

# Mitigating Port Impact on Claxton Bay Fisheries

Page 8



Developing T&T's  
Energy Industry  
Page 2

March 2010

The National Gas Company of  
Trinidad and Tobago Limited (NGC)  
Orinoco Drive  
Point Lisas Industrial Estate, Couva  
Republic of Trinidad and Tobago  
West Indies

● **MANAGING EDITOR**

Christine Punnett

● **CONTRIBUTING WRITERS**

Dr Vernon Paltoo,  
Dr Reeza Mohammed

● **PHOTOGRAPHS**

NGC Archives,  
Mark Lyndersay, Kevin Reis

● **DESIGN**

Lonsdale Saatchi & Saatchi  
Advertising Limited

● **PRINTING**

Zenith Printing Services Limited

● **ALL CORRESPONDENCE TO**

GASCO NEWS  
c/o NGC Marketing Communications  
P.O.Box 1127, Port of Spain  
Trinidad and Tobago

● **PRODUCED BY**

The National Gas Company of  
Trinidad and Tobago Limited (NGC)



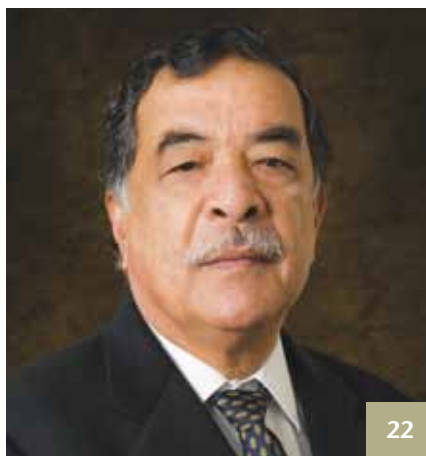
*Construction work for marine pipelaying – NEO/Tobago gas pipeline projects.*

Front Cover: Tropical mullet – one of the  
species fished by Claxton Bay fishermen.

Material in this publication,  
with the exception of  
photography, may be  
reproduced once credit  
is given to GASCO NEWS.



8



22



26

## MARKET DEVELOPMENT

Developing the Energy Industry of T&T 2

Energy and Entrepreneurship 5

## ENVIRONMENT

Assessment of Strategies for Mitigating the Impact of the Point Lisas South and East Industrial Port on Claxton Bay Fisheries 8

## LEGACY

An Energy Visionary – Trevor Boopsingh Remembered 22

## NGC NEWS

NEO Pipe Haul 24

Tobago Pipeline Project 24

Liquid Fuels Pipeline Project 24



17

## NEC NEWS

Communication Centre in Claxton Bay 25

Pt Lisas Estate, South and East 25

Pt Lisas Port, South and East 25

Galeota Port 25

Oropouche Bank 26

La Brea Industrial Estate 26

Union Industrial Estate 26

## INDUSTRY NEWS

Barbados Agrees to Import Gas 27

Petrotrin Gas Upgrades 27

More German Investments Coming to T&T 27

Venezuela Signs Energy Pact with Trinidad and Tobago 27

Renewable Energy 28

Parex Searches for Oil and Gas 28

Suncor Divests 28

Chilean Leader Salutes T&T Gas Supply 28

# DEVELOPING THE ENERGY INDUSTRY OF TRINIDAD AND TOBAGO

## UPDATE ON NEC PROJECTS 2010

*The following is a presentation delivered at the South Trinidad Chamber of Industry and Commerce's (STCIC's) Trinidad and Tobago Energy Conference 2010 held January 25-27, 2010.*

The National Energy Corporation (NEC) is continuing development of the energy industry based on the mandate of the Government of Trinidad and Tobago. It should be noted that the global economic crisis of 2008/09 had a significant impact on the pace of implementation of projects. In addition, issues pertaining to regulatory approvals, specifically the issuance of Certificates of Environmental Clearance (CECs) have adversely affected commencement of several key infrastructural projects. Nevertheless progress has been made on both the development of infrastructure, as well as the implementation of the energy-based projects. This paper will provide an update on the status of current projects in development and present prospective projects for future development.

Initially it will be useful to highlight NEC's present mandate, which encompasses the following:

- The conceptualization, promotion, development and facilitation of new energy-based and downstream industries in Trinidad and Tobago.
- Identification and development of new industrial estates.
- Identification and development of new industrial deep water ports to facilitate these estates.
- Ownership and operation of marine



By VERNON PALTOO, PhD  
Team Leader – Business Development  
National Energy Corporation  
of Trinidad and Tobago Limited

and other infrastructural assets to facilitate all gas-based petrochemical and metal plants.

- Development and Management of Union and La Brea Industrial Estates.
- Towage and harbour operations.
- Sustainable management of the environment.

### Infrastructure Projects

NEC is involved with the active development of one new estate at Point Lisas and three ports at Point Lisas, Brighton and Galeota.

#### *Point Lisas South and East Industrial Estate (PLSEIE)*

This estate comprises approximately 1800 ha and is located south and east of the existing Point Lisas Estate. Construction is anticipated to start in 2011 after receipt of the CEC, with Phase 1 to be completed in 2012 at an estimated cost of US\$65 million.

#### *Multi-user Pier Facility for PLSEIE*

This project entails the construction of three berths to facilitate the new Point Lisas South and East Industrial Estate. Contracts have been awarded for pier construction and work is due to begin in 2010 pending receipt of a CEC for the project. Completion is expected by 2011/2012 at an estimated cost of US\$160 million.

#### *Dock and Storage Yard at the Port of Brighton*

The Dock and Storage Yard which is currently under construction at Brighton consists of a 307m Quay Wall with 5 ha of reclamation for a total of 9 ha, and this includes space for incoming raw material storage. Construction started in the third quarter of 2008 and the dock was completed in 2009. The total project cost is estimated at US\$40 million.

#### *Galeota Port*

This new port is to be located on the southeast coast of Trinidad, close to the existing bpTT facilities and will comprise five berths to serve mainly the E and P companies operating in that region. It also includes a new fishing and landing facility to be used by the communities of southeast Trinidad. The CEC for this project was received in 2009 and construction is due to commence in 2010 and be completed in 2011 at a cost of US\$100 million.

### New Investment Projects

NEC continues to aggressively pursue the development of energy-based projects to fulfil the mandate for downstream integration of the industry.

As a result, the following projects are currently under development:

- MHTL UAN/Melamine Complex
- Essar Iron and Steel Complex
- Alutrint Aluminium Smelter
- Carisal Calcium Chloride Project
- Lurgi/LyondellBasell Gas to Polypropylene Project

### *MHTL UAN/Melamine Complex*

Construction of this integrated petrochemical processing facility began in 2006 at the Point Lisas Industrial Estate, and it is expected to become fully operational during 2010. The complex will contain seven petrochemical plants including ammonia, nitric acid, ammonium nitrate, urea, urea ammonium nitrate (UAN) and two melamine units. Total capital cost for

the project is approximately US\$1.7 billion and the output products from the complex will include 60,000 tpy melamine and 1.5 MMtpy UAN. Further industries which can be developed from melamine include resins, laminates, furniture manufacture and adhesives. UAN is used in the preparation of solid and liquid fertilizers.

### *Essar Iron and Steel Complex*

The Essar Iron and Steel Complex, to be located at the Point Lisas South and East Industrial Estate, is expected to begin construction in the 2011 time frame with production targeted for 2014. This integrated iron and steel complex with an estimated capital cost of US\$1.7 billion would produce 2.5 MMtpy Hot Rolled Coils (HRC) from hot briquette iron (HBI) and pellets.

Hot rolled coils present an extensive range of downstream manufacturing opportunities including wire, rods, sheets, cable, galvanized material, pipes, pressure vessels, roofing materials and many others.

### *Alutrint Aluminium Smelter*

The Alutrint Aluminium Smelter project will be located at the Union Industrial Estate and construction is expected to begin pending resolution of legal issues pertaining to its CEC. The project will include a 125,000 tpy aluminium smelter, as well as other associated downstream plants. Capital cost is projected to be approximately US\$800 million. Many other industries can be developed from aluminium, including sheets, strips, angles, castings, pipes, and car parts manufacture.



*Architect's rendering of the Alutrint Aluminium Smelter plant*

### *Carisal Calcium Chloride Project*

Carisal is expected to begin construction of a calcium chloride, sodium hydroxide, hydrochloric acid, and sodium hypochlorite manufacturing facility in 2010 at the Point Lisas South and East Industrial Estate. Capital expenditure is estimated at US\$300 million and production is scheduled for 2011. These inorganic chemicals are non-traditional as compared with methanol and ammonia, and represent a new range of products to be manufactured in Trinidad and Tobago. Furthermore, the possible applications are widespread and include antifreeze products, detergents, water treatment, agricultural products and cement manufacture.

### *Lurgi/LyondellBasell Gas to Polypropylene Project*

Lurgi and LyondellBasell, together with various State agencies, are developing a project to produce 450,000 tpy polypropylene together with gasoline and LPG as by-products using methanol as the feed material. The project will include a methanol plant, a methanol to propylene plant and a polypropylene plant. Construction is projected to begin in 2011 and be completed by 2014, with a capital expenditure of US\$2.5 billion. Polypropylene will form the basis of developing a plastics industry in Trinidad and Tobago, with possible manufacturing industries such as carpets, ropes, tapes, film sheeting, appliance parts and toys.

### **Future Investment Projects**

Creation and development of integrated downstream energy-based projects provide a wide range of benefits to the country which includes:

- Production of higher value products.
- Greater value for natural gas
- Larger number of permanent and construction jobs per unit of capex
- Enhanced and broader R and D potential for innovation in the energy industry

- Impetus and synergies for developing manufacturing industries
- Opportunity to establish a specialty chemicals industry.

In this regard, NEC will continue to build the energy industry along the following key sectors that will allow for leveraging our existing and developing industries and expertise:

- *Ammonia Downstream:* Expansion of downstream ammonia processing into products such as urea ammonium nitrate, methylamines and melamine.
- *Methanol Downstream:* Expansion of downstream methanol processing into products such as acetic acid, vinyl acetate, formaldehyde and formaldehyde resins.
- *Polyolefins and Downstream:* Development of polyethylene and polypropylene projects, and associated downstream plastic industries.
- *Metals Processing and Downstream:* Development of the downstream metals processing industry in iron, steel and aluminium.

Furthermore, there will be emphasis on the expansion of inorganic chemical manufacturing, which will be initiated with the introduction of the Carisal project. As such, projects that will be targeted for active development are:

- Calcium chloride
- Calcium hydroxide
- Calcium nitrate
- Calcium sulphate
- Sodium chloride
- Sodium hydroxide
- Sodium hypochlorite
- Magnesium chloride
- Magnesium hydroxide
- Potassium nitrate
- Potassium chloride
- Ammonium sulphate
- Ammonium nitrate
- Ammonium chloride
- Aluminium sulphate

- Aluminium chloride
- Hydrochloric acid
- Sulphuric acid

The following benefits can be derived from establishing these relatively small inorganic chemical projects:

- Natural gas used as a fuel as opposed to a raw material
- Minimal infrastructure requirements
- Relatively small capital expense
- Modest utility requirements
- Minimal land requirements
- Less complex to establish than organic industries

Nontraditional energy-based projects, including specialty chemicals and biochemicals, are also in development and represent near to medium term ventures for industrial processing. These would include maleic anhydride and its derivatives, amino acids and single cell protein production.

Even so, NEC recognizes that current hydrocarbon resources are finite and is also desirous of implementing projects that use alternative or renewable sources of energy. Among these would be projects that involve solar energy, wind energy, methanol to power, tar sands and methane hydrates.

### **Conclusion**

The projects that are currently being developed by NEC represent important steps towards diversification and expansion of the energy industry in Trinidad and Tobago. This can only be achieved by the creation of energy-based industries that will be able to generate and sustain an integrated manufacturing sector. Essential to this will be the parallel development of the energy services sector, as well as building of the human resource base to meet the needs of such industries.

NEC is cognizant of its integral role in achieving these goals and will continue to implement its mandate based on the Government's national energy policy.

# ENERGY AND ENTREPRENEURSHIP

*Excerpt from the Feature Address  
by Senator, the Honourable Conrad  
Enill, Minister of Energy and Energy  
Industries, at the STCIC annual  
Energy Conference, January 25, 2010.*

This theme “Energy and Entrepreneurship” is very consistent as it supports one of the key objectives of our Vision 2020 plan. The Government of Trinidad and Tobago is pursuing policies in order to create a society in which the quality of life for all our citizens is continuously improving. In that context it was just a few short months ago, in 2009, that Trinidad and Tobago, along with most of the world’s countries, faced an unprecedented financial crisis. The projections for Trinidad and Tobago at that time were that GDP would decline by about 3% overall. In 2010, we are now advised by the Central Bank that the local economy is predicted to grow at a rate of 2% this year, with private sector demand beginning to build momentum in the second quarter.

