PLEA FOR THE ESTABLISHMENT OF A GOVERNMENTAL POLICY FRAMEWORK, LAWS, REGULATIONS AND AUTHORITIES TO REGULATE THE IMPORTATION OF LIQUEFIED NATURAL GAS BY SEA

Synopsis

Rescue Vleesbaai Action Group ("REVAG") has been opposing the Environmental Impact Assessment ("EIA") process in respect of the erection of an offshore facility for the importation of liquefied natural gas ("LNG") by PetroSA in the bay of Vleesbaai, near Mossel Bay, since 2008. The Department of Environmental Affairs rejected the Scoping Report on 9 September 2010. On 30 September 2010 PetroSA decided not to pursue the EIA process for the said proposal any further. REVAG is grateful for the outcome. However, it could easily have been otherwise.

It has been reported that other parties plan to import LNG at the Port of Ngqura at Coega in the Eastern Cape, Cape Town harbour, Saldanha Bay as well as along the West Coast. In the light of REVAG's experience over the past two years, we fear that the communities in those areas are not aware of the risks and dangers of the proposed activities.

Citizens of South Africa cannot rely only on the environmental laws and their application by the authorities, to ensure that the hazards in respect of LNG or compressed natural gas ("CNG") and its importation are not visited on their communities. The Government has to play its role in this regard as well.

<u>There is currently no governmental policy framework in place in South Africa regulating the importation of LNG/CNG by sea, its offloading and regasification.</u>

NERSA's rules do not deal with the possibility of an offshore LNG/CNG offloading facility, its siting and the behaviour of LNG/CNG Storage and Regasification Vessels at sea. Neither SAMSA nor the TNPA has the authority to consider the application for the siting/location and operation of such a facility offshore.

It is recommended that any further LNG/CNG importation or gas licence applications before NERSA should be suspended until such framework, and the necessary enabling Acts, Rules and Regulations, have been promulgated by Government. NERSA itself cannot fill the policy void as it involves a number of State Departments.

This memorandum gives an overview of:

- the voids in the current policy framework;
- the USA regulatory regime and the enabling Acts that would be required, eg an equivalent to the Deepwater Port Act;
- the type of regulations that would be required in respect of LNG/CNG offloading facilities and LNG/CNG carriers;
- the enforcement agencies that would have to be given much wider powers, eg South African National Ports Authority and S A Marine Safety Authority; and
- a new enforcement agency that would have to be established similar to the US Coast Guard to regulate LNG/CNG carriers at sea, unless the SA Navy is specifically mandated to perform certain functions.

Prior to any policy measures being finalized, the necessary research has to be done in respect of the risks and hazards of LNG/CNG, large LNG/CNG carriers, LNG/CNG storage and regasification vessels as well as large-scale offshore LNG spill tests in South African waters.

1. INTRODUCTION AND BACKGROUND

The Rescue Vleesbaai Action Group ("REVAG") has been opposing the Environmental Impact Assessment ("EIA") process in respect of the erection of an offshore facility for the importation of liquefied natural gas ("LNG") by PetroSA in the bay of Vleesbaai, near Mossel Bay, since 2008. The Department of Environmental Affairs rejected the Scoping Report on 9 September 2010. On 30 September 2010 PetroSA decided not to pursue the EIA process for the said proposal any further. REVAG is grateful for the outcome. However, it could have been otherwise.

It has been reported that other parties plan to import LNG/CNG at the Port of Ngqura at Coega in the Eastern Cape, Cape Town harbour, Saldanha Bay as well as along the West Coast. In the light of REVAG's experience over the past two years, we fear that the communities in those areas are not aware of the risks and dangers of the proposed activities.

Citizens of South Africa can currently only rely only on the environmental laws and their application by the authorities, to ensure that the hazards in respect of LNG/CNG and its importation are not visited on their communities. The Government has to play its role in this regard by putting the necessary authorities and regulations in place to regulate the importation of LNG/CNG by sea, its offloading and regasification, and the vessels used for its transportation at sea.

For more information in regard to the PetroSA proposal and REVAG's opposition to it, you are referred to REVAG's website www.revag.co.za

This document is merely the recordal of REVAG's own research with limited resources over the past year. It does not purport to be exhaustive and authoritative. However, it intends to:

- urge government and its agencies to attend to the shortcomings in the policy and regulatory framework; and
- give any group of citizens who are concerned about the proposed location of an LNG import facility in their vicinity, a heads-up in respect of the regulatory landscape.

2. APPROVED GOVERNMENT POLICY

2.1. One would have assumed that the importation of LNG/CNG already forms part of the approved National Energy Policy. Does such a policy exist and is it part of such approved policy?

The White Paper on the Energy Policy of the Republic of South Africa was published in December 1998 and approved by Cabinet on 2 December 1998. See www.dme.gov.za/pdfs/energy/planning/wp_energy_policy_1998.pdf

As far as the regulatory regime, industry structure, transmission, distribution, fiscal matters and technical standards are concerned (par 7.5.6 – 7.5.11) it is quite clear that **what was envisaged was the importation of gas <u>from neighbouring countries via "the construction and operation of transmission and distribution pipelines, storage and metering</u>.**" (par 7.5.11). This is echoed in par 7.5.12 which states:"**No restrictions will be placed on the use of gas, or on the amount of national primary energy sourced from gas that may be imported from SADC countries**."

The importation of LNG/CNG by sea or from non-SADC countries was not envisaged or catered for and is clearly NOT part of Government's current energy policy.

Government's policy in respect of environment, health and safety is set out in par 8.4.

A **Gas Infra-Structure Plan** was issued by the Department of Minerals and Energy and updated on 19 April 2005. See www.dme.gov.za/pdfs/energy/gas/gas_infrastructure_plan.pdf

Par 11.7 deals with LNG as alternative form of natural gas transmission to South African gas markets. It mentions "ocean transport of the LNG" and "**unloading and storage at the reception terminal**." On page 53 the Government's thinking is summarized as follows:

"The capital costs of a regasification facility is shown in Table 4 and was developed based on the following assumptions:

- modifications to the Cape Town harbor facilities to accommodate 6 000 tonnes LNG tankers.
- LNG receiving terminal with 130 000 m^3 transfer capabilities. This will include loading arms, LNG transfer lines and return gas lines.
- two 65 000 m^3 LNG storage tanks.
- Secondary 75 bar LNG compression system.
- 70 MMscfd regasification plant.
- 75 bar, 18" pipeline connecting the LNG plant to the main transmission line at City Gate 2.

Plant Capital Costs	**US $ m**
Modifications to Cape Town harbour	5.8
LNG receiving terminal	72.6
LNG storage tanks	112
Regasification plant	52
Gas pipeline	2.5
Total	**244.9**

Total annual terminal and pipeline operational expenditure will amount to US $ 9.06 million."

It is clear that the importation of LNG at a floating offloading facility at sea by means of Storage and Regasification Vessels ("SRV's") was never contemplated and is NOT part of the Government's current Gas Infrastructure Plan. LNG/CNG carriers without on-board regasification facilities are also not mentioned.

2.2. **South Africa therefore does not have a policy in respect of the siting, safety and regulation of offshore LNG/CNG Import terminals**. For all the issues involved see the report to Congress by Paul Parfomak and Adam Vann, (2009) LNG Import Terminals: Siting, Safety and Regulation, Congressional Research Service, The Library of Congress, RL32205, February 2009. Such policy is formulated by doing research, publishing the necessary white and green papers, and having public hearings. For the pdf version of the full report see http://ncseonline.org/NLE/CRSreports/09Mar/RL32205.pdf

2.3. **Under which Department's jurisdiction does policy formulation in respect of the matters raised in 1.2 fall, or is it a joint inter-departmental responsibility?** According to par 8.10 of the White Paper on the Energy Policy, referred to in 2.1 above, the governance roles of the different governmental institutions have been clarified. It is concluded in par 8.10.2 (page 107) that extensive interdepartmental co-operation will be required.

2.4. **The National Energy Regulator of South Africa ("NERSA"), with its current mandate as set out in 7.2 below, cannot on its own attempt to fill the policy void.** See in this regard the article "Electricity Policy: Regulator must come under spotlight in SA's power play" in Business Day of 29 January 2010 by prof Mike Muller, visiting adjunct professor at the Wits University Graduate School of Public and Development Management, attached hereto as a separate PDF file. Herewith a few extracts:

"At a minute to midnight (or more precisely, on December 31 2009) the Department of Energy belatedly promulgated an Integrated Resource Plan, setting the basic framework of investment for the next three years. Then the Cabinet confirmed the rumour that part of the new Kusile power station may be sold. But NERSA has not yet provided a framework to explain how process for electricity from a part-privatised generator will be determined while protecting the public interest.

