

**ALLEGATO 1.D.4**  
**BG ITALIA, "PROJECT HS&E PLAN",**  
**REV. B, 3/04/2002**

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**ABBREVIATIONS**

AFD	Approved for Design
ALARP	As Low As Reasonably Practicable
AMT	Asset Management Team
BATNEEC	Best Available Technique Not Entailing Excessive Cost
BPEO	Best Practicable Environmental Option
EMS	Environmental Management System
ENVID	Environmental Hazard and Identification Study
ES	Environmental Statement
HAZID	Hazard Identification Study
HAZOP	Hazard and Operability Study
HS&E	Health, Safety and Environment
LTI	Lost Time Injury
OSC	Operational Safety Case
P&ID	Piping and Instrumentation Diagram

## 1 INTRODUCTION

### 1.1 Project Outline

BG Group proposes to develop, finance, build, own and operate a Liquefied Natural Gas (LNG) Import Terminal at the Port of Brindisi, Southern Italy. The new LNG Terminal will have an initial throughput of up to approximately 6 million tonnes of LNG per year delivered in LNG carriers (tankers) of up to approximately 140,000 cubic metres capacity. The LNG terminal will include deep-water berthing and unloading facilities, tanks for storing the LNG between deliveries and regasification, vaporisation systems, boil-off gas handling systems and a range of utilities and buildings. It will take approximately 3 years to construct and is currently planned to start up in 2006. The facility will export its product by short underground pipelines to a local power station and to the Italian high-pressure gas transmission system nearby.

#### 1.1.1 Location

A location has been identified that has previously been designated for such purposes in the Brindisi Port Plan. This designated area lies in the outer Port of Brindisi within an area of deep water protected by a breakwater and a series of small islands.

The development will involve both the reclamation of land from the sea and the use of some existing land. It is a brownfield location with an adjacent petrochemical complex currently owned and operated by Enichem.

There is land available for possible development of cold-base industries by others.

Up to 22 ha of sea within the control of the Port Authority have been designated for reclamation and industrial development in the Port Master Plan. A narrow strip of foreshore (total area about 2 ha) bounding on the sea area is included in addition. It is proposed to reclaim an area adequate for the onshore LNG facilities. Beyond the reclaim area there is an area of sea that has been designated for construction of the LNG jetty and one or two LNG ship berths.

Basic design work has confirmed the feasibility of the development at the designated location. The design will comply with the specialist European Code for LNG facilities, EN 1473.

#### 1.1.2 Legislative Context - Safety and Environmental Approvals

BG Italy has made an application to the Italian Authorities for their consent to the project under Article 8 of the 'Law for the deregulation of several administrative proceedings in the public sector' (Law 340 of 24 November 2000).

This requires submissions to be made to a 'Conference of Services' appointed by the Ministry of Industry, which includes representatives who are empowered to deal with the safety and environmental aspects of the project.

The basis of the approval for construction (Nulla Osta di Fattibilita or NOF) will be agreed with a regional safety sub-committee. This requires BG Italy to submit a preliminary safety report in accordance with Decree DPCM of 31 March 1989.

A Safety and Environmental Management System will, at the detailed design and construction stage of the project, be developed in accordance with EU Directives as implemented in Italy.

The environmental impact will be discussed with the VIA (Environmental Impact Assessment) service of the Environment Ministry and an Environmental Statement prepared.

## 1.2 Project HS&E Policy

The Brindisi LNG Project HS&E policy is to:

“Identify the health, safety and environmental hazards arising from the Brindisi LNG Project and manage the associated risks such that the risks are reduced to as low as reasonably practicable.”

This will ensure that the BG Italy Health, Safety and Environmental Policy is adhered to throughout all phases of the Brindisi LNG Project.

The BG Italy HS&E policy is summarised as:

*“BG Italy recognises that the protection of the health and safety of its employees and others affected by its operations, and the protection of the environment, are an integral part of the Company’s business performance and a prime responsibility of management at every level. Wherever BG Italy operates, it is committed to achieving a high level of performance.”*