The global economic recovery continues; it is projected that the world oil market should gradually tighten in 2010 and 2011. While non-OECD countries lead 2010 demand recovery, OECD countries should begin to show significant oil demand growth in 2011, in response to improving economic conditions. Projected economic growth in the OECD more than doubles from 1.2% in 2010 to 2.7% in 2011.

## **What does this mean for Trinidad and Tobago?**

These countries represent the destinations of most valuable exports. Positive economic growth in these countries helps to bolster consumption



*Senator, the Honourable Conrad Enill*

which in turn helps to secure our markets and resultant revenue streams. Concerning the world oil market, analysts have projected that crude prices, which have been trending upward since mid-2009, will continue to increase in 2010 and 2011. Although global oil inventories and spare production capacity remain very high by historical standards, expectations of a continued global economic turnaround have continued to support oil markets and prices.

Conversely, when we look at natural gas, we see that the Henry Hub spot price averaged \$5.50 per thousand cubic feet (Mcf) in December 2009, \$1.73 per Mcf higher than the average spot price in November. Prices were affected by the colder-than-normal weather in December. According to the United States Energy Information Administration, the Henry Hub spot price averaged \$4.06 per Mcf in 2009, and the forecasted price in 2010 is \$5.36 per Mcf and \$6.12 per Mcf for 2011. Continued high storage levels in the United States combined with their domestic production capabilities and slow consumption growth are expected

to keep prices from rising dramatically through the forecast period.

Meanwhile, recent additions to global liquefied natural gas (LNG) supply in Russia, Yemen, Qatar and Indonesia are projected to cause US LNG imports to increase by almost 0.5 Bcf/d in 2010 to 1.76 Bcf/d. US LNG imports are projected to increase slightly in 2011, as growing global demand for LNG absorbs the new supply growth. This means that the world economy is forecasted to get into recovery mode this year, resulting in increased demand for products and services. This suggests that we have withstood the challenge of the global crisis and today we are able to plan for a more sustainable future. Building on this platform Government has considered a number of relevant matters and I propose to update you on some of these.

The energy sector of Trinidad and Tobago continues to have direct relevance to the future economic growth and sustainable development of the economy of the country, accounting as it did for about 48% of GDP in 2009. The Government seeks to maximize revenue potential (especially that which is generated by the energy sector), create wealth and encourage greater distribution of wealth for the benefit of the population.

The energy platform for our further development is being carefully constructed and, with the widest possible involvement, designed to create activity in the sector.

Our focus at this time includes:

- The revised fiscal terms designed to stimulate activity
- The priority use of gas resources
- The ability of Petrotrin to boost local oil production, and
- Our renewable energy agenda.

The Government has completed the review of the fiscal system and is at this time awaiting comments from the industry. When the announcement to undertake this review was made in January 2008, the economic and financial climate substantially differed from what it is today. At that time the projections for the oil and gas prices and market accessibility were very buoyant. By the time the initial fiscal proposals were presented to the sector, market forces had changed drastically, both oil and gas prices had fallen; increasing supplies of natural gas were more readily available. This latter fact was compounded by the potential growth and commercialization of Shale Gas in the United States which has revolutionized conventional thinking that only LNG imports could satisfy growing US demands.

Almost simultaneously, the world economy faced a major financial upheaval. Many industrialized countries entered recession, several financial institutions and companies failed. Access to investment tightened and fiscal stimulus packages were created to reactivate growth. Against this background, we had to review our initial fiscal proposals, particularly the contractual arrangements that will be offered under future competitive bid rounds as well as the concessionary (tax/royalty) arrangements.

What has emerged from the process is that the Production Sharing Contract (PSC) remains the preferred form of arrangement that will be offered to potential investors in future competitive bid rounds. Our PSC will be similar to the 1995/1996 models in which companies were allowed to evaluate their risks and offer an adequate share of Profit Petroleum. This is intended to reduce some of the inherent risks and encourage potential investment.

With respect to the concessionary arrangement, emphasis is placed on those areas and activities where incentives

**The Government, in a very deliberate strategy, continues to review our gas sector development plans and provides updated priorities for gas development**

for revitalization and sustainability are required, such as in the mature offshore oil acreages and on land where enhanced oil recovery projects are undertaken. Specifically, the incentives will directly impact on the Supplemental Petroleum Tax rates that will be payable by companies. In so doing, it will provide companies with additional financial flows to re-invest in the upstream sector. This new regime will address small, mature fields and tail-end production and will allow for a situation intended to encourage new investment while allowing current production levels to be sustained.

Last year, the results of the latest audit of our natural gas resources were provided and there was much comment on the life of the existing resource. The Government is pursuing the auction, via competitive bidding, of new acreage, firstly in shallow water and then later this year in the deep water acreage. There was also quite a bit of discussion on the use to which this resource was being put, both at present and in the future. The Government, in a very deliberate strategy, continues to review our gas sector development plans and provides updated priorities for gas development:

- allocate gas for the new approved projects including – Alutrint, Essar Steel and Gas to Polypropylene.

- existing plants and their future needs for defined periods
- debottlenecking of the current LNG trains subject to several matters – including the determination of the project structure and marketing arrangements
- ammonia and related downstream facilities.

The local energy sector has experienced several policy adjustments over the past few years in an effort to ensure that the challenge of attaining sustainable development is being appropriately addressed as the industry evolves.

Oil production has been on the decline and the country has become gas based; however, we would like to encourage a mix that is more balanced. Petrotrin has an important role to play in delivering on this objective and we have challenged its leadership to organize in such a way as to support this requirement for increases in oil production.

Petrotrin in response has begun to deliver on this mandate. Seven sub-licences for fields located in eastern Trinidad were granted in October of last year; three of the Service Contracts have been signed and work is about to commence and the other four will be signed by the end of January, 2010. gains in production volumes will be realized from this initiative.

Petrotrin also has been mandated to develop a programme for the efficient and effective management of the Trinmar asset.

Petrotrin will also be acquiring a 3D seismic programme over its assets in their North West District and API's Oropouche farmout area of South Trinidad in February 2010. The work will be completed by December 2010. The survey is intended to guide the future exploration on land and result in the identification of more oil drilling locations.

Before the Copenhagen summit, world leaders were in agreement that a lot remains to be done if the perils of global warming are to be reversed. They were also in agreement that there is a need for the international community to take concrete and cohesive action to combat climate change. Developing countries went to Copenhagen hoping for firm and binding commitments from developed countries, especially towards funding and technological exchange. There was hope that the conference would, among others, set clear targets on emission reductions from developed countries, and most importantly, extract firm and binding commitments from developed countries towards providing financing and technology transfer for mitigation and adaptation in developing countries. In the end what was produced was a short “accord” that sets down no specific limits for future emissions beyond those that its signatories volunteer. There is an argument about measuring carbon emissions on a per capita basis and using this as a yardstick to determine who should take the greater action and bear the costs to bring the climate change threat under control.

The facts are, according to Carbon Monitoring for Action (CARMA), Asia (5.75), North America (3.09) and Europe (1.88) account for over 10.72 billion tonnes of carbon emissions annually. The rest of the world accounts for just about 700 million tonnes per year! In addition, the use of coal has been clearly proven to be one of the greatest contributors to global carbon emissions. Trinidad and Tobago produces 99% of its electricity from natural gas and 0% from coal. By comparison the US produces 49% of its electricity from coal, the UK 33%, India over 70% and China over 75%. In this regard, the figures clearly speak for themselves.

In the context of Trinidad and Tobago being a small-island state, there

is a view that countries such as ours will be the first to feel the effects of climate change, the most dramatic and disastrous being sea-level rise. Some of the forecasts point to massive increases in sea levels from as early as 2050.

This is a sobering thought.

Trinidad and Tobago’s government:

- Switched to all unleaded gasoline several years ago. We are in the midst of reducing our natural gas consumption in electricity generation by a programme to have all of our power generation converted to combined-cycle generators by 2016. The South Chamber, the Ministry of Energy and Energy Industries and the Ministry of Planning Housing and the Environment are currently working together to collaborate and conceptualise a Carbon Capture and Storage project for Trinidad and Tobago. This project will outline the role and responsibility of each organization, the technology to be employed and the implications of the Carbon Capture and Storage project for existing plants.
- Planned for a large reduction in diesel and gasoline consumption via the expansion of the Compressed Natural Gas programme.
- Is developing a renewable energy policy for Trinidad and Tobago which should be available for comment shortly. Additionally, we are in the process of developing a framework for partnering with the United States through its Department of Energy (USDOE) in the development of a Renewable Energy Research Centre and a Framework for Partnership under the Energy and Climate Partnership of the Americas (ECPA). The partnership was first announced at the Fifth Summit of the Americas in Port of Spain, where President Obama invited all countries of the Western Hemisphere to be a part of

a united effort in this critical area. Since the Summit in April, regional response has been positive across all five ECPA elements: energy efficiency, renewable energy, cleaner fossil fuels, critical infrastructure and energy poverty alleviation. Moreover, the Renewable Energy Research Centre would provide an excellent opportunity to broaden our joint activities while building needed capacity in the region. The centre would benefit from being networked to other regional energy centres that have already been established in Chile, Peru and Colombia, and other centres that might be established.

The progress of Trinidad and Tobago depends on its use of the energy resources in ways that provide maximum benefit to all the people of our country. The Government has embraced a sustainable development methodology that aims to improve our standard of living and expand our nation’s opportunities for tomorrow as we move towards developed nation status. The key strategies developed and deployed by this Government for the current and long-term vibrancy of the gas sector revolve around the deliberate selection of a mix of gas-consuming projects which will provide for diversification, balance and maximum value-adding potential for our economy.

Trinidad and Tobago is entering a new era and in keeping with the theme of this conference, we are quite conscious of the importance of entrepreneurship as small and medium-sized entities are the backbone of most economies. These actions are required to give us success in our current attempts to efficiently and effectively shape the fortunes of the energy sector and the national economy over the medium to long term. This is all with a view to making Trinidad and Tobago a preferred business partner in today’s global village as we strive towards Vision 2020.

# ASSESSMENT OF STRATEGIES FOR MITIGATING THE IMPACT OF THE PT LISAS SOUTH AND EAST INDUSTRIAL PORT ON CLAXTON BAY FISHERIES

*This article was prepared on behalf of the National Energy Corporation. In this March 2010 issue of Gasco, due to space constraints, only Section 1 has been reproduced. The remaining Sections 2, 3, 4 and 5 will be continued in the upcoming July 2010 issue of Gasco.*

National Energy Corporation (NEC) was mandated by the Government of the Republic of Trinidad and Tobago to construct a port facility for the Point Lisas South and East Industrial Estate. To obtain a Certificate of Environmental Clearance (CEC 1761/2007) for this project, an Environmental Impact Assessment (EIA) was carried out based on Terms of Reference (ToR) issued to NEC by the Environmental Management Authority (EMA) dated April 16, 2007.

The EIA study has identified as “major” the impact of the navigation channel and turning basin of the port on the fisheries in the Claxton Bay area and in particular, the mullet fisheries. In this regard, NEC has proposed the retraining and retooling of the



By REEZA MOHAMMED, PhD  
Environmental Coordinator,  
National Energy Corporation

fishers affected as well as upgrading the facilities at Claxton Bay as measures to mitigate the long-term impact of the proposed construction of the port, navigation channel and turning basin, on the commercial mullet fisheries in the Claxton Bay area.

NEC is required by the EMA to determine the receptiveness of the relevant stakeholders to these proposed mitigation strategies through the conduct of appropriate and timely

consultations. The following proposal is therefore intended for consultation and discussion primarily with fishers operating in the project impact area in Claxton Bay to determine their receptiveness to this proposal.

The primary elements of the mitigation strategy proposed for the consideration of the fishers are as follows:

- (i) The retraining and retooling of the fishermen operating out of the Claxton Bay area to enable them to harvest other commercially viable species of finfish from the Gulf of Paria, and
- (ii) The provision of improved fish processing facilities at Claxton Bay to enable the use of other commercially viable species of fish harvested from the Gulf of Paria and landed at Claxton Bay.

The strategies considered appropriate for the Claxton Bay Landing Site and for continued fishing operations in the Gulf of Paria are as follows:

- The exploitation of alternative fisheries within the Gulf of Paria
- Training/re-training for fishermen and shellfish harvesters
- The upgrade of existing building infrastructure and amenities at Claxton Bay Fish Landing Facility, and
- The development of fish refuges to support recruitment of fishstock back into traditional fishing areas after construction disturbance.

