



Skills Framework for Energy and Chemicals

A Guide to Occupations and Skills

An initiative of

SKILLS*future*

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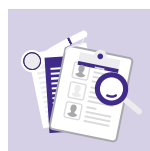
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About the Skills Framework

The Skills Framework is a SkillsFuture initiative developed for the Singapore workforce to promote skills mastery and lifelong learning. Jointly developed by SkillsFuture Singapore, Workforce Singapore and the Singapore Economic Development Board, together with employers, industry associations, education and training providers, and unions, the Skills Framework for Energy and Chemicals provides useful information on:



With the Skills Framework, individuals are equipped to make informed decisions about career choices, as well as take responsibility for skills upgrading and career planning.



Assess Career Interests

- Discover employment opportunities
- Understand career pathways
- Recognise personal attributes required



Prepare for Desired Jobs

- Understand skills and competencies required



Find Avenues to Close Skills Gaps

- Identify relevant training programmes to equip oneself with the required skills and competencies
- Participate in on-the-job training opportunities provided by companies



Renew, Upgrade and Deepen Skills

- Plan for career development/transition
- Recognise skills and competencies required for the intended job role
- Identify training programmes to upgrade and deepen skills

Energy and Chemicals: Charting Growth and Opportunities

Singapore's powerful mix of refining, olefins production and chemicals manufacturing, as well as business and innovation capabilities, has made it one of the world's leading Energy and Chemicals hubs.

At 1.3 billion barrels of oil refined per day, Singapore ranks amongst the world's top five export refining hubs. This enables the production of four million tonnes of ethylene annually, which lays the necessary foundation for Singapore's foray into high value-added petrochemicals products and specialty chemicals.

The Energy and Chemicals sector is an important pillar of the Singapore economy, contributing to 3.9% of the Gross Domestic Product (GDP) and a third of manufacturing output, with over 28,400 people employed. According to the World Trade Statistical Review 2017, Singapore was among the top 10 exporters of chemicals in 2016, a strong indicator of the country's contribution to the global chemicals market.

At the heart of Singapore's Energy and Chemicals sector is Jurong Island. Situated off the southern coast of Singapore and formed through the amalgamation of seven smaller islands in the early 1990s, Jurong Island has come to serve as the centrepiece for refining, petrochemical and specialty chemical activities. Its key value proposition is integration, from the perspective of being connected to both customer and supplier, often literally over the fence through dedicated pipes.

In 2010, Singapore launched the Jurong Island v2.0 initiative, which was targeted at improving cost competitiveness and strengthening Singapore's chemicals value chain. Several projects under the initiative have been realised, which have helped reduce utilities cost, increase options for feedstock, enhance logistics capabilities, as well as improve productivity in supporting activities such as the process, construction and maintenance sector.

Singapore also invests heavily in developing an extensive and strong public and private research ecosystem, that supports chemicals innovation and improve Research and Development yield such as A*STAR's Institute of Chemical Engineering Sciences, Institute of High Performance Computing and the Institute of Material Research and Engineering.

Singapore's strong technical expertise in manufacturing combined with innovative research capabilities form a unique value proposition for the Energy and Chemicals sector. Underpinned by strong business fundamentals such as pro-business policies, strong Intellectual Property protection and extensive free trade agreements, Singapore continues to be a choice destination for Energy and Chemicals.

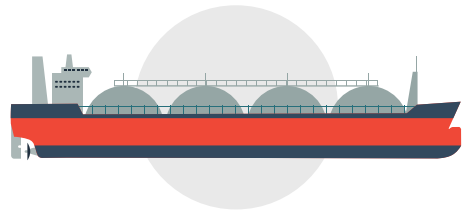
It is for these reasons that over a hundred global companies including ExxonMobil, Shell, DuPont, Sumitomo Chemical, Evonik and 3M have set up major operations in Singapore. As the sector continues to grow, Singaporeans will be presented with rewarding and fulfilling career opportunities.



Key Statistics



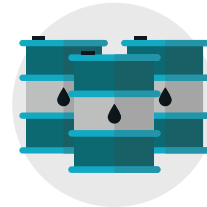
At **1.3 billion barrels of oil refined per day**, Singapore ranks among the **world's top five export refining hubs**



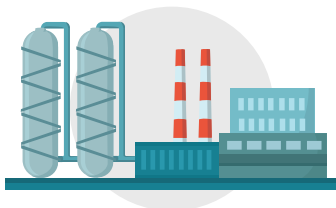
According to the World Trade Statistical Review 2017, Singapore ranked among the **top 10 exporters of chemicals** in 2016



The Energy and Chemicals sector contributed to **3.9% of Singapore's GDP** in 2015



The sector accounted for **close to a third of Singapore's total manufacturing output at S\$78 billion** in 2015



Singapore has four crackers with a combined cracking capacity of **four million tonnes of ethylene per annum**



Jurong Island is home to **more than 100 global companies with investments over S\$50 billion**

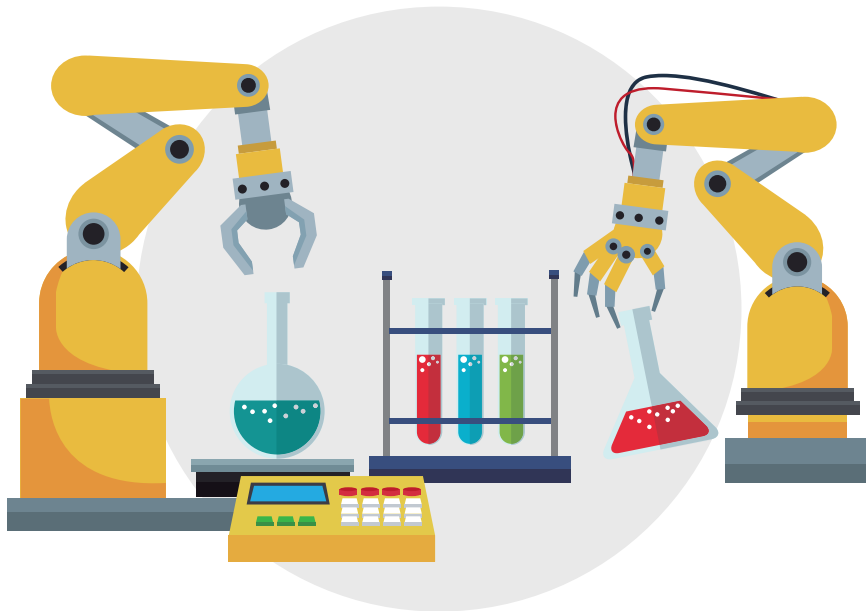


The Energy and Chemicals sector **employed 28,400 people** in 2015



Each worker in the sector contributed about **\$372,000 in manufacturing value-added** in 2015

Future Developments



Singapore will play an increasingly significant role in the Energy and Chemicals sector as it sits in the heart of Asia, the world's largest and fastest growing market for chemicals.

Megatrends such as the growing middle class, rapid urbanisation, climate change, water and food security are demanding attention for Asia-specific solutions, pushing companies to develop sophisticated yet cost-efficient chemicals. It is estimated that the global specialty chemicals market will grow at a compound annual growth rate of 5.4% from 2015 to 2025, with Asia Pacific growing at 6.35% and accounting for 45% of the market share.

It is for these reasons that Singapore has identified specialty chemicals as its next engine of growth, with a focus on end-markets such as lubricant additives, oilfield and water chemicals, consumer care, agricultural chemicals, and animal health and nutrition, as well as functional chemicals such as surfactants and functional polymers. Industrial biotechnology and synthetic biology are also technology focus areas that will be explored.

Over the last few years, several specialty chemical companies such as Solvay and Evonik have leveraged Singapore's strengths in manufacturing and innovation to set up strategic hubs to direct their operations in the region. Looking ahead, Singapore will continue building its innovation capacity to help companies develop new solutions effectively and efficiently to ride on Asia's growth.

Another exciting trend is advanced manufacturing. This new era of manufacturing will see automation such as robotics and automated guided vehicles meet with digital technologies such as data analytics and artificial intelligence. For instance, Shell has deployed drones to conduct inspection on its plant, while Chevron Oronite has deployed a wireless plant infrastructure to account for worker movement, improving worksite safety and increasing productivity. Workers will now need to focus on tasks that require higher level thinking skills, such as working alongside robots and exercising judgment based on data, adding value to their work and their companies' bottom line.

Anticipating these shifts in evolution of the Energy and Chemicals sector, Singapore has developed the Industry Transformation Map (ITM) for its Energy and Chemicals sector, which will encompass key strategies and initiatives to support the sector's innovation and productivity drive, as well as its jobs and skills and internationalisation efforts. The ITM will be a blueprint that will steer Singapore's future development as a globally competitive and leading Energy and Chemicals hub.

Desired Attributes and Skills in Demand

A career in the Energy and Chemicals sector provides diverse opportunities to individuals seeking rewarding and enriching careers. If you enjoy the challenge of working in a highly dynamic and technologically advanced sector, delight in formulating engineering or chemistry solutions, and are keen in developing deep technical expertise, the sector offers opportunities to develop your passion and grow your career.

As the sector continues to transform, these are some examples of skills in demand now and in the future. Those seeking successful careers in the Energy and Chemicals sector can set themselves apart by developing these attributes and acquiring these skills in demand.

DESIRED ATTRIBUTES



Analytical

Enjoys analysing things from all angles and thinking of ways to solve problems



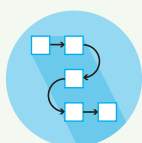
Team-Oriented

Works collaboratively and effectively with others to achieve identified objectives



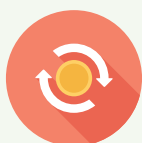
Creative

Thinks of original and innovative ways to develop new methods, systems or products and make existing ones work more effectively



Structured and Systematic

Enjoys working with data, records and equipment in a logical and orderly manner, and in compliance with procedures, regulatory and safety requirements



Adaptable

Reacts readily to and manages changes in environments and situations



Open to Learning

Demonstrates a willingness to improve on self-development within and outside one's area of work

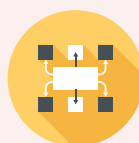
SKILLS IN DEMAND

Digitalisation Skills



Internet of Things Management

Manages interconnected smart devices and equipment to access real-time data for monitoring plant and equipment performance, and to perform troubleshooting



Data Analytics System Design

Designs and integrates the use of data analytics into the value chain of business operations to drive optimisation



Robotic and Automation Technology Application

Integrates robotics and automation into the manufacturing workflow to enhance productivity, precision and safety

Product Development and Innovation Skills



Applied Research and Development

Applies research techniques to develop useful and commercially viable products



Innovation Management

Manages innovation strategies and practices, and ensures compliance with Intellectual Property regulations and patents rights



Product Design and Development

Designs and develops new products from conceptualisation to market readiness

Take Your Career Further

A skilled workforce is essential in sustaining Singapore's competitiveness as a globally competitive and leading Energy and Chemicals hub. There is a wide range of initiatives and schemes available to both individuals and employers to promote skills acquisition and upgrading.



FOR INDIVIDUALS

Education and Career Guidance

Education and Career Guidance (ECG) equips students, as well as adults, with the necessary knowledge, skills and values to make informed education and career decisions. With the help of trained ECG counsellors, students will be exposed to a wide range of education and career options, and given the opportunities to make informed post-secondary education choices. Singaporeans in the workforce can benefit from career coaching, employability skills workshops and networking sessions through Workforce Singapore's Careers Connect, and the Employment and Employability Institute.

Enhanced Internships

The Enhanced Internships are designed to provide students with a more meaningful internship experience through more structured learning and support at the workplace. Participating companies will work closely with the Institute of Technical Education (ITE) and polytechnics to deliver a positive and meaningful internship experience for their interns.

SkillsFuture Credit

Credit of \$500 for all Singapore Citizens aged 25 and above to defray costs for a wide range of skills-related courses to encourage skills development and lifelong learning.

SkillsFuture Earn and Learn Programme

A work-learn programme designed to give graduates from the ITE and polytechnics a headstart in careers related to their discipline of study. Suitable candidates will be matched with a job related to their field of study, and undergo structured on-the-job training and mentorship in participating companies. They can also gain industry experience and attain an industry-recognised certification concurrently.

SkillsFuture Fellowships

Monetary award of \$10,000 to recognise Singapore Citizens with deep skills, who are champions of lifelong learning, and committed to contributing to the skills development of others.

SkillsFuture Mid-Career Enhanced Subsidy

Singaporeans aged 40 and above will receive higher subsidies of up to 90% of course fees for over 8,000 SSG-supported courses and at least 90% of programme cost for Ministry of Education-subsidised full-time and part-time courses.



FOR EMPLOYERS

SkillsFuture Employer Awards

The SkillsFuture Employer Awards is a tripartite initiative that recognises employers who have made significant efforts in investing in their employees' skills development, are strong advocates for SkillsFuture and building a lifelong learning culture in their workplace.

WorkPro

WorkPro encourages employers to implement progressive employment practices through job re-design, age management practices and flexible work arrangements. Companies can receive grants of up to \$480,000 to support the implementation of these initiatives.

Lean Enterprise Development (LED) Scheme

The LED scheme helps progressive Small and Medium Enterprises (SMEs) transform and grow in the new manpower-lean landscape, by supporting companies to become more manpower-lean, build a stronger Singaporean core and develop a better quality workforce. Companies can tap on relevant assistance schemes and training programmes coordinated by a cross-agency LED taskforce comprising various government agencies. The scheme provides companies with transitional manpower support if temporary flexibility in deploying foreign manpower is required.



FOR INDIVIDUALS AND EMPLOYERS

MySkillsFuture

MySkillsFuture is a one-stop online portal that enables Singaporeans to chart their own career and lifelong learning pathways, through access to industry information and tools to search for training programmes to broaden and deepen skills. It incorporates the national Jobs Bank, presenting an integrated platform for users to access resources related to jobs, education and skills training.

Professional Conversion Programme for Chemicals Manufacturing

This programme aims to equip mid-career Professionals, Managers, Executives and Technicians (PMETs) with the necessary knowledge and competencies to pursue a career in the chemicals manufacturing sector. Jobs are largely technical in nature with a focus on manufacturing, production, engineering or product development amongst others. Key modules covered include overview of production processes, interpretation of process plant drawings, the processes of plant start-up and shutdown, root cause analysis techniques, and process safety management. Employers will receive 70-90% support for both salary and course fee.

Professional Conversion Programme for Manufacturing Professional

This programme aims to equip mid-career PMETs with the knowledge and skills to pursue a career in the manufacturing sector for professional level positions such as warehouse supervisor, manufacturing manager, trainer and safety supervisor, amongst others. Key modules covered include manufacturing safety, work processes and quality procedures. Employers will receive 70-90% support for both salary and course fee.

Professional Conversion Programme for Associate Researcher (Consumer Chemicals)

This programme aims to equip mid-career PMETs with the knowledge and competencies to pursue a career in the research field in the consumer/specialty chemicals sector. The Associate Researcher could be exposed to disciplines such as regulatory, process formulation, microbiology and life sciences, amongst others. Key modules covered include research and development methodologies, application of design thinking and formulation of product ingredients. Employers will receive 70-90% support for both salary and course fee.

Professional Conversion Programme for Manufacturing Associate

This programme aims to equip mid-career PMETs with the knowledge and skills to pursue a career in the manufacturing sector in associate level positions such as machine operator, logistics assistant, packer, welder and operations executive, amongst others. Key modules covered include manufacturing safety, quality systems and 5S techniques. Employers will receive 70-90% support for both salary and course fee.

Professional Conversion Programme for Technical Sales Engineer/Manager

This programme aims to equip mid-career PMETs with the knowledge and skills to pursue a career in the manufacturing sector in technical sales and business development positions such as business development manager, technical sales engineer and project manager, amongst others. Key modules covered include developing effective marketing plans, building customer loyalty, and implementing effective pricing strategies. Employers will receive 70-90% support for both salary and course fee.

Career Support Programme

Singapore Citizens PMETs, who are made redundant and/or unemployed, and actively looking for new jobs for 6 months or more can take on new jobs paying \$3,600 or more with training, to help them settle into the new job.

Companies can receive up to \$42,000 in salary support for up to 18 months when they hire eligible PMETs who are retrenched and/or unemployed for six months or more, in jobs that pay at least \$3,600.

Jobs Bank

The Jobs Bank, administered by WSG, is a free service provided to all Singapore-registered companies and Singapore Citizens and Permanent Residents. It helps to facilitate online job matching between local job seekers and employers.

Work Trial

Individuals can gain experience through a short term work trial and be offered employment to receive incentives of up to \$5,100. Employers can assess a jobseeker's fit via a cost-free short term work stint before offering employment.

P-Max

The Place-and-Train programme matches job-seeking PMETs to suitable positions in SMEs, and assists SMEs to better recruit, train, manage and retain their newly-hired PMETs.

Initiatives and Schemes by:

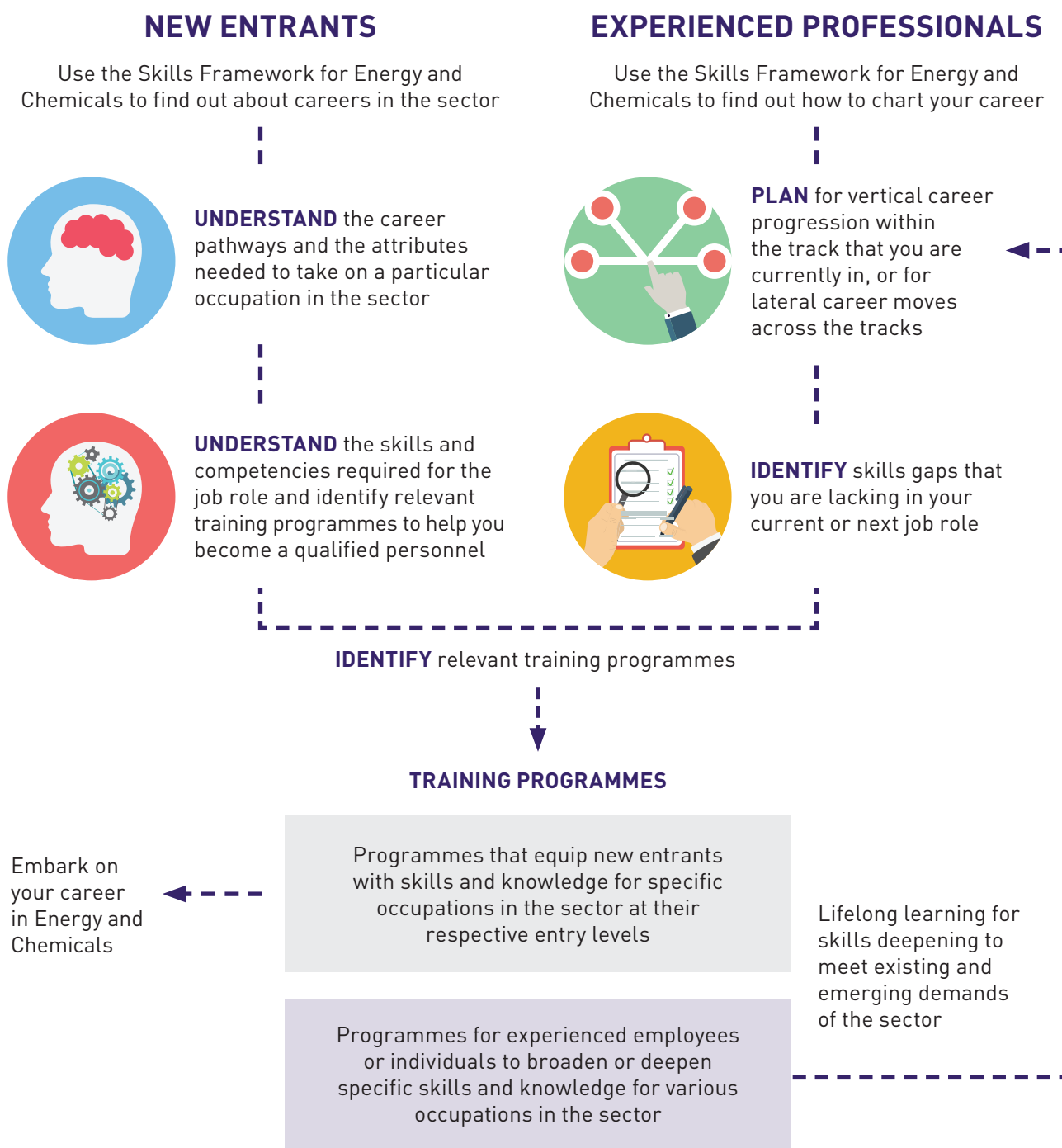
 SkillsFuture Singapore

 Workforce Singapore

For more information on the initiatives and schemes, please visit
skillsfuture.sg | wsg.gov.sg

Realise Your Potential - Take the Next Step Forward

Now that you have some idea of what a career in the Energy and Chemicals sector can offer and the available government initiatives and schemes to support your career goals, you are ready to take the next step!

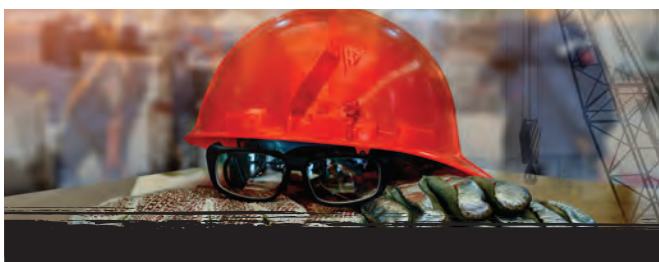


For a list of training programmes available for the Energy and Chemicals sector, please visit: skillsfuture.sg/skills-framework

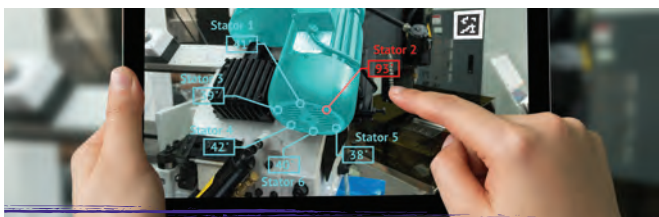
Skills Maps



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Paul Chung

Vice President, Human Resource
Oiltanking Asia Pacific Pte Ltd

HELPING OTHERS EXCEL

As the Vice President of Human Resource (HR) for Oiltanking Asia Pacific, Paul Chung makes it a point to use his wealth of experience to help others reach their goals. Despite being retrenched in a previous job, his positive attitude and willingness to learn have opened many doors for him. It is this resilience that he hopes others can adopt as well. His mission is to cultivate a strong team that can weather any storm.

To achieve this, Paul has adopted the Skills Framework for Energy and Chemicals as a reference for in-house career, competency and training roadmaps. He has customised it to match the company's own needs. "This is very useful for us as it articulates required skills, evaluates them and helps us build organisational capabilities. As an international company with 79 terminals in 24 countries, this Framework can also be applied to the other terminals to help us build a skilled and competent workforce."

He says that HR can use this as a tool to guide existing or future employees. The Career Pathways in particular can help "show them the possibilities and building blocks they need to build in order to progress up the skills ladder and eventually the ranks in the company. They will be heartened to know that they have a roadmap to follow and not just arbitrary learnings."

Paul believes there are many opportunities in the Energy and Chemicals sector. "Asia Pacific will be a region of key growth for many companies as the population growth is still strong and investments in infrastructure, manufacturing and consumer spending will continue to drive growth and demand in Energy and Chemicals," he explains.

"This sector will continue to be a strong pillar in both the Singapore and world economies as the products are needed in our daily lives. Constant innovation will also make production more effective and efficient." With technological advancements, Paul says there will be new ways of working. "The key is to be open to change and to embrace new learnings coming our way. We need to constantly learn, unlearn and relearn."

"This sector will continue to be a strong pillar in both the Singapore and world economies as the products are needed in our daily lives."

Production and Process Engineering

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Production Planner	34
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Supply Chain/Commercial Manager	38
Process Engineer	40
Senior Process Engineer	42
Process Safety Engineer	45
Senior Process Safety Engineer	47
Process Engineering Manager	49
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Supervisor Continuous Catalytic Reformer (CCR) and Aromatics

Clara Wang

ExxonMobil Asia Pacific Pte. Ltd.

TEAMWORK IS CRUCIAL

Clara Wang knows first-hand the importance of teamwork. As Supervisor of the CCR and Aromatics unit at ExxonMobil, she leads a team of 12 technicians in ensuring the units that they are responsible for at the refinery run smoothly. She believes that the key is having a mutual respect for one another, regardless of job role or seniority.

“My responsibility is to listen, encourage, guide and mentor my team members to achieve our team’s objectives of safe and flawless execution of our work,” Clara explains. One example demonstrating her leadership capabilities was when she led her team in a unit recovery effort, when a unit under her team’s care faced a major upset, thus avoiding adverse impact to the wider refinery. While these moments were challenging, they were good opportunities for growth.

There are also misconceptions that people have of the sector – that it is extremely labour intensive and male-dominated. “There are some who believe that being a process technician means doing a lot of manual work outdoors at the plant the whole time. The reality is that our plant is highly automated, and for me personally, I’m usually in the field 35-40% of the time, and in the office 60-65% of the time.” She also says it is not uncommon within ExxonMobil to have female leaders and supervisors.

“This is a very dynamic industry, and those wanting to work in the Energy and Chemicals sector must be adaptable and keen to learn,” explains Clara. This is

something that Clara herself has done over the years. As a graduate of Singapore Polytechnic with a diploma in Process Engineering in 1995, she took on the role of Operations Technician. Clara and her classmate were the first two female technicians to work at the former Mobil Refinery. Her fellow colleagues made her feel comfortable, but did not give her any special privileges as she was expected to perform well in her own right. She learnt the ropes and was promoted a few grades at the Senior Technician level. Once she developed greater knowledge and skills in her area of expertise, she moved up the ranks to Supervisor.

She believes this positive mind-set will help new entrants to the sector. “I’d recommend those interested in joining the sector to keep an open mind as they explore the different job options and opportunities the industry offers, and learn about the different career pathways that are possible as they move within various tracks in the industry, such as those mapped out in the Skills Framework for Energy and Chemicals,” says Clara.

“This is a very dynamic industry, and those wanting to work in the Energy and Chemicals sector must be adaptable and keen to learn.”

Junior Process Technician

JOB ROLE DESCRIPTION

The Junior Process Technician supports the execution and maintenance of safe and reliable plant operations by assisting with process units and utilities operations at plant sites, as well as basic frontline maintenance activities, under close supervision and in compliance with Standard Operating Procedures (SOPs). He/She assists with process sampling and basic testing to ensure that the product quality is within customers' requirements.

The Junior Process Technician applies Safe System of Work (SSoW) procedures and risk control measures to ensure work activities are carried out safely. He is a member of the Emergency Response Team (ERT) and he supports continuous improvement projects in plants.

The Junior Process Technician usually works on a rotating shift, in a team, and in the field. He is a good team player and is able to interact effectively with others.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none">• Apply risk control measures to ensure work activities are carried out safely• Apply Safe System of Work (SSoW) procedures to ensure work activities are performed safely• Assist in toolbox meetings prior to starting work activities• Comply with WSH and EMS systems• Perform good housekeeping in the workplace
	Manage emergency responses and crises	<ul style="list-style-type: none">• Respond to emergencies as an Emergency Response Team (ERT) member
	Perform process units and utilities operations	<ul style="list-style-type: none">• Apply emerging technologies to perform process operational tasks• Assist in basic frontline maintenance, process sampling and testing• Assist in basic troubleshooting during all modes of operation, including process upset conditions• Assist in preparing process equipment and work areas for mechanical, maintenance and turnaround works• Assist in routine field data logging and reporting• Assist in the start-up, monitoring and shutdown of process units and utilities at plant sites• Follow Standard Operating Procedures (SOPs) for process operations
	Administer staff and organisational development	<ul style="list-style-type: none">• Support continuous improvement projects

Junior Process Technician

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Continuous Improvement Management	Level 2	Teamwork	Basic
	Data and Statistical Analytics	Level 1	Interpersonal Skills	Basic
	Emergency Response Management	Level 2	Communication	Basic
	Engineering Drawing Interpretation and Management	Level 1	Digital Literacy	Basic
	Environmental Management System Framework Development and Implementation	Level 1	Lifelong Learning	Basic
	Feedstock and Product Transfer Operations Management	Level 1		
	Operations Reporting Protocol Application	Level 1		
	Preventive Maintenance Management	Level 1		
	Process Equipment Preparation for Mechanical Work	Level 1		
	Process Unit and Utilities Operations Management	Level 1		
	Safe System of Work Development and Implementation	Level 1		
	Sample Management	Level 2		
	Standard Operating Procedure Development and Implementation	Level 1		
	Workplace Safety and Health Framework Development and Implementation	Level 1		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 1		

Process Technician

JOB ROLE DESCRIPTION

The Process Technician executes and maintains safe and reliable plant operations by performing routine process units and utilities operations at plant sites, as well as basic frontline maintenance activities, in accordance with Standard Operating Procedures (SOPs). He/She monitors process parameters and performs in-process sampling and basic testing to ensure that the product quality is within customers' requirements.

The Process Technician complies with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements by applying Safe System of Work (SSoW) procedures when performing work activities, and responds to emergencies in the plant as a member of the Emergency Response Team (ERT). He contributes to organisational development by supporting continuous improvement projects.

The Process Technician usually works on a rotating shift, in a team, and in the field. He is a good team player and is able to interact effectively with others.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Apply Safe System of Work (SSoW) procedures to ensure work activities are performed safely • Comply with WSH and EMS systems • Ensure contractors comply with the organisation's WSH and EMS standards and practices • Participate in activity-based risk assessments • Participate in toolbox meetings prior to starting work activities • Perform good housekeeping in the workplace
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Respond to emergencies as an Emergency Response Team (ERT) member
	Perform process units and utilities operations	<ul style="list-style-type: none"> • Apply emerging technologies to perform process operational tasks • Apply Standard Operating Procedures (SOPs) for process operations • Operate robotic and automation technologies to perform plant surveillances and inspections • Perform basic frontline maintenance, process sampling and testing • Perform routine field data logging and reporting • Perform start-up, monitoring and shutdown of process units and utilities at plant sites • Prepare process equipment and work areas for mechanical, maintenance and turnaround works • Support troubleshooting during all modes of operation, including process upset conditions • Use new data technologies to monitor plant and equipment performance
	Administer staff and organisational development	<ul style="list-style-type: none"> • Support continuous improvement projects

Process Technician

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Continuous Improvement Management	Level 2	Teamwork	Basic
	Data and Statistical Analytics	Level 2	Interpersonal Skills	Basic
	Emergency Response Management	Level 2	Communication	Basic
	Engineering Drawing Interpretation and Management	Level 2	Digital Literacy	Basic
	Environmental Management System Framework Development and Implementation	Level 2	Problem Solving	Basic
	Feedstock and Product Transfer Operations Management	Level 2		
	Incident Investigation Management	Level 2		
	Operations Reporting Protocol Application	Level 2		
	Preventive Maintenance Management	Level 1		
	Process Equipment Preparation for Mechanical Work	Level 2		
	Process Operations Troubleshooting	Level 2		
	Process Unit and Utilities Operations Management	Level 2		
	Robotic and Automation Technology Application	Level 2		
	Safe System of Work Development and Implementation	Level 2		
	Sample Management	Level 2		
	Standard Operating Procedure Development and Implementation	Level 2		
	Third Party Management	Level 2		
	Workplace Safety and Health Framework Development and Implementation	Level 2		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 2		

Senior Process Technician

JOB ROLE DESCRIPTION

The Senior Process Technician executes and maintains safe and reliable plant operations by performing routine process units and process utilities operations in control rooms and plant sites, as well as troubleshooting activities during all modes of plant operation. He/She reviews sampling and testing results and manipulates process parameters to meet product quality targets.