## 1.3 Purpose of this Document

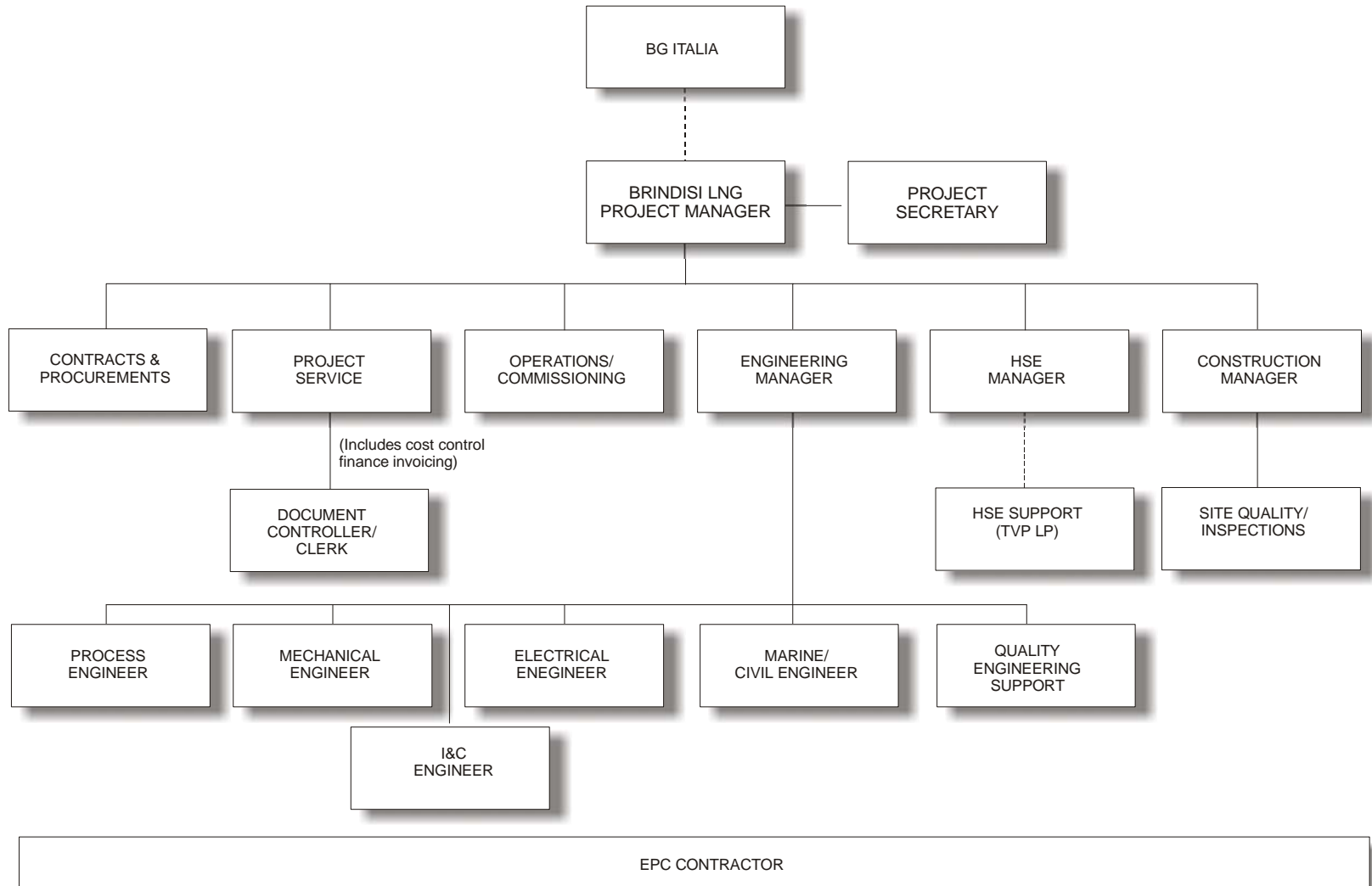
BG Italy is committed to ensuring that the risks to personnel shall be as low as reasonably practicable and adverse impacts on the environment minimised wherever reasonably practicable. This will be achieved by developing Project HS&E goals; introducing HS&E Reporting; planned HS&E activities; and clear implementation responsibilities and schedule.

## 1.4 Scope

BG Italy will adopt a lifecycle approach to engineering design and HS&E. This section describes the arrangements for HS&E management for the tendering phase, the design, construction, installation and commissioning of the new facilities. It thus pertains to both the Project Management Team (PMT) and its contractors. The plan includes links between the PMT and the Asset Management Team (AMT) handling the project. Commissioning of the new facilities will be subject to the Brindisi Project Health, Safety and Environmental Management System.

## 1.5 Project Organisation

The Brindisi LNG Project Management team structure is shown in the organogram in figure 2.1. Detailed descriptions of roles and responsibilities for both the Project Management Team and the Contractors are provided in Appendix 2 of this document. Note that the responsibilities identified are applicable from the start of the project until formal handover to operations.



## 2 PROJECT HS&E GOALS

### 2.1 Individual Risk of Fatality

The individual risk of fatality for any person from the Brindisi LNG facility will be As Low As Reasonably Practicable (ALARP) following introduction of hydrocarbons through the development of appropriate controls.

Every endeavour will be taken throughout the design stage to investigate potential options that might arise as a result of the development being undertaken such that risk levels may be reduced.

In general terms the ALARP level will be considered as having been met if the cost of reducing the risk further cannot be justified by the reduction in risk which would occur. When the justification is made qualitatively some or all of the following will be applied where appropriate:

- demonstration of the application of best practice including technology and management techniques,
- reference to trends in accident and incident statistics,
- discussion/comparison of risk levels before and after possible change, i.e. identification of practicable options for reduction of risks following the preferred hierarchy as follows, elimination or minimisation of hazard, engineering design, suitable systems of working, and then personal protective equipment

The justification of ALARP may require formal, quantitative cost – benefit analysis.

If quantitative risk analysis is applied, the following criteria shall apply when judging the tolerability of risk to persons:

- Individual risk any worker above  $10^{-3}$  per annum should be considered intolerable and fundamental risk reduction improvements are required.
- Individual risk below  $10^{-3}$  but above  $10^{-6}$  per annum for any worker should be considered tolerable if it can be demonstrated that the risks are ALARP.
- Individual risks below  $10^{-6}$  per annum for any worker should be considered as broadly acceptable and no further improvements are considered necessary provided documented control measures are in place and maintained.
- Individual risk to any member of the general public as a result of BG Group businesses activities should be considered as intolerable if greater than  $10^{-4}$  per annum.
- The base cost per statistical life saved in 2000 money will be taken as £1.5 MM.

### 2.2 Environmental Risk

Environmental risks shall be determined using the BPEO/BATNEEC approach. Both the control measures identified and the process being assessed must be reviewed to ensure that they represent the Best Practicable Environmental Option and Best Available Technique Not Entailing Excessive Cost.

### 2.3 Injuries – Project Phase

The overall goal of the project is to achieve the design, fabrication, installation and commissioning of the Brindisi LNG facilities with:

- Zero lost time injuries for both BG Italy and Contractor employees.



- Minimal number of medical treatment cases.

BG Italy will monitor the safety statistics of the contractor and will be proactive in reversing any adverse trends. It is fully expected, however, that BG Italy will be assisting the process of improvement, not leading it, which is the responsibility of the relevant Contractor.

