Qualification Pack

Green Hydrogen Tank Farm Manager

QP Code: LSC/Q3904

Version: 1.0

NSQF Level: 6

Logistics Sector Skill Council || No. 480 A, 7th Floor, Khivraj Complex II, Anna Salai, Nandanam
Chennai-600035 || email:hari@lsc-india.com

Contents

Qualification Pack

LSC/Q3904: Green Hydrogen Tank Farm Manager

Brief Job Description

The individual manages one or more Green Hydrogen tank farms, monitors overall operations, maintenance and coordinates with stakeholders. She/he is also responsible for the safety and security of the storage of liquid Green Hydrogen and the infrastructure of the tank farm. The individual ensures compliance with all protocols and restrictions for handling GH2.

Personal Attributes

The job holder should be medically and physically fit to operate in liquid terminals and Green Hydrogen Tank Farm. She/he should be observant and diligent in monitoring operations and performance. She/he should have analytical, organizational and leadership traits to prepare forecasts, budgets and schedules and implement them.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. LSC/N3919: Assist in GH2 tank farm planning
2. LSC/N3920: Support in commissioning of GH2 tank farm
3. LSC/N3921: Ensure compliance for the storage and handling of green hydrogen
4. LSC/N3922: Analyze trends, prepare forecasts and schedules for the movement of GH2
5. LSC/N3923: Conduct periodic operational and tank farm inspections
6. LSC/N3924: Follow Safety and Security Guidelines for Green Hydrogen Tank Farms
7. LSC/N3925: Respond to Emergencies, Disasters and Pollution Control at Green Hydrogen Tank Farms
8. DGT/VSQ/N0102: Employability Skills (60 Hours)

Qualification Pack (QP) Parameters

Sector	Logistics
Sub-Sector	Port Terminals, ICD and CFS, Liquid Logistics

Qualification Pack

Occupation	Green Hydrogen Operations/ Handling, Port Operations Coordination, Documentation and Reporting, Engineering/Maintenance
Country	India
NSQF Level	6
Credits	20
Aligned to NCO/ISCO/ISIC Code	NCO-2015/1324
Minimum Educational Qualification & Experience	Completed 4 year UG program (Petrochemical Engineering/ Chemical Engineering) with 3 Years of experience in handling DG/ Chemicals OR Completed 3 year UG degree (Chemistry) with 4 Years of experience in handling DG/ Chemicals OR 2-year Diploma after 12th grade (in any field) (Petrochemical/ Chemical Engineering) with 5 Years of experience in handling DG/ Chemicals OR Completed 3 year diploma after 10th (Petrochemical/Chemical Engineering) with 7 Years of experience in handling DG/ Chemicals OR Previous relevant Qualification of NSQF Level (5) with 3 Years of experience in handling DG/ Chemicals
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	25 Years
Last Reviewed On	NA
Next Review Date	30/04/2027
NSQC Approval Date	30/04/2024
Version	1.0
Reference code on NQR	QG-06-TW-02476-2024-V1-LSC
NQR Version	1.0

LSC/N3919: Assist in GH2 tank farm planning

Description

This unit is about planning the requirements of GH2 tank farms, designing the layout and coordinating with EPC contractors.

Scope

The scope covers the following :

- Identify GH2 tank farm requirements
- Coordinate with Engineering Procurement and Construction (EPC) contractors

Elements and Performance Criteria

Identify GH2 tank farm requirements

To be competent, the user/individual on the job must be able to:

PC1. analyze GH2 cargo movement trends and storage capacity in the region to identify demand

PC2. assess possible locations (port terminals, inland units) for setting up tank farms

PC3. evaluate the type and frequency of cargo moved, regulatory requirements, ease of connectivity, availability of skilled resources, cargo offtake possibilities, port and intake connectivity, overall profitability and returns

PC4. finalize the location and type of cargo terminal in discussion with superiors and decision panel of the organization

PC5. finalize the capacity requirement and tank specifications for GH2 storage

PC6. check with relevant ministry for approval and subsidies available for setting up GH2 tank farm

PC7. coordinate with technical team/consultant for preparing the detailed layout and component design, piping layout, IT requirements, and safety compliances

Coordinate with Engineering Procurement and Construction (EPC) contractors

To be competent, the user/individual on the job must be able to:

PC8. release advertisement and invite bids for GH2 tank farm construction and commissioning

PC9. evaluate EPC contractors to finalize the right company for construction and setting the tank terminal

PC10. evaluate Information Technology (IT) vendors, safety system vendors and control system vendors for compliance to requirements and price

PC11. advise the construction contractor on requirements, type of cargo, estimated precautions and IT integration required, etc.

PC12. advice the contractor regarding layout of terminal, different buildings, distance between tanks, evacuation routes, and other safety and regulatory requirements

PC13. ensure depressurization methods of hydrogen storage system - vent stack system etc. are properly installed.

PC14. review progress on installation of tanks, pipelines, loading/unloading terminals, etc. on a regular basis

PC15. supervise integration of IT systems and control systems with tank farm hardware

PC16. escalate any delays in construction/ system integration and take corrective/preventive actions

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. properties and characteristics of Green Hydrogen

KU2. the applications of Green hydrogen in industry, transport and power production

KU3. organizational procedures and Standard Operating Procedures (SOPs) for tasks at hand, documentation policy and emergency responses

KU4. security and safety procedures to be followed

KU5. reporting structure of the organization and the supplier for escalation of issues

KU6. risk and impact of not following defined procedures/work instructions

KU7. coding system followed for different type of liquids and their distress codes

KU8. different type of cargo, their classification A, B, C and their handling procedure and precautions

KU9. SOPs for different operations, Petro-chemical standards International Electrotechnical Commission (IEC) 61511, IEC 61508, American Petroleum Institute (API) 2350, National Fire Protection Association (NFPA), Oil industry safety directorate guidelines and various committee recommendations

KU10. different regulatory authorities, Partnering Government Agencies (PGAs), stakeholders involved

KU11. regulatory requirements with respect to cargo handling and terminal layout

KU12. using fire extinguisher and protocols for emergencies

KU13. documentation requirement for different type of cargo, equipment and their handling

KU14. handling and emergency procedures for hazardous cargo

KU15. coordination with related stakeholders

KU16. documents and certificates to be verified in case of transports both trucks and wagons

KU17. bid evaluation and vendor management

KU18. government and regulatory requirement of green hydrogen business space

KU19. risk associated with green hydrogen business landscape

KU20. legislative, organizational, site requirements and related technical procedures for GH2

KU21. National Green Hydrogen policy and corresponding incentives/subsidies available and procedures for availing the same

KU22. government/corporate policies and guidelines on: workplace safety, identification and mitigation of safety hazards, work procedures and SOPs on green hydrogen storage

KU23. the different methods of H2 storage (single vessel/multi cylinder cascade/portable storage/ tube-trailers etc. and how these systems are set up

KU24. type I/II/III/IV cylinders and difference in setting up method.

