and derive performance improvement actions.

Participants

Petrogenium. strives to have a broad representation of knowledgeable staff taking part in the gap closure review workshop. This should include management positions to demonstrate commitment and to assist with the provision of higher-level insights to the workshop. But equally important it is to have the various experts and operational staff around as they can provide in-depth insights in the performance of the facility and the organization. This will also ensure that certain events and decisions will be viewed in a realistic context and help participants to agree on actions needed to improve. **Petrogenium.**'s facilitation ensures that the right discussions take place and that a constructive way forward is determined and documented.

Workshop Objectives

- A joint and consistent understanding of the performance of the facility and the gaps with operations elsewhere.
- Agreeing a prioritization of the key performance gaps that will be further analysed for performance improvement. The choice shall be underwritten by the potential for margin improvement or cost reduction, or the strategic importance of the item.
- Have course participants work in small groups, create an understanding of the underperformance, and come up with specific actions to close the performance gap.
- Provide a coherent set of prioritized improvement actions against an agreed timeline. The totality of actions over time will be visualized as an improvement roadmap.
- Obtain full understanding and acceptance of the gap closure actions in a presentation to management where each work group presents its views and recommended way forward.

Programme

Day 1

- Scrutiny of benchmarking report findings and gaining full acceptance for its conclusions.
- Ranking of the various gaps with input from management and selection of the 3 most important performance items to be analysed in more detail.

Day 2

- Work in parallel groups to analyse the underperformance
- As a team facilitated by **Petrogenium.** staff, formulate and prioritise the necessary actions to help close the performance gaps.
- Create an action plan and implementation schedule and prepare a set of slides to present to management.

Day 3

- Working groups to present their results to the other groups and receive comments and suggestions for improvement.
- Working groups to further improve their plans and update presentations.
- **Petrogenium.** and working group presentation to management of the work done and the gap closure plans developed.

Introduction to the LNG Energy Transition

Workshop Facilitator:
Jannes Regterschot

Abstract

This **Petrogenium.** workshop explores the impact of the Energy Transition on the LNG Business, and specifically on LNG Export Facilities including the LNG markets they service. The main objective is to raise the awareness for the changes and actions needed due to the Energy Transition and to lay out the next step in the process which is the definition of an implementation strategy. The interactive workshop will first set the context for how the decarbonization drive may affect the LNG business and assets. We will assess the emissions from LNG production, the need to reduce these emissions, and deal with the options to decarbonise LNG plants. The workshop will take a global perspective on the LNG business, brainstorm the future of the LNG market and lay out the next step of how to define a decarbonization strategy for your own production facility.

To make the workshop most meaningful to the client's situation, it will to some extent be tailored to the geographic location of the production facilities and the main markets served.

Participants

The course is meant for LNG facility management and staff that will be involved in business and facility changes needed to decarbonise the LNG production chain. This potentially covers employees of a wide range of backgrounds, varying from the various technical orientations to strategic, legal, marketing, project and commercial staff. Decarbonizing LNG production will not only mean a significant change to current operation, but also the marketing of a greener product and achieving longer term sustainability and profitability.

Workshop Objectives

- Being aware of the context of global warming and the drive for LNG GHG emission reductions.
- Understanding the classification into scope 1, 2 and 3 GHG emissions.
- Identify emissions from your own LNG production facilities and the full LNG production chain and assess their contribution to global warming.
- Identify and evaluate options to decarbonize the production at your LNG production facilities.
- Gain an insight in the various drivers for GHG emission reduction, ranging from governmental, marketing, commercial, reputational to existential.
- Define the next step of how to come to a strategy and transformation for decarbonising your LNG production chain, considering the various stages of project development and implementation.

Specific Considerations

To allow fine-tuning to the client's situation it is required to receive upfront information regarding the specific client operation. The client should therefore identify a person in its organisation that will act as client focal point for **Petrogenium.** and ensure an efficient workshop preparation.

Programme

Day 1

- Kick off, introductions, course objectives and expectations
- Climate change and international actions on GHG emissions
- Scope 1, 2 and 3 emissions for your production facilities
- Defining the case for change

Day 2

- Modifications to LNG export facilities to reduce scope 1 and 2 emissions.
- Renewable fuels and anticipated changes in the future Gas/LNG market
- Next step of developing decarbonization strategic options and their implementation
- Recap and workshop closure

The actual contents and coverage of the workshop are flexible and will be adjusted and fine-tuned to customer needs

Hydrocracking

Consultant / Trainer:

Dr. Bob Scheffer

The **Petrogenium.** Hydrocracking course is an extensive awareness programme for engineers and operational staff dealing with all aspects of hydrocracking units. In addition planning, scheduling and procurement staff will find the course valuable as aspects and pitfalls of the catalyst testing and procurement best practices are discussed.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: oil refining personnel especially those involved with hydrocracking; researchers & professionals who work in hydrocracking; catalyst manufacturing staff, especially those involved in the production& research of hydrocracking catalysts; staff involved in refinery optimization & maximizing synergies between refinery processes.

Learning Objectives

How to make optimal use of hydrocracking units; understanding the types of reactions & kinetics, including reaction calculations; catalyst explanations, manufacture & commercially available catalysts; feedstocks; catalysts handling & testing; corrosion; safety aspects; troubleshooting; tenders & technical offers; technical forecasts based on pilot plant data.

Programme

Day 1

- Hydrocracking schemes
- Product properties
  - Types of reactions and kinetics
  - Kinetics: HDN, HDS, Hydrogenation, cracking
  - Reaction Mechanism - Normalisation
- Catalysts
  - Composition - Hydrogenation function - Acidity - Amorphous - Silica-Alumina - Zeolites
  - Properties of catalysts (e.g. SA, PV, MPD, strength etc)
- Catalyst manufacture
  - Support- Zeolite- Extrusion- Calcination- Impregnation - QC & Analyses
- Commercially available hydrocracking catalysts
  - Topsoe- ART- Axens- Criterion / Shell

Day 2

- Feedstocks
  - Type - Contaminants
- Catalyst handling
  - Reactor loading - Presulphiding procedures - Unloading
- Catalyst testing
  - Best Practices pretest - WABT Temperature profile - WHSV - Recycle cutpoint - Pressure
  - Gas to oil ratio - Critical Measurements
- Calculations
  - Conversion- Hydrogen consumption- Normalizations of WABT's

Day 3

- Corrosion
  - High-temperature - Aqueous - Wash-water injection to prevent corrosion
- Safety aspects
  - Catalysts - H2S - Polycyclic Aromatics - NH3- Sulphiding Compounds- Ni(CO)4
- Troubleshooting
  - Reasons for malperformance in- How to identify/rectify malperformance
  - Invitation to tender/Technical offer preparation
  - How to prepare a technical forecast based on pilot plant data

Thermal Cracking Process

Consultant / Trainer:

Jari Marci

The **Petrogenium.** Thermal Cracking Course is an awareness skills course aimed at professionals who deal with Visbreaker or Thermal Conversion units at a Refinery.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore, the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: Unit technologists, process engineers and experienced operations staff who are working on or exposed to visbreaking technology or its products (fuel oil blending operations). Further the course will be valuable to anybody that wants to gain better perspective on how the Thermal Cracking Units fits into the refining scheme.