Given this policy uncertainty and fluidity, it will be hard for NERSA to make well considered recommendations, much less claim to have consulted about them. **So the suggestion that it should recuse itself and throw the ball back to the politicians was seriously made.**

……..It would be sensible to initiate an overhaul of the 1998 policy…….
If that happens, an early question will be **why an accountable economic regulator such as NERSA, conceived with a limited focus on price and performance, is now replacing the government as the planner of a sector so central to the life of the country.**

Such a review is not yet in the script but the role of parastatals and the way decisions are taken about them is increasingly contested. As that debate develops, the role of the regulators should come under the spotlight."

3. RESEARCH

Prior to policy being formalized, research will be required e.g. in respect of the risks and dangers of LNG/CNG. **To the best of our knowledge this has not taken place in SA yet. Research**

normally precedes and influences policy. The research must include large LNG/CNG carriers, LNG/CNG storage and regasification vessels and large-scale offshore LNG spill tests must be conducted in SA waters.

4. LAWS

Enabling laws are required to set out the rules of the game and determine jurisdictions of various governmental agencies. For example, **in the USA they have**:

- Deepwater Port Act which deals with such installations at sea
- National Environmental Management Act
- Pipeline Safety Act
- Coastal Zone Management Act
- National Fire Protection Association

For an overview of the USA regulatory regime, see **Annexure 1** hereto.

In South Africa we only seem to have:

- Environmental Management Act, 107 of 1998 ("NEMA")
- Maritime Traffic Act, 2 of 1981
- National Ports Act, 12 of 2005
- Mine Health and Safety Act, 29 of 1996
- Occupational Health and Safety Act, 85 of 1993
- National Energy Regulator Act, 40 of 2004
- The Gas Act, 48 of 2001
- Petroleum Pipelines Act, 60 of 2003

No Act however specifically deals with and regulates the licensing, siting (i.e. location) and operation of LNG/CNG offloading installations at sea. There is also no act that regulates large LNG/CNG carriers or LNG/CNG Storage and Regasification Vessels and facilities.

5. REGULATIONS AND STANDARDS

Regulations and standards are required especially in respect of siting, safety, and roles of the various authorities.

There are currently no safety standards in place for the erection and operation of a floating LNG/CNG offloading facility in South Africa. There is also no independent agency to do the monitoring. In reply to a question by REVAG, PetroSA said that <u>they</u> would develop these standards as they go along!

In the USA they have the US Code of Federal Regulations (CFR) 49, Part 193. It sets out federal safety standards in respect of LNG offloading facilities. This determines separation distances, safety and protection zones. See **Annexure 2** hereto.

6. GOVERNMENTAL AUTHORITIES TO BE INVOLVED

It is expected that at least the following South African Government Departments should be involved:

- Department of Energy
- Department of Defence
- Department of Environmental Affairs
- Department of Labour
- Department of Transport
- Treasury
- CSIR (Council for Scientific and Industrial Research)
- Provincial Governments: Pursuant to 33 U.S.C. § 1508 of the Deepwater Port Act, the governor of the adjacent coastal state must approve the issuance of a deepwater port license. It means that adjacent coastal states, through their governors, have a veto power over all Deepwater Port Act projects.

7. APPROVAL AND ENFORCEMENT AGENCIES

7.1. NERSA (National Energy Regulator of South Africa)

NERSA's mandate is to regulate the electricity, piped-gas and petroleum pipeline industries in terms of the Electricity Regulation Act, 2006 (Act No. 4 of 2006), Gas Act, 2001 (Act No. 48 of 2001) and Petroleum Pipelines Act, 2003 (Act No. 60 of 2003). Its mandate seems broadly similar to that of the Federal Energy Regulatory Commission in USA. See its website www.nersa.org.za. See also the comments about its role in 2.4 above.

From a NERSA regulatory perspective it appears as if proposed projects for the importation of LNG/CNG by sea will fall at least under the regulatory ambit of the Gas Act and that a licence in terms of section 15 of the Gas Act will be required. "Gas" is defined as including liquefied natural gas and re-gasified natural gas. If this preliminary view is correct, this will trigger the requirement for a licence to be issued by the "Gas Regulator" which is defined in the Act as meaning the "*National Energy Regulator established by section 3 of the National Energy Regulator Act, 2004*" (i.e. NERSA).

The Gas Act sets out the specific requirements regarding an application for a licence, which include the following:

- Section 15 sets out the activities requiring a licence. These inter alia include the construction or operation of transmission, storage, liquefaction and re-gasification facilities.

- Section 16(2)(f) – "*Any application contemplated in subsection (1) must include … the plans and ability of the applicant to comply with all applicable labour, health, safety and environmental legislation*".

- Section 17 – a public participation process is required to be followed.

- Section 18(b) – "*Before considering an application for a licence in terms of this Act, the Gas Regulator … may direct the applicant to alter the plans for the proposed construction of gas facilities or the proposed provision of gas services in order to comply with applicable health, safety or environmental legislation*".

In terms of GN 289 of 1 March 2006, rules regarding licensing have been made by NERSA. These appear to still remain valid but this will have to be verified. Without going into detail on these rules, the following points should be noted:

- The rules set out the information required in respect of a number of activities, such as the construction of a re-gasification facility. **The possibility of storage and re-gasification on board a ship is however not mentioned. The siting of such vessel is obviously also not mentioned.**

- **What is required however is proof of the viability of the proposed facility including commercial structure, projected cash flows, LNG sources and LNG supply in tonnes per annum.**

- In terms of rule 15(b), objections to the application will be considered by NERSA at the stage of the Gas Act licence application.

- The rules indicate, in terms of rule 3, that "*An application for a licence must be made in writing in the form specified in Annexure A and must contain the information specified therein*". Chapter 2 of Annexure A "DOCUMENTS TO BE ATTACHED TO THIS APPLICATION" includes:

    - v "*8. A certified copy of the Record of Decision of the relevant environmental authorities in accordance with the National Environmental Management Act, 1998*

(Act No. 107 of 1998) permitting the activity for which the licence is sought, if applicable or proof and the status of such a permit application".

- v "*9. List of applicable regulations, operating and technical standards, codes and specifications including those relating to safety to be used in the activities for which this application is made. For example, American Society of Mechanical Engineers (ASME) Standards, American Petroleum Institute (API) Standards and European Norms (EN)*".

- v "*12. Provide proof of compliance with regulations made under the Gas Act, 2001 (Act no. 48 of 2001) regarding environmental rehabilitation*".

Based on the above documents (notably the document referred to at item 8) it appears that the Gas Act application is likely to proceed only once a positive environmental authorisation has been obtained.

It also would appear that there are a number of aspects of environmental and health and safety consideration in terms of the requirements of the Gas Act licensing that may potentially not receive adequate attention through the NEMA EIA process. These may include the "*List of applicable regulations, operating and technical standards, codes and specifications including those relating to safety to be used in the activities for which this application is made*" as well as the rehabilitation requirements that arise through the Gas Act, amongst others.

An "international standards" criterion is introduced into the equation through item 9. NERSA has shown the capacity to make tough decisions against applicants and, assuming that a licence application will be required, both the EIA process and the Gas Act licensing process should be seen as avenues to raise concerns and to oppose any proposed LNG/CNG project.

7.2. NPA (South African National Ports Authority)

It is also known as the **TNPA** (Transnet National Ports Authority). **It seems as if it only has jurisdiction over ports/harbours.**

Transnet National Ports Authority is a division of Transnet Limited and is mandated to control and manage all seven commercial ports on the 2 954 km South African coastline. Transnet

National Ports Authority has developed Port Rules in terms of section 80(2) of the **National Ports Act, no 12 of 2005,** "for the control and management of ports and the approaches thereto and for the maintenance of safety, security and good order in the ports".

The **Port Rules** as approved by the Minister of Transport, came into effect on 6 March 2009, as published in the Government Gazette No. 31986 (Vol. 525) on 6 March 2009. The Minister of Transport has promulgated **Port Regulations** in terms of section 80(1) of the National Ports Act. The Port Regulations published in Government Gazette No. 30486 came into effect on 23 November 2007.

7.3. SAMSA (SA Maritime Safety Authority)

REVAG addressed a letter to SAMSA on 4 June 2009. SAMSA's reply dated 18 June 2009 is attached as **Annexure 3**. It *inter alia* states as follows:

"SAMSA's jurisdiction does not extend to the approval or rejection of the proposed LNG terminal which I understand will be under the control of the TNPA and the environmental aspect will be dealt with by the Department of Environmental Affairs, they are the custodians."