KU25. mechanical and electrical testing equipment and their functioning

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. written instructions
GS2. design documents, layouts, plans, presentations, reports
GS3. perform SWOT analysis for outlining key business opportunities in the GH2 value chain
GS4. take decision with systematic course of actions and/or response
GS5. read and interpret various electrical codes, data sheet, safety features etc. relevant to GH2
GS6. ERP and computer generated reports
GS7. terminal layout and storage plans
GS8. SOPs and safety regulation and compliance manuals
GS9. work-orders, bid evaluation reports, instructions, etc.
GS10. various reports and letters
GS11. communicate with supply chain specialists, freight operators, EPC, senior management and port authorities
GS12. communicate with regulatory authorities and PGAs
GS13. decide on capacity, cargo type and location for tank farms
GS14. decide on suitable EPC for commissioning
GS15. decide if the project is ready for commissioning
GS16. plan and estimate the co-ordination required for resolving a query
GS17. maintain punctuality and respond n a timely manner
GS18. prioritize and execute tasks based on client requirements
GS19. be a team player and achieve joint goals
GS20. adhere to assigned timelines and compliance requirements
GS21. address the customer requirement when designing tank farms
GS22. co-ordinate and handle major issues with different departments for smooth construction and compliances
GS23. provide suggestions for meeting compliance in different activities
GS24. analyze trends to identify tank farm requirements
GS25. review layout plans to ensure it meets compliance
GS26. conduct correct estimate of forecasts to identify the right location and capacity considering business profitability
GS27. ensure compliance in designing and layout

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Identify GH2 tank farm requirements	**13**	**26**	**-**	**5**
PC1. analyze GH2 cargo movement trends and storage capacity in the region to identify demand	1	4	-	1
PC2. assess possible locations (port terminals, inland units) for setting up tank farms	2	3	-	1
PC3. evaluate the type and frequency of cargo moved, regulatory requirements, ease of connectivity, availability of skilled resources, cargo offtake possibilities, port and intake connectivity, overall profitability and returns	2	4	-	1
PC4. finalize the location and type of cargo terminal in discussion with superiors and decision panel of the organization	2	3	-	-
PC5. finalize the capacity requirement and tank specifications for GH2 storage	2	4	-	-
PC6. check with relevant ministry for approval and subsidies available for setting up GH2 tank farm	2	4	-	1
PC7. coordinate with technical team/consultant for preparing the detailed layout and component design, piping layout, IT requirements, and safety compliances	1	4	-	1
Coordinate with Engineering Procurement and Construction (EPC) contractors	**17**	**34**	**-**	**5**
PC8. release advertisement and invite bids for GH2 tank farm construction and commissioning	2	4	-	-
PC9. evaluate EPC contractors to finalize the right company for construction and setting the tank terminal	2	4	-	1
PC10. evaluate Information Technology (IT) vendors, safety system vendors and control system vendors for compliance to requirements and price	2	4	-	1
PC11. advise the construction contractor on requirements, type of cargo, estimated precautions and IT integration required, etc.	2	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. advice the contractor regarding layout of terminal, different buildings, distance between tanks, evacuation routes, and other safety and regulatory requirements	1	3	-	-
PC13. ensure depressurization methods of hydrogen storage system - vent stack system etc. are properly installed.	2	4	-	1
PC14. review progress on installation of tanks, pipelines, loading/unloading terminals, etc. on a regular basis	2	4	-	1
PC15. supervise integration of IT systems and control systems with tank farm hardware	2	4	-	1
PC16. escalate any delays in construction/ system integration and take corrective/preventive actions	2	4	-	-
NOS Total	**30**	**60**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	LSC/N3919
NOS Name	Assist in GH2 tank farm planning
Sector	Logistics
Sub-Sector	Port Terminals, ICD and CFS, Liquid Logistics
Occupation	Green Hydrogen Operations/ Handling, Port Operations Coordination, Documentation and Reporting, Engineering/Maintenance
NSQF Level	6
Credits	2
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024

LSC/N3920: Support in commissioning of GH2 tank farm

Description

This unit is about implementing safety and security features and assisting in the commissioning of the GH2 tank farm.

Scope

The scope covers the following :

- Implement safety and security features
- Assist in commissioning of the terminal

Elements and Performance Criteria

Implement safety and security features

To be competent, the user/individual on the job must be able to:

PC1. use pressure relief valves and automatic shut-off mechanisms to prevent the uncontrolled release of hydrogen

PC2. utilize oil-free equipment compatible with pure oxygen to avoid combustion risks

PC3. choose electrical equipment rated for zone 0 or zone 1 depending on the potential hydrogen concentration and risk of spark ignition

PC4. set up intrinsically safe tools and components that eliminate the risk of sparking, such as sealed switches, capacitors, and motors

PC5. implement various control measures, such as pressure relief valves, explosion suppression systems, leak detection systems, interlocks and automated safety systems

PC6. install various hydrogen flame detection methods, such as Ultraviolet (UV) Flame Detectors, Infrared (IR) Flame Detectors, Multi-spectrum Detectors, Video Image Flame Detectors (VIFDs), etc.

PC7. use sensors that can alert the responsible person such as a safety officer when storage rooms are not maintaining the ideal conditions for storing hazardous chemicals

Assist in commissioning of the terminal

To be competent, the user/individual on the job must be able to:

PC8. follow green hydrogen system installation, testing and commissioning checklist

PC9. check the terminal for adherence to the designed plans, layout, software requirements etc.

PC10. perform pre-commissioning tests/ downstream considerations including hydrogen purity & pressure test, to detect leakage, compressor assembly operational and performance test, safety test

PC11. check the tank farm for adherence to various regulations and mandatory compliances required

PC12. use checklists for commissioning of each hydrogen system / equipment / machinery / piping as per OEM recommendation

PC13. perform pre-operative tests of tanks, pipelines, valves, regulators, control systems, fire safety equipment, alarms etc.

PC14. ensure all the equipment and control systems clear the pre-operative tests as per guidelines and regulations, else take corrective actions

PC15. perform trial run and pre -commissioning tests in accordance with the applicable norms/ statutory requirement/ regulatory standards

PC16. provide final go-ahead for commissioning once the components are fully tested and required approvals are received

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. properties and characteristics of Green Hydrogen

KU2. the applications of Green hydrogen in industry, transport and power production

KU3. organizational procedures and Standard Operating Procedures (SOPs) for tasks at hand, documentation policy and emergency responses

KU4. security and safety procedures to be followed

KU5. reporting structure of the organization and the supplier for escalation of issues

KU6. risk and impact of not following defined procedures/work instructions

KU7. coding system followed for different type of liquids and their distress codes

KU8. different type of cargo, their classification A, B, C and their handling procedure and precautions

KU9. SOPs for different operations, petro-chemical standards International Electrotechnical Commission (IEC) 61511, IEC 61508, American Petroleum Institute (API) 2350, National Fire Protection Association (NFPA), Oil industry safety directorate guidelines and various committee recommendations

KU10. different regulatory authorities, Partnering Government Agencies (PGAs), stakeholders involved

KU11. regulatory requirements with respect to cargo handling and terminal layout

KU12. using fire extinguisher and protocols for emergencies

KU13. documentation requirement for different type of cargo, equipment and their handling

KU14. handling and emergency procedures for hazardous cargo

KU15. coordination with related stakeholders

KU16. documents and certificates to be verified in case of transports both trucks and wagons

