

Description of Proposed Project

Project	FCCU Reactor & Regenerator Rejuvenation Project
Objectives	To replace degraded equipment within the Fluidised Catalytic Cracking Unit (FCCU) to ensure ongoing future operation of the FCCU and hence local petrol (Mogas) supply for the Sydney market. This also fulfils our license requirement to maintain and operate equipment in a proper/efficient manner.
Major elements including any environmental impact mitigation measures	<p>The Major element of the project involves removal of equipment approaching end of life (i.e. repair costs are increasing and escalating) and replacement with new modern design, which will offer benefits with respect to utility consumption and reduced hydrocarbon inventory. Design intent of the unit (capacity) remains unchanged, with project objective being to replace degraded equipment.</p> <p>A smaller element of the project is to increase capacity of the regenerator to allow increased conversion from the unit (i.e. higher yield of product for given feedstock). This will result in a small increase in refinery air emissions, though the energy intensity (as well as pollutants produced per tonne of product) will remain constant/reduce.</p> <p>It is noted that the two elements are non-related, with the major part being replacement of degraded reactor, which has a positive/neutral impact on air emissions. The second part (being regenerator capacity) will result in increased air emissions, offsetting the reduction achieved by the main part. The net result will be air emissions increasing slightly/remaining neutral depending on the pollutant.</p>
Any ancillary works	Nil.
Outline of construction methods	New equipment to be manufactured by specialised vendor off-site and transported to site 1-2 months before planned major maintenance period. During the major maintenance period, old equipment will be removed and new equipment reinstalled. Use of existing foundations will be reused for new reactor.
Outline of operations	Design intent of the FCCU operation remains unchanged. Use of modern technology allows improved conversion (Mogas manufacture) for less or equivalent energy/emissions.
Location(s)	Clyde Refinery, Durham Street, Rosehill.
Time frame	Manufacture of equipment will take place from Mid 2006 to late 2007 at specialised vendor. Construction (installation of new equipment) will occur during planned maintenance period in Q1 2008.

**TABLE 1
IDENTIFY THE ISSUES**

Characteristics of the Project (during construction & operation)	Potential Issues
How is the proposal likely to affect the physical aspects of the environment or introduces pollution or safety risk factors?	
1. disturbs the topography or above or below ground features including filling, excavation, dredging, tunnelling; eg landforming, site preparation, quarrying, reclamation, creation of islands, waterbodies, etc; involves the disposal of large quantities of spoil	It is expected that new equipment will be transported via waterways or road to the site, with larger equipment via waterways. At this stage, no dredging of waterways is expected (based on recent Mogas Improvement Project experience), but will confirmed via a study once equipment sizing is known/confirmed.
2. affects a natural waterbody, wetland or groundwater aquifer or the natural water drainage pattern; affects the quality or quantity of water in the systems	Nil Impact
3. uses groundwater or surface water from a natural waterbody; stores water in a dam or artificial waterbody	Nil impact
4. changes the flood or tidal regimes or be affected by the flooding or tides	Nil impact
5. uses, stores, disposes or transports hazardous substances (flammable, explosive, toxic, radioactive, carcinogenic or mutagenic substances); uses or generates pesticides, herbicides, fertilisers or other chemicals which may build up residues in the environment	Positive. Smaller modern equipment will reduce inventory of hydrocarbons within the equipment. Operating conditions (temperature/pressure) remains unchanged.
6. generates or disposes of gaseous, liquid or solid waste (industrial, medical or domestic waste, sewage, sludge or effluent, spoil or overburden); generates greenhouse gas emissions or releases chemicals which affect the ozone layer or are precursors to photochemical smog; generates or disposes of hazardous waste	<p>Air Emissions (mainly CO₂/SO_x) will increase slightly from site, but when expressed as tonne of product produced will remain constant/decrease, due to improved efficient/yields from the unit. Absolute NO_x emissions are expected to remain neutral, but also decreasing when expressed as tonne per tonne of product produced . VOC emissions will reduce slightly due to smaller inventory of hydrocarbons. Further detail on magnitude of emission changes are given in table 2. No impact on waste water generation.</p> <p>Old equipment (metal) will be recycled as much as practicable. As consequence of removing old equipment, waste including refractory and insulation will be created. This waste will be handled as per current site license requirements for waste disposal.</p> <p>As consequence of increase availability of unit (new vs old unit), flaring and hence associated emissions will reduce.</p>
7. emits dust, odours, noise, vibrations, blasts, electromagnetic fields or radiation in the proximity of residential areas or land uses likely to be affected.	<p>Noise levels will be unchanged as replacement of static equipment only.</p> <p>For PM10/particulates emissions, concentration of dust/particulates will remain low and below current license limits and expected future limits. Absolute PM10/dust emissions will increase slightly due to increase capacity of the regen, but remain constant/reduce slightly when expressed as tonne per tonne of product produced.</p>

