Use of the Cape Peron outlet pipeline to dispose of industrial wastewater, Kwinana

Water Corporation

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 1135
May 2004

Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
26/05/03	**Level of Assessment set (following any appeals upheld)**	**8**
08/12/03	**Proponent Document Released for Public Comment**	**28**
16/02/04	**Public Comment Period Closed**	**10**
19/03/04	**Final Proponent response to the issues raised**	**4**
31/05/04	**EPA report to the Minister for the Environment**	**10**

ISBN. 0 7307 6771 X
ISSN. 1030 - 0120
Assessment No. 1471

Summary and recommendations

The Water Corporation proposes to discharge up to 30 megalitres (ML) per day of industrial wastewater, in addition to treated wastewater from the Woodman Point and Cape Peron wastewater treatment plants and water from the Jervoise Bay Groundwater Recovery Scheme, to the Sepia Depression via the Cape Peron outlet. This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposal.

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

Relevant environmental factors

The EPA decided that the following environmental factors relevant to the proposal required detailed evaluation in the report:

(a) Marine environment: ecological values; and

(b) Marine environment: social values.

There were a number of other factors raised that were related to the proposal but are not part of the proposal or are not environmental factors. Appendix 3 provides further information on these.

Conclusion

The EPA has considered the proposal by the Water Corporation to discharge up to 30 ML per day of industrial wastewater to the Sepia Depression via the Cape Peron outlet.

The EPA notes that, due to the cumulative discharge of industrial and treated wastewater from wastewater treatment plants, the proposal will result in a low ecological protection zone for toxicants within a 100 metre radius of the diffuser and outside of this, a zone of high ecological protection. The proposal allows for the potential addition of further sources of industrial wastewater besides that from industries considered in this assessment, provided proposals for further industrial discharges are referred to the EPA. Industries currently operating will not be permitted to increase their load of toxicants discharged from current levels and any change to the load or character of their discharge will need to be referred to the EPA. Annual loads from future industry sources must not exceed three and one half times the annual typical 2004 levels. The maximum volume of industrial wastewater discharge in future will be up to five times the 2004 volume and therefore a three and one half times limit is a less than proportional increase in load. The load limit has been set to encourage an overall reduction in waste discharge from existing and/or new industries and because concentration criteria do not address levels of

accumulation of toxicants in the environment. The cumulative nitrogen load from industrial and treated wastewater from wastewater treatment plants is limited to 1994 levels, in accordance with previous commitments made by the proponent. The discharge of industrial wastewater will not increase the area where primary recreation and seafood harvesting are not recommended due to the existing discharge of treated wastewater from wastewater treatment plants. No aesthetic impact is anticipated from the discharge of industrial wastewater.

With regard to primary recreation and seafood harvesting the EPA has set long-term objectives, after extensive community consultation (EPA 2000), which will result in these unsuitable areas being reduced over time. Discharge of industrial wastewater will not prevent the EPA's long-term objectives being attained.

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 5, and summarized in Section 4 of this report.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for the discharge by the Water Corporation of up to 30 megalitres per day of industrial wastewater, in addition to treated wastewater from wastewater treatment plants and water from the Jervoise Bay Groundwater Recovery Scheme, to the Sepia Depression via the Cape Peron outlet;
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 5, and summarised in Section 4, including the proponent's commitments.
4. That the Minister imposes the conditions and procedures recommended in Appendix 5 of this report.

Conditions

Having considered the proponent's commitments and information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by the Water Corporation to discharge industrial wastewater to the Sepia Depression via the Cape Peron outlet is implemented. These conditions are presented in Appendix 5. Matters addressed in the conditions include the following:

(a) that the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 5;

(b) standard conditions for proponent nomination, time limits of approval, compliance audit and performance review, and decommissioning plans;

(c) preparation of a Monitoring and Management Plan for the Sepia Depression Ocean Outlet;

(d) the spatial extent of low and high ecological protection zones and toxicant criteria;

(e) the procedure for new or changes to industrial wastewater discharge;

(f) limitations on the annual toxicant loads from participating industries;

(g) limitations on nutrient loads; and

(h) protection of sediment quality.