KU17. bid evaluation and vendor management

KU18. government and regulatory requirement of green hydrogen business space

KU19. risk associated with green hydrogen business landscape

KU20. legislative, organizational, site requirements and related technical procedures for GH2

KU21. National Green Hydrogen policy and corresponding incentives/subsidies available and procedures for availing the same

KU22. government/corporate policies and guidelines on: workplace safety, identification and mitigation of safety hazards, work procedures and SOPs on green hydrogen storage

KU23. the different methods of H2 storage (single vessel/multi cylinder cascade/portable storage/ tube-trailers etc and how these systems are set up

KU24. type I/II/III/IV cylinders and difference in setting up method
KU25. mechanical and electrical testing equipment and their functioning

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. written instructions
GS2. design documents, layouts, plans, presentations, reports
GS3. perform SWOT analysis for outlining key business opportunities in the GH2 value chain
GS4. take decision with systematic course of actions and/or response
GS5. read and interpret various electrical codes, data sheet, safety features etc. relevant to GH2
GS6. ERP and computer generated reports
GS7. terminal layout and storage plans
GS8. SOPs and safety regulation and compliance manuals
GS9. work-orders, bid evaluation reports, instructions, etc.
GS10. various reports and letters
GS11. communicate with supply chain specialists, freight operators, EPC, senior management and port authorities
GS12. communicate with regulatory authorities and PGAs
GS13. decide on capacity, cargo type and location for tank farms
GS14. decide on suitable EPC for commissioning
GS15. decide if the project is ready for commissioning
GS16. plan and estimate the co-ordination required for resolving a query
GS17. maintain punctuality and respond n a timely manner
GS18. prioritize and execute tasks based on client requirements
GS19. be a team player and achieve joint goals
GS20. adhere to assigned timelines and compliance requirements
GS21. address the customer requirement when designing tank farms
GS22. co-ordinate and handle major issues with different departments for smooth construction and compliances
GS23. provide suggestions for meeting compliance in different activities
GS24. analyze trends to identify tank farm requirements
GS25. review layout plans to ensure it meets compliance
GS26. conduct correct estimate of forecasts to identify the right location and capacity considering business ensure compliance in designing and layout profitability
GS27. ensure compliance in designing and layout

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Implement safety and security features	**12**	**26**	**-**	**5**
PC1. use pressure relief valves and automatic shut-off mechanisms to prevent the uncontrolled release of hydrogen	1	3	-	-
PC2. utilize oil-free equipment compatible with pure oxygen to avoid combustion risks	2	4	-	1
PC3. choose electrical equipment rated for zone 0 or zone 1 depending on the potential hydrogen concentration and risk of spark ignition	1	3	-	-
PC4. set up intrinsically safe tools and components that eliminate the risk of sparking, such as sealed switches, capacitors, and motors	2	4	-	1
PC5. implement various control measures, such as pressure relief valves, explosion suppression systems, leak detection systems, interlocks and automated safety systems	2	4	-	1
PC6. install various hydrogen flame detection methods, such as Ultraviolet (UV) Flame Detectors, Infrared (IR) Flame Detectors, Multi-spectrum Detectors, Video Image Flame Detectors (VIFDs), etc.	2	4	-	1
PC7. use sensors that can alert the responsible person such as a safety officer when storage rooms are not maintaining the ideal conditions for storing hazardous chemicals	2	4	-	1
Assist in commissioning of the terminal	**18**	**34**	**-**	**5**
PC8. follow green hydrogen system installation, testing and commissioning checklist	2	4	-	-
PC9. check the terminal for adherence to the designed plans, layout, software requirements etc.	2	3	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. perform pre-commissioning tests/ downstream considerations including hydrogen purity & pressure test, to detect leakage, compressor assembly operational and performance test, safety test	2	4	-	-
PC11. check the tank farm for adherence to various regulations and mandatory compliances required	2	3	-	1
PC12. use checklists for commissioning of each hydrogen system / equipment / machinery / piping as per OEM recommendation	2	4	-	-
PC13. perform pre-operative tests of tanks, pipelines, valves, regulators, control systems, fire safety equipment, alarms etc.	2	4	-	1
PC14. ensure all the equipment and control systems clear the pre-operative tests as per guidelines and regulations, else take corrective actions	2	4	-	1
PC15. perform trial run and pre -commissioning tests in accordance with the applicable norms/ statutory requirement/ regulatory standards	2	4	-	1
PC16. provide final go-ahead for commissioning once the components are fully tested and required approvals are received	2	4	-	1
NOS Total	**30**	**60**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	LSC/N3920
NOS Name	Support in commissioning of GH2 tank farm
Sector	Logistics
Sub-Sector	Port Terminals, ICD and CFS, Liquid Logistics
Occupation	Green Hydrogen Operations/ Handling, Port Operations Coordination, Documentation and Reporting, Engineering/Maintenance
NSQF Level	6
Credits	3
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024

LSC/N3921: Ensure compliance for the storage and handling of green hydrogen

Description

This unit is about reviewing port, cargo documentation, stakeholder coordination and regulatory compliances for the storage and handling of green hydrogen.

Scope

The scope covers the following :

- Review cargo and compliance documentation
- Coordinate with stakeholders
- Ensure compliance with legal and regulatory requirements

Elements and Performance Criteria

Review cargo and compliance documentation

To be competent, the user/individual on the job must be able to:

PC1. coordinate with shipping lines, vessels, freight transporters, importers and exporters and the port authorities to obtain requisite cargo documents

PC2. review documentation of transport vehicles, including their certificates for fitness for operation, availability of a requisite license for carrying GH2, etc.

PC3. review cargo documents like bills of lading, shipping bills, Participating Government Agencies (PGA) clearances, etc., for compliance with regulations and standards

PC4. review fitness certificates and related documents of Material Handling Equipment (MHEs), cranes and terminal equipment

PC5. check for fitness and functionality of disaster response equipment and systems

PC6. prepare compliance and fitness reports as per regulatory requirements regarding tank farm layout, disaster response, fitness of equipment, etc.

PC7. maintain accurate records of equipment calibration, maintenance activities, and performance data

Coordinate with stakeholders

To be competent, the user/individual on the job must be able to:

PC8. respond to and resolve queries raised by port and customs authorities, custom brokers, shipping liners, clients, and transporters regarding the status of different shipments

PC9. coordinate between the vessel, shipper/ importer/exporter, agents and port authorities to ensure that all compliances and requirements are met

PC10. respond and coordinate with various PGAs and regulatory authorities regarding cargo handling and their specific requirements

PC11. coordinate with port authorities, clients, Partnering Government Agencies (PGAs), etc., for resolving cargo transfers, pending cases, tank repairs, etc.