Learning Objectives

This course provides a general introduction to thermal conversion processes such as visbreaking, distillate cracking and Thermal Gasoil Units. The basis and theory behind the process will be addressed including properties of feed residue and products as well as stability theory. Further elements are main process equipment including their constraints, unit operation as well as unit decokes. The course will further address fuel oil blending as well as process economics. The last day of the course is an interactive clinic workshop during which current challenges and issues of the unit at hand will be discussed and analysed.

Programme

Day 1

- Basics of Thermal Conversion
- Line-ups of Thermal Conversion units
- Yields and properties of TC-products
- Exercise 1
- TC-equipment

Day 2

- Monitoring of TCUs
- Start-up, shut-down
- Decoke
- Exercise 2
- Troubleshooting
- HSE and emergency procedures

Day 3

- Thermal conversion furnaces
- Exercise 3
- TC Open Clinic

Distillation Technology

Consultant / Trainer:

Jari Marci & Charu Ehrenreich

The **Petrogenium.** Distillation course is the basic building block to provide awareness on the fundamentals of Distillation and its application in oil refining. The course will introduce the fundamentals and theory behind distillation as well as provide an overview of industrial distillation equipment. The key focus of the course is on the most important distillation processes of the (atmospheric) crude oil distillation unit and the vacuum distillation unit. Secondary applications like 2-cut splinters and stabilizers will also be addressed.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore, the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: operational staff and (process) engineers on all levels on crude oil and vacuum distillation units or other distillation sections.

Learning Objectives

This course will provide understanding, raise awareness of design aspects and provide guidance to refinery staff on optimal operation of their distillation units.

Programme

Day 1

- Introduction and basics: distillation basics and theory
  - Modelling of vapour-liquid equilibria, Raoult's law, partial pressure
  - Column modelling, tray efficiency, rate based models
  - Setting of operating conditions: pressure & temperature limits, operating window
- Distillation equipment, types, features and limitations
  - Distillation trays, valves and downcomers. Random and structure packing.
  - Inlet and outlet devices, distributors and draw-off trays.
- Exercise 1
- Crude Distillation Units
  - Types and line-ups, operation, monitoring and optimisation
  - Product specifications: Flash point, cloud points, distillation (initial/final) boiling points

Day 2

- Miscellaneous equipment (vacuum sets, liquid ring pumps, drums & accumulators)
- Vacuum Distillation Units
  - Types and line-ups, operation, monitoring and optimization, Maxwell-Bonnell Temperature
  - Product specifications: Cloud Points, Conradson Carbon Residue
- Exercise 2
- Troubleshooting
  - Jet flooding, foaming, entrainment, downcomer limitations
  - Column turndown

Day 3

- Others distillation units
  - Stabilizers, LPG splitters, stripper-dryer columns
- Process control schemes
- Exercise 3
- Distillation Open Clinic

Hydrogenation Technologies in Steam Crackers

Consultant / Trainer:

Dr. Stefan Iselborn

The **Petrogenium.** Hydrogenation Technologies in Steam Crackers course will provide insight into catalysts and technologies for the selective and full hydrogenation of ethylene, MAPD, butadiene, and the pyrolysis gasoline fraction (pygas) in steam crackers and will raise awareness of design aspects and catalyst properties on optimum operation of their hydrogenation facilities to plant engineers and operation staff. The performance of benchmark units will be presented and methods for improvements towards benchmark performance of plants. The influence of impurities and special operation, such as start-up, regeneration etc. on plant economics, including catalyst lifetime, will be addressed. Safety aspects will also be covered.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: petrochemical technologists, process engineers and purchasing managers who deal with hydrogenation units and catalysts.

Learning Objectives

- to identify potential for higher profitability of your plant
- to maximize the yield of valuable products
- to increase onstream time
- to guide extension or improvement projects for your plants

Programme

Day 1

Basics of hydrogenation chemistry

- Chemistry
- Thermodynamics and kinetics of reactions
- Process flow diagram options
- Reactor designs
- Catalyst types and suppliers

Day 2

- Process variables and control
- Kinetics
- Evaluation of operation data (Which? How?)

Day 3

- Start-up and regeneration options
- Troubleshooting
- Case studies
- Course evaluation

Catalytic Resid Upgrading-Ebbulated Bed Process

Consultant / Trainer:

Dr. Wessel Ijstra

The **Petrogenium.** Catalytic Resid Upgrading (EB) Course is an awareness skills course aimed at professionals that deal with Ebbulated Bed Conversion units at a refinery.

Separate courses can be offered on Catalytic Resid Upgrading using Fixed Bed technology as well as courses in Fuel Oil blending.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: Unit technologists, process engineers, experienced operations- and laboratory staff who are working on or exposed to Resid Upgrading technology or its feeds and products (fuel oil blending operations). Further the course will be valuable to anybody that wants to gain better perspective on how Resid Upgrading Units fit into the refining scheme.

Learning Objectives

This one-day course provides a general introduction to Catalytic Resid Upgrading and more specifically Ebbulated Bed units. The basis and theory behind the process will be addressed including properties of feed and products as well as stability theory. Further elements are main process equipment including their constraints, unit operation as well Catalyst Addition Rate optimization. The workshop can be concluded with an interactive discussion and analysis on the current challenges and issues of the unit at hand.

Programme

Part 1

Introduction

- Basics of Catalytic Resid Upgrading
- Line-ups of Resid Upgrading units
- Yields and Properties of Resid Upgrading-products
- Marine fuel oil: specification and application aspects

Part 2

Operating conditions and performance optimization

- Important process parameters and their impact on performance
- Performance monitoring and optimization

Part 3

Selecting a new catalyst system

- Setting-up Invitation to Bid
- Options for catalyst evaluation
- Requirements for technical proposal

Part 4

Discussions on issues in unit at hand

Fundamentals of Aromatics Recovery

Consultant / Trainer:

Thomas Diehl & Brigitte Sölla

The **Petro**genium**.** Aromatics Recovery / Extraction / Extractive Distillation course provides insight into technological fundamentals and will raise awareness of design aspects to refinery / petrochemical plant staff on optimized operation of their aromatics recovery facilities. Over many years the **Petro**genium. experts gathered deep technical expertise in the operation, optimization and troubleshooting of all extraction / extractive distillation technologies and their associated equipment. This knowledge and resulting best practices were collected and built the foundation for the course.

