

**Environmental Impact Classification
Pursuant to Section 98 of the *Petroleum Act 2000***

Caroline Carbon Dioxide Well & Purification Plant

June 2001

INTRODUCTION

Pursuant to section 98 of the *Petroleum Act 2000* (the Act) the Minister must classify the regulated activities covered by a prepared Environmental Impact Report (EIR) as either low, medium or high impact.

The classification must be made on the basis of:

- The prepared Environmental Impact Report (EIR); and
- Criteria established for classifying the level of environmental impact of regulated activities, a copy of which is found on the PIRSA Petroleum Group web page:
<http://www.pir.sa.gov.au/dhtml/ss/section.php?sectID=437&templD=8>.
- Comments received from the Department of Environment and Heritage (DEH) and the Department of Water Resources (DWR) in accordance with established inter-Government Memorandum of Administrative Arrangements.

This document summarises the classification made by PIRSA on the Caroline Carbon Dioxide Plant owned and operated by Air Liquide Australia Ltd near Mount Gambier in the south east of South Australia. This classification is based on the information provided in the December 2000 EIR for this plant prepared by ECOS Consulting (Aust) Pty Ltd as submitted to PIRSA on the 4 January 2001.

The Caroline Plant has been in operation since 1967. The EIR assessed here was prepared to satisfy the requirement for the preparation and approval of a Statement of Environmental Objectives (SEO) under Part 12 of the Act for the operation of this facility.

SUMMARY OF CLASSIFICATION

- 1) From an analysis of the environmental significance of the various potential impacts associated with this operation – summarised in attachment #1 against the classification criteria – the overall operation of this facility has been assessed and classified as **low impact**.
- 2) The most significant issues associated with this operation remain:
 - a) the potential long term soil impacts resulting from water disposal via irrigation. It will be requested as an approval condition of the SEO that the company undertake by the end of March 2001 soil sampling within the area where water is disposed to ascertain the extent of any

contamination through out the soil profile.

- b) the potential long term impacts on the soil resulting from the buried solid waste in the disused waste pits on the site. The soil within the vicinity of these pits will be sampled and analysed by March 2001 for contamination so as to ascertain the existence or absence of any problem.
 - c) the uncertainty associated with potential for groundwater crossflow contamination resulting from casing failure brought about by corrosion.
- 3) Comments received by DEH support the low impact classification. In addition, comments and recommended amendments submitted by DWR have been submitted and it will be made a condition of approval of the SEO that these recommendations be addressed in the EIR and SEO.
- 4) Therefore pursuant to delegated powers dated 25 September 2000, gazetted 28 September 2000, I hereby classify this regulated act as low impact.

C D COCKSHELL
Acting Director Petroleum Group
Office of Minerals and Energy Resources
Delegate of the Minister for Minerals and Energy

Attachment 1

CAROLINE CARBON DIOXIDE PLANT - ENVIRONMENTAL SIGNIFICANCE ASSESSEMENT

EIR - Sections	IMPACT	PREDICTABILITY					SIGNIFICANCE SCORES	MANAGEABILITY					SIGNIFICANCE SCORES	COMMENTS	ENVIRONMENTAL SIGNIFICANCE OF IMPACT	
		SIZE	SCOPE	DURATION	FREQUENCY	STAKEHOLDER CONCERNS		AVOIDANCE	PROBABILITY	DURATION	SIZE & SCOPE	CUM EFFECTS				STAKEHOLDER CONCERNS
4, Table 3	Natural Environment Impacts Soil Impacts: resulting from water disposal and spills	Low	Low	High	High	High	4	No	High	Long	Small	None	None	3	Any chemical, fuel or oil spill at the plant is expected to be relatively small in volume (max. 300 litres of unleaded petrol) and localised within the contained impermeable storage area. Spill response procedures in place to deal with spill incident immediately. Disposal of stormwater and formation water via irrigation may result in saturation of the soil profile and/or build up of hydrocarbons and salt and decrease in the soil PH. Any adverse consequences to the soil are minimised by ensuring that the sprinkler is relocated regularly enough to prevent the soil becoming saturated and pools of water developing. The discharged water quality (hydrocarbon, salinity and ph) is monitored and analysed as per ANZECC guidelines for agriculture 6 monthly. Soil sampling will be requested to be undertaken as part of the approval conditions so as to ascertain the extent of any contamination within the soil profile in this region.	Medium
4, Table 3	Soil Impacts: resulting from solid waste disposed of in disused pits	Low	Low	Low	High	Low	4	No	High	Long	Small	None		3	Disused waste disposal earthen pits are present on the site in which puraspec, activated carbon and silica gel were disposed in. The pits have been back filled and any leaching of contaminants into the soil are expected to remain localised within the vicinity of the buried pits which are 4 by 5 meters wide and 1 meter deep. The soil within the vicinity of the disused pits will be sampled by March 2001 and analysed for hydrocarbon content, salinity and PH levels. On the basis of these results, any necessary remedial action of the soil will be undertaken. Note: that solid wastes are now stored in a sealed area and collected and disposed of by a licensed waste removal contractor.	Medium
4, Table 3	Groundwater Impacts: resulting from spills.	High	High	High	High	High	1	Yes						1	The potential of any adverse consequence resulting from a chemical, fuel or oil spill on the groundwater is avoided as the storage of these are contained within an area comprising of an impermeable surface which will prevent the seepage of any such substance into the underlying aquifer. In addition, the spill response procedures will provide additional assurance any spill will be contained.	Low