At the Focus Group Meetings held by Aurecon on behalf of PetroSA from 18 to 20 May 2009 it was conceded by Aurecon and PetrosA that no safety and operating standards exist in SA in respect of Storage and Regasification Vessels (SRV's) or LNG carriers and the operation at Submersible Turret Loading Buoys (STL's). SAMSA's reply thereto was as follows:
"Once the project has been approved, SAMSA will have in place procedures, standards and stringent requirements to be adhered to."

REVAG asked whether SAMSA has siting (location) requirements and regulations (along the lines of the USA's Federal Energy Regulator) for LNG installations onshore and offshore. Its reply was as follows: **"No, but SAMSA will need to be informed on the proposed location to determine and promulgate navigational and safety zones."**

REVAG stated in its letter to SAMSA that PetroSA seems to be the only party that is busy determining the location of the proposed facility. In other countries there are governmental authorities that have issued rules, regulations and guidelines with which applicants (such as PetroSA) have to comply. SAMSA replied as follows: **"SAMSA can only become involved where safety of navigation is an issue both by the LNG carrier and other vessels operating in the area."**

REVAG asked what are SAMSA's requirements in this regard? SAMSA replied as follows: **"None"**

REVAG asked whether SAMSA's requirements comply with international best practice, standards and norms? SAMSA replied as follows: **"Siting is not a SAMSA issue unless there is a conflict that will endanger safety of life at sea or be a pollution threat." SAMSA is therefore not concerned with or mandated to protect life on land.**

SAMSA does not seem to fulfill the same functions as the US Maritime Administration which grants "deepwater port licences" [see www.marad.dot.gov/ports_landing_page/deepwater_port_licensing. For details of the license granting process and what is involved in the USA deepwater port licensing program see www.marad.dot.gov/ports_landing_page/deepwater_port_licensing/dwp_faq.htm
See **Annexures 4 and 5** hereto.

8. COAST GUARD

The Coast Guard developed Navigation and Inspection Circular (NVIC) 03-05 *Guidance for Oversight of Post-Licensing Activities Associated with Development of Deepwater Ports* (Coast Guard 2005b) in order to provide guidance related to design, plan review, fabrication, installation, inspection, maintenance, and oversight of deepwater ports.

South Africa does not have an agency similar to the US Coast Guard. SAMSA does not have its own patrol vessels. Unless a SA Coast Guard is established, the SA Navy will have to be specifically mandated to fulfill this role.

9. PROVINCIAL GOVERNMENTS AND THEIR NATURE CONSERVATION DEPARTMENTS

Their role is currently unclear.

Pursuant to 33 U.S.C. § 1508 of the Deepwater Port Act, the governor of the adjacent coastal state must approve the issuance of a deepwater port license. It means that adjacent coastal states, through their governors, have a veto power over all Deepwater Port Act projects. This seems to be a sound principle that should be adopted by South Africa as well.

10. LOCAL AUTHORITIES, FIRE PROTECTION AND SAFETY DEPARTMENTS

There is no doubt that any proposed LNG/CNG offloading facility would pose substantial safety risks to members of nearby communities. In accordance with the Major Hazard Installation (MHI) Regulations R.692 of 30 July 2001 under the Occupational Health and Safety Act (No 85 of

1993), a major hazard installation risk assessment will have to be conducted for the facility. The risk assessment report must be submitted to the following authorities (MHI Regulation 5[1]):

• The Chief Inspector of the Department of Labour.

• The Provincial Director of the Department of Labour in the Province concerned.

• The Head of the Emergency Services of Municipalities in the area.

The MHI risk assessment process falls under legislation governed by the National and Provincial Departments of Labour and the Municipalities involved, and not by the National and Provincial Departments of Environmental Affairs. MHI Regulation 9 (1) (c) gives a local authority the power to disapprove a particular major hazard installation if it poses a risk to housing and other centres of population.

11. SITE SPECIFIC HAZARDOUS INSTALLATION STUDIES

The transportation of LNG, its storage on board a SRV, its regasification and the pumping of gas to shore is, according to Sandia Laboratories [SAND2005-7339, page 14 – see below], a "*hazardous marine import operation*" and fraught with risks.

In a 2005 report, using conservative estimates and with the assistance of computer modelling, Sandia concluded that in a scenario where approximately 200 000 m^3 of LNG are released from two tanks, under wind conditions of 2 m/s, it will result in a flammable vapour cloud of potentially ignitable methane gas extending up to 7.3 miles or over 11 kilometres downwind from the proposed installation. In addition to the aforegoing findings, REVAG has been advised that although the vaporized LNG may not burn, the gas may still be toxic and/or asphyxiating in any concentration, and therefore still lethal to human beings, as far as it travels downwind.

The key issue arising from this 2005 Sandia Report is therefore that, in one of the LNG storage breach scenarios assessed, the maximum distance to Lower Flammability Limit (LFL) associated such a breach is over 11 km (refer to page 24 and Table 5).

"LFL" in the context is understood as being that distance from the point of spillage to where the gas has dispersed sufficiently not to be flammable anymore (i.e. the gas has been diluted (mixed with air) to the point where the gas concentration is too low for it to burn). In other words, "LFL" translates to "flammability footprint". It seems reasonable to consider this as a safety limit as far as fire is concerned.

We also refer to Tim Riley's website www.LngDanger.com – refer in particular to the link to "Ignitable LNG Vapor Clouds". The information reflected in this website suggests that far greater ignitable vapour cloud scenarios have been identified (for example, in terms of an EIA report in response to proposed LNG offloading facilities near Oxnard in California, in the case of an offshore LNG carrier collision in the channel traffic lane [125,000 cubic meter spill, five tank rupture] the ignitable vapour cloud would spread 30 miles (48 kilometres) before ignition blast).

Further to the questions around safety and the reliance placed upon the 2004 Sandia Report in PetroSA's Final Scoping Report, it is stated as follows at page 96:

> "*In the USA, the National Fire Protection Association recommends that an incident heat flux value of 5 kW/m^2 be the design level that should not be exceeded at a property line or in areas where groups of more than 50 people might assemble. Consequently, 5 kW/m^2 is commonly used for establishing fire protection distances for people (Sandia, 2004). This has been disputed by certain stakeholders involved with the proposed project. However health and safety regulatory bodies around the world commonly use this value for radiated heat from any source (i.e. for any industry, not just LNG), and it is deemed acceptable for the PetroSA project as best practice*".

This "deemed" acceptability of the 5 kW/m^2 is certainly open to question in the context of the proposed project as this is evidently not the only value that is relied upon by health and safety regulatory bodies around the world. By way of example, extracts from a document prepared by Levitan & Associates, Inc. (LAI) for the Long Island Power Authority relating to the Broadwater LNG terminal (*Broadwater LNG A Technical Assessment Market, Technology, Environmental and Safety Related Impacts in New York State*, July 2007, at page 105) indicates that:

> "*FERC relies exclusively on the thermal radiation levels identified in NFPA 59A. It must be noted that in the 2005 NFPA 59A update, the proposed revision to the thermal radiation flux levels, from 5 kW/m^2 to 2.5 kW/m^2, was rejected. In Europe, the allowable thermal radiation level for "critical areas", i.e. areas that are difficult to evacuate on short notice, is 1.5 kW/m^2 [ref: California Energy Commission, December 8, 2005 filing at FERC concerning the Long Beach LNG terminal (CP04-58-000)]. In Austria, the land use planning standard for new facilities is 2.0 kW/m^2. [ref: ibid] LAI considers 2 kW/m^2 to be the thermal flux level that should be used as the limit for calculating safe distances from an LNG pool or vapor fire*".

In every case it should be established whether the location alternatives do or do not present "critical areas" as envisaged in the above extract in that, in the event of an actual or pending accident or incident involving a lng carrier or SRV (such as one or two LNG carriers or SRV's being driven towards the shore by wind or wave action), the impacted communities would be extremely difficult to evacuate on short notice. This suggests that the appropriate "buffer zone" between the LNG offloading facility and human habitation (proposed to be 2.5 km at page 96 of the Final Scoping Report) requires reconsideration based on a **complete and current analysis of global best practice in respect of public health and safety standards**. In addition, it is an absolute prerequisite for the approval of the siting of any proposed LNG offloading facility that **a site specific safety study has to be done by world renowned experts in respect of the maximum number of LNG carriers or SRV's that would at any one point in time be present at the said proposed location**. Both such considerations must form part of the quantitative risk assessment which is to be undertaken.