Participants

This **Petro**genium**.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: refinery/petrochemical technologists, process engineers & economists and operational staff who work with Aromatics Recovery Units with Extractive Distillation or LL-Extraction technology.

Learning Objectives

- To operate your plant safely
- To optimise the margin and energy usage
- To ensure the quality of the solvent over an extended period
- To guide improvement projects for your plants

Programme

Day 1

Basics of aromatics production

- Introductions
- Process Principles
- Process Flow and Equipment (Columns/Extractor internals)

Day 2

Process fundamentals

- Process Variables
- Process Control
- Process Calculations

Day 3

Day-to-day operational aspects

- Operating procedures
- Troubleshooting
- Solvent monitoring
- Corrosion prevention (Sulfolane)

LDPE Process Chemistry & Product Training

Consultant / Trainer:

Dr. Dieter Littmann

The **Petrogenium.** LDPE course is centred around the process chemistry of the high-pressure polymerisation of ethylene to make low density polyethylene and the associated product properties and product applications. The course provides the background to understand the specific polymer structure and how to tailor product properties by adjusting process conditions. The mean product applications for LDPE are covered and the required product properties discussed.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: plant management, process engineers, laboratory personal and product developers.

Learning Objectives

Process and Polymer Chemistry Basics

- What is PE
- What is LDPE
- Free Radical Polymerisation Reaction

Process Control and Process Chemistry

- Polymerisation Initiators
- Chain Transfer Agents
- Comonomers
- Control of Polymer Properties

LDPE Products

- Structure-Property Relationship
- Product Applications
- Product Quality Parameters
- Product Testing
- Product Additivation
- Scope of Ethylene Copolymer Products

Programme

Day 1

General Introduction LDPE Process

- Polymer Characteristics of PE and specifically LDPE
- Polymerisation Basics
- General Control of Polymerisation Conditions
- Process Chemicals (Initiators, Chemicals, Inhibitors)
- Key Characteristics of Tubular and Autoclave Reactor
  - Impact on Product Properties and related Applications
- Control of Polymer Properties
- Process Disturbances

Day 2

General Introduction LDPE Products

- Key Product Characteristics
- Polymer Structure and Property Relationship
- Polymer Processing and Product Applications
  - Film Application
  - Extrusion Coating
  - Blow Molding
  - Injection Molding
  - Wire & Cable
- Product Quality Testing

Sulphur Recovery & Tail Gas Treating

Consultant / Trainer:

Egbert van Hoorn & Frank Oehlschlaeger

The **Petrogenium.** Sulphur Recovery and Tail-Gas Treating training provides unique insight into the design and operation of Sulphur Recovery and Tail gas treating units. Over many years the **Petrogenium.** experts have gathered deep technical expertise in design, commissioning, start-up, operation, optimization and troubleshooting of SRUs, Tail-Gas Treating units and associated equipment. This knowledge and resulting best practices built the foundation for the course.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: engineers as well as operational staff; depending on the participants, the training can receive a theoretical profile or focus more on practical aspects.

The duration of the course is flexible. 1.5 days is the minimum although this can be extended to 3 days dependent on the client: the programme example given is for 3 days. Operator training will typically be limited to 2 days.

Learning Objectives

In the more technology and design focused 3-day course, a wide overview of commercially available and proven technology is provided highlighting pros and cons of each option including their specific limitations. Especially engineers and project developers will find this concept useful.
For operators a training program of 2-days, focussing on the actual technology at site, best practices and other operational aspects is available.

The operator training is to focus on the process technology installed at the particular site. For this option DCS screenshots of the particular site are included into the course program to allow more site-specific discussion about operating parameters and unit line-ups.

Programme

Day 1

Sulpher Recovery Fundamentals:

- Introduction and environmental impact
- Sulphur Recovery Unit equipment
- Tail gas incineration (thermal, catalytic)
- Sulphur degassing

Day 2

Sulpher Recovery Unit Operations:

- Instrumentation and control
- Commissioning and start-up
- Normal operation, monitoring, shutdown
- Hot and cold standby
- Trouble shooting
- Performance testing and analytical
- Process safety

Day 3

Tail Gas Treating and Sulphur process description, equipment, operation, advantages/ disadvantages:

- SCOT process
- Superclaus® and Euroclas® process
- Sub-dewpoint porcesses
- Cansolv
- WSA process®
- Thiopaq®
- Sulphur Storage

Amine Treating & Sour Water Stripping

Consultant / Trainer:

Egbert van Hoorn & Frank Oehlschlaeger

The key objective of the course is to provide understanding, raise awareness and guidance to refinery staff in the field of amine treating and sour water stripping. The content of this course will enable staff to optimize unit operation, troubleshoot upsets as well as to provide them with design awareness.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: operational staff and process engineers who are involved in operation, supervision or maintenance of Amine and Sour Water Stripping units.

The duration of the course is flexible. 1.5 days is the minimum although this can be extended to 3 days dependent on the client: the programme example given is for 2 days, the most common length. Operator training will typically be limited to 2 days.

Learning Objectives

- To understand the process principles in Amine Treating and Sour Water Stripping
- The purpose of the process units in the refinery
- To understand the Unit Equipment, Column Internals, Unit operation and Monitoring
- To interpret Amine analysis
- The process control steering of the unit
- How to handle the degradation of Amine solvents and Heat stable salts
- Troubleshooting

Programme

Day 1

Introductions, Course Objectives and Expectations

- Process Principles
- Amine Chemistry and Selection
- Equipment Review
- Design Parameters and Operating Conditions
- Amine Analysis

Day 2

- Process Control
- Loss Reduction and Foaming Control
- Corrosion Control and Case Studies
- Filtration
- Degradation of Amine Solvents and Heat Stable Salts
- Review of the Actual Refinery Operation
- Sour Water Stripping

Caustic & MEROX treatment

Consultant / Trainer:

Egbert van Hoorn & Frank Oehlschlaeger

The **Petrogenium.** Caustic and MEROX Treatment training provides unique insight into the design and operation of Sulphur Recovery and Tail gas treating units. Over many years the **Petrogenium.** experts have gathered deep technical expertise in caustic treatment and processes. This knowledge and resulting best practices built the foundation for the course.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: Experienced operators; Unit and responsible engineers; in Downstream Refinery, Upstream Oil and Gas or LNG establishments.