## 2.4 Project Management

- Good HS&E performance will not be compromised by commercial or schedule pressures.
- The PMT and its contractor will endeavour to meet or exceed all international, national and BG Group HS&E standards in both design and construction of the facilities.
- All HS&E related permits, licenses and consents will be obtained in a timely manner.
- Contractors and suppliers will be required to have acceptable HS&E plans and management systems in place prior to commencing significant levels of work. HS&E plans to be project specific.
- An HS&E performance incentive scheme will be implemented in all major contracts, wherever possible.
- Regular HS&E review meetings and/or workshops will be held with the contractor
- Significant HS&E incidents (e.g. LTI's, worsening injury trends, oil spills) will be investigated in a timely manner and lessons learned circulated.

## 2.5 Environment

The environmental goals adopted by the project are:

- Zero accidental discharges to atmosphere or liquid discharges to sea with a potentially adverse impact on the environment.
- Minimising planned discharges and emissions through all phases of the project in its operations.
- All solid wastes to be disposed of in an approved and auditable manner.
- All commitments made in the Environmental Statement for the development will be met.
- Comply with all Italian and international environmental laws and regulations

## 2.6 Inherent Safety

Concept selection has been based on the identification and coarse evaluation of the risks from hazardous events and where reasonably practicable; the application of inherently safe design principles. Minimisation of environmental impacts has also been a high priority. To this end the following specific design goals have been set:

- Simple, proven designs should be used in preference to novel techniques except where these techniques are designed to reduce risks to persons.
- Facilities should be designed for minimum maintenance and high availability/ reliability.
- Hydrocarbon inventories should be minimised.
- The potential for ignition should be minimised.
- Impact of human error should be minimised.

- Facilities should be designed to withstand maximum closed in pressure.
- Non-welded connections in pressurised hydrocarbon services shall be minimised.
- Processing facilities design, layout and natural ventilation arrangements should minimise the potential for accumulations of gas mixtures.

In setting these goals the Project's intention is to challenge the contractor to strive for high levels of inherent safety. For example, minimisation will not always be reasonably practicable when costs are compared to benefits. However, if this is regarded as a starting point, as the design moves towards a more reasonably practicable solution and the reasons for doing so are *properly justified and documented* the ALARP argument is made effectively.

## 2.7 Design Safety Goals

### 2.7.1 Emergency Response

Measures shall be provided, as far as reasonably practicable, for the safe and effective evacuation, escape and rescue of personnel from the facility to a place of safety.

The application of such measures shall be risk based and will address the following:

- **General**

*Arrangements shall be provided to warn all persons on the facility of the occurrence of an emergency.*

*Sufficient control facilities shall be provided to assess an incident and to bring it under control.*

*Sufficient means of communication shall be provided within the facility and to external parties.*

- **Escape Routes**

*Safe means of escape shall be provided from all areas.*

*At least one escape route to the Safe Location from all potentially manned areas shall remain passable for sufficient time to allow all personnel to muster in an emergency.*

*Escape routes shall be readily accessible, unobstructed, well marked, and illuminated with adequate emergency lighting.*

- **Muster Areas**

*Muster areas shall be provided at the Safe Location with sufficient space to accommodate the total complement of personnel.*

*Muster areas shall be readily accessible, unobstructed, well marked and illuminated with adequate emergency lighting.*

*Suitable medical facilities shall be provided at the place of safety.*

### 2.7.2 Emergency Systems

Measures shall be provided (Emergency Systems), so far as reasonably practicable, to reduce the frequency and consequences of potential fire and explosion incidents.

So far as reasonably practicable, the Emergency Systems provided shall survive major incident conditions and continue operating with sufficient level of operability for the duration required for each system to carry out its function.

The application of such measures shall be risk based and will address the following:

- **Blowdown, Venting and Flaring**

*A system shall be provided to depressurise and dispose of flammable gas inventories to a safe location.*

- **Fire and Gas Detection**

*All areas of the installation shall be monitored by fire and gas detection systems appropriate to the risk, and be provided with manual alarm call points.*

*These systems shall provide warnings to specified control points and, in situations hazardous to personnel, automatically raise specific alarm warnings.*

*The systems shall provide for initiation of Emergency Shutdown, where appropriate.*

*Smoke and gas detectors shall be suitably located to detect smoke or gas ingress to the control room and other occupied buildings.*

- **Emergency Shutdown System (ESD)**

*An ESD system shall be provided to detect deviations outside acceptable limits of operation or control and to implement a sequence of actions to render the installation safe.*

*The level of shutdown shall depend on the nature and severity of the detected deviation and structured to enable a safe, effective and controlled shutdown.*

*ESD status and actions shall be displayed at appropriate control points.*

- **Fire and Blast Protection**

*Fire and blast protection systems (active and/or passive) shall be provided in order to minimise the possibility of personnel injury from the consequences of an accidental event (incident).*

*Structural design for the installation shall ensure that key components can resist fire and blast loadings, provide the required Control Room integrity, and prevent incident escalation.*

*The installation design and layout shall be developed so as minimise blast overpressure and/or fire propagation.*

- **Emergency Power System**

*The emergency power system shall maintain power for the required duration to the ESD blowdown system.*

### 3 HS&E REPORTING

#### 3.1 Routine Reporting

The PMT will report on a monthly basis to the BG Italy Asset Management Team. This report will include a section on HS&E that will address (*inter alia*):

Lost time injuries, medical centre attendances, first aid treatments, near misses, HS&E suggestions and dangerous occurrences for the month.

Hours worked by BG staff and Contractors.

A summary of any incidents occurring in the month.

A description of other HS&E matters of interest, e.g. progress, legislative changes, improvement notices.

In order to facilitate this process the contractor will be requested to provide information to the PMT on a monthly basis and in accordance with BG Group requirements, Directive HSE-DIR-313 and HSE-COP-413.