Ensure compliance with legal and regulatory requirements

To be competent, the user/individual on the job must be able to:

PC12. ensure periodic training and fitness of disaster response team

PC13. review evacuation and first response protocol to be followed in case of pollution and disasters

PC14. monitor compliance with local, country and international laws and processes on a regular basis

PC15. monitor compliance with respect to cargo handling and storage norms, particularly for hazardous cargo and GH2

PC16. identify areas of non-compliance, and implement policies for compliances

PC17. conduct inspections to check compliance with Standard Operating Procedures (SOPs) and regulations

PC18. conduct Mock testing of fire fighting system

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organizational procedures and SOPs for tasks at hand, documentation policy and emergency responses

KU2. security and safety procedures to be followed

KU3. reporting structure of the organization and the supplier for escalation of issues

KU4. risk and impact of not following defined procedures/work instructions

KU5. coding system followed for different types of liquids and their distress codes

KU6. different kinds of cargo, their classification A, B, C and their handling procedure and precautions

KU7. SOPs for different operations, Petro-chemical standards International Electrotechnical Commission (IEC) 61511, IEC 61508, American Petroleum Institute (API) 2350, National Fire Protection Association (NFPA), Oil industry safety directorate guidelines, International Maritime Dangerous Goods (IMDG), Hazardous Chemicals (HAZCHEM) guidelines and various committee recommendations

KU8. different regulatory authorities, PGAs, and stakeholders involved

KU9. regulatory requirements with respect to cargo handling and terminal layout

KU10. using fire extinguisher and protocols for emergencies

KU11. documentation requirement for different types of cargo, equipment and their handling

KU12. handling and emergency procedures for hazardous cargo

KU13. coordination with related stakeholders

KU14. documents and certificates to be verified in case of transports, both trucks and wagons

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. interpreting shipping manifest, bill of lading, shipping bills and related documents

GS2. operating Enterprise resource planning (ERP) and computer-generated reports

GS3. terminal layout and storage plans

GS4. SOPs and safety regulations, compliance manuals and reports
GS5. work-orders and instructions
GS6. various reports and letters
GS7. communicate with customers, freight operators, transporters, shipping companies, other supervisors and port authorities
GS8. communicate with regulatory authorities and PGAs
GS9. check if the cargo, equipment, and layout meet compliance
GS10. decide on the appropriate response and documentation of different queries and events
GS11. plan and estimate the coordination required for resolving a query
GS12. maintain punctuality and respond in a timely manner
GS13. prioritize and execute tasks based on client requirements
GS14. make work plans and resource allocation plans
GS15. make checks on the execution of work plans
GS16. be a team player and achieve joint goals
GS17. adhere to assigned timelines and compliance requirements
GS18. address the urgency regarding various documentation and compliance requests
GS19. identify trends/common mistakes in compliance with a procedure and its documentation
GS20. co-ordinate and handle major issues with different departments
GS21. provide suggestions for meeting compliance in different activities
GS22. anticipate compliance requirements for different activities
GS23. review layout plans to ensure storage plan meets compliance
GS24. ensure compliance in all documentation and operations
GS25. check that all security measures and safety protocols are followed at all times

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Review cargo and compliance documentation	**8**	**22**	**-**	**4**
PC1. coordinate with shipping lines, vessels, freight transporters, importers and exporters and the port authorities to obtain requisite cargo documents	1	3	-	-
PC2. review documentation of transport vehicles, including their certificates for fitness for operation, availability of a requisite license for carrying GH2, etc.	1	3	-	1
PC3. review cargo documents like bills of lading, shipping bills, Participating Government Agencies (PGA) clearances, etc., for compliance with regulations and standards	1	3	-	1
PC4. review fitness certificates and related documents of Material Handling Equipment (MHEs), cranes and terminal equipment	1	3	-	-
PC5. check for fitness and functionality of disaster response equipment and systems	1	3	-	-
PC6. prepare compliance and fitness reports as per regulatory requirements regarding tank farm layout, disaster response, fitness of equipment, etc.	2	4	-	1
PC7. maintain accurate records of equipment calibration, maintenance activities, and performance data	1	3	-	1
Coordinate with stakeholders	**8**	**14**	**-**	**3**
PC8. respond to and resolve queries raised by port and customs authorities, custom brokers, shipping liners, clients, and transporters regarding the status of different shipments	2	3	-	1
PC9. coordinate between the vessel, shipper/ importer/exporter, agents and port authorities to ensure that all compliances and requirements are met	2	4	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. respond and coordinate with various PGAs and regulatory authorities regarding cargo handling and their specific requirements	2	3	-	1
PC11. coordinate with port authorities, clients, Partnering Government Agencies (PGAs), etc., for resolving cargo transfers, pending cases, tank repairs, etc.	2	4	-	-
Ensure compliance with legal and regulatory requirements	**14**	**24**	**-**	**3**
PC12. ensure periodic training and fitness of disaster response team	2	3	-	-
PC13. review evacuation and first response protocol to be followed in case of pollution and disasters	2	4	-	-
PC14. monitor compliance with local, country and international laws and processes on a regular basis	2	3	-	1
PC15. monitor compliance with respect to cargo handling and storage norms, particularly for hazardous cargo and GH2	2	3	-	-
PC16. identify areas of non-compliance, and implement policies for compliances	2	3	-	1
PC17. conduct inspections to check compliance with Standard Operating Procedures (SOPs) and regulations	2	4	-	1
PC18. conduct Mock testing of fire fighting system	2	4	-	-
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	LSC/N3921
NOS Name	Ensure compliance for the storage and handling of green hydrogen
Sector	Logistics
Sub-Sector	Port Terminals, ICD and CFS, Liquid Logistics
Occupation	Green Hydrogen Operations/ Handling, Port Operations Coordination, Documentation and Reporting, Engineering/Maintenance
NSQF Level	6
Credits	3
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024

LSC/N3922: Analyze trends, prepare forecasts and schedules for the movement of GH2

Description

This unit is about analyzing cargo trends, preparing forecasts and monitoring schedules for movement of GH2.

Scope

The scope covers the following :

- Analyze cargo trends and prepare forecasts and budgets
- Analyze operational trends to estimate maintenance

Elements and Performance Criteria

Analyse cargo trends and prepare forecasts and budgets

To be competent, the user/individual on the job must be able to:

PC1. analyze the historic trends of GH2 handled in the terminal and their frequency of operations

PC2. analyze GH2 ageing in the tank farm, pipeline usage, cleaning frequency, and loss trends

PC3. prepare storage and revenue forecasts and budget for tank farm units

PC4. analyze truck loading/unloading operations and their efficiencies

PC5. estimate average utilization of tank capacities, operational costs, estimated product-wise costs, product loss trends, etc.

PC6. suggest recommendations for increasing utilization of tanks, reducing transactional losses, better monitoring of operational parameters, improving loading/unloading turnaround time, reducing costs, etc.

PC7. set-up consensus meetings with peers and seniors and get their approval on the forecasts and budgets

PC8. review work schedules, resource allocation and make amendments to ensure optimal resource utilization

PC9. make amendments to budgets periodically based on the review of actual performance

PC10. prepare near future forecasts in terms of mix and quantity based on historical analysis and committed GH2 traffic

PC11. estimate resources and budget required for handling the forecasted cargo

PC12. report the analysis and forecast to management for inputs and further analysis

Analyse operational trends to estimate maintenance

To be competent, the user/individual on the job must be able to:

PC13. analyze tank equipment performance in terms of repairs undertaken, time elapsed since last scheduled maintenance, frequency of emergency alarms, component breakdown, cargo loss, rate of corrosion, etc.