The duration of the course is flexible. 1 day is the minimum although this can be extended to 2 or 3 days dependent on the client: the programme example given is for 3 days. Operator training will typically be limited to 2 days.

Learning Objectives

The seminar time and content can be adapted to client requirements because of its modular concept. It can be given in one, one-and-a-half, two or three days, dependent on the subjects of interest for the client. The best results are gained with the inclusion of client operating data and problems into the discussions and exercises.

Programme

Day 1

- Introduction
- Caustic treating principles
- Caustic treating for H2S removal and prewash
- Amine H2S extraction of LPG fractions:
  - Importance for pretreatment
  - Reduction of caustic consumption
  - Main operation points
- Mercaptan extraction from LPG fractions:
  - MEROX® process
  - THIOLEX® process
- Mercaptan extraction from condensate fractions
- Exercise on understanding

Day 2

- Mercaptan extraction from light gasoline fractions
- Equipment Review for extraction of RSH
- Required analysis and schedule
- Troubleshooting operational problems
- Mercaptan sweetening of normal gasoline fractions:
  - Traditional sweetening process
  - Minalk® process
  - Mericat® process
  - Caustic free process
- Required analysis and schedule
- Troubleshooting operational problems
- Exercise on understanding

Day 3

- RSH sweetening of Kerosene fractions
  - Traditional UOP fixed bed process
  - Modern UOP fixed bed process
  - Mericat J® process
  - Caustic free process
- Required analysis and schedule
- Troubleshooting operational problems
- Exercise on understanding
- Minimizing caustic disposal
- Caustic neutralization and oxidation
- Summary

Energy and Utility Systems

Consultant / Trainer:

Jan Zander

The **Petrogenium.** Utility and Energy course has the key objective to provide understanding and guidance to staff, with the purpose to improve the reliability, efficiency and effectiveness of utilities generation and distribution at your refinery, petrochemical complex or LNG facility. Over many years the **Petrogenium.** experts gathered deep technical expertise in the operation, optimization and troubleshooting of all Utility complex aspects and its associated equipment. This knowledge and resulting best practices were collected and built the foundation for the course.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: (new) engineers and senior operational staff whereas based on the attendee profile a more theoretical or practical course approach can be followed. If desired the 4-day can be structured with side specific support activities and exercises during various sessions.

Learning Objectives

Understanding of all factors related to energy and utilities to improve the reliability, efficiency and effectiveness of utilities generation and distribution of refineries, petrochemical complexes or LNG facilities; problems that are experienced in many manufacturers' sites but are not described in detail in most textbooks will be dealt with, in order to help the participants in trouble shooting several hot utilities systems once they come across these issues.

Programme

Day 1

- Introduction
- Basic water chemistry
- Water sources & surge
- Sedimentation & clarification
- Filtration
- Ion exchange / demin plant

Day 2

- De-aeration & oxygen scavenging
- BFW pumps & NPSH
- Boilers & combustion basics
- Boiler water treatment
- Condensate treatment
- Steam distribution, control & dynamics

Day 3

- Steam turbines
- Condensers
- Cooling towers performance
- Cooling water treatment
- CT water & chlorination
- Cooling water & legionella

Day 4

- Water integrity protection
- Process safety in utilities
- Pump curves
- Condensate trapping
- Fuel gas
- Instrument air
- Nitrogen
- Reliability philosophy
- Power dynamics

The course is also available in a version for (night) shift operator training (face-to-face or remotely). For an impression of what an on-line course for (night) shift operators could look like:

Fired Equipment

Consultant / Trainer:

Louis Jacobs

The **Petrogenium.** Fired Equipment course will provide an introduction to the basics of Fired Equipment, theory of combustion and different forms of fired equipment in practice. Applications in refinery units are discussed in detail.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: operational staff and (process) engineers on all levels working on fired equipment in distillation units, process units, utilities, treatment units etc.

Learning Objectives

Combustion theory, Burners, Environmental aspects, Heat Transfer and 2-phase flow phenomena.

Programme

Day 1

Introduction and Basics:

- Theory of Combustion
- Efficient operation
- Heat Transfer in fired equipment
- Two-phase flow in heater tubes
- Failure mechanisms process side

Day 2

- Environmental aspects
- Burner functionality, types, Low NOx
- Combustion control and safeguarding
- Failure mechanisms combustion side

Day 3

Applications of Fired Equipment

- Boilers
- Distillation heaters
- Cracking heaters
- Hydrogen manufacturing
- Exercises

Combustion, Fired Heater Operation & Flue Gas Treatment

Consultant / Trainer:

Dirk-Jan Treur & Louis Jacobs

The **Petrogenium.** Combustion course will provide an introduction into a wide range of topics related to traditional Fired Heaters, Heat Recovery Units and Boilers. Apart from combustion theory this course will also emphasize on the specific process side of the heater as well as on treatment of flue gasses. Control & Safeguarding, efficient operation, start-up/shut-down, emergencies and maintenance/inspection are subjects covered in this course. In addition, the trainers will introduce the participants into the latest developments on burners, transition to electrical heaters and the consequences for fired heaters when moving towards Carbon Capture.

Participants

This **Petrogenium.** course can be tailored for the specific needs of a refinery, chemical plant or LNG site. Target audience includes Technologists, HSE specialists, Senior Operators, Inspectors and C&S specialists. The course is classroom-based but can be supported by a visit in the field.

The option for post-course consultancy/help-desk support is also available.

Learning Objectives

Combustion theory, Burners, Furnaces, Incinerators, Heat Recovery, Boilers, Electrical Heaters, (2-phase) flow properties, tube metal temperatures, furnace efficiency, formation of pollutants, GHG reduction, (IR-) inspection of heater tubes, control and (flame) safeguarding, operation, maintenance and inspection.