#### 3.2 Injury Reporting

In order to facilitate appropriate support, monitoring and feedback from BG Italy and BG Group it is imperative that serious incidents are reported to the PMT in a timely manner. Specifically it will be a requirement that the following incidents are reported verbally as soon as possible after the occurrence (and certainly within 1 hour):

A fatality.

Loss of limb or eye

Head injury involving unconsciousness

Other injuries with potential for permanent handicap such as a broken neck.

In addition any incident that has the potential to cause any of the injuries listed above should be reported as if the injury had occurred. Reporting should be to the Project Manager in the first instance or, if he is unavailable, the project HS&E Adviser.

Other, less serious, injuries and incidents should be reported on a monthly basis in the routine reports described in section 3.1. Note, however, that if the incidence rate of less serious injuries appears high then BG Italy will request reporting on a weekly basis to facilitate trend analysis.

#### 3.3 Environmental Reporting

All unplanned releases to the environment must be reported to the PMT as soon as practicable.

## 4 HS&E ACTIVITIES

The following subsections describe key safety activities aimed at achieving the Project HS&E Goals. These will occur at one of three stages during the project:

Stage 1: Project Development Process

Stage 2: Project Execution

Stage 3: Construction, Installation and Commissioning

### 4.1 Project Development Process

#### 4.1.1 HS&E Performance Improvement Programme

The project will develop and adopt an HS&E performance improvement programme in line with BG Group guidance. This will entail a profiling exercise undertaken by a representative from the BG Group Loss Prevention Department, followed by the development of a programme to reach the agreed targets for improvement.

As some of the targets to be achieved by the project team will have knock-on requirements the profiling exercise should be completed before contract award.

#### 4.1.2 Initial Submission to Government Authorities

The purpose of this submission is to inform the Authorities as to BG Italy's proposals for the Brindisi LNG facility and to outline the management of safety, environmental and health matters under the Article 8 procedure.

#### 4.1.3 Preliminary Hazard Identification

Techniques of hazard identification will be adopted to evaluate the concept. This will require representatives from the PMT, BG Italy Operations and HS&E, BG Group Skill Centres and the contractors.

The basic objective of the hazard identification will be to ensure that the development concept is technically sound and that there are no major obstacles or gaps.

#### 4.1.4 Evaluation of Contractor Proposals

The proposals by the Contractor will be reviewed to determine whether the Contractors have taken, or will be able to take, proper consideration of risks to persons and the environment and if their management controls are acceptable. The review will critically examine their:

- Health, safety and environmental performance
- Health, safety and environmental management system
- Proposed design solutions
- Understanding of the ALARP principle.
- Where appropriate feedback will be given in order to clarify certain aspects of the proposals.

## 4.2 Project Execution

### 4.2.1 HS&E Interface Meetings.

Regular HS&E interface meetings will be held between the PMT, BG Italy Operations and HS&E representatives and the contractor. The main objectives of these meetings will be to:

- Identify HS&E concerns and assign responsibility for closure
- Review design and interface issues with an impact on HS&E
- Track HS&E performance across the project
- Act as a forum for dissemination of lessons learned, either from incidents on the project or elsewhere in the world
- Monitor progress of Safety Case work and supporting studies
- Ensure that all participants in the development are aware of others' expectations especially in preparation for the installation and commissioning phases.
- Advise on need for, assign responsibility for and monitor progress of "emergency" documents, e.g. emergency response procedures.

The frequency of these meetings will be flexible such that they can be held at appropriate stages throughout the project. As a base, however, they are expected to be held once a month.

### 4.2.2 PMT HS&E Meetings

The PMT will hold meetings to discuss HS&E issues on a regular basis. The participants in this meeting will include the Project Manager, Operations Manager and Brindisi HS&E Adviser.

The principal topics to be reviewed will be:

- HS&E Performance improvement programme
- Safety statistics, and incentive scheme progress
- Review findings of serious incident investigations
- Progress of statutory HS&E submissions
- Areas of concern

The exact format of this meeting has yet to be agreed but it is likely that it will take place every two months. The meeting will probably be held immediately prior to the regular HS&E Interface meetings (see 4.2.1 above).

### 4.2.3 HS&E Incentive Scheme

An HS&E incentive scheme will be developed and applied to the contractor. The aim of the scheme will be to maintain a high profile for HS&E issues throughout the project to facilitate delivery of the project goals (see section 2).

It is expected that the agreed scheme will be implemented at the fabrication facilities and at the construction site. Typical elements of the schemes will include:

- Emphasis will be placed on encouraging proactive HS&E actions.

- Good HS&E performance should not be coupled with other performance indicators; the HS&E scheme should be a stand alone one.

#### 4.2.4 Safety Case

A Safety Case for the Brindisi LNG facility will be developed to demonstrate that:

- The arrangements within the HS&E Management System are adequate to ensure that the BG Italy Health, Safety and Environmental Policy and statutory requirements will be complied with in relation to the installation and any activity in connection with it;
- All HS&E hazards which could give rise to a major incident or the need for evacuation, escape or rescue have been systematically identified and their risks to persons (workforce and/or members of the public) and the environment evaluated;
- Measures have been or will be taken to prevent the hazards occurring or to reduce the risks to persons and the environment to as low as reasonably practicable levels;
- Appropriate performance standards have been established for the critical measures required to manage major hazards and associated risks and appropriate schemes are in place for verification of these;
- Adequate arrangements for the audit of the arrangements within the HS&E Management System have been established.

The PMT through its contractor is responsible for providing appropriate descriptions of the facilities, risk assessments, major hazard control measures and their performance standards and justification of ALARP for inclusion in the Brindisi LNG site Safety Case.

#### 4.2.5 Environmental Statement

BG Italy will make a number of commitments to government and consultative bodies in the Environmental Statement for the facility, according to the current applicable environmental legislation. A register will be developed and maintained by the PMT to facilitate timely and satisfactory close-out of these commitments.