The Senior Process Technician administers the Workplace Safety and Health (WSH) and Environmental Management Systems (EMS) by leading toolbox meetings and coordinating Safe System of Work (SSoW) procedures to ensure work activities are performed safely. He supports the Site Incident Controller (SIC) during emergency response situations. He also contributes to staff and organisational development by identifying opportunities for continuous improvement and providing guidance to junior staff.

The Senior Process Technician usually works on a rotating shift, in a team, and in the field and/or control room. He is an analytical, decisive and results-driven team player.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Coordinate Safe System of Work (SSoW) procedures to ensure work activities are performed safely • Coordinate with contractors to ensure compliance with the organisation's WSH and EMS standards and practices • Ensure compliance with WSH and EMS systems among team members • Ensure team members adhere to good housekeeping practices • Lead toolbox meetings prior to starting work activities • Participate in activity-based risk assessments
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Support the Site Incident Controller (SIC) during emergency response situations
	Perform process units and utilities operations	<ul style="list-style-type: none"> • Apply emerging technologies to perform process operational tasks • Coordinate the preparation of process equipment and work areas for mechanical, maintenance and turnaround works • Maintain Standard Operating Procedures (SOPs) for process operations • Operate robotic and automation technologies to perform plant surveillances and inspections • Perform start-up, monitoring, control and shutdown of process units and utilities in control rooms and plant sites • Perform trending and analyses on data and information collated from the field and control systems • Perform troubleshooting during all modes of operation, including process upset conditions • Review sampling and testing results and manipulate process parameters to meet product quality targets • Use new data technologies to analyse plant and equipment performance
	Administer staff and organisational development	<ul style="list-style-type: none"> • Contribute to continuous improvement initiatives and activities • Identify opportunities for continuous improvement • Provide guidance to junior staff

Senior Process Technician

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Continuous Improvement Management	Level 3	Teamwork	Intermediate
	Control Room Operations Management	Level 3	Communication	Intermediate
	Data and Statistical Analytics	Level 2	Interpersonal Skills	Intermediate
	Emergency Response Management	Level 3	Digital Literacy	Basic
	Engineering Drawing Interpretation and Management	Level 3	Problem Solving	Basic
	Environmental Management System Framework Development and Implementation	Level 3		
	Feedstock and Product Transfer Operations Management	Level 3		
	Incident Investigation Management	Level 2		
	Internet of Things Management	Level 2		
	Operations Reporting Protocol Application	Level 3		
	Process Equipment Preparation for Mechanical Work	Level 3		
	Process Operations Troubleshooting	Level 3		
	Process Unit and Utilities Operations Management	Level 3		
	Procurement Management	Level 2		
	Project Management	Level 3		
	Robotic and Automation Technology Application	Level 2		
	Safe System of Work Development and Implementation	Level 3		
	Sample Management	Level 2		
	Staff Management	Level 3		
	Standard Operating Procedure Development and Implementation	Level 3		
	Technical Report Writing	Level 2		
	Third Party Management	Level 3		
	Training, Coaching and Assessment Management	Level 3		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 2		

Production Supervisor

JOB ROLE DESCRIPTION

The Production Supervisor leads optimal and safe plant operations by managing routine process units and process utilities operations during his/her shift and by monitoring the plant's performance. He/She is responsible for executing production plans and schedules and controls production processes to meet product quantity and quality targets.

The Production Supervisor supervises staff and contractors' compliance with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements and participates in WSH and EMS incident investigations. He leads emergency responses as the Site Incident Controller (SIC) of the organisation's Emergency Response Team (ERT). In addition, he takes charge of his shift team's personnel capability development by providing coaching and mentoring.

The Production Supervisor leads a team on a rotating shift in the field and/or control room. He has good leadership skills and encourages teamwork among his shift members. He interacts effectively with others and has good communication, analytical and problem-solving skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Participate in WSH and EMS incident investigations • Supervise compliance with WSH and EMS systems • Supervise contractors to ensure compliance with the organisation's WSH and EMS standards and practices • Supervise good housekeeping in the workplace • Supervise the conduct of activity-based risk assessments • Supervise the execution of Safe System of Work (SSoW) procedures • Supervise toolbox meetings prior to starting work activities
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Assist the organisation's crisis management team to continually improve crisis management plans • Lead emergency responses as the Site Incident Controller (SIC)
	Perform process units and utilities operations	<ul style="list-style-type: none"> • Execute production plans and schedules • Monitor and control production processes to meet product quantity and quality targets • Review data trends and analyses to monitor plant performance • Supervise the application of emerging technologies for process operational tasks within the team • Supervise the operation of robotic and automation technologies to perform plant surveillances and inspections • Supervise the preparation of process equipment and work areas for mechanical, maintenance and turnaround works • Supervise the start-up, monitoring, control and shutdown of process units and process utilities at control rooms and plant sites • Supervise troubleshooting during all modes of operation, including process upset conditions • Support the development and implementation of Standard Operating Procedures (SOPs) for process operations • Use new data technologies to review plant operations and equipment performance
	Administer staff and organisational development	<ul style="list-style-type: none"> • Coach and mentor staff • Identify opportunities for continuous improvement • Manage resources within the team • Support the implementation of continuous improvement initiatives and activities

Production Supervisor

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Change Management	Level 4	Communication	Intermediate
	Continuous Improvement Management	Level 3	Problem Solving	Intermediate
	Control Room Operations Management	Level 4	Interpersonal Skills	Intermediate
	Crisis Management	Level 3	Managing Diversity	Intermediate
	Data and Statistical Analytics	Level 2	Resource Management	Basic
	Emergency Response Management	Level 4		
	Engineering Drawing Interpretation and Management	Level 3		
	Environmental Management System Framework Development and Implementation	Level 3		
	Feedstock and Product Transfer Operations Management	Level 4		
	Incident Investigation Management	Level 3		
	Internet of Things Management	Level 2		
	Operations Reporting Protocol Application	Level 4		
	Organisational Resource Management	Level 4		
	Plant Turnaround Management	Level 3		
	Process Equipment Preparation for Mechanical Work	Level 4		
	Process Operations Troubleshooting	Level 4		
	Process Unit and Utilities Operations Management	Level 4		
	Procurement Management	Level 3		
	Production Planning and Scheduling	Level 3		
	Project Management	Level 3		
	Robotic and Automation Technology Application	Level 3		
	Safe System of Work Development and Implementation	Level 3		
	Staff Development Management	Level 3		
	Staff Management	Level 4		
	Standard Operating Procedure Development and Implementation	Level 4		
	Technical Report Writing	Level 3		
	Third Party Management	Level 4		
	Training, Coaching and Assessment Management	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		

Superintendent

JOB ROLE DESCRIPTION

The Superintendent oversees process operations at plant sites, manages shift teams and facilitates the utilisation of resources to meet production and quality targets. He/She drives the development and implementation of Standard Operating Procedures (SOPs) by reviewing existing production or work processes to optimise the workflow for the entire production chain.

The Superintendent drives compliance with Workplace Safety and Health (WSH) and Environmental Management System (EMS) regulatory and system requirements, by ensuring risk assessments for production-related activities are conducted, control measures are implemented, and by leading WSH and EMS incident investigations. He leads the Emergency Response Team (ERT) as the Site Incident Controller (SIC) during emergencies. In addition, he coaches and mentors the Production Supervisors under his charge and validates production-related continuous improvement initiatives and activities.

The Superintendent manages shift teams on a rotating shift basis in the field and/or control room, and may be on standby round-the-clock for production-related matters. He possesses good leadership, people management, resource management, communication and problem-solving skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Drive compliance with WSH and EMS regulatory and system requirements • Ensure risk assessments for production-related activities are conducted and control measures are implemented • Lead WSH and EMS incident investigations • Manage contractors to ensure compliance with the organisation's WSH and EMS standards and practices • Review Safe System of Work (SSoW) processes and drive enforcement
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Support routine site PSM compliance reviews • Support the implementation of the PSM framework relating to production
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Facilitate responses to crisis situations and recovery activities, in accordance with organisational crisis management frameworks and procedures • Lead emergency responses as the Site Incident Controller (SIC)
	Perform process units and utilities operations	<ul style="list-style-type: none"> • Drive production teams to ensure deliverables are met during maintenance and turnaround activities • Drive the development, implementation and compliance of Standard Operating Procedures (SOPs) for process operations • Manage plant operations and performance, in accordance with production aims and objectives • Manage the implementation of emerging technologies for process operational tasks across production teams • Provide guidance to production teams in complex operational abnormalities
	Administer staff and organisational development	<ul style="list-style-type: none"> • Assist in the implementation of business continuity plans • Coach and mentor staff • Manage resources across production teams • Manage team performance to achieve organisational goals • Validate continuous improvement initiatives and activities

Superintendent

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Business Continuity Management	Level 4	Leadership	Advanced
	Change Management	Level 4	Decision Making	Advanced
	Continuous Improvement Management	Level 4	Problem Solving	Advanced
	Control Room Operations Management	Level 4	Sense Making	Advanced
	Crisis Management	Level 4	Resource Management	Advanced
	Data and Statistical Analytics	Level 3		
	Emergency Response Management	Level 4		
	Engineering Drawing Interpretation and Management	Level 4		
	Engineering Management of Change	Level 4		
	Engineering Project Management	Level 3		
	Environmental Management System Framework Development and Implementation	Level 4		
	Feedstock and Product Transfer Operations Management	Level 5		
	Incident Investigation Management	Level 3		
	Internet of Things Management	Level 3		
	Operations Reporting Protocol Application	Level 5		
	Organisational Resource Management	Level 4		
	Plant Turnaround Management	Level 4		
	Process Control	Level 3		
	Process Equipment Preparation for Mechanical Work	Level 4		
	Process Operations Troubleshooting	Level 5		
	Process Plant and Equipment Integrity Management	Level 3		
	Process Safety Management Framework Development and Implementation	Level 3		
	Process Unit and Utilities Operations Management	Level 5		
	Procurement Management	Level 4		
	Production Planning and Scheduling	Level 3		
	Robotic and Automation Technology Application	Level 4		
	Safe System of Work Development and Implementation	Level 5		
	Staff Development Management	Level 4		
	Staff Management	Level 4		
	Standard Operating Procedure Development and Implementation	Level 5		

Superintendent

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES	
	Technical Report Writing	Level 4
	Third Party Management	Level 4
	Training, Coaching and Assessment Management	Level 4
	Workplace Safety and Health Framework Development and Implementation	Level 4
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 4
	Yield Analysis	Level 3

Production Manager

JOB ROLE DESCRIPTION

The Production Manager oversees all activities in the production department and ensures that plant operations comply with regulatory and organisational requirements. He/She is accountable for plant operations and performance, in accordance with production aims and objectives, and securing high operational availability so that production plans are executed in the most cost-effective manner.

The Production Manager endorses risk assessments for production-related activities, Safe System of Work (SSoW) processes and procedures, Standard Operating Procedures (SOPs) and the annual production plan and schedule. He manages emergency responses as the Site Main Controller (SMC) of the organisation's Emergency Response Team (ERT) and participates in crisis management activities according to his designated role. In addition, he coaches and mentors production department personnel in plant technology, and reviews and approves initiatives and activities for continuous improvements within plants.

The Production Manager works on a day shift and oversees the production department in the field and/or control room. As a department manager, he is required to have good leadership, resource management, planning, analytical and problem-solving skills, and must be able to interact effectively with others to achieve departmental goals.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Endorse risk assessments for production-related activities • Endorse Safe System of Work (SSoW) processes and procedures • Review the plant's compliance with WSH and EMS regulatory and system requirements • Support WSH and EMS incident investigation reviewing process
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Contribute to routine site PSM compliance reviews • Review the implementation of PSM frameworks relating to production
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Lead crisis responses and recovery activities in accordance with recovery and business continuity strategies • Manage emergency responses as the Site Main Controller (SMC)
	Perform process units and utilities operations	<ul style="list-style-type: none"> • Endorse business and annual production plans and schedules • Endorse Standard Operating Procedures (SOPs) for process operations • Manage overall plant operations and performance in accordance with production aims and objectives • Oversee the technical reliability and integrity of process units and utilities • Provide remote guidance to production teams in complex operational abnormalities through virtual collaboration • Provide strategic direction in implementing emerging technologies for plant operations • Support the endorsement of maintenance and turnaround schedules to ensure plant availability and reliability
	Administer staff and organisational development	<ul style="list-style-type: none"> • Coach and mentor staff • Contribute to business continuity planning, implementation and execution • Drive departmental performance to achieve organisational goals • Manage department level resources and budgets • Review and endorse continuous improvement initiatives and activities

Production Manager

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Budget Management	Level 5	Leadership	Advanced
	Business Continuity Management	Level 5	Communication	Advanced
	Change Management	Level 5	Problem Solving	Advanced
	Continuous Improvement Management	Level 5	Decision Making	Advanced
	Crisis Management	Level 5	Interpersonal Skills	Advanced
	Emergency Response Management	Level 5		
	Engineering Management of Change	Level 5		
	Environmental Management System Framework Development and Implementation	Level 5		
	Feedstock and Product Transfer Operations Management	Level 5		
	Incident Investigation Management	Level 5		
	Internet of Things Management	Level 4		
	Operations Reporting Protocol Application	Level 5		
	Organisational Analysis Management	Level 5		
	Organisational Resource Management	Level 5		
	Plant Turnaround Management	Level 4		
	Process Plant and Equipment Integrity Management	Level 5		
	Process Safety Management Framework Development and Implementation	Level 4		
	Process Unit and Utilities Operations Management	Level 6		
	Procurement Management	Level 5		
	Production Planning and Scheduling	Level 5		
	Robotic and Automation Technology Application	Level 5		
	Safe System of Work Development and Implementation	Level 6		
	Staff Development Management	Level 5		
	Staff Management	Level 5		
	Standard Operating Procedure Development and Implementation	Level 6		
	Supply Chain Management	Level 5		
	Third Party Management	Level 5		
	Training, Coaching and Assessment Management	Level 5		
	Workplace Safety and Health Framework Development and Implementation	Level 5		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 5		
	Yield Analysis	Level 5		

Operation Specialist

JOB ROLE DESCRIPTION

The Operation Specialist supports plant operations by coordinating day-to-day production activities, as well as maintenance and turnaround schedules and activities, for production shift teams, so as to meet production plans and schedules. He/She supports the Site Incident Controller (SIC) during emergency response situations.

The Operation Specialist contributes to plant operation improvements by working closely with the production, process engineering and discipline engineering teams to define and execute plant improvement projects, and by reviewing Standard Operating Procedures (SOPs) for the process area under his charge. He also supports the implementation of the Process Safety Management (PSM) framework for production activities, and ensures compliance with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements across production teams.

The Operation Specialist may work on either a rotating or day shift in the field. He works closely with other departments, is able to work independently, and possesses good problem-solving, organisational, communication and interpersonal skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Coordinate Safe System of Work (SSoW) processes across production teams • Coordinate the conduct of activity-based risk assessments at the department level • Ensure compliance with WSH and EMS systems across production teams • Participate in WSH and EMS incident investigations
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Participate in routine site PSM compliance reviews • Support the implementation of PSM systems relating to production
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Assist the organisation's crisis management team to continually improve crisis management plans • Support the Site Incident Controller (SIC) during emergency responses
	Perform process units and utilities operations	<ul style="list-style-type: none"> • Apply emerging technologies for the monitoring of plant performance and process troubleshooting • Coordinate maintenance and turnaround activities • Support plant operations and performance, in accordance with production planning and scheduling objectives • Support process monitoring and optimisation • Support product quality conformance and advise on corrective actions during non-conformance • Support the development and implementation of Standard Operating Procedures (SOPs) for process operations • Support troubleshooting during all modes of operation, including process upset conditions • Use new data technologies to support operations and equipment performance
	Administer staff and organisational development	<ul style="list-style-type: none"> • Identify opportunities for continuous improvement • Support the implementation of continuous improvement initiatives and activities

Operation Specialist

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Change Management	Level 4	Problem Solving	Intermediate
	Continuous Improvement Management	Level 3	Decision Making	Intermediate
	Crisis Management	Level 3	Teamwork	Intermediate
	Data and Statistical Analytics	Level 3	Communication	Intermediate
	Emergency Response Management	Level 4	Interpersonal Skills	Intermediate
	Engineering Drawing Interpretation and Management	Level 4		
	Engineering Management of Change	Level 3		
	Engineering Project Management	Level 3		
	Environmental Management System Framework Development and Implementation	Level 4		
	Feedstock and Product Transfer Operations Management	Level 4		
	Incident Investigation Management	Level 3		
	Internet of Things Management	Level 2		
	Non-Conformance Management	Level 3		
	Plant Turnaround Management	Level 3		
	Process Control	Level 3		
	Process Operations Troubleshooting	Level 4		
	Process Optimisation	Level 4		
	Process Plant and Equipment Integrity Management	Level 3		
	Process Safety Management Framework Development and Implementation	Level 3		
	Process Unit and Utilities Operations Management	Level 4		
	Project Management	Level 4		
	Quality Assurance Management	Level 3		
	Robotic and Automation Technology Application	Level 3		
	Safe System of Work Development and Implementation	Level 4		
	Standard Operating Procedure Development and Implementation	Level 4		
	Technical Report Writing	Level 3		
	Workplace Safety and Health Framework Development and Implementation	Level 4		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		
	Yield Analysis	Level 3		

Learning and Development Specialist

JOB ROLE DESCRIPTION

The Learning and Development Specialist supports the design, conduct and evaluation of end-to-end learning and development interventions for the purpose of developing organisational competence and capability. He/She manages the organisation's learning and development framework by developing competency-based training, coaching and assessment programmes to address training needs, and evaluating the programmes' effectiveness for continuous improvement.

The Learning and Development Specialist supports the implementation of individual development plans for staff, trainers and assessors, and coordinates competency assessments for production teams. He coordinates with line management and the human resource department to pilot new training initiatives, and sources for external training and learning programmes in line with the organisation's learning and development strategies.

The Learning and Development Specialist is meticulous, has a strong interest in people development, and possesses strong organisation, communication and interpersonal skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems
	Manage learning and development frameworks	<ul style="list-style-type: none"> • Conduct training needs analyses for the organisation • Design and develop the organisation's competency framework • Identify suitable technologies and methodologies to enhance training, coaching and assessment programmes • Source external training and learning programmes • Support the implementation of staff development plans • Support the implementation of trainers' and assessors' development plans
	Administer learning and development programmes	<ul style="list-style-type: none"> • Coordinate competency assessments for production teams • Coordinate the piloting of new training initiatives with relevant stakeholders • Develop and implement training, coaching and assessment programmes • Evaluate the effectiveness of training, coaching and assessment programmes
	Administer staff and organisational development	<ul style="list-style-type: none"> • Contribute to continuous improvement initiatives and activities • Maintain up-to-date knowledge of developments in the learning and development field

Learning and Development Specialist

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Change Management	Level 4	Developing People	Intermediate
	Continuing Professional Development Management	Level 4	Interpersonal Skills	Intermediate
	Continuous Improvement Management	Level 3	Teamwork	Intermediate
	Environmental Management System Framework Development and Implementation	Level 3	Digital Literacy	Intermediate
	Learning and Development Framework Management	Level 4	Lifelong Learning	Intermediate
	Project Management	Level 4		
	Staff Development Management	Level 4		
	Trainer and Assessor Development Management	Level 4		
	Training, Coaching and Assessment Management	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 3		

Learning and Development Superintendent

JOB ROLE DESCRIPTION

The Learning and Development Superintendent collaborates closely with line management and the human resource department to develop and implement learning and development strategies and interventions that are aligned with the organisation's strategic and operational objectives, for the purpose of assuring organisational competence and capability development. He/She manages the organisation's learning and development framework by reviewing the organisation's training needs, competency framework and training, coaching and assessment programmes to ensure their relevancy.

The Learning and Development Superintendent evaluates and drives the implementation of suitable learning technologies and methodologies to enhance the delivery of training, coaching and assessment programmes. He drives the implementation of new training initiatives with relevant stakeholders and evaluates their suitability and effectiveness. In addition, he is responsible for coaching and mentoring junior staff in his team.

The Learning and Development Superintendent is passionate about helping staff to deepen their skills and develop their full potential. He is able to lead his team effectively, is structured and methodical, and possesses excellent communication and analytical skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems
	Manage learning and development frameworks	<ul style="list-style-type: none"> • Approve external training and learning programmes in line with the organisation's learning and development strategies • Ensure the implementation of staff development plans at the department level • Evaluate and drive the implementation of suitable and emerging technologies and methodologies to enhance training, coaching and assessment programmes • Review and ensure the implementation of trainers' and assessors' development plans • Review the organisation's competency framework to address competency gaps • Review the organisation's training needs
	Administer learning and development programmes	<ul style="list-style-type: none"> • Drive the continuous improvement of training, coaching and assessment programmes • Drive the implementation of competency assessments for production teams • Drive the implementation of new training initiatives with relevant stakeholders • Review training, coaching and assessment programmes
	Administer staff and organisational development	<ul style="list-style-type: none"> • Coach and mentor staff • Drive continuous improvement initiatives and activities • Drive departmental performance to achieve organisational goals • Maintain up-to-date knowledge of developments in the learning and development field • Manage resources within the team

Learning and Development Superintendent

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Change Management	Level 4	Developing People	Advanced
	Continuing Professional Development Management	Level 5	Lifelong Learning	Advanced
	Continuous Improvement Management	Level 4	Service Orientation	Advanced
	Environmental Management System Framework Development and Implementation	Level 3	Communication	Intermediate
	Learning and Development Framework Management	Level 5	Leadership	Intermediate
	Organisational Resource Management	Level 4		
	Project Management	Level 5		
	Staff Development Management	Level 5		
	Trainer and Assessor Development Management	Level 5		
	Training, Coaching and Assessment Management	Level 5		
	Workplace Safety and Health Framework Development and Implementation	Level 3		

Production Planner

JOB ROLE DESCRIPTION

The Production Planner is responsible for managing and executing production plans and schedules to ensure that products are delivered to customers on time and within schedule. He/She plans for the entire production supply chain from feedstock to production, storage and distribution, and analyses production data to optimise production and inventory control.

The Production Planner coordinates with the maintenance planning team to align production targets with the planning of maintenance and turnaround schedules. He supports the reporting of plant production status and raw materials inventories, and highlights issues that may affect production output. He monitors feedstock movement to ensure minimal interruption to the production schedule. In addition, he identifies opportunities for continuous improvement in the organisation's supply chain operations.

The Production Planner works closely with the production, maintenance planning, sales and logistics teams, and interfaces with suppliers and distributors. He is able to work independently and possesses strong planning, analytical, communication and interpersonal skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems
	Manage production planning and scheduling	<ul style="list-style-type: none"> • Conduct real-time and historical tracking of plant production data, availability and planned maintenance activities • Develop production plans and schedules to meet customers' needs • Initiate the formulation of protocols and guidelines for transportation requirements of products to internal and external customers • Perform production data analyses to optimise production, and for inventory control • Use new data technologies to optimise production planning and scheduling
	Support production and maintenance activities	<ul style="list-style-type: none"> • Coordinate with internal and external stakeholders to optimise inventory control and production • Coordinate with relevant stakeholders to ensure the execution of production plans and schedules • Coordinate with the maintenance team to align production targets with the planning of maintenance and turnaround schedules • Highlight issues that affect production output • Respond to product non-conformance with the production and technical teams, to minimise interruption to production schedules • Support the reporting of plant production status and raw materials inventories
	Manage supply chain	<ul style="list-style-type: none"> • Monitor feedstock movement to minimise interruptions to production schedules
	Administer staff and organisational development	<ul style="list-style-type: none"> • Assist in business continuity planning processes • Identify opportunities for continuous improvement • Support the implementation of continuous improvement initiatives and activities

Production Planner

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Business Continuity Management	Level 4	Sense Making	Intermediate
	Change Management	Level 4	Resource Management	Intermediate
	Continuous Improvement Management	Level 3	Communication	Intermediate
	Data and Statistical Analytics	Level 2	Interpersonal Skills	Intermediate
	Environmental Management System Framework Development and Implementation	Level 3	Problem Solving	Intermediate
	Feedstock and Product Transfer Operations Management	Level 4		
	Market Demand and Feedstock Management	Level 4		
	Non-Conformance Management	Level 3		
	Organisational Resource Management	Level 4		
	Plant Economic Modelling	Level 4		
	Procurement Management	Level 3		
	Production Planning and Scheduling	Level 4		
	Supply Chain Management	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 3		

Feedstock Supply Trader

JOB ROLE DESCRIPTION

The Feedstock Supply Trader is responsible for sourcing, scheduling, moving and optimising feedstock through supply chains and distribution systems. He/She liaises with business sites at other locations to ensure an efficient and low-cost supply chain. He manages the organisation's feedstock trading portfolio by planning and executing optimal purchase timings and delivery modes, while balancing operational requirements and market movements.

The Feedstock Supply Trader manages commercial activities by supporting annual commercial contract conformance audits with existing suppliers, and by reviewing their ability to meet quality and delivery requirements. He makes recommendations to improve the productivity, quality and efficiency of supply chain operations. In addition, he builds and maintains good relationships with major suppliers and end-users to optimise feedstock sourcing and trading, and conducts business development in the trading region to identify new sourcing or trading opportunities.

The Feedstock Supply Trader demonstrates an intuitive commercial acumen and strong numeracy skills. He is able to work in a fast-paced environment under pressure and is highly self-motivated. He possesses excellent decision-making and planning skills. He works closely with the production, sales and logistics teams, and interfaces with suppliers and distributors.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems
	Manage production planning and scheduling	<ul style="list-style-type: none"> • Develop protocols and guidelines for transportation requirements of products to internal and external customers • Use new data technologies to optimise supply chains and distribution systems
	Manage supply chains	<ul style="list-style-type: none"> • Coordinate with the logistics team on freight risk and efficient execution of feedstock trading contracts • Develop and utilise tools and models to forecast feedstock costs • Liaise with business sites at other locations to ensure an efficient, low-cost supply chain • Manage feedstock trading portfolios • Mitigate feedstock quality risks by ensuring suppliers adhere to contractual obligations • Monitor market movements, trends and fundamentals affecting feedstock availability and prices • Plan and coordinate feedstock lifting and transmission activities • Plan and devise optimal purchase timings, quality and delivery modes through balancing operational requirements and market movements • Source and procure feedstock across supply chains and distribution systems

Feedstock Supply Trader

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Manage commercial activities	<ul style="list-style-type: none"> • Build and maintain good relationships with major suppliers and end-users for sourcing feedstock and trading optimisation • Conduct business development in the trading region, identify new opportunities and generate new ideas • Interpret data, reports and market trends to ensure feedstock availability and commercial variables are effectively managed • Recommend improvements and changes to enhance the productivity, quality and efficiency of supply chain operations • Review supplier approval audits to assess their ability to meet quality and delivery requirements • Supervise supplier credit terms and credit risks in line with company agreed limits, controls and procedures • Support annual commercial contract conformance audits with existing suppliers • Support the development of supply chain economic models for enterprise resource planning • Work closely with management to maximise profit margins
	Administer staff and organisational development	<ul style="list-style-type: none"> • Assist in the implementation of business continuity plans • Validate continuous improvement initiatives and activities

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Budget Management	Level 4	Resource Management	Advanced
	Business Continuity Management	Level 4	Global Mindset	Intermediate
	Business Networking Management	Level 5	Decision Making	Intermediate
	Change Management	Level 4	Interpersonal Skills	Intermediate
	Continuous Improvement Management	Level 4	Sense Making	Intermediate
	Data and Statistical Analytics	Level 3		
	Environmental Management System Framework Development and Implementation	Level 3		
	Market Demand and Feedstock Management	Level 4		
	Materials Qualification	Level 4		
	Plant Economic Modelling	Level 4		
	Procurement Management	Level 5		
	Production Planning and Scheduling	Level 4		
	Quality Assurance Management	Level 3		
	Supply Chain Management	Level 5		
	Third Party Management	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 3		

Supply Chain/Commercial Manager

JOB ROLE DESCRIPTION

The Supply Chain/Commercial Manager oversees all activities of the supply chain/commercial team, and is responsible for developing strategies for sourcing feedstock and third-party trading for maximised profit and efficiency across all supply channels. He/She is accountable for maintaining optimal raw materials and stock level inventories to ensure that the organisation's working capital objectives are met.

The Supply Chain/Commercial Manager manages commercial activities, such as developing supply chain economic models for enterprise resource planning. He manages supplier contract negotiations and supplier credit terms and risks, in line with the organisation's commercial objectives. He endorses recommendations to improve the productivity, quality and efficiency of supply chain operations. In addition, he coaches and mentors supply chain/commercial team personnel and drives departmental performance to meet the organisation's commercial objectives.

The Supply Chain/Commercial Manager demonstrates excellent commercial acumen and business development abilities. He collaborates with the production, sales and logistics teams and interfaces with suppliers and distributors. He possesses excellent leadership, resource management, decision-making and networking skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Ensure compliance with WSH and EMS systems at the department level • Review and update supply chain practices in accordance with new or revised WSH and EMS standards and regulations
	Manage production planning and scheduling	<ul style="list-style-type: none"> • Drive the adoption of new data technologies to optimise supply chains and distribution systems • Endorse protocols and guidelines for transportation requirements of products to internal and external customers
	Manage supply chains	<ul style="list-style-type: none"> • Coordinate all supply chain activities associated with new product introduction • Develop strategies for sourcing feedstock and third-party trading • Establish processes to minimise feedstock quality risks • Manage the distribution team, including shipping, inventory accuracy, freight and warehousing and cost management • Validate tools and models to forecast feedstock costs
	Manage commercial activities	<ul style="list-style-type: none"> • Endorse recommendations to improve the productivity, quality and efficiency of supply chain operations • Manage commercial activities to maximise profit margins • Manage raw materials and stock level inventories to maintain the organisation's working capital objectives • Manage supplier approval audits to assess their ability to meet quality and delivery requirements • Manage supplier contract negotiations in line with the organisation's commercial objectives • Manage supplier credit terms and risks • Manage the development of supply chain economic models for enterprise resource planning • Review reports on data and market trends to ensure that feedstock availability and commercial variables are effectively managed

Supply Chain/Commercial Manager

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer staff and organisational development	<ul style="list-style-type: none"> • Coach and mentor staff • Contribute to business continuity planning, implementation and execution • Drive departmental performance to achieve organisational goals • Manage department level resources and budgets • Review and endorse continuous improvement initiatives and activities

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Budget Management	Level 5	Leadership	Advanced
	Business Continuity Management	Level 5	Decision Making	Advanced
	Business Networking Management	Level 5	Interpersonal Skills	Advanced
	Business Planning Management	Level 5	Global Mindset	Advanced
	Change Management	Level 5	Communication	Advanced
	Continuous Improvement Management	Level 5		
	Environmental Management System Framework Development and Implementation	Level 4		
	Market Demand and Feedstock Management	Level 5		
	Materials Qualification	Level 5		
	Organisational Analysis Management	Level 5		
	Organisational Resource Management	Level 5		
	Plant Economic Modelling	Level 5		
	Procurement Management	Level 6		
	Production Planning and Scheduling	Level 5		
	Staff Development Management	Level 5		
	Staff Management	Level 5		
	Strategy Development and Implementation Management	Level 5		
	Supply Chain Management	Level 6		
	Third Party Management	Level 5		
	Training, Coaching and Assessment Management	Level 5		
	Workplace Safety and Health Framework Development and Implementation	Level 4		

Process Engineer

JOB ROLE DESCRIPTION

The Process Engineer provides technical support on process control and automation to optimise process capability, efficiency, yield and quality, in compliance with the organisation's Workplace Safety and Health (WSH), Environmental Management System (EMS) and Process Safety Management (PSM) system requirements. He/She works closely with the process safety engineering team by providing process engineering input to ensure that plant safeguarding requirements are met. He may also specialise in process control, process optimisation or process engineering projects, depending on organisational needs.