EIR - Sections	IMPACT	PREDICTABILITY					MANAGEABILITY					COMMENTS	ENVIRONMENTAL SIGNIFICANCE OF IMPACT			
		SIZE	SCOPE	DURATION	FREQUENCY	STAKEHOLDER CONCERNS	SIGNIFICANCE SCORES	AVOIDANCE	PROBABILITY	DURATION	SIZE & SCOPE			CUM EFFECTS	STAKEHOLDER CONCERNS	SIGNIFICANCE SCORES
4, Table 3	Groundwater Impacts: formation and storm water disposal.	High	Medium	High	High	High	2	Yes						1	It is envisaged that any contaminants in the disposed water will be retained in the first few meters. Substantiation of this has been demonstrated by investigations carried out on oil spill sites in the Cooper Basin. In light of the fact that the shallowest aquifer in this region is some 22 meters below the surface and that the quality of the disposed water is maintained at the ANZECC water quality guideline level for agricultural use, any threat of contamination of groundwater by disposed water is considered very unlikely. To substantiate their claim, Air Liquide have agreed to extend the scope of the soil sampling to be undertaken around the disused waste pits in March 2001, to include sampling and analysis of the soil profile in the region where waste water is disposed. This will be made a condition of approval of the SEO. It is also reported in the EIR that the Department of Water Resources samples the groundwater quarterly from the bore on the plant site which provides another means for monitoring for potential aquifer contamination.	Low
4, Table 3	Groundwater Impacts: crossflow contamination due to casing corrosion.	Low	Low	Med	Med	Med	5	No	Low	Short				2	The EIR does not provide any details of the downhole completion of the well, that is, the aquifer and reservoirs intercepted, casing and tubing details etc. This needs to be detailed so as to allow an informed assessment of the down hole risks to be more clearly illustrated and understood. These details will be requested from the operator. The major risk to downhole aquifer contamination has been identified in the EIR as the consequences of casing corrosion. It is not clear in the EIR how corrosion protection is being implemented in the well. Details of the casing corrosion protection process implemented will be requested. However, daily monitoring of well head pressure and "tell-tale" diesel system is undertaken to assess casing integrity. Therefore any leakage due to casing corrosion will be detected almost immediately allowing for immediate remedial action to be undertaken within a short enough period to prevent any substantial aquifer crossflow contamination to occur.	Medium
3, 4, Table 3	Native flora	High	High	High	High	High	1	Yes						1	No disturbance to native flora will occur as the plant is surrounded by Pine plantations with the nearest native vegetation being 1.5 km to the east in the Native Forest Reserve.	Low
3, 4, Table 3	Native fauna	High	High	High	High	High	1	Yes						1	Little natural fauna habitat exists in the surrounding area for the plant to pose any substantial risk to native fauna.	Low
2, 4, Tables 1 & 3	Air impacts: Resulting from plant green house gas emissions, CO2, methane and disposal of off-spec CO2 gas.	High	High	High	High	High	1	No	High	Long	Small	Small	No major concerns	3	Relatively the emissions of green house gases from this plant are small. The operator is also seeking to decrease its CO2 emissions by 5% by December 2001.	Low
3.5	Social Environment Impacts															
	Cultural Sites	High	High	High	High	High	1	Yes						1	No indigenous or non-indigenous cultural heritage sites or items present.	Low