The Environmental Statement will be reviewed and revised, as appropriate, by BG Italy to reflect the current status of the facilities and to demonstrate that the environmental risks have been adequately controlled. The requirements for environmental risk mitigation will be incorporated into the contract.

#### 4.2.6 Hazard Identification (HAZID)

A detailed Hazard Identification study will be performed. The aim of the exercise is to ensure that the design requirements for inherent safety and the elimination, prevention, and mitigation of major hazards are identified.

The HAZID should be undertaken with representatives of the PMT, BG Italy Operations and HS&E, BG Group Skill Centres and the contractor present.

#### 4.2.7 Environmental Hazard Identification (ENVID)

An ENVID should be carried out by the contractor which addresses construction, installation and commissioning activities as well as operational issues. The output from the ENVID will allow the contractor to tailor his workplan to minimise impacts to the environment.

#### 4.2.8 Hazard and Operability Study (HAZOP)

A detailed HAZOP will be undertaken at a suitable time during the detailed design phase. This is likely to be at the point that P&ID's are approved for design (AFD) but will be agreed with BG Italy.

As with the earlier hazard identification processes the team will comprise representatives from PMT, BG Italy Operations, BG Group Skill Centres and the contractor.

The HAZOP will be organised by the contractor but the procedure; scope, schedule and Chairman must be agreed with BG Italy.

#### 4.2.9 HS&E Risk Assessments

The risks from the identified hazards (HAZID and ENVID) will be assessed by the contractor and appropriate controls identified and implemented to reduce the risks to ALARP. The analysis and assessment work involved will aim to rank the risks derived from the hazards, effects and consequences as 'broadly acceptable', 'tolerable if ALARP' and intolerable'.

Where risks are defined as intolerable, positive measures shall be taken to reduce such risks. Where risks are defined as tolerable, further assessment shall be undertaken to determine the benefit of additional risk reduction measures. Cost benefit analysis may be used to aid in this process.

The objective of the assessments is to define both qualitatively and, where appropriate, quantitatively, the design features, the emergency systems, the protective and mitigation systems and equipment which can provide the most benefit in terms of risk reduction in accordance with the ALARP principle. The assessments will be undertaken and repeated as often as necessary through the design development.

#### 4.2.10 HS&E Risk Register

In order to ensure that all engineering HS&E issues are properly addressed throughout the project it is necessary to:

- Identify the HS&E issues and risks.
- Record actions necessary to resolve them.
- Monitor satisfactory close out of actions.
- Transfer the records to the operator at the completion of the project.

The contractor will be required to establish a suitable tracking system as soon as possible after contract award. The tracking system should be electronic to facilitate interrogation and audit and should be supported by a suitable procedure. The HS&E Risk Register should be periodically reviewed/updated.

#### 4.2.11 Construction and Commissioning Risk Assessments

These assessments are intended to ensure that the health, safety and environmental risks posed during the installation and commissioning phases are reduced to as low as reasonably practicable.

These assessments are likely to be held as a series of discrete studies performed as and when the procedures become available. Note, however, that they should be performed early enough to allow enhancements to be incorporated as necessary.

It will be the responsibility of the contractor to arrange these assessments on a schedule agreed with BG Italy.



#### 4.2.12 Design Review

Design reviews will be required at various periods throughout the project and will include HS&E elements. The Project Manager in conjunction with other members of the PMT and AMT will define the schedule and scope of these reviews.

As these reviews are conducted by BG Group the PMT will request them at appropriate times in line with the schedule. Requests for a review will be issued with sufficient lead time to allow the terms of reference to be finalised and the review team to be identified and assembled.

Once developed the review schedule will be submitted to Project and Engineering Management Skill Centre so that the same team leader can be reserved for each review, where practicable.

#### 4.2.13 Pre-mobilisation HS&E Brief

Immediately prior to major construction mobilisation it is intended that BG Italy will participate in the HS&E brief. Typically this will be a presentation to the bulk of the construction personnel that will address:

- Background to the project.
- Scope of the work.
- The importance of safe working.
- Specific safety or environmental concerns for that mobilisation.
- Feedback or questions from personnel.
- Inspection/tour of the site.

#### 4.2.14 Bridging Documents

The Health, Safety and Environmental Management System of the Contractor will have been reviewed during the assessment stage. Presuming that this is found to be of an equivalent standard to BG Italy's, then the contractor will be operating under it during the construction phase. There will, therefore, need to be bridging documents to address the disparities between contractor's HS&E MS and BG Italy's. BG Italy and the Contractor will produce this document.

#### 4.2.15 Waste Management Programme

Identify waste streams that will be generated during construction and commissioning and review proposed procedures for disposal. Make recommendations if additional needs are identified and ensure agreed recommendations are implemented.

#### 4.2.16 Collate Emissions/ Waste Data

Review BG Group and BG Italy requirements for monitoring registers and collect data from the Environmental Statement and ENVID to populate register. Nominate personnel to collect monitoring data. Review annual data, rationalise and forward to BG Group.

#### 4.2.17 Emergency Response Exercises

Prior to commencement of the main construction phase tabletop emergency response exercises will be held. These will be formulated to test the arrangements described in the bridging documents and thereby provide assurance to management that incidents will be responded to efficiently. Tabletop and practical

exercises will be repeated at appropriate intervals throughout the construction and commissioning phases to assure the continued adequacy of the arrangements.

#### 4.2.18 HS&E Audits

A schedule of audits will be developed early in the execution phase. These will principally be aimed at assessing the implementation of the Contractor's Health, Safety and Environmental Management System and the schedule will be risk based. It is likely that the following audits will be undertaken although the exact extent is to be defined:

- Safety audit of contractor's main fabrication site.

- Audit of HS&E MS implementation for construction.

- Fabrication yard and Construction Occupational Health audit.