Contents

1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment on the environmental factors relevant to the proposal by the Water Corporation, to discharge industrial wastewater, in addition to treated wastewater from the Woodman Point and Cape Peron wastewater treatment plants and water from the Jervoise Bay Groundwater Recovery Scheme, to the Sepia Depression via the Cape Peron outlet. The proposal also takes into account the future replacement of the Cape Peron wastewater treatment plant with a new East Rockingham wastewater treatment plant.

In 1982 the EPA assessed a proposal by the proponent to discharge treated wastewater from the Woodman Point and Cape Peron wastewater treatment plants to the Sepia Depression. At the conclusion of that assessment, a statement was issued by the then Premier that "no effluents from Kwinana industries would be considered for the scheme without a separate and complete environmental review". The proposal to discharge industrial wastewater has therefore been assessed in accordance with that requirement.

The proposal has been assessed at Public Environmental Review (PER) level. The PER was released for public review on the 8 December 2003 and submissions closed on the 16 February 2004.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the environmental factors relevant to the proposal. The Conditions and Commitments to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides Other Advice by the EPA, Section 6 presents the EPA's conclusions and Section 7, the EPA's Recommendations.

Appendix 6 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process, and which have been taken into account by the EPA, appear in the report itself.

2. The proposal

The proposal is to discharge up to 30 megalitres per day (ML/day) of industrial wastewater, in addition to treated wastewater from Woodman Point and Cape Peron wastewater treatment plants and water from the Jervoise Bay Groundwater Recovery Scheme, to the Sepia Depression via the Cape Peron outlet line from the following specified sources and further unspecified sources:
the Kwinana Wastewater Reclamation Plant (KWRP);
BP Refinery (Kwinana);
CSBP Limited; and
Edison Mission Energy.

The proposal does not allow any of the specified industries to increase their discharge of current contaminant loads to the marine environment. Any proposal to change the loads or character of these discharges beyond that assessed will need to be referred to the EPA. Any proposal to add a new unspecified industrial discharge to the Sepia Depression Ocean Outlet Landline (SDOOL) will need to be referred to the EPA.

No construction or marine ecological disturbance of the existing pipeline or diffuser is required for this proposal. The proposal includes the instruments and controls, telemetry and shutdown systems between industries and the KWRP and SDOOL as described in Section 2 of the PER, which are relevant to monitoring and controlling wastewater input to the Sepia Depression. A location plan for the proposal is shown in Figure 1.

The SDOOL also receives wastewater from other sources, namely the Woodman Point and Cape Peron wastewater treatment plants and Jervoise Bay Groundwater Recovery Scheme. These sources contribute toxicants, nutrients and bacterial loads to the wastewater discharge. The maximum combined discharge from all sources is 208 ML/day, which is the capacity of the outlet pipeline. It would not be possible to separate the environmental impacts of industrial wastewater discharge from that of other sources, except in the case of constituents that are unique to an industrial discharge. Therefore the cumulative environmental impacts from the combined concentration and loads of contaminants from all sources need to be considered. The proposal also takes into account the cumulative environmental impacts of replacing the Cape Peron wastewater treatment plant with a new East Rockingham wastewater treatment plant.

The proponent defined the main characteristics of the proposal as summarised in Table 1 below. A detailed description of the proposal is provided in Sections 4 and 5 of the PER (Water Corporation, 2003).

