



AN ENVIRONMENTAL PERSPECTIVE OF THE RE- INDUSTRIALIZATION OF LA BREA

Dr Ahmad A Khan

Rapid Environmental Assessments (2003) Ltd.

BACKGROUND

- La Brea has a long history of economic activity based on the exploitation of petroleum and hydrocarbon resources including:
 - Pitch
 - Asphalt Processing
 - Oil Exploration and Production
 - Petroleum Refining
 - Secondary Oil Recovery
 - Oil and Gas Service Industries
- Communities that developed in La Brea were dependent on these sectors for social and economic growth. Later, as these industries waned, subsistence farming, service industries and commercial activities became the main drivers of local economic activity.



BACKGROUND

- La Brea is home to a number of industrial sites which co-exist with centres of commercial activity and residential communities. These include:
 - LABIDCO Industrial Estate
 - Brighton Industrial Port and Harbour
 - Lake Asphalt of Trinidad and Tobago Limited
 - Petrotrin Land-based Oil Producing Fields and Tank Farms
 - Trinmar Offshore Oil Producing Fields
 - Lease Operator Oil Production Areas.
 - Union Industrial Estate (UIE).



HISTORY OF UNION INDUSTRIAL ESTATE

- Born out of a Government Policy to create new industrial estates where further monetization of gas resources could occur through downstream industrial activity.
- UIE was approved in 2003 and NEC set about the task of developing the 300ha of land comprising parcels of the old Brighton and Vessigny, Oil Fields in 2004.



HISTORY OF UNION INDUSTRIAL ESTATE

- First tenants of the UIE were:
 - Alutrint Aluminium Complex
 - Trinidad Generation Unlimited Combined Cycle Power Plant
 - First UAN urea ammonium nitrate Plant
 - Coffeeville Industries urea ammonium nitrate plant
- Brighton Port and Harbour were upgraded over the period 2008 – 2011 by the NEC to provide necessary dock storage and material handling facilities for import and transfer of raw materials required by the plants on the UIE and for product export from the plants on the UIE. Integral in this upgrade was a conveyor system and new road network connecting the port and the UIE.



STATUS OF THE UNION INDUSTRIAL ESTATE

- Over the course of the period 2006 to 2009, foreign direct investment in Trinidad and Tobago waned and the proposals for the two urea ammonium plants proposed for the UIE were withdrawn.
- In 2009, the Alutrint Aluminium Complex was given the green light to proceed but by the end of 2009, its Certificate of Environmental Clearance was revoked by a High Court. An appeal was filed with the Court of Appeal and a decision on whether to reinstate the CEC or not is pending.
- In 2010, Government policy towards an aluminium smelter changed and the project was cancelled.



STATUS OF THE UNION INDUSTRIAL ESTATE

- UIE now houses the 720MW Combined Cycle power plant which is nearing completion.
- 24” Natural Gas pipeline in place to bring natural gas to the UIE
- Brighton Port upgrade complete and new berths in place to accommodate additional shipping.
- Brighton Port material storage yard and material handling facilities were suspended .
- Brighton Harbour capital dredging complete and turning basin and approach channel now wider and deeper to accommodate large Panamax vessel of up to 11.8m draught.



FUTURE USE OF THE UNION INDUSTRIAL ESTATE

- Proposals may include:
 - Downstream aluminium manufacture without a smelter component – rods, cables, billets, bars, tubing, foil, wheels, etc...
 - Silica smelting and glass manufacture
 - Photovoltaic Cell manufacture
 - Melamine manufacture
 - Polypropylene manufacture
 - Ship building and repair



ENVIRONMENTAL IMPACTS OF CURRENT INDUSTRIAL ACTIVITIES IN LA BREA.

- There are a number environmental impacts associated with current industrial activities within La Brea and environs.
- These impacts can lead to deterioration of air quality, pollution of surface waters and marine areas, contamination of land, loss of biological resources and risks to human health and public safety.
- All industries are successful in mitigating these impacts to varying degrees by incorporating safety and environmental pollution control factors in plant and equipment design, and by implementing operational controls and management systems throughout the project life cycle.



ENVIRONMENTAL IMPACTS OF CURRENT INDUSTRIAL ACTIVITIES IN LA BREA.