- Audit of HS&E MS implementation during commissioning.

#### 4.2.19 Environmental Audits

Audits on the contractor's environmental performance will also be included on the schedule when developed. It is likely that the following audits will be performed:

- EMS implementation during fabrication.

- EMS implementation during construction

#### 4.2.20 Fabrication Site Inspection

Inspections will be made of the fabrication site by the PMT. The objective of the inspections will be to ensure that safe operations are being followed at site and risks to personnel are kept ALARP at all times. In the event that safety performance is lower than expected the frequency of visits will be increased.

#### 4.2.21 Construction Site Inspection

The construction site will be subject to HS&E inspections by BG Italy. The objective of the inspections will be to ensure that safe operations are being followed at site and risks to personnel are kept ALARP at all times. In the event that safety performance is lower than expected the frequency of visits will be increased.

#### 4.2.22 Pre-mobilisation Inspection

Part of the pre-mobilisation brief (see 4.2.13), this inspection is to assess the readiness of the contractor.

## 4.3 Construction, Installation and Commissioning

### 4.3.1 Commissioning and Handover Review

The objective of this review will be to confirm that the facilities are, or will be, fit for commissioning and subsequent operation. It will verify that the arrangements for commissioning and introduction of hydrocarbons are sound and that health, safety and environmental issues have been adequately addressed. It will be organised in close consultation with the Operator; the primary concern will be to ensure a controlled handover to the operational phase of the project.

### 4.3.2 OSC Review

The Operational Safety Case will be independently reviewed by BG Group. The object of the review is to ensure that the document:

- Correctly determines major hazards and controls for the new facilities
- Shows a clear demonstration that risks to persons will be as low as reasonably practicable

The review team will be made up from representatives from appropriate BG Group Skill Centres.

The Operational Safety Report required under Italian legislation (decree DPCM 31.03.89) will be prepared for prior approval.

## 5 IMPLEMENTATION RESPONSIBILITIES

Tables 5.1, 5.2, 5.3 and 5.4 summarise the implementation strategy for this plan in “RACI Chart” (Responsible, Accountable, Consult and Inform) format. The definitions for abbreviations used in the tables are:

- A: Accountable i.e. the person on whose desk the buck stops.
- R: Responsible i.e. the person (people) who must do the work (or ensure that it is completed). Where more than one person has responsibility they are shown with shared responsibility.
- C: Consult i.e. the personnel who must be consulted with to finalise the document or activity. They may have input in terms of comments or participation in the activity.
- I: Inform i.e. those people who must be informed about the activity, both before it occurs and afterwards in a summary of main findings.

**Table 5.1: RACI Chart for HS&E Activities  
Contractor Proposals**

Ref	ACTIVITY DESCRIPTION	POSITION			
		Operations Representative	HS&E Adviser	Project Team Members	Contractor
4.1.1	Performance Improvement Plan	I	R	I	I
4.1.2	Initial Submission to Gov. Authorities	R	R	I	
4.1.3	Preliminary Hazard Identification	C	R	C	
4.1.4	Evaluation of Proposal	I	R	C	

**Table 5.2: RACI Chart for HS&E Activities  
Project Execution Phase**

Ref	ACTIVITY DESCRIPTION	POSITION				
		Project Manager	Operations Representative	HS&E Adviser	Project Team Members	Contractor
4.2.1	HS&E Interface Meetings	A	I	R	I	C
4.2.2	PMT HS&E Meetings	A	C	R	I	
4.2.3	HS&E Incentive Scheme	A	I	R	I	R
4.2.4	Safety Case	C	A	R	C	R
4.2.5	Environmental Statement	C	A	R	C	R
4.2.6	Hazard Identification (HAZID)	I	C	R	C	AR
4.2.7	Environmental Hazard Identification (ENVID)	I	C	R	C	AR
4.2.8	Hazard and Operability Study (HAZOP)	I	C	R	C	AR
4.2.9	HS&E Risk Assessments	I	C	R	C	AR
4.2.10	HS&E Risk Register	C	I	AR	C	R
4.2.11	C and C Risk Assessments	I	C	R	C	AR
4.2.12	Design Review	AR	C	C	I	R
4.2.13	SIMOP's Assessments	A	C	R	I	R
4.2.14	Pre-mobilisation HS&E Brief	C	C	R		A
4.2.15	Bridging Documents	I	C	R	I	AR
4.2.16	Waste Management Programme	R	A	C	I	R
4.2.17	Collate Emissions/ Waste Data	I	A	C	I	R
4.2.18	Emergency Response Exercises	C	A	R	I	C

Ref	ACTIVITY DESCRIPTION	POSITION				
		Project Manager	Operations Representative	HS&E Adviser	Project Team Members	Contractor
4.2.19	HS&E Audits	A	C	R	I	C
4.2.20	Environmental Audits	I	A	R	I	C
4.2.21	Fabrication Site Inspection	AR	C	C	I	C
4.2.22	Construction Site Inspection	AR	C	C	I	C
4.2.23	Pre-mobilisation Inspection	AR	C	C	I	C

Table 5.4: RACI Chart for HS&E Activities  
**Construction, Installation, Commissioning**

Ref	ACTIVITY DESCRIPTION	POSITION				
		Project Manager	Operations Representative	HS&E Adviser	Project Team Members	Contractor
3.4.1	Commissioning & Handover Review	AR	C	C	I	C
3.4.2	OSC Review	C	A	R	I	C