Table 1: Summary of key proposal characteristics

Parameter	Description		
Location	Sepia Depression Ocean Outlet; approximately 4.1 km offshore west south west of Point Peron, Western Australia		
	Current (2003)	**Current plus initial KWRP (2004)**	**Ultimate proposal (2019 worst case)**
Industry Reclaimed Water Reuse	0	17 ML/day	up to 27 ML/day
Industry Wastewater Discharge to SDOOL Typical Maximum	 0 0	 6 ML/day 13 ML/day	 up to 30 ML/day
Combined Treated Wastewater Quantity and Quality			
Average Volume Typical***** Maximum******	 124 ML/day 124 ML/day	 113 ML/day 122 ML/day	 up to 200 ML/day up to 208 ML/day
Suspended Solids	34 mg/L	39 - 42 mg/L	35 mg/L
Biochemical Oxygen Demand (BOD_5)	22 mg/L	24 - 32 mg/L	16 mg/L
Total Nitrogen (TN)	18 mg/L	22 - 32 mg/L	27 mg/L
Total Phosphorus (TP)	10 mg/L	11 - 12 mg/L	12 mg/L
Toxicants	As per PLOOM reporting 1992 to 2002*	As per Table 4-2, PER	As per Table 4-4, PER
Sepia Depression Ocean Outlet Landline Diffuser	As previously reported by EPA Bulletin 114, May 1982. No construction or terrestrial or marine ecological disturbance of the existing Sepia Depression Ocean Outlet Landline or diffuser is required for this proposal.		

***** HGM 1992; Kinhill 1998a; DAL 1997a, 1997b, 1997c, 2000, 2002; DALSE 2002a, 2002b

Abbreviations: mg/L milligram per litre ML Megalitre
PLOOM Perth Long-term Ocean Outlet Monitoring

Since release of the PER, a number of modifications to the proposal have been made in consultation with the proponent. These include:

- amendment of the definition of the proposal as shown below (Table 2) to provide a more auditable characteristics table ;

Table 2: Modified key proposal characteristics

Parameter	Description		
Location	Sepia Depression Ocean Outlet; approximately 4.1 km offshore west south west of Point Peron, Western Australia		
	Current (2003)	**Current plus initial KWRP (2004)**	**Possible expansion (2019)**
Industry Reclaimed Water Reuse	0	17 ML/day	up to 27 ML/day
Industry Wastewater Discharge to SDOOL			
Typical	0	6 ML/day	up to 30 ML/day
Maximum	0	13 ML/day	
Combined Treated Wastewater Quantity and Quality			
Average Volume			
Typical*	124 ML/day	113 ML/day	up to 200 ML/day
Maximum**	124 ML/day	122 ML/day	up to 208 ML/day
Suspended Solids	34 mg/L	39 - 42 mg/L	35** mg/L
Biochemical Oxygen Demand (BOD_5)	22 mg/L	24 - 32 mg/L	16** mg/L
Total Nitrogen (TN)	18 mg/L	22 - 32 mg/L	22* -27** mg/L
Total Phosphorus (TP)	10 mg/L	11 - 12 mg/L	11* - 12** mg/L
Dilutions	~	Average dilution of the SDOOL wastewater stream will be at least 1:300 with the dilution being above 1:200 99% of the time within 100 metres of the Sepia Depression Ocean Outlet (SDOO) diffuser	
Annual Toxicant Loads from Industrial Participants		Toxicant loads from industries nominated in this proposal, will not increase beyond that currently permitted to be discharged to Cockburn Sound, unless the proposal for a change to loads is referred to the EPA.	Annual cumulative toxicant loads to be within 3.5 times the 2004 loads, estimated from typical projected flows with typical toxicant concentrations. New proposals for discharges to Sepia Depression Ocean Outlet Landline to be referred to the EPA.
Toxicant Concentrations	as per PLOOM reporting, 1992 to 2002***	Projected loads and flows will result in toxicant concentrations meeting the ANZECC & ARMCANZ 80% species protection guideline values for bio-accumulating toxicants at the diffuser.	
	as per PLOOM reporting, 1992 to 2002***	Projected loads and flows will result in toxicant concentrations meeting the ANZECC & ARMCANZ 99% species protection guideline values (with the exception of Cobalt, where the 95% guideline shall apply) beyond 100 metres from the Sepia Depression Ocean Outlet diffuser	
Nutrient Loads	Nutrient loads from the Sepia Depression Ocean Outlet to Sepia Depression will be no greater than 1994 loads, and should subsequent monitoring show an adverse environmental impact at that level, it will be reduced to 75% of 1994 loads.		
Sediment	ANZECC & ARMCANZ Interim Sediment Quality Guideline-low levels to be used as trigger for management action and investigation for bio-accumulating substances within the zone of low ecological protection, and generally outside the zone of low ecological protection.		
Protection of Social Values			
Contact recreation	The area not meeting the guidelines for contact recreation due to domestic wastewater discharge will not increase because of the addition of industrial effluent.		
Aesthetic value	Visual amenity will not deteriorate because of the addition of industrial effluent.		
Seafood for Human Consumption	The industrial wastewater discharge will not increase area not meeting the guidelines for seafood harvesting due to domestic wastewater discharge.		