The Process Engineer supports the production department by conducting production trial runs and recommending improvements to Standard Operating Procedures (SOPs) and work methods for production areas or processes. He supports projects during plant commissioning and turnaround activities and troubleshoots issues arising from changes in process operations or new production plant projects.

The Process Engineer works closely with the production team and other departments. He possesses strong analytical thinking and problem-solving skills, is a good team player and interacts effectively with others.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH), Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems • Provide feedback to the Health, Safety and Environment (HSE) team on any non-conformance with WSH and EMS systems • Support WSH and EMS incident investigations
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Provide process engineering input to ensure plant safeguarding requirements are met
	Support process plant optimisation	<ul style="list-style-type: none"> • Deliver process engineering projects or services, using established technologies for process optimisation • Provide technical support on process control and automation to improve process capability, efficiency, yield and quality • Support analyses of real-time plant data and vendor data and make recommendations for process efficiency improvements
	Perform process engineering support	<ul style="list-style-type: none"> • Conduct production trial runs for new raw materials introduction and/or new product specifications • Determine product specifications, in collaboration with relevant stakeholders, to meet customers' requirements and standards • Recommend changes and improvements to Standard Operating Procedures (SOPs) and work methods for specific production areas and/or processes • Support non-conformance investigations and advise on mitigation measures
	Manage process engineering projects	<ul style="list-style-type: none"> • Provide technical justification bases for projects • Support projects during plant commissioning and turnaround activities • Support troubleshooting activities arising from changes in process operations or new production plant projects • Use interactive digital modelling for process engineering solutions with reference to case studies and standards
	Manage asset integrity	<ul style="list-style-type: none"> • Support asset integrity assurance and compliance • Support asset integrity risk and reliability analyses and improvement activities
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Support continuous improvement, including pipeline reviews, and equipment and system performance and limits

Process Engineer

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Change Management	Level 4	Sense Making	Intermediate
	Commissioning and Start-Up Management	Level 3	Computational Thinking	Intermediate
	Continuing Professional Development Management	Level 4	Problem Solving	Intermediate
	Continuous Improvement Management	Level 3	Communication	Intermediate
	Data Analytics System Design	Level 3	Interpersonal Skills	Intermediate
	Data and Statistical Analytics	Level 3		
	Engineering Drawing Interpretation and Management	Level 4		
	Engineering Management of Change	Level 3		
	Engineering Project Management	Level 3		
	Environmental Management System Framework Development and Implementation	Level 3		
	Front-End Engineering Design Management	Level 3		
	Incident Investigation Management	Level 3		
	Internet of Things Management	Level 3		
	Major Hazard Installation Safety Case Management	Level 3		
	Non-Conformance Management	Level 4		
	Operations Reporting Protocol Application	Level 4		
	Process Control	Level 3		
	Process Development Management	Level 4		
	Process Engineering Design	Level 4		
	Process Operations Troubleshooting	Level 4		
	Process Optimisation	Level 4		
	Process Plant and Equipment Integrity Management	Level 4		
	Process Safety Management Framework Development and Implementation	Level 4		
	Process Unit and Utilities Operations Management	Level 4		
	Project Management	Level 4		
	Robotic and Automation Technology Application	Level 3		
	Safety Integrity Levels Management	Level 3		
	Standard Operating Procedures Development and Implementation	Level 4		
	Technical Presentation	Level 4		
	Technical Report Writing	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		
	Yield Analysis	Level 3		

Senior Process Engineer

JOB ROLE DESCRIPTION

The Senior Process Engineer provides technical support to the production team for process troubleshooting, and proposes countermeasures to ensure safe and reliable operations. He/She leads the development of new applications, and the implementation of integrated solutions for process changes, new equipment and technologies to improve process capability, efficiency, yield and quality. He may also specialise in process control, process optimisation or process engineering projects, depending on organisational needs.

The Senior Process Engineer coordinates closely with the process safety engineering team to ensure plant safeguarding requirements are met, in compliance with Workplace Safety and Health (WSH), Environmental Management System (EMS) and Process Safety Management (PSM) system requirements. He leads non-conformance investigations and advises on mitigation measures to ensure that product quality meets customers' requirements. He reviews the technical justifications for new process engineering projects to evaluate their suitability, and supervises troubleshooting activities relating to changes in process operations or new production plant projects. In addition, he contributes to staff capability development by coaching and mentoring junior staff in his team.

The Senior Process Engineer works closely with the production and process safety teams and other departments. He is analytical, enjoys solving problems, and interacts effectively with others. He also possesses good leadership, communication and resource management skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems • Provide feedback to the Health, Safety and Environment (HSE) team on any non-conformance with WSH and EMS systems • Support WSH and EMS incident investigations
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Coordinate with the process safety engineering team to ensure plant safeguarding requirements are met
	Support process plant optimisation	<ul style="list-style-type: none"> • Deliver innovative solutions using established and emerging technologies for process optimisation • Provide technical support on process control and automation to improve process capability, efficiency, yield and quality • Review analyses of real-time plant data and vendor data and make recommendations for process efficiency improvements
	Perform process engineering support	<ul style="list-style-type: none"> • Evaluate production trial runs to validate new raw materials introduction and/or new product specifications • Lead collaborations with relevant stakeholders to determine product specifications to meet customers' requirements and standards • Lead non-conformance investigations and advise on mitigation measures • Review recommendations for changes and improvements to Standard Operating Procedures (SOPs) and work methods for specific production areas and/or processes
	Manage process engineering projects	<ul style="list-style-type: none"> • Review technical justification bases for projects • Supervise troubleshooting activities arising from changes in process operations or new production plant projects • Support projects during plant commissioning and turnaround activities • Use interactive digital modelling for process engineering solutions with reference to case studies and standards
	Manage asset integrity	<ul style="list-style-type: none"> • Review asset integrity risk and reliability analyses and improvements • Support and advise on asset integrity assurance and compliance

Senior Process Engineer

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Coach and mentor staff • Manage team performance to achieve organisational goals • Support continuous improvement, including pipeline reviews, and equipment and system performance and limits

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Change Management	Level 4	Computational Thinking	Advanced
	Commissioning and Start-Up Management	Level 4	Problem Solving	Advanced
	Continuing Professional Development Management	Level 4	Decision Making	Intermediate
	Continuous Improvement Management	Level 4	Communication	Intermediate
	Data Analytics System Design	Level 3	Creative Thinking	Intermediate
	Data and Statistical Analytics	Level 4		
	Engineering Drawing Interpretation and Management	Level 5		
	Engineering Management of Change	Level 4		
	Engineering Project Management	Level 4		
	Environmental Management System Framework Development and Implementation	Level 3		
	Front-End Engineering Design Management	Level 4		
	Incident Investigation Management	Level 3		
	Internet of Things Management	Level 3		
	Major Hazard Installation Safety Case Management	Level 4		
	Non-Conformance Management	Level 4		

Senior Process Engineer

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES	
	Operations Reporting Protocol Application	Level 4
	Plant Economic Modelling	Level 4
	Process Control	Level 4
	Process Development Management	Level 4
	Process Engineering Design	Level 5
	Process Operations Troubleshooting	Level 5
	Process Optimisation	Level 5
	Process Plant and Equipment Integrity Management	Level 5
	Process Safety Management Framework Development and Implementation	Level 4
	Process Unit and Utilities Operations Management	Level 5
	Procurement Management	Level 4
	Project Management	Level 5
	Robotic and Automation Technology Application	Level 4
	Safety Integrity Levels Management	Level 4
	Standard Operating Procedure Development and Implementation	Level 5
	Technical Presentation	Level 5
	Technical Report Writing	Level 4
	Training, Coaching and Assessment Management	Level 3
	Workplace Safety and Health Framework Development and Implementation	Level 3
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3
	Yield Analysis	Level 4

Process Safety Engineer

JOB ROLE DESCRIPTION

The Process Safety Engineer provides process safety and risk assessment support to plants. He/She is responsible for implementing the Process Safety Management (PSM) framework for hazard identification, assessment of consequences and control of risks, in compliance with existing PSM regulations, international codes and recommended practices. He uses tracking tools to track PSM performance data and contributes to the development and maintenance of the technical section of the organisation's Major Hazard Installation (MHI) Safety Case.

The Process Safety Engineer conducts process safety reviews and safety-related studies and analyses for existing and new facilities. He participates in process safety incident investigations and follows up on preventive and corrective actions. In addition, he supports asset integrity assurance and compliance and contributes to process safety-related continuous improvement projects.

The Process Safety Engineer works closely with the process engineering team and Health, Safety and Environment (HSE) department, and liaises with regulatory authorities for process safety matters. He is a team player with good communication, analytical and problem-solving skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems • Participate in process safety incident investigations and follow up on preventive and corrective actions • Support the development and improvement of Safe System of Work (SSoW) frameworks
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Implement and maintain PSM frameworks for hazard identification, assessment of consequences and control of risks • Support the development and maintenance of the technical section of the organisation's Major Hazard Installation (MHI) Safety Case • Prepare PSM performance data using tracking tools • Upkeep plant safeguarding systems to ensure compliance with process safety standards
	Support process engineering projects	<ul style="list-style-type: none"> • Provide technical justification bases for projects from the process safety perspective • Provide technical support on process troubleshooting and optimisation from the process safety perspective • Support projects during plant commissioning and turnaround activities • Use emerging technologies for process safety solutioning with reference to case studies and safety standards
	Manage asset integrity	<ul style="list-style-type: none"> • Support asset integrity assurance and compliance • Support asset integrity risk and reliability analyses and improvement activities
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Contribute to process safety-related continuous improvement projects

Process Safety Engineer

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Change Management	Level 4	Sense Making	Advanced
	Commissioning and Start-Up Management	Level 3	Computational Thinking	Advanced
	Continuing Professional Development Management	Level 4	Problem Solving	Intermediate
	Continuous Improvement Management	Level 3	Transdisciplinary Thinking	Intermediate
	Data Analytics System Design	Level 3	Lifelong Learning	Intermediate
	Data and Statistical Analytics	Level 3		
	Engineering Drawing Interpretation and Management	Level 4		
	Engineering Management of Change	Level 3		
	Engineering Project Management	Level 3		
	Engineering Safety Standards Interpretation	Level 3		
	Environmental Management System Framework Development and Implementation	Level 3		
	Front-End Engineering Design Management	Level 3		
	Internet of Things Management	Level 3		
	Major Hazard Installation Safety Case Management	Level 5		
	Operations Reporting Protocol Application	Level 4		
	Process Control	Level 3		
	Process Engineering Design	Level 4		
	Process Operations Troubleshooting	Level 4		
	Process Optimisation	Level 4		
	Process Plant and Equipment Integrity Management	Level 4		
	Process Safety Management Framework Development and Implementation	Level 4		
	Robotic and Automation Technology Application	Level 3		
	Safe System of Work Development and Implementation	Level 4		
	Safety Integrity Levels Management	Level 3		
	Technical Presentation	Level 4		
	Technical Report Writing	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		

Senior Process Safety Engineer

JOB ROLE DESCRIPTION

The Senior Process Safety Engineer provides technical advice and guidance on process safety-related activities. He/She leads the implementation of the Process Safety Management (PSM) framework in the organisation, and reviews plant safeguarding system requirements to ensure compliance with process safety standards. In addition, he provides technical input for the development and maintenance of the organisation's Major Hazard Installation (MHI) Safety Case.

The Senior Process Safety Engineer administers the Workplace Safety and Health (WSH) and Environmental Management Systems (EMS) by advising on the development and improvement of Safe System of Work (SSoW) frameworks, and by ensuring proper closure of process safety incident investigations and their notification to relevant authorities. He provides support and advice for asset integrity assurance and compliance, and leads process safety reviews during new projects. In addition, he contributes to staff capability development by coaching and mentoring junior staff in his team.

The Senior Process Safety Engineer works closely with the process engineering team and Health, Safety and Environment (HSE) department, and liaises with regulatory authorities for process safety matters. He is analytical, enjoys solving problems, and possesses good communication and interpersonal skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Advise on the development and improvement of Safe System of Work (SSoW) frameworks • Comply with WSH and EMS systems • Review process safety incident investigations and ensure proper closure of investigations and notification to relevant authorities
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Lead the implementation of PSM frameworks • Manage and review PSM performance data using tracking tools • Review plant safeguarding systems to ensure compliance with process safety standards • Review PSM frameworks for hazard identification, assessment of consequences and control of risks • Support the development and maintenance of the technical section of the organisation's Major Hazard Installation (MHI) Safety Case
	Support process engineering projects	<ul style="list-style-type: none"> • Lead technical support on process troubleshooting and optimisation from the process safety perspective • Review technical justification bases for projects from the process safety perspective • Support projects during plant commissioning and turnaround activities • Use emerging technologies for process safety solutioning with reference to case studies and safety standards
	Manage asset integrity	<ul style="list-style-type: none"> • Review asset integrity risk and reliability analyses and improvements • Support and advise on asset integrity assurance and compliance
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Coach and mentor staff • Manage team performance to achieve organisational goals • Supervise process safety-related continuous improvement projects

Senior Process Safety Engineer

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Change Management	Level 4	Sense Making	Advanced
	Commissioning and Start-Up Management	Level 4	Problem Solving	Advanced
	Continuing Professional Development Management	Level 4	Lifelong Learning	Advanced
	Continuous Improvement Management	Level 4	Computational Thinking	Intermediate
	Data Analytics System Design	Level 3	Decision Making	Intermediate
	Data and Statistical Analytics	Level 4		
	Engineering Drawing Interpretation and Management	Level 5		
	Engineering Management of Change	Level 4		
	Engineering Project Management	Level 4		
	Engineering Safety Standards Interpretation	Level 4		
	Environmental Management System Framework Development and Implementation	Level 3		
	Front-End Engineering Design Management	Level 4		
	Internet of Things Management	Level 3		
	Major Hazard Installation Safety Case Management	Level 5		
	Operations Reporting Protocol Application	Level 4		
	Process Control	Level 4		
	Process Operations Troubleshooting	Level 5		
	Process Optimisation	Level 5		
	Process Engineering Design	Level 5		
	Process Plant and Equipment Integrity Management	Level 5		
	Process Safety Management Framework Development and Implementation	Level 4		
	Robotic and Automation Technology Application	Level 4		
	Safe System of Work Development and Implementation	Level 5		
	Safety Integrity Levels Management	Level 4		
	Technical Presentation	Level 5		
	Technical Report Writing	Level 4		
	Training, Coaching and Assessment Management	Level 3		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		

Process Engineering Manager

JOB ROLE DESCRIPTION

The Process Engineering Manager manages the process engineering and process safety engineering teams to ensure optimum technical support for plant facilities. He/She is the sponsor of the organisation's Process Safety Management (PSM) framework and is accountable for ensuring the plant safeguarding system is compliant with process safety standards. He also provides technical input for the review of the organisation's Major Hazard Installation (MHI) Safety Case.

The Process Engineering Manager leads in the provision of technical support to the production team for process capability, efficiency, yield and quality improvements. He endorses recommendations for production trial runs, as well as recommendations for changes and improvements to Standard Operating Procedures (SOPs) and work methods for production areas and/or processes. He is accountable for all plant improvement and Management of Change (MOC) projects. In addition, he coaches and mentors junior staff in the process engineering and process safety engineering teams, and manages continuous improvement initiatives for process-related time, cost and quality improvements.

The Process Engineering Manager works closely with the process engineering team and Health, Safety and Environment (HSE) department, and liaises with regulatory authorities for process safety matters. He is proficient in engineering project management, and possesses good leadership, people management, decision-making and resource management skills, so as to achieve departmental goals.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Ensure compliance with WSH and EMS systems at the department level • Review process safety incident findings and trends, and recommend improvements
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Approve PSM performance data for reporting • Manage the compliance of plant safeguarding systems with process safety standards • Review the organisation's Major Hazard Installation (MHI) Safety Case • Sponsor the PSM framework to meet the organisation's PSM goals
	Support process plant optimisation	<ul style="list-style-type: none"> • Endorse recommendations for process efficiency improvements • Lead technical support to the production team to improve process capability, efficiency, yield and quality • Manage new technology applications for process optimisation
	Perform process engineering support	<ul style="list-style-type: none"> • Endorse non-conformance investigation reports • Endorse production trial runs for new raw materials introduction and/or new product specifications • Endorse recommendations for changes and improvements to Standard Operating Procedures (SOPs) and work methods for specific production areas and/or processes • Manage relevant stakeholders to determine product specifications to meet customers' requirements and standards
	Manage process engineering projects	<ul style="list-style-type: none"> • Manage all plant improvement projects and Management of Change (MOC) projects during plant operation, commissioning and turnaround • Manage troubleshooting activities arising from new production plant projects
	Manage asset integrity	<ul style="list-style-type: none"> • Formulate strategies and action plans to drive process integrity management and recommend improvements
	Administer staff and organisational development	<ul style="list-style-type: none"> • Coach and mentor staff • Contribute to business continuity planning, implementation and execution • Drive departmental performance to achieve organisational goals • Drive the adoption of technologies to support virtual collaboration in remote locations • Manage continuous improvement initiatives for time, cost and quality improvements • Manage department level resources and budgets

Process Engineering Manager

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Budget Management	Level 5	Leadership	Advanced
	Business Continuity Management	Level 5	Developing People	Advanced
	Change Management	Level 5	Decision Making	Advanced
	Commissioning and Start-Up Management	Level 5	Communication	Advanced
	Continuing Professional Development Management	Level 5	Interpersonal Skills	Advanced
	Continuous Improvement Management	Level 5		
	Data Analytics System Design	Level 4		
	Engineering Drawing Interpretation and Management	Level 5		
	Engineering Management of Change	Level 5		
	Engineering Project Management	Level 5		
	Engineering Safety Standards Interpretation	Level 5		
	Environmental Management System Framework Development and Implementation	Level 4		
	Front-End Engineering Design Management	Level 5		
	Internet of Things Management	Level 4		
	Major Hazard Installation Safety Case Management	Level 6		
	Non-Conformance Management	Level 5		
	Operations Reporting Protocol Application	Level 5		
	Organisational Analysis Management	Level 5		
	Organisational Resource Management	Level 5		
	Plant Economic Modelling	Level 5		
	Process Control	Level 5		
	Process Development Management	Level 5		
	Process Engineering Design	Level 6		
	Process Operations Troubleshooting	Level 5		
	Process Optimisation	Level 6		
	Process Plant and Equipment Integrity Management	Level 6		
	Process Safety Management Framework Development and Implementation	Level 5		
	Procurement Management	Level 5		
	Robotic and Automation Technology Application	Level 5		
	Safety Integrity Levels Management	Level 5		
	Staff Development Management	Level 5		
	Staff Management	Level 5		
	Technology Road Mapping	Level 5		
	Training, Coaching and Assessment Management	Level 5		
	Workplace Safety and Health Framework Development and Implementation	Level 4		
	Yield Analysis	Level 5		

Principal Engineer (Technology)

JOB ROLE DESCRIPTION

The Principal Engineer (Technology) applies his/her expertise in process technology to drive innovative solutions for complex engineering problems and plant improvement. He/She provides technical advice to support the long-term planning of production sites and facilities and to ensure the successful completion of engineering projects.

The Principal Engineer (Technology) supports plant equipment automation and optimisation by recommending new process technologies and applications that enhance the efficiency of production and maintenance activities. He drives the development of the Process Safety Management (PSM) framework, ensures its integration into production processes and projects, and reviews the organisation's Major Hazard Installation (MHI) Safety Case. At the organisational level, he is responsible for translating continuous improvement strategies into actionable plans for the production and process engineering department, and for driving the development of technical capabilities for engineering teams to ensure optimum engineering support for plant facilities.

The Principal Engineer (Technology) is a key resource person who advises senior management, plant customers and engineering groups, both internal and external, on process technology matters. He is highly analytical, enjoys solving challenging problems, and is able to lead others effectively. He is expected to possess strong project management, transdisciplinary thinking and decision-making skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Ensure compliance with WSH and EMS systems at the department level • Review process safety incident findings and trends, and recommend improvements
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Drive PSM framework development and integration into production processes and projects • Provide technical expertise on plant safeguarding systems • Review the organisation's Major Hazard Installation (MHI) Safety Case
	Perform process engineering support	<ul style="list-style-type: none"> • Provide technical expertise for production trial runs
	Manage process engineering projects	<ul style="list-style-type: none"> • Drive innovative solutions for complex engineering problems and plant improvement using emerging or new technologies • Guide Safe System of Work (SSoW) processes and procedures for all engineering and technology improvement projects • Provide technical advice to support long-term plans for production sites and facilities
	Manage equipment automation and optimisation	<ul style="list-style-type: none"> • Act as the liaison between internal and/or external engineering groups and plant customers to ensure engineering input quality • Recommend new process technologies and applications • Recommend technologies and techniques that enhance the efficiency and effectiveness of production and maintenance activities
	Manage asset integrity	<ul style="list-style-type: none"> • Formulate strategies and action plans to drive process integrity management and to recommend improvements
	Administer staff and organisational development	<ul style="list-style-type: none"> • Build in-house technical capabilities for engineering teams • Contribute to the development of business continuity plans • Drive the adoption of technologies to support virtual collaboration in remote locations • Translate continuous improvement strategies into actionable plans

Principal Engineer (Technology)

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Business Continuity Management	Level 5	Leadership	Advanced
	Business Networking Management	Level 5	Global Mindset	Advanced
	Change Management	Level 5	Transdisciplinary Thinking	Advanced
	Commissioning and Start-Up Management	Level 5	Developing People	Advanced
	Continuing Professional Development Management	Level 5	Decision Making	Advanced
	Continuous Improvement Management	Level 6		
	Data Analytics System Design	Level 4		
	Data and Statistical Analytics	Level 5		
	Engineering Management of Change	Level 5		
	Engineering Project Management	Level 5		
	Engineering Safety Standards Interpretation	Level 5		
	Engineering Support Management	Level 5		
	Environmental Management System Framework Development and Implementation	Level 4		
	Front-End Engineering Design Management	Level 5		
	Internet of Things Management	Level 5		
	Major Hazard Installation Safety Case Management	Level 6		
	Operations Reporting Protocol Application	Level 5		
	Plant Economic Modelling	Level 5		
	Process Control	Level 5		
	Process Development Management	Level 6		
	Process Engineering Design	Level 6		
	Process Operations Troubleshooting	Level 5		
	Process Optimisation	Level 6		
	Process Plant and Equipment Integrity Management	Level 6		
	Process Safety Management Framework Development and Implementation	Level 5		
	Project Management	Level 6		
	Robotic and Automation Technology Application	Level 5		
	Safety Integrity Levels Management	Level 5		
	Standard Operating Procedure Development and Implementation	Level 6		
	Technical Presentation	Level 6		
	Technology Road Mapping	Level 5		
	Workplace Safety and Health Framework Development and Implementation	Level 4		

Health, Safety and Environment (HSE)

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Environmental, Health and Safety Affairs (EHSA) Leader

Loh Yin May

Celanese Singapore Pte Ltd

SAFETY IS A CORE VALUE

As Environmental, Health and Safety Affairs (EHSA) Leader, Loh Yin May is in charge of the safety department at Celanese Singapore Pte Ltd, a technology and specialty materials company that engineers and manufactures a variety of products. Here, she plays a crucial role in ensuring the safety of herself and her peers.

Yin May has been in the industry for more than a decade in other job roles, starting as a Process and Production Engineer. In these roles, she experienced first-hand the various safety procedures put in place by the safety department. When the opportunity came along to take up this role as EHSA Leader, she jumped at the chance to find out more about developing and enforcing these procedures.

A trend that she has noticed in the Energy and Chemicals sector is the use of technology to improve workflow. "I've seen the logging of process parameters using old technology. Now it's all in the system and we can even generate reports from stored historical data. Transmission of data from the field no longer requires a cable since there is wireless technology too. There is also the use of drones to do inspections in inaccessible areas that can totally eliminate the risk of human entry into those areas!"

With new technology, Yin May says there needs to be in-depth understanding of the possible risks

that might come up. This is why she encourages constant upgrading and training. "There are always new regulations such as Major Hazard Installation (MHI) Regulations that keep me busy and give me the opportunity to learn more," she explains.

Yin May believes the Skills Framework for Energy and Chemicals can help her identify areas of personal improvement to work on. The inclusion of technical skills and competencies in the Skills Map helps differentiate the requirements for each job level. She intends to expand her current occupational safety role to include process safety in the near future. "Have an open mind and a heart for continuous learning. Each role is a challenge and an opportunity to learn and get better," she advises.

"Have an open mind and a heart for continuous learning. Each role is a challenge and an opportunity to learn and get better."

Health, Safety and Environment Specialist

JOB ROLE DESCRIPTION

The HSE Specialist implements and administers the organisation's Workplace Safety and Health (WSH) and Environmental Management System (EMS) programmes in the workplace and supports the development of WSH and EMS frameworks, in compliance with pertinent government regulations and organisational health, safety and environmental guidelines.

The HSE Specialist supports the development and implementation of Safe System of Work (SSoW) processes and procedures at the workplace, and interfaces with the production and process engineering department, engineering and maintenance department, and contractors to ensure compliance. He/She assists in the development of emergency response and crisis management plans and works to identify and reduce known risks that could lead to emergencies or crises. He also supports the implementation of continuous improvement initiatives and activities at the workplace.

The HSE Specialist is a good team player, has good written and verbal communication skills, interacts effectively with others, and enjoys delivering training.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Conduct WSH and EMS-related training and communication sessions for staff and contractors • Conduct WSH and environmental accident and incident investigations and follow up on corrective and preventive actions • Conduct WSH and EMS system and legal compliance reviews and audits • Contribute to the development of the organisation's Major Hazard Installation (MHI) Safety Case • Ensure all staff and contractors comply with the organisation's WSH and EMS standards and practices • Implement WSH and EMS systems • Support the development of WSH and EMS frameworks
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Assist in emergency response and crisis management activities, in line with the defined organisational structure • Assist in the development of emergency response and crisis management plans
	Apply Safe Systems of Work (SSoW)	<ul style="list-style-type: none"> • Support SSoW activities, interfacing with the production team, maintenance team and contractors • Support the development and implementation of SSoW processes and procedures
	Administer staff and organisational development	<ul style="list-style-type: none"> • Identify opportunities for continuous improvement • Support the implementation of continuous improvement initiatives and activities

Health, Safety and Environment Specialist

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Audit and Review Management	Level 3	Communication	Intermediate
	Change Management	Level 4	Interpersonal Skills	Intermediate
	Continuing Professional Development Management	Level 4	Teamwork	Intermediate
	Continuous Improvement Management	Level 3	Digital Literacy	Intermediate
	Crisis Management	Level 3	Sense Making	Intermediate
	Emergency Response and Crisis Management Development and Implementation	Level 4		
	Emergency Response Management	Level 4		
	Environmental Management System Framework Development and Implementation	Level 4		
	Incident Investigation Management	Level 4		
	Major Hazard Installation Safety Case Management	Level 3		
	Project Management	Level 4		
	Robotic and Automation Technology Application	Level 4		
	Safe System of Work Development and Implementation	Level 4		
	Third Party Management	Level 3		
	Training, Coaching and Assessment Management	Level 3		
	Workplace Safety and Health Framework Development and Implementation	Level 4		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		

Senior Health, Safety and Environment Specialist

JOB ROLE DESCRIPTION

The Senior HSE Specialist coordinates the development of the Workplace Safety and Health (WSH) and Environmental Management System (EMS) frameworks across departments, and supervises WSH and EMS system reviews and audits, to ensure compliance with pertinent government regulations and organisational health, safety and environmental guidelines. He/She supervises the implementation of WSH and EMS programmes in the organisation, and manages training and communication sessions for staff and contractors. He also contributes to the development of the organisation's Major Hazard Installation (MHI) Safety Case.

The Senior HSE Specialist provides technical input for the development and update of Safe System of Work (SSoW) processes and procedures, and audits compliance with SSoW activities. He is responsible for coordinating the development of emergency response and crisis management plans. In addition, he contributes to staff and organisational development by validating continuous improvement initiatives and activities, and by coaching and mentoring junior staff in the Health, Safety and Environment (HSE) department.

The Senior HSE Specialist is a good team player, has excellent written and verbal communication skills, interacts effectively with others, and enjoys delivering training.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Contribute to the development of the organisation's Major Hazard Installation (MHI) Safety Case • Coordinate the development of WSH and EMS frameworks across departments • Manage WSH and EMS-related training and communication sessions for staff and contractors • Review WSH and EMS systems • Supervise all staff and contractors' compliance with the organisation's WSH and EMS standards and practices • Supervise WSH and EMS system and legal compliance reviews and audits • Supervise WSH and environmental accident and incident investigations, and ensure proper closure of investigations and their notification to relevant authorities
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Coordinate emergency response and crisis management activities, in line with the defined organisational structure • Coordinate the development of emergency response and crisis management plans
	Apply Safe Systems of Work (SSoW)	<ul style="list-style-type: none"> • Audit compliance with SSoW activities, interfacing with the production team, maintenance team and contractors • Lead the development and update of SSoW processes and procedures
	Administer staff and organisational development	<ul style="list-style-type: none"> • Coach and mentor staff • Manage team performance to achieve organisational goals • Validate continuous improvement initiatives and activities

Senior Health, Safety and Environment Specialist

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Audit and Review Management	Level 4	Communication	Intermediate
	Change Management	Level 4	Sense Making	Intermediate
	Continuing Professional Development Management	Level 4	Developing People	Intermediate
	Continuous Improvement Management	Level 4	Digital Literacy	Intermediate
	Crisis Management	Level 4	Interpersonal Skills	Intermediate
	Emergency Response and Crisis Management Development and Implementation	Level 5		
	Emergency Response Management	Level 4		
	Environmental Management System Framework Development and Implementation	Level 5		
	Incident Investigation Management	Level 4		
	Major Hazard Installation Safety Case Management	Level 4		
	Project Management	Level 5		
	Robotic and Automation Technology Application	Level 4		
	Safe System of Work Development and Implementation	Level 5		
	Third Party Management	Level 4		
	Training, Coaching and Assessment Management	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 5		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 4		

Health, Safety and Environment Manager

JOB ROLE DESCRIPTION

The HSE Manager oversees all activities in the Health, Safety and Environment (HSE) department and is responsible for providing technical expertise on HSE issues to relevant stakeholders. He/She leads the development of the Workplace Safety and Health (WSH) and Environmental Management System (EMS) frameworks, and evaluates the organisation's WSH and EMS systems to ensure compliance with pertinent government regulations and organisational health, safety and environmental guidelines. He reviews WSH and environmental accident and incident findings and trends to recommend improvements. Furthermore, he coordinates the development and maintenance of the organisation's Major Hazard Installation (MHI) Safety Case.