APPENDIX 1 PROJECT IMPLEMENTATION SCHEDULE

Health, Safety & Environment		Start	Finish	Dec-00	Jan-01	Feb-01	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01	Sep-01
LVT0401	HS&E Management			[Green bar]									
LVT0402	Develop Project HS&EMS			[Green bar]									
LVT0403	Coarse HAZOP												
LVT0404	HS&E Evaluation												
LVT0405	Develop HS&E Incentive Scheme												
LVT0406	Safety Studies & OSC Support												
LVT0407	EIS Review and Support												
LVT0408	HAZID												
LVT0409	ENVID												
LVT0410	HAZOP												
LVT0411	Establish HS&E Risk Register												
LVT0412	Review HS&E Risk Register												
LVT0413	Construction and Commissioning Risk Assessments												
LVT0414	Design Review												
LVT0415	SIMOP's Assessments												
LVT0416	Pre-Mobilisation HS&E Brief												
LVT0417	Develop Bridging Documents												
LVT0418	Develop Waste Management Programme												
LVT0419	Develop Emergency Response Plan												
LVT0420	Conduct Emergency Response Exercise												
LVT0421	Fabrication Site Audit												
LVT0422	Construction Audit												
LVT0423	Occupational Health Audit												
LVT0424	Commissioning Audit												
LVT0425	Environmental Audit												
LVT0426	Commissioning & Handover Review												
LVT0427	Pre-mobilisation Inspection												
LVT0428	Safety Case Review												

Project HS&E Activities Schedule (Note this will be subject to development and revision post contract award.)



## APPENDIX 2 ROLES AND RESPONSIBILITIES

### 1. General HS&E Responsibilities

It is the responsibility of personnel on the project team to ensure that their own job is performed in a safe and environmentally acceptable manner. In summary:

- The level of risk seen by the employee or any employee under his supervision while carrying out his job shall be acceptably low.
- The level of risk posed to others by the employee or any employee under his supervision in the course of his job shall be acceptably low.
- The product of the employee's work and that of any employees under his supervision shall itself be acceptably safe.

If any team members believe that the criteria summarised above are not being met in their particular case, they should discuss the matter with their supervisor as a matter of urgency.

Personnel who become aware of an unsafe situation or action, in which they are or are not directly involved, should notify the Project Manager or the HS&E Adviser at the earliest opportunity.

### 2. Role Specific Safety and Environmental Responsibilities

In order to ensure that the HS&E policy and strategic objectives are adequately addressed throughout the project, specific responsibilities are assigned to roles within the Project Management Team (PMT). These responsibilities are summarised in the following sub-sections. These responsibilities are in addition to any general ones identified elsewhere in this safety management plan, or job descriptions.

#### Project Manager

Carries overall responsibility for the implementation of the HS&E Management System to the Brindisi LNG Project and for ensuring that applicable HS&E legislation, BG Italy policies and project goals are adhered to. Specifically, HS&E responsibilities include ensuring that:

- HS&E will not be compromised by schedule or commercial issues.
- Occupational health, environmental and safety aspects are considered fully by all parties.
- All hazards are identified and assessed.
- Safety and environmental standards adopted by Contractors are acceptable to BG Italy.
- Risks to persons have been reduced to levels that are tolerable and as low as reasonably practicable.
- Adverse environmental impacts are eliminated or reduced as far as reasonably practicable.
- Personnel on the project are competent to undertake the work for which they are responsible.
- HS&E and other audits or reviews are carried out as per the plan.

The project manager is also responsible for the safe execution of the project, and taking steps to ensure that the Contractor provides a facility that can be operated in a safe and environmentally acceptable manner.

#### HS&E Adviser

Co-ordinates and monitors all HS&E activities for the project to ensure that HS&E requirements and planned arrangements are being implemented. Specifically, he:

Provides advice and assistance to the Project Manager and to other project team members in the performance of their HS&E responsibilities.

Is responsible for ensuring the Contractor provides suitable data input to BG Italy to facilitate the timely development of the Brindisi LNG Site Operational Safety Case.

Creates and maintain overall project records for injury statistics and report any HS&E incidents into the BG Italy and BG Group systems.

Responsible for co-ordinating the production, updating and implementation of this HS&E Plan which will:

- “Oversee” the HS&E management systems of the involved parties.
- Identify schedules for audits and monitoring of HS&E activities undertaken by the PMT, including commitments made in the Environmental Statement.
- Identify schedules for audits and monitoring of contractors’ HS&E plans.
- Confirm that Contractors employ competent personnel in HS&E critical roles, and have a system for ongoing competency assurance.
- Ensure that the risks to personnel during execution, operation and maintenance are tolerable and as low as reasonably practicable.
- Ensure that the risks to the environment are reduced as far as reasonably practicable.
- Ensure that environmental mitigation measures are implemented by Contractors in compliance with permit commitments and current Italian legislation.

### **Operations Manager**

Carries overall responsibility for the implementation of the Asset HS&E Management System requirements to all surface facilities being provided for the Brindisi LNG Project. This includes ensuring that applicable HS&E legislation, BG Italy policies and project goals are adhered to.

- Specifically, HS&E responsibilities include ensuring that for the overall facilities development:
- HS&E will not be compromised by schedule or commercial issues.
- Occupational health, environmental and safety aspects are considered fully by all parties.
- All hazards are identified and assessed.
- Safety and environmental standards adopted by Contractors are acceptable to BG Italy.
- Risks to persons have been reduced to levels that are tolerable and as low as reasonably practicable.
- Adverse environmental impacts are eliminated or reduced as far as reasonably practicable.
- Personnel on the project are competent to undertake the work for which they are responsible.
- HS&E and other audits or reviews are carried out as per the plan.
- A safety case is prepared
- Ongoing production facilities are conducted in a safe manner during construction activities
- An Environmental Statement is prepared and approved by the Italian authorities, and is adhered to by all elements of the project.
- Preparation of Emergency Response plans and carrying out Emergency Response Audits

The operations manager is also responsible for the safe delivery of facilities project, and taking steps to ensure that Contractors involved provide a facility that can be operated in a safe and environmentally acceptable manner.

### **Contractor**

- Responsible for developing and implementing an HS&E incentive scheme in consultation with the HS&E Adviser and the Project Manager.