How is the proposal likely to affect the biological aspects of the environment?	
1. clears or modifies (including by modifying the drainage) native vegetation (including trees, shrubs, grasses, herbs or aquatic species)	Nil. New equipment will make use of existing foundations, and hence no excavation.
How is the proposal likely to affect natural or community resources?	
1. uses or results in the use of community services or infrastructure including roads, power, water, drainage, waste management, education, medical, social services	Temporary (once off) use of roads and waterways in late 2007 for transportation of new equipment to site, as well as once off transport by road for disposal of equipment (metal recycling).
2. uses or results in the use of natural resources including water (ground or surface), energy sources, prime agricultural land, etc	Unit is net exporter of energy, which is recovered and utilised on site, thereby reducing energy imported onto site.
How is the proposal likely to affect the community?	
1. generates population movements including influx or departure of the workforce;	Temporary impact leading up to and during 2008 planned maintenance period. Small additional workforce (~25 people) in 2H of 2007 leading up to major maintenance period. During major maintenance period, ~500 additional workforce will be employed for the implementation of this project as well as maintenance on the remainder of the unit. This additional number is as per historical maintenance periods conducted every 6 years on site. Reference should be made to previous DA submissions relating temporary impact of fluid workforce.
2. changes the workforce or industry structure of the area/region; affects employment opportunities	Temporary. See above.
3. affects areas of high population densities or established development patterns	Nil Impact
4. affects or affecting access to an area, building or items of aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, recreational, aesthetic or social significance or other special value for present or future generations	Nil Impact
5. affects the visual or scenic landscape (including major cuts/fills, towers, projects on escarpments etc)	Initially temporary, during period of major lifts in early Q1 2008 when large cranes will be used for the lifting of the old and new equipment. Thereafter, new reactor will be 10m taller than existing, but still lower in height than existing surrounding structures and stacks, and no/minimal impact when viewed from outside. Being new equipment, modern lighting standards will be applied and the reactor/stripper will also be more visible at night. However, no sleep or nuisance impact on adjacent properties is anticipated due to the distance from boundary and the low level (amenity) of lighting employed
6. affects sunlight or views of another property	Nil Impact
7. affects the amenity of publicly owned land (particularly recreational areas, national parks or reserves)	Nil Impact
8. changes land use from the surrounding uses as a direct or indirect result of the project; forms a barrier to movement within the community or access to existing properties; leads to a loss of housing	Nil Impact

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9. generates significant volume of traffic (road, rail, air, pedestrian etc)	Nil Impact
10 generates nuisance or health or safety risks including air pollution, odour, noise or vibration, blasting, electromagnetic fields or radiation or releases disease or genetically modified organisms or change the bush fire regime	Emissions as per earlier discussion
How is the proposal likely to affect areas sensitive because of physical factors?	Nil Impact
How is the proposal likely to affect areas sensitive because of biological factors?	Nil Impact
How is the proposal likely to affect areas allocated for conservation purposes?	Nil Impact
How is the proposal likely to affect areas sensitive because of community factors?	Nil Impact