PC14. estimate the maintenance requirement and frequency considering performance and frequency of change of cargo

PC15. prepare maintenance schedules based on analysis and implement the same

PC16. prepare analysis reports and submit to management

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organizational procedures and Standard Operating Procedures (SOPs) for tasks at hand, documentation policy and emergency responses

KU2. security and safety procedures to be followed

KU3. reporting structure of the organization and the supplier for escalation of issues

KU4. risk and impact of not following defined procedures/work instructions

KU5. coding system followed for different type of cargo and their distress codes

KU6. different type of cargo, their classification A, B, C and their handling procedure and precautions

KU7. SOPs for different operations, Petro-chemical standards International Electrotechnical Commission (IEC) 61511, IEC 61508, American Petroleum Institute (API) 2350, National Fire Protection Association (NFPA), Oil industry safety directorate guidelines and various committee recommendations

KU8. using fire extinguisher and protocols for emergencies, pollution and leakages

KU9. operations of control systems pumps, valves, alarm systems, etc.

KU10. use of analytical tools, ERPs, software

KU11. understanding of tanks, their life terms, repair and maintenance requirements, etc.

KU12. basic understanding of different tank farm/ liquid terminal operation costs, their norms and estimates

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. information on documents and in ERP

GS2. various cargo labels and requirements

GS3. handling instructions/company log books and records

GS4. SOPs and safety manuals

GS5. reports, presentations, etc.

GS6. written instructions, reports and analysis

GS7. prepare presentations, schedules, forecasts

GS8. communicate clearly with managers, supervisors and other stakeholders

GS9. provide advice and guidance to peers and juniors

GS10. decide on ageing of the cargo

GS11. decide on forecasts of cargo

GS12. decide schedules for maintenance

GS13. clearly coordinate with ground staff for smooth operations

GS14. prioritize and execute tasks within the scheduled time limits
GS15. maintain schedules and punctuality
GS16. be a team player and achieve joint goals
GS17. adhere to the timelines and ensure that they are met
GS18. analyze customer requirements, cargo trends and prepare plans to handle the same
GS19. prepare right budgets to best utilize resources
GS20. identify areas for enhancing productivity and minimizing losses
GS21. analyze cargo trends ageing, frequency, etc.
GS22. analyze maintenance and tank operation trends
GS23. prepare correct estimates for forecasts and budgets
GS24. prepare and strictly implement maintenance schedules
GS25. identify areas for improvement

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Analyse cargo trends and prepare forecasts and budgets	**22**	**45**	**-**	**7**
PC1. analyze the historic trends of GH2 handled in the terminal and their frequency of operations	1	3	-	-
PC2. analyze GH2 ageing in the tank farm, pipeline usage, cleaning frequency, and loss trends	1	4	-	-
PC3. prepare storage and revenue forecasts and budget for tank farm units	2	4	-	1
PC4. analyze truck loading/unloading operations and their efficiencies	2	4	-	-
PC5. estimate average utilization of tank capacities, operational costs, estimated product-wise costs, product loss trends, etc.	2	4	-	1
PC6. suggest recommendations for increasing utilization of tanks, reducing transactional losses, better monitoring of operational parameters, improving loading/unloading turnaround time, reducing costs, etc.	2	3	-	1
PC7. set-up consensus meetings with peers and seniors and get their approval on the forecasts and budgets	2	4	-	1
PC8. review work schedules, resource allocation and make amendments to ensure optimal resource utilization	2	4	-	1
PC9. make amendments to budgets periodically based on the review of actual performance	2	3	-	-
PC10. prepare near future forecasts in terms of mix and quantity based on historical analysis and committed GH2 traffic	2	4	-	-
PC11. estimate resources and budget required for handling the forecasted cargo	2	4	-	1
PC12. report the analysis and forecast to management for inputs and further analysis	2	4	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Analyse operational trends to estimate maintenance	**8**	**15**	**-**	**3**
PC13. analyze tank equipment performance in terms of repairs undertaken, time elapsed since last scheduled maintenance, frequency of emergency alarms, component breakdown, cargo loss, rate of corrosion, etc.	2	4	-	-
PC14. estimate the maintenance requirement and frequency considering performance and frequency of change of cargo	2	4	-	1
PC15. prepare maintenance schedules based on analysis and implement the same	2	4	-	1
PC16. prepare analysis reports and submit to management	2	3	-	1
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	LSC/N3922
NOS Name	Analyze trends, prepare forecasts and schedules for the movement of GH2
Sector	Logistics
Sub-Sector	Port Terminals, ICD and CFS, Liquid Logistics
Occupation	Green Hydrogen Operations/ Handling, Port Operations Coordination, Documentation and Reporting, Engineering/Maintenance
NSQF Level	6
Credits	3
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024

LSC/N3923: Conduct periodic operational and tank farm inspections

Description

This unit is about inspecting the operations and inventory. It also covers conducting periodic inspections on tank farms to ensure compliance and smooth operations.

Scope

The scope covers the following :

- Inspect operations and inventory
- Inspect tank farms

Elements and Performance Criteria

Inspect operations and inventory

To be competent, the user/individual on the job must be able to:

PC1. review performance reports of tank farm equipment, cargo levels, temperature control systems, sensors, tank farm alarms and infrastructure status, utilization status, repair and cargo handling schedules, etc., on the Internet of Things (IoT) system controls

PC2. assess reports of loading, pumping and cleaning and high priority activities performed, inspection, fitness and maintenance reports

PC3. review the recording of different measuring devices in the control room to check that all parameters are under prescribed limits

PC4. inspect whether subordinates follow GH2 protocols and preventive actions such as pressure release, pumping of liquid, etc., in case of any anomaly found in reports

PC5. monitor the inventory report concerning pressure, temperature and cargo levels to check for losses

PC6. take corrective and preventive actions if cargo loss is over the prescribed limits

PC7. inspect compliance with hazardous material handling norms

PC8. estimate loss and submit reports detailing the loss, status of controls and monitoring parameters

PC9. escalate issues to management and external technical support team as and when required

Inspect tank farms

To be competent, the user/individual on the job must be able to:

PC10. conduct periodic visual inspections of tanks and check for corrosion, missing paints, fractures and leakages from welding and drainage, cleanliness, adherence to regulatory and company norms, etc.

PC11. provide instructions for maintenance works like surface painting, cleaning of exteriors, removal of residuals lying outside etc.

PC12. check for safety compliance, cargo storage and handling, use of adequate Personal Protective Equipment (PPEs) including firefighting system, use of FRC (Flame Resistant Clothing) in hydrogen area, resources, fitness of equipment and personnel, etc.

PC13. inspect the emergency pathways and ensure not obstructions, and emergency systems are operational and easily accessible

PC14. check that all pumps and pipelines are functional and free from corrosion

PC15. inspect the depressurization methods of hydrogen storage system - use of water seal or vent stack system

PC16. examine whether the key safety measures are followed at hydrogen compression and storage system by performing periodic/ regular leak testing of hydrogen storage systems using soap solution, carry out gas leak detection & method of placement.