***** Typical means the expected average daily operating parameter.

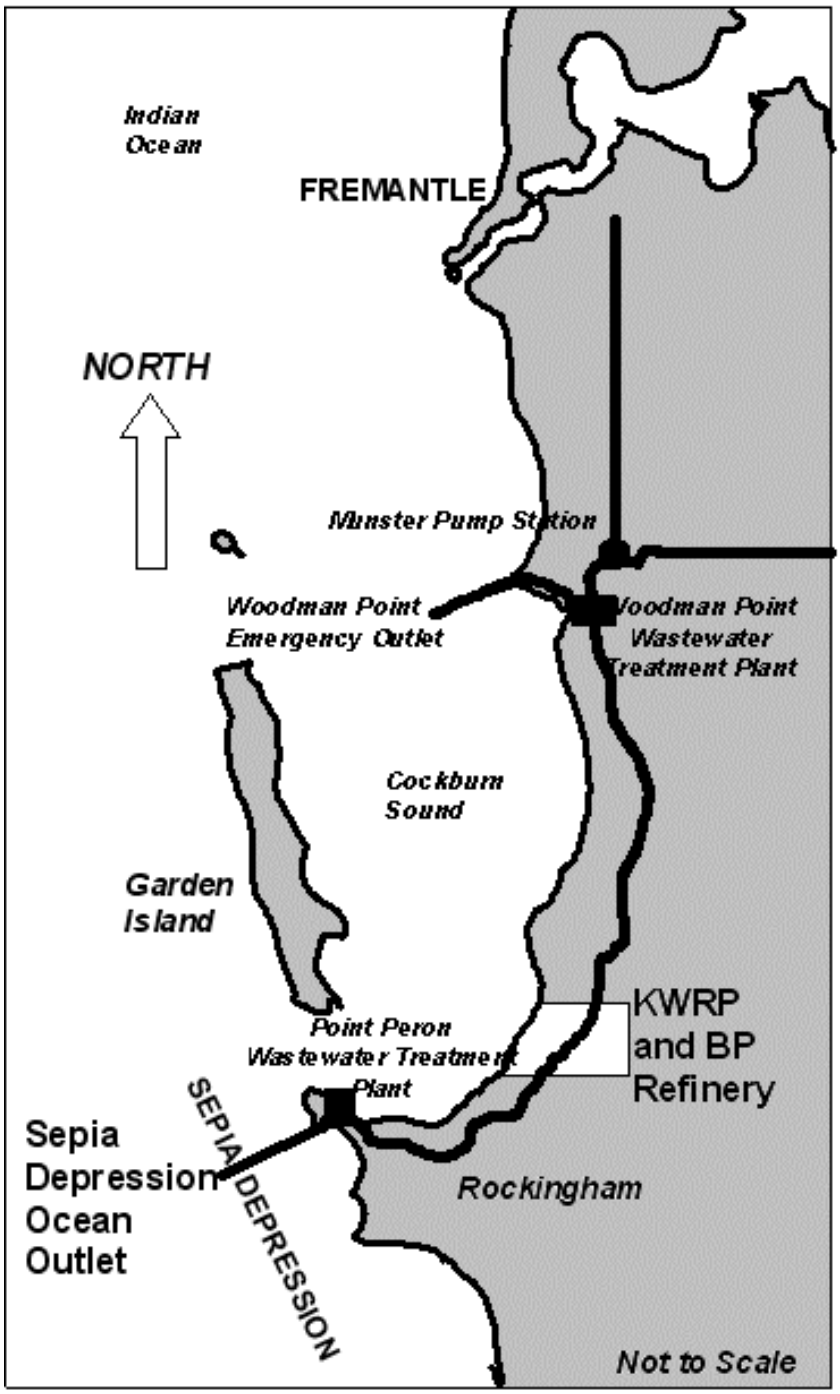
****** Maximum means the expected infrequent highest (peak) operating condition reflecting "normal" operational variability.