The HSE Manager is a senior member of the organisation's crisis management team and manages the development of the organisation's emergency response and crisis management plans. He is responsible for managing the organisation's Safe System of Work (SSoW) framework to ensure that work activities are carried out safely. In addition, he coaches and mentors HSE department personnel and drives departmental performance to achieve the organisation's HSE goals.

The HSE Manager actively promotes a safe workplace culture across the organisation. As a department manager, he is required to have good leadership, interpersonal and resource management skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Coordinate the development and maintain the organisation's Major Hazard Installation (MHI) Safety Case • Evaluate WSH and EMS systems • Lead the development of WSH and EMS frameworks • Liaise with external stakeholders on WSH and EMS matters • Manage WSH and EMS-related training and communication at organisational level • Manage WSH and EMS systems and legal compliance reviews and audits • Oversee all staff and contractors' compliance with the organisation's WSH and EMS standards and practices • Review WSH and environmental accident and incident findings and trends to recommend improvements
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Manage the development of emergency response and crisis management plans • Review emergency response and crisis management activities, in line with the defined organisational structure • Support crisis management activities as a senior member of the incident management team (IMT) and/or crisis management team
	Apply Safe Systems of Work (SSoW)	<ul style="list-style-type: none"> • Manage and review the development of SSoW processes and procedures • Manage SSoW frameworks at organisational level
	Administer staff and organisational development	<ul style="list-style-type: none"> • Manage department level resources and budgets • Coach and mentor staff • Contribute to business continuity planning, implementation and execution • Drive departmental performance to achieve organisational goals • Review and endorse continuous improvement initiatives and activities

Health, Safety and Environment Manager

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Audit and Review Management	Level 5	Communication	Advanced
	Budget Management	Level 5	Sense Making	Advanced
	Business Continuity Management	Level 5	Developing People	Advanced
	Change Management	Level 5	Leadership	Advanced
	Continuous Improvement Management	Level 5	Interpersonal Skills	Advanced
	Crisis Management	Level 5		
	Emergency Response and Crisis Management Development and Implementation	Level 6		
	Emergency Response Management	Level 5		
	Engineering Management of Change	Level 5		
	Environmental Management System Framework Development and Implementation	Level 6		
	Incident Investigation Management	Level 5		
	Major Hazard Installation Safety Case Management	Level 5		
	Organisational Analysis Management	Level 5		
	Organisational Resource Management	Level 5		
	Procurement Management	Level 5		
	Safe System of Work Development and Implementation	Level 6		
	Staff Development Management	Level 5		
	Staff Management	Level 5		
	Training, Coaching and Assessment Management	Level 5		
	Workplace Safety and Health Framework Development and Implementation	Level 6		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 5		

Engineering and Maintenance

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Chief Engineer/Fellow	89



Maintenance Engineer (Instrument and Control System)

Marcus Chia

Petrochemical Corporation of Singapore (Private) Limited

RIISING TO CHALLENGES

Marcus Chia is not one to shy away from challenges. He believes that the challenges present in the Energy and Chemicals sector gives him the opportunity to grow and become better at his job. As an Engineer (Instrument and Control System, Maintenance) at Petrochemical Corporation of Singapore (Private) Limited, he believes in facing situations head on and learning from them.

One of Marcus's responsibilities is to manage and oversee the maintenance of distributed control systems (DCS) in the plant. Another is to provide instrumentation and control system engineering design and implementation for new projects, including advance process control and optimisation of the process plants in the company. "Working in a petrochemical process plant can be an arduous task, as the processes are usually complex. There is a need to continuously learn," he says.

In May 2017, Marcus represented his company in the Regional Olefin Plant Technical Conference, where he showcased and presented the wireless instrumentation used in the plant to his peers. Recalling the event as one of the most memorable events in this career, Marcus stood out amongst 20 other speakers from around the region and took home the Best Speaker award.

He encourages the younger generation of Singaporeans to join him in the sector. Through outlining the various tracks in the Skills Framework's Career Pathways, he hopes this educates and

encourages those interested in the sector. "Most people are aware of the production and process engineering track, and see it as a natural career choice. Therefore, there needs to be more outreach to get new entrants to see that another route they can take is engineering and maintenance. The Skills Framework for Energy and Chemicals raises awareness on the other options available out there," Marcus says.

His advice for those thinking about joining the sector: "Come in with an open mind and gain as much knowledge as possible. There are many growing sectors in Singapore, and the Energy and Chemicals sector is definitely a good choice!" he says.

"Come in with an open mind and gain as much knowledge as possible. The Energy and Chemicals sector is definitely a good choice!"

Maintenance Planner

JOB ROLE DESCRIPTION

The Maintenance Planner coordinates with internal and external stakeholders to plan and schedule routine and non-routine maintenance work to support reliable plant operations. He/She optimises maintenance plans and schedules to minimise plant downtime and total maintenance cost through detailed planning and scheduling of maintenance work orders, and coordination with vendors, contractors, production and relevant engineering teams.

The Maintenance Planner coordinates with the production team to ensure that maintenance and turnaround schedules are aligned with production targets. He is a member of the Emergency Response Team (ERT). In addition, he supports the implementation of initiatives and activities for plant continuous improvement.

The Maintenance Planner works closely with the production, maintenance and discipline engineering teams. He is able to work independently, and possesses strong problem-solving, organisation, communication and interpersonal skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems
	Perform inspection and maintenance work	<ul style="list-style-type: none"> • Coordinate with the production team to ensure maintenance and turnaround schedules are aligned with production targets • Prioritise maintenance and turnaround work based on analyses of maintenance reports
	Manage maintenance planning and scheduling	<ul style="list-style-type: none"> • Coordinate with internal and external stakeholders for maintenance and turnarounds • Develop maintenance plans and schedules for routine and non-routine maintenance work • Interface with procurement and vendors to align equipment lead times with planned maintenance work activities • Optimise maintenance plans and schedules to minimise downtime and costs • Support the reporting of plant maintenance and availability status
	Administer staff and organisational development	<ul style="list-style-type: none"> • Assist in business continuity planning processes • Identify opportunities for continuous improvement • Support the implementation of continuous improvement initiatives and activities

Maintenance Planner

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Asset Integrity Management	Level 3	Resource Management	Intermediate
	Business Continuity Management	Level 4	Creative Thinking	Intermediate
	Change Management	Level 4	Decision Making	Intermediate
	Continuous Improvement Management	Level 3	Communication	Intermediate
	Environmental Management System Framework Development and Implementation	Level 3	Teamwork	Intermediate
	Maintenance Integrity and Reliability Framework Development and Implementation	Level 3		
	Maintenance Planning and Scheduling	Level 4		
	Organisational Resource Management	Level 4		
	Plant Turnaround Management	Level 4		
	Preventive Maintenance Management	Level 3		
	Procurement Management	Level 3		
	Supply Chain Management	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 3		

Junior Maintenance Technician

JOB ROLE DESCRIPTION

The Junior Maintenance Technician assists with the routine monitoring, basic troubleshooting and rectification of process equipment and systems to maintain their availability and reliability for plant operations. He/She works under close supervision and in compliance with maintenance Standard Operating Procedures (SOPs). He assists with maintenance activities associated with plant turnaround, and may specialise in electrical, rotating, static or instrumentation and control-related maintenance work.

The Junior Maintenance Technician applies Safe System of Work (SSoW) procedures and risk control measures to ensure work activities are carried out safely, and in compliance with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements. He is a member of the Emergency Response Team (ERT) and supports continuous improvement projects for the plant.

The Junior Maintenance Technician works in the field, on either a rotating or day shift, and may be on call. He is a good team player and interacts effectively with others.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Apply risk control measures to ensure work activities are carried out safely • Apply Safe System of Work (SSoW) procedures to ensure work activities are performed safely • Assist in toolbox meetings prior to starting work activities • Comply with WSH and EMS systems • Perform good housekeeping in the workplace
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Respond to emergencies as an Emergency Response Team (ERT) member
	Perform inspection and maintenance work	<ul style="list-style-type: none"> • Apply emerging technologies to perform inspection and maintenance work • Assist in plant preventive and corrective maintenance on process equipment and systems • Assist in process equipment and system troubleshooting and rectification • Assist in the routine monitoring and inspection of process equipment and systems • Assist in the testing and commissioning of new and/or modified process equipment and systems • Assist in turnaround maintenance work • Follow Standard Operating Procedures (SOPs) for inspection and maintenance work
	Administer staff and organisational development	<ul style="list-style-type: none"> • Support continuous improvement projects

Junior Maintenance Technician

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Continuous Improvement Management	Level 2	Teamwork	Basic
	Data and Statistical Analytics	Level 1	Sense Making	Basic
	Electrical Field Maintenance Management	Level 1	Communication	Basic
	Emergency Response Management	Level 2	Problem Solving	Basic
	Engineering Drawing Interpretation and Management	Level 1	Decision Making	Basic
	Environmental Management System Framework Development and Implementation	Level 1		
	Instrumentation and Control Field Maintenance Management	Level 1		
	Mechanical Field Maintenance Management	Level 1		
	Plant Turnaround Management	Level 1		
	Preventive Maintenance Management	Level 2		
	Robotic and Automation System Maintenance	Level 1		
	Safe System of Work Development and Implementation	Level 1		
	Workplace Safety and Health Framework Development and Implementation	Level 1		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 1		

Maintenance Technician

JOB ROLE DESCRIPTION

The Maintenance Technician performs routine monitoring and inspection, troubleshooting and rectification, as well as preventive and corrective maintenance on process equipment and systems, in accordance with maintenance Standard Operating Procedures (SOPs). He/She conducts maintenance work for plant turnarounds and records performed maintenance and inspection work in the computerised maintenance management system (CMMS). He may specialise in electrical, rotating, static or instrumentation and control related-maintenance work.

The Maintenance Technician applies Safe System of Work (SSoW) procedures, and participates in activity-based risk assessments, to ensure work activities are carried out safely and in compliance with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements. He is a member of the Emergency Response Team (ERT) and supports continuous improvement projects for the plant.

The Maintenance Technician works in the field, either on a rotating or day shift, and may be on call. He is a good team player and interacts effectively with others.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Apply Safe System of Work (SSoW) procedures to ensure work activities are performed safely • Comply with WSH and EMS systems • Ensure contractors comply with the organisation's WSH and EMS standards and practices • Participate in activity-based risk assessments • Participate in toolbox meetings prior to starting work activities • Perform good housekeeping in the workplace
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Respond to emergencies as an Emergency Response Team (ERT) member
	Perform inspection and maintenance work	<ul style="list-style-type: none"> • Apply emerging technologies to perform inspection and maintenance work • Assist in root cause analyses of equipment failures • Follow Standard Operating Procedures (SOPs) for inspection and maintenance work • Perform plant preventive and corrective maintenance on process equipment and systems • Perform routine monitoring and inspection of process equipment and systems • Perform testing and commissioning of new and/or modified process equipment and systems • Perform troubleshooting and rectification on process equipment and systems • Perform turnaround maintenance work • Record maintenance and inspection work in the computerised maintenance management system (CMMS)
	Administer staff and organisational development	<ul style="list-style-type: none"> • Support continuous improvement projects

Maintenance Technician

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Asset Integrity Management	Level 2	Teamwork	Basic
	Continuous Improvement Management	Level 2	Sense Making	Basic
	Data and Statistical Analytics	Level 2	Problem Solving	Basic
	Electrical Field Maintenance Management	Level 2	Decision Making	Basic
	Emergency Response Management	Level 2	Communication	Basic
	Engineering Drawing Interpretation and Management	Level 2		
	Environmental Management System Framework Development and Implementation	Level 2		
	Incident Investigation Management	Level 2		
	Inspection Engineering Management	Level 2		
	Instrumentation and Control Field Maintenance Management	Level 2		
	Mechanical Field Maintenance Management	Level 2		
	Plant Turnaround Management	Level 2		
	Preventive Maintenance Management	Level 2		
	Process Analyser Maintenance Management	Level 2		
	Robotic and Automation System Maintenance	Level 2		
	Robotic and Automation Technology Application	Level 2		
	Safe System of Work Development and Implementation	Level 2		
	Third Party Management	Level 2		
	Workplace Safety and Health Framework Development and Implementation	Level 2		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 2		

Senior Maintenance Technician

JOB ROLE DESCRIPTION

The Senior Maintenance Technician supports the planning and implementation of preventive and corrective maintenance activities to ensure process equipment and system availability and reliability for plant operations. He/She performs root cause analyses to investigate equipment failure causes, and tests and commissions new and/or modified process equipment and systems to ensure their functionality and safe operation. He coordinates turnaround maintenance work among team members. He may specialise in electrical, rotating, static or instrumentation and control related-maintenance work.

The Senior Maintenance Technician administers the Workplace Safety and Health (WSH) and Environmental Management Systems (EMS) by leading toolbox meetings and coordinating Safe System of Work (SSoW) procedures among team members. He coordinates contractors to ensure their compliance with WSH and EMS standards and practices. He is a member of the Emergency Response Team (ERT). In addition, he identifies opportunities for continuous improvement in the plant and provides guidance to junior staff.

The Senior Maintenance Technician works in the field, on either a rotating or day shift, and may be on call. He is a good team player, interacts effectively with others, and has good analytical and problem-solving skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Coordinate Safe System of Work (SSoW) procedures to ensure work activities are performed safely • Coordinate with contractors to ensure compliance with the organisation's WSH and EMS standards and practices • Ensure compliance with WSH and EMS systems among team members • Ensure team members adhere to good housekeeping practices • Lead toolbox meetings prior to starting work activities • Participate in activity-based risk assessments
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Respond to emergencies as an Emergency Response Team (ERT) member
	Perform inspection and maintenance work	<ul style="list-style-type: none"> • Apply emerging technologies to perform inspection and maintenance work • Coordinate and prioritise plant preventive and corrective maintenance activities • Coordinate maintenance work during turnarounds • Coordinate routine monitoring and inspection of process equipment and systems • Coordinate the troubleshooting and rectification of process equipment and systems • Maintain Standard Operating Procedures (SOPs) for inspection and maintenance work • Perform root cause analyses of equipment failure • Perform testing and commissioning of new and/or modified process equipment and systems • Record maintenance and inspection work in the computerised maintenance management system (CMMS)
	Administer staff and organisational development	<ul style="list-style-type: none"> • Contribute to continuous improvement initiatives and activities • Identify opportunities for continuous improvement • Provide guidance to junior staff

Senior Maintenance Technician

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Asset Integrity Management	Level 2	Problem Solving	Intermediate
	Continuous Improvement Management	Level 3	Communication	Intermediate
	Data and Statistical Analytics	Level 2	Teamwork	Intermediate
	Electrical Field Maintenance Management	Level 3	Managing Diversity	Intermediate
	Emergency Response Management	Level 3	Interpersonal Skills	Intermediate
	Engineering Drawing Interpretation and Management	Level 3		
	Environmental Management System Framework Development and Implementation	Level 3		
	Incident Investigation Management	Level 2		
	Inspection Engineering Management	Level 3		
	Instrumentation and Control Field Maintenance Management	Level 3		
	Instrumentation and Control System Maintenance Management	Level 3		
	Internet of Things Management	Level 2		
	Maintenance Planning and Scheduling	Level 3		
	Mechanical Field Maintenance Management	Level 3		
	Plant Turnaround Management	Level 3		
	Preventive Maintenance Management	Level 3		
	Process Analyser Maintenance Management	Level 3		
	Procurement Management	Level 2		
	Project Management	Level 3		
	Robotic and Automation System Maintenance	Level 3		
	Robotic and Automation Technology Application	Level 2		
	Safe System of Work Development and Implementation	Level 3		
	Staff Management	Level 3		
	Technical Report Writing	Level 2		
	Third Party Management	Level 3		
	Training, Coaching and Assessment Management	Level 3		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		

Maintenance Supervisor

JOB ROLE DESCRIPTION

The Maintenance Supervisor plans and prioritises plant preventive and corrective maintenance activities to facilitate high availability of process equipment and systems for plant operations. He/She supervises maintenance activities for plant turnarounds, routine monitoring and inspection activities, equipment troubleshooting, as well as equipment failure root cause analyses.

The Maintenance Supervisor supervises staff and contractors' compliance with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements, and participates in incident investigations. He supports the discipline engineering team with integrity assurance, improvement activities and asset risk and reliability analyses. He is a member of the Emergency Response Team (ERT) and contributes to crisis management activities. In addition, he takes charge of his team's personnel capability development by providing coaching and mentoring.

The Maintenance Supervisor leads a team in the field, works on either a rotating or day shift, and may be on call. He has good leadership skills and encourages teamwork among his team members. He interacts effectively with others and has good communication, analytical and problem-solving skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Participate in WSH and EMS incident investigations • Supervise compliance with WSH and EMS systems • Supervise contractors to ensure compliance with the organisation's WSH and EMS standards and practices • Supervise good housekeeping in the workplace • Supervise the conduct of activity-based risk assessments • Supervise the execution of Safe System of Work (SSoW) procedures • Supervise toolbox meetings prior to starting work activities
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Assist the organisation's crisis management team to continually improve crisis management plans • Respond to emergencies as an Emergency Response Team (ERT) member
	Perform inspection and maintenance work	<ul style="list-style-type: none"> • Ensure timely recording and input of maintenance and inspection work in the computerised maintenance management system (CMMS) • Manage condition monitoring and routine inspection of process equipment and systems • Plan and prioritise plant preventive and corrective maintenance activities • Supervise maintenance work for turnarounds • Supervise the application of emerging technologies for inspection and maintenance work within the team • Supervise troubleshooting, root cause analyses, and rectification of process equipment and systems • Support the development and implementation of Standard Operating Procedures (SOPs) for inspection and maintenance work • Validate the testing and commissioning of new and/or modified process equipment and systems
	Manage asset integrity	<ul style="list-style-type: none"> • Participate in integrity assurance and improvement activities • Support asset risk and reliability analyses, and implement improvement activities
	Administer staff and organisational development	<ul style="list-style-type: none"> • Coach and mentor staff • Identify opportunities for continuous improvement • Manage resources within the team • Support the implementation of continuous improvement initiatives and activities

Maintenance Supervisor

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Asset Integrity Management	Level 3	Sense Making	Advanced
	Change Management	Level 4	Decision Making	Intermediate
	Continuous Improvement Management	Level 3	Leadership	Intermediate
	Crisis Management	Level 3	Teamwork	Intermediate
	Data and Statistical Analytics	Level 2	Interpersonal Skills	Intermediate
	Electrical Field Maintenance Management	Level 4		
	Emergency Response Management	Level 3		
	Engineering Drawing Interpretation and Management	Level 3		
	Engineering Management of Change	Level 3		
	Environmental Management System Framework Development and Implementation	Level 3		
	Incident Investigation Management	Level 3		
	Inspection Engineering Management	Level 4		
	Instrumentation and Control Field Maintenance Management	Level 4		
	Instrumentation and Control System Maintenance Management	Level 4		
	Internet of Things Management	Level 2		
	Maintenance Integrity and Reliability Framework Development and Implementation	Level 3		
	Maintenance Planning and Scheduling	Level 3		
	Mechanical Field Maintenance Management	Level 4		
	Organisational Resource Management	Level 4		
	Plant Turnaround Management	Level 3		
	Preventive Maintenance Management	Level 4		
	Process Analyser Maintenance Management	Level 4		
	Procurement Management	Level 3		
	Project Management	Level 3		
	Robotic and Automation System Maintenance	Level 4		
	Robotic and Automation Technology Application	Level 3		
	Safe System of Work Development and Implementation	Level 3		
	Staff Development Management	Level 3		
	Staff Management	Level 4		
	Technical Report Writing	Level 3		

Maintenance Supervisor

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES	
	Third Party Management	Level 4
	Training, Coaching and Assessment Management	Level 4
	Workplace Safety and Health Framework Development and Implementation	Level 3
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 4

Maintenance Manager

JOB ROLE DESCRIPTION

The Maintenance Manager oversees all activities in the maintenance department and is accountable for achieving high availability of process equipment and systems to improve plant performance and reliability. He/She formulates maintenance and contracting strategies for maintenance and turnaround work, in accordance with the organisation's goals. He endorses maintenance and turnaround schedules to ensure plant availability and reliability.

The Maintenance Manager manages asset integrity assurance and improvement activities, as well as asset integrity performance standards and controls. He administers the Workplace Safety and Health (WSH) and Environmental Management Systems (EMS) by endorsing risk assessments for maintenance-related activities and Safe System of Work (SSoW) processes and procedures. He supports the Site Main Controller (SMC) in emergency situations and participates in crisis management activities. In addition, he coaches and mentors maintenance department personnel and reviews and endorses initiatives and activities for plant continuous improvement.

The Maintenance Manager works in the field, on either a rotating or day shift, and may be on call. As a department manager, he is required to have good leadership, resource management, planning, analytical and problem-solving skills, and must be able to interact effectively with others, so as to achieve departmental goals.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Audit contractors' compliance with the organisation's WSH and EMS standards and practices • Endorse risk assessments for maintenance-related activities • Endorse Safe System of Work (SSoW) processes and procedures • Review compliance with WSH and EMS regulatory and system requirements • Support the incident investigation reviewing process
	Manage emergency responses and crises	<ul style="list-style-type: none"> • Facilitate responses to crisis situations and recovery activities, in accordance with the crisis management framework and procedures • Support the Site Main Controller (SMC) during emergency response situations
	Perform inspection and maintenance work	<ul style="list-style-type: none"> • Endorse maintenance and turnaround plans and schedules to ensure plant availability and reliability • Endorse plant preventive and corrective maintenance activities • Endorse Standard Operating Procedures (SOPs) for inspection and maintenance work • Ensure the effective implementation of the computerised maintenance management system (CMMS) for maintenance work traceability • Formulate contracting strategies for maintenance and turnaround work • Manage the availability and reliability of process equipment and systems to minimise downtime and maintenance costs • Manage the troubleshooting and rectification of process equipment and systems • Provide strategic direction in implementing emerging technologies to enhance plant availability, reliability and to reduce maintenance costs

Maintenance Manager

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS		KEY TASKS	
	Manage asset integrity		<ul style="list-style-type: none"> • Manage asset integrity performance standards and controls • Manage asset risk and reliability analyses and implement improvement activities • Manage integrity assurance and improvement activities • Manage the maintenance team's adherence to Management of Change (MOC) processes, policies and procedures 	
	Administer staff and organisational development		<ul style="list-style-type: none"> • Coach and mentor staff • Contribute to business continuity planning, implementation and execution • Drive departmental performance to achieve organisational goals • Manage department level resources and budgets • Review and endorse continuous improvement initiatives and activities 	
SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Asset Integrity Management	Level 4	Leadership	Advanced
	Budget Management	Level 5	Resource Management	Advanced
	Business Continuity Management	Level 5	Developing People	Advanced
	Change Management	Level 5	Interpersonal Skills	Advanced
	Continuous Improvement Management	Level 5	Decision Making	Advanced
	Crisis Management	Level 4		
	Electrical Engineering Management	Level 3		
	Emergency Response Management	Level 4		
	Engineering Management of Change	Level 4		
	Environmental Management System Framework Development and Implementation	Level 5		
	Incident Investigation Management	Level 5		
	Inspection Engineering Management	Level 5		
	Internet of Things Management	Level 4		
	Maintenance Integrity and Reliability Framework Development and Implementation	Level 4		
	Maintenance Planning and Scheduling	Level 5		
	Mechanical Rotating Equipment Engineering Management	Level 3		
	Mechanical Static Equipment Engineering Management	Level 3		
	Organisational Analysis Management	Level 5		
	Organisational Resource Management	Level 5		
	Plant Turnaround Management	Level 4		
	Preventive Maintenance Management	Level 5		
	Procurement Management	Level 5		

Maintenance Manager

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES	
	Reliability Engineering Management	Level 4
	Robotic and Automation System Maintenance	Level 5
	Staff Development Management	Level 5
	Staff Management	Level 5
	Third Party Management	Level 5
	Training, Coaching and Assessment Management	Level 5
	Workplace Safety and Health Framework Development and Implementation	Level 5
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 5

Discipline Engineer

JOB ROLE DESCRIPTION

The Discipline Engineer provides discipline-specific engineering support to production facilities and projects on matters related to the selection, specification, construction, performance, integrity, reliability, fitness for service and repair of equipment. He/She supports the maintenance and production teams in the delivery of plant operational excellence and asset integrity assurance, by conducting risks analyses on plant and equipment and advising on corrective actions for equipment faults and failures. He may specialise in electrical, rotating, static, analyser, reliability, project, or integrity and inspection-related engineering work.

The Discipline Engineer manages the automation and optimisation of plant equipment by defining equipment operating parameters, limits and engineering controls, and by conducting value analyses on equipment, technology and labour versus automation to achieve best value engineering solutions. He manages engineering projects by defining their scope and supporting their execution. In addition, he supports plant continuous improvement by reviewing pipelines and equipment and system performance and limits.

The Discipline Engineer works closely with the maintenance, production and Health, Safety and Environment (HSE) teams. He possesses strong analytical thinking and problem-solving skills, is a good team player and interacts effectively with others.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems • Ensure contractors and vendors comply with the organisation's WSH and EMS standards and practices • Support the development of the organisation's Major Hazard Installation (MHI) Safety Case • Support WSH and EMS incident investigations
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Comply with PSM systems
	Manage engineering projects	<ul style="list-style-type: none"> • Define the scope of engineering projects and evaluate vendor proposals against engineering design specifications • Develop technical documents for equipment operation and maintenance with reference to vendors' equipment manuals as part of Management of Change (MOC) • Support process safety reviews for plant operation, MOC projects and new projects • Support the execution of engineering projects including feasibility studies, engineering design, procurement, construction, Pre-Startup Safety Reviews (PSSR), start-up and commissioning
	Manage asset integrity	<ul style="list-style-type: none"> • Conduct risk analyses on plant and equipment • Perform functional integrity audits with the maintenance team • Provide discipline engineering support in the development and implementation of asset integrity management systems • Support the maintenance team in troubleshooting, root cause analyses and provide solutions for equipment faults and failures

Discipline Engineer

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Manage equipment automation and optimisation	<ul style="list-style-type: none"> • Compare new versus rebuilt equipment, existing versus new technologies, and labour versus automation to achieve best value engineering solutions • Define equipment operating parameters, limits and engineering controls for the optimisation of equipment reliability and availability • Perform data analytics and engineering feasibility studies for alternative engineering solutions • Support analyses of real-time equipment data and vendor data and make recommendations for equipment efficiency improvements
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Support continuous improvement, including pipeline reviews, and equipment and system performance and limits

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Asset Integrity Management	Level 4	Sense Making	Intermediate
	Change Management	Level 4	Decision Making	Intermediate
	Commissioning and Start-Up Management	Level 3	Problem Solving	Intermediate
	Continuing Professional Development Management	Level 4	Transdisciplinary Thinking	Intermediate
	Continuous Improvement Management	Level 3	Teamwork	Intermediate
	Data Analytics System Design	Level 3		
	Data and Statistical Analytics	Level 3		
	Electrical Engineering Management	Level 3		
	Engineering Drawing Interpretation and Management	Level 4		
	Engineering Management of Change	Level 3		
	Engineering Project Management	Level 3		
	Engineering Safety Standards Interpretation	Level 3		
	Engineering Support Management	Level 4		
	Engineering, Procurement and Construction Management	Level 3		
	Environmental Management System Framework Development and Implementation	Level 3		
	Equipment and System Value Engineering Management	Level 4		
	Front-End Engineering Design Management	Level 3		
	Incident Investigation Management	Level 3		
	Inspection Engineering Management	Level 4		
	Instrumentation and Control Design Engineering Management	Level 3		
	Internet of Things Management	Level 3		

Discipline Engineer

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES	
	Maintenance Integrity and Reliability Framework Development and Implementation	Level 4
	Major Hazard Installation Safety Case Management	Level 3
	Mechanical Rotating Equipment Engineering Management	Level 3
	Mechanical Static Equipment Engineering Management	Level 3
	Plant Turnaround Management	Level 4
	Process Safety Management Framework Development and Implementation	Level 3
	Project Management	Level 4
	Reliability Engineering Management	Level 4
	Robotic and Automation Technology Application	Level 3
	Technical Presentation	Level 4
	Technical Report Writing	Level 4
	Third Party Management	Level 4
	Workplace Safety and Health Framework Development and Implementation	Level 3
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3

Senior Discipline Engineer

JOB ROLE DESCRIPTION

The Senior Discipline Engineer manages the integrity of plant assets and equipment by leading discipline engineering support in the development and implementation of the organisation's asset integrity management system. He/She coordinates discipline engineering support to the maintenance team in asset and equipment troubleshooting and root cause analyses, and conducts cross-functional integrity audits with the maintenance team. He may specialise in electrical, rotating, static, analyser, reliability, project, or integrity and inspection-related engineering work.

The Senior Discipline Engineer manages the automation and optimisation of plant equipment by reviewing equipment operating parameters, limits and engineering controls, and by reviewing value analysis results on equipment, technology and labour versus automation for the purpose of achieving best value engineering solutions. He reviews the scope of engineering projects and leads their execution including the conduct of feasibility studies, provision of engineering design, procurement, construction, Pre-Startup Safety Reviews (PSSR), start-up and commissioning. He also leads the development of technical documents for equipment operation and maintenance as part of Management of Change (MOC). In addition, he supports plant continuous improvement and coaches and mentors the discipline engineers.

The Senior Discipline Engineer works closely with the maintenance, production and Health, Safety and Environment (HSE) teams. He is analytical, enjoys solving problems and interacts effectively with others. He also possesses good leadership, communication and resource management skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems • Ensure contractors and vendors comply with the organisation's WSH and EMS standards and practices • Support the development of the organisation's Major Hazard Installation (MHI) Safety Case • Support WSH and EMS incident investigations
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Comply with PSM systems
	Manage engineering projects	<ul style="list-style-type: none"> • Lead the development of technical documents for equipment operation and maintenance with reference to vendors' equipment manuals as part of Management of Change (MOC) • Lead the execution of engineering projects including feasibility studies, engineering design, procurement, construction, Pre-Startup Safety Reviews (PSSR), start-up and commissioning • Review the scope of engineering projects and lead the evaluation of vendor proposals against engineering design specifications • Support process safety reviews for plant operations, MOC projects and new projects
	Manage asset integrity	<ul style="list-style-type: none"> • Conduct cross-functional integrity audits with the maintenance team • Coordinate discipline engineering support to the maintenance team in troubleshooting, root cause analyses and provide solutions for equipment faults and failures • Lead discipline engineering support in the development and implementation of asset integrity management systems • Lead risk analyses on plant and equipment

Senior Discipline Engineer

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Manage equipment automation and optimisation	<ul style="list-style-type: none"> • Lead data analytics and engineering feasibility studies for alternative engineering solutions • Review equipment operating parameters, limits and engineering controls for the optimisation of equipment reliability and availability • Review new versus rebuilt equipment, existing versus new technologies and labour versus automation to achieve best value engineering solutions • Review the analysis of real-time equipment data and vendor data and make recommendations for equipment efficiency improvements
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Coach and mentor staff • Manage team performance to achieve organisational goals • Support continuous improvement, including pipeline reviews, and equipment and system performance and limits

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Asset Integrity Management	Level 4	Communication	Advanced
	Change Management	Level 4	Problem Solving	Advanced
	Commissioning and Start-Up Management	Level 4	Sense Making	Advanced
	Continuing Professional Development Management	Level 4	Lifelong Learning	Advanced
	Continuous Improvement Management	Level 4	Creative Thinking	Intermediate
	Data Analytics System Design	Level 3		
	Data and Statistical Analytics	Level 4		
	Electrical Engineering Management	Level 4		
	Engineering Drawing Interpretation and Management	Level 5		
	Engineering Management of Change	Level 4		
	Engineering Project Management	Level 4		
	Engineering Safety Standards Interpretation	Level 4		
	Engineering Support Management	Level 4		
	Engineering, Procurement and Construction Management	Level 4		
	Environmental Management System Framework Development and Implementation	Level 3		
	Equipment and System Value Engineering Management	Level 4		
	Front-End Engineering Design Management	Level 4		
	Incident Investigation Management	Level 3		
	Inspection Engineering Management	Level 5		

Senior Discipline Engineer

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES	
	Instrumentation and Control Design Engineering Management	Level 4
	Internet of Things Management	Level 3
	Maintenance Integrity and Reliability Framework Development and Implementation	Level 5
	Major Hazard Installation Safety Case Management	Level 4
	Mechanical Rotating Equipment Engineering Management	Level 4
	Mechanical Static Equipment Engineering Management	Level 4
	Plant Turnaround Management	Level 4
	Process Safety Management Framework Development and Implementation	Level 3
	Procurement Management	Level 4
	Project Management	Level 5
	Reliability Engineering Management	Level 4
	Robotic and Automation Technology Application	Level 4
	Technical Presentation	Level 5
	Technical Report Writing	Level 4
	Third Party Management	Level 4
	Training, Coaching and Assessment Management	Level 3
	Workplace Safety and Health Framework Development and Implementation	Level 3
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3

Engineering Manager

JOB ROLE DESCRIPTION

The Engineering Manager is accountable for the management of discipline engineering support to various departments to deliver operational excellence, asset integrity assurance and engineering project management. He/She formulates strategies for plant integrity and inspection and maintenance work. He validates cross-functional integrity audit findings and recommends corrective and preventive measures for plant assets and equipment.

