1 Non-Technical Summary of EIA for the 2nd Upgrade of Revithoussa Island – Construction of 3rd Tank

1.1 General

The existing LNG terminal is in Revithoussa Island by mid-1999. It is used for storage of transported LNG and its regasification so that it may be released for consumption. The Revithoussa DESFA LNG facility is designed to carry out the following facilities:

- LNG unloading from LNG ships
- LNG quantities storage
- reliquidation of gases generated by natural evaporation of LNG in the tanks
- pumping and gasification of LNG
- NG insertion into the National Natural Gas Transmission System (NNGTS)
- Inactivation, Gassing Up, Cooling and Partial Filling of LNG ship cargo tanks.

1.2 Second Upgrade of Liquefied Natural Gas Terminal

The second upgrade of the LNG Terminal at Revithoussa includes, among others, adding a third “double shell” tank with a net capacity of 95,000m^3.

The aim of the project with the addition of the third tank at Revithoussa and the increase of the capacity of the terminal is:

I. To increase the available storage space which will allow the increase of the maximum Temporary Storage Period and the enhancement of the operator’s capacity for load balancing - taking into account the estimated future growth of the NG market in Greece.
II. To meet the demand of natural gas in case of discontinuation of supply for long periods.
III. To reduce the number of ship calls at the island.
IV. To increase competition due to activation of more LNG carriers
V. To reduce cost per unit volume of LNG. Thus, the project is expected to lead to lower prices for NG consumers.

The third tank is composed of two vessels, outer and inner; these are designed so that each alone may withstand the stored LNG.

The new tank has a diameter of 81.5 m and a total height of 37.26 m.

The new equipment required under the second expansion of the LNG Terminal includes four new submerged pumps to be installed in the new tank; and five new main lines. The connections for these lines are already made, so that shutdown of the Terminal is not necessary.

The other existing plants at the Terminal will not be modified with the installation of the third tank, such as the two existing reservoirs; the cryogenic LNG Compressors, the recondenser; the high pressure LNG pumps; the vaporisers; the containment vessels; and the gas fuel, flare, Compressed air, nitrogen, potable water, seawater, cooling water, fire fighting water, Fuel oil Systems.

In particular, the following main facilities are not modified:

- Two existing LNG tanks
- Cryogenic LNG Compressors
- Recondenser
- High-pressure LNG pumps
- Vaporisers
- Fuel Gas System
- Flare System
- Compressed Air System
- Nitrogen System
- Drinking Water and Facility Water System
- Seawater System
- Cooling Water System
- Fire Fighting Water System
- Fuel Oil System
- K.O. Drums

1.3 Project Location

The construction of the 3rd LNG storage tank is sited at the industrial installations of the LNG terminal on the island of Revithoussa, Municipality of Salamis, Regional Unit of Islands, Region of Attica.

1.4 Alternatives for the 3rd Tank

Different options were examined for the 3rd Tank, including the Zero Option. For the sake of safety and compatibility, technology and type of tank were chosen to be identical to the existing tanks and facilities. Therefore, the parameters that should be considered are size and location. In summary, three different tank capacities, four alternative locations and two sites for each position, above or below ground, were examined. The following is a summary overview of the alternatives:

I. Capacity

Theoretically, the tank size and the storage volume could reach up to 125.000m³, based on the inner diameter of 78m and minimum D/H ratio equal to 2.5 so as to meet seismic requirements and the applicable codes and standards. However, this would require the internal height of the tank to be 31m, i.e. adding 6m to the total height of the tank. Since the foundation plate will remain at the same level as the existing tanks, for compatibility reasons, i.e. at sea level, the larger tank would be visually inconsistent with existing tanks due to its height. A smaller tank would not fulfill the purposes of the project as efficiently as the size finally chosen, i.e. 95.000m ³.