******* HGM 1992; Kinhill 1998a; DAL 1997a, 1997b, 1997c, 2000, 2002; DALSE 2002a, 2002b

- change to some background values for metals in seawater, as a result of further research as shown in Appendix 4;
- definition of a "low ecological protection zone" within 100 metres (m) of the diffuser. At the edge of the low ecological protection zone 200 times dilution of the discharge will be obtained 99% of the time;
- an agreement that industrial wastewater will only be accepted with the aim that the quality of the combined wastewater streams will meet the ANZECC & ARMCANZ 80% species protection guidelines for toxicants (ANZECC & ARMCANZ 2000) at the discharge point and the ANZECC & ARMCANZ 99% species protection guidelines 100 metres (m) from the diffuser, except for cobalt for which the 95% species protection guideline applies;
- capping the discharge of toxicant loads from industries at a maximum permissible level of 3.5 times the typical annual 2004 industrial load. The typical annual industrial load in 2004 and maximum permissible load for toxicants is shown in Table 3.

Table 3: Annual industry toxicant loads

	Proposed Loads 2004 (Tonnes/year)	Future Maximum Permissible Loads (Tonnes/year)
Arsenic (III)	0.029	0.102
Cadmium	0.017	0.060
Chromium	0.034	0.119
Cobalt	0.027	0.095
Copper	0.179	0.627
Lead	0.026	0.091
Mercury	0.002	0.007
Molybdenum	0.337	1.18
Nickel	0.059	0.207
Selenium	0.006	0.021
Silver	0.007	0.025
Vanadium	0.078	0.273
Zinc	0.884	3.09
Cyanide (total)	0.333	1.17
Hydrocarbons	0.623	2.20
Phenols	0.026	0.091
Absorbable organic halogens	0.001	0.004



(Source: Water Corporation)

Figure 1: Location of the Sepia Depression Ocean Outlet

3. Relevant environmental factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the relevant factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as industry contingency plans, amendment of licences or alternative uses for wastewater, while related to the proposal, are not part of the proposal or are not environmental factors.

It is the EPA's opinion that the following environmental factors relevant to the proposal require detailed evaluation in this report:

(a) Marine environment: ecological values; and

(b) Marine environment: social values.

The above relevant factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

Details on the relevant environmental factors and their assessment are contained in Sections 3.1 - 3.2. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

3.1 Marine environment: ecological values

Description

Industrial wastewater discharge will contribute toxicants, nutrients, suspended solids and substances such as anti-scalants and hydrocarbons to the treated wastewater from wastewater treatment plants being discharged through the SDOOL. These contaminants have the potential to adversely impact the marine environment by causing changes in ecosystem processes, loss of biodiversity, changes in abundance or biomass of marine life and increases in the levels of contaminants in biota, water and sediments.