TABLE 2(a)
ANALYSE THE EXTENT OF THE POTENTIAL IMPACTS

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	Evaluation criteria		Ranking of potential significance of extent
		size, scope & intensity	duration	
Physical or pollution impacts (during operation and construction)				
(a) Air impacts				
1. air quality impacts (eg dust, smoke, grit, odours, precursors to photochemical smog, fumes, toxic or radioactive gaseous emissions) with economic, health, ecosystem or amenity considerations	NO _x SO _x Dust (PM10, particulates) VOC	In absolute terms, Nox emissions are expected to remain constant, decreasing when expressed as tonne per tonne of product due to improved efficiency. SOx emissions will increase by ~5%, but will still remain far lower than historical limits due to new 50ppm Mogas Sulphur specification requiring the site to process far sweeter crudes than historical. PM10, particulate emissions will increase by ~5% in absolute terms, but will remain below existing and future expected license limits. Emissions will remain constant when expressed in terms of kg per tonne of product produced, due to improved efficiency from the unit. VOC is expected to reduce slightly due to smaller inventory of hydrocarbons in the unit. It is noted that the main part of the project, being replacement of the degraded equipment has a positive impact on the emissions. The increased emissions are a consequence of the smaller project to increase regenerator capacity, which delivers improved efficiency for the unit/site.	Normal Operation	Low
2. greenhouse implications – direct or indirect impacts <ul style="list-style-type: none"> ▪ direct emissions ▪ use of carbon energy ▪ vegetation clearing 	CO ₂	CO ₂ emissions will increase by ~5% in absolute terms, but will remain constant when expressed in terms of tones per tones of product produced.	Normal Operation	Low
3. ozone implications consideration	As above re NO _x , VOC	As Above	Normal Operation	Low
4. any other air impacts.				
(b) Water impacts				
1. impacts from the use of surface or groundwater	Nil Impact			
2. impacts from changes to natural waterbodies, wetlands or runoff patterns	Nil Impact			
3. impacts from changes to flooding or tidal regimes	Nil Impact			
4. impacts from change in water quality with economic, health,	Nil Impact	Nil impact with respect to quality and generation of waste-water.		

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Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	Evaluation criteria		Ranking of potential significance of extent
		size, scope & intensity	duration	
ecosystem or amenity considerations eg salinity, colour, odour, turbidity, temperature, dissolved oxygen, nutrients, pH factors or pollutants (intentional or unintentional releases of oil, fuels, toxins (including heavy metals and anti-foulants), spoil, sediment, sewage or waste)				
5. any other impacts on water or from the use or storage of water.	Nil Impact	Existing area is concreted and equipped with drainage system to the refinery interceptors.		
(c) Soil and stability impacts				
1. remove soil – topsoil or underlying layers	Nil Impact	Existing equipment foundations will be reused and hence no excavation.		
2. degradation of soil quality including contamination (intentional or unintentional), salinisation, acidification				
3. loss of soil from wind or water erosion				
4. loss of structural integrity of soil				
5. results in land instability with high risks from land slides or subsidence				
6. any other impacts on soils.				
(d) Noise and vibration impacts				
1. results in increased noise or vibrations to unacceptable levels for the surrounding communities	Noise levels unchanged as result of project	Unchanged as replacement of static equipment only.	-	-
2. affects sensitive properties (educational, hospitals, residential, heritage)	Nil Impact			
3. any other impacts from noise, blasting or vibration.	Nil Impact			
(e) Any other physical or pollution impacts				

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Characteristics of potential impacts (adverse & beneficial)	Type of potential impact	Evaluation criteria		Ranking of potential significance of extent
		size, scope & intensity	duration	
Biological impacts (during operation and construction) Nil Impact				
(a) Fauna impacts (including animals, birds, amphibians, reptiles, insects, fish or other aquatic species)				
Nil Impact				
(b) Flora impacts (including on trees, shrubs, grasses, herbs or aquatic plants)				
Nil Impact				
(c) Biodiversity impacts				
Nil Impact				
(d) Threatened species, populations or ecological communities or their habitat *				
Nil Impact				

Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	Evaluation criteria		Ranking of potential significance of extent
		size, scope & intensity	duration	
Resource use impacts (during operation and construction)				
(a) Community resources				
1. any significant increase in the demand for services and infrastructure resources including roads, power, water supply and drainage, waste (including sewage) management, education, medical and social services	Nil impact	No significant change as unit is net exporter of energy, which will be utilised on site, resulting in improved energy utilisation, and hence reduced energy imported to site.	-	-
2. any significant resource recycling or reuse schemes to reduce resource usage	Small	Old equipment (metal) to be recycled (re once off).	Once off	Low
3. any diversion of resources to the detriment of other communities or natural systems	Nil impact			
5. any other impacts.	Nil impact			
(b) Natural resources				
Nil Impact				
(c) Transportation impacts (during construction and operation)				
1. substantial impacts on existing transportation systems (rail, water, road, air or pedestrian both public and private), altering present patterns of circulation, modal split or movement of people &/or goods	Water/road	Small impact associated with once off transport of new equipment to site (by waterways/road) and transport of old equipment from site (road)	~1-2 months before/after installation	Low
2. encourages directly or indirectly additional traffic a) during construction b) during operation	Small	Small increase in traffic associated with once off construction period only.	~2-3 months during construction period	Low
3. any degradation of infrastructure such as roads, bridges	Nil Impact			
4. increases demand for parking (off and on	Nil Impact			