## Foreword

Economic viability of fishing operations is dependent upon several critical factors. These factors include:



Claxton Bay – View from the sea.

an abundant fishery, a fisherman skilled at using the required fishing gear and the mechanical ability to navigate and locate fish. The ability to harvest does not always guarantee the success for a small scale fisherman. Factors which enhance economic viability include high catches, natural or acquired knowledge of different fishing techniques, access to technological/innovative advances in gear type and the ability to earn profit through good business management practices (Pomery, R. 1988).

This proposal seeks therefore to identify the current status of the mullet and oyster/mussel fisheries at Claxton Bay given the traditional methods currently employed for harvesting. It assesses the expected economic loss from each fishery as a result of the proposed Point Lisas South and East Port Project and it presents a proposal to address the anticipated loss in income to oyster harvesters and small scale (artisanal) fishermen operating at the Claxton Bay Fishing Depot.

The majority of statistical data cited in this report was accessed from the public records of the following institutions: the Fisheries Division of the Ministry of Agriculture, Land and Marine Resources of Trinidad and Tobago, the National Agricultural Marketing and Development Corporation (NAMDEVCO), the Central Statistical Office of Trinidad and Tobago, the Caribbean Regional Fisheries Mechanism (CRFM) and the Food and Agriculture Organization

**Factors which enhance economic viability include high catches, natural or acquired knowledge of different fishing techniques...**

of the United Nations. As such, the reliability of the data present can be confirmed by accessing the reference links cited with text or contacting any of the organizations listed above.

### **STATUS OF THE MULLET AND SHELLFISH FISHERIES AT CLAXTON BAY WEST COAST, TRINIDAD**

#### **Current Status of the Artisanal Gillnet Fishery, West Coast, Trinidad**

Gillnet fishing is one of the most important fishing methods used by the artisanal multi-gear fishing fleet of Trinidad and Tobago (Kuruvilla 2007). The gillnet fishery is particularly important to the islands and it is second only to trawling in terms of revenue. Within the Gulf of Paria, gillnets are the most commonly used gear and areas of operation for this gear overlap with most other methods. A survey of the fishery in 2000 (Nagassar, 2001), found that there were about 100 vessels and 400 fishermen on the west coast directly involved in gillnetting. Additionally, in a 2003 fishing vessel census conducted by the Fisheries Division it was identified that of 430 vessel operators (mainly commercial) interviewed along the west coast 31% of the fishers used gillnets for fishing (Fisheries Division, 2003; Kuruvilla 2007).

The main landing sites along the west coast of Trinidad associated with artisanal gillnet fishing are; Port of Spain, Claxton Bay, Carli Bay, San Fernando, Bonasse/(Cedros), Fullerton and Iacos (Kuruvilla 2007). The major commercial fisheries in the Gulf of Paria targeted by the artisanal gillnetting fleet are the demersal fishery for groundfish and the coastal pelagic fishery for mid-water and surface species.

Landings of groundfish\* in Trinidad from gillnets, lines (banking, palangue, à la vive), beach-seine and fishpots are dominated by six main species groups of major commercial importance.

These are: Whitemouth Croaker (*Micropogonias furnieri*), Salmon (comprising several species of Cynoscion; *Macrodon ancylodon*), Blinck (*Diapterus* spp.), Redfish/Snapper (primarily *Lutjanus synagris*), Grunts (several species of Haemulon and Orthopristis; *Genyatremus luteus*) and Catfish (several species of Bagre and Arius). The main target species for the coastal pelagic fishery are the Carite or Serra Spanish Mackerel (*Scomberomorus brasiliensis*), King Mackerel (*Scomberomorus cavalla*) and several species of sharks (*Sphyrna* tudes, *Rhizoprionodon lalandii*, *Carcharhinus porosus*, *C. limbatus*). Associated species include Cavalli (*Caranx hippos*) and other carangids. The gillnet fishery for Mullet (*Mugil* spp.) operating out of Claxton Bay is considered a limited or specific fishery (Kuruvilla 2007).

The gillnets used in Trinidad and Tobago are the multifilament (green) nets that are generally fished at night and the monofilament (transparent/white) nets which may be used either during the day or at night. The multifilament nets are set at the surface of the water supported by a float line and are usually used to target Carite (*Scomberomorus brasiliensis*), Kingfish (*Scomberomorus cavalla*) and other pelagic species. The monofilament nets are generally weighted and set below the surface of the water and anchored at both ends, or at one end with the other attached to the boat by the cork or float line. About 60% of gillnets are set as demersal nets (Kuruvilla, 2007).

The monofilament gillnet used in Trinidad is a modification of the net that was introduced under the FAO Shark Project which was conducted through the Fisheries Division in the late 1980s (Nagassar, 2000). Locally the more popular mesh sizes for gillnets range between 31/2 (89 mm) and 41/4 (108 mm) in diagonal stretch with

\* A bottom-dwelling marine fish species of commercial value

4 (102 mm) being the most popular (Nagassar 2000). The characteristics of the monofilament and multifilament nets used in Trinidad and Tobago, as reported by Chan A Shing (2002) are presented in Table 1. A smaller gillnet mesh of 3 3/4" is the primary size of mesh used by fishermen targeting the mullet species within the Gulf of Paria (Kuruvilla 2007).

The area within the Gulf of Paria predominantly fished with gillnets amounts to approximately 994.023 km<sup>2</sup> (Fisheries Division 2002). The location of these gillnetting areas as defined by the Fisheries Division in 2002 is presented in Figure 1 below.

#### Overview and Current Status of Mullet Fishery at the Claxton Bay Landing Site, West Coast, Trinidad

The gillnetting fishery operating out of Claxton Bay (the focus of this proposal) targets Mullet in the central Gulf of Paria. This is an inshore fishery specific to the Claxton Bay area (Ramjohn 1999) and most fishing occurs at depths of 9–14m. During the months of January to April, however, fishing occurs at a greater distance from shore and the areas exploited span from Claxton Bay to Port of Spain and Claxton Bay to La Brea (Solomon 2002).

The Claxton Bay fishing depot sits along the western Gulf of Paria coastline and the Southern Main Road and supports a thriving fishing industry. Whilst the gillnetting of mullet is the most important fishery in terms of the number of fishermen targeting the species, fishermen at Claxton Bay also fish for Carite (*S. brasiliensis*), King fish (*S. cavalla*), Salmon (*Cynoscion* spp.), and Crocro (*M. furnieri*) (Solomon, 2002). Additionally, the Fisheries Division Statistics for 2008 indicated that a very small percentage of fishermen at Claxton Bay also engage in fish potting, palangue, banking and à la vive methods of fishing (Fisheries Division 2008).

Table 1: Characteristics/features of Gillnets used in Trinidad and Tobago (Chan A Shing 2002)

Type of net	Mesh Size (Inches)	Weight (Lbs)	Mesh Depth	Length	Average cost of Net TTD
Nylon Multifilament	4" - 3.75"	50 or 25lb bales (3-6 bales per net)	100 mesh/ 50b	732-1190m	n/a
Nylon Monofilament	4"- 3.75"	(5 – 8 bales per net)	100 mesh/ 50lb 50mesh/ 25lb	450-1098m	\$2457/ 100lbs (Repairs est. at \$261/ 100lbs/ month) (Nagassar, 2001)

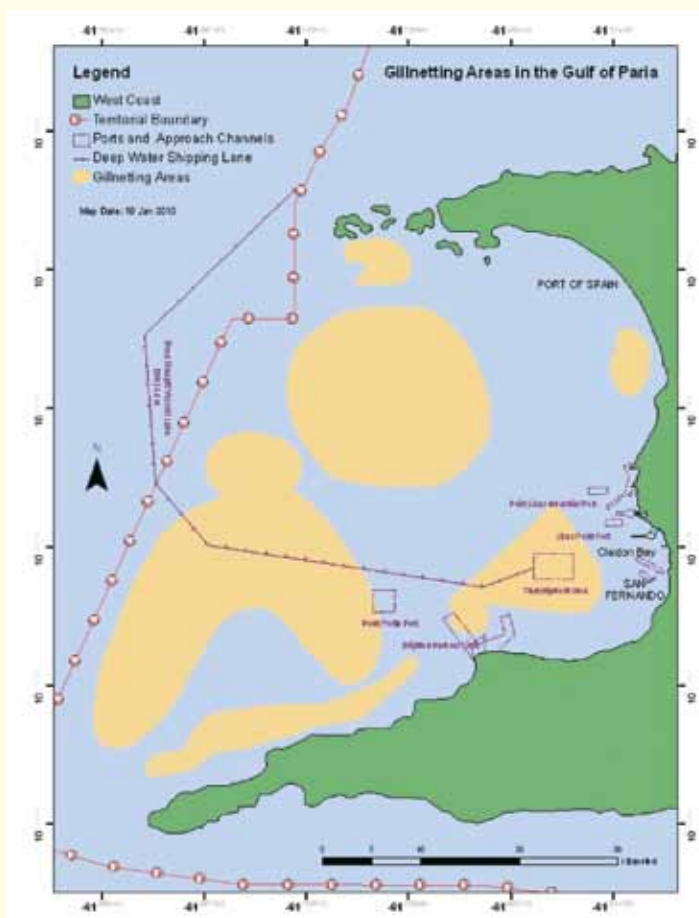


Figure 1: The Gillnetting areas of the Gulf of Paria

- Reference Data
- 1) Geographic Extent of Fishing Areas Fisheries Division Map 2002
  - 2) Navigational Chart, Gulf of Paria Hydrographer of the Navy, 3rd Edition 2005, Updated September 2009
  - 3) Produced Using ArcGis 9.2 Copyright ESRI 2006

At present, there are 31 boats registered with the Fisheries Division which land their catch at Claxton Bay and an estimate of 62 fishermen operating out of the landing site (Fisheries Division 2008). This Fisheries Division estimate may however be lower than the actual number of fishermen using the Claxton Bay landing facility. The records of a focus group meeting held with the Claxton Bay Fishing Association and representatives of NEC at NEC Head Office in Couva, on the September 25, 2008, suggest that there are currently 100 fishermen operating out of the Claxton Bay landing site (NEC 2008). The number of fishermen landing their catch at Claxton Bay has thus doubled over the last 10 years. Surveys conducted by Solomon in 1998-1999 identified that approximately 50 individuals were involved in mullet fishing at Claxton Bay, 15 were registered boat owners and the remainder classified as crew (Solomon 2002). In 2003, it was reported that there were 24 vessels using Claxton Bay as their home port and approximately 48 fishermen at the Claxton Bay landing site (see Figure 2) (Fisheries Division, 2003).

**The number of fishermen landing their catch at Claxton Bay has doubled over the last 10 years. Surveys conducted by Solomon in 1998 to 1999 identified that approximately 50 individuals were involved in mullet fishing at Claxton Bay**

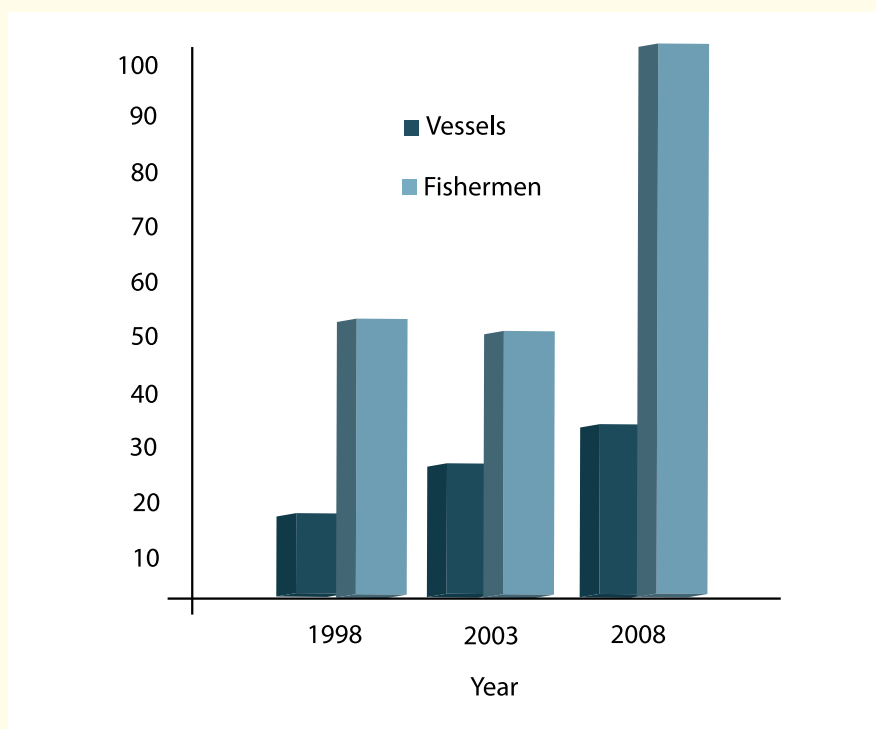


Figure 2: The number of vessels and fishermen using the Claxton Bay landing site in 1998, 2003 and 2008.