PC17. escalate issues that need external technical repairs and servicing

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organizational procedures and Standard Operating Procedures (SOPs) for tasks at hand, documentation policy and emergency responses

KU2. security and safety procedures to be followed

KU3. reporting structure of the organization and the supplier for escalation of issues

KU4. risk and impact of not following defined procedures/work instructions

KU5. coding system followed for different type of liquids and their distress codes

KU6. different type of cargo, their classification A, B, C and their handling procedure and precautions

KU7. SOPs for different operations, Petro-chemical standards International Electrotechnical Commission (IEC) 61511, IEC 61508, American Petroleum Institute (API) 2350, National Fire Protection Association (NFPA), Oil industry safety directorate guidelines and various committee recommendations

KU8. using fire extinguisher and protocols for emergencies

KU9. operations of control systems, pumps, valves, alarm systems, etc.

KU10. documentation requirement for different type of cargo and their handling

KU11. handling and emergency procedures for hazardous cargo

KU12. current events regarding liquid tank farms happening across the world including new technologies and best practices

KU13. various common mistakes and precautions to be taken in tank farms

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. written instructions

GS2. Enterprise resource planning (ERP) alarms, gauges and meters, message and notification, daily reports

GS3. inspection checklists

GS4. monitoring and inspection reports

GS5. communicate with supervisors, ground workforce, pumping attendants, transport operators

GS6. coordinate with local authorities, external support agencies
GS7. identify anomaly in operations
GS8. identify damage or abnormalities in tank structure
GS9. decide on need for servicing, repair and training
GS10. plan and coordinate between teams to achieve joint goals
GS11. maintain punctuality and respond in a timely manner
GS12. prioritize and execute tasks based on checklist and priority requirements
GS13. check completion of an activity
GS14. adhere to the assigned timelines
GS15. address the urgency regarding cargo and emergencies
GS16. anticipate need for repair or maintenance in tanks
GS17. anticipate additional precautions to be taken for different operations
GS18. coordinate with manager, external stakeholders to quickly address issues
GS19. analyze trends of cargo level, alarms, servicing requirement, etc. to draw inferences and future requirements
GS20. analyze trend of type of cargo stored to understand future requirement
GS21. estimate ageing of cargo and periodic requirement for tank maintenance
GS22. anticipate and identify hazardous situations and take necessary precautions
GS23. raise alarm and quick emergency response in case of hazards and accidents
GS24. monitor inventory to track losses, theft, etc.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Inspect operations and inventory	**14**	**31**	**-**	**5**
PC1. review performance reports of tank farm equipment, cargo levels, temperature control systems, sensors, tank farm alarms and infrastructure status, utilization status, repair and cargo handling schedules, etc., on the Internet of Things (IoT) system controls	1	4	-	-
PC2. assess reports of loading, pumping and cleaning and high priority activities performed, inspection, fitness and maintenance reports	2	3	-	-
PC3. review the recording of different measuring devices in the control room to check that all parameters are under prescribed limits	1	3	-	-
PC4. inspect whether subordinates follow GH2 protocols and preventive actions such as pressure release, pumping of liquid, etc., in case of any anomaly found in reports	2	4	-	1
PC5. monitor the inventory report concerning pressure, temperature and cargo levels to check for losses	1	3	-	1
PC6. take corrective and preventive actions if cargo loss is over the prescribed limits	1	4	-	-
PC7. inspect compliance with hazardous material handling norms	2	3	-	1
PC8. estimate loss and submit reports detailing the loss, status of controls and monitoring parameters	2	3	-	1
PC9. escalate issues to management and external technical support team as and when required	2	4	-	1
Inspect tank farms	**16**	**29**	**-**	**5**
PC10. conduct periodic visual inspections of tanks and check for corrosion, missing paints, fractures and leakages from welding and drainage, cleanliness, adherence to regulatory and company norms, etc.	2	3	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. provide instructions for maintenance works like surface painting, cleaning of exteriors, removal of residuals lying outside etc.	2	4	-	-
PC12. check for safety compliance, cargo storage and handling, use of adequate Personal Protective Equipment (PPEs) including firefighting system, use of FRC (Flame Resistant Clothing) in hydrogen area, resources, fitness of equipment and personnel, etc.	2	3	-	-
PC13. inspect the emergency pathways and ensure not obstructions, and emergency systems are operational and easily accessible	2	4	-	1
PC14. check that all pumps and pipelines are functional and free from corrosion	2	3	-	-
PC15. inspect the depressurization methods of hydrogen storage system - use of water seal or vent stack system	2	4	-	1
PC16. examine whether the key safety measures are followed at hydrogen compression and storage system by performing periodic/ regular leak testing of hydrogen storage systems using soap solution, carry out gas leak detection & method of placement.	2	4	-	1
PC17. escalate issues that need external technical repairs and servicing	2	4	-	1
NOS Total	**30**	**60**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	LSC/N3923
NOS Name	Conduct periodic operational and tank farm inspections
Sector	Logistics
Sub-Sector	Port Terminals, ICD and CFS, Liquid Logistics
Occupation	Green Hydrogen Operations/ Handling, Port Operations Coordination, Documentation and Reporting, Engineering/Maintenance
NSQF Level	6
Credits	2
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024

LSC/N3924: Follow Safety and Security Guidelines for Green Hydrogen Tank Farms

Description

This unit is about maintaining equipment performance, adhering to regulation and safety standards at the green hydrogen tank farm.

Scope

The scope covers the following :

- Compliance with GH2 regulations and standards
- Safety procedure and First aid

Elements and Performance Criteria

Compliance with GH2 Regulations and Standards

To be competent, the user/individual on the job must be able to:

PC1. stay informed about the latest regulations related to hydrogen production, storage and refuelling

PC2. keep away any ignition sources from hydrogen storage areas and maintain a strict no-smoking policy within this zone

PC3. ensure hazardous areas and equipment are clearly marked with appropriate signage and warnings

PC4. use specialized Personal Protective Equipment (PPE) for working in a hydrogen environment, such as flame-resistant suits made from non-static material, goggles and face shields to protect against pressure-driven debris, gloves (neoprene or nitrile), safety boots, respirators and hearing protection for noisy areas

PC5. always wear appropriate cryogenic protective clothing, gloves and equipment when handling liquid hydrogen

PC6. report any non-compliance issues promptly to relevant personnel

PC7. liaise with regulatory authorities during inspections and audits

PC8. prepare written accident/incident report and share with the concerned officer/department

PC9. inform fire safety department about any near-miss incidents in the work place

Safety Procedures and First Aid

To be competent, the user/individual on the job must be able to:

PC10. adhere to safety protocols when using materials, tools, and equipment for handling GH2

PC11. refer to relevant safety standards and guidelines like IEC 61508, NFPA 2, and industry best practices for identifying hydrogen process hazards

PC12. vent hydrogen to a safe, designated area well away from ignition sources, using a dedicated vent stack designed for high-pressure hydrogen release

PC13. dilute oxygen with an inert gas like nitrogen before venting to decrease its concentration and mitigate fire risks

PC14. check that pathways/ emergency escape routes are clear and free from grease/ oil and ensure good housekeeping practices

PC15. maintain ideal temperature and humidity level of storage areas used to safely contain gas cylinders and follow infection control guidelines

PC16. follow first aid instructions according to the type of injury/ incident

PC17. move yourself or the injured person away from the source of the cryogenic liquid or gas to stop further exposure

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. principles of hydrogen storage, and dispensing equipment