In the 2004 Sandia Report [SAND2004-6258], the guidance document for assessing risk of inadvertent or intentional releases of LNG, Sandia considered mainly open-water transportation operations. While the 2005 Sandia Report should be read in its entirety, and of course in the context of the project it relates to, the following are key extracts:

- The Report states (on page 29) that "*By contrast, the Cabrillo project covers a much broader spectrum than LNG off-loading by including LNG storage (within the FSRU [Floating Storage and Regasification Unit]), regasification and pumping gas to shore. Some aspects of the proposed design – especially active and passive methods for station keeping – have an*

extensive track record in other deep water systems (e.g., drag anchors). But other operations on a floating facility (e.g., processing) have fewer applications in the LNG industry and as such may involve more uncertain risks".

- Sandia states (on page 30) that the location of the (Cabrillo) FSRU 22 km offshore is sufficiently remote as to pose limited risk to shore-side persons or facilities under any scenario of LNG release. However, even at such a distance offshore, the Report nevertheless still emphasises that "*But if the mooring were to fail, whether caused accidentally or intentionally, there should be a contingency plan to prevent the FSRU from drifting near shore*". The question therefore has to be posed in every instance whether the proposed location (or siting) of a proposed facility would allow adequate time for any "contingency plans" to be effectively implemented in the event of a mooring failure, in particular given the number of safety standby vessels that is proposed to be used.

- Sandia concluded its 2005 Report (on page 32) by stating the following: "*Many of the concerns dealt with the difficult area of the identification and evaluation of credible intentional threats and the analysis of the potential fire and dispersion hazards associated with possible large LNG spills. Both the threat and the hazard analyses can be very difficult and complicated*".

The LNG safety provisions in the federal pipeline safety law of the USA require the Secretary of Transportation to "*consider the ... **need to encourage remote siting***" of new LNG facilities (49 U.S.C SS 60103). Federal regulations contain no clear definition of what constitutes "remote" siting, relying instead on safety exclusion zones to satisfy the remoteness requirements under the Pipeline Safety Act. This regulatory alternative was criticised by the General Accounting Office (GAO) in 1979 testimony to Congress supporting remote siting in the Pipeline Safety Act:

> "***We believe remote siting is the primary factor in safety. Because of the inevitable uncertainties inherent in large-scale use of new technologies and the vulnerability of the facilities to natural phenomena and sabotage, the public can be best protected by placing these facilities away from densely populated areas***" [Peach J.D. GAO, Director, Energy and Minerals Division. Testimony to the Senate Committee on Commerce, Science and Transportation. Washington, DC. April 25, 1979. Page 10. The General Accounting Office is now known as the Government Accountability Office]

The source of the above information is a *Report to Congress by Paul Parfomak and Adam Vann, (2009) LNG Import Terminals: Siting, Safety and Regulation, Congressional Research Service, The Library of Congress, RL32205, February 2009*.

REVAG fully endorses the concept of remote siting in South Africa and the motivation behind it as elucidated by the USA's Governmental Accountability Office. The determination of ultimate risk exposures associated with marine based LNG technology is understood to be an evolving science (as demonstrated by Sandia's review of the Cabrillo Port IRA). All findings seem to be based on theoretical modelling exercises without any full scale tests of large-scale offshore LNG spills having been conducted. Permissible public risk exposures apparently vary around the world and the risk exposure is also expected to be dramatically increased by the requirement that at least one LNG tanker needs to supply gas on a permanent basis.

It is quite clear that **safety considerations have a major influence on the proposed location of such a facility**. In the light of the grave risks posed by this type of hazardous project close to the coast using new technology, **all necessary safety related studies (whether required in terms of the Mine Health and Safety Act 29 of 1996, the Occupational Health and Safety Act 85 of 1993, or any other applicable legislation**), **should in future precede the EIA phase studies** as identified safety concerns arising from those safety related studies may specify new locations further offshore or even elsewhere or may otherwise preclude the location alternatives proposed.

12. CONCLUSION

The South African Government is hereby urgently requested to instruct the responsible Government Departments and regulatory authorities to supplement the current policy framework with the necessary Acts, Rules and Regulations (and, if required, Regulatory authorities) to regulate the importation of LNG by sea, its offloading and regasification, as well as large LNG/CNG carriers and LNG/CNG Storage and Regasification Vessels.

7 October 2010

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Annexure 1

LNG SAFETY AND SECURITY

The Center for Energy Economics issued a safety and security update on LNG in October 2003, which was updated in November 2006.
Herewith a few extracts:

Separation Distance.
Federal regulations have always required that LNG facilities be sited at a safe distance from adjacent industrial, communities and other public areas. Also, safety zones are established around LNG ships while underway in U.S. waters and while moored. The safe distances or exclusion zones are based on LNG *vapor dispersion* data, and *thermal radiation* contours and other considerations as specified in regulations. (p12)

In the U.S., regulators regulate *setbacks or protection distances* for LNG storage and other facilities. The federal safety standards on LNG facilities are found in the U.S. Code of Federal Regulations (CFR) 49, Part 193.[1] Setbacks are important for protecting surrounding areas should the unlikely release of LNG or a fire occur at an LNG facility. The regulations specify that each LNG container and LNG transfer systems have a *thermal radiation protection zone* beyond the impoundment area.[2] Each onshore LNG container or tank must be within a secondary dike or impoundment area. These thermal radiation exclusion zones must be large enough so that the heat from an LNG fire does not exceed a specified limit for people and property. The thermal radiation exclusion zone must be owned or controlled by the operator of the LNG facility. The code also specifies how the thermal radiation distance is calculated for each LNG facility. The Gas Research Institute (GRI) computer model or a similar model is to be used and wind speed, ambient temperature and relative humidity producing the maximum exclusion distances are to be applied subject to other detailed provision of the regulation.

Similar to the provision for thermal radiation protection, the U.S. federal regulation 49 CFR Part 193 specifies that each LNG container and LNG transfer system must have a *flammable vapor dispersion exclusion zone* around the facility that is owned or controlled by the facility operator. The vapor dispersion exclusion zone must be large enough to encompass that part of the vapor cloud which could be flammable. The code specifies how the flammable vapor dispersion distance is calculated for each LNG facility. In order to account for irregular mixing of the vapor cloud, the regulation designates the vapor cloud hazard area as the area where the average gas concentration in air is equal to or greater than 2.5 percent (half of the lower flammability limit of methane). This provides a margin of safety to account for irregular mixing. The regulation also specifies other parameters including dispersion conditions that should be used in computing the dispersion distances. Computer models are used to calculate dispersion

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[1] 49 CFR Part 193: http://cfr.law.cornell.edu/cfr/cfr.php?title=49&type=part&value=193.
[2] The term *impoundment* is used in the LNG industry to identify a spill control design that will direct and contain the liquid in case of a release. Earthen or concrete dikes may provide impoundment surrounding an LNG container.

distances. Under U.S. regulations, protection distances are to be calculated specific to each location to prevent exposure to fire or thermal radiation.

Safety zones differ for ships in transit as opposed to ships in port. Port safety zones are established by the USCG and port captain, based on the specific risk factors at a given terminal. There are two purposes for safety zones for LNG ships – to minimize collision while the ship is underway, and at berth to protect surrounding property and personnel from hazards that could be associated with ignition. In the U.S., the use of safety zones around LNG ships began in 1971 at the Everett Terminal in Boston Harbor. Safety zones are established based on the specific circumstances, including navigational requirements, in a specific area.
In the U.S., federal regulations are provided in the Code of Federal Regulations (CFR).[3] The following regulations and standards/codes provide guidelines for the design, construction and operation of LNG facilities. See Appendix 2 for details.

- 49CFR Part 193 *Liquefied Natural Gas Facilities: Federal Safety Standards*
- 33CFR Part 127 *Waterfront Facilities Handling Liquefied Natural Gas and Liquefied Hazardous Gas*
- NFPA 59A[4] *Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)*
- NFPA 57 *Standard for Liquefied Natural Gas (LNG) Vehicular Fuel Systems*
- API 620 *Design and Construction of Large, Welded Low Pressure Storage Tanks*

Who Regulates LNG in the U.S.?

A schematic of regulatory entities, and their relationships with each other and integration with international standards organizations is shown in Figure 28.

[3] U.S. Code of Federal Regulations: http://www.access.gpo.gov/nara/cfr/index.html.
[4] The National Fire Protection Association (NFPA): http://www.nfpa.org/. The NFPA began developing NFPA 59A in 1960 by a committee of the American Gas Association and was adopted in 1967.