(Source: Solomon 2002 and Fisheries Division 2009 Statistics)

The number of boats landing at Claxton Bay account for approximately 7% of the total gillnetting fleet in Trinidad and Tobago (Fisheries Division 2003). The boats used for mullet fishing are generally made of fibreglass or wooden boats coated with fibreglass. They range from 7m to 9m in length and are equipped with one or two outboard engines. The number of nets per boat varies from one to three nets (Solomon 2002).

The Claxton Bay landing site (depot) falls under the administrative purview of the Fisheries Division. The facilities provided at the site include:

- A shed used for the repair of nets and boats
- A recreational room
- A storage building with locker-type facilities
- A slipway
- A building used for fish processing

- An ice trailer
- A retail market with stalls oriented towards the road for fish vending
- Two plastic water storage tanks
- Parking facilities.

One of the major problems at the facility is the inability of fishermen to land catch at low tide. The shallow muddy nature of the landing area renders landing at low tide virtually impossible. During periods of low tide, catch landing occurs at the southern end of the bay near the Trinidad Cement Limited (TCL) Port Facility approximately 1 km from the depot. A temporary jetty structure\* built with spoil and rubble material is now present to the north of the landing site. It is however unclear

\* The legality of the structure remains unknown

Figure 3: The facilities available at the Claxton Bay landing Site, West Coast, Trinidad.



- a) Ice trailer
- b) Vending stalls
- c) Water storage tanks
- d) Parking area and net shed
- e) Locker shed
- f) Boats and fishing nets
- g) Boats and improvised jetty
- h) Alternative landing site

who was responsible for building this structure. Figure 3 shows the facilities provided at the Claxton Bay landing site, the alternative landing site used at low tide and the temporary jetty built at the Claxton Bay landing site.

Mullet catches from the Gulf of Paria are comprised of three species; White Mullet (*Mugil curema*), Parassi Mullet (*Mugil incilis*) and Striped Mullet (*Mugil cephalus*). The main species and

most important to the fishery is *Mugil curema*. The highest catch of this species occurs during January to April and the lowest catches during the months of June to December. *M. cephalus* and *M. incilis* are caught incidentally\* in small amounts mainly during the months of January and February and December and January respectively.

One of the major constraints of the mullet fishery is its seasonal nature. The mullet fishery is divided into full and part time fishermen. Part-time fishermen fish

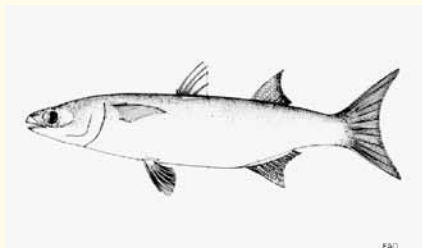
for mullet during the months of highest abundance (January to April) and target different species of fish throughout the rest of the year (Solomon, 2002). Full-time mullet fishermen target mainly mullet throughout the year, however, they sometimes engage in other fisheries during periods of low mullet abundance. Surveys conducted by Solomon in 1999 indicated that 90% of fishermen in Claxton Bay operated as fulltime fishermen. During the months

\* The legality of the structure remains unknown

Figure 4: Species of mullet harvested and landed at Claxton Bay  
(Source: [www.Fishbase.org](http://www.Fishbase.org))



a) *Mugil curema*



b) *M. incilis*



c) *Mugil cephalus*

of highest abundance, fishing is carried out both during the day and night. Approximately 10 hours per day is spent at sea. Fishing occurs for at least four days during the week, during the season (Monday to Thursday). For the months of low abundance however, fishing is very irregular and generally based on sightings (Solomon 2002).

The income generated from the mullet fishery is likewise quite seasonal. The average, annual ex-vessel income generated from the harvesting of mullet at Claxton Bay over the four-year period 2005 to 2008 (inclusive) was TT\$217,518.10 (Fisheries Division Statistics 2005 to 2008). The gross ex-vessel earnings generated during the reported high season (January to April) accounted for approximately 42% of total earnings for the same period 2005 to 2008 (Figure 5 refers). As one would expect, the monthly landings follow a similar trend with a decline in net landings occurring during the latter months of the year (Figure 6 refers).

The income generated from the mullet fishery is likewise quite seasonal. The average, annual ex-vessel income generated from the harvesting of mullet at Claxton Bay over the four-year period

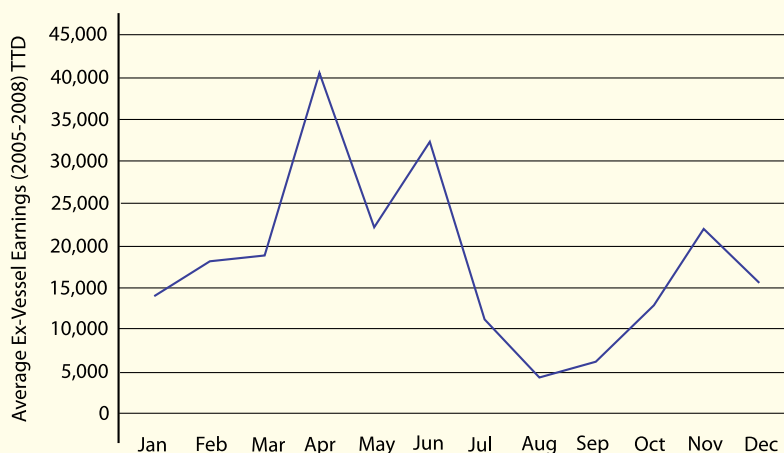


Figure 5: Monthly ex-vessel or gross earning generated from the mullet fishery at the Claxton Bay landing site for 2005 to 2008  
(Source: Fisheries Division 2005 to 2008 Statistics)

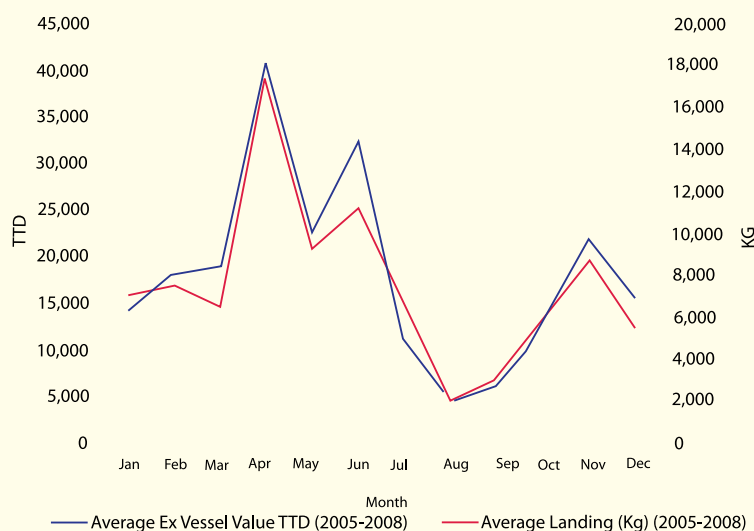


Figure 6: Comparison of the monthly ex-vessel earning generated from the mullet fishery and the net landings of mullet by weight at the Claxton Bay landing site for 2005 to 2008. (Source: Fisheries Division 2005 to 2008 Statistics)

The average ex-vessel\* earning from the sale of fresh mullet at Claxton Bay between 2005 and 2008 was calculated as TT\$18,126.51 per month. A monthly average of 7,492.62 kg of mullet was harvested over this four-year period. Based on the records of the Fisheries Division (Fisheries Division Statistics 2005 to 2008), these mullet landings consisted of a “standard” sized mullet sold at an average of TT\$2.61 per kg and “large” mullet sold at an average of TT\$4.88 per kg.

Assuming these price and harvest trends remain constant over the next five years, then the projected annual earnings from the Claxton Bay mullet fishery over the period 2010 to 2014 (inclusive) can be estimated at TT\$217,518.10, with a gross five-year earnings averaging TT\$1,087,590.

Field surveys conducted by Schorse in 2007 for Environmental Impact Assessments (EIAs) for proposed drilling activities in Block 1a and 1b within the central Gulf of Paria indicated that a fisherman’s weekly income may average as high as TT\$5,000. It was noted, however, that incomes can vary greatly from week to week (Schorse 2007).

Mullet catches from the Gulf of Paria are sometimes sold locally at the Port of Spain Wholesale Fish Market, to restaurants, fast food outlets and processing plants, or to longliners and shark fishermen operating out of Mayaro and Moruga where it is used for bait. The Port of Spain Wholesale Fish Market is the main market for the wholesaling of fish in Trinidad and Tobago. The price of fish at this facility influences the price of fish traded at other markets around the country. The average wholesale price obtained for mullet at the Port of Spain market was TT\$6.45 per kg for the period 2007 to 2009 (inclusive). The highest and lowest prices obtained during this period were TT\$11.02 per kg and TT\$4.68 per kg respectively (Figure 7 refers). The total quantity of mullet sold at the Port of Spain Fish Market amounted to 25,884 kg in 2007, 18,579

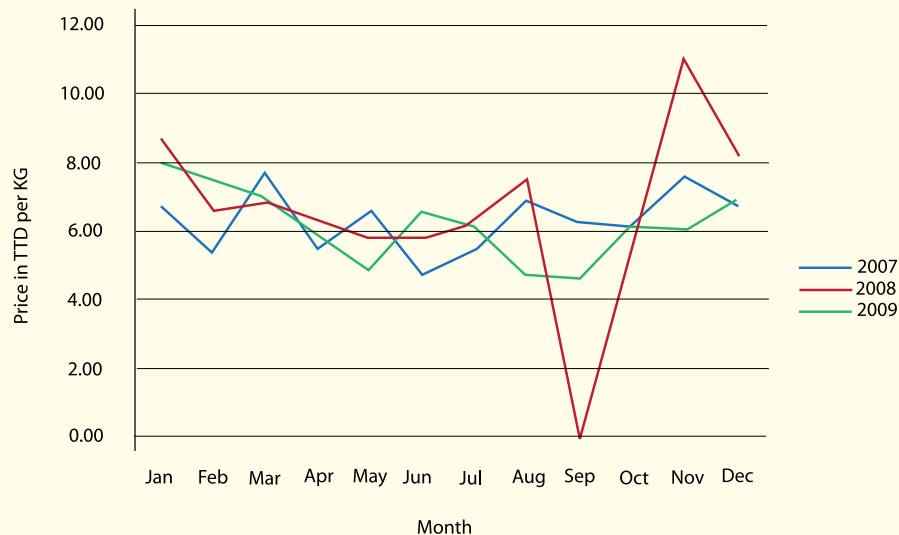


Figure 7: Market trends in the price of mullet sold at the Port of Spain Wholesale Market for the period 2007 to 2009

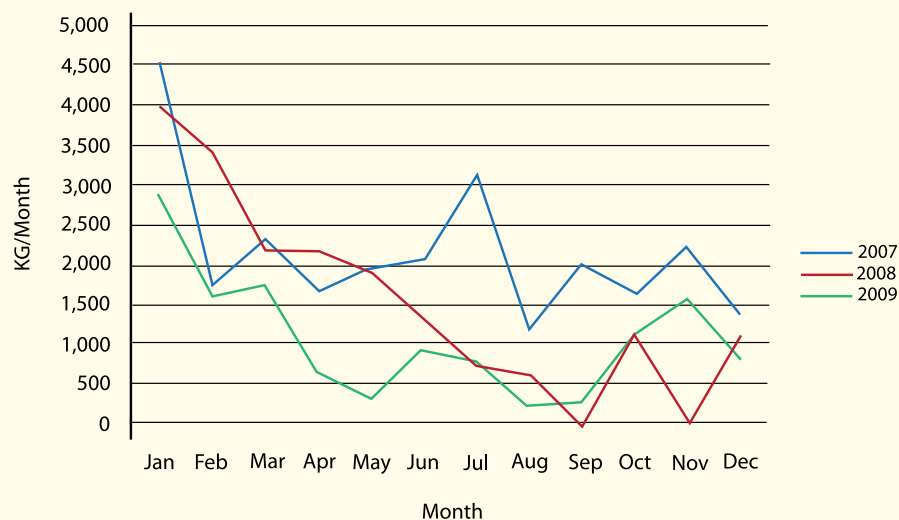


Figure 8: Market trends in quantities of mullet sold at the Port of Spain Wholesale Market over the period 2007 to 2009

kg in 2008 and 12,986 kg in 2009. Between 2007 and 2009 (inclusive) the monthly average of mullet sold was 1,244 kg and the months with largest quantities of mullet being sold were January to March (Refer to Figure 8).