The Engineering Manager drives the review of equipment reliability and availability to maximise equipment utilisation. He endorses the scope of engineering projects and conducts process safety reviews for plant operation, Management of Change (MOC) projects and new engineering projects. He ensures the department's compliance with Workplace Safety and Health (WSH), Environmental Management System (EMS) and Process Safety Management (PSM) system requirements, and is involved in the review of the organisation's Major Hazard Installation (MHI) Safety Case. In addition, he coaches and mentors the discipline engineering team and manages continuous improvement initiatives for engineering-related time, cost, reliability and safety improvements.

The Engineering Manager manages a multi-disciplinary team of engineers and coordinates with other departmental managers for the planning and execution of engineering projects. He possesses strong leadership, project management, resource management and decision-making skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Ensure compliance with WSH and EMS systems at the department level • Review the organisation's Major Hazard Installation (MHI) Safety Case
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Ensure compliance with PSM systems at the department level
	Manage engineering projects	<ul style="list-style-type: none"> • Conduct process safety reviews for plant operation, Management of Change (MOC) projects and new projects • Endorse technical documents for equipment operation and maintenance • Endorse the scope of engineering projects and selection of vendors
	Manage asset integrity	<ul style="list-style-type: none"> • Endorse risk analyses on plant and equipment • Endorse the development and implementation of processes for asset integrity management systems • Facilitate the provision of discipline engineering support to various departments to deliver operational excellence, asset integrity and project management • Formulate strategies for plant integrity and inspection with the maintenance team • Verify cross-functional integrity audit findings and recommend corrective and preventive measures
	Manage equipment automation and optimisation	<ul style="list-style-type: none"> • Drive equipment reliability and availability reviews to maximise equipment utilisation • Endorse equipment operating parameters, limits and engineering controls for safe and optimum operating conditions • Endorse new versus rebuilt equipment, existing versus new technologies and labour versus automation to achieve best value engineering solutions • Endorse recommendations for equipment efficiency improvements • Strategise the use of data analytics across the plant and derive actionable insights for alternative engineering solutions

Engineering Manager

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer staff and organisational development	<ul style="list-style-type: none"> • Coach and mentor staff • Contribute to business continuity planning, implementation and execution • Drive departmental performance to achieve organisational goals • Drive the adoption of technologies to support virtual collaboration in remote locations • Manage continuous improvement initiatives for time, cost and quality improvements • Manage department level resources and budgets

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Asset Integrity Management	Level 5	Communication	Advanced
	Budget Management	Level 5	Computational Thinking	Advanced
	Business Continuity Management	Level 5	Creative Thinking	Advanced
	Change Management	Level 5	Decision Making	Advanced
	Commissioning and Start-Up Management	Level 5	Problem Solving	Advanced
	Continuing Professional Development Management	Level 5		
	Continuous Improvement Management	Level 5		
	Data Analytics System Design	Level 4		
	Electrical Engineering Management	Level 5		
	Engineering Management of Change	Level 5		
	Engineering Project Management	Level 5		
	Engineering Safety Standards Interpretation	Level 5		
	Engineering Support Management	Level 5		
	Engineering, Procurement and Construction Management	Level 4		
	Environmental Management System Framework Development and Implementation	Level 4		
	Equipment and System Value Engineering Management	Level 5		
	Front-End Engineering Design Management	Level 5		
	Inspection Engineering Management	Level 5		
	Instrumentation and Control Design Engineering Management	Level 5		
	Internet of Things Management	Level 4		
	Maintenance Integrity and Reliability Framework Development and Implementation	Level 6		
	Major Hazard Installation Safety Case Management	Level 5		

Engineering Manager

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES	
	Mechanical Rotating Equipment Engineering Management	Level 5
	Mechanical Static Equipment Engineering Management	Level 5
	Organisational Analysis Management	Level 5
	Organisational Resource Management	Level 5
	Plant Turnaround Management	Level 5
	Preventive Maintenance Management	Level 5
	Process Safety Management Framework Development and Implementation	Level 4
	Procurement Management	Level 5
	Reliability Engineering Management	Level 5
	Robotic and Automation Technology Application	Level 5
	Staff Development Management	Level 5
	Staff Management	Level 5
	Technology Road Mapping	Level 5
	Third Party Management	Level 5
	Training, Coaching and Assessment Management	Level 5
	Workplace Safety and Health Framework Development and Implementation	Level 4

Principal Engineer (Engineering)

JOB ROLE DESCRIPTION

The Principal Engineer (Engineering) acts as a technical advisor to provide problem-solving consultation and engineering expertise for complex engineering projects. He/She manages plant asset integrity by providing technical recommendations for equipment and system degradation issues, and by integrating mitigation measures for plant and equipment assessed risks into the organisation's business continuity plan.

The Principal Engineer (Engineering) manages plant asset and equipment optimisation by leading technical investigations, tests and validations of new technology and equipment for operational excellence. He provides technical input for the development and review of the organisation's Major Hazard Installation (MHI) Safety Case, and ensures the integration of the Process Safety Management (PSM) framework into engineering projects. At the organisational level, he is responsible for translating continuous improvement strategies into actionable plans for the engineering and maintenance department, and for driving the development of technical capabilities for the engineering team, so as to ensure optimum technical support for assuring plant asset and equipment performance.

The Principal Engineer (Engineering) is a key resource person who advises senior management, engineering groups (both internal and external), the production and process engineering department, and the Health, Safety and Environment (HSE) department on engineering matters. He is highly analytical, enjoys solving challenging problems, and is able to lead others effectively. He is expected to possess strong project management, transdisciplinary and decision-making skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Ensure compliance with WSH and EMS systems at the department level • Provide technical input for the development and review of the organisation's Major Hazard Installation (MHI) Safety Case
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Drive the implementation of PSM frameworks and their integration into engineering projects
	Manage engineering projects	<ul style="list-style-type: none"> • Act as technical advisor for complex engineering projects to ensure compliance with engineering standards • Critique technical documents for equipment operation and maintenance to ensure optimal reliability and integrity of equipment • Identify significant technical deviations from design to warrant change-out or major overhaul of equipment and/or systems • Lead process safety reviews for plant operation, Management of Change (MOC) projects and new projects • Share best practices in the implementation of engineering standards and design
	Manage asset integrity	<ul style="list-style-type: none"> • Act as technical advisor for the continuous improvement of asset integrity management systems • Lead the implementation of equipment and systems value engineering • Provide technical recommendations for equipment and system degradation issues to enhance plant reliability and availability • Validate plant and equipment risk analysis reports and integrate mitigation measures into business continuity plans
	Manage equipment automation and optimisation	<ul style="list-style-type: none"> • Drive the optimisation of process equipment reliability and availability • Lead technical investigations, tests and validations of new technologies and equipment for operational excellence • Provide engineering guidance and oversight to various departments to achieve best value engineering solutions • Recommend technologies and techniques that enhance the efficiency and effectiveness of production and maintenance activities • Synthesise data across entire plants for equipment integration and optimisation

Principal Engineer (Engineering)

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer staff and organisational development	<ul style="list-style-type: none"> • Build in-house technical capabilities for the engineering team • Contribute to the development of business continuity plans • Drive the adoption of technologies to support virtual collaboration in remote locations • Translate continuous improvement strategies into actionable plans

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Asset Integrity Management	Level 5	Leadership	Advanced
	Business Continuity Management	Level 5	Global Mindset	Advanced
	Business Networking Management	Level 5	Developing People	Advanced
	Change Management	Level 5	Problem Solving	Advanced
	Commissioning and Start-Up Management	Level 5	Decision Making	Advanced
	Continuing Professional Development Management	Level 5		
	Continuous Improvement Management	Level 6		
	Data Analytics System Design	Level 4		
	Data and Statistical Analytics	Level 5		
	Electrical Engineering Management	Level 5		
	Engineering Drawing Interpretation and Management	Level 5		
	Engineering Management of Change	Level 5		
	Engineering Project Management	Level 5		
	Engineering Safety Standards Interpretation	Level 5		
	Engineering Support Management	Level 5		
	Engineering, Procurement and Construction Management	Level 5		
	Environmental Management System Framework Development and Implementation	Level 4		
	Equipment and System Value Engineering Management	Level 5		
	Front-End Engineering Design Management	Level 5		
	Inspection Engineering Management	Level 6		
	Instrumentation and Control Design Engineering Management	Level 5		
	Internet of Things Management	Level 5		
	Maintenance Integrity and Reliability Framework Development and Implementation	Level 5		
	Major Hazard Installation Safety Case Management	Level 5		

Principal Engineer (Engineering)

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES	
	Mechanical Rotating Equipment Engineering Management	Level 5
	Mechanical Static Equipment Engineering Management	Level 5
	Plant Turnaround Management	Level 5
	Preventive Maintenance Management	Level 6
	Process Safety Management Framework Development and Implementation	Level 5
	Project Management	Level 6
	Reliability Engineering Management	Level 5
	Robotic and Automation System Maintenance	Level 5
	Robotic and Automation Technology Application	Level 5
	Technical Presentation	Level 6
	Technical Report Writing	Level 4
	Technology Road Mapping	Level 5
	Workplace Safety and Health Framework Development and Implementation	Level 4

Chief Engineer/Fellow

JOB ROLE DESCRIPTION

The Chief Engineer/Fellow is responsible for the strategic planning and design of complex engineering solutions to meet customers' requirements. He/She drives the direction and strategy for the development and implementation of engineering projects, and provides concise design criteria and process constraint considerations for capital projects such as plant improvements and/or expansions.

The Chief Engineer/Fellow leads engineering research for the adoption of new technologies and equipment to enhance the organisation's operational excellence and business competitiveness. He advises on advanced methods and techniques to ensure a sound asset integrity management system. He provides technical expertise for the review of the organisation's Major Hazard Installation (MHI) Safety Case and leads Process Safety Management (PSM) audit and compliance reviews, in compliance with Workplace Safety and Health (WSH), Environmental Management System (EMS) and PSM requirements. At the organisational level, he designs the organisation's technology roadmap and drives continuous improvement strategies. In addition, he leverages on his deep technical expertise and industry experience to develop technical capabilities for engineering teams and domain expertise for the organisation.

The Chief Engineer/Fellow is the organisation's technical expert who advises senior management and business partners on advanced engineering matters. He maintains and builds strong links with the external engineering community and establishes best practises in the implementation of engineering standards and design. He is a strategic and creative thinker, demonstrates exceptional problem-solving and communication skills, and networks effectively.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Drive compliance with WSH and EMS systems at organisational level
	Administer Process Safety Management (PSM) systems	<ul style="list-style-type: none"> • Lead PSM audit and compliance reviews • Technically review the organisation's Major Hazard Installation (MHI) Safety Case
	Manage engineering projects	<ul style="list-style-type: none"> • Drive direction and strategies for the development and implementation of engineering projects • Establish best practices in the implementation of engineering standards and design • Provide concise design criteria and process constraints in the management of capital projects for process facilities expansions or improvements • Provide technical expertise and validate process safety reviews for plant operations, Management of Change (MOC) projects and new projects
	Manage asset integrity	<ul style="list-style-type: none"> • Act as advisor to top management and business partners on advanced methods and techniques to ensure sound asset integrity management systems • Lead engineering research for adoption of new technologies and equipment to enhance business competitiveness
	Manage equipment automation and optimisation	<ul style="list-style-type: none"> • Drive the research and adoption of new technologies for data analytics • Provide leadership and direction for new technologies and equipment for operational excellence

Chief Engineer/Fellow

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer staff and organisational development	<ul style="list-style-type: none"> • Build in-house technical capabilities for engineering teams • Contribute to the development of business continuity plans • Design the organisation's technology roadmap through the analysis of market trends and external drivers • Drive continuous improvement strategies at organisational level • Drive the adoption of technologies to support virtual collaboration in remote locations • Provide leadership to uphold and shape the organisation's culture, values and behaviour

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Asset Integrity Management	Level 5	Leadership	Advanced
	Business Networking Management	Level 6	Communication	Advanced
	Change Management	Level 6	Transdisciplinary Thinking	Advanced
	Continuing Professional Development Management	Level 5	Decision Making	Advanced
	Continuous Improvement Management	Level 6	Global Mindset	Advanced
	Data Analytics System Design	Level 5		
	Data and Statistical Analytics	Level 6		
	Engineering Project Management	Level 5		
	Engineering Safety Standards Interpretation	Level 5		
	Engineering Support Management	Level 5		
	Engineering, Procurement and Construction Management	Level 5		
	Environmental Management System Framework Development and Implementation	Level 5		
	Equipment and System Value Engineering Management	Level 5		
	Inspection Engineering Management	Level 6		
	Internet of Things Management	Level 5		
	Maintenance Integrity and Reliability Framework Development and Implementation	Level 6		
	Major Hazard Installation Safety Case Management	Level 6		
	Plant Turnaround Management	Level 5		
	Process Safety Management Framework Development and Implementation	Level 5		
	Project Management	Level 6		
	Reliability Engineering Management	Level 6		
	Robotic and Automation Technology Application	Level 6		
	Technical Presentation	Level 6		
	Technology Road Mapping	Level 6		
	Workplace Safety and Health Framework Development and Implementation	Level 5		

Quality Assurance and Quality Control (QA&QC)

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Quality Control and Laboratory Manager

Thayanithi Ganesh

Evonik Methionine (SEA) Pte Ltd

EXCITING DEVELOPMENTS ON THE HORIZON

As a woman working in a male-dominated sector often viewed as high-risk and hazardous, Thayanithi Ganesh, Quality Control and Laboratory Manager at Evonik Methionine (SEA) Pte Ltd, says that this perception is far from the truth.

“There are many growth opportunities in this sector for everyone – both men and women. Safety is also the most important factor, and our work is carried out in a secured and controlled environment,” she says. Thayanithi is responsible for various lab activities, lab analyses and online measurements. In her team, their goal is to provide analytical services to meet production requirements and comply with quality, environmental, and occupational safety rules and regulations.

Her interest in laboratory work began when she was still in school. It led her to pursue a master’s degree in Applied Chemistry. “Learning about different types of analytical equipment and applications further developed my interest in this field,” she explains. Being in the profession since 1998, she says that she is constantly learning as she progresses in her career. For many years, she has learned the ropes of the chemical profession. After gaining more experience, she became a Project Leader and eventually took on more responsibilities as Quality Control and Laboratory Manager.

While Thayanithi says that the role can be challenging at times, she is looking forward to many new

developments on the horizon. “Evonik’s second world-scale methionine plant in Singapore is expected to become operational in 2019, and we are currently planning for the resources and manpower to support the operation of this new plant.” In preparation for this, they are in the process of hiring more staff. She aims to use the Skills Framework for Energy and Chemicals as a reference. In particular, she will use it as a guide when planning the career progression for Laboratory Technicians.

Besides the company expanding, she is also excited for the future of the Energy and Chemicals sector as a whole, as she says that the sector will continue to leverage on digitalisation. An example of this is the Laboratory Information Management System (LIMS) that supports the laboratory’s operations. In the coming years, Thayanithi believes that digitalisation will allow for a more streamlined workflow and greater efficiency in lab processes. “Digitalisation presents an exciting future for the Energy and Chemicals sector, and having this digital vision can further drive our competitive advantage as a company,” she explains.

“Digitalisation presents an exciting future for the Energy and Chemicals sector, and having this digital vision can further drive our competitive advantage as a company.”

Laboratory Assistant

JOB ROLE DESCRIPTION

The Laboratory Assistant supports day-to-day laboratory operations by assisting with basic calibration and simple troubleshooting of laboratory equipment, preparation of stock solutions and reagents, and sample labelling, in strict accordance with laboratory Standard Operating Procedures (SOPs) and under close supervision. He/She complies with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements by applying risk control measures for the safe execution of work activities, and performs good housekeeping in the workplace.

The Laboratory Assistant assists in conducting routine product and in-process sample analyses, and inspects samples for contamination, foreign matter or defects, to ensure product quality meets required specifications. He also contributes to organisational development by supporting continuous improvement projects.

The Laboratory Assistant usually works in a team, on either a day or rotating shift, in the laboratory. He is meticulous, a good team player and interacts effectively with others.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Apply risk control measures to ensure work activities are carried out safely • Assist in the handling, storage and transportation of hazardous substances and dangerous goods, in accordance with WSH and EMS standards and practices • Comply with WSH and EMS systems • Perform good housekeeping in the workplace
	Perform laboratory operations	<ul style="list-style-type: none"> • Assist in basic calibration and simple troubleshooting on a range of laboratory equipment • Assist in the labelling of samples • Assist in the preparation of stock solutions and reagents • Follow Standard Operating Procedures (SOPs) for laboratory operations
	Manage sample collection and analyses	<ul style="list-style-type: none"> • Apply emerging technologies to perform product and in-process sampling, and laboratory data management • Assist in inspecting samples for contamination, foreign matter and/or defects • Assist in routine product and in-process sample analyses, according to documented test methods • Assist in the recording of routine sample testing results
	Manage Quality Assurance and Quality Control (QA&QC)	<ul style="list-style-type: none"> • Maintain Certificate of Analysis (COA) filing
	Administer staff and organisational development	<ul style="list-style-type: none"> • Support continuous improvement projects

Laboratory Assistant

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Analytical Method Validation	Level 2	Teamwork	Basic
	Continuous Improvement Management	Level 2	Communication	Basic
	Data and Statistical Analytics	Level 1	Interpersonal Skills	Basic
	Environmental Management System Framework Development and Implementation	Level 1	Lifelong Learning	Basic
	Laboratory Data Reporting and Analysis Management	Level 1	Service Orientation	Basic
	Laboratory Equipment Maintenance and Calibration Management	Level 2		
	Laboratory Operations Management	Level 1		
	Product Testing Management	Level 2		
	Quality Assurance Management	Level 2		
	Quality Control Management	Level 1		
	Sample Management	Level 1		
	Workplace Safety and Health Framework Development and Implementation	Level 1		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 1		

Laboratory Technician/Technologist

JOB ROLE DESCRIPTION

The Laboratory Technician/Technologist executes day-to-day laboratory operations, such as performing basic calibration and simple troubleshooting on a range of laboratory equipment and/or on-line analysing devices, as well as laboratory consumable inventory checks. He/She handles, stores and transports hazardous substances and dangerous goods in accordance with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements, and helps to respond to chemical spillages and emergencies.

The Laboratory Technician/Technologist performs routine and non-routine product and in-process analyses, in accordance with documented test methods, to ensure that product quality is as per specifications. He records and maintains up-to-date sample testing results in the laboratory information management system (LIMS). He also contributes to organisational development by supporting continuous improvement projects.

The Laboratory Technician/Technologist usually works in a team, on either a day or rotating shift, in the laboratory. He is meticulous, and is able to work independently as well as interact effectively with others.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems • Handle, store and transport hazardous substances and dangerous goods, in accordance with WSH and EMS standards and practices • Participate in activity-based risk assessments • Perform good housekeeping in the workplace • Respond to chemical spillages and emergencies
	Perform laboratory operations	<ul style="list-style-type: none"> • Follow Standard Operating Procedures (SOPs) for laboratory operations • Label samples • Perform laboratory consumable inventory checks and identify purchasing requirements • Prepare stock solutions and reagents • Provide technical support on formulation, prototyping and product applications • Support basic calibration and simple troubleshooting on a range of laboratory equipment and/or on-line analysing devices
	Manage sample collection and analyses	<ul style="list-style-type: none"> • Apply emerging technologies to perform product and in-process sampling, and laboratory data management • Perform inspections on samples for contamination, foreign matter and/or defects • Perform routine and non-routine product and in-process sample analyses, according to documented test methods • Record sample testing results into the laboratory information management system (LIMS)
	Manage Quality Assurance and Quality Control (QA&QC)	<ul style="list-style-type: none"> • Generate Certificates of Analysis (COA)
	Administer staff and organisational development	<ul style="list-style-type: none"> • Support continuous improvement projects

Laboratory Technician/Technologist

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Analytical Method Validation	Level 2	Teamwork	Basic
	Continuous Improvement Management	Level 2	Communication	Basic
	Data and Statistical Analytics	Level 2	Sense Making	Basic
	Environmental Management System Framework Development and Implementation	Level 2	Interpersonal Skills	Basic
	Incident Investigation Management	Level 2	Problem Solving	Basic
	Laboratory Data Reporting and Analysis Management	Level 2		
	Laboratory Equipment Maintenance and Calibration Management	Level 2		
	Laboratory Operations Management	Level 2		
	Materials Qualification	Level 2		
	Non-Conformance Management	Level 2		
	Product Testing Management	Level 2		
	Quality Assurance Management	Level 2		
	Quality Control Management	Level 2		
	Sample Management	Level 2		
	Technical Services Management	Level 2		
	Workplace Safety and Health Framework Development and Implementation	Level 2		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 2		

Senior Laboratory Technician/Technologist

JOB ROLE DESCRIPTION

The Senior Laboratory Technician/Technologist coordinates work activities among team members in the laboratory, such as the preparation of stock solutions and reagents, laboratory consumable inventory checks, and purchase and qualification of new laboratory equipment and consumables. He/She ensures that team members comply with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements, and adhere to good housekeeping practices.

The Senior Laboratory Technician/Technologist performs trending and analyses on sample testing results to ensure conformance with product quality, and initiates corrective actions for non-conformance issues. He also contributes to staff and organisational development by identifying opportunities for continuous improvement and providing guidance to junior staff.

The Senior Laboratory Technician/Technologist usually works in a team, on either a day or rotating shift, in the laboratory. He is organised and meticulous, possesses good communication skills, and is able to work independently with minimal supervision as well as interact effectively with others.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Compile and maintain Safety Data Sheets (SDS) • Ensure compliance with WSH and EMS systems among team members • Ensure team members adhere to good housekeeping practices • Handle, store and transport hazardous substances and dangerous goods, in accordance with WSH and EMS standards and practices • Participate in activity-based risk assessments • Respond to chemical spillages and emergencies
	Perform laboratory operations	<ul style="list-style-type: none"> • Coordinate laboratory consumable inventory checks, purchasing and qualification of new laboratory equipment and consumable items • Coordinate the preparation of stock solutions and reagents among team members • Maintain Standard Operating Procedures (SOPs) for laboratory operations • Perform calibration and troubleshooting on a range of laboratory equipment and/or on-line analysing devices • Perform periodic checks to ensure the correct labelling of samples • Perform technical work involving formulation, prototyping and product applications
	Manage sample collection and analyses	<ul style="list-style-type: none"> • Apply emerging technologies to perform product and in-process sampling, and laboratory data management • Perform inspections on samples for contamination, foreign matter and/or defects • Perform routine and non-routine product and in-process sample analyses, according to documented test methods • Perform trending and analyses on sample testing results for conformance with product quality and initiate corrective actions for non-conformance issues • Record sample testing results into the laboratory information management system (LIMS)
	Manage Quality Assurance and Quality Control (QA&QC) Administer staff and organisational development	<ul style="list-style-type: none"> • Liaise across departments to ensure completeness of Certificate of Analysis (COA) documentation • Contribute to continuous improvement initiatives and activities • Identify opportunities for continuous improvement • Provide guidance to junior staff

Senior Laboratory Technician/Technologist

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Analytical Method Validation	Level 3	Teamwork	Intermediate
	Continuous Improvement Management	Level 3	Problem Solving	Intermediate
	Data and Statistical Analytics	Level 2	Communication	Intermediate
	Environmental Management System Framework Development and Implementation	Level 3	Sense Making	Intermediate
	Incident Investigation Management	Level 2	Interpersonal Skills	Intermediate
	Laboratory Data Reporting and Analysis Management	Level 3		
	Laboratory Equipment Maintenance and Calibration Management	Level 3		
	Laboratory Operations Management	Level 3		
	Materials Qualification	Level 3		
	Non-Conformance Management	Level 3		
	Procurement Management	Level 2		
	Product Testing Management	Level 3		
	Project Management	Level 3		
	Quality Assurance Management	Level 3		
	Quality Control Management	Level 3		
	Sample Management	Level 3		
	Staff Management	Level 3		
	Technical Report Writing	Level 2		
	Technical Services Management	Level 3		
	Training, Coaching and Assessment Management	Level 3		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 2		

Laboratory Supervisor

JOB ROLE DESCRIPTION

The Laboratory Supervisor is responsible for planning laboratory operation activities during his/her shift, to meet customers' needs within schedule and in accordance with the organisation's quality objectives. He/She supervises the conduct of activity-based risk assessments and ensures the compilation and currency of Safety Data Sheets (SDS), in compliance with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements.

The Laboratory Supervisor supervises routine and non-routine sample analyses and sample inspections, and reviews data trends and analyses on sample testing results to verify conformance with Quality Assurance and Quality Control (QA&QC) standards. He manages non-conformance by highlighting findings to management, and initiates plant or process work stoppage in the event of product quality issues. In addition, he coaches and mentors the laboratory technicians and supports the implementation of initiatives for laboratory and QA&QC-related continuous improvements.

The Laboratory Supervisor leads a team, on either a day or rotating shift, in the laboratory. He has good leadership skills and encourages teamwork among his shift members. He interacts effectively with others and has good communication, analytical and problem-solving skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Ensure the compilation and currency of Safety Data Sheets (SDS) • Lead emergency responses to chemical spillages • Supervise good housekeeping in the workplace • Supervise compliance with WSH and EMS systems • Supervise the conduct of activity-based risk assessments • Supervise the proper handling, storage and transportation of hazardous substances and dangerous goods, in accordance with WSH and EMS standards and practices
	Perform laboratory operations	<ul style="list-style-type: none"> • Plan laboratory operation activities, to meet customers' needs within schedule and in accordance with the organisation's quality objectives • Supervise the preparation and inventory checks of stock solutions and reagents • Supervise the purchasing and technical specification of new laboratory equipment and consumable items • Supervise troubleshooting on a range of laboratory equipment, and plan calibration and preventive maintenance schedules • Support laboratory special projects for new developments, systems and equipment at the department level • Support the development and implementation of Standard Operating Procedures (SOPs) for laboratory operations
	Manage sample collection and analyses	<ul style="list-style-type: none"> • Review data trends and analyses to verify conformance with QA&QC specifications and make recommendations to the production team • Supervise data entry and retrieval from the laboratory information management system (LIMS) • Supervise inspections on samples for contamination, foreign matter and/or defects • Supervise routine and non-routine sample analyses and technical work for product formulation, prototyping and applications • Supervise the application of emerging technologies for product and in-process sampling, and laboratory data management, within the team

Laboratory Supervisor

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Manage Quality Assurance and Quality Control (QA&QC)	<ul style="list-style-type: none"> • Ensure good documentation control and management at the department level • Sign off Certificates of Quality (COQ) for product releases
	Manage non-conformance	<ul style="list-style-type: none"> • Initiate plant or process work stoppages in the event of product quality issues • Prepare and distribute non-conformance reports, and escalate to management for remedial action
	Administer staff and organisational development	<ul style="list-style-type: none"> • Coach and mentor staff • Identify opportunities for continuous improvement • Manage resources within the team • Support the implementation of continuous improvement initiatives and activities

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Analytical Method Validation	Level 3	Communication	Intermediate
	Change Management	Level 4	Sense Making	Intermediate
	Continuous Improvement Management	Level 3	Decision Making	Intermediate
	Data and Statistical Analytics	Level 2	Teamwork	Intermediate
	Environmental Management System Framework Development and Implementation	Level 3	Digital Literacy	Intermediate
	Incident Investigation Management	Level 3		
	Laboratory Data Reporting and Analysis Management	Level 4		
	Laboratory Equipment Maintenance and Calibration Management	Level 4		
	Laboratory Operations Management	Level 4		
	Materials Qualification	Level 3		
	Non-Conformance Management	Level 4		
	Organisational Resource Management	Level 4		
	Procurement Management	Level 3		
	Product Testing Management	Level 3		
	Project Management	Level 3		
	Quality Assurance Management	Level 3		
	Quality Control Management	Level 3		
	Sample Management	Level 4		
	Staff Development Management	Level 3		
	Staff Management	Level 4		
	Technical Report Writing	Level 3		
	Training, Coaching and Assessment Management	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		

QA&QC Manager

JOB ROLE DESCRIPTION

The QA&QC Manager organises and controls the day-to-day operations of the laboratory, in accordance with the organisation's Quality Assurance and Quality Control (QA&QC) objectives. He/She is accountable for the development and implementation of a coordinated Quality Management System (QMS) and documentation management system to ensure that the organisation's systems and processes comply with internal and external quality accreditation requirements.

The QA&QC Manager reviews investigation findings and root cause analyses, and liaises with internal and external stakeholders, to ensure the resolution of non-conformance issues. He establishes and drives the implementation of Standard Operating Procedures (SOPs) for Safety Data Sheet (SDS) documentation, in compliance with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements. In addition, he coaches and mentors QA&QC department personnel and drives departmental performance to achieve the organisation's quality goals.