Figure 1. U.S. LNG Regulators

Onshore/Marine

Federal Agencies

The Department of Energy

Federal Energy Regulatory Commission (FERC)

The U.S. Coast Guard (USCG)

The Department of Transportation (DOT)

The U.S. Environmental Protection Agency (EPA)

U.S. Minerals Management Service

U.S. Fish and Wildlife Service

U.S. Department of Labor Occupational Safety & Health Administration (OSHA)

U.S. Army Corps of Engineers

Offshore

Federal Agencies

The Department of Energy

The U.S. Coast Guard (USCG)

The Department of Transportation (DOT)

U.S. Fish and Wildlife Service

National Oceanic and Atmospheric Administration

U.S. Department of Labor Occupational Safety & Health Administration (OSHA)

U.S. Army Corps of Engineers

State & Local Agencies

Departments of environmental protection

Fire departments

Police

Non-Governmental Regulators/Standards Organizations

The National Fire Protection Association (NFPA)

American Society of Mechanical Engineers (ASME)

The American Society of Civil Engineers (ASCE)

The American Petroleum Institute (API)

The American Concrete Institute (ACI)

The American Society for Testing and Materials (ASTM)

Federal, state, and local authorities have the power to regulate the construction and operation of LNG facilities. Federal regulation of the industry is by far the most comprehensive, and there is a separate regulatory requirement for the construction and operation of LNG facilities. All governmental entities have some ability to regulate each phase of a facility's life. Determination of jurisdiction between federal and state agencies is a constitutional matter. Both states and the U.S. Congress may regulate activities.

Federal Regulation of LNG

LNG facilities fall under the regulation of a large number of federal agencies, including, but not limited to, the U.S. Coast Guard, Department of Transportation, Federal Energy Regulatory Commission, Environmental Protection Agency, U.S. Department of Labor Occupational Safety & Health Administration, Customs and Immigration. Four federal agencies have specific regulatory enforcement roles spelled out by statutes. These agencies are the Department of Energy, the Federal Energy Regulatory Commission, the Department of Transportation, and the U.S. Coast Guard. The roles of these agencies and their LNG-specific regulations are described in this appendix. These agencies and others also enforce regulations that are applied to many parts of the energy industry.

The Department of Energy (DOE)

All imports of LNG require a certificate for importation from the DOE. The process of getting a certificate requires a study by the DOE. However, this process is automatic for countries that are free trade nations. The regulatory role of the DOE is only to monitor the amount of LNG being imported and exported, and to protect American energy supplies via the certification process.

The Federal Energy Regulatory Commission (FERC)

LNG onshore terminals in the U.S. had historically been treated like interstate pipelines, thus allowing FERC to regulate these facilities. FERC has jurisdiction over onshore import and export facilities, and some peakshaving facilities, and thus, regulatory control over most of existing U.S. LNG facilities. FERC has significant oversight responsibility for LNG import and export facilities during their construction. FERC can approve or reject the location of all LNG import and export facilities prior to construction. One step of the review process requires a safety review and analysis of the design. The design of LNG facilities must conform to the National Fire Protection Association's (NFPA) LNG standards, such as NFPA 59A. FERC also regulates the modification and expansion of LNG onshore facilities.

FERC prepares an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) for all onshore facilities as part of the certification process to construct or operate an LNG facility. In addition to evaluating environmental concerns, FERC reviews the engineering design of the facility and monitors construction of the project.

The Department of Transportation (DOT)

The DOT plays a major role in ensuring the safe operation of LNG facilities by reviewing construction and operation of facilities. The Secretary of Transportation is charged with prescribing minimum safety standards concerning the location, design, installation, construction, initial inspection, and testing of a new LNG facility and offshore facilities. Specifically, DOT's Research and Special Programs Administration (RSPA), Office of Pipeline Safety (OPS), oversees federal safety standards for LNG facilities. These standards include requirements for site location, design, construction, operations and maintenance of an LNG facility, as well as personnel qualifications and training, fire protection, and security.

Additionally, DOT has specially trained personnel who conduct periodic on-site inspections of LNG facilities.

For interstate LNG facilities there is some jurisdictional overlap in the review of the location, design and construction of the facility. Although FERC approves the site, the Office of Pipeline Safety and a state agency authorized to act as OPS's agent may complement FERC's efforts in reviewing the design and monitoring the construction of an LNG facility. The certificate issued by FERC may contain conditions that reflect input from OPS or could attach conditions in addition to their requirements.

The U.S. Coast Guard (USCG)

In U.S. waters, the USCG regulates U.S. flag LNG ships and barges. The USCG has regulatory authority over their design, construction, manning, and operation, and the duties of their officers and crew. USCG regulations focus on safety. One way it provides oversight is through onboard inspection when LNG ships at the berth to confirm compliance with the prescribed regulations and with safety standards. These inspections are also conducted on foreign flag ships when in U.S. waters.

The USCG works with terminal and ship operators to ensure that the policies and procedures in place conform to required standards. The USCG also works with operators to conduct emergency response drills and joint exercises to test response plans. The USCG ensures that operators have adequate safety and environmental protection equipment and procedures to respond to an incident.

In addition to this oversight function the USCG determines the suitability of a waterway to transport LNG safely, and it requires that operation and emergency manuals be submitted for the ports where ships will operate. They also create safety rules for specific ports in order to minimize the chance of accidents. At LNG export or import terminal facilities, the USCG has jurisdiction over the marine transfer area which is the part of a waterfront facility between the ship and the last manifold valve immediately before the receiving tanks.

In November 2002, the U.S. Deepwater Port Act was amended by the Maritime Transportation Safety Act (MTSA) to include natural gas. As a result of this amendment the USCG now regulates deepwater LNG ports.

The U.S. Environmental Protection Agency (EPA)

The EPA establishes air and water standards for all LNG operations, and controls air, water and land pollution.

State regulation of LNG

Some states have specific regulations that pertain to LNG; however, there is no national standard for regulation at the state level. Some regulatory agencies (e.g. state departments of environmental protection) are involved in granting permits for specific activities with potential adverse environmental impacts (such as air permits, dredge material disposal).

Local regulation of LNG

Local government agencies may also have requirements for the construction, operation and maintenance of LNG terminals. State and local agencies like the fire department and police also have jurisdiction on the basis of protecting the safety of the surrounding area.

Non-Governmental Regulation of LNG

The National Fire Protection Association (NFPA) develops fire safety codes and standards drawing upon the technical expertise of persons from diverse professional backgrounds that form technical committees. These committees address concerns about specific activities or conditions related to fire safety. The members of these committees use an open consensus process to develop standards for minimizing the possibility and effects of fire. NFPA has adopted two comprehensive standards, NFPA 59A and NFPA 57, that relate to LNG.

NFPA 59A Standard for the Production, Storage and Handling of Liquefied Natural Gas (LNG) 2001 Edition describes the basic methods of equipment fabrication as well as LNG installation and operating practices that provide for protection of persons and property. It also "provides guidance to all persons concerned with the construction and operation of equipment for the production, storage, and handling of liquefied natural gas." This comprehensive standard contains detailed technical requirements to ensure safety of LNG facilities and operations, including general facility considerations, process systems, stationary LNG storage containers, vaporization facilities, piping systems and components, instrumentation and electrical services.

The standard also incorporates, by reference, technical standards developed by a number of other professional organizations, such as American Society of Mechanical Engineers (ASME)[5], the American Society of Civil Engineers (ASCE)[6], the American Petroleum Institute (API)[7], the American Concrete Institute (ACI)[8], and the American Society for Testing and Materials (ASTM)[9]. (A complete list of these organizations appears in the last chapter of the NFPA standard.)

The NFPA is not empowered to enforce compliance with its codes and standards. Only regulatory bodies or political entities that have enforcement powers can set the standards that the NFPA creates to regulate the industry. An example is when FERC uses the NFPA standards in their safety review of LNG facilities.

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[5] American Society of Mechanical Engineers (ASME) http://www.asme.org/
[6] American Society of Civil Engineers (ASCE) http://www.asce.org/
[7] American Petroleum Institute (API) http://api-ec.api.org
[8] American Concrete Institute (ACI) http://www.aci-int.org/
[9] American Society for Testing and Materials (ASTM) http://www.astm.org

Annexure 2

PART 193—LIQUEFIED NATURAL GAS FACILITIES: FEDERAL SAFETY STANDARDS

Subpart B—Siting Requirements

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§ 193.2051 Scope.

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Each LNG facility designed, constructed, replaced, relocated or significantly altered after March 31, 2000 must be provided with siting requirements in accordance with the requirements of this part and of NFPA 59A (incorporated by reference, *see* §193.2013). In the event of a conflict between this part and NFPA 59A, this part prevails.

[Amdt. 193–17, 65 FR 10958, Mar. 1, 2000, as amended by Amdt. 193–18, 69 FR 11336, Mar. 10, 2004]

§ 193.2055 [Reserved]

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§ 193.2057 Thermal radiation protection.

top

Each LNG container and LNG transfer system must have a thermal exclusion zone in accordance with section 2.2.3.2 of NFPA 59A (incorporated by reference, *see* §193.2013) with the following exceptions:

(a) The thermal radiation distances shall be calculated using Gas Research Institute's (GRI) report GRI–89/0176 (incorporated by reference, *see* §193.2013), which is also available as the “LNGFIRE III” computer model produced by GRI. The use of other alternate models which take into account the same physical factors and have been validated by experimental test data shall be permitted subject to the Administrator's approval.