At certain times of the year mullet is exported whole (unprocessed) or salted (processed) to Canada and the United States (Solomon 2002). Approximately 30% of fishermen\*\* interviewed at the Claxton Bay landing site by Schorse

in 2007 indicated that they do export their catch (Schorse 2007). Mr. Kishore Boodram (President of the Claxton Bay Fishing Association) in a newspaper interview showed that 53,900 lbs (24,500 kg) of mullet caught in 2008 and 98,800 lbs (44,909.1 kg) caught in 2007 were sold to a seafood export company called Sea Foods Enterprises Limited

\* The price received by the fisherman at point of landing

\*\*Survey conducted by Schorse in 2007 had a sample population of 15 fishermen from the Claxton Bay landing site.

(Broadbridge, *Trinidad Newsday* Online Resources 2009.) Sea Foods Enterprises Limited is a local company registered to export fresh and frozen fish. The main markets they supply to are the United States of America, Canada and the Caribbean (Sea Foods Enterprises Ltd 2010).

The Fisheries Division is responsible for overseeing the administrative functions of providing permits for the import and export of frozen seafood for domestic\* purposes as well as recommending applicants wishing to import/export chilled/frozen sea foods for commercial purposes to the Ministry of Trade and Industry for the granting of licences (Fisheries Division 2010). However, at the time of writing this report, statistical data and records of the number of frozen fish exporters handling mullet and the quantity of mullet exported from Trinidad were not available from the Fisheries Division. FAO reports that in 2003 there were 18 fish processing plants throughout Trinidad and Tobago that engaged in the export of chilled and frozen fish products with minimal value added (FAO 2010).

Processing increases the value of a fish product and prior to surveys conducted by Solomon in 1999, mullet fish were gutted and salted by fishermen and their crew at the Claxton Bay Depot, then exported. In her writings Solomon (2002) identified that the processing of mullet at the Claxton Bay landing site stopped in the late 1990s because of sanitation concerns (Solomon 2002). It was not clear who raised these concerns but the salting shed used at the time was open to the elements and wind-borne pollutants (Solomon 2002). Along with past sanitation issues mullet fish processors operating at Claxton Bay have been faced with other notable problems. During a national workshop in 2000 on Shrimp and Groundfish Fisheries of the Brazil-Guianas Shelf, hosted by the FAO and held in Couva, Trinidad, it was identified that the mullet fishermen of Claxton Bay experience

**Under the Fish and Fishery Products Regulations of 1998, a person cannot export fish or process any fish for export unless the processing is carried out in an establishment certified by the Food and Drug Division of the Ministry of Health of Trinidad and Tobago**

persistent problems with the Customs and Excise division in exporting their fish to Venezuela (Food and Agriculture Organization of the United Nations 2000).

The degree of fish processing currently occurring at the Claxton Bay landing site was unclear at the time of writing this review. In a newspaper article about the state of fishing at Claxton Bay, Mr. Boodram indicated that 10,000 lbs of salted mullet fish from the Claxton Bay site was sold to Venezuela in July 2008 (Asha Javeed, *Trinidad Guardian* Online Resources 2008). Whilst this provided an estimate of the monthly quantities of processed fish currently being exported from Claxton Bay to Venezuela, it should be noted that the Fisheries Division has no statistical records of the quantities of processed mullet leaving the landing site on an annual basis. Additionally, the earnings generated from the export of salted mullet were not reported by the Central Statistical Office in their 1995 to 2005 agriculture survey. During the preparation of this report, a source at the Fisheries Division indicated that at the start of the year 2010 the building used for the processing of mullet at the Claxton Bay landing site was under renovation. As such, processing activities have since stopped for these works to be carried out (pers. comm.).

Under the Fish and Fishery Products

Regulations of 1998, a person cannot export fish or process any fish for export unless the processing is carried out in an establishment certified by the Food and Drug Division of the Ministry of Health of Trinidad and Tobago. It is still uncertain whether the Claxton Bay Depot is considered a certified establishment for the export of fish and the processing of fish for export. However, the FAO in its 2010 country profile report has stated that in general the infrastructure for the handling and marketing of fish at landing sites around Trinidad and Tobago cannot be classified as well-developed since many of the sanitary requirements fall short of the established standards (FAO, 2010).

90% of the fishermen operating out of Claxton Bay in 1998 and 1999 indicated that mullet fishing was their only source of income (Solomon 2000). The remaining 10% were involved in several forms of alternative employment on an irregular basis. Fishing in the locality is a family affair with skills and knowledge being passed from one generation to the next and for most fishermen operating at Claxton Bay it is the only form of employment they have ever known.

Recent field interviews conducted at Claxton Bay identified that most fishermen at the site have been fishing for over 20 years and that fishing was their primary source of income (Schorse 2007). Solomon (2000) reported that only 25% of the mullet fishermen at the Claxton Bay landing site had a secondary level education. The author also indicated that the majority had a primary level of education and none of them had ever attended a tertiary institute.

A lack of alternative skills put these fishermen at a definite disadvantage during low fishing seasons and periods of low catch. Unable to easily integrate into alternative service sectors, the other forms of employment undertaken by fishermen include plumbing, carpentry,

\* (10kg maximum)

Table 2: Aspects for improved performance in the mullet fishery at Claxton Bay

Activity	Aspect	Possible Remediation Steps and Reference Code
Fishing/Harvesting	Mullet species is seasonal. The income generated from the fishery outside of peak season is quite low.	Exploitation of an alternative commercial fishery. [Code 1.1]
Fish Landing	There are extensive mudflats along the west coast of Trinidad and as such the landing of catch is limited to high tide when vessels can come ashore.	Improve dock side facilities [Code 1.2]
Fish Processing	Fish processing at Claxton Bay is limited. It is uncertain whether the site is legally certified for the export and sale of processed fish.	Improve the existing amenities provided at the Claxton Bay fishing depot. [Code 1.3] Training in: <ul style="list-style-type: none"> <li>• On Board Handling of Fish,</li> <li>• Fish Processing Technology,</li> <li>• Quality Assurance and Quality Control in Fish and Fishery Products.</li> </ul> Thus ensuring certification for export of fish and processed fish products can be obtained from the relevant authorities. [Code 1.4]
Social Development	Fishermen at the Claxton Bay Depot have very little marketable skills outside of those related to fishing.  Ineffective small-scale business management practices.	Training in the provision of alternative services which may or may not be related to the fishing industry. Examples are boat engine and net repair. [Code 1.5]  Apply small business management practices to the task of fishing and the sale of fish. [Code 1.6] Training in aspects such as Fish Processing Technology and Fish merchandising. [Code 1.7]

house painting and gardening (Solomon 2002). However, Solomon in 2002 pointed out that the income generated from these activities were insufficient to support a family of five or more. The majority of fishermen at the Claxton Bay landing site are between the ages of 20 and 30 years and most fishermen support extended families. Social statistics for the period 1998 to 1999 indicated that the average number of dependants per household was five and usually more than one member of the household was engaged in fishing (Solomon 2002).

#### **Possible Areas for Improved Efficiency of the Mullet Fishery at the Claxton Bay Landing Site, West Coast, Trinidad**

Based on the above overview and current status of the Claxton Bay Mullet Fishery, several areas for possible increases in economic efficiency of the fishery have been identified. These aspects are itemized and coded in Table 2 above. The possible strategies which may be implemented to address each aspect and improve the earnings generated from fishing at Claxton Bay are examined in greater detail in Section 3.

#### **Current Status of the Oyster/Mussel Fishery at the Claxton Bay Landing Site, West Coast, Trinidad**

Another open access fishery exploited at Claxton Bay is the harvesting of shellfish from the Claxton Bay Mangrove System. The harvesting of shellfish is an informal activity which is subsistence\* in nature. People move freely into the activity when employment opportunities and income is low or where those involved have the activity as their sole source of income.

\* An activity which supports the basic needs of an individual

Figure 9: Species of shellfish harvested at Claxton Bay (Source: <http://www.idscaro.net>)



a) *Crassostrea rhizophorae*



b) *Perna viridis*



c) *Mytella guyanensis*

The species of shellfish harvested from the study area include Oyster (*Crassostrea rhizophorae*) and Swamp Mussels (*Mytella guyanensis* and *Perna viridis*) (Refer to Figure 9). The mussels harvested in Trinidad are commonly referred to as “mok” (Lucas et al. 2007). High densities of oysters have been recorded on mangrove prop roots and submerged structures within the Claxton Bay wetland. In comparison, moderate densities (but a high diversity) of edible mussels can be found in the mud of the river banks at the mouth of the “LNG” River and on submerged prop roots and logs buried in coastal mud around the Claxton Bay Mangrove System (Lucas et al. 2007), (refer to Figure 10).

The open access nature of these resources makes it difficult to quantify the number of shellfish harvesters operating within the Claxton Bay area. On a national scale the economic importance of this resource to Trinidad fisheries may be underestimated, as data is not formally captured by any state agency.

Oysters are regularly harvested throughout coastal areas in Trinidad, however, the major collecting beds are located on the west coast (La Croix 1971). Oyster collectors were reported in the Claxton Bay area during site



Figure 10: Oyster and mussel beds observed at the mouth of the LNG River, Claxton Bay.

surveys conducted by Lucas et al. in 2007. These oyster collectors use tracks leading from the Southern Main Road to gain access to the wetland and the oyster beds located along the coast. The oysters in this area are the main source of income generated by many families, (Lucas et al. 2007).

The population demographics of the oyster fishery in Trinidad were examined by La Croix in 1971. At the time, it was reported that age of oyster collectors generally ranged from 12 to 50 (average 25) with a predominance of youth in this shellfishery. Only 43% were reported to have families and the family size was estimated at five persons

**On a national scale the economic importance of this resource to Trinidad fisheries may be underestimated, as data is not formally captured by any state agency**

per household (La Croix 1971). It is doubtful whether much has changed in this community structure over the years.

Oysters are commonly sold at the roadside, at bars and recreational facilities. It is a popular appetizer in Trinidad and a mythical aphrodisiac used by local men. Both oysters and mussels are sold raw as a cocktail or 12 per plate (Figure 11 refers). Chin Yuen Kee (1978) estimated that it would take a persistent collector five hours to collect a 2 gal container of oysters. The oysters would have had an average size of 2.5cm to 3.8cm in length with less than 10% being greater than 6.3 cm.

Generally oysters are retailed by collectors themselves or sold wholesale by collectors to vendors. A breakdown of the economics of oyster vending and the net income from sales as a vendor/collector or a vendor/purchaser is presented in Tables 2 and 3 respectively. The approach used for calculating the net income was based on research methods previously employed by Chin Yuen Kee (1978) and La Croix (1971). The monetary values identified in the tables below are the average wholesale and retail prices provided by oyster vendors informally interviewed (by the authors) for this proposal.

Oysters and mussels are currently sold TT\$6 to TT\$7 per cocktail and TT\$12 for a dozen on a plate. Roadside vending of this appetizer is quite common and the earnings generated by a vendor is influenced by the vendor's location. The estimated monthly earnings of a vendor/collector or vendor/purchaser is proportional to the number of days spent selling their product. As shown in Tables 3 and 4, if one tin of 400 oysters is sold in one day then the daily earnings of a vendor/purchaser is just above that of minimum wage (assuming minimum

Figure 11: Preparation of an Oyster Cocktail



Roadside vending of oysters is quite common with earnings influenced by the vendor's location

Table 3: Estimated daily earnings from the retail of oysters.

(The retail and wholesale prices used below were based on data obtained through informal interviews with oyster vendors in January 2010)

## 2009 EARNINGS ESTIMATES

Items	TTD
1 tin 400	\$200.00
Transportation	\$20.00
Condiments	\$20.20
	<b>\$240.20</b>
Sale of 65 Cocktails	\$390.00
Net Profit	\$149.80

	TTD
2 bottles ketchup	\$11.20
5 limes	\$5.00
5 peppers	\$1.00
onion	\$1.00
garlic	\$0.50
chive	\$1.50

wage is at a rate of TT\$12 per hour). The data presented in Table 3 indicates that the income realized by vendor/collector operations appear to be higher than that realized by vendor/purchaser operations.

The income generated from this

enterprise appears to be meager and subsistent in nature. Like the fishing community, the majority of oyster vendors are not trained in alternative skills and this makes it difficult for them to obtain employment in other services sectors.

Table 4: Breakdown of the Estimated Net Earnings Realized by Harvesters and Vendors in the Small-scale Oyster Fishery of the West Coast, Trinidad.