The QA&QC Manager champions industry best practices for QA&QC in the organisation. As a department manager, he is required to have good leadership, interpersonal and resource management skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Endorse the Management of Hazardous Chemicals Programme (MHCP) • Endorse risk assessments for laboratory operation-related activities • Ensure emergency response protocols for chemical spillages are in place and adhered to • Establish and drive the implementation of Standard Operating Procedures (SOPs) for Safety Data Sheet (SDS) documentation • Review compliance with WSH and EMS regulatory and system requirements
	Perform laboratory operations	<ul style="list-style-type: none"> • Endorse preventive maintenance regimes for laboratory equipment and/or on-line analysing devices • Endorse SOPs for laboratory operations • Manage laboratory operation activities, in accordance with the organisation's Quality Assurance and Quality Control (QA&QC) objectives • Manage the budgeting and purchasing of new laboratory equipment and consumable items • Provide strategic direction in implementing emerging technologies for laboratory operations • Set direction on laboratory special projects and assignments
	Manage Quality Assurance and Quality Control (QA&QC)	<ul style="list-style-type: none"> • Champion industry best practices for QA&QC • Formulate strategies for quality assurance and product and/or process improvement • Manage organisational level QA&QC training and communication • Manage quality audits to ensure that the organisation's processes and systems are aligned with internal and external accreditation requirements • Manage the development and implementation of the Quality Management System (QMS) within the organisation • Manage the implementation of the documentation management system within the organisation
	Manage non-conformance	<ul style="list-style-type: none"> • Liaise with internal and external stakeholders to resolve non-conformance issues • Review investigation findings and root cause analyses regarding inconsistent quality processes and non-conformance issues

QA&QC Manager

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer staff and organisational development	<ul style="list-style-type: none"> • Coach and mentor staff • Contribute to business continuity planning, implementation and execution • Drive departmental performance to achieve organisational goals • Drive the adoption of technologies to support virtual collaboration in remote locations • Manage department level resources and budgets • Review and endorse continuous improvement initiatives and activities

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Analytical Method Validation	Level 5	Transdisciplinary Thinking	Advanced
	Audit and Review Management	Level 6	Leadership	Advanced
	Budget Management	Level 5	Interpersonal Skills	Advanced
	Business Continuity Management	Level 5	Decision Making	Advanced
	Change Management	Level 5	Communication	Advanced
	Continuous Improvement Management	Level 5		
	Environmental Management System Framework Development and Implementation	Level 5		
	Incident Investigation Management	Level 5		
	Laboratory Data Reporting and Analysis Management	Level 6		
	Laboratory Equipment Maintenance and Calibration Management	Level 5		
	Laboratory Operations Management	Level 6		
	Materials Qualification	Level 5		
	Non-Conformance Management	Level 5		
	Organisational Analysis Management	Level 5		
	Organisational Resource Management	Level 5		
	Procurement Management	Level 5		
	Product Testing Management	Level 5		
	Quality Assurance Management	Level 5		
	Quality Control Management	Level 5		
	Sample Management	Level 6		
	Staff Development Management	Level 5		
	Staff Management	Level 5		
	Training, Coaching and Assessment Management	Level 5		
	Workplace Safety and Health Framework Development and Implementation	Level 5		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 5		

Laboratory Chemist

JOB ROLE DESCRIPTION

The Laboratory Chemist applies existing test methods and analytical techniques for product testing and quality control, and recommends improvements in accordance with international best practice standards and procedures. He/She manages laboratory operation activities to meet customers' needs within schedule, and in accordance with the organisation's quality objectives. He develops and maintains laboratory Standard Operating Procedures (SOPs) and carries out laboratory special projects.

The Laboratory Chemist is responsible for maintaining the compliance of laboratory activities with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements, which includes implementing the Management of Hazardous Chemicals Programme (MHCP) in the laboratory. He manages non-conformance by identifying standard deviation and product failure data from the laboratory information management system (LIMS). In addition, he implements continuous improvement initiatives and activities for the laboratory.

The Laboratory Chemist works in a team in the laboratory. He is a team player, able to work independently, organised and possesses good analytical and communication skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> Analyse information from Safety Data Sheets (SDS) for the conduct of laboratory activities Coordinate the conduct of activity-based risk assessments at the department level Implement the Management of Hazardous Chemicals Programme (MHCP) Maintain WSH and EMS practices and compliance with regulations and system requirements for laboratory activities at the department level Support WSH and EMS incident investigations
	Perform laboratory operations	<ul style="list-style-type: none"> Carry out laboratory special projects for new developments, systems and equipment at the department level Develop and maintain Standard Operating Procedures (SOPs) for laboratory operations Develop preventive maintenance regimes for laboratory equipment and/or on-line analysing devices Manage laboratory operation activities to meet customers' needs within schedule and in accordance with the organisation's quality objectives Provide technical advice on specifications for new laboratory equipment and consumable items
	Manage analytical and test methods	<ul style="list-style-type: none"> Apply analytical techniques for product testing and quality control Apply existing test methods and recommend improvements, in accordance with international best practice standards and procedures Assist in the design of new experiments to solve complex problems and deliver high quality analytical results Liaise with government agencies, testing laboratories and external suppliers regarding regulatory requirements, international standards and product specifications
	Manage non-conformance	<ul style="list-style-type: none"> Identify standard deviation and product failure data from the laboratory information management system (LIMS) Support investigations into inconsistent quality processes and non-conformance issues
	Administer staff and organisational development	<ul style="list-style-type: none"> Adopt technologies to support virtual collaboration in remote locations Implement continuous improvement initiatives and activities

Laboratory Chemist

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Analytical Method Validation	Level 4	Problem Solving	Advanced
	Change Management	Level 4	Sense Making	Advanced
	Continuing Professional Development Management	Level 4	Leadership	Intermediate
	Continuous Improvement Management	Level 3	Developing People	Intermediate
	Data and Statistical Analytics	Level 3	Communication	Intermediate
	Environmental Management System Framework Development and Implementation	Level 4		
	Incident Investigation Management	Level 3		
	Laboratory Data Reporting and Analysis Management	Level 4		
	Laboratory Equipment Maintenance and Calibration Management	Level 4		
	Laboratory Operations Management	Level 4		
	Non-Conformance Management	Level 4		
	Product Testing Management	Level 4		
	Project Management	Level 4		
	Quality Assurance Management	Level 3		
	Quality Control Management	Level 4		
	Sample Management	Level 4		
	Technical Presentation	Level 4		
	Technical Report Writing	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 4		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		

Senior Laboratory Chemist

JOB ROLE DESCRIPTION

The Senior Laboratory Chemist develops and validates new and improved test methods and establishes improved analytical techniques for the purpose of product testing and quality control. He/She liaises with government agencies, testing laboratories and external suppliers on matters relating to regulatory requirements, international standards and product specifications. He supports laboratory operations by validating the technical specifications of new laboratory equipment and providing guidance for the conduct of laboratory special projects.

The Senior Laboratory Chemist ensures the compliance of laboratory activities with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements, by reviewing laboratory safe work practices and Standard Operating Procedures (SOPs). He manages non-conformance by highlighting standard deviation and product failure data to the quality assurance team. He validates continuous improvement initiatives and activities for the laboratory, and provides coaching and mentoring to the laboratory team.

The Senior Laboratory Chemist leads a team of chemists in the laboratory. He is able to multi-task, and possesses excellent analytical, communication and interpersonal skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Ensure risk assessments for laboratory-related activities are conducted and control measures are implemented • Ensure compliance with WSH and EMS regulatory and system requirements at the department level • Establish the Management of Hazardous Chemicals Programme (MHCP), in accordance with industry practices and guidelines • Integrate information from Safety Data Sheets (SDS) into laboratory safe work practices and Standard Operating Procedures (SOPs) • Support WSH and EMS incident investigations
	Perform laboratory operations	<ul style="list-style-type: none"> • Ensure preventive maintenance regimes are aligned with the specifications of laboratory equipment and/or on-line analysing devices • Provide guidance on the conduct of laboratory special projects for new developments, systems and equipment at the department level • Review SOPs for laboratory operations • Validate technical specifications of new laboratory equipment and consumable items
	Manage analytical and test methods	<ul style="list-style-type: none"> • Design new experiments to solve complex problems and deliver high-quality analytical results • Develop and validate new and improved test methods, in accordance with international best practice standards and procedures • Establish improved analytical techniques for product testing and quality control • Liaise with government agencies, testing laboratories and external suppliers regarding regulatory requirements, international standards and product specifications
	Manage non-conformance	<ul style="list-style-type: none"> • Review standard deviation and product failure data and escalate to the quality assurance team where necessary • Support investigations into inconsistent quality processes and non-conformance issues

Senior Laboratory Chemist

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Coach and mentor staff • Manage team performance to achieve organisational goals • Validate continuous improvement initiatives and activities

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Skill/Competency	Level	Skill/Competency	Level
	Analytical Method Validation	Level 4	Problem Solving	Advanced
	Change Management	Level 4	Sense Making	Advanced
	Continuing Professional Development Management	Level 4	Communication	Advanced
	Continuous Improvement Management	Level 4	Decision Making	Intermediate
	Data and Statistical Analytics	Level 4	Leadership	Intermediate
	Environmental Management System Framework Development and Implementation	Level 4		
	Incident Investigation Management	Level 3		
	Laboratory Data Reporting and Analysis Management	Level 5		
	Laboratory Equipment Maintenance and Calibration Management	Level 5		
	Laboratory Operations Management	Level 5		
	Non-Conformance Management	Level 4		
	Procurement Management	Level 4		
	Product Testing Management	Level 5		
	Project Management	Level 5		
	Quality Assurance Management	Level 4		
	Quality Control Management	Level 4		
	Sample Management	Level 5		
	Technical Presentation	Level 5		
	Technical Report Writing	Level 4		
	Training, Coaching and Assessment Management	Level 3		
	Workplace Safety and Health Framework Development and Implementation	Level 4		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 4		
	Yield Analysis	Level 4		

QA Engineer

JOB ROLE DESCRIPTION

The QA Engineer maintains and implements the Quality Management System (QMS) for the organisation. He/She manages Quality Assurance and Quality Control (QA&QC) by conducting audits for quality system conformance, and by liaising across departments to maintain good documentation control and management. He conducts QA&QC-related training and communication sessions for staff and contributes to the development of strategic quality improvement programmes for the organisation.

The QA Engineer conducts investigations into inconsistent quality processes and non-conformance and recommends preventive actions to eliminate recurrences of such issues. He monitors product failure data and performance trends, and initiates remedial actions with relevant departments, where necessary. In addition, he actively identifies opportunities and prepares recommendations for continuous improvement in quality, productivity and cost efficiency.

The QA Engineer is meticulous, thinks systematically and is able to work independently. He possesses good organisation, problem-solving, interpersonal and communication skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems
	Manage Quality Assurance and Quality Control (QA&QC)	<ul style="list-style-type: none"> • Conduct QA&QC-related training and communication sessions • Conduct quality system conformance audits and initiate corrective actions • Implement Quality Management Systems (QMS) • Liaise across departments to maintain good documentation control and management • Maintain and support data collection methodologies for quality assurance and product and/or process improvements • Support the development of strategic quality improvement programmes
	Manage non-conformance	<ul style="list-style-type: none"> • Conduct investigations and compile information regarding inconsistent quality processes and non-conformance issues • Conduct root cause analyses and recommend preventive actions • Monitor product failure data, performance trends and initiate remedial actions with respective departments
	Manage continuous improvement	<ul style="list-style-type: none"> • Identify quality assurance improvement opportunities and propose applications of new technologies and processes • Prepare recommendations for quality and productivity improvements and cost reduction opportunities
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Implement continuous improvement initiatives and activities

QA Engineer

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Audit and Review Management	Level 4	Sense Making	Advanced
	Change Management	Level 4	Communication	Advanced
	Continuing Professional Development Management	Level 4	Leadership	Intermediate
	Continuous Improvement Management	Level 3	Problem Solving	Intermediate
	Data and Statistical Analytics	Level 3	Decision Making	Intermediate
	Environmental Management System Framework Development and Implementation	Level 3		
	Laboratory Data Reporting and Analysis Management	Level 4		
	Materials Qualification	Level 4		
	Non-Conformance Management	Level 3		
	Project Management	Level 4		
	Quality Assurance Management	Level 4		
	Quality Control Management	Level 4		
	Technical Presentation	Level 4		
	Technical Report Writing	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		

Senior QA Engineer

JOB ROLE DESCRIPTION

The Senior QA Engineer manages Quality Assurance and Quality Control (QA&QC) by reviewing the organisation's Quality Management System (QMS) and making recommendations for improvement in quality system conformance, documentation control and quality data collection methodologies. He/She supports the development of strategic quality improvement programmes for the organisation.

The Senior QA Engineer leads investigations into inconsistent quality practices and non-conformance issues, and manages remedial actions for product failure with relevant departments. He manages the continuous improvement of the organisation's QMS by researching and proposing the adoption of industry best practices in QA&QC. He provides advice on quality matters for new product and application development to the technical service and Research and Development (R&D) teams. In addition, he coaches and mentors the junior staff in the QA&QC team.

The Senior QA Engineer leads a team of QA engineers. He is systematic, meticulous and organised, and possesses excellent analytical, problem-solving, interpersonal and communication skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems
	Manage Quality Assurance and Quality Control (QA&QC)	<ul style="list-style-type: none"> • Manage QA&QC-related training and communication sessions • Review data collection methodologies for quality assurance and product improvement • Review documentation control and management and recommend organisational level improvements • Review Quality Management Systems (QMS) • Supervise quality system conformance audits and recommend organisational level improvements • Support the development of strategic quality improvement programmes
	Manage non-conformance	<ul style="list-style-type: none"> • Lead investigations and review compiled information regarding inconsistent quality processes and non-conformance issues • Review product failure data and performance trends, and manage remedial actions with respective departments • Review root cause analysis procedures and methods
	Manage continuous improvement	<ul style="list-style-type: none"> • Advise technical service and Research and Development (R&D) teams on quality matters for new product development and applications • Research and propose adoption of industry best practices for QA&QC • Review recommendations for quality and productivity improvements and cost reduction opportunities • Validate quality assurance improvement proposals and applications of new technologies and processes
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Coach and mentor staff • Manage team performance to achieve organisational goals • Validate continuous improvement initiatives and activities

Senior QA Engineer

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Audit and Review Management	Level 5	Communication	Advanced
	Change Management	Level 4	Sense Making	Advanced
	Continuing Professional Development Management	Level 4	Problem Solving	Advanced
	Continuous Improvement Management	Level 4	Interpersonal Skills	Advanced
	Data and Statistical Analytics	Level 4	Decision Making	Intermediate
	Environmental Management System Framework Development and Implementation	Level 3		
	Laboratory Data Reporting and Analysis Management	Level 5		
	Materials Qualification	Level 4		
	Non-Conformance Management	Level 4		
	Project Management	Level 5		
	Quality Assurance Management	Level 5		
	Quality Control Management	Level 4		
	Technical Presentation	Level 5		
	Technical Report Writing	Level 4		
	Training, Coaching and Assessment Management	Level 3		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		

Technical Service, Application and Product Development

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Applications Scientist

Allan Cher

Croda Singapore Pte Ltd

BE CREATIVE, STAY CURIOUS

Being surrounded by cosmetics and personal care products on a daily basis, Allan Cher was curious to find out what goes into these products. He wanted to know if there was a way to enhance the efficacies of everyday items such as shampoo or body wash. This interest led him to take up the role as Applications Scientist in the Personal Care sector at Croda Singapore Pte Ltd.

As part of the Product Validation and Claims Substantiation (PVCS) department, Allan is responsible for designing and carrying out PVCS laboratory experiments. He also works closely with the sales and marketing teams to provide creative and innovative solutions to address consumers' personal care needs.

While there is a misconception that laboratory work is monotonous, Allan believes there is more to it than following protocols blindly. "Challenge yourself to optimise or design new protocols by thinking creatively. Being an Applications Scientist, curiosity is important. Dare to question standard protocols and optimise fixed processes. Run trials and back your hypotheses with data," he advises.

Allan makes it a point to challenge himself by broadening his knowledge and increasing his skills. When he heard about a Specialist Diploma in Cosmetic Science from his colleagues, he grabbed

the opportunity to take up the Singapore Polytechnic course. Now that he has completed it, he is looking forward to applying what he has learnt in product formulation to his job.

With this acquired knowledge, Allan's goal is to be a Technical Service Manager in the future. He believes that the Career Pathways in Skills Framework can help him and other professionals further their career goals. "We can use it to identify other job roles of the same level, should we plan for a lateral career move to broaden our skillsets and capabilities. On the other hand, we can use it to plan for our vertical career progression pathway."

He remains optimistic about the Energy and Chemicals sector and encourages new entrants to join him. "The general outlook of the specialty chemical industry is definitely promising in the upcoming years, as Asia plays a major role due to its emerging economies. Furthermore, Singapore's strategic geographical location helps to attract many big players to set up their manufacturing and research and development sites here," Allan explains.

"Challenge yourself to optimise or design new protocols by thinking creatively."

Technical Service Engineer

JOB ROLE DESCRIPTION

The Technical Service Engineer provides technical advice and consultation on products and their applications to customers. This includes executing technical service, application and product development-related projects with customers, troubleshooting issues on products reported by customers, and performing modifications to products to suit customers' requirements.

The Technical Service Engineer possesses a sound understanding of the organisation's products in relation to other products in the market, and supports the development of new products based on new technology applications. He/She conducts product application-related presentations and training to external parties. In addition, he conducts all work activities in compliance with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements.

The Technical Service Engineer is able to work independently in the laboratory and/or at the customers' sites. He collaborates closely with the application, Research and Development (R&D), and sales and marketing teams. He is customer-oriented, a good team player, enjoys solving problems and possesses strong project management, technical writing and presentation skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems • Conduct activity-based risk assessments • Implement the Management of Hazardous Chemicals Programme (MHCP)
	Manage application and product development	<ul style="list-style-type: none"> • Analyse properties and characteristics of existing products against other products in the market • Support the development of new products, based on new technology applications
	Manage technical services	<ul style="list-style-type: none"> • Implement material and application tests to solve customer problems for targeted industries • Maintain up-to-date knowledge of market requirements and technical developments within the industry • Perform technical modifications to current products according to customers' requirements • Provide on-site technical support to customers • Provide product application-related presentations and training to external parties • Support the execution of technical service, application and product development-related projects with customers • Troubleshoot technical issues in existing products reported by customers
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Implement continuous improvement initiatives and activities

Technical Service Engineer

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Change Management	Level 4	Communication	Intermediate
	Continuous Improvement Management	Level 3	Sense Making	Intermediate
	Environmental Management System Framework Development and Implementation	Level 3	Decision Making	Intermediate
	Laboratory Data Reporting and Analysis Management	Level 4	Problem Solving	Intermediate
	Laboratory Operations Management	Level 4	Service Orientation	Intermediate
	Materials Qualification	Level 3		
	Product Design and Development	Level 4		
	Product Testing Management	Level 4		
	Project Management	Level 4		
	Quality Control Management	Level 3		
	Sample Management	Level 4		
	Strategic Service Excellence Management	Level 4		
	Technical Presentation	Level 4		
	Technical Report Writing	Level 4		
	Technical Services Management	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		

Senior Technical Service Engineer

JOB ROLE DESCRIPTION

The Senior Technical Service Engineer leads the implementation of technical support strategies and plans for the organisation's products and their applications to customers. This includes designing material and application tests to solve customers' problems for targeted industries, and managing the execution of technical service, application and product development-related projects with customers. He/She also leads the provision of product application-related presentations and training to external parties.

The Senior Technical Service Engineer reviews the properties and characteristics of the organisation's products against other products in the market, so as to explore new industrial applications with new or existing customers. He supervises the development of new products and applications, based on new technology applications. In addition, he coaches and mentors junior staff in the technical service team and is responsible for managing the team's performance to achieve organisational goals.

The Senior Technical Service Engineer leads a team and works in the laboratory and/or customers' sites. He collaborates closely with the application, Research and Development (R&D), and sales and marketing teams. He has a strong focus on providing excellent customer service, enjoys solving problems, has strong interpersonal skills, and possesses excellent project management and technical writing and presentation skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems • Ensure risk assessments are conducted and control measures are implemented • Implement the Management of Hazardous Chemicals Programme (MHCP)
	Manage application and product development	<ul style="list-style-type: none"> • Review properties and characteristics of existing products against other products in the market • Supervise the development of new products, based on new technology applications
	Manage technical services	<ul style="list-style-type: none"> • Design material and application tests to solve customer problems for targeted industries • Lead on-site technical support to customers • Lead the provision of product application-related presentations and training to external parties • Maintain up-to-date knowledge of market requirements and technical developments within the industry • Manage the execution of technical service, application and product development-related projects with customers • Supervise technical modifications to the organisation's current products according to customers' requirements • Supervise troubleshooting activities for technical issues in existing products reported by customers
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Coach and mentor staff • Manage team performance to achieve organisational goals • Validate continuous improvement initiatives and activities

Senior Technical Service Engineer

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Business Networking Management	Level 5	Communication	Advanced
	Change Management	Level 4	Problem Solving	Advanced
	Continuous Improvement Management	Level 4	Service Orientation	Advanced
	Environmental Management System Framework Development and Implementation	Level 3	Sense Making	Advanced
	Innovation Management	Level 4	Decision Making	Intermediate
	Laboratory Data Reporting and Analysis Management	Level 5		
	Laboratory Operations Management	Level 4		
	Materials Qualification	Level 4		
	Product Design and Development	Level 4		
	Product Testing Management	Level 5		
	Project Management	Level 5		
	Quality Control Management	Level 3		
	Sample Management	Level 4		
	Strategic Service Excellence Management	Level 4		
	Technical Presentation	Level 5		
	Technical Report Writing	Level 4		
	Technical Services Management	Level 5		
	Training, Coaching and Assessment Management	Level 3		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 4		

Application Chemist

JOB ROLE DESCRIPTION

The Application Chemist performs technical work for product development, and develops innovative application-specific solutions, in line with the organisation's business objectives as well as market needs. He/She documents notes for new product development, applications and formulations, for both internal and external customers. He evaluates new applications and/or products, employing suitable test methods and developing alternative or new methods, where necessary.

The Application Chemist supports the technical service team in troubleshooting technical issues reported by customers. He also provides product application-related training to internal customers. He conducts activity-based risk assessments and implements the Management of Hazardous Chemicals Programme (MHCP) in the laboratory, in compliance with Workplace Safety and Health (WSH) and Environmental Management System requirements.

The Application Chemist works in a team in the laboratory, and collaborates closely with the technical service, Research and Development (R&D), and sales and marketing teams. He is a good team player and has a creative and problem-solving mind-set. He can manage multiple projects effectively, and possesses strong technical writing and presentation skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems • Conduct activity-based risk assessments • Implement the Management of Hazardous Chemicals Programme (MHCP)
	Manage application and product development	<ul style="list-style-type: none"> • Apply customer-relevant protocols for claim validation and non-standard methodologies • Conduct technical work and projects for product development and innovation • Develop innovative application-specific solutions and new analytical methods via technological know-how • Document product development, formulation and application notes for both internal and external customers • Identify opportunities to expand existing product lines, based on assessments of customer and market needs • Maintain up-to-date knowledge of market requirements and technical developments within the industry • Perform standard and customer-specific laboratory testing • Review specific industry, regulatory and Intellectual Property (IP) standards for compliance
	Manage technical services	<ul style="list-style-type: none"> • Provide product application-related training to internal customers • Support the execution of technical service, application and product development-related projects with customers • Support the technical service team in troubleshooting technical issues reported by customers
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Implement continuous improvement initiatives and activities

Application Chemist

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Change Management	Level 4	Creative Thinking	Intermediate
	Continuing Professional Development Management	Level 4	Lifelong Learning	Intermediate
	Continuous Improvement Management	Level 3	Communication	Intermediate
	Data and Statistical Analytics	Level 3	Teamwork	Intermediate
	Environmental Management System Framework Development and Implementation	Level 3	Problem Solving	Intermediate
	Laboratory Data Reporting and Analysis Management	Level 4		
	Laboratory Operations Management	Level 4		
	Materials Qualification	Level 3		
	Product Design and Development	Level 4		
	Product Testing Management	Level 4		
	Project Management	Level 4		
	Quality Control Management	Level 3		
	Sample Management	Level 4		
	Strategic Service Excellence Management	Level 4		
	Technical Presentation	Level 4		
	Technical Report Writing	Level 4		
	Technical Services Management	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		

Senior Application Chemist

JOB ROLE DESCRIPTION

The Senior Application Chemist leads technical work and projects for product development and innovation, and validates the development of application-specific solutions and new analytical methods, based on technological know-how. He/She studies market trends and customer needs to assess the feasibility of expanding existing product lines, in accordance with the organisation's business needs.

The Senior Application Chemist supports the technical service team by managing the execution of technical service, application and product development-related projects with customers. He also provides technical expertise in troubleshooting technical issues reported by customers. In addition, he coaches and mentors junior staff in the application team, and is responsible for managing the team's performance to achieve organisational goals.

The Senior Application Chemist leads a team in the laboratory, and collaborates closely with the technical service, Research and Development (R&D), and sales and marketing teams. He is creative and enjoys solving complex problems. He can manage multiple projects effectively, and possesses excellent technical writing and presentation skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems • Ensure risk assessments are conducted and control measures are implemented • Implement the Management of Hazardous Chemicals Programme (MHCP)
	Manage application and product development	<ul style="list-style-type: none"> • Assess the feasibility of expanding existing product lines, based on assessments of customer and market needs • Lead technical work and projects for product development and innovation • Maintain customer-relevant protocols for claim validation and non-standard methodologies • Maintain up-to-date knowledge of market requirements and technical developments within the industry • Review specific industry, regulatory and Intellectual Property (IP) standards for compliance • Review standard and customer-specific laboratory testing • Review the documentation of product development, formulation and application notes for both internal and external customers • Validate the development of innovative application-specific solutions and new analytical methods, based on technological know-how
	Manage technical services	<ul style="list-style-type: none"> • Lead product application-related training to internal customers • Manage the execution of technical service, application and product development-related projects with customers • Support the technical service team in troubleshooting technical issues reported by customers
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Coach and mentor staff • Manage team performance to achieve organisational goals • Validate continuous improvement initiatives and activities

Senior Application Chemist

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Change Management	Level 4	Problem Solving	Advanced
	Continuing Professional Development Management	Level 4	Sense Making	Advanced
	Continuous Improvement Management	Level 4	Creative Thinking	Advanced
	Data and Statistical Analytics	Level 4	Computational Thinking	Advanced
	Environmental Management System Framework Development and Implementation	Level 3	Service Orientation	Intermediate
	Innovation Management	Level 4		
	Laboratory Data Reporting and Analysis Management	Level 5		
	Laboratory Operations Management	Level 5		
	Materials Qualification	Level 4		
	Product Design and Development	Level 4		
	Product Testing Management	Level 5		
	Project Management	Level 5		
	Quality Control Management	Level 3		
	Sample Management	Level 5		
	Strategic Service Excellence Management	Level 4		
	Technical Presentation	Level 5		
	Technical Report Writing	Level 4		
	Technical Services Management	Level 5		
	Training, Coaching and Assessment Management	Level 3		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 4		

Technical Service Manager

JOB ROLE DESCRIPTION

The Technical Service Manager is accountable for managing the provision of technical services to customers and business partners in a cost-effective and timely manner, to win and sustain projects as part of the organisation's customer strategy and to meet business objectives. He/She provides technical expertise in troubleshooting technical issues in products reported by customers.

The Technical Service Manager has an acute understanding of market trends and other products in the market. He formulates strategies to ensure the competitiveness of the organisation's products in the market, and drives the development of innovative products and targeted applications to exploit market opportunities and meet customer needs. He profiles the organisation's technical leadership and branding through research and presentations at scientific and industry events and seminars. In addition, he coaches and mentors the application and technical service teams and ensures that projects for technical service, application and product development are appropriately resourced and prioritised to meet business goals.

The Technical Service Manager works closely with the Research and Development (R&D) and sales and marketing teams, and establishes strong links with the external scientific community. He is committed to delivering excellent service for the organisation, leads his department effectively to deliver projects, and possesses excellent interpersonal, communication, and technical writing and presentation skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Endorse risk assessments for application and/or technical service-related activities • Ensure compliance with WSH and EMS systems at the department level
	Manage application and product development	<ul style="list-style-type: none"> • Establish strong links with the external scientific community, including academia, trade associations and professional bodies • Formulate strategies for new and innovative product development • Formulate strategies in reviewing existing products to ensure competitiveness in the market
	Manage technical services	<ul style="list-style-type: none"> • Drive technical learning to ensure the organisation's technical leadership in the market • Endorse the design of material and application tests to solve customers' problems for targeted industries • Manage product application-related presentations and training to internal and external customers • Manage technical modifications to current products according to customers' requirements • Manage the provision of technical services to customers in a cost-effective and timely manner • Provide technical expertise in troubleshooting technical issues • Secure long-term and sustainable projects with customers to meet business goals
	Administer staff and organisational development	<ul style="list-style-type: none"> • Manage department level resources and budgets • Coach and mentor staff • Contribute to business continuity planning, implementation and execution • Drive departmental performance to achieve organisational goals • Drive the adoption of technologies to support virtual collaboration in remote locations • Review and endorse continuous improvement initiatives and activities

Technical Service Manager

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Budget Management	Level 5	Interpersonal Skills	Advanced
	Business Continuity Management	Level 5	Problem Solving	Advanced
	Business Networking Management	Level 5	Service Orientation	Advanced
	Business Planning Management	Level 5	Communication	Advanced
	Change Management	Level 5	Leadership	Advanced
	Continuous Improvement Management	Level 5		
	Environmental Management System Framework Development and Implementation	Level 4		
	Innovation Management	Level 4		
	Laboratory Data Reporting and Analysis Management	Level 5		
	Laboratory Operations Management	Level 5		
	Materials Qualification	Level 5		
	Organisational Analysis Management	Level 5		
	Organisational Resource Management	Level 5		
	Procurement Management	Level 5		
	Product Design and Development	Level 5		
	Product Testing Management	Level 5		
	Staff Development Management	Level 5		
	Staff Management	Level 5		
	Strategic Service Excellence Management	Level 5		
	Technical Presentation	Level 6		
	Technical Services Management	Level 6		
	Training, Coaching and Assessment Management	Level 5		
	Workplace Safety and Health Framework Development and Implementation	Level 4		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 5		

Research and Development (R&D)

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Research and Development Manager	130
Principal Chemist	133
Chief Chemist/Fellow	135
General Manager/Site Director/Vice President	137

Research Technologist

JOB ROLE DESCRIPTION

The Research Technologist supports Research and Development (R&D) by researching and compiling data from various sources to support the development of research proposals. He/She assists in performing technical laboratory-based studies, experiments, analyses and evaluations for R&D projects. In addition, he documents and summarises experimental data for further review and interpretation by chemists.

The Research Technologist contributes to new product development by supporting the process development and scale-up for new and improved products. He performs routine laboratory operations by performing basic troubleshooting and maintenance of R&D laboratory equipment, and supports chemists with laboratory activities as required. He complies with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements when conducting laboratory activities. In addition, he contributes to continuous improvement initiatives and activities for the laboratory.