(b) In calculating exclusion distances, the wind speed producing the maximum exclusion distances shall be used except for wind speeds that occur less than 5 percent of the time based on recorded data for the area.

(c) In calculating exclusion distances, the ambient temperature and relative humidity that produce the maximum exclusion distances shall be used except for values that occur less than five percent of the time based on recorded data for the area.

[Amdt. 193–17, 65 FR 10958, Mar. 1, 2000, as amended by Amdt. 193–18, 69 FR 11336, Mar. 10, 2004]

§ 193.2059 Flammable vapor-gas dispersion protection.

top

Each LNG container and LNG transfer system must have a dispersion exclusion zone in accordance with sections 2.2.3.3 and 2.2.3.4 of NFPA 59A (incorporated by reference, *see* §193.2013) with the following exceptions:

(a) Flammable vapor-gas dispersion distances must be determined in accordance with the model described in the Gas Research Institute report GRI–89/0242 (incorporated by reference, *see* §193.2013), "LNG Vapor Dispersion Prediction with the DEGADIS Dense Gas Dispersion Model." Alternatively, in order to account for additional cloud dilution which may be caused by the complex flow patterns induced by tank and dike structure, dispersion distances may be calculated in accordance with the model described in the Gas Research Institute report GRI–96/0396.5 (incorporated by reference, *see* §193.2013), "Evaluation of Mitigation Methods for Accidental LNG Releases. Volume 5: Using FEM3A for LNG Accident Consequence Analyses". The use of alternate models which take into account the same physical factors and have been validated by experimental test data shall be permitted, subject to the Administrator's approval.

(b) The following dispersion parameters must be used in computing dispersion distances:

(1) Average gas concentration in air = 2.5 percent.

(2) Dispersion conditions are a combination of those which result in longer predicted downwind dispersion distances than other weather conditions at the site at least 90 percent of the time, based on figures maintained by National Weather Service of the U.S. Department of Commerce, or as an alternative where the model used gives longer distances at lower wind speeds, Atmospheric Stability (Pasquill Class) F, wind speed = 4.5 miles per hour (2.01 meters/sec) at reference height of 10 meters, relative humidity = 50.0 percent, and atmospheric temperature = average in the region.

(3) The elevation for contour (receptor) output H = 0.5 meters.

(4) A surface roughness factor of 0.03 meters shall be used. Higher values for the roughness factor may be used if it can be shown that the terrain both upwind and downwind of the vapor cloud has dense vegetation and that the vapor cloud height is more than ten times the height of the obstacles encountered by the vapor cloud.

(c) The design spill shall be determined in accordance with section 2.2.3.5 of NFPA 59A (incorporated by reference, *see* §193.2013).

[Amdt. 193–17, 65 FR 10959, Mar. 1, 2000, as amended by Amdt. 193–18, 69 FR 11336, Mar. 10, 2004]

§§ 193.2061-193.2065 [Reserved]

top

§ 193.2067 Wind forces.

top

(a) LNG facilities must be designed to withstand without loss of structural or functional integrity:

(1) The direct effect of wind forces;

(2) The pressure differential between the interior and exterior of a confining, or partially confining, structure; and

(3) In the case of impounding systems for LNG storage tanks, impact forces and potential penetrations by wind borne missiles.

(b) The wind forces at the location of the specific facility must be based on one of the following:

(1) For shop fabricated containers of LNG or other hazardous fluids with a capacity of not more than 70,000 gallons, applicable wind load data in SEI/ASCE 7–02 (incorporated by reference, *see* §193.2013).

(2) For all other LNG facilities:

(i) An assumed sustained wind velocity of not less than 150 miles per hour, unless the Administrator finds a lower velocity is justified by adequate supportive data; or

(ii) The most critical combination of wind velocity and duration, with respect to the effect on the structure, having a probability of exceedance in a 50-year period of 0.5 percent or less, if adequate wind data are available and the probabilistic methodology is reliable.

[45 FR 9203, Feb. 11, 1980, as amended by Amdt. 193–1, 45 FR 57419, Aug. 28, 1980; 58 FR 14522, Mar. 18, 1993; Amdt. 193–16, 63 FR 37505, July 13, 1998; Amdt. 193–17, 65 FR 10959, Mar. 1, 2000; Amdt. 193–19, 71 FR 33409, June 9, 2006]

§§ 193.2069-193.2073 [Reserved]

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FLOATING LIQUEFIED NATURAL GAS ("LNG") FACILITY PROPOSED BY PETROSA

1. REVAG represents concerned residents in the areas of Vleesbaai and Mossel Bay. For more detail see www.revag.co.za.

2. SAMSA is aware of the PetroSA's proposal to erect a LNG facility in the bay of Vleesbaai. SAMSA attended the Authority Meeting held on 2 January 2009. The minutes of that meeting are Annexure G to the Draft Scoping Report.
   That is correct.

3. For more information on PetroSA's proposal you are referred to Aurecon's website http://enviro.webfoundryza.com. The Draft Scoping Report in respect of the Environmental Impact Assessment (EIA) of the proposal, which can be found on Aurecon's website, is currently being finalized.

4. PetroSA and it's consultants are conducting the process with extreme haste and urgency. They want the Department of Water and Environmental Affairs to approve the proposal during October 2009, It concerns us that SAMSA is not Intimately involved every step of the way, especially during the EIA and design phases of this mega project. If SAMSA is not involved now, it may be too late to influence PetroSA's decisions. In the light of the seriousness of the matter, we urgently require more information and would appreciate it if SAMSA could supply us with answers to the questions which follow.

5. Has SAMSA approved PetroSA's proposal in principia or granted a licence in respect thereof? If so, could we have details please.

SAMSA's jurisdiction does not extend to the approval or rejection of the proposed LNG terminal which I understand will be under the control of the TNPA and the environmental aspect will be dealt with by the Department of Environment Affairs, they are the custodians.

6. Is SAMSA aware of the risks and dangers of LNG? If not, it is recommended that you obtain a copy of the DVD by Tim Riley with that title.

   SAMSA is conversant with the associated risks in the carriage of LNG. SAMSA's team has experienced and qualified ships masters' who have experience on LNG tankers and our experience in international forums relating to LNG tankers indicate that it is one of the safest methods of carriage at sea. "Despite these concerns, as of early 2008, "no significant loss of **LNG** tank cargo has ever occurred." Strauss Centre Straits of Hormuz

7. Has SAMSA approved the Importation of gas and/or LNG by PetroSA in principle? If so details are required.
   This is not within SAMSA's jurisdiction as imports are not in the scope of SAMSA's mandate.

8. At the Focus Group Meetings held by Aurecon on behalf of PetroSA from 18 -20 May 2009 it was conceded by Aurecon and PetroSA that no safety and operating standards exist in SA in respect of Storage and Regasification Vessels (SRV's) or LNG carriers and the operation at Submersible Turret Loading Buoys (STL's).

   The vessels will comply with the IMO standards (IGC Code) and recommendations as detailed in ISSGOT, SIGTTO and the IC'S Tanker Safety Guide for this type of vessel. The flag State administers these requirements and SAMSA audits them through the Port State Control regime.

   8.1 Is this statement correct?
   Once the project has been approved; SAMSA will have in place procedures standards and stringent requirements to be adhered to

   8.2 What (if any) are SAMSA's requirements in this regard?
   SAMSA as the regulatory body and a member of the IMO will ensure compliance with national and international regulations.

   8.3 Do these requirements comply with international best practice, standards and norms?

All LNG vessels in international service must comply with the major maritime treaties agreed to by the International Maritime Organization (IMO), such as the International Convention for the Safety of Life at Sea, popularly known as the "SOLAS Convention" and the International Convention for the Prevention of Pollution from Ships, popularly known as the "MARPOL Convention." In addition, LNG vessels must comply with the

International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk, known as the "IGC Code."

9. Does SAMSA have siting (location) requirements and regulations (along the lines of the USA's Federal Energy Regulator) for LNG installations offshore and onshore?
No, but SAMSA will need to be informed on the proposed location to determine and promulgate navigational and safety zones.
9.1 PetroSA seems to be the only party that is busy determining the location of the proposed facility. In other countries there are governmental authorities that have issued rules, regulations and guidelines with which applicants (such as PetroSA) have to comply.
SAMSA can only become involved where safety of navigation is an issue both by the LNG carrier and other vessels operating in the area.
9.2 What are SAMSA's requirements in this regard?
None
9.3. Do SAMSA's requirements comply with international best practice, standards and norms?
Sitting is not a SAMSA issue unless there is a conflict that will endanger safety of life at sea or be a pollution threat.