Industry	Known Impact	How Managed
Oil Production	Air Emissions of flammable hydrocarbons, poisonous hydrogen sulphide and greenhouse gases from oil wells and crude oil storage tanks.	Hydrogen Sulphide scrubbed out of crude oil during production.
	Effluent discharges of produced water containing hydrocarbons, trace metals, brine, organic chemicals and inorganic chemicals from oil production facilities.	Oil water separators used to reduce the amount of crude oil in effluent.
	Land contamination by petroleum, brine, produced fluids, crude oil spills, asphaltic compounds from crude oil handling facilities and through accidental spills and leaks.	Spills and leaks are quickly cleaned up and area impacted restored. Tank solids are treated at a bioremediation facility prior to final disposal.



ENVIRONMENTAL IMPACTS OF CURRENT INDUSTRIAL ACTIVITIES IN LA BREA.

Industry	Known Impact	How Managed
Oil Production	Loss of biological resources through land clearing to make way for well sites, pipeline right of ways and tank farms.	Amount of forest to be cleared is minimized. Forests are planted elsewhere as a compensation strategy.
	Contamination of wildlife habitats through crude oil spills and leaks	Spills and leaks are quickly cleaned up and area impacted restored.
	Risks to human health (including cancers and respiratory diseases) and public safety from air emissions, spills and leaks and from fires and explosions from all facets of the industry.	Facilities designed in accordance with API codes to ensure low risk of fire and explosion. SOPs employed to reduce risk of exposure of population to spills, leaks and routine emissions and effluent discharges.



ENVIRONMENTAL IMPACTS OF CURRENT INDUSTRIAL ACTIVITIES IN LA BREA.

Industry	Known Impact	How Managed
Power Generation and Distribution.	Noise from plant, equipment and machinery.	Noise controlled by plant, equipment and machinery design to meet local and international standards. Noise damping (buffer zones and sound proofing) employed in plant site. Acoustic Modelling used to position plant equipment and machinery on plant site so that noise is minimized at plant boundary.
	Risks to human health (including respiratory diseases) and public safety from air emissions, electromagnetic radiation and from fires and explosions from all facets of the industry.	Facilities designed in accordance with ASTM and other codes to ensure low risk of fire and explosion and shielding of electromagnetic radiation.

ENVIRONMENTAL IMPACTS OF CURRENT INDUSTRIAL ACTIVITIES IN LA BREA.

Industry	Known Impact	How Managed
Power Generation and Distribution.	Air Emissions of hydrocarbons, sulphur dioxide, nitrous oxides, particulate matter and green house gases from stationary point sources and fugitive emissions.	Environmental pollution control technology incorporated in plant design, as well as air dispersion modelling, used to ensure emissions meet international standards.
	Effluent discharges containing hydrocarbons, organic and inorganic chemicals and particulate matter from plant and equipment cooling, plant and equipment lubrication and from leaks and spills.	Need for large quantities of cooling water reduced by using closed loop cooling or air cooled systems. Leaks and spills contained at source and cleaned up immediately.



ENVIRONMENTAL IMPACTS OF THE ALUTRINT ALUMINIUM COMPLEX.

Industry	Potential Impact	How Managed
Aluminium Smelting and Metal Manufacture	Air emissions of Hydrogen Fluoride, Nitrous Oxides, Sulphur Dioxide, Particulate Matter, Volatile Organic Compounds and green house gases from smelting of alumina and from production of rods, cables and wire.	Bag houses and scrubbers and other pollution control technology incorporated in plant, equipment and machinery design to ensure compliance with stringent international standards. Redundant pollution control technology installed at design stage to ensure compliance with standards if primary systems fail. Buffer zone around plant site separating plant from neighbouring communities.
	Noise from plant, equipment and machinery	Noise abatement technology incorporated in design to meet local and international standards. Buffer zone around plant site

ENVIRONMENTAL IMPACTS OF THE ALUTRINT ALUMINIUM COMPLEX.