2009	Net Daily Earnings	Net 5-Day Earning	Net 7-Day Earning
No. of Cocktails sold daily	65 65	35 35	10 65 35 10 10
Vendor /Collector	\$349.80 *	169.8 \$2,448.60	* \$1,749.00 849 1188.6 *
Vendor /purchaser	\$149.80 \$1,048.60	* *	* \$749.00 * *

Table 5: Area for Improvement in the Oyster/Mussel Fishery in Claxton Bay

Activity	Aspect	Possible Remediation Steps and Reference Code
Social Development	Harvesters at Claxton Bay have limited alternative skills	1.5 & 1.7 Because of the proximity of the Claxton Bay Fishing Depot to the Mangrove area where oysters are harvested, individuals engaged in this enterprise would benefit from obtaining training in key skill areas such as: <ul style="list-style-type: none"> <li>• Boat Engine and Net Repair</li> <li>• Fish Processing Technology,</li> <li>• Quality Assurance and Quality Control in Fish &amp; Fishery Products. These alternative skills would be marketable in and around the Claxton Bay Fishing Depot and other landing sites along the west coast. [Code 1.5 -1.7 Ref: Table 2]</li> </ul>

### Possible Areas for Improved Efficiency in the Oyster/Mussel Fishery at the Claxton Bay West Coast Trinidad

Based on the overview of the subsistence Oyster Fisheries, one main area for potential improvement has been identified. This aspect is itemized and coded in Table 5 above.

The strategies which may be implemented to address the aspect identified and improve the social well-being of harvesters within the Claxton Bay area are examined in greater detail in the coming sections to be highlighted in Gasco July 2010.

## References

- Agard, J. B. R. and Gobin J. (1993). *Assessment of the coastal marine environment from Pointe-à-Pierre to La Brea (Oropuche Bank). Analysis of Macrobenthic in relation to oil pollution, natural oil seepage and disturbance in Trinidad, Institute of Marine Affairs (IMA). IMA Technical Report p 26.*
- Cervigón, F (1993), *Los peces marinos de Venezuela. Volume 2. Fundación Científica Los Roques, Caracas, Venezuela. p. 497.*
- Chan A Shing C. (2002). *Atlas – Marine Fisheries of Trinidad and Tobago, Part 1, Trinidad Inshore Fisheries. Fisheries Information Series 10. p. 76. Ministry of Agriculture, Land and Marine Resources, Port of Spain, Trinidad.*
- Claro R. and J.P. Gracia-Arteaga, (1999). *Prospective of an artificial Habitat Programme for Fishes of the Cuban Shelf Editorial Academia No 452 Florida Sea Grant Programme University of Florida.*
- Claro, R. (1994). *Características generales de la ictiofauna. pp. 55-70. In R. Claro (ed.) Ecología de los peces marinos de Cuba. Instituto de Oceanología Academia de Ciencias de Cuba and Centro de Investigaciones de Quintana Roo.*
- Cocheret de la Morinière E., I. Nagelkerken, H. van der Meij and G. van der Velde (2004). *What attracts juvenile coral reef fish to mangroves: habitat complexity or shade? Volume 144, Number 1 Marine Biology.*
- Collette, B.B. (1999) *Pomatomidae. Bluefishes. p. 2650. In K.E. Carpenter and V. Niem (eds.) FAO species identification guide for fishery purposes. Vol. 4. Bony fishes part 2 (Mugilidae to Carangidae).*
- CRFM (2006). *CRFM Fishery Report – 2006 Volume 1 Report of Second Annual Scientific Meeting – Port of Spain, Trinidad and Tobago, pp. 13-22. March 2006.*

- Dass (1983). *Some aspects of the biology of the Lane Snapper Lutjanus synagris* (Linnaeus, 1758) in Trinidad. Research Report No. IMA/12/83. Institute of Marine Affairs: Chaguaramas, Trinidad and Tobago
- FAO (2000). *Report of Aa National Workshop on Shrimp and Groundfish Fisheries of the Brazil-Guianas Shelf*. GCP/Int/648/Nor Field Report F-8 (En) Food and Agriculture Organization of The United Nations; FAO/Norway Government Cooperative Programme
- Farbes, B. (1983). *Fisheries related observations of the North-eastern South America*. Draft Report. Fisheries Division Ministry of Agriculture Lands and Food Production Trinidad West-Indies.
- Fisheries Division (2003). *The Fisheries Division Census of Fishing Vessels of Trinidad*. Fisheries Division, Ministry of Agriculture, Land and Marine Resources.
- Fisheries Division (2005). *Fisheries and Aquaculture Statistics for Trinidad and Tobago*. Fisheries Division, Ministry of Agriculture, Land and Marine Resources.
- Fisheries Division (2006). *Fisheries and Aquaculture Statistics for Trinidad and Tobago*. Fisheries Division, Ministry of Agriculture, Land and Marine Resources.
- Fisheries Division (2007). *Fisheries and Aquaculture Statistics for Trinidad and Tobago*. Fisheries Division, Ministry of Agriculture, Land and Marine Resources.
- Fisheries Division (2008). *Fisheries and Aquaculture Statistics for Trinidad and Tobago*. Fisheries Division, Ministry of Agriculture, Land and Marine Resources.
- Fisheries Division (2009). *Fisheries and Aquaculture Statistics Report for Trinidad and Tobago*. Fisheries Division, Ministry of Agriculture, Land and Marine Resources
- Ferreira, L. and L. Martin (2005). *National Report – Trinidad and Tobago*. In *Report of the First Annual CRFM Scientific Meeting*. CRFM Fishery Report No 11.
- Gade, H.G. (1961). *On some Oceanographic observations in the Southeastern Caribbean Sea and the adjacent Atlantic Ocean, with special reference to the influence of the Orinoco River*. Boletín del Instituto Oceanografico de Venezuela 1: pp. 287-342.
- Grant, E.M. (1982) *Guide to fishes*. 5th edition. Dep. Harbours Mar., Brisbane, Queensland, Australia, p. 896.
- Gopaul, N.H. and J.Wolf. (1996). *A numerical model of tidal and wind-driven circulation in the Gulf of Paria*. Caribbean Marine Studies. No 5, pp. 23-40.
- Heileman, L.T. and D. Ramsaroop (1990). *Seasonal variations in some oceanic parameters in the Gulf of Paria, Trinidad and Tobago, West Indies*. Caribbean Marine Studies 1: pp. 101-113.
- Kuruvilla S. (2007). *Report on the Marine Resources & Fisheries of the Gulf of Paria for the Environmental Impact Assessments for Exploratory Drilling Activities in Block 1a & 1b Prepared for Coastal Dynamics*. Petro-Canada Block 1b Drilling Programme – Environmental Impact Assessment. Appendix H. Coastal Dynamics Limited 2007.
- La Croix M. (1971). *The Oyster Fishery of Trinidad and Tobago*. Officer Research Division of Fisheries Ministry of Agriculture.
- Maingot, J. and S. Manickchand-Heileman (1987). *Field per recruit analysis of the lane snapper Lutjanus synagris* (Linnaeus 1758) in Trinidad, West Indies. Institute of Marine Affairs, Chaguaramas: Trinidad and Tobago.
- Manickchand-Dass, S. (1987). *Reproduction, Age and Growth of the Lane Snapper Lutjanus synagris* (Linnaeus), in Trinidad, West Indies. Bulletin of Marine Science, 40 (1): pp. 22-28.
- Manickchand-Heileman S. and M. Julien-Flus (1990). *Species compositions and seasonality of a coastal demersal fish stock in Trinidad, West Indies*. Caribbean Marine Studies 1: pp. 11-21.
- May, J.L. and J.G.H. Maxwell (1986) *Trawl fish from temperate waters of Australia*. CSIRO Division of Fisheries Research, Tasmania. p. 492.
- Mohammed, E. et al. (2005). *Coastal Fisheries Profile of Latin America and the Caribbean Trinidad and Tobago*. (in press)
- NEC (2008). *Cat Reporting Transcription in Respect of National Energy Corporation of Trinidad and Tobago Limited Focus Group Meeting Re EIA for Proposed Development of an Industrial Port at Claxton Bay with the Claxton Bay Fishing Association, held at NEC Head Office Cor. Rivulet Road and Factory Road, Brechin Castle, Couva, on Thursday, September 25, 2008*.
- Nagassar, N. (2001). *Frame Survey of the Gillnet Fishery of Trinidad and Tobago*. Presented at the National Consultation on the Monitoring and Advisory Committee on the Fisheries of Trinidad and Tobago. Fisheries Division, Ministry of Agriculture, Land and Marine Resources. pp. 44 – 66.
- Nagassar N. (2000). *Frame Survey on the Gillnet Fishery of Trinidad and Tobago*. A Report prepared for the National Consultation of the Monitoring and Advisory Committee on the Fisheries of Trinidad and Tobago. Fisheries Division, Ministry of Agriculture, Land and Marine Res. Port of Spain, Trinidad.
- Ramjohn, D.D. (1999). *Checklist of coastal and marine fishes of Trinidad and Tobago*. Fisheries Information Series 8. Marine Fishery Analysis Unit Fisheries Division, Mins, Agri, Land and Marine Res. Port of Spain Trinidad.
- *Rapid Environmental Assessments (2003) Ltd (REAL); Worleyparsons Infrastructure and Environment Limited and Senes Consultants Limited, 2009. National Energy Corporation of Trinidad and Tobago Limited, Development of an Industrial Port at Claxton Bay North. CEC 1761/2007 Supplementary Environmental Impact Assessment Study*.
- Schorse M. (2007). *Socio-Cultural Assessment for the Environmental*

*Impact Assessments for Exploratory Drilling Activities in Block 1a and 1b Prepared for Coastal Dynamics. Petro-Canada Block 1b Drilling Programme – Environmental Impact Assessment. Appendix H. Coastal Dynamics Limited 2007.*

- Solomon F.N. (2002). *The Mullet Fishery in the Gulf of Paria Trinidad*. MPhil Thesis University of the West Indies St. Augustine Campus Trinidad.
- Soomai S. (2004). *Status of Coastal Zone and Fisheries/Aquatic Resources Management and the Incorporation of Demographic and Socio-Economic Considerations/Indicators: Trinidad and Tobago, August 2004*, CRFM .
- Soomai S. and C. Porch (2006). *The Lane Snapper (Lutjanus synagris) fishery of Trinidad and Tobago* CRFM Fishery Report (2006) Volume 1 Report of Second Annual Scientific Meeting – Port of Spain, Trinidad and Tobago, 13-22 March 2006. pp. 122-134.
- Smith, C.L. (1997). *National Audubon Society field guide to tropical marine fishes of the Caribbean, the Gulf of Mexico, Florida, the Bahamas, and Bermuda*. Alfred A. Knopf, Inc., New York. p. 720.
- Sheehy, D.J. (1983). *New approaches in artificial reef design and applications*. Aquabio p. 13.
- Silva Lee, A. (1975). *Observaciones sober arrecifes artificiales usados para pescar en Cuba*. Ser Oceanol, Acad. Cien. Cuba 26.1:13.
- Van Andel, T.J., H. Postma (1954). *Recent sediments in the Gulf of Paria*. Reports of the Orinoco Shelf, Vol 1. North-Holland Publishing Company Amsterdam.