10. What flammable vapour danger zones around LNG operations would SAMSA require?
SAMSA can determine a safety zone around an offshore installation in terms of the Marine Traffic Act, Regulation 8C, and would apply similar principles to those used when considering the danger zone around the FA platform. The recommended distance is 0.73 nautical miles; we would probably consider 1 nautical mile.

11. What thermal radiation zone around LNG operations would SAMSA require?
SAMSA can determine a safety zone around an offshore installation in terms of the Marine Traffic Act, Regulation 8C, and would apply similar principles to those used when considering the danger zone around the FA platform. The recommended distance is 0.73 nautical miles; we would probably consider 1 nautical mile.

12. What are SAMSA's requirements to prevent a LNG carrier running aground and exploding?

SAMSA cannot prevent ships grounding, but will consider the location of the terminal from a navigational safety aspect.

13. What are SAMSA's requirements to avoid LNG carriers from being hijacked at attacked?
There are no known terrorist/hijackers in the sea area of South Africa. This is an issue for National Intelligence/SANDF/SAPS. All vessels entering/transiting South African waters are tracked by AIS/LRIT and have to be ISPS compliant.

14. We assume that SAMSA has jurisdiction over the safety and operational aspects of all LNG carriers in South African waters (in the USA they are regulated by the US Coast Guard)?

14.1 If so, what are SAMSA's requirements in this regard?
As per 8.3

14.2 Do these requirements comply with international best practice, standards and norms?
The South African standards reflect international best practice.

14.3 Will SAMSA's vessels be patrolling the South African waters and safety perimeters around the SRV's and STL's?
SAMSA do not operate patrol vessels.

14.3.1 Every LNG carrier will fly under the flag of a specific country. Will SAMSA's standards override those of the country of origin, in case of conflict?
South African maritime law is applicable to all vessels, regardless of nationality when operating in territorial waters.

Capt. N.T.Campbell
Manager: Southern Region

cc: S. Tilayi (Executive Head Centre for Ships)
D. Manley (Principal Officer – Mossel Bay)

Annexure 4

U.S. Department of Transportation

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Frequently Asked Questions

What is LNG?

LNG, or liquefied natural gas, is natural gas in liquid form. Natural gas is cooled to minus 259 degrees Fahrenheit (-161 degrees Celsius) for transport.

What is a deepwater port?

Deepwater ports were initially defined in 1974 as “non-vessel, fixed or floating manmade structures that are used as ports or terminals for the loading, unloading, or handling of oil for transportation to a state.”

The 2002 amendment to the Deepwater Port Act (DWPA) expanded this definition to include facilities constructed at sea which are used as terminals to transfer natural gas, usually received in the form of Liquefied Natural Gas (LNG) from LNG carriers to onshore storage facilities and pipelines. In order to receive LNG, specialized port facilities are required. Eight such land-based import facilities and three such deepwater based facilities exist in the United States today.

Additional import facilities will be needed to accommodate the projected increases in demand for LNG. In light of this, the DWPA was amended to allow for the construction of new LNG port facilities in the waters beyond the U.S. territorial limits.

The term "Deepwater Port" includes all associated components and equipment, including pipelines, pumping stations, service platforms, mooring buoys, and similar features or equipment to the extent they are located seaward of the high water mark.

Who has the authority to issue licenses for deepwater ports?

The authority for the issuance, transfer, amendment, or reinstatement of a license for the construction or maintenance of a deepwater port rests with the U.S. Secretary of Transportation. However, as published in the June 18, 2003 Federal Register, the Secretary delegated this authority to the Administrator of the Maritime Administration (68 FR 36496).

The Maritime Administration, acting on behalf of the Secretary, is required to confer with a number of federal agencies and the public, and must also obtain approval from adjacent states. The U.S. Coast Guard, now part of Department of Homeland Security, has been delegated authority for license processing functions (62 FR 11382) (March 12, 1997) and the Administrator of the Research and Special Programs Administration, which is also part of the Department of Transportation, has authority by delegation for the establishment, enforcement, and review of regulations concerning the safe construction, operation, or maintenance of pipelines on Federal Lands or the Outer Continental Shelf (49 CFR §1.53(a)(3)).

What is the license granting process and who is involved in it?

Beyond the Maritime Administration, the U.S. Environmental Protection Agency (EPA) and Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) and National Marine Fisheries Service (NMFS) have responsibilities to make recommendations regarding potential impacts of the proposed facilities on the environment in accordance with National Environmental Policy Act (NEPA) regulations, to which the port facilities are subject.

The Department of the Interior's (DOI) Fish and Wildlife Services (FWS) is responsible for protecting and conserving migratory birds, endangered species, marine mammals, and interjurisdictional fish. Applicants for Federal licenses are required to consult with the FWS on projects potentially affecting wildlife species and resources.

The Maritime Administration, working through DOI's Mineral Management Service (MMS) and the Department of Energy provides insight into the benefits and consequences of the proposed facilities to the nation's energy needs.

The U.S. Department of State provides counsel in the reconciliation of safety and environmental requirements with respect to international obligations.

The U.S. Coast Guard (USCG) is instrumental in developing the environmental and marine navigation aspects of the decision and in confirming compliance with all environmental regulations as stipulated by NEPA.

The Maritime Administration is charged with confirming the ability of the applicant to meet the financial requirements of the Deepwater Port Act, including the posting of the required bonds, as well as the citizenship requirements.

The Maritime Administration has the responsibility to issue the Record of Decision (ROD) and the License. The ROD and License are drafted and negotiated in close cooperation with the USCG. The ROD must be issued within 90 days of the last public hearing, which, by statute, must take place within 240 days after the public has been notified of a complete application for Federal license. The Maritime Administration can stop the clock, with appropriate notification to applicants, to request further information as needed during the application review process.

How and where do companies get information to apply for a DWP license?

The Code of Federal Regulations (CFR) 33 Parts 148, 149, 150 is a temporary interim rule that revises regulations adopted in 1975 to implement the Deepwater Port Act. The temporary rule streamlines regulations to the natural gas deepwater ports authorized by Congress in the Maritime Security Act of 2002. The document provides specific information including frequently asked questions on submitting applications to own, construct, and operate LNG deepwater ports.

What happens if a company does not accept the conditions specified for the license?

The Secretary may issue a license outright with no special conditions, deny the license, or issue a license subject to certain conditions which may be specified. If the applicant does not like the conditions, it may withdraw its application.

How long does the license-granting process take?

The Deepwater Port Act mandates that the entire process, from submittal of a complete application to a Record of Decision (ROD), must be completed within 356 days. The decision that the application is complete must be rendered within 21 days of formal receipt of application documented through a "Notice of Application," with a 5 day period to post the notice in the Federal Register. Once a ROD is issued, then the applicant must make the facility fully operational. Estimates for this to be accomplished have ranged from 2 to 4 years.

What is the role of the states in the licensing process?

Adjacent coastal states, acting through their governors, have a veto power over all Deepwater Port Act projects. States must also demonstrate compliance with the Coastal Zone Management Act.

How does the public get involved?

The public is informed of the entire process through publications in the Federal Register, as well as the posting of all public documents on the Federal Docket Management system: www.regulations.gov. The National Environment Policy Act (NEPA) process, as well as other Federal statutes (e.g., the Coastal Zone Management Act) also provides for public participation.

Each Federal Register notice will indicate opportunities for public involvement. The public is able to participate in the initial scoping meeting to determine which potential impacts are most important to consider during the NEPA process. Following issuance of a draft Environmental Impact Statement, or an Environmental Assessment, the public is able to comment as well as attend public hearings. The final environmental report will include responses to public and agency comments.

What is the current and projected need for deepwater ports?

According to the U.S. Department of Energy (DOE), energy consumption in the United States is expected to increase more rapidly than domestic energy production through 2020. Further, natural gas demand is expected to exceed domestic production during this period requiring double the current capacity to import natural gas by 2020.

Natural gas can be imported via pipelines from neighboring nations or by ship using specialized LNG carriers. However, in order to receive LNG, specialized port facilities are required.

Currently, **eight** such land-based LNG import facilities and **three** such offshore based facilities exist in the continental United States. To meet the expected demand for LNG imports, which are projected by the Energy Information Administration to increase from 0.31 trillion cubic feet in 2008 to 1.38 trillion cubic feet in 2020, several more import facilities or facility expansions will be necessary.

What are the different types of vaporization technologies that are commonly used to process LNG?