Programme

Day 1

Introduction

- Fired equipment
- Combustion theory

Burner designs & Environmental Aspects

- Burner features, typical burners
- Developments and future changes
- Environmental Aspects

Day 2

Fired heaters

- Heat transfer modes
- Transfer of Heat & Energy losses
- Exercise on efficiency

Flow patters in heater tubes

- Development of 2-phase flow
- Impact on transfer of heat
- Exercise 2-phase flow

Day 3

Boilers & heat recovery unit

- Principles
- Water, Fire & Electrical tube boilers
- Heat Recovery Units

Electrical heaters

- TEMA type and radiative heaters
- Exercise electrical heater

Day 4

Inspection & maintenance

- Failure mechanisms
- Materials, corrosion, refractory
- Tube skin measurement
- IR Thermography

Draft control on fired equipment

- Boilers & HRSG's vs. Fired Heaters
- Stacks
- Natural, Forced and Balanced draft
- Air pre-heaters
- Brownfield Carbon Capture, impact on fired equipment
- Exercise Draft

Day 5

Optional

- Practical problems
- Special topics
- Visit Fired Equipment on site

TEMA & HTRI Heat Exchanger Design & Cost Saving Management

Consultant / Trainer:

Bert Boxma

The course provides in depth practical understanding of major proven heat exchanger technologies and “state of art” fouling mitigation technologies. Pro’s and Con’s of several heat exchanger types are presented explained with life operational examples. This course provides a good mix of theory and common practices using highly interactive case studies where attendees are encouraged to use in-house heat exchanger type selection software and rigorous design/rating world-class software from HTRI.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants could include a wide range of Technical Professionals but will greatly benefit:

- Engineers in disciplines Process, Mechanical, Project acting as specialist or generalist.
- Design Specialist in heat exchanger to extend their knowledge HTRI specific Engineers in various disciplines; Maintenance, Turn-Around, & Cost Estimating

Learning Objectives

By the end of this course, participants will be able to perform or become:

- Proper Heat Exchanger Selection
- Heat Exchanger sizing
- Active Communicator during Meetings with Vendors
- Better observer during final inspection of heat exchangers
- Clear understanding of HTRI results

Programme

Day 1

Shell and tubulars

- Historical & Market Aspects
- Basic Heat Transfer
- Mean Temperature Difference & Thermal Efficiency
- Fundamentals of Stream Analysis
- TEMA Nomenclature & Selection
- Shell, Bundle, Baffle and Tube type Selection

Day 2

Shell & Tubulars Advanced Technologies

- Fouling Mitigation Technologies
- High Pressure Breech Lock Closure type
- Texas Tower, Helitower, Helixchanger, Helifin, Helitrans
- Tube Insert Technologies
- Low-fin, High-flux, Corrugated and Twisted Tube applications and examples

Day 3

Vibration Analysis and HTRI / TEMA Case Studies

- Tube Vibration and FIV Prevention Technologies
- Case Study Selection of TEMA type
- HTRI Case study

Day 4

Air Cooled & Compact Heat Exchangers

- Air Cooled & Economizer Type
- Double Pipe, Hairpin
- Plate & Frame, Spiral Plate & Spiral Coil
- Welded Plate (Printed Circuit, Packinox, Brazed Aluminum)
- Submerged & Waterbath Type
- Open Rack Vaporizer
- Case Studies on Selection

Day 5

HTRI Thermal Design Aspects

Condensers & Reboilers

- Practical Aspects of Condenser Design (Reflux, Vent, Shellside versus Tubeside)
- Practical Aspects of Reboiler Design (Thermosyphon, Kettle, Falling Film)

HTRI Masterclass

Consultant / Trainer:
Bert Boxma

In this course the trainer will explain the world-class software module Xist from HTRI in live sessions. Xist can handle the design/rating of shell & tube, hairpin and jacketed pipe geometries.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

This Masterclass is very suitable for novice users of HTRI software including process and mechanical engineers who like to work more often with heat exchanger simulation software.

Attendees may have their own HTRI software installed or request HTRI for a month free trial Xist software.

Programme

We start with examples of single phase followed by condensation, reboiling and tube vibration. How to set up a rating case starting from scratch. Going through the input fields step-by-step to run your heat exchanger model. What input and output matters? After a successful run we will evaluate the results as presented by HTRI in data, graphs and drawings.

Training will enable you to in make your own tube lay-out with different pass arrangements including bundle impingement protection, sealing devices, tie-rod locations and bundle runners.

During the course it ispossible to generate actual plant simulations so the output results can directly be used and modifications can be implemented. Training examples will be used to broaden design skills. Each session will be closed with a Quiz.

It is to be advised to run the Masterclass HTRI together with other Masterclasses such as:

- Single Phase
- Mean Temperature Difference
- Condensation
- Boiling
- Vibration
- Fouling
- Enhanced Heat Transfer & Trouble Shooting
- Sulphur Condensers and WHB

These other Masterclasses contain essential theoretical and practical detail in order to perform a proper evaluation of HTRI results.

TEMA & HTRI Heat Exchanger Design & Cost Saving Masterclass

Consultant / Trainer:

Bert Boxma

This Masterclass can be tailored to a specific client's needs. Built from a series of chosen modules, the Masterclass can provide an in depth practical understanding of major proven heat exchanger technologies and "state of art" fouling mitigation technologies. Pro's and Con's of several heat exchanger types can be explained with life operational examples. The Masterclass will mix theory and common practices using highly interactive case studies where attendees are encouraged to use in-house heat exchanger type selection software and rigorous design/rating world-class software from HTRI.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants could include a wide range of Technical Professionals who want to improve the performance of heat exchanger in their company for shell & tube and compact types but will greatly benefit:

- Engineers in disciplines Process, Mechanical, Project acting as specialist or generalist.
- Design Specialist in heat exchanger & heat Transfer Engineers to extend their knowledge HTRI; specific Engineers in various disciplines; Maintenance, Instrument, Turn-Around, & Cost Estimating

Programme

Module 1 - Shell & Tube HX
Heat Exchanger Overview
Shell & Tubular Discussion
Stream Analysis

Module 2 - Shell & Tube HX
Deep dive Shell & Tube heat exchanger
TEMA nomenclature
Case studies

Module 3 - Shell & Tube HX
Tube-Tubesheet connection
Tube vibration
Examples & remedies

Module 4 - Shell & Tube HX
High velocity protection
Impingement plate or rods implementation
Cost savings

Module 5 - Shell & Tube HX
Removable bundles
(U-tube, Floating Heads and Texas Towers)

Module 6 - Shell & Tube HX
Shell side aspects
Tube support in different systems

Module 7 - Shell & Tube HX
Tube varieties
Twisted tube or High fFux tube

Module 8 - Shell & Tube HX
Operational aspects
Use of tube inserts

Module 9 - Air Cooled HX
Tube application & selection
Process application

Module 10
Double pipe or Multi Tube Hairpin HX
Process Application

Module 11 - Plate & Frame Gasketed HX
Process application & experiences

Module 12 - Other HX Types
Spiral plate, Plate in Shell, Packinox, Spiral Coil, Printed Circuit and Braised Aluminium

Module 13 - No Steam HX
Electrical heater, Submerged Combustion Vaporizer, Open Rack Vaporizer and others

Technical Integrity Management in Refineries

Consultant / Trainer:

Dr. Henk Helle

Gradually refinery owners have come to recognize that the single most important characteristic of an excellent refinery is the quality of their Asset Integrity Management. Functional Integrity, Legal integrity and Technical Integrity are all part of this, but the current course focusses on Technical Integrity. The "**Petrogenium.** Technical Integrity Management in Refineries" course provides insight and guidance by systematically exploring the many threats that may exist or arise in refinery units. That, and the methods to manage these threats such as Risk Based Integrity Management, Compliance Management and Management of Change.

