
LNG Liquefaction Process Training Course: Pretreatment, Refrigeration Cycles and Train Output

24 – 28 May 2027
Tokyo





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Programme Summary

The LNG liquefaction process is the subject of this one-week training course for plant, project and technical managers in gas companies, ending in a plant process review pack for one liquefaction train. Liquefaction plants run close to design limits, and a weak grasp of pretreatment, refrigeration and bottlenecks leads to lost output and poor technology choices. The programme follows gas from feed to storage, applying each tool to a plant or project of the participant's own. Mars Training Centre UK delivers this programme on the LNG liquefaction process to mixed-organisation cohorts.

The Business Case

An LNG train turns feed gas into a tradeable cargo only if every step performs together. Contaminants that pass pretreatment damage cold equipment, and a small bottleneck can cap output for the whole train. Managers who can read the process, compare technology families and rank improvements ask better questions of engineers and contractors, and make sounder choices on upgrades and new capacity.

- Plant Output: Improves as bottlenecks are located and ranked before changes are made.
- Unplanned Downtime: Falls as pretreatment upsets are recognised early.
- Technology Choice Quality: Improves as process families are compared on common criteria.

Principles and Evidence Base

- Refrigeration cycle: The thermodynamic cycle that removes heat from gas underpins the process reading in Sessions 1 and 3.
- Cascade and mixed refrigerant process families: Two established liquefaction designs form the comparison made in Session 3.
- Bottleneck analysis: Locating the step that limits throughput guides the output ranking in Session 4.

Intended Participants

- Plant managers who answer for the output of a liquefaction facility.
- Project managers who plan or review new LNG capacity.
- Technical managers who brief engineers and contractors on process options.
- Commercial and planning leaders who rely on plant availability and output.
- Maintenance and operations leaders who manage cold-section equipment.

Typical functions include LNG operations, projects, technical services and planning in gas companies and engineering contractors.



Learning Outcomes

1. Participants will be able to diagnose the steps and duties in an LNG liquefaction train.
2. Participants will be able to evaluate pretreatment options against feed gas composition.
3. Participants will be able to compare cascade and mixed refrigerant designs against plant needs.
4. Participants will be able to assess the bottlenecks that limit train capacity.
5. Participants will be able to prioritise output improvements by value and effort.
6. Participants will be able to justify a process or upgrade choice to a technical committee.

Programme Structure

Day 1: LNG Liquefaction Process Foundations

How does natural gas become LNG, and where does each plant step sit in that path?

- LNG Plant Block Flow Diagram
- Feed Gas Specification Sheet
- Phase Behaviour Reading Guide
- Energy and Cooling Duty Map
- Process Question Brief

Day 2: Gas Pretreatment and Conditioning

What must be removed from feed gas before it can be cooled safely?

- Acid Gas Removal Review
- Dehydration Option Table
- Mercury Removal Checklist
- Heavy Hydrocarbon Extraction Sheet
- Pretreatment Upset Log

Day 3: Refrigeration Cycles and Process Families

How do cascade and mixed refrigerant designs compare for a given plant?

- Refrigeration Cycle Diagram
- Cascade Process Summary
- Mixed Refrigerant Process Summary
- Process Family Comparison Matrix
- Compressor and Driver Option Sheet

Day 4: Train Capacity and Plant Output

What limits the output of a liquefaction train, and how is it raised?



- Train Capacity Bottleneck Table
- Ambient Temperature Output Curve
- Feed Gas Variation Case Sheet
- Storage and Loading Interface Chart
- Output Improvement Ranking Matrix

Day 5: Applying the Tools to One LNG Plant

Do the process, pretreatment, cycle and output tools support one plant review?

- Applying the Session 1 LNG Plant Block Flow Diagram
- Using the Session 2 Pretreatment Upset Log
- Testing the Session 3 Process Family Comparison Matrix
- Checking the Session 4 Output Improvement Ranking Matrix
- Completing the Plant Process Review Pack

Methodology

The programme uses a structured exercise method built on anonymised plant data, process flow diagrams, feed gas analyses and operating summaries. Participants work in mixed technical and commercial groups on one shared plant, challenge each other's readings of the data and receive written facilitator feedback on each exercise set.

- Suggested activity: Tracing a feed gas contaminant through each plant step.
- Suggested activity: Comparing two process families for a given plant size.
- Suggested activity: Ranking three output improvements against a bottleneck table.

Capstone Output

Each participant completes a plant process review pack for one liquefaction train. It holds a block flow summary, a pretreatment risk list, a process family comparison, a bottleneck table and a ranked list of output improvements. The pack is used at work to brief a technical committee, frame a contractor query and plan the next turnaround scope discussion.

Frequently Asked Questions

Is the LNG liquefaction process suitable for managers who are not process engineers?

Yes. The LNG liquefaction process is taught for managers with some exposure to gas or plant work, using diagrams and simple cases in place of detailed design calculations.



Which models does the LNG liquefaction process rest on in this programme?

The LNG liquefaction process rests on the refrigeration cycle, the cascade and mixed refrigerant process families and bottleneck analysis.

How is the pack from the LNG liquefaction process used at work?

You use the plant process review pack to brief a technical committee, frame a contractor query and plan the next turnaround scope discussion.

How does the LNG liquefaction process differ from general gas processing training?

The LNG liquefaction process centres on cooling and condensing gas into LNG and the output of a train, while general gas processing training centres on treating and separating gas for pipeline sale.