Several common types of vaporization commonly used are Open Rack Vaporization (ORV); Submerged Combustion Vaporization (SCV); Intermediate Fluid Vaporization (IFV); and Shell-and-Tube Vaporization (STV).

What is Open Rack Vaporization?

Open Rack Vaporization (ORV) is a type of technology that uses the heat from a continuous supply of processed water to regasify LNG and produce natural gas.

For offshore terminals, seawater provides the supply of process water. Seawater at ambient temperature is pumped through a series of heat exchanges, treated with an oxidizer (e.g., sodium hypochlorite) to prevent fouling from marine growth, and is discharged back to the source at a cooler temperature. Vaporization effectiveness depends on seawater temperature, which must be at least 46 degrees Fahrenheit and preferably warmer.

This technology produces no combustion-related air emissions except for those related to pumping equipment. Because of the large volumes of water used, protecting the source and receiving waters is essential to the design and use of ORV intake and discharge.

What is Submerged Combustion Vaporization?

Submerged Combustion Vaporization (SCV) is a highly efficient, bath-type vaporization technology where the Liquefied Natural Gas (LNG) passes through submerged steel tube

bundles. The heat source used to warm the process water comes directly from jetting combustion gases into the bath (with the combustion process fueled by 1.5 to 2.0 percent of the LNG cargo).

SCV uses an open flame to heat the process water. In order to neutralize acidic conditions, the water must be treated with a caustic compound, which requires safeguards in transportation, storage, handling, and use. SCV technology requires a considerable amount of space, an open flame, and high fuel usage.

What is Intermediate Fluid Vaporization?

This closed-loop technology uses an antifreeze-type fluid, such as ethylene glycol or propane, referred to as the heat transfer fluid (HTF). Seawater flows through tubes in the bottom of a large boiler to heat the HTF.

This fluid passes through a shell-and-tube vaporization unit to regasify the LNG, and then moves to a second heat exchanger where it condenses before being re-boiled. This two heat exchanger arrangement requires a large amount of space.

What is Shell and Tube Vaporization?

Shell and Tube Vaporization (STV) technology uses a natural gas-fired heat exchanger or boiler in which tubes containing Liquefied Natural Gas pass through a counter-current of heated water or glycol/water. The natural gas to heat the water or glycol/water is extracted from the send-out from the system's vaporizers. The burning of natural gas results in NOx and other air emissions. STV's can also be designed to use seawater as a heat source, in an open-loop system. STV's are suitable for use on floating platforms or ships that lack the stability of a fixed platform.

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Annexure 5

Licensing Process and Requirements

Introduction

In response to both the nation's growing energy and security needs, Congress accelerated the deepwater port licensing process to promote the importation of natural gas to offshore energy receiving facilities. The rigid timeline of the Deepwater Port Act requires significant pre-application development on the part of an applicant to meet license requirements and avoid a suspended review that can significantly delay processing activities. The Maritime Administration and U.S. Coast Guard work with applicants to meet rigorous review requirements and the expectations of state regulators and the general public in the licensing process.

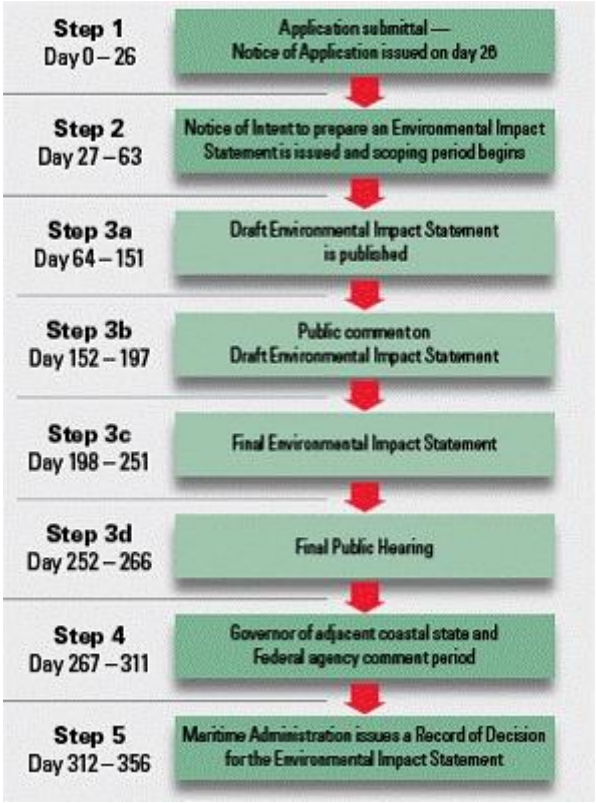
The Pre-Application Process

The pre-application stage gives potential applicants the opportunity to confer with the Maritime Administration and the U.S. Coast Guard to provide an overview of their proposed project, discuss the intricate details of the federal and state application and licensing process, introduce key personnel, and discuss specific financial requirements mandated by the Deepwater Port

Act. Applicants are encouraged to conduct similar meetings with state and local agencies to review and discuss state requirements and interests.

Processing Timeline

The project milestones of the application process have mandatory deadlines and operate on a 356-day 'clock' that begins when the applicant submits an application, and ends when the Maritime Administration issues a Record of Decision. The Maritime Administration, the Coast Guard, and other federal and state agencies evaluate a newly submitted application for completeness. This process takes 26 days, and results in either a Notice of Application or a formal rejection by the Maritime Administrator. The table below represents a typical timeline, assuming there will be no clock stoppage to get additional information.



The National Environmental Policy Act process takes up approximately two-thirds (240 days) of the application review timeline, beginning when the Notice of Application is issued. During this time, the Maritime Administration and the U.S. Coast Guard, in collaboration with other agencies, ensure that a thorough Environmental Impact Statement is developed. Without complete information, meeting this onerous timeline is impossible. Any gaps in information may require a suspension of the timeline. The Maritime Administration and the Coast Guard will suspend an application review because of a lack of adequate information necessary to the licensing process. Issues that have triggered "stop clocks," or suspended reviews, include:

- Inadequate information regarding project financing;
- Re-gasification technologies;

- Fisheries analysis;
- Air quality review;
- Endangered species; and
- Marine habitats.

Along with the National Environmental Policy Act review process, the Maritime Administration has its own approval criteria that must be met before a license may be issued. Once the application has made it through the federal and state review process and has reached the Record of Decision stage, the Maritime Administrator considers nine criteria, which are detailed below.

Further, the Record of Decision describes the Maritime Administration's decision to grant, grant with conditions, or deny the application. For example, if a license is revoked or terminated, all components of the deepwater port must be removed. Licensees must guarantee, through a license condition, that the facility will be decommissioned at the end of the facility's life cycle or upon revocation or termination of the license and/or facility.

License Requirements/Criteria

Financial Responsibility
Applicants must be financially able to construct, own, and operate the deepwater port, and must provide a financial guarantee or bond sufficient to meet all costs for complete removal of all components of the deepwater port upon revocation or termination of the license and/or facility. Further, applicants must be able to meet the requirements of the Oil Pollution Act of 1990 (33 U.S.C. §§2701 et seq.; 104 Stat 484) as they relate to the Deepwater Port Act.

Compliance with Relevant Laws, Regulations, and License Conditions
Applicants must comply with relevant laws, regulations, and license conditions, and must state their intention to do so in writing.

National Interest
The construction and operation of the deepwater port must be in the national interest and consistent with national security, energy sufficiency, environmental quality, and other national policy goals and objectives.

International Navigation
The deepwater port should not interfere with international navigation or other reasonable uses of the high seas, as defined by treaty, convention, or customary international law.

Impact on the Marine Environment
The deepwater port will be constructed and operated using the best available technology to prevent or minimize adverse environmental impact, in accordance with environmental review criteria.

National Environmental Laws
The deepwater port will comply with national environmental laws. The application must properly address all relevant provisions of the Clean Air Act, as amended, the Federal Water Pollution

Control Act, and the Marine Protection, Research and Sanctuaries Act as well as other applicable Federal and state environmental laws.

Consultation with the Secretaries of the Army, State, and Defense
The Secretary of the Army, the Secretary of State, and the Secretary of Defense must be consulted and must express their views on the adequacy of the application and its effect on programs within their respective jurisdictions.

Approval of the Governor of the Adjacent Coastal State
Pursuant to 33 U.S.C. § 1508 of the Deepwater Port Act, the governor of the adjacent coastal state(s) must approve the issuance of a deepwater port license. Silence on this issue denotes approval.

Consistency with Coastal Zone Management Program
An applicant for a deepwater port license must demonstrate consistency with the Coastal Zone Management Plan of the adjacent Coastal States (per the Coastal Zone Management Act of 1972).

For information on how to apply for a Deepwater Port License and what to include in your application, see: Deepwater ports: General (33 CFR 148.105)

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