Over many years **Petrogenium.**'s experts have collected and mobilized extensive expertise in the integrity management methods of refineries and individual refinery units; all this expertise is incorporated in the course. The course is highly interactive and should be valuable for most of the staff at refineries, especially for those working in refineries with perennial integrity issues.

Participants

This **Petrogenium.** course can be tailored for basic awareness of inexperienced staff or for intermediate or experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: operators, inspectors, integrity-, process- and project engineers and service company reps; engineers & managers responsible for the reliable and safe design and operation of crude units. Non-refinery personnel, e.g., service providers, chemical vendors and engineering contractors. Those involved in the design of crude units or equipment for crude units may also benefit.

Learning Objectives

The challenges of corrosion and degradation and the barriers that can be applied through design, materials selection, process design and -control. How to prioritize and focus resources using a risk based approach; how to effectively operate a refinery safer, more reliably and more sustainably.

Programme

1st & 2nd half day

- Integrity Management and its Culture
- Threats and Barriers
- Design
- Materials
- Process design
- Operation and IOWs
- Key Corrosion Indicators

3rd & 4th half day

- Non-intrusive inspection
- Intrusive inspection
- Procedures, Codes and Standards
- Fitness-for-Purpose
- Risk based methodologies
- Compliance
- Management of Change

Corrosion Control in Crude Units

Consultant / Trainer:
Dr. Henk Helle

Crude units seem simple and straightforward, but the feedstocks they process may not be so benign. The "**Petrogenium.** Corrosion Control in Crude Units" course aims to provide insight and guidance by systematically exploring the many complications and threats that may exist in crude units, or can be the unintended consequence of unfortunate choices. That, and the remedies against such threats.

Over many years the **Petrogenium.** experts have collected and mobilized extensive expertise in the control of corrosion and fouling in crude units and associated equipment. The course is highly interactive and should be valuable for staff at all refineries, especially for those working in refineries with perennial corrosion issues.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: operators, inspectors, integrity-, process- and project engineers and service company reps; engineers & managers responsible for the reliable and safe design and operation of crude units. Non-refinery personnel, e.g., service providers, chemical vendors and engineering contractors. Those involved in the design of crude units or equipment for crude units may also benefit.

Learning Objectives

The challenges of overhead corrosion, high temperature corrosion and fouling; Crucial process steps as desalting, caustic injection and overhead protection are treated in depth; some pitfalls of opportunity crudes; to operate a crude unit safer, more reliably and more sustainably.

Programme

1st & 2nd half day

- Atmospheric and Vacuum Distillation units.
- Feedstock: types and contaminants.
- Threats to integrity. Corrosion, cracking, fouling,
- High temperature sulfidic corrosion and naphthenic acid corrosion. Interaction, operational effects
- Aqueous corrosion in the column top and overhead system corrosion.
- Materials, protections, barriers and verifications

3rd & 4th half day

- Desalters and desalter operation. Desalter types, grids, operating variables, efficiencies
- Caustic addition to crude: Why, What and How
- Overhead protection by injection of water, ammonia , inhibitors, amines: Why or why not; how?
- Fouling: causes, effects and remedies

Introduction to Reliability for Engineers

Consultant / Trainer:
Francisco Amarra

This **Petrogenium.** Introduction to Reliability for Engineers course gives a brief introduction to reliability, concepts and practical application. Ideal for practicing engineers and supervisors to get a good overview of what reliability is about and how it can benefit the organization.

The course is conducted in 3 days on client site.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: engineers and supervisors from: Maintenance, Operations, Projects, Process Engineering, Contracts/Procurement, Warehousing, Safety, Human Resources, Environment and Health, Finance, Economics and Scheduling, Turnaround, etc.

Learning Objectives

This course provides provides a more in-depth understanding of reliability and how it impacts the way assets in the facilities could be effectively managed. It offers an insight in reliability concepts and how it is applied in the real world. Case studies and practical exercises will demonstrate how it changes the paradigm beliefs of the participants of this course.

Programme

Day 1

- Objectives & Premises
- Building the Case for PM Tasks
  - Stages to Maintenance Excellence
  - Maintenance in the overall business process
  - Syndicate Session #1
- Maintenance & Reliability Principles
  - Meaning of “Maintenance”
  - Need for Maintenance
  - Evolution of Maintenance
  - Equipment Life & Failure Patterns
  - Failure Pattern F: Infant Mortality

Day 2

- Features of Poor Maintenance
- Modern Reliability Views
- Maintenance Options
- Syndicate Session #2
- Maintenance Policies
  - Stand-alone
  - Dedicated duty
  - Dedicated standby
  - Run-to-Failure
  - Hidden Failure
  - Syndicate Session #3

Day 3

- Understanding the P-F Curve
  - Civil
  - Electrical
  - Mechanical
  - Tire Maintenance (example)
  - Cost Effectiveness of Maintenance
- RCM Application
  - Benefits
  - IPF, RBI and RCM Development
  - Meaning of “Life”

Introduction to Reliability for Managers

Consultant / Trainer:
Francisco Amarra

This **Petrogenium.** Introduction to Reliability for Managers course gives a short overview of reliability, concepts and practical application. Ideal for busy managers and top executives to get a good overview of what reliability is about and how it can benefit the organisation.

The course is conducted in 1 day (between 6-8 hours) and may be F2F or online.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: managers from: Maintenance, Operations, Process Engineering, Contracts/Procurement, Warehousing, Safety, Human Resources, Environment and Health, Finance, Economics and Scheduling, Turnaround, etc.

Learning Objectives

This course provides a brief overview of reliability and how it impacts the way assets in the facilities could be effectively managed. It offers an insight in basic reliability concepts and how it is applied in the real world. Case studies and practical exercises will demonstrate how it changes the paradigm beliefs of the participants of this course.