KU2. safety protocols and regulations governing the operation and storage of hydrogen

KU3. hydrogen fire, cryogenic temperatures and high-pressure systems

KU4. wearing cryogenic protective clothing

KU5. common signs of equipment malfunction, leaks, or pressure irregularities

KU6. interpretation of monitoring tools and indicators

KU7. electric equipment in hazardous areas/zones

KU8. PASS technique of using a fire extinguisher

KU9. common safety hazards associated with green hydrogen

KU10. record-keeping requirements for compliance documentation

KU11. emergency shut-off systems and alarms

KU12. inertization of system with nitrogen

KU13. apply basic knowledge of MSDS used for KOH, H2, O2

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. communicate clearly and concisely with colleagues, supervisors, and emergency services

GS2. collaborate effectively with maintenance personnel to diagnose and address equipment issues

GS3. actively listen to and consider feedback from colleagues and supervisors

GS4. make quick and informed decisions during emergencies

GS5. adapt to changing circumstances and unforeseen situations

GS6. remain up-to-date on the latest regulations and standards

GS7. maintain composure and clear thinking under pressure

GS8. evaluate risks and benefits before taking any action

GS9. utilize the principles of time management and organizational skills to prioritize tasks, manage workload, and meet deadlines effectively

GS10. engage in ongoing professional development for enhanced job performance

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Compliance with GH2 Regulations and Standards	**14**	**32**	**-**	**5**
PC1. stay informed about the latest regulations related to hydrogen production, storage and refuelling	1	3	-	-
PC2. keep away any ignition sources from hydrogen storage areas and maintain a strict no-smoking policy within this zone	1	3	-	-
PC3. ensure hazardous areas and equipment are clearly marked with appropriate signage and warnings	2	4	-	1
PC4. use specialized Personal Protective Equipment (PPE) for working in a hydrogen environment, such as flame-resistant suits made from non-static material, goggles and face shields to protect against pressure-driven debris, gloves (neoprene or nitrile), safety boots, respirators and hearing protection for noisy areas	2	4	-	1
PC5. always wear appropriate cryogenic protective clothing, gloves and equipment when handling liquid hydrogen	2	4	-	-
PC6. report any non-compliance issues promptly to relevant personnel	2	4	-	1
PC7. liaise with regulatory authorities during inspections and audits	2	4	-	1
PC8. prepare written accident/incident report and share with the concerned officer/department	1	3	-	1
PC9. inform fire safety department about any near-miss incidents in the work place	1	3	-	-
Safety Procedures and First Aid	**16**	**28**	**-**	**5**
PC10. adhere to safety protocols when using materials, tools, and equipment for handling GH2	2	3	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. refer to relevant safety standards and guidelines like IEC 61508, NFPA 2, and industry best practices for identifying hydrogen process hazards	2	3	-	-
PC12. vent hydrogen to a safe, designated area well away from ignition sources, using a dedicated vent stack designed for high-pressure hydrogen release	2	4	-	1
PC13. dilute oxygen with an inert gas like nitrogen before venting to decrease its concentration and mitigate fire risks	2	4	-	1
PC14. check that pathways/ emergency escape routes are clear and free from grease/ oil and ensure good housekeeping practices	2	4	-	1
PC15. maintain ideal temperature and humidity level of storage areas used to safely contain gas cylinders and follow infection control guidelines	2	3	-	1
PC16. follow first aid instructions according to the type of injury/ incident	2	4	-	-
PC17. move yourself or the injured person away from the source of the cryogenic liquid or gas to stop further exposure	2	3	-	-
NOS Total	**30**	**60**	**-**	**10**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	LSC/N3924
NOS Name	Follow Safety and Security Guidelines for Green Hydrogen Tank Farms
Sector	Logistics
Sub-Sector	Port Terminals, ICD and CFS, Liquid Logistics
Occupation	Green Hydrogen Operations/ Handling, Port Operations Coordination, Documentation and Reporting, Engineering/Maintenance
NSQF Level	6
Credits	2
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024

LSC/N3925: Respond to Emergencies, Disasters and Pollution Control at Green Hydrogen Tank Farms

Description

This unit is about the response and the actions to be taken during emergencies, disasters and pollution control at the green hydrogen tank farm.

Scope

The scope covers the following :

- Emergency, Disaster and Pollution control response

Elements and Performance Criteria

Emergency, Disaster and Pollution control response

To be competent, the user/individual on the job must be able to:

PC1. review and approve disaster management plans, drill schedules shared by supervisors

PC2. raise alarms in case of any emergency - fire, leakage, or pollution

PC3. use appropriate fire extinguishers compatible with hydrogen and fire hoses to isolate the fire at the source

PC4. wear appropriate personal protective equipment (PPE) when handling or using extinguishers in a hydrogen environment

PC5. operate emergency shutdown procedures in case of leaks, pressure spikes, or other safety concerns and activate alarms as necessary

PC6. respond promptly and effectively to emergencies and potential hydrogen leaks, including evacuation procedures, communication with emergency services, and implementation of emergency response plans

PC7. coordinate with local authorities and nearby village representatives for evacuation

PC8. follow SOP to contain the disaster or pollution

PC9. assist fellow workers in quick response and evacuation as per SOP

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. principles of hydrogen storage, and dispensing equipment

KU2. safety protocols and regulations governing the operation and storage of hydrogen

KU3. hydrogen fire, cryogenic temperatures and high-pressure systems

KU4. wearing cryogenic protective clothing

KU5. common signs of equipment malfunction, leaks, or pressure irregularities

KU6. interpretation of monitoring tools and indicators

KU7. electric equipment in hazardous areas/zones

KU8. PASS technique of using a fire extinguisher
KU9. common safety hazards associated with green hydrogen
KU10. record-keeping requirements for compliance documentation
KU11. emergency shut-off systems and alarms
KU12. inertization of system with nitrogen
KU13. apply basic knowledge of MSDS used for KOH, H2, O2

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. communicate clearly and concisely with colleagues, supervisors, and emergency services
GS2. collaborate effectively with maintenance personnel to diagnose and address equipment issues
GS3. actively listen to and consider feedback from colleagues and supervisors
GS4. make quick and informed decisions during emergencies
GS5. adapt to changing circumstances and unforeseen situations
GS6. remain up-to-date on the latest regulations and standards
GS7. maintain composure and clear thinking under pressure
GS8. evaluate risks and benefits before taking any action
GS9. utilize the principles of time management and organizational skills to prioritize tasks, manage workload, and meet deadlines effectively
GS10. engage in ongoing professional development for enhanced job performance

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Emergency, Disaster and Pollution control response	**30**	**60**	**-**	**10**
PC1. review and approve disaster management plans, drill schedules shared by supervisors	3	7	-	1
PC2. raise alarms in case of any emergency - fire, leakage, or pollution	4	7	-	1
PC3. use appropriate fire extinguishers compatible with hydrogen and fire hoses to isolate the fire at the source	3	7	-	1
PC4. wear appropriate personal protective equipment (PPE) when handling or using extinguishers in a hydrogen environment	4	7	-	1
PC5. operate emergency shutdown procedures in case of leaks, pressure spikes, or other safety concerns and activate alarms as necessary	4	7	-	2
PC6. respond promptly and effectively to emergencies and potential hydrogen leaks, including evacuation procedures, communication with emergency services, and implementation of emergency response plans	4	7	-	1
PC7. coordinate with local authorities and nearby village representatives for evacuation	3	6	-	1
PC8. follow SOP to contain the disaster or pollution	3	6	-	1
PC9. assist fellow workers in quick response and evacuation as per SOP	2	6	-	1
NOS Total	**30**	**60**	**-**	**10**

