



LNG terminal in Rotterdam:

VOPAK/Gasunie

GATE (Gas Access To Europe) is a joint venture between VOPAK and Gasunie with the intention to build and operate a LNG terminal in the Port of Rotterdam. As part of the permit application process, DNV was asked to provide international expertise and input for the risk assessment of the LNG terminal and the LNG tanker transport.

Critical issues

Over the years Liquid Natural Gas (LNG) has become an increasingly important energy source. To benefit from this development VOPAK and Gasunie are planning one of the first LNG import terminals in the Port of Rotterdam. Information was required on the failure frequencies of LNG pipelines. In addition, as part of the permit application procedure, a quantitative assessment of the nautical risks involved in the project was necessary.

Although worldwide no accidental spills caused by LNG vessels have occurred, many parties involved are concerned about the potential consequences of LNG spills. Not only are credible scenarios subjected to quantitative studies, also the non-credible and terrorist scenarios require sound risk based analyses. Also a falling object risk assessment was requested for the LNG tanks in order to set up appropriate engineering requirements.

For the permit application process GATE was in need of professional QRA support for LNG based on current worldwide best practices. In addition to the specialist LNG-knowledge available at VOPAK, experience and detailed knowledge of recent developments was considered essential.

Solutions

For the LNG header pipeline, DNV provided GATE with international guidelines on the use of pipeline failure frequencies and identified a recommended value.

Furthermore a nautical QRA was performed to assess the risk of the LNG tanker transport to the GATE terminal. With collision data and leak frequencies provided by the Maritime Research Institute Netherlands (MARIN) the Location Specific Risk (PR) and Societal Risk (GR) were calculated.

Consequence modelling was carried out, using DNV's risk modelling software SAFETI, to provide a quantified and graphical risk picture.

Also insight was given into the Maximum Non Credible Scenario's (MNCA) to account for intentional acts such as terrorism. Based on DNV's involvement in Joint Industry Projects on LNG, it was possible to provide GATE with worst case hazard zones for ship collision accidents.

Thirdly DNV calculated the accident frequencies for falling objects (helicopters, air traffic routes) on one of the LNG tanks, based on international air crash casuistic and Rotterdam specific location characteristics.

Value delivered

The studies provided GATE with:

- An aligned (GATE) approach with Port of Rotterdam's LNG feasibility study;
- Insight into & alignment with current worldwide discussions and visions on LNG effect zones and potential terrorist intervention scenario's;
- Use of state of the art collision analysis methodology, provided by MARIN;
- Frequencies of falling object risk on LNG tanks to be used as input in the ITT to potential building contractors
- Information available to facilitate public hearings;

The information provided to GATE was without any delay accepted by the Dutch Authorities.

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