#### Web References

- BFAR (2009) *Mariculture Bureau of Fisheries and Aquatic Resources Marine Zones and parks*. Accessed January 28, 2010. [http://mariculture.bfar.da.gov.ph/mz\\_business\\_grouperpage.htm](http://mariculture.bfar.da.gov.ph/mz_business_grouperpage.htm)
- Broadbridge C. (2008) *Trinidad and Tobago Newsday Online Resources. Trinidad's Hidden Garden of Eden*, July 5, 2009. Accessed January 25, 2010. <http://www.newspday.co.tt/features/print,0,103268.html>
- Florida Museum of Natural History Biological Profile. Accessed January 2010 <http://www.flmnh.ufl.edu/fish/Gallery/Descript/LaneSnapper/LaneSnapper.html>
- Food and Agriculture Organization of the United Nations, Fisheries and Aquaculture Department, Fishery and Aquaculture Country Profiles 2000-2010. Trinidad and Tobago Accessed January 2010. [http://www.fao.org/fishery/countrysector/FI-CP\\_TT/en](http://www.fao.org/fishery/countrysector/FI-CP_TT/en)
- Food and Agriculture Organization of the United Nations, Fisheries And Aquaculture Department, FAO Corporate Document Repository, *Fishing with Traps and Pots*. Accessed January 2010. <http://www.fao.org/docrep/004/X2590E/x2590e07.htm>
- Sivalingam S. (1981). *Basic Approach to Mariculture, Problems and Development Strategies (Ken/77/014) Government of Kenya/UNDP/FAO Pilot Project "Development of Coastal Aquaculture"* Food and Agriculture Organization of the United Nations, Fisheries and Aquaculture Department, FAO Corporate Document Repository. Accessed January 28, 2010 <http://www.fao.org/docrep/field/003/AC571E/AC571E00.htm>
- Sivalingam S. (1981) *Mariculture as a Method of Using Coastal Zones (Ken/77/014) Government of Kenya/UNDP/FAO Pilot Project, "Development of Coastal Aquaculture"* Food and Agriculture Organization of the United Nations, Fisheries and Aquaculture Department, FAO Corporate Document Repository. Accessed January 28, 2010 <http://www.fao.org/docrep/field/003/AC583E/AC583E00.htm>
- Javeed, A. (2008) *Trinidad Guardian Online Resources, Fishing's bleak future, South and Central fishermen fear their way of life may soon be gone forever*. Thursday, August 14, 2008. Accessed January 2010. <http://legacy.guardian.co.tt/archives/2008-08-18/bussguardian3.html>
- Kishore R., Finlay J., Clarke-Marshall M., Ramsundar H., de Souza G. and Haylock H. (2006). *Coastal Resource Management in the Wider Caribbean Resilience, Adaptation, and Community Diversity. Chapter 7: Political organization and socio-economics of fishing communities in Trinidad and Tobago, Grenada and Belize*. Edited by Yvan Breton, David Brown, Brian Dary, Milton Houghton, and Luis Ovares p. 300. Accessed January 2010. [http://www.idrc.ca/en/ev-102785-201-1-DO\\_TOPIC.html#tab10](http://www.idrc.ca/en/ev-102785-201-1-DO_TOPIC.html#tab10)
- Ministry of Agriculture, Land and Marine Resources (MALMR) 2010. *Government of the Republic of Trinidad and Tobago*. MALMAR Services. Date Accessed January 28, 2010. [http://agri.gov.tt/home/index.php?option=com\\_content&task=view&id=125&Itemid=96](http://agri.gov.tt/home/index.php?option=com_content&task=view&id=125&Itemid=96)
- Phillip K. C. (2009). *Trinidad and Tobago Express Online Resources. Pollution killing fish stocks*. Monday, April 13, 2009. Accessed January 25th 2010. [www.trinidadexpress.com/index.pl/print?id=161464059](http://www.trinidadexpress.com/index.pl/print?id=161464059)
- Sea Foods Enterprises Limited (2010). Date Accessed January 25th 2010 <http://seafoodstt.com/>



Courtesy Newsday

# An Energy Visionary

## TREVOR BOOPSINGH

# REMEMBERED

When Trevor Boopsingh passed on February 9, 2010, he left a void and many memories for his peers and colleagues in the petroleum sector. Mr. Trevor Boopsingh was one of the key petroleum engineers responsible for guiding and shaping Trinidad and Tobago's petroleum industry for the benefit of its citizens.

Mr. Boopsingh, recipient of one of the country's highest awards, the Chaconia Gold Medal, started as a senior petroleum engineer at the Ministry of Petroleum and Mines in 1973 (now the Ministry of Energy and Energy Industries). At the Ministry, the young Boopsingh rose to Director of Energy Planning, then to the level of its Permanent Secretary. During his career, Mr. Boopsingh presided over the creation of the Petroleum Company of Trinidad and Tobago (Petrotrin) serving as its first Chairman. He was also part of the team that revised T&T's Petroleum Tax Legislation and developed an overall vision for the future development of the local petroleum industry. When a petroleum engineering programme was established at UWI, he was a senior lecturer, authoring or co-authoring over 56 technical papers and publications. In recognition of his contribution as an oil expert he earned the title of International Distinguished Lecturer from the Society of Petroleum Engineers – the first Trinidadian to be so honoured.

NEC President Mr. Andrew Jupiter remembers Mr. Boopsingh in these words, "He had an excellent grasp of international oil politics and



*Trevor Boopsingh (1944-2010)  
Chaconia Medal (Gold) Recipient*

"Trevor's thinking was pivotal in the change of approach to gas utilization, and his will to confront the multinationals so that the country could benefit from its natural resources was critical to our development"

geopolitics. He was able to connect what was happening in Saudi Arabia with London, with the US. What struck me was not just his facility with figures, it was the depth of his understanding of those numbers. Only a few people are responsible for shaping our views of the oil industry and he was one of them. I always found him very approachable, always willing to share his views and he listened, but he had little patience if you weren't sound on your topic."

Former NGC President Frank Look Kin was already working at the Ministry of Petroleum and Mines when he met Trevor Boopsingh. He would work with

Mr. Boopsingh for almost a decade after they started their careers as Petroleum Engineers III. Mr. Look Kin recalls a tight-knit group at the Ministry, comprising himself, Rupert Mends, Andrew Jupiter and Mr. Boopsingh. He recalls with a laugh, "They called us the forest when we were found together, talking. We were all dedicated, we believed that we were representing the country and its resources," said Mr. Look Kin. "We had a sense of pride in what we were trying to achieve."

Both Messrs Look Kin and Jupiter remember the pivotal discussions surrounding the mandate for the

National Gas Company (NGC) created in August 1975. According to Mr. Jupiter, “When I worked at the Ministry of Petroleum and Mines, in 1979, I worked with Frank Look Kin on developing graphs for gas wells that were being flared. This was when the government decided to close wells with high gas to oil ratios. That was the start of the decisions that would bring that gas onshore and NGC would pipe and process it. Under local laws, if the gas was being flared, the Government could take it for free and the local gas industry began with the Teak, Poui and Samaan platforms.”

“Trevor’s thinking was pivotal in the change of approach to gas utilization, and his will to confront the multinationals so that the country could benefit from its natural resources was critical to our development. He was able to make difficult technical decisions and allocate human resources judiciously. There was a lot of drama about it,” recalls Frank Look Kin of the decision to close the wells.

In that period, oil production peaked at 242,000 barrels of oil per day and wells were being produced with a high gas to oil ratio. The engineers in the ministry were very concerned. The oil was being produced at high pressure, and the valuable natural gas was being flared and therefore wasted. We were very disturbed about it. In Guayaguayare, as much as 100 million cubic feet per day was being burned off. The decision was taken to shut in the oil production and that cost the country around 15,000 barrels of oil per day. The then Minister of Petroleum, Mr. Errol Mahabir, supported us and we closed between six and eight wells on the basis of resource conservation until there was a way to utilize the flared natural gas. It was a drastic measure and one that wasn’t immediately profitable, but in the early 1980s, the newly installed flare gas platforms were collecting 100 million cubic feet of gas. NGC, the operational

**‘He was particularly skilful at guiding transactions, and he was particularly good at transactions with multinationals and working to build value for the apparently divergent value of both multinational companies and Trinidad & Tobago’**

arm of that initiative, has collected 600 billion cubic feet of gas to date from the Teak and Poui fields, which is testimony to the initiative.”

NGC is only one of the energy sector’s institutions in which Trevor Boopsingh played a key and vital role. He was a founding member of the Trinidad and Tobago Chapter of the Society of Petroleum Engineers, founded in 1973. He played a pivotal role in the founding of the Engineering Institute, an effort to bring academia and industry together in petroleum sector problem-solving. He served as the third Chairman of the Society of Petroleum Engineers. There is now an award named for him in the organization’s recognition programmes.

He also served as Chairman of the Vision 2020 Sub-Committee on Energy.

“He had a real gift for ‘back of the envelope’ calculations,” remembers Frank Look Kin. “Trevor would quickly massage figures that could guide his understanding and approach during negotiations. He would grasp the big

financial picture very quickly and could chart a plan based on that information.”

“He was particularly skilful at guiding transactions, and he was particularly good at transactions with multinationals and working to build value for the apparently divergent value of both multinational companies and Trinidad and Tobago,” recalls Andrew Jupiter.

Mr. Jupiter remembers Trevor’s work as Chairman of the Petrotrin Board as a defining time in his management career. “I was a member of that board, and I was very impressed with the way he worked to bring two different cultures, from two very different State companies, Trintoc and Trintopec, together.” In doing so, he created an institution that lasts to this day and that commitment to projects with tangible outcomes, perhaps, is what Trevor Boopsingh has most generously given to Trinidad and Tobago – a sincere appreciation of the value of learning and corporate stability in the energy sector which has only redounded to the country’s benefit.

His book *A View from the South – Oil, Gas and Development* remains recommended reading and one of his great dreams, the Eastern Caribbean Gas Pipeline which he hoped would link Barbados, St Lucia, Martinique and Guadeloupe to Trinidad and Tobago’s gas supply, is a vision in progress.

“He was a brilliant engineer and his passing is a big loss for Trinidad and Tobago. He had a vision for energy in Trinidad and Tobago,” said Mr. Look Kin. “He did a lot of positive work at the Ministry of Petroleum and Mines and at the University of the West Indies. He had a gift for simplifying things for non-technical people. He didn’t like a regime that was built on doing favours. He wanted institutional arrangements that would lubricate the growth of local business; that’s what he worked towards all his life.”

*Gasco* extends condolences to the family of Trevor Boopsingh.

May he rest in peace.

## NEO Pipe Haul

The onshore segment of the NEO natural gas pipeline, a 36" diameter pipe, was hauled on long flat bed trailer-trucks to the work site in Guayaguayare. Trucks, each carrying three lengths of pipe per trip, undertook this exercise. The journey started from the pipeyard at Union Industrial Estate, La Brea to Mayaro/Guayaguayare, via the Southern Main Road, the M2 Ring Road, Manahambre Road, the Naparima Mayaro Main Road through Tableland, Poole Village, Mayaro and along the Guayaguayare/Mayaro Main Road.

This exercise will take place from March to May 2010.

The communities along the route are La Brea, Rousillac, Debe, Ste Madeleine, Princes Town, Tableland, Rio Claro, Mayaro and Guayaguayare.

The NEO pipeline will transport natural gas from the Angostura Field, off the North East Coast of Trinidad to NGC's new Abyssinia Accumulator Station at Beachfield. It will comprise an 83 km offshore segment that makes landfall at Mayaro Bay and a 10.5 km onshore segment from there to the Accumulator Station.

## Tobago Pipeline Project

The start of the first quarter of 2010 signalled increased activity and positive outcomes for the NEO/Tobago Pipelines Project. At mid-January the project team celebrated the significant achievement of the successful pull onshore of the 12-inch section of the offshore pipeline via horizontal directional drill (HDD) for the onshore approach of the pipeline to Tobago.

The length of the HDD was 1250 m and an additional 500m of concrete-coated pipe was also laid from the HDD exit hole further offshore. When the main pipe-lay work commences in May 2010, this tail section of line will be picked up from the sea floor and the

## The NEO pipeline will transport natural gas from the North East Coast of Trinidad to NGC's new Accumulator Station at Beachfield

construction work will advance for 53 km to the Angostura field off the North East Coast of Trinidad.

The significance of this milestone could be appreciated even more when one considers that the design of the 12" HDD proved a major challenge since NGC was determined to ensure that minimum damage was done to the existing reef structures off the Tobago coast. A comprehensive survey and the identification of the most suitable location for the exit hole demanded that the directional drill was to be designed to also curve to the left in addition to the change in the vertical elevation which was 10m to 40m below the seabed. Exclusive of weather and third party delays the HDD took approximately 48 days.

The completion of this line scheduled for third quarter this year apart from ensuring reliability of supply to Trinidad and Tobago customers, will also provide a connection for gas delivery to the Eastern Caribbean, with Barbados its first prospective customer.

Meanwhile construction activity continues on the Gas Receiving Facility at Cove Estate. To date the foundation works have been completed and MEI works are expected to commence shortly.

## Liquid Fuels Pipeline Project

By early first quarter 2010 the Liquid Fuels Pipeline System Project had successfully completed 100% of the pipe lay on the 8" multiproduct pipeline from Pointe-à-Pierre to Frederick Settlement, Caroni. Restoration works are nearing completion.

On Saturday March 6, 2010 a major project milestone was achieved with the commissioning of this multiproduct line. Although unintended (the pipeline is intended for hydrocarbons), the pipeline was commissioned with water for use as a temporary supply from the Caroni River to the Petrotrin Refinery.

The very harsh and extreme dry season depleted the country's water reservoirs including Petrotrin's own ponds and created challenges for the Refinery to carry out its operations. In an effort to alleviate the challenges, NGC brought forward the commissioning of the pipeline and firewater tank to move water from the Caroni River to Petrotrin.

The fact that the pipeline was usable for this purpose is testament to the capability of NGC and its contractors. Even more noteworthy is the fact that the pipeline project was brought in on time (six months) and on budget. The commissioning of the pipeline and the fire water tank for water transportation was expected to take 14 days. It was completed in 10 days. The system has the capability of transporting 35,000 bbls/day (1.5 million gpd) of water to the refinery.