National Occupational Standards (NOS) Parameters

NOS Code	LSC/N3925
NOS Name	Respond to Emergencies, Disasters and Pollution Control at Green Hydrogen Tank Farms
Sector	Logistics
Sub-Sector	Port Terminals, ICD and CFS, Liquid Logistics
Occupation	Green Hydrogen Operations/ Handling, Port Operations Coordination, Documentation and Reporting, Engineering/Maintenance
NSQF Level	6
Credits	2
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024

Qualification Pack

DGT/VSQ/N0102: Employability Skills (60 Hours)

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Career Development & Goal Setting
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

Elements and Performance Criteria

Introduction to Employability Skills

To be competent, the user/individual on the job must be able to:

PC1. identify employability skills required for jobs in various industries

PC2. identify and explore learning and employability portals

Constitutional values – Citizenship

To be competent, the user/individual on the job must be able to:

PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.

PC4. follow environmentally sustainable practices

Becoming a Professional in the 21st Century

To be competent, the user/individual on the job must be able to:

PC5. recognize the significance of 21st Century Skills for employment

PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life

Basic English Skills

To be competent, the user/individual on the job must be able to:

PC7. use basic English for everyday conversation in different contexts, in person and over the telephone

PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English

PC9. write short messages, notes, letters, e-mails etc. in English

Career Development & Goal Setting

To be competent, the user/individual on the job must be able to:

PC10. understand the difference between job and career

PC11. prepare a career development plan with short- and long-term goals, based on aptitude

Communication Skills

To be competent, the user/individual on the job must be able to:

PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings

PC13. work collaboratively with others in a team

Diversity & Inclusion

To be competent, the user/individual on the job must be able to:

PC14. communicate and behave appropriately with all genders and PwD

PC15. escalate any issues related to sexual harassment at workplace according to POSH Act

Financial and Legal Literacy

To be competent, the user/individual on the job must be able to:

PC16. select financial institutions, products and services as per requirement

PC17. carry out offline and online financial transactions, safely and securely

PC18. identify common components of salary and compute income, expenses, taxes, investments etc

PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation

Essential Digital Skills

To be competent, the user/individual on the job must be able to:

PC20. operate digital devices and carry out basic internet operations securely and safely

PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively

PC22. use basic features of word processor, spreadsheets, and presentations

Entrepreneurship

To be competent, the user/individual on the job must be able to:

PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research

PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion

PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity

Customer Service

To be competent, the user/individual on the job must be able to:

PC26. identify different types of customers

PC27. identify and respond to customer requests and needs in a professional manner.

PC28. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

To be competent, the user/individual on the job must be able to:

PC29. create a professional Curriculum vitae (Résumé)

PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively

PC31. apply to identified job openings using offline /online methods as per requirement

PC32. answer questions politely, with clarity and confidence, during recruitment and selection

PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills and different learning and employability related portals

KU2. various constitutional and personal values

KU3. different environmentally sustainable practices and their importance

KU4. Twenty first (21st) century skills and their importance

KU5. how to use English language for effective verbal (face to face and telephonic) and written communication in formal and informal set up

KU6. importance of career development and setting long- and short-term goals

KU7. about effective communication

KU8. POSH Act

KU9. Gender sensitivity and inclusivity

KU10. different types of financial institutes, products, and services

KU11. how to compute income and expenditure

KU12. importance of maintaining safety and security in offline and online financial transactions

KU13. different legal rights and laws

KU14. different types of digital devices and the procedure to operate them safely and securely

KU15. how to create and operate an e- mail account and use applications such as word processors, spreadsheets etc.

KU16. how to identify business opportunities

KU17. types and needs of customers

KU18. how to apply for a job and prepare for an interview

KU19. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. read and write different types of documents/instructions/correspondence

GS2. communicate effectively using appropriate language in formal and informal settings

GS3. behave politely and appropriately with all
GS4. how to work in a virtual mode
GS5. perform calculations efficiently
GS6. solve problems effectively
GS7. pay attention to details
GS8. manage time efficiently
GS9. maintain hygiene and sanitization to avoid infection

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Introduction to Employability Skills	**1**	**1**	**-**	**-**
PC1. identify employability skills required for jobs in various industries	-	-	-	-
PC2. identify and explore learning and employability portals	-	-	-	-
Constitutional values – Citizenship	**1**	**1**	**-**	**-**
PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
PC4. follow environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	**2**	**4**	**-**	**-**
PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-
PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
Basic English Skills	**2**	**3**	**-**	**-**
PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
Career Development & Goal Setting	**1**	**2**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. understand the difference between job and career	-	-	-	-
PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
Communication Skills	**2**	**2**	**-**	**-**
PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
PC13. work collaboratively with others in a team	-	-	-	-
Diversity & Inclusion	**1**	**2**	**-**	**-**
PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
Financial and Legal Literacy	**2**	**3**	**-**	**-**
PC16. select financial institutions, products and services as per requirement	-	-	-	-
PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
Essential Digital Skills	**3**	**4**	**-**	**-**
PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Entrepreneurship	**2**	**3**	**-**	**-**
PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
Customer Service	**1**	**2**	**-**	**-**
PC26. identify different types of customers	-	-	-	-
PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-
PC28. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	**2**	**3**	**-**	**-**
PC29. create a professional Curriculum vitae (Résumé)	-	-	-	-
PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
PC31. apply to identified job openings using offline /online methods as per requirement	-	-	-	-
PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0102
NOS Name	Employability Skills (60 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC

2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC

3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)

4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criterion

5. To pass the Qualification Pack, every trainee should score a minimum of 70% for NSQF level 4 & above job roles and 50% for NSQF level 1 to 3 job roles

6. In case of unsuccessful completion, the trainee may seek re-assessment on the Qualification Pack

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Minimum Passing % at NOS Level: 50

(**Please note**: A Trainee must score the minimum percentage for each NOS separately as well as on the QP as a whole.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
LSC/N3919.Assist in GH2 tank farm planning	30	60	-	10	100	15
LSC/N3920.Support in commissioning of GH2 tank farm	30	60	-	10	100	15
LSC/N3921.Ensure compliance for the storage and handling of green hydrogen	30	60	-	10	100	15
LSC/N3922.Analyze trends, prepare forecasts and schedules for the movement of GH2	30	60	-	10	100	15
LSC/N3923.Conduct periodic operational and tank farm inspections	30	60	-	10	100	15
LSC/N3924.Follow Safety and Security Guidelines for Green Hydrogen Tank Farms	30	60	-	10	100	10
LSC/N3925.Respond to Emergencies, Disasters and Pollution Control at Green Hydrogen Tank Farms	30	60	-	10	100	10
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	5
Total	**230**	**450**	**-**	**70**	**750**	**100**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.