- Develops and implements an HS&E Plan for the design, fabrication, offsite transportation of equipment, construction and commissioning of the facilities.
- Undertakes the plant HAZOP, HAZIDs and Environmental Hazard Identification studies with the participation of BG Italy and the Project Team.
- Develops and implements an HS&E Risk Register to communicate hazards and controls to the workforce and Operations personnel.
- Maintains records of time worked, HS&E incidents and waste/emissions for regular reporting to the Project.
- Provides input on the inherent safety measures taken in developing the design of the project, which will be integrated into a combined safety case for the whole plant by the Operations Manager.
- Ensure construction and Operations personnel receive an HS&E briefing pre-mobilisation.
- Develops bridging documents to co-ordinate the interfaces between the HS&E management systems of the Project, the Contractor and BG Italy.
- Responsible for ensuring all activities by the Contractor and sub-contractors comply with applicable HS&E legislation, BG Italy policies, project goals and the contractor HS&E Plan.
- Implements the requirements of the ES that relate to the construction phase and operational performance and standards.

All contractors will be required to indicate their intended organisation for the management of all HS&E aspects, based on the generic outline provided. The independence of their HS&E specialists and links to the most senior member of their management team must be clearly defined.

### APPENDIX 3 – BG GROUP SECURITY CONSIDERATIONS

In implementing its Security Policy, BG Group will:

- Identify and periodically assess the security threats arising from its business operations and assess and manage the associated risks.
- Develop and maintain an effective Security Management system.
- Consider security at all stages of planning.
- Protect all Company assets, including personnel, corporate image, proprietary information, physical property, and key business processes, from all forms of harm.
- Mitigate or minimise identified risks by the use of proactive and cost-effective measures and procedures.
- Encourage a positive commitment to security by all levels of management by providing sufficient resources commensurate with the assessed risks.
- Conduct security operations in full compliance with the Statement of Business Principles, national legal requirements, international standards and, where appropriate improve on the performance standards specified.
- Produce emergency response, contingency and business interruption plans to cover all significant, foreseeable events to minimise the impact of any incident or emergency, and test and train personnel in their effective implementation.
- Record, analyse and investigate all reported security incidents and irregularities and develop improvements to prevent their re-occurrence
- Introduce and maintain active programmes to develop security awareness and responsibility among all staff and contractors.
- Ensure compliance with the policy through a process of education, review and audit.
- Involve and consult employees and, where appropriate, their representatives.
- Cooperate fully with relevant enforcement agencies and work with industry and external bodies to further improve the development of security management and practices.

**APPENDIX 4 – EMERGENCY RESPONSE PLAN**

1.0	Background	
1.1	Introduction	
1.2	Objectives	
1.3	Responsibility	
1.4	List of Anticipated Emergencies & Levels of Response	
1.5	Scope of Emergency Response Plan	
2.0	Organization and Planning	
2.1	Emergency Response Plan - Concept	
2.2	Emergency Response Team	
2.3	Recovery Teams – Business Continuity at local level.	
2.4	Authority and Communication	
2.4.1	Authority for Implementation of ERP	
2.4.2	Delegation of Authority	
2.5	Communication – Higher level of notification of an emergency.	
2.6	Recovery from the losses.	
2.7	Emergency Response – Incident Control Room	
2.8	Equipment in Incident Control Room	
	Annex - 1 : Organization Chart of Emergency Response Team	
	Annex - 2 : Emergency Response Communication and Mobilization Links	
	Annex - 3: Escalation of an Emergency – Guidance.	
	Annex - 4: Flow of Emergency Response.	
	Annex – 5 : Equipment in Incident Control Room	
<b>Section –2 : Emergency Response Organization, Roles and Responsibilities</b>		
1.0	Emergency Response Team Composition and Responsibilities	

1.1	Nominated ERT Team members	
1.2	ERT Current Status List	
2.0	Roles and Responsibilities of Emergency Response Team	
2.1	Role of ERT Chairman	
2.2	Role of Incident Controller	

2.3	Role of Fire & Safety Coordinator	
2.4	Role of Technical Coordinator	
2.5	Role of Mutual Aid and Off Site Coordinator	
2.6	Role of Welfare and Finance coordinator	
2.7	Role of Medical, Security and Rescue coordinator	
2.8	Role of Duty Manager	
2.9	Role of Incident Recorder	
	Annex – 6: ERT Current Status List.	

### Section – 3 : Alert Procedures

1.0	First Alert Procedures	
1.1	Employee Briefing	
1.2	Telephone Recording Devices	
1.3	First Alert Actions	
1.4	Guidance for Media Inquiries	
1.5	Preservation of Evidence	
2.0	Second Alert Procedures	
2.1	Introduction	
2.2	Second Alert Actions	
	Annex – 7: First Alert Proforma	
	Annex – 8 : ERT Agenda	

### Section – 4 : Emergency Action Guidelines

1.0	Emergency Response Guidelines for Non-plant buildings and office premises	
1.1	Anticipated Emergencies – in non-plant buildings & office premises.	
1.2	Steps to be taken – initial emergency actions	
2.0	Emergency Response Action Guidelines for incident controller, ERT Members & off site emergency team.	
2.1	Basic Actions for Gas Leak	
2.2	Action in case of a fire	
2.3	Leakage from Gas Pipeline	
2.4	Procedure for informing Authorities	
2.5	Media inquiries	
2.6	Procedure for dealing with relatives of injured	
2.7	Procedure for evacuation of persons from and adjacent to affected site	
2.8	Procedure for Bomb Threat	
2.9	Procedure for Visitors	
2.10	Specific Guidance on critical operations during an Emergency like isolation, venting, safe assembly etc.	
	Annexure –10 : Emergency Contacts	
	Annexure –9 : Mutual Aid Details	