II. Location

- Location 1 - East of the existing tanks, partially supported on earthfilled areas either above-ground or underground.
- Location 2 - East of the existing tanks at the minimum distance, in accordance with standard EN1473 (+11 m), with the road network at a lower level, mainly supported on bedrock, either above-ground or underground. Also, in the same position, a third alternative was examined; this differs with respect to a dyke around it and raising the level of the road network.
- Location 3 - North of the existing tanks at the minimum distance, according to EN1473 standards (+23 m), mainly on earthfills, above ground - as underground installation would require the placement of the mounting plate at a grade below sea level.
- Location 4 - West of the existing tanks, mainly founded in bedrock, underground.

1.5 Project Construction Concept

Project construction is divided into two main parts: the earthworks for the accommodation of the third tank; and construction of the third LNG tank. At the southeastern end of the island one well will be drilled with a diameter of ~ 82m, at a distance of 129m from the eastern reservoir and a depth of ~ 25.00m, with an estimated volume of earthworks equal to 129,000m³. This well shall accommodate the construction of the new LNG storage tank. A part of the tank (the one not encased below grade) will be backfilled with ~ 30,000m ³ from the excavated material generated from the well, reducing the spoiling on the landscape and assimilating the 3rd tank in the existing plants.

A circumferential road around of the third tank will be constructed for safety purposes. Pipe ways; LNG low pressure pumps; and LNG leakage collection trench as well as retention basin, etc. will also be constructed , just as for the existing tanks. The inclination of the soil around the LNG processing equipment shall allow effluent drainage to the collection trench and finally to the retention basin. Although the new third tank is covered by the existing leakage retention basin, there is the option for construction of a further leak

retention basin. Details on the size and location of the new basin will be engineered in the detailed design phase of the new tank.

During the construction phase, the Best Available project site Techniques will be followed to minimize impacts on the natural and social environment. These include, but are not limited to the following:

1. Performance of works in the presence of the supervising engineers of DESFA or parties authorized by DESFA engineers;
2. Performance of excavation exclusively within the delimited project area, as shown in the approved plans and studies of the project;
3. Compliance to technical protocols, procedures and requirements of worksite legislation;
4. Avoidance of burying worksite waste such as wrapping materials, pallets, all kinds of boxes, electrodes, wires, welding parts etc., especially at foundation and concreting positions;
5. Using well - maintained equipment;
6. Full reinstatement after completion of the works, etc.

The construction works will be carried out with suitable mechanical equipment rather than by using explosives for safety reasons.

1.6 Measures for Natural Environment Rehabilitation and Protection

There will be no gas pollutant emissions from new equipment or the new tank. Additional quantities of liquid waste from the new equipment will be processed in the existing wastewater treatment plant, located on the island Revithoussa. Generation of solid waste, sludge or toxic waste will be avoided.

The acoustic environment will not be affected during the construction phase, as these operations will be limited. Moreover, these will take place exclusively on the island of Revithoussa, which is isolated from the rest of the region. Noise from existing facilities and new equipment will be maintained within the limits specified in PD 1180/81 and the applicable European legislation.

Project construction and operation will not affect the existing and planned land uses and will not impact sites of archaeological interest. The visual impact is minimized as the 3rd tank will be fully integrated into the industrial environment by the construction of an embankment around it.

Terrestrial and marine ecosystems in the region will not be affected.

The proposed measures promote the upgrading of degraded natural environment of the region. Replacing other, more polluting fossil fuels with Natural Gas, contributes to the achievement of national objectives for combating Climate Change.

1.7 Conclusions

The upgrade of the Liquefied Natural Gas Terminal in the island of Revithoussa is considered paramount to Greece after having been annexed under Article 6 of the General Framework for Physical Planning and Sustainable Development, regarding the “Spatial structure of critical infrastructure networks and transport services, energy and communications”.

This EIS examines the impact on the natural and social environment during the construction and operation phase of the third tank, within the framework of the second Upgrade of the LNG Terminal at Revithoussa; it furthermore proposes measures to mitigate any negative impact. Considering that the negative impact is generally limited and insignificant, and taking into account the implementation of mitigation measures and the opportunity for improving the environment by using Natural Gas, i.e. a less polluting material, it concludes that:

the construction and operation of the 3rd Storage Tank of Liquefied Natural Gas at the Terminal of Revithoussa Island is environmentally fully acceptable; and the issuance of a Decision of Approval of Environmental Terms is proposed.