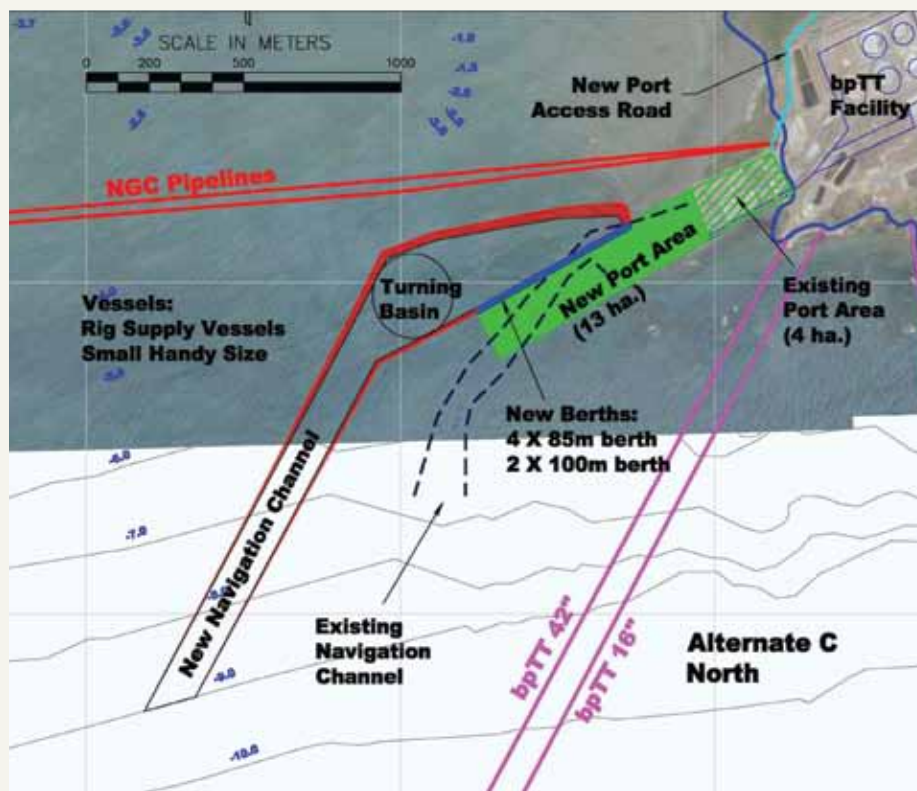


*Construction work for marine pipelaying – NEO/Tobago pipeline projects.*

## Communication Centre at Claxton Bay

NEC has established a communication centre at Claxton Bay as part of its ongoing commitment to build mutual understanding with the communities in which it operates. The establishment of the centre is in keeping with NEC's compliance with the requirements outlined in gaining the Certificate of Environmental Clearance (CEC) for the construction of the Point Lisas South and East Industrial Estate and Port. NEC's Chairman, Mr. Malcolm A. Jones, spoke about the project, highlighting some of the benefits to be derived from the development of the industrial estate and port. He said that the communities of Couva, Marabella and Chaguanas, which have grown as a result of the Point Lisas Industrial Estate, were a template for the development that will take place in Claxton Bay.

The Honourable Christine Kangaloo, Minister of Science, Technology and Tertiary Education and Member of Parliament for Pointe-à-Pierre, which includes Claxton Bay, delivered the feature address. Minister Kangaloo shared the Government's vision for the development of the energy sector and pointed out how the new estate and port would fit into this vision. She commended NEC on taking this important step towards strengthening communication with its fenceline communities and encouraged members of the public to utilize the facility to obtain information, provide comments and air their concerns. The Communication Centre will be open Monday to Friday from 9 a.m. to 5 p.m. and on Saturdays from 9 a.m. to 2 p.m.



*Galeota Port*

## Pt Lisas Estate, South and East

CARIRI is collecting baseline air, water and noise data for the project. The research company has completed sampling for the wet season and is now sampling for the dry season. It is anticipated that dry season sampling would be completed by June 2010. A consultant will be retained to respond to the EMA's Review and Assessment Report (RAR). NEC expects to make a formal response to the EMA's RAR by October 2010.

## Pt Lisas Port, South and East

Detailed designs have been completed and reviewed for this project pending

the receipt of a CEC. NEC has allocated space next to its offices for the first shipment of materials for the project, 8,866 tons of steel sheets and circular piles for use in the proposed quay wall.

## Galeota Port

Field bathymetric, geotechnical surveys and cadastral surveys have been undertaken and all design reports, plans and documents have been submitted with the approval of the independent design engineer and classification society Bureau Veritas. Monitoring plans done by contractor Coastal Dynamics have been finalized and submitted to the EMA for approval. Costs related to the relocation of existing installations on the site are being finalized. Blasting and coating of the sheet piles for the fish landing is complete and construction of

temporary site facilities will commence pending the acquisition of statutory permits. The finished facility will consist of a 529.2m quay wall comprising five berths, a navigation channel 80m wide and 7.6m deep with a turning basin 200m in diameter.

## Oropouche Bank

Technital has submitted its fifth report on the project, completing the second phase of its consultancy services for the master plan and preliminary engineering on the project. NEC is in receipt of Terms of Reference from the EMA and Technital will now begin the third phase of the project in March 2010 ahead of schedule toward the conduct of an Environmental Impact Assessment. The Oropouche Bank project is a reclamation initiative to be sited north of the Godineau River outfall. The reclamation project will eventually create an industrial island of 1,400 ha that will be linked by a permeable causeway to the mainland approximately 2.5k long.

## La Brea Industrial Estate

The construction of the Alutrint Handling Facility has commenced under contractor GLF/River. PIHL/Besix has completed the construction of the Alutrint Dock and is performing finishing works on the access road to the facility. The reconstruction of La Brea Dock – Berth 1 and the refurbishment of security booths at La Brea are complete. The closing of abandoned wells on the Labidco Estate is currently awaiting a response from the Ministry of Energy and Energy Industries before approval can be sought from the Town and Country Planning Division. Representatives from Petrotrin and the Ministry have identified and recorded the condition of the wells on the estate. Employment at the estate stands at 926 with 63% of employees drawn from La Brea and its environs.



*Construction work on La Brea marine infrastructure.*

## Union Industrial Estate

Within the scope of activity permitted by the NEC's CEC for the Alutrint Complex, preparation for dewatering of the site and dynamic compaction is being undertaken during the first quarter of 2010 pending the approval of the EMA.

Royal Haskoning Caribbean Limited is preparing detailed designs to address issues with the Vessigny River and drainage on Union Industrial Estate. Construction related to this drainage control project is expected to begin in March 2010.

NGC is constructing a valve station and laying the line for the supply of gas to the power plant.

Asphalting works by contractor Sunco continue with 11,760 m<sup>2</sup> of base course laid to date. This figure represents 20% of the contracted works. The scope of works contracted to Sunco was reduced according to contractual obligations and Namalco has been awarded a contract to complete 40% of the paving works.

The TGU power plant is in progress, with electrical installations and pipeworks commencing in February 2010. The foundation of the installation is complete. Delivery of gas to the plant is due in April 2010 with commissioning of the plant scheduled for September 2010.

## Barbados Agrees to Import Gas

R. Gregory Rich, Chief Executive Officer of the Eastern Caribbean Gas Pipeline Company Limited (“ECGPC”), announced that the Government of Barbados had agreed to the importation of natural gas, via pipeline from Trinidad and Tobago. He said, “While ECGPC’s current focus is the pipeline segment to Barbados, there continues to be strong interest expressed by other islands in the Eastern Caribbean to import natural gas as a clean fuel to generate electricity. Extension of the pipeline from Barbados to these islands (St. Lucia, Dominica, Martinique and Guadeloupe) will be pursued as gas customer interest and available gas supplies permit.” The shareholders of ECGPC are Guardian Holdings Ltd, Trinidad and Tobago Unit Trust Corporation, the National Gas Company of Trinidad and Tobago Ltd and the Intra-Caribbean Gas Pipeline Company Ltd.

## Petrotrin Gas Upgrades

Petrotrin expects to bring its new gas optimization project online by the end of 2011. The US\$750 million project will refurbish the company’s catalytic cracker, add a new de-sulphuring module to the refinery’s operations and generally improve the refinery’s efficiency, enabling a wider range of inputs and improving the quality and quantity of high value outputs it can offer for export.

## More German Investments Coming to T&T

The future for economic relations between Trinidad and Tobago and Germany is bright, with the promise of new German investments to come. This was the view expressed by German Ambassador to T&T, Dr Ernst Martens, during an exchange of instruments of ratification for a treaty concerning the



*Petrotrin Refinery*

encouragement and reciprocal protection of investments between T&T and Germany at Knowlsley.

Martens said the treaty was signed in Berlin in 2006 and the long process of deliberations both in Germany and in T&T have now come to a successful end. Information provided to *Business Day* by the German Embassy indicated that last year, T&T imported goods worth \$1.54 billion (172 million euros) from Germany, mainly vehicles and machinery. At the same time, T&T exported goods worth \$583 million (\$65.1 million euros) to Germany, mainly iron and steel, chemicals and commodities. T&T already is a major destination for German direct investment.

The entry into force of the bilateral treaty concerning the Encouragement

and Reciprocal Protection of Investments will support this trend. German companies like Ferrostaal, Lurgi and Proman have been active in the petrochemical sector of Trinidad and Tobago for many years. Moreover, Ferrostaal is constructing a power plant in La Brea that will utilize the latest state of the art technology in order to assure complete protection of the environment.

## Venezuela Signs Energy Pact with T&T

Maria Eugenia Marciano Casado, Venezuela’s ambassador to T&T, noted recently that the two nations will sign a development pact to increase trade in energy products and to develop the oil and gas sectors of both countries.



*Pipelaying activities for the Pt Lisas Industrial Estate*

Some of the richest energy deposits in both nations lie at the national boundaries of Trinidad and Tobago and Venezuela. Venezuela's Aeropostal recently reinstated its Port of Spain to Caracas route.

## Renewable Energy

Minister of Energy Conrad Enill announced in March that a Regional Renewable Energy Research Centre will be established in Trinidad and Tobago. The Ministry of Energy and Energy Industries views renewable energy as part of its planning toward sustainable development. The Caribbean region is ideally positioned to make use of wave, wind and solar energy, and the Government of Trinidad and Tobago plans to be proactive in exploring its options. A green paper on renewable energy and climate change will be prepared and circulated for public consultation.

## Parex Searches for Oil and Gas

Parex Resources Inc, a Canadian oil and gas company, has invested \$90 million in seismic mapping and aerial investigations of Trinidad and Tobago's Central Range and has identified three sites for deep wells. Parex has produced a 2D seismic chart detailing the sites of the three deep wells at Cory Moruga, Central Range Block Moruga and Central Range Block Cedar Hill.

Much of Parex's current production and reserves are in Argentina. The three Central Range onshore blocks, totalling 218,900 acres, will be drilled and explored in three phases over two years.

## Suncor Divests

Canada's Suncor Energy is selling its natural gas interests in Trinidad and Tobago to Centrica plc for US\$380 million. Suncor's production is estimated at 60 million cubic feet of

natural gas equivalent per day from a 17.3% stake in Trinidad's North Coast Marine Area block NCMA-1. The Suncor sale also includes equity in Block 22, 1a and 1b. Suncor's divestments are part of a strategy of shedding non-core assets and include natural gas assets in Western Canada, the United States Rockies and the Netherlands.

## Chilean Leader Salutes T&T Gas Supply

After overseeing the signing of an agreement to deepen natural gas trade agreements with Trinidad and Tobago, Chile's President Michelle Bachelet described Trinidad and Tobago as a "serious and reliable" supplier of liquefied natural gas.

First gas to Chile was used to launch a gas port at Qunitero, and the success of that initial transaction has deepened interest in more trade agreements between the two countries on other economic matters.

one  
moment  
please

to reflect on the beauty  
that surrounds us here  
in Trinidad and Tobago

**NATURE'S  
INCANDESCENT  
CARPET:**

The brilliant yellow flowers of a poui tree cover the ground at its base around the Queen's Park Savannah in Port of Spain. The poui (*Tabebuia chrysantha*) is a member of the genus *tabebuia* which ranges from Florida, Central and South America to the Caribbean.

*Photo by Kevin Reis*





*THE NATIONAL GAS COMPANY  
OF TRINIDAD AND TOBAGO LIMITED*

Orinoco Drive  
Point Lisas Industrial Estate, Couva  
Republic of Trinidad and Tobago, W.I.  
P. O. Box 1127, Port of Spain  
Tel: (868) 636-4662, 4680  
Fax: (868) 679-2384  
Email: [info@ngc.co.tt](mailto:info@ngc.co.tt)  
Website: [www.ngc.co.tt](http://www.ngc.co.tt)