EIR - Sections	IMPACT	PREDICTABILITY						MANAGEABILITY						COMMENTS	ENVIRONMENTAL SIGNIFICANCE OF IMPACT	
		SIZE	SCOPE	DURATION	FREQUENCY	STAKEHOLDER CONCERNS	SIGNIFICANCE SCORES	AVOIDANCE	PROBABILITY	DURATION	SIZE & SCOPE	CUM EFFECTS	STAKEHOLDER CONCERNS			SIGNIFICANCE SCORES
Table 4, Appendix #2.	<p>Public Safety Impacts: Due to well head rupture or fire or explosion risks.</p> <p>Economic Environment Impacts</p>	High	High	Medium	Medium	Medium	2	No	Low	Short	Small	Small		1	The major risks to third parties, eg public, have been identified as either wellhead rupture and fire or explosion at the plant. As shown by the risk analysis summarised in Appendix #2, the likelihood of such incidents occurring is assessed as low. The wellhead and plant monitoring procedures listed in Table 3 and in the SEO are major controls put in place to minimise the likelihood of such incidents. Similarly, the emergency response procedures are in place to avoid any adverse consequences to third parties in the event of such incidents.	Low
3.1	Other land use	High	High	High	High	High	1	Yes						1	The major other adjacent land use in this area is the pine plantations for timber production, the plant has operated since 1967 in this area without any conflict with the timber industry nor with the graziers in the area which the nearest is located about 4.5 km to the South of the plant.	Low

Department for Water Resources

Resource Assessment

Our Ref: DWR01/0029

27 February 2001

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Dear Sir

RE CAROLINE CO₂ PURIFICATION PLANT SEO & EIR

I refer to your email request, dated 5 February 20001, seeking comment on the 'Air Liquide Australia Ltd Caroline Carbon Dioxide Purification Plant: Environmental Impact Report (EIR), and Statement of Environmental objectives (SEO), which were forwarded to this Department for consideration and comment.

Background

The proponent, Air Liquide, operates a carbon dioxide purification plant that produces 21,000 tonnes of CO₂ per year. This plant has been operating since 1967. The source liquid, which comes from a deep well, contains approximately 90 – 94.5% CO₂. Impurities include sulphur compounds, nitrogen, and hydrocarbons (10,000 L/year), and some free water. The company is licensed under the *Water Resources Act 1997* to draw 6 ML/year of groundwater for use in the purification process,

Processing water, which is dosed with corrosion inhibitor and sulphuric acid, is produced at a rate of 9 ML/year, which includes waste hydrocarbon. This is stored in an effluent tank in which formation water and stormwater are also stored. This water is subsequently disposed of via irrigation within the plant site.

The plant has been assessed by PIRSA to be low impact, subject to the following conditions, that are supported by this Department:



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1. Soil sampling to determine the contamination resulting from the disposal of water.
2. Soil sampling to determine the impact of the disused solid waste disposal pits.
3. The provision of additional information related to the geology, well casing corrosion protection, and the potential for inter-aquifer flow.

A fourth condition is proposed to complement condition-1. It is suggested that the proponent:

4. Develop, and implement, a suitable irrigation program to manage the impacts of irrigation disposal of water by determining acceptable application rates and soil contaminant loadings.

The EIR and SEO

The EIR satisfactorily identifies the environmental issues, the response to which is stated in the SEO.

However, the EIR does not identify the geology or hydrogeology in the region, or the risks associated with casing failure, which is the issue of greatest concern from the groundwater perspective. Casing failure results in the potential for both inter-aquifer flow, and cross-flow contamination from the gas production zone into the overlying aquifers.

It is recommended that the SEO clearly identify the requirement for geophysical logging of the well on a regular (possibly annual) basis, to determine casing integrity. All geophysical logs that are of assistance in assessing casing integrity should be employed. This methodology may pre-empt casing failure that will be detected by monitoring wellhead pressure, and the 'tell-tale' diesel system.

It is also recommended that a contingency plan be developed, which can be implemented in response to a serious contamination event.

It is advised that comment be sought from the EPA, regarding the waster disposal issues, if this has not already been done.

Please contact Stephen Howles on 8204 9814 if you have any queries concerning this matter.

Yours sincerely



Bryan Harris
DIRECTOR RESOURCE ASSESSMENT
DEPARTMENT FOR WATER RESOURCES