Programme

Day 1

- Objectives & Premises
- Building the Case for PM Tasks
  - Stages to Maintenance Excellence
  - Maintenance in the overall business process
- Maintenance & Reliability Principles
  - Meaning of “Maintenance”; Need for Maintenance; Evolution of Maintenance
  - Equipment Life & Failure Patterns
  - Failure Pattern F: Infant Mortality
  - Features of Poor Maintenance
  - Modern Reliability Views
  - Maintenance Options
- Maintenance Policies
  - Stand-alone
  - Dedicated duty
  - Dedicated standby
  - Run-to-Failure
  - Hidden Failure
- RCM Application
  - Benefits
  - IPF, RBI and RCM Development

Maintenance Planning & Scheduling

Consultant / Trainer:
Francisco Amarra

The **Petrogenium.** Maintenance Planning & Scheduling course will provide an in-depth understanding of reliability and how it impacts the way assets in the facilities could be effectively managed. This course is intended for new and experienced routine maintenance planners and schedulers.

The pre-requisites for attending this course are:

- SAP-PM organization in place
- Company Risk Matrix in place
- SAP system and PM module fully functional
- SAP CMMS and PM module training completed
- New RBWS system in place and RBWS training completed
- Safety training completed on:
  - Job Safety Analysis
  - HAZOP (optional)
- Reliability training on:
  - Introduction to Reliability for Engineers
  - FMEA or FMECA (optional)
- New WO Process fully developed (based on P&SO Workshop)

The course is conducted for 5 days on the client's site.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: engineers and supervisors from: Maintenance, Operations, Projects, Process Engineering, Contracts/Procurement, Warehousing, Safety, Human Resources, Environment and Health, Finance, Economics and Scheduling, Turnaround, etc.

Learning Objectives

This course provides a more in-depth understanding of reliability and how it impacts the way assets in the facilities could be effectively managed. It offers an insight in reliability concepts and how it is applied in the real world. Case studies and practical exercises will demonstrate how it changes the paradigm beliefs of the participants of this course.

Programme

Day 1

- Objectives of P/S Training
- Pre-requisites
- Nomenclature/Acronyms
- Background
- Routine Maintenance Process
  - Risk Matrix
  - Maintenance Work Prioritization
  - Work Classification
  - Routine Maintenance Workflow Process

Day 2

Planning

- SAP-PM Screenshots
- Planner Qualifications
- Functions
- Level of Work Packs

Day 3

- Planning Flow
- Planning Considerations
- Work Package
- Work Pack Development Exercise
- Planning KPIs

Day 4

Scheduler

- Scheduling Process
- CPM (Critical Path Methodology)
- Functions
- Scheduling Flow Diagram
- Forward Log/Backlog
- Floating Job
- Schedule pre-requisites
- Preparation & Structure

Day 5

- Benefits of Scheduling
- Work Scheduling Exercise
- Managing Forward Logs
- Scheduling KPIs
- Course review

Routine Maintenance Work Process Development Workshop

Consultant / Trainer:

Francisco Amarra

Some organizations feed that they don't have an efficient work process for their routine maintenance system. This **Petrogenium.** Workshop for Routine Maintenance Work Process Development delves into the issues that plague the maintenance and operations organizations with regards to a best-in-class work process.

The following are the pre-requisites for this course:

- A documented work order/work prioritization process and in place
- SAP-PM in place
- Company Risk Matrix in place

This workshop is conducted for 5 days on client site.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants may include: Operations (operators and/or supervisors), maintenance field engineers, maintenance planners and schedulers, workshop supervisors and reliability engineers.

Learning Objectives

This workshop aims to develop a best-in-class and fit-for-purpose work process for maintenance and operations organizations. It allows a critical assessment of the gaps found in the "As-Is" work process and ensures that these gaps are effectively closed or eliminated in the development of the "To-Be" work process. Process KPIs will continuously monitor the effectiveness of the implementation of each step of the work process. The end of the course requires the participants to present to management the output "new look" work process for approval and implementation.

Programme

Day 1

- Introduction
  - Personal Introductions (participants)
  - Vision Statement
  - Participant's Expectations
  - Workshop Objectives, Tasks and End Results
- What is a "Brown Paper" Exercise?
- "As-Is" Work Process
  - Work Identification
  - Planning
  - Execution
  - Close-out
  - Brown Paper Construction Considerations

Day 2

- Review of "As-Is" Work Process
  - Good Points
  - Areas for Improvement (Process/ Tools/People)
- Best Practice Introduction
  - Client Risk Matrix
  - Process Steps World Class Practice

Day 3

- "To-Be" Work Process
  - Work Identification
  - Work Order Planning
  - Scheduling
  - Execution
  - Close-out

Day 4

- RACI Identification
- Process KPI Identification
- Benefits / Challenges of New Work Process

Day 5

- Workshop Evaluation
- Preparation for presentation to Management
- Presentation to Management

Extending Turnaround Interval Workshop

Consultant / Trainer:
Francisco Amarra

The frequency and duration of turnarounds (TA) could spell the difference between a healthy profit or a painful loss for a facility such as an oil refinery. The frequencies of TA depends on the performance of critical equipment in a unit or plant and once these equipment fails to perform to acceptable levels, then a turnaround is inevitable.

This workshop allows the organization to assess and reduce the frequency of turnaournds for specific units of the whole facility through a systematic review of critical equipment historical performance, deterioration rate, operational practices, operational spares, etc.

The workshop duration depends on the number of critical equipment to be analyzed using the algorithm, but normally it would range between 2 – 6 weeks.

Participants

This **Petrogenium.** course can be tailored for for intermediate staff and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Participants should include technical authorities from: Maintenance, Inspection, Operations, Process Engineering, Economics and Scheduling, and Turnaround.

Learning Objectives

This workshop gives the opportunity for the whole organization to assess the frequency of turnarounds for the whole facility. If the frequency is not acceptable to the organization, the workshop provides a better understanding of the challenges it is facing in attempting to reduce the frequency of the turnarounds.

An algorithm has been developed to assist in the analysis of existing equipment based on current operating conditions. Various options will be considered to try to extend the operating life of the equipment.

Programme

- Objectives & Premises
- Setting the desired initial frequency of turnaround
- Review of historical performance of each critical equipment
- Presentation of current performance of each critical equipment
- Identify mandatory and legal requirements affecting the operational availability of the plant
- Identify equipment performance that not meet the desired frequency of the turnaround
- Choose from options available in order to increase equipment performance and meet the desired TA frequency
- Conduct a feasibility study on each option
- Obtain management approval for chosen option
- Assess overall plant performance. The shortest maintenance period of critical equipment will determine the frequency of the turnaround.