The Research Technologist works in a team in the laboratory. He is analytical, a good team player, able to work independently, and possesses good communication and technical writing skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems • Conduct activity-based risk assessments • Handle, store and transport hazardous substances and dangerous goods in accordance with WSH and EMS standards and practices • Maintain good housekeeping in the workplace
	Perform laboratory operations	<ul style="list-style-type: none"> • Assist in the documentation of Research and Development (R&D) work records for both internal and external customers • Document and summarise experimental data for review and interpretation by chemists • Perform basic troubleshooting and maintenance of R&D laboratory equipment in accordance with laboratory standards • Support chemists with laboratory activities
	Manage Research and Development (R&D)	<ul style="list-style-type: none"> • Assist in performing technical laboratory-based studies, experiments, analyses and evaluations for R&D projects • Compile research data to support development of research proposals • Support the design of experiments and tests according to market and business needs
	Manage new product development	<ul style="list-style-type: none"> • Assist in the co-creation of new products in collaboration with the technical service and application teams • Support process development and scale-up for new and improved products
	Administer staff and organisational development	<ul style="list-style-type: none"> • Contribute to continuous improvement initiatives and activities • Identify opportunities for continuous improvement

Research Technologist

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Continuous Improvement Management	Level 3	Communication	Intermediate
	Environmental Management System Framework Development and Implementation	Level 3	Computational Thinking	Intermediate
	Laboratory Data Reporting and Analysis Management	Level 3	Problem Solving	Intermediate
	Laboratory Equipment Maintenance and Calibration Management	Level 3	Digital Literacy	Intermediate
	Laboratory Operations Management	Level 3	Sense Making	Intermediate
	Procurement Management	Level 2		
	Product Testing Management	Level 3		
	Project Management	Level 3		
	Quality Control Management	Level 2		
	Sample Management	Level 3		
	Technical Report Writing	Level 3		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 2		

Research and Development Chemist

JOB ROLE DESCRIPTION

The R&D Chemist performs complex technical laboratory-based studies, experiments, analyses and evaluations for Research and Development (R&D) projects. He/She develops research objectives and proposals for new product innovation and supports the execution of projects for new technology, materials or ingredients.

The R&D Chemist supports the development of advanced solutions and formulations, in compliance with Intellectual Property (IP) and patent rights, and determines new product specifications for production scale-up. He documents R&D work for internal and external customers, and makes recommendations to improve product research based on analyses of experimental data. In addition, he implements the Management of Hazardous Chemicals Programme (MHCP) for the laboratory, in compliance with Workplace Safety and Health (WSH) and Environmental Management System (EMS) requirements.

The R&D Chemist works in a team in the laboratory, and collaborates closely with the application and technical service teams to co-create new products. He is a good team player and has a creative and problem-solving mind-set. He is able to work independently, can manage multiple projects effectively, and possesses strong technical writing and presentation skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems • Conduct activity-based risk assessments • Implement the Management of Hazardous Chemicals Programme (MHCP) • Supervise good housekeeping in the workplace
	Perform laboratory operations	<ul style="list-style-type: none"> • Document Research and Development (R&D) work records for both internal and external customers • Interpret and analyse experimental data and recommend improvements on product research • Perform troubleshooting of R&D laboratory equipment in accordance with laboratory standards
	Manage Research and Development (R&D)	<ul style="list-style-type: none"> • Develop research objectives and proposals for new product innovations • Maintain up-to-date knowledge of market requirements and scientific and technological developments within the industry • Perform complex technical laboratory-based studies, experiments, analyses and evaluations for R&D projects • Support innovation, new technology, materials or ingredients-related research projects • Support reviews on new technologies and research techniques and integrate with R&D-based projects • Support the design of experiments and tests according to market and business needs
	Manage new product development	<ul style="list-style-type: none"> • Co-create new products in collaboration with technical service and application teams • Determine new product specifications for production scale-up • Develop Intellectual Property (IP) and patents of new products for business objectives • Identify process development and scale-up for new and improved products • Support the development of advanced solutions and formulations with compliance to IP and patent rights
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Implement continuous improvement initiatives and activities

Research and Development Chemist

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Applied Research and Development Management	Level 4	Creative Thinking	Intermediate
	Change Management	Level 4	Lifelong Learning	Intermediate
	Continuing Professional Development Management	Level 4	Communication	Intermediate
	Continuous Improvement Management	Level 3	Teamwork	Intermediate
	Data and Statistical Analytics	Level 3	Leadership	Intermediate
	Environmental Management System Framework Development and Implementation	Level 3		
	Innovation Management	Level 4		
	Laboratory Data Reporting and Analysis Management	Level 4		
	Laboratory Equipment Maintenance and Calibration Management	Level 3		
	Laboratory Operations Management	Level 4		
	Materials Qualification	Level 3		
	Procurement Management	Level 3		
	Product Design and Development	Level 4		
	Product Testing Management	Level 4		
	Project Management	Level 4		
	Quality Control Management	Level 3		
	Sample Management	Level 4		
	Technical Presentation	Level 4		
	Technical Report Writing	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 3		

Senior Research and Development Chemist

JOB ROLE DESCRIPTION

The Senior R&D Chemist supervises the Research and Development (R&D) team and provides scientific and technical guidance on their projects, which includes the effective planning of project milestones and deliverables. He/She develops research objectives and proposals for new product innovation and designs experiments according to market and business needs.

The Senior R&D Chemist manages new product development by evaluating new product specifications for production scale-up, validating process development and scale-ups for new and improved products, and developing Intellectual Property (IP) and patents of new products for business objectives. He coaches and mentors the junior staff in the team and is responsible for managing the team's performance to achieve organisational goals.

The Senior R&D Chemist leads a team in the laboratory, and collaborates closely with the application and technical service teams to co-create new products. He is goal-oriented, creative and enjoys solving complex problems. He can manage multiple projects effectively, and possesses excellent technical writing and presentation skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Comply with WSH and EMS systems • Ensure risk assessments are conducted and control measures are implemented • Implement the Management of Hazardous Chemicals Programme (MHCP)
	Perform laboratory operations	<ul style="list-style-type: none"> • Manage the troubleshooting and maintenance of Research and Development (R&D) laboratory equipment in accordance with laboratory standards • Review experimental data and provide recommendations on product research improvements • Review the documentation of R&D work records for both internal and external customers
	Manage Research and Development (R&D)	<ul style="list-style-type: none"> • Design experiments and tests according to market and business needs • Develop new technologies and research techniques and integrate into R&D-based projects • Develop research objectives and proposals for new product innovation • Maintain up-to-date knowledge of market requirements and scientific and technological developments within the industry • Manage innovation, new technology, materials or ingredients-related research projects • Provide scientific and technical guidance and supervision to the R&D team on their projects • Review complex technical laboratory-based studies, experiments, analyses and evaluations for R&D projects
	Manage new product development	<ul style="list-style-type: none"> • Develop advanced solutions and formulations with compliance to Intellectual Property (IP) and patent rights • Develop IP and patents of new products for business objectives • Evaluate product specifications for production scale-up • Lead the co-creation of new products in collaboration with technical service and application teams • Validate process development and scale-ups for new and improved products

Senior Research and Development Chemist

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer staff and organisational development	<ul style="list-style-type: none"> • Adopt technologies to support virtual collaboration in remote locations • Coach and mentor staff • Manage team performance to achieve organisational goals • Validate continuous improvement initiatives and activities

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Applied Research and Development Management	Level 5	Creative Thinking	Advanced
	Business Networking Management	Level 5	Sense Making	Advanced
	Change Management	Level 4	Problem Solving	Advanced
	Continuing Professional Development Management	Level 4	Computational Thinking	Advanced
	Continuous Improvement Management	Level 4	Communication	Intermediate
	Data and Statistical Analytics	Level 4		
	Environmental Management System Framework Development and Implementation	Level 3		
	Innovation Management	Level 4		
	Laboratory Data Reporting and Analysis Management	Level 5		
	Laboratory Equipment Maintenance and Calibration Management	Level 4		
	Laboratory Operations Management	Level 5		
	Materials Qualification	Level 4		
	Process Development Management	Level 4		
	Procurement Management	Level 4		
	Product Design and Development	Level 5		
	Product Testing Management	Level 5		
	Project Management	Level 5		
	Quality Control Management	Level 3		
	Sample Management	Level 5		
	Technical Presentation	Level 5		
	Technical Report Writing	Level 4		
	Training, Coaching and Assessment Management	Level 3		
	Workplace Safety and Health Framework Development and Implementation	Level 3		
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 4		

Research and Development Manager

JOB ROLE DESCRIPTION

The R&D Manager directs strategic Research and Development (R&D) programmes for the organisation, and drives the development of innovative new products, to generate and maintain commercially viable product lines and meet agreed business objectives. He/She drives technical learning to ensure the organisation's scientific and technical leadership in the market, and ensures that research undertaken upholds the highest scientific standards.

The R&D Manager manages new product development by liaising with relevant departments to bring new and innovated products from bench-top to scale-up and commercialisation phases. He endorses recommendations for product research improvements. In addition, he coaches and mentors R&D department personnel and ensures that R&D projects are appropriately resourced and prioritised to meet business goals.

The R&D Manager works closely with the application, technical service and sales and marketing teams. He establishes strong links with the external scientific community, research institutions and potential business partners to explore possible collaborations for the co-creation of products or research. He is able to lead his team effectively and possesses excellent interpersonal, communication, and technical writing and presentation skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Endorse risk assessments for Research and Development (R&D)-related activities • Ensure compliance with WSH and EMS systems at the department level
	Perform laboratory operations	<ul style="list-style-type: none"> • Endorse recommendations on product research improvements
	Manage Research and Development (R&D)	<ul style="list-style-type: none"> • Align R&D direction and strategies with the organisation's business objectives and customers' needs • Conduct technical and financial assessments on R&D projects • Drive technical learning to ensure the organisation's scientific and technical leadership in the market • Endorse research proposals for new product innovations internally, and in collaboration with external partners • Establish strong links with the external scientific community, including academia, trade associations and professional bodies • Lead innovation, new technology, materials or ingredients-related research projects • Lead scientific and technical guidance and supervision to research teams on their projects • Provide wide-ranging, independent technical input and direction to R&D projects • Validate the design of experiments and tests, according to market and business needs
	Manage new product development	<ul style="list-style-type: none"> • Liaise with relevant departments to bring new and innovated products from bench-top to scale-up and commercialisation phases • Manage Intellectual Property (IP) and patents for the commercialisation of new products

Research and Development Manager

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer staff and organisational development	<ul style="list-style-type: none"> • Manage department level resources and budgets • Coach and mentor staff • Contribute to business continuity planning, implementation and execution • Drive departmental performance to achieve organisational goals • Drive the adoption of technologies to support virtual collaboration in remote locations • Review and endorse continuous improvement initiatives and activities

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Applied Research and Development Management	Level 6	Leadership	Advanced
	Budget Management	Level 5	Communication	Advanced
	Business Continuity Management	Level 5	Creative Thinking	Advanced
	Business Networking Management	Level 5	Lifelong Learning	Advanced
	Business Planning Management	Level 5	Global Mindset	Advanced
	Change Management	Level 5		
	Continuing Professional Development Management	Level 5		
	Continuous Improvement Management	Level 5		
	Environmental Management System Framework Development and Implementation	Level 4		
	Innovation Management	Level 5		
	Laboratory Data Reporting and Analysis Management	Level 6		

Research and Development Manager

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES	
	Laboratory Equipment Maintenance and Calibration Management	Level 5
	Laboratory Operations Management	Level 6
	Materials Qualification	Level 5
	Organisational Analysis Management	Level 5
	Organisational Resource Management	Level 5
	Process Development Management	Level 4
	Procurement Management	Level 5
	Product Design and Development	Level 6
	Product Testing Management	Level 5
	Sample Management	Level 6
	Staff Development Management	Level 5
	Staff Management	Level 5
	Strategic Service Excellence Management	Level 5
	Strategy Development and Implementation Management	Level 5
	Technical Presentation	Level 6
	Technical Services Management	Level 6
	Training, Coaching and Assessment Management	Level 5
	Workplace Safety and Health Framework Development and Implementation	Level 4
	Workplace Safety and Health Hazard Identification and Risk Control Management	Level 5

Principal Chemist

JOB ROLE DESCRIPTION

The Principal Chemist acts as a technical advisor, providing problem-solving consultation and technical expertise in quality control, applications, scientific research and new product development. He/She designs complex experiments in the laboratory, based on requirements of the industry, customers, and/or his field of specialisation. He provides technical expertise to support laboratory operations by leading the troubleshooting of existing chemical validations and preparations, and develops new methods when required.

The Principal Chemist leads applied research projects to drive chemical product innovation, and ensures that research undertaken upholds the highest scientific standards. He prepares applied research papers and presents them at scientific and industry events and conferences. He provides technical expertise for the development of the laboratory's Management of Hazardous Chemicals Programme (MHCP). At the organisational level, he is responsible for translating continuous improvement strategies into actionable plans for the respective laboratory functional departments, and for driving the development of technical capabilities for the laboratory teams.

The Principal Chemist is a key resource person who advises senior management and laboratory functional departments on chemistry and scientific methodologies. He maintains and builds strong relationships with the external scientific community. He is highly analytical, enjoys solving complex problems, and is able to lead others effectively. He is expected to possess strong project management, transdisciplinary thinking and decision-making skills.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Ensure compliance with WSH and EMS systems at the department level • Provide technical expertise for the development of the Management of Hazardous Chemicals Programme (MHCP)
	Provide technical support to laboratory operations	<ul style="list-style-type: none"> • Design and conduct complex experiments and analyses in the laboratory, based on industry, customer or field of specialisation requirements • Lead the identification, development and deployment of new analytical technologies to support product and process development • Lead the troubleshooting of existing chemicals validations and preparations, and develop new validation methods if required • Prepare application development reports for presentation to internal and external customers • Provide technical evaluations for the procurement of advanced laboratory equipment
	Manage applied research	<ul style="list-style-type: none"> • Act as a liaison to evaluate market potential and external technologies for applied research • Conduct applied research studies on performance modelling, product and process characterisation and analyses • Lead applied research projects to drive chemical product innovation • Represent the organisation at scientific forums and present applied research papers
	Administer staff and organisational development	<ul style="list-style-type: none"> • Build in-house technical capabilities for laboratory teams • Contribute to the development of business continuity plans • Drive the adoption of technologies to support virtual collaboration in remote locations • Recommend new and emerging technologies for laboratory and applied research management • Translate continuous improvement strategies into actionable plans

Principal Chemist

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Analytical Method Validation	Level 5	Leadership	Advanced
	Applied Research and Development Management	Level 5	Computational Thinking	Advanced
	Business Networking Management	Level 5	Transdisciplinary Thinking	Advanced
	Change Management	Level 5	Global Mindset	Advanced
	Continuing Professional Development Management	Level 5	Communication	Advanced
	Continuous Improvement Management	Level 6		
	Data and Statistical Analytics	Level 5		
	Environmental Management System Framework Development and Implementation	Level 4		
	Innovation Management	Level 5		
	Laboratory Data Reporting and Analysis Management	Level 6		
	Laboratory Operations Management	Level 6		
	Materials Qualification	Level 5		
	Non-Conformance Management	Level 5		
	Product Design and Development	Level 5		
	Product Testing Management	Level 5		
	Project Management	Level 6		
	Technical Presentation	Level 6		
	Technical Report Writing	Level 4		
	Technical Services Management	Level 6		
	Workplace Safety and Health Framework Development and Implementation	Level 4		

Chief Chemist/Fellow

JOB ROLE DESCRIPTION

The Chief Chemist/Fellow is responsible for the strategic planning and design of complex laboratory solutions for the industry, professional and technical societies, government and other organisations. He/She is the organisation's technical expert on chemistry and scientific matters, who advises senior management and business partners on advanced technologies and methodologies for applied research, in accordance with applicable government regulations and manufacturing processes.

The Chief Chemist/Fellow formulates the direction and strategy in applied research to exploit market potential and industry trends, so as to maintain and improve the organisation's competitive position in the market. He represents the organisation in Research and Development (R&D) consortiums for open innovation within the industry, and profiles the organisation's scientific and technical leadership at scientific and industry events and conferences. At the organisational level, he designs the organisation's technology roadmap and drives continuous improvement strategies. In addition, he leverages on deep technical expertise and industry experience to develop technical capabilities for the laboratory teams and domain expertise for the organisation.

The Chief Chemist/Fellow maintains and builds strong links with the external scientific community, research institutions and business partners to explore business or collaborative research opportunities. He is a strategic and creative thinker, demonstrates exceptional problem-solving and communication skills, and networks effectively.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer Workplace Safety and Health (WSH) and Environmental Management Systems (EMS)	<ul style="list-style-type: none"> • Drive compliance with WSH and EMS systems at the organisational level
	Provide technical support to laboratory operations	<ul style="list-style-type: none"> • Advise senior management and business partners on advanced technologies and methodologies in applied research • Endorse the design and conduct of complex experiments and analyses in the laboratory, based on industry, customer or field of specialisation requirements • Lead the identification, development and deployment of new analytical technologies to support product and process development • Manage the planning and design of complex laboratory solutions for the industry, professional and technical societies, government and other organisations
	Manage applied research	<ul style="list-style-type: none"> • Endorse scientific techniques and procedures for product design and innovation • Explore technical collaboration opportunities with industry partners and research institutions for product development and innovation • Formulate direction and strategies in applied research to exploit market potential and industry trends • Represent the organisation at scientific forums and present applied research papers • Represent the organisation in Research and Development (R&D) consortiums across the value chain for open innovation within the industry

Chief Chemist/Fellow

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Administer staff and organisational development	<ul style="list-style-type: none"> • Build in-house technical capabilities for laboratory teams • Contribute to the development of business continuity plans • Design the organisation's technology roadmap through analyses of market trends and external drivers • Drive continuous improvement strategies at the organisational level • Drive the adoption of technologies to support virtual collaboration in remote locations • Provide leadership to uphold and shape the organisation's culture, values and behaviour

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Applied Research and Development Management	Level 6	Leadership	Advanced
	Business Networking Management	Level 6	Communication	Advanced
	Change Management	Level 6	Transdisciplinary Thinking	Advanced
	Continuing Professional Development Management	Level 5	Decision Making	Advanced
	Continuous Improvement Management	Level 6	Global Mindset	Advanced
	Data and Statistical Analytics	Level 6		
	Environmental Management System Framework Development and Implementation	Level 5		
	Innovation Management	Level 6		
	Laboratory Data Reporting and Analysis Management	Level 6		
	Laboratory Operations Management	Level 6		
	Materials Qualification	Level 5		
	Product Design and Development	Level 6		
	Project Management	Level 6		
	Technical Presentation	Level 6		
	Technical Report Writing	Level 4		
	Workplace Safety and Health Framework Development and Implementation	Level 5		
	Yield Analysis	Level 5		

General Manager/Site Director/Vice President

JOB ROLE DESCRIPTION

The General Manager/Site Director/Vice President establishes the overall strategy and direction of the organisation with a view of growing its business and driving its competitiveness in a globalised environment. He/She ensures the strategic alignment of business plans with the organisation's vision, mission and business objectives. He directs compliance and corporate governance, ensuring that the organisation stays abreast of changes in regulatory and legislative requirements, and advocates a safe workplace culture across the organisation.

The General Manager/Site Director/Vice President oversees all manufacturing operations and provides leadership to department managers to ensure that departmental deliverables are achieved in a timely and cost-effective manner. He drives the continuous improvement of site operations through innovation, safety, productivity and efficiency initiatives. He builds strong networks with diverse stakeholders with a view of advancing the organisation's interests. In addition, he drives organisational capability development and succession planning to ensure a competent workforce and continuous talent pipeline.

The General Manager/Site Director/Vice President is a calculated risk-taker and strategic thinker with excellent business acumen. He is decisive, results-driven and demonstrates exceptional leadership and communication abilities.

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Direct compliance and corporate governance	<ul style="list-style-type: none"> • Advocate a safe workplace culture across the organisation • Drive compliance with the organisation's corporate governance standards • Endorse the organisation's Major Hazard Installation (MHI) Safety Case • Endorse the organisation's quality, Workplace Safety and Health (WSH) and Environmental Management System (EMS) policies • Ensure organisational compliance to regulatory requirements and legislation, and keep abreast of changes in compliance requirements • Establish and maintain the organisation's brand reputation
	Establish strategy and direction	<ul style="list-style-type: none"> • Establish business performance indicators and measurement standards • Establish the organisation's vision, objectives and strategy • Lead business planning and strategic alignment with the organisation's business objectives • Lead strategic resource planning and management to optimise organisational capacity and capability • Steer the implementation of the organisation's business strategies
	Lead manufacturing operations	<ul style="list-style-type: none"> • Control capital and operational budgets • Drive continuous improvement through innovation, safety, productivity and efficiency initiatives • Drive the development of new and innovative products to improve customer value proposition • Ensure the delivery of the organisation's business and annual production plans and schedules • Recommend changes in production objectives, according to market conditions • Set strategic objectives for plant maintenance and asset integrity management systems

General Manager/Site Director/Vice President

CRITICAL WORK FUNCTIONS AND KEY TASKS	CRITICAL WORK FUNCTIONS	KEY TASKS
	Drive business and organisational development	<ul style="list-style-type: none"> • Build business and professional networks • Drive organisational succession planning, capability and talent development • Drive the formulation of technology strategies and roadmaps • Empower the senior management team to make decisions and ensure their accountability in achieving departmental performance targets • Provide leadership to uphold and shape the organisation's culture, values and behaviour • Synergise crisis management and business continuity plans to mitigate business impact during disruptive events

SKILLS AND COMPETENCIES	TECHNICAL SKILLS AND COMPETENCIES		GENERIC SKILLS AND COMPETENCIES (TOP 5)	
	Budget Management	Level 6	Leadership	Advanced
	Business Continuity Management	Level 6	Global Mindset	Advanced
	Business Networking Management	Level 6	Developing People	Advanced
	Business Planning Management	Level 6	Managing Diversity	Advanced
	Change Management	Level 6	Decision Making	Advanced
	Continuous Improvement Management	Level 6		
	Crisis Management	Level 6		
	Data Analytics System Design	Level 5		
	Data and Statistical Analytics	Level 6		
	Emergency Response and Crisis Management Development and Implementation	Level 6		
	Environmental Management System Framework Development and Implementation	Level 6		
	Innovation Management	Level 6		
	Learning and Development Framework Management	Level 6		
	Maintenance Integrity and Reliability Framework Development and Implementation	Level 6		
	Major Hazard Installation Safety Case Management	Level 6		
	Organisational Analysis Management	Level 6		
	Organisational Resource Management	Level 6		
	Robotic and Automation Technology Application	Level 6		
	Staff Development Management	Level 6		
	Staff Management	Level 6		
	Strategic Service Excellence Management	Level 6		
	Strategy Development and Implementation Management	Level 6		
	Technology Road Mapping	Level 6		
	Workplace Safety and Health Framework Development and Implementation	Level 6		



Goh Swee Chen

Chairperson

Shell Companies in Singapore

EMPOWERING OTHERS TO MAKE A DIFFERENCE

A leader in the Energy and Chemicals sector, Goh Swee Chen believes that the key to a successful company is the empowerment of its people. Swee Chen has been in Shell Companies in Singapore for more than a decade, and the Chairman since 2014. Spending a large part of her career leading multinational teams across the world, she understands the importance of equipping employees with skills.

She says that while companies generally put a lot of focus on higher-level talent, there needs to be an emphasis on employees that are critical to its on-the-ground operations. "In order to sustain our business, people play a very important part. We want the sector to be an attractive choice, for those contemplating their career choices. When I first came into the role as Chairman, my team and I asked – how do we make Shell relevant to Singapore, and how do we make Singapore relevant to Shell?" Those questions led Swee Chen and her team to focus on developing the skill sets of employees in critical technical operations, specifically in manufacturing and maritime.

She also sees the value in programmes offered by SkillsFuture Singapore such as SkillsFuture Earn and Learn which allows students to study while training on-the-job to gain relevant hands-on experience. With technological advancements, she also explains that those in the sector need to be open to life-long learning to maintain relevancy in a landscape that is constantly evolving.

Swee Chen knows first-hand how challenging it can be to make a career switch - she was running infocomm technology (ICT) teams and operations prior to transitioning to run Shell's lubricants and commercial fuels businesses for Asia Pacific/Middle East in 2011. "It was uncomfortable at first; 80% of the content of the role was new to me. I had to develop new skill sets, and re-establish a network of stakeholders. What I noticed is those who have progressed fast in their careers are those who are willing to test themselves and try new things. Push the boundaries of comfort by picking up and learning new skills," Swee Chen says.

Swee Chen also emphasises on the wide range of career opportunities offered in the Energy and Chemicals sector, where the Skills Framework is able to provide an overview of the sector, as well as a reference point to calibrate job groups, skills and competencies for her company. She looks forward to having more people joining the sector in the near future. "This is a sector that matters. It powers human progress. It does not just power mobility, its energy and chemicals solutions are essential for day-to-day living," she concludes.

"Push the boundaries of comfort to pick up new things and learn new skills."

Overview of Technical Skills and Competencies

Technical Skills and Competencies (TSCs)

TSC Category	TSC Title	TSC Description	Proficiency Levels					
			1	2	3	4	5	6
Business and Organisational Management	Budget Management	Manage budget and finance systems and processes for tracking of budget utilisation to ensure efficient and effective use of budgets				●	●	●
	Business Continuity Management	Develop Business Continuity Plans (BCPs) by executing business impact analyses, enterprise threat and risk analyses, impact scenario evaluations, recovery requirements and solution implementation in the organisation				●	●	●
	Business Networking Management	Establish mutually beneficial relationships with business partners and stakeholders including technical experts, industry associations, potential clients and customers					●	●
	Business Planning Management	Develop business plans by analysing growth opportunities, evaluating the business environment and upkeeping sustainable competitive advantages					●	●
	Change Management	Implement organisational changes smoothly as well as manage reactions to ensure seamless transitions during changes				●	●	●
	Continuous Improvement Management	Apply continuous improvement processes to optimise operating costs, task efficiency and effectiveness in production, services and processes		●	●	●	●	●
	Organisational Analysis Management	Evaluate factors that can affect the organisation's performance as well as strategically assess the organisation's own resources and potential					●	●
	Organisational Resource Management	Implement resource management plans which include defining the organisation's resource requirements, functional roles, job role descriptions, reporting lines, accountabilities and responsibilities				●	●	●
	Procurement Management	Manage the ordering, receipt, review and approval of items from suppliers to meet business goals		●	●	●	●	●
	Project Management	Plan, execute, track and govern projects, which include allocating and managing people resources, time, and budgets, as well as stakeholder engagement and problem resolution			●	●	●	●
	Staff Management	Apply the organisation's human resources policies, procedures and standards to effectively manage staff under the direct control of the position holder, ranging from coordination to directing people and teams			●	●	●	●
	Strategic Service Excellence Management	Establish strategies and operating principles to consistently meet and manage clients' expectations so as to support business requirements				●	●	●
	Strategy Development and Implementation Management	Develop and implement organisational strategic plans and provide direction to the organisation					●	●
	Technical Presentation	Deliver effective and engaging presentations for a variety of audiences				●	●	●
	Technical Report Writing	Produce reports with specific information and evidence presented in a clear and structured format		●	●	●		
	Third Party Management	Manage third parties such as contractors, suppliers and vendors to ensure control of work and compliance is in full alignment with the organisation's policies and standards		●	●	●	●	

Overview of Technical Skills and Competencies

Technical Skills and Competencies (TSCs)

TSC Category	TSC Title	TSC Description	Proficiency Levels					
			1	2	3	4	5	6
Data Analytics	Data Analytics System Design	Integrate the use of data analytics within the manufacturing environment for identification of bottlenecks and opportunities for process improvement			●	●	●	
	Data and Statistical Analytics	Interpret and analyse data using statistical techniques to uncover trends and patterns to locate and define new process improvement opportunities	●	●	●	●	●	●
Discipline Engineering Specialisation	Electrical Engineering Management	Manage the design, technical specification, selection, modification and troubleshooting of electrical engineering equipment and systems in process plants			●	●	●	
	Electrical Field Maintenance Management	Interpret and apply routine and non-routine electrical field maintenance and inspection work instructions and regimes to ensure optimal availability and reliability of electrical equipment and control systems in process plants	●	●	●	●		
	Inspection Engineering Management	Manage fixed equipment and piping inspection schemes, materials selection, construction, corrosion control, condition and fitness-for-service through on-stream, risk-based monitoring programmes and downtime inspections, to provide inspection engineering technical support to maintenance, engineering design and project teams		●	●	●	●	●
	Instrumentation and Control Design Engineering Management	Manage the technical design, selection, specification, modification and troubleshooting of instrumentation and control systems in process plants to provide instrumentation and control engineering design and support to production, maintenance and project teams			●	●	●	
	Instrumentation and Control Field Maintenance Management	Perform routine and non-routine instrumentation field maintenance and inspection work to ensure optimal availability and reliability of instrumentation and control devices and systems in process plants	●	●	●	●		
	Instrumentation and Control System Maintenance Management	Interpret and implement maintenance regimes, processes and procedures for programming, configuration and maintenance of control systems to ensure optimal availability and reliability of process plant and equipment			●	●		
	Mechanical Field Maintenance Management	Perform routine and non-routine mechanical field maintenance work to ensure optimal availability and reliability of mechanical rotating and static equipment in process plants	●	●	●	●		
	Mechanical Rotating Equipment Engineering Management	Manage the design, technical specification, selection, modification and troubleshooting of mechanical rotating equipment, structures and systems to provide mechanical engineering discipline support to production, maintenance and project teams			●	●	●	
	Mechanical Static Equipment Engineering Management	Manage the design, technical specification, selection, modification and troubleshooting of mechanical static equipment, structures and systems to provide mechanical engineering discipline support to production, maintenance and project teams			●	●	●	
	Process Analyser Maintenance Management	Interpret and implement maintenance regimes, processes and procedures for maintenance and configuration and inspection of process analysers to ensure their optimal availability and reliability		●	●	●		

Overview of Technical Skills and Competencies

Technical Skills and Competencies (TSCs)

TSC Category	TSC Title	TSC Description	Proficiency Levels					
			1	2	3	4	5	6
Discipline Engineering Specialisation	Reliability Engineering Management	Manage life cycle costing, root cause failure analyses, reliability modelling and assessments, fit-for-purpose analyses and failure patterns of plant and equipment to provide reliability engineering technical support to production, maintenance and project teams				●	●	●
Discipline Engineering Support Management	Engineering Safety Standards Interpretation	Design and implement appropriate safety and safeguarding engineering solutions standards in accordance with legislative requirements and industry best practices			●	●	●	
	Engineering Support Management	Provide discipline engineering technical support and expertise in technical specifications, modifications, asset integrity and troubleshooting of engineering equipment and systems, to production, maintenance and project teams				●	●	
	Equipment and System Value Engineering Management	Develop and evaluate discipline-specific engineering equipment and systems to continuously improve process plant performance within manufacturers' safe operating parameters and limits				●	●	
	Technology Road Mapping	Plan short-term and long-term goals for the implementation of new and emerging process plant and equipment technologies, to continuously improve plant performance and to make capital out of future market needs					●	●
Emergency Response and Crisis Management	Crisis Management	Establish and implement crisis management frameworks and procedures to deal with disruptive or unexpected crisis situations that threaten to harm the organisation, its stakeholders or the public			●	●	●	●
	Emergency Response and Crisis Management Development and Implementation	Develop and maintain the Emergency Response and Crisis Management (ERCM) framework in accordance with legislative and organisational requirements, comprising policies, standards and procedures				●	●	●
	Emergency Response Management	Respond to emergencies by executing emergency response plans and procedures to mitigate the impact of emergency incidents		●	●	●	●	
Engineering Design and Project Management	Commissioning and Start-Up Management	Manage the commissioning, start-up, and operationalisation of new or modified process plants and equipment			●	●	●	
	Engineering Management of Change	Manage changes made to process plants, equipment and systems to ensure possible hazards and implications to process safety, production and quality are taken into consideration, and such changes are traceable, documented and evaluated			●	●	●	
	Engineering Project Management	Manage engineering projects and coordinate with project teams and stakeholders to achieve project outcomes and objectives			●	●	●	
	Engineering, Procurement and Construction Management	Manage engineering design, procurement and construction for new process plants and/or plant expansion projects			●	●	●	
	Front-End Engineering Design Management	Manage Front-End Engineering and Design (FEED) for process plant and equipment			●	●	●	