Industry	Potential Impact	How Managed
Aluminium Smelting and Metal Manufacture	Hazardous solid wastes, including spent pot lining, generated from smelting and metal production processes.	Hazardous waste segregation from other solid waste streams and containment in sealed containers. Off island disposal at engineered purpose built disposal facility.
	Risks to human health (including cancers and respiratory diseases) and public safety from air emissions, electromagnetic radiation and from fires and explosions from smelting process.	Facilities designed in accordance with ASTM and other codes to ensure low risk of fire and explosion and shielding of electromagnetic radiation. Air emissions controlled at source with pollution control equipment to meet most stringent international standards.



ENVIRONMENTAL IMPACTS OF PROPOSED NEW INDUSTRIAL ACTIVITIES IN LA BREA.

Industry	Potential Impact	How Managed
Silica Smelting and Glass Manufacture	Same as Aluminium Smelting	Same as Aluminium Smelting
Aluminium Manufacture (no smelting)	Air emissions of NO _x , SO _x , PM and VOCs	Technology based engineering controls incorporated in plant design to meet international air emission standards.
	Noise from plant and machinery	Technology based engineering controls incorporated in plant design to meet local and international noise standards.
	Solid wastes	Recovery at source, recycling or disposal at sanitary landfill.

ENVIRONMENTAL IMPACTS OF PROPOSED NEW INDUSTRIAL ACTIVITIES IN LA BREA.

Industry	Potential Impact	How Managed
Photo Voltaic Cell Manufacturing	Toxic Gaseous Emissions during photovoltaic cell coating process.	Technology based engineering controls incorporated in plant design. Buffer zone around plant site separating process areas from adjacent communities.
	Toxic and hazardous solid and liquid wastes requiring proper treatment prior to disposal.	Segregation from other solid and liquid waste streams, containment in sealed containers and off island disposal.



ENVIRONMENTAL IMPACTS OF PROPOSED NEW INDUSTRIAL ACTIVITIES IN LA BREA.

Industry	Potential Impact	How Managed
Photo Voltaic Cell Manufacturing	Air emissions containing particulate matter, nitrous oxides, sulphur dioxide, and volatile organic compounds from manufacturing process.	Technology based engineering controls incorporated in plant design.
	Risks to human health and public safety from manufacturing process.	Technology based engineering controls incorporated in plant design to reduce risk of fire, explosion and pollutants leaving plant.



ENVIRONMENTAL IMPACTS OF PROPOSED NEW INDUSTRIAL ACTIVITIES IN LA BREA.

Industry	Potential Impact	How Managed
Ship Building and Repair	Noise from plant, machinery and equipment used and from general construction activities	Confining excessively noisy processes to enclosed buildings. Buffer zones separating process areas from residential areas.
	Air emissions from welding and sandblasting operations	Standard operating procedures for minimizing amount of emissions produced. Use of shielding to mitigate against offsite pollution of adjacent areas.



ENVIRONMENTAL IMPACTS OF PROPOSED NEW INDUSTRIAL ACTIVITIES IN LA BREA.

Industry	Potential Impact	How Managed
Ship Building and Repair	Effluent from construction activities including effluent from corrosion protection coating process	Effluent trapped in sumps and treated in wastewater treatment plants to meet local and international standards prior to discharge.
	Solid and hazardous waste from construction and repair processes requiring specialised handling, treatment and disposal.	Segregation of toxic and hazardous solid wastes from non-hazardous waste. Recycle where appropriate. Treat and then dispose of toxic and hazardous wastes at licensed facilities.
	Risks to human health and public safety from various activities associated with construction and repair processes.	Safe operating work practices.

SUMMARY

- La Brea and its environs are well placed to play host once more to a new wave of industrial developments that carry the value-added component from natural gas further down stream
- The environmental impacts of present industrial process and future ones must be evaluated cumulatively. A carrying capacity study needs to be done for the La Brea UIE and the results of the assessment used to determine the nature and types of industries that can be fit into the UIE and adjacent areas so that environmental degradation, human health and public safety is maintained.



SUMMARY

- All industrial processes carry inherent risks to the environment, to human health, and to public safety.
- Modern industrial plants are made safer and their impacts mitigated through:
 - sound plant design,
 - standard operating procedures,
 - compliance with stringent EHS management systems and
 - ongoing EHS audits
- All impacts are manageable and the trade-off between the residual risk of having the industry versus the economic benefits derived from the industry is often of a net positive benefit.