Project Management

Consultant / Trainer:

Brian Young

The **Petrogenium.** Project Management training portfolio lays out the integrated knowledge capture and lessons learnt during the worldwide execution of major project development through to operation, maintain and abandonment of assets.

The training modules have been developed from many years of practitioner experience in execution of mega projects and operating/maintenance of oil and gas, refining and petrochemical complexes.

The training modules are constantly reviewed and updated reflecting changes in the industry and blends soft skills, hard methodologies and business acumen.

Participants

This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Learning Objectives

The modules cover both organisation and individual competencies and can be developed to meet Company specific training programme requirements.
Training courses can be tailored to accommodate specific competency gaps for customers. If you have any questions regarding the training below or any additional wishes, please contact us.

Programme Modules

- Project implementation overview
- Project phase ‘Identify’
- Project phase ‘Feasibility’
- Project phase ‘Pre feed’
- Project phase ‘Feed’
- Project phase ‘Execution’
- Project phase ‘Operate’
- EPCC project phases
- Engineering phase
- Construction phase
- Construction HSE

Project Guidelines

Consultant / Trainer:
Brian Young

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Participants

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Learning Objectives

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Training courses can be tailored to accommodate specific competency gaps for customers. If you have any questions regarding the training below or any additional wishes, please contact us.

Programme Modules

- Scouting report BOD and BDP
- Project specification and BDEP
- Project premise document (PPD)
- Project execution strategy (PES)
- Project execution plan (PEP)
- HSE assurance in capital projects
- Capital cost estimation
- Alliances and incentives contracting
- Owners costs
- Scheduling
- Project check-list
- Project assurance
- Peer review
- Operations implementation plan (OIP)
- SMART START
- Project controls
- Quality management in projects
- Information management

Project Value Capture

Consultant / Trainer:

Brian Young

The **Petrogenium.** Project Management training portfolio lays out the integrated knowledge capture and lessons learnt during the worldwide execution of major project development through to operation, maintain and abandonment of assets.

The training modules have been developed from many years of practitioner experience in execution of mega projects and operating/maintenance of oil and gas, refining and petrochemical complexes.

The training modules are constantly reviewed and updated reflecting changes in the industry and blends soft skills, hard methodologies and business acumen.

Participants

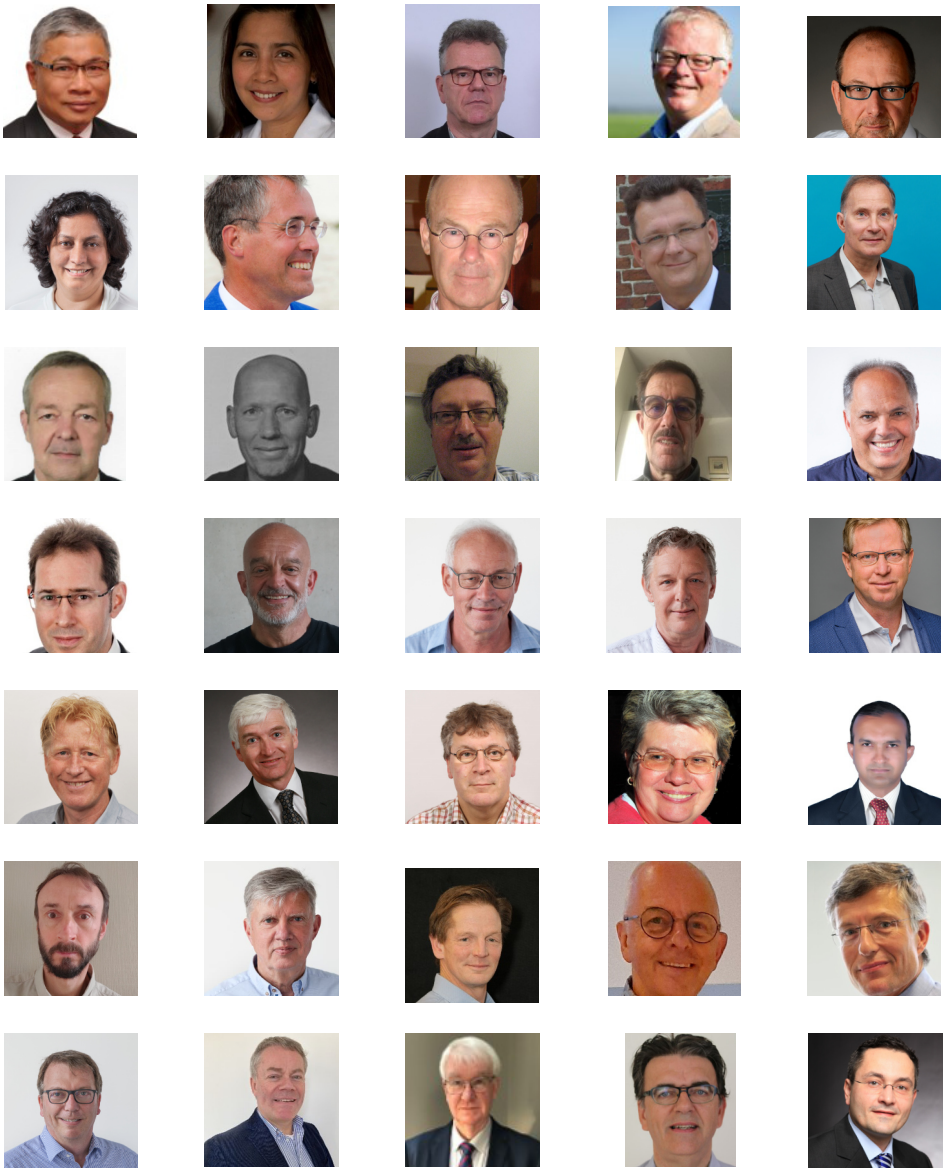
This **Petrogenium.** course can be tailored for awareness/inexperienced staff, for intermediate and for experienced personnel. Furthermore the course can be customized for a specific refinery, plant or unit. The option for post-course consultancy/help-desk support is also available.

Learning Objectives

The modules cover both organisation and individual competencies and can be developed to meet Company specific training programme requirements.
Training courses can be tailored to accommodate specific competency gaps for customers. If you have any questions regarding the training below or any additional wishes, please contact us.

Programme Modules

- Value engineering
- Risk and opportunity management
- Project norms and estimating criteria
- Opportunity framing and project premises
- Design class
- Contracting and procurement strategy
- Building a project team
- Availability assurance reliability modelling
- Human factor engineering
- Constructability
- Lessons learned



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Because Experience Matters