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Characteristics of potential impacts (adverse & beneficial)	Type of potential impacts	Evaluation criteria		Ranking of potential significance of extent
		size, scope & intensity	duration	
street including in residential areas)				
5. any other impacts on transport or traffic.	Nil Impact			
Community impacts (during operation and construction)				
(a) Social factors				
1. any impacts which result in a change in the demographic structure of the community	Nil impact			
2. any environmental impact that may cause substantial change or disruption to the community (loss of neighbour cohesion, access to facilities, links to other communities, community identity or cultural character)	Nil impact			
3. any impacts which result in some individuals or communities being significantly disadvantaged	Nil impact			
4. any impacts on the health, safety, security, privacy or welfare of individuals or communities	See earlier section re emissions.			
5. any impacts that result in a change in the level of demand for community resources (eg facilities, services and labour force)	Nil impact			
6. any other social impacts.	Nil impact			
(b) Heritage, aesthetic, cultural impacts				
Nil impact				
(c) Economic factors (including impacts on employment, industry and property value)				
1. any impacts which result in a decrease to net economic welfare	Employment	Restoration of FCCU unit is important in ensuring long term future of the refinery due to its importance in Mogas production for Sydney. Failure to rejuvenate would result in limited life for the refinery, and jeopardises current full time employment of ~300-400 staff and ~200-300 contractors. Further smaller businesses providing services to Clyde would also be impacted. Further, reduced Mogas from site/closure of site will increase demand for imported Mogas into Sydney from Asia/Europe, which due to limited availability, will have potential impact on supply and pricing in the short term.		Large
2. any impacts that result in a decrease in the economic stability of the community	As above			
3. any impacts which result in a change to the public sector revenue or expenditure base	Nil impact			
4. any other economic impacts.	Nil impact			
(d) Land use				
Nil impact				

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Characteristics of the environment	Type of potential impact	Evaluation criteria		Ranking of potential significance
		size, scope & intensity	duration	
Sensitive because of physical factors:		Nil impact		
Nil Impact				
Sensitive because of biological factors:		Nil impact		
Nil Impact				
Sensitive because of conservation factors :		Nil impact		
Nil Impact				
Sensitive because of community factors :		Nil impact		
Nil Impact				

SUMMARY OF THE ISSUES AND THE LEVEL OF ASSESSMENT

What are the key issues? Consider the <ul style="list-style-type: none"> ▪ Extent of the impacts ▪ Nature of the impacts ▪ Environmentally sensitivity of site 	What is the extent of the studies required to determine the level of risk?	What is the extent of the studies required to avoid, minimise or manage the impacts so the risks are acceptable?
Air emissions (Nox)	In absolute terms, NOx emissions are expected to remain constant, decreasing when expressed as tonne per tonne of product produced due to improved efficiency. The above will be reviewed in more detailed as part of the Environmental Assessment	Further NOx reduction from site will be reviewed separately by a proposed Pollution Reduction Programme (PRP) to be initiated with the DEC
Air emissions (CO2)	In absolute terms, CO ₂ emissions are expected to increase by ~5%, though essentially constant when expressed as tonne per tonne of product produced due to improved efficiency. The above will be reviewed in more detailed as part of the Environmental Assessment	As a consequence of both State (Energy Action Savings Plan) and Federal (Energy Efficiency Opportunity Workshops) initiatives, action plans and projects will be identified to reduce energy usage and reduce CO ₂ emissions over the next few years. Such projects will offset the CO ₂ emissions from this project as well as identify further reductions.
Air emissions (PM10/dust)	In absolute terms, dust/PM10 emissions are expected to increase by ~5%, though essentially constant when expressed as tonne per tonne of product produced due to improved efficiency. It is already noted that the current emission levels (mg/Nm ³) are below current future envisaged limits. The above will be reviewed in more detailed as part of the Environmental Assessment	As PM10 is produced through the combustion processes on site, then the above State and Federal action plans to reduce CO ₂ will also deliver reduced PM10 emissions.
Air emissions (SOx)	SOx emissions will increase by ~5%, but will still remain far lower than historical limits due to new 50ppm Mogas Sulphur specification requiring the site to process far sweeter crudes than historical.	
VOC Emissions	Minimal positive impact due to reduced inventory within the reactor.	