Overview of Technical Skills and Competencies

Technical Skills and Competencies (TSCs)

TSC Category	TSC Title	TSC Description	Proficiency Levels					
			1	2	3	4	5	6
Health, Safety and Environment Management	Environmental Management System Framework Development and Implementation	Develop Environmental Management System (EMS) frameworks and implement procedures and practices to ensure compliance with legal and organisational requirements as well as commitment to environment protection	●	●	●	●	●	●
	Incident Investigation Management	Apply a systematic and objective approach in workplace incident and accident investigations which include responding, reporting, gathering data and information, root cause analyses, implementation and review of corrective and preventive measures, to prevent recurrence of incidents and accidents		●	●	●	●	
	Safe System of Work Development and Implementation	Develop Safe System of Work (SSoW) frameworks and implement practices to ensure a safe and reliable environment for operations, maintenance and contracting activities	●	●	●	●	●	●
	Workplace Safety and Health Framework Development and Implementation	Develop Workplace Safety and Health (WSH) frameworks and implement procedures and practices to ensure a safe and reliable workplace environment	●	●	●	●	●	●
	Workplace Safety and Health Hazard Identification and Risk Control Management	Implement a systematic approach for hazard identification and risk assessment to effectively eliminate or reduce risks	●	●	●	●	●	
Laboratory Management	Laboratory Data Reporting and Analysis Management	Manage laboratory data for reporting and analysis purposes, ranging from collation, record, access and retrieval from the laboratory information management systems (LIMS)	●	●	●	●	●	●
	Laboratory Equipment Maintenance and Calibration Management	Maintain laboratory equipment to ensure maximum availability of equipment and accuracy of measurements based on the organisation's standards and vendors' operating, maintenance and calibration instructions		●	●	●	●	
	Laboratory Operations Management	Manage laboratory operational activities including all analyses, work planning, scheduling, testing and validation required to meet internal and external customer requirements	●	●	●	●	●	●
	Sample Management	Manage samples in solid, liquid and gas phases, from preparation, sampling, labelling, transportation, storage to disposal in compliance with regulatory and organisational requirements	●	●	●	●	●	●
	Technical Services Management	Manage technical service support to deliver innovative technical solutions and industry applications of products to customers and markets		●	●	●	●	●

Overview of Technical Skills and Competencies

Technical Skills and Competencies (TSCs)

TSC Category	TSC Title	TSC Description	Proficiency Levels					
			1	2	3	4	5	6
Learning and Development Management	Continuing Professional Development Management	Facilitate the implementation of continuing professional development plans within the organisation to extend, update and maintain the technical competences of professionals				●	●	
	Learning and Development Framework Management	Develop and apply a learning and development framework to manage competency and capability development for the organisation				●	●	●
	Staff Development Management	Manage staff capabilities and competency-based development through learning and development activities to build a skilled workforce			●	●	●	●
	Trainer and Assessor Development Management	Develop and apply trainer and assessor development plans to ensure high quality of workplace learning and assessment programmes are in place				●	●	
	Training, Coaching and Assessment Management	Deliver competency-based on-the-job training, coaching and assessment in line with the processes and procedures of the learning and development framework			●	●	●	
Maintenance Management	Asset Integrity Management	Manage asset integrity of process plants and equipment to ensure optimal availability, reliability and integrity of equipment and systems		●	●	●	●	
	Maintenance Integrity and Reliability Framework Development and Implementation	Develop and implement maintenance integrity and reliability frameworks to ensure availability and reliability of process plants and equipment			●	●	●	●
	Maintenance Planning and Scheduling	Develop and execute maintenance plans and schedules to optimise plant availability and reliability			●	●	●	
	Plant Turnaround Management	Develop and implement plant turnaround management plans to achieve turnaround objectives in coordination with internal and external stakeholders	●	●	●	●	●	
	Preventive Maintenance Management	Develop and implement preventive maintenance workflows, procedures and practices to optimise plant equipment availability and reliability	●	●	●	●	●	●
Process Engineering Management	Process Control	Apply process control to monitor and optimise process plant performance and quality of production output			●	●	●	
	Process Development Management	Manage process development for new or significantly altered raw materials, catalysts or products including early stage piloting, trial runs and full-scale production				●	●	●
	Process Engineering Design	Apply process design principles, engineering standards, control and safety strategies for the development of new and existing process plants				●	●	●
	Process Optimisation	Optimise the production and efficiency of process plants through analysing and reviewing process unit, equipment and plant performance				●	●	●
	Yield Analysis	Apply yield analysis processes and techniques to monitor and drive process yield improvements			●	●	●	

Overview of Technical Skills and Competencies

Technical Skills and Competencies (TSCs)

TSC Category	TSC Title	TSC Description	Proficiency Levels					
			1	2	3	4	5	6
Process Operations Management	Control Room Operations Management	Perform control room operations in order to monitor and control process units and utilities in a safe and reliable condition by using process control Distributed Control Systems (DCSs)			●	●		
	Engineering Drawing Interpretation and Management	Use engineering drawings including Process Flow Diagrams (PFDs), Piping and Instrument Diagrams (P&IDs), process equipment datasheets, vendor equipment engineering drawings and/or layouts and equipment datasheets, to support operations, maintenance and engineering activities	●	●	●	●	●	
	Feedstock and Product Transfer Operations Management	Perform feedstock and product transfer and blending for continuous and/or batch processes to meet operational requirements	●	●	●	●	●	
	Operations Reporting Protocol Application	Perform operations reporting in accordance with the organisation's communication protocol, procedures and systems	●	●	●	●	●	
	Process Equipment Preparation for Mechanical Work	Prepare process plant and equipment so that they are decommissioned before and commissioned after mechanical work respectively in accordance with safe work practices	●	●	●	●		
	Process Operations Troubleshooting	Perform a structured approach in process operations troubleshooting by using appropriate tools, techniques and engineering documents to identify and locate causes of problems and correct them in a safe and reliable manner		●	●	●	●	
	Process Plant and Equipment Integrity Management	Manage process plant and equipment performance to safeguard and improve plant integrity and energy efficiency			●	●	●	●
	Process Unit and Utilities Operations Management	Operate, monitor and control process units and utilities in order to manage process operations and planning to meet organisational business targets	●	●	●	●	●	●
	Standard Operating Procedure Development and Implementation	Develop Standard Operating Procedures (SOPs) and implement procedures to ensure that process operational tasks for all modes of plant operation are performed correctly and consistently in accordance with regulatory and organisational objectives	●	●	●	●	●	●
Process Safety Management	Major Hazard Installation Safety Case Management	Develop Major Hazard Installation (MHI) Safety Cases to mitigate risks arising from major accident hazards, and reduce risks to As Low As Reasonably Practicable (ALARP)			●	●	●	●
	Process Safety Management Framework Development and Implementation	Develop Process Safety Management (PSM) frameworks and implement procedures and practices to ensure the integrity and reliability of safeguards and protection systems within process plant operations			●	●	●	
	Safety Integrity Levels Management	Analyse and determine appropriate Safety Integrity Levels (SIL) for the selection of safety protection devices and systems to ensure hardware and software meet SIL-rated requirements			●	●	●	

Overview of Technical Skills and Competencies

Technical Skills and Competencies (TSCs)

TSC Category	TSC Title	TSC Description	Proficiency Levels					
			1	2	3	4	5	6
Quality Assurance and Quality Control Management	Analytical Method Validation	Verify analytical methods used to ensure accuracy, validity and reliability		●	●	●	●	
	Audit and Review Management	Manage audit and review processes and procedures including planning, execution and reporting, to ensure compliance with legal and Quality Management System (QMS) requirements			●	●	●	●
	Materials Qualification	Manage the quality of materials to ensure material specifications conform to product requirements		●	●	●	●	
	Non-Conformance Management	Develop and implement non-conformance procedures and practices to ensure non-conformance materials and products are identified and managed		●	●	●	●	
	Quality Assurance Management	Establish and implement quality assurance (QA) parameters and procedures to ensure compliance with the organisation's Quality Management System (QMS) requirements		●	●	●	●	
	Quality Control Management	Establish and implement quality control (QC) systems and procedures to ensure the quality of products meet desired levels of standards and compliance at all stages	●	●	●	●	●	
Research and Development Management	Applied Research and Development Management	Manage applied Research and Development (R&D) projects and activities to innovate and develop new products and processes				●	●	●
	Innovation Management	Integrate creativity and innovation into the design and development of products and processes while ensuring compliance and non-infringement of existing Intellectual Property (IP) regulations and patents rights				●	●	●
	Product Design and Development	Manage new product design and development from Research and Development (R&D), including initial product design concepts, small batch piloting, market testing and evaluation				●	●	●
	Product Testing Management	Develop product testing protocols and procedures based on product specifications to test and determine the full characteristics of product profiles		●	●	●	●	
Supply Chain and Production Planning Management	Market Demand and Feedstock Management	Manage feed supply for market demand and respond to feed shortfall, opportunity realisation for feed surplus and/or changes in customer demand				●	●	
	Plant Economic Modelling	Develop plant economic models for current operations, and growth scenarios according to business plans, to forecast optimal plant and economic configurations for supply and demand				●	●	
	Production Planning and Scheduling	Establish and implement strategic production planning and scheduling to meet production targets and cycle time indices			●	●	●	
	Supply Chain Management	Develop and maintain supply chain processes, comprising feedstock, production, storage, and export, to ensure supply and demand are managed in an integrated manner and in full alignment with production availability, downtime, plant turnarounds and market conditions				●	●	●

Overview of Technical Skills and Competencies

Technical Skills and Competencies (TSCs)

TSC Category	TSC Title	TSC Description	Proficiency Levels					
			1	2	3	4	5	6
Technology Application Management	Internet of Things Management	Integrate data from computing devices, equipment and machines in a networked environment to provide specific solutions		●	●	●	●	
	Robotic and Automation System Maintenance	Maintain robotic and automation systems to meet operation requirements and propose strategies for improvements to the automation system's performance	●	●	●	●	●	
	Robotic and Automation Technology Application	Integrate robotic and automation technologies in manufacturing workflows, including process operations, maintenance, logistics and plant surveillance, to enhance productivity and precision and reduce reliance on manual tasks		●	●	●	●	●

Overview of Technical Skills and Competencies

General Description for Technical Skills and Competencies (TSCs)

Level	Responsibility (Degree of supervision and accountability)	Autonomy (Degree of decision-making)	Complexity (Degree of difficulty of situations and tasks)	Knowledge and Abilities (Required to support work as described under Responsibility, Autonomy and Complexity)
6	Accountable for significant areas of work, strategy or overall satisfaction	Empowered to chart direction and practices within and outside of work (including professional field/community), to achieve/exceed work results	Complex	<ul style="list-style-type: none"> • Synthesise knowledge issues in a field of work and the interface between different fields, and create new forms of knowledge • Employ advanced skills, to solve critical problems and formulate new structures, and/or to redefine existing knowledge or professional practice • Demonstrate exemplary ability to innovate, and formulate new ideas and structures
5	Accountable for achieving assigned objectives, decisions made by self and others	Provide leadership to achieve desired work results; Manage resources, set milestones and drive work	Complex	<ul style="list-style-type: none"> • Evaluate factual and advanced conceptual knowledge within a field of work, involving critical understanding of theories and principles • Select and apply an advanced range of cognitive and technical skills, demonstrating mastery and innovation, to devise solutions to solve complex and unpredictable problems in a specialised field of work • Manage and drive complex work activities
4	Work under broad direction Hold accountability for performances of self and others	Exercise judgement; adapt and influence to achieve work performance	Less routine	<ul style="list-style-type: none"> • Evaluate and develop factual and conceptual knowledge within a field of work • Select and apply a range of cognitive and technical skills to solve non-routine/abstract problems • Manage work activities which may be unpredictable • Facilitate the implementation of innovation
3	Work under broad direction May hold some accountability for performance of others, in addition to self	Use discretion in identifying and responding to issues, work with others and contribute to work performance	Less routine	<ul style="list-style-type: none"> • Apply relevant procedural and conceptual knowledge and skills to perform differentiated work activities and manage changes • Able to collaborate with others to identify value-adding opportunities
2	Work with some supervision Accountable for a broader set of tasks assigned	Use limited discretion in resolving issues or enquiries. Work without frequently looking to other for guidance	Routine	<ul style="list-style-type: none"> • Understand and apply factual and procedural knowledge in a field of work • Apply basic cognitive and technical skills to carry out defined tasks and to solve routine problems using simple procedures and tools • Present ideas and improve work
1	Work under direct supervision assigned Accountable for tasks	Minimal discretion required. Expected to seek guidance	Routine	<ul style="list-style-type: none"> • Recall factual and procedural knowledge • Apply basic skills to carry out defined tasks • Identify opportunities for minor adjustments to work tasks

Overview of Generic Skills and Competencies

Generic Skills and Competencies (GSCs)

GSC	GSC Description	Proficiency Levels		
		Basic	Intermediate	Advanced
Communication	Convey and exchange thoughts, ideas and information effectively through various mediums and approaches.	Communicate information with others to respond to general inquiries and to obtain specific information.	Articulate and discuss ideas and persuade others to achieve common outcomes.	Negotiate with others to address issues and achieve mutual consensus.
Computational Thinking	Develop and use computational models, tools and techniques to interpret and understand data, solve problems and guide decision-making.	Use computational models, tools and techniques to identify patterns in a problem and develop a solution.	Modify existing computational models, tools and techniques to develop different solutions.	Develop and create computational models, tools and techniques to implement new solutions and apply to other problems.
Creative Thinking	Adopt a fresh perspective to combine ideas or information in new ways and make connections between seemingly unrelated fields to create new ideas and applications.	Connect ideas or information from related fields or applications to address an immediate issue.	Connect or combine ideas or information from unrelated fields or applications to generate multiple ideas to bring about a specific outcome.	Create original applications or ideas to reveal new possibilities and reshape goals through high level of innovativeness.
Decision Making	Choose a course of action from various alternatives using a reasoned process to achieve intended goals.	Make decisions of simple or routine nature to achieve intended goals using given information and guidelines.	Make decisions in a complex setting to achieve intended goals using a structured process and multiple sources of available information.	Make decisions in a volatile and ambiguous setting using a structured process and limited sources of available information to achieve intended goals.
Developing People	Help others to learn and develop their capabilities to enhance their performance and achieve personal or professional goals.	Use demonstration and explanation to teach a familiar task to inexperienced co-workers.	Provide coaching to others to develop their skills and knowledge on their jobs to enhance performance.	Provide mentorship to help others in their professional and personal development to improve performance and further their careers.
Digital Literacy	Use ICT tools, equipment and software to create, evaluate and share information digitally with others.	Perform basic functions using software programmes pertaining to computer operating systems and file management, and search online information.	Use available software features to create and edit documents, customise templates and reports and evaluate online information.	Use available software features to enhance documents, analyse and manipulate data, and use ICT to organise, share and communicate information clearly and coherently.
Global Mindset	Awareness of diversity across global cultures and markets. Seek opportunities to adopt successful practices and ideas.	Demonstrate understanding of global challenges and opportunities and how to transfer best practices across cultures. Respect cultural differences and needs of a diverse workforce.	Develop global networks and manage virtual relationships while balancing both local and global perspectives. Adopt a local and global perspective when making decisions.	Build the organisation's capabilities to compete in a global environment. Manage tension between corporate requirements, global and cultural differences.

Overview of Generic Skills and Competencies

Generic Skills and Competencies (GSCs)

GSC	GSC Description	Proficiency Levels		
		Basic	Intermediate	Advanced
Interpersonal Skills	Manage relationships efficiently and communicate with others effectively to achieve mutual consensus and outcomes.	Recognise own internal feelings and emotional states to manage interpersonal relationships in social situations.	Detect and decipher emotions of others to manage interpersonal relationships in social situations.	Influence, guide and handle others' emotions to build instrumental relationships and manage conflicts and disagreements.
Leadership	Lead others to achieve objectives in the most effective way. Provide an inclusive workplace that cultivates workplace relationships and teamwork, and foster the development of others.	Demonstrate professionalism to set a good example at peer level. Support others through own initiative and enthuse others through own positive and energetic approach.	Lead by example at team level. Encourage and guide others to adopt a point of view, make changes or take action. Provide a team environment that facilitates relationships building, teamwork and the development of others.	Lead by example at organisational level. Inspire, motivate and guide others to adopt a point of view, make changes or take action. Cultivate an open, cooperative and collaborative learning culture for the organisation.
Lifelong Learning	Seek out opportunities to enhance one's knowledge and skills. Access and acquire new knowledge and skills actively for continual learning.	Organise and manage own learning by setting learning targets. Identify learning approaches to achieve work or career goals.	Engage in collaborative learning by discussing one's learning with others and soliciting feedback to continually improve oneself.	Conduct self-reflective practices to review one's learning to facilitate continual growth in one's career or profession.
Managing Diversity	Work well with people from different ethnic, social, cultural and educational backgrounds and understand the concerns and interests of diverse work groups.	Demonstrate sensitivity to the cultural characteristics, values, beliefs, and behaviors of another ethnic or cultural group.	Build relationships with different ethnic or cultural groups by engaging in cross-cultural cooperative projects.	Manage conflicts arising from different ethnic or cultural groups and work effectively in cross-cultural settings.
Problem Solving	Generate feasible and efficient solutions to solve problems and capitalise on new opportunities.	Identify easily perceivable problems and follow given guidelines and procedures to solve the problems.	Identify less perceivable problems and use problem solving tools and techniques to solve the problems.	Anticipate potential problems beyond the current scope and apply higher order problem solving tools and techniques to turn problems into opportunities.
Resource Management	Efficient and effective deployment and allocation of resources when and where they are needed. Include planning, allocating and scheduling of resources to tasks, which typically include manpower, machines, money and materials.	Use resources to ensure optimum and efficient use of resources.	Deepen insights into the planning, allocation and deployment of resources to anticipate needs. Plan the allocation and deployment of resources efficiently and effectively.	Establish strategies for the allocation and deployment of resources efficiently and effectively.

Overview of Generic Skills and Competencies

Generic Skills and Competencies (GSCs)

GSC	GSC Description	Proficiency Levels		
		Basic	Intermediate	Advanced
Sense Making	Organise and analyse data and information accurately to identify relationships and detect patterns and trends to gain insights for decision-making.	Identify relationships and linkages within different components of data.	Interpret data to uncover patterns and trends between various sources of data.	Analyse data relationships, patterns and trends to gain important insights and make informed decisions.
Service Orientation	Commit to exceeding both internal and external customers' needs. Proactively identify customer needs and sustain a culture of service excellence within the organisation.	Exceed customer needs and expectations and handle service challenges with a positive mindset. Demonstrate an understanding of the organisation's service vision, mission and values.	Anticipate customer needs and expectations and elicit feedback from customers to improve service. Build relationships with customers to create and sustain customer loyalty.	Model, lead, train and motivate staff with a focus on sustaining a culture that encourages commitment to service excellence and high performance.
Teamwork	Work collaboratively and effectively with others to contribute to group efforts to achieve identified objectives.	Contribute to a positive and cooperative working environment by fulfilling own responsibilities and providing support to co-workers to achieve team goals.	Facilitate work team activities, provide assistance and support needed by team members and promote ownership and commitment among team members to work goals to improve team performance.	Establish teams, design and assess tasks to continually improve team effectiveness and cultivate a sense of organisational ownership and a cooperative working environment.
Transdisciplinary Thinking	Understanding of concepts across multiple disciplines, with the capacity to synthesise the knowledge and insights to guide decisions and foster cooperation.	Research and adapt concepts from outside one's field of expertise to supplement one's core knowledge and proficiency.	Co-relate material from diverse knowledge bases to guide decisions and policy making. Participate in reflective and trans-disciplinary communities within and outside the organisation.	Synthesise knowledge and insights across disciplinary boundaries to aid strategic decisions and foster cooperation within and outside of the organisation.
Virtual Collaboration	Use online collaborative communication tools to work as teams to accomplish tasks or projects.	Participate and contribute in a virtual team. Set up appropriate online collaborative tools and supporting equipment.	Use interactive collaborative tools to foster cohesion and commitment among virtual team members to achieve goals. Keep up-to-date with innovative online collaborative tools and applications to enhance one's proficiency in engaging in virtual collaboration.	Leverage on diverse team talent, latest online collaborative technologies and virtual platforms to produce collaborative behaviour and achieve technological savviness in virtual collaboration.

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BP Singapore Pte Ltd	Mitsui Phenols Singapore Pte Ltd
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Clariant (Singapore) Pte. Ltd.	Shell Eastern Petroleum (Pte Ltd)
Coim Asia Pacific Pte Ltd	SI Group - Singapore Pte Ltd
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Denka Singapore Pte Ltd	Singapore Refining Company Private Limited
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Wage Information

MONTHLY GROSS WAGES OF SELECTED OCCUPATIONS IN MANUFACTURING, JUNE 2016

Occupations	Gross Wage	
	25th Percentile (\$)	75th Percentile (\$)
Chief Operating Officer/General Manager	8,357	18,810
Managing Director/Chief Executive Officer	5,000	15,000
Manufacturing Plant/Production Manager	5,477	10,100
Procurement/Purchasing Manager	5,682	10,356
Quality Assurance Manager	5,850	10,900
Research and Development Manager	6,915	11,815
Technical/Engineering Services Manager (e.g. Shipyard Manager)	6,341	11,067
Chemical Engineer	4,050	6,239
Chemist	4,095	6,272
Electrical Engineer	3,987	6,156
Industrial and Production Engineer	4,200	6,350
Mechanical Engineer	4,070	6,068
Technical Sales Professional	3,500	5,270
Chemical Engineering Technician	3,028	5,466
Chemistry Technician	2,519	3,985
Electrical Engineering Technician	2,878	5,000
Human Resource Associate Professional	3,089	4,741
Manufacturing Engineering Technician	2,859	4,320
Mechanical Engineering Technician	3,001	4,425
Chemical Processing and Chemical Products Plant and Machine Operator	2,440	4,150

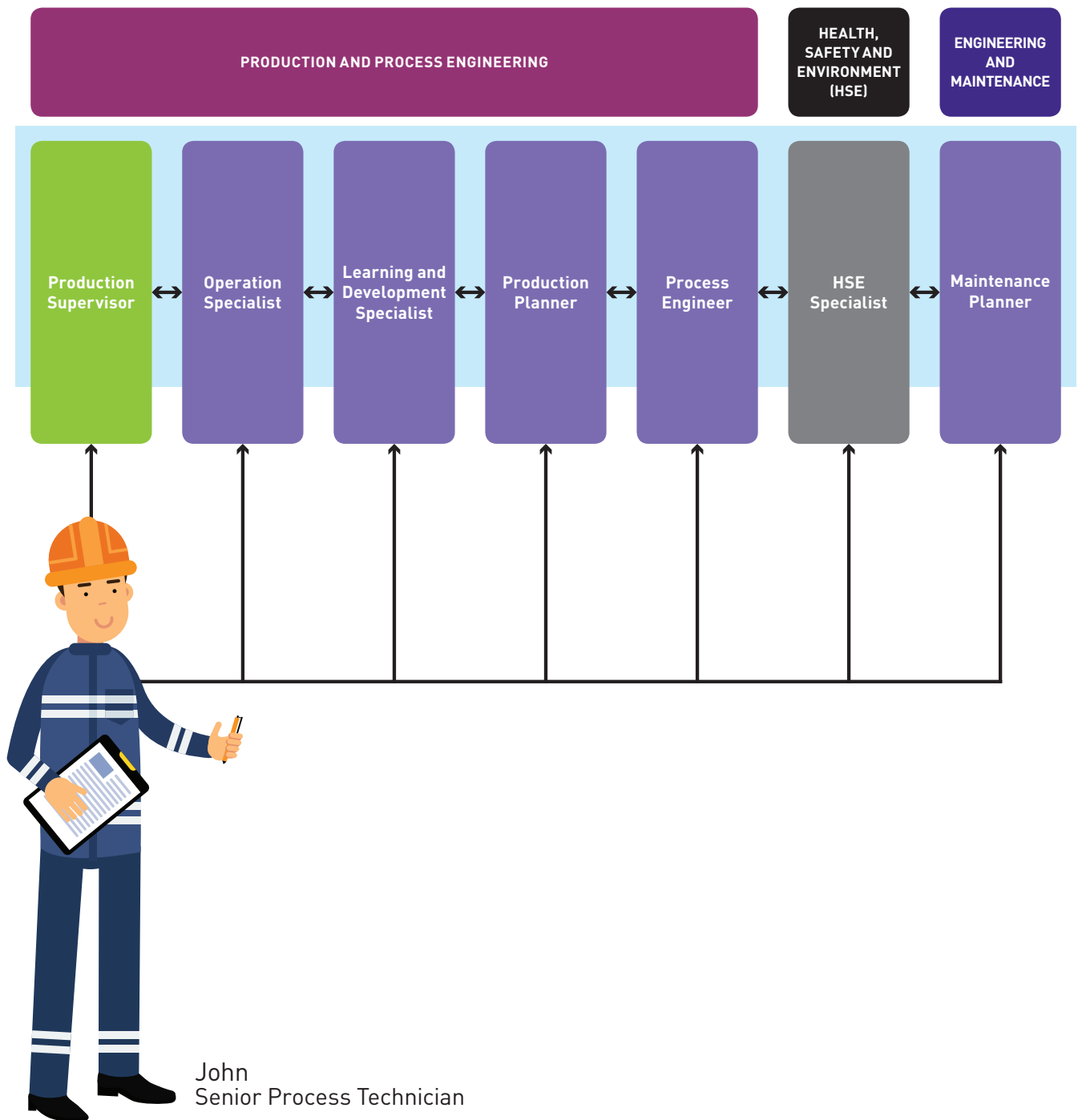
Source: Occupational Wage Survey, Manpower Research & Statistics Department, Ministry of Manpower

Notes:

- 1) Data pertain to full-time resident employees in the private sector establishments each with at least 25 employees.
- 2) Monthly Gross Wage refers to the sum of the basic wage, overtime payments, commissions, allowances, and other regular cash payments. It is before deduction of employee CPF contributions and personal income tax and excludes employer CPF contributions, bonuses, stock options, other lump sum payments and payments-in-kind.
- 3) 25th Percentile Wage refers to the wage level which divides the bottom 25% of wage earners from the rest.
- 4) 75th Percentile Wage refers to the wage level which divides the top 25% of wage earners from the rest.

Illustration of Vertical and Lateral Progression of a Senior Process Technician

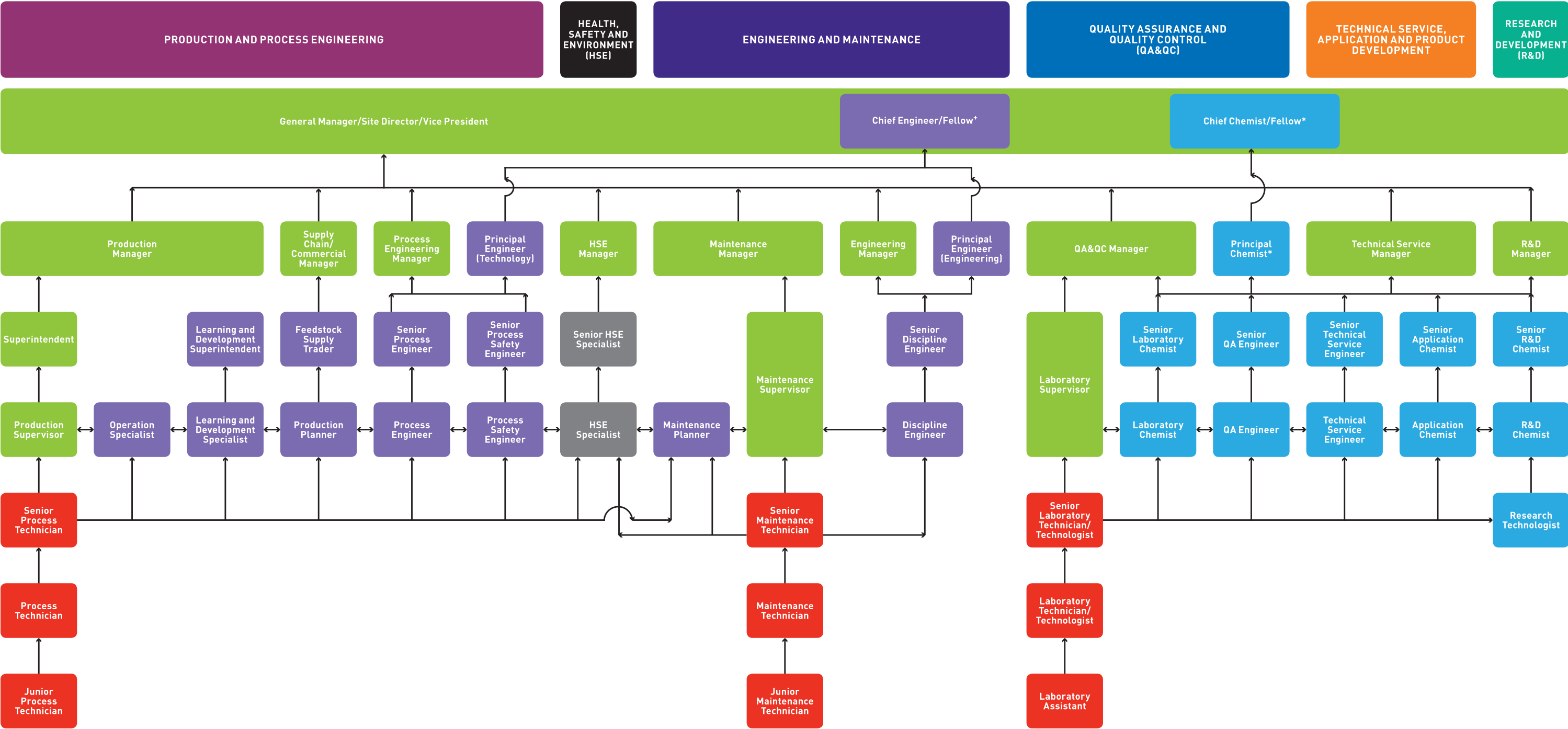
This illustration depicts the possibility of the Senior Process Technician to move into any of the roles indicated. Progression in the Energy and Chemicals sector does not only occur vertically, it can occur laterally as well. This opens up a wide range of opportunities for those pursuing a fruitful career in Energy and Chemicals.



Note: The career pathway would depend on individual performance, capability (skills and competencies), experience, aspiration and company needs.

SKILLS FRAMEWORK FOR ENERGY AND CHEMICALS

Career Pathways



The Career Map serves as a reference to reflect the available job roles and possible career pathways in the Energy and Chemicals sector, which may vary depending on each company's structure and business context. The career progression pathways would depend on individual performance, capability, experience, aspiration, as well as company needs.

Legend:

→ Lateral Progression within the same functional track and/or cross-functional tracks

↑ Vertical Progression

Legend:

- Red: Represents Technicians
- Purple: Represents Engineers and Technical Professionals
- Grey: Represents Health, Safety and Environment (HSE) Specialists
- Green: Represents Managers and Functional Leaders
- Blue: Represents Chemists

*The Principal Chemist and Chief Chemist/Fellow job roles are applicable to the QA&QC, Technical Service, Application and Product Development, and R&D tracks.
+ The Chief Engineer/Fellow job role is applicable to the Production and Process Engineering and Engineering and Maintenance tracks.

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