Toxicant concentrations

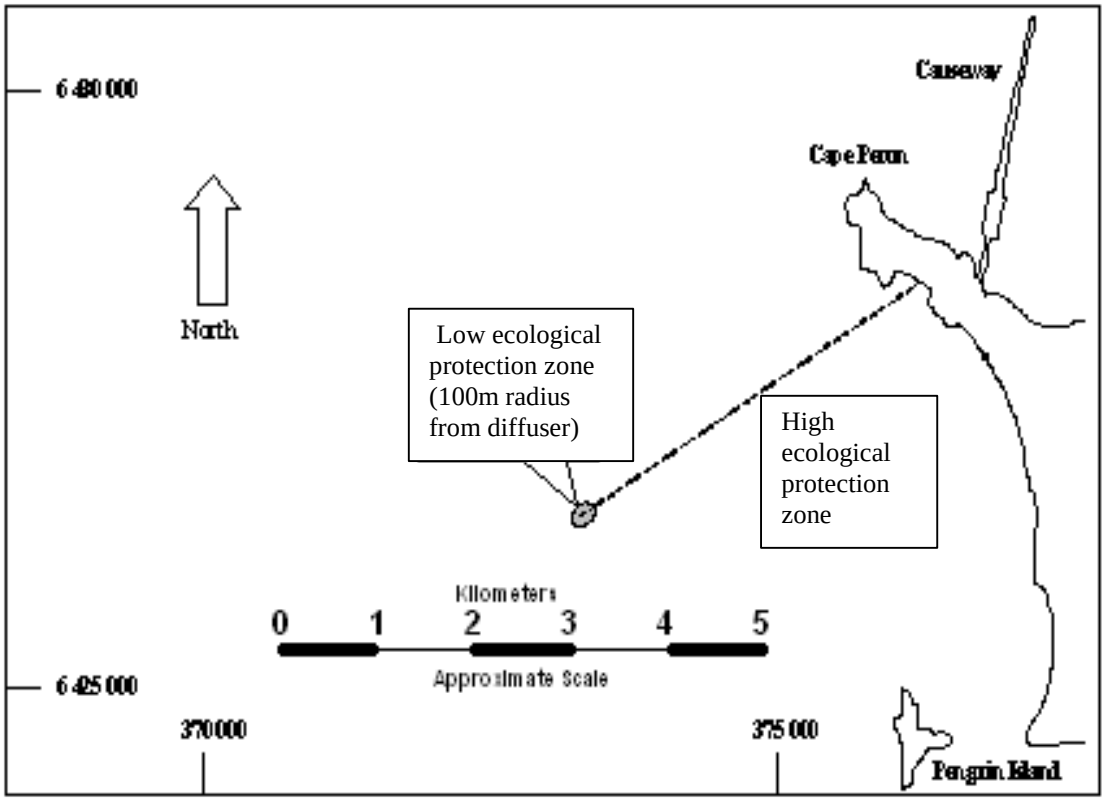
The proponent has considered the wastewater discharge from BP Refinery, CSBP Ltd, Edison Energy and the KWRP. Using the high ecological protection criteria for Cockburn Sound for toxicants the proponent demonstrated in the PER that these criteria could be met at the edge of a zone of initial dilution for typical and worst case discharges from industries in 2004 and for hypothetical typical and worst case discharges in 2019. The zone of initial dilution described in the PER is a zone in which a typical dilution of the wastewater plume of 300 times is achieved within a

distance of about 25m of the surface expression of the plume. The position of the surface expression of the plume varies with currents and winds. In order to simplify the definition of this zone, it was decided, with the agreement of the proponent, to define a zone of 100 m radius around the diffuser within which an average dilution of the wastewater stream of at least 300 times and above 200 time 99% of the time will be obtained.

The concentrations of contaminants at the edge of the 100 m zone for the 2004 and 2019 scenarios in the PER were recalculated using amended background concentrations in seawater, as given in Appendix 4 (DoE, 2004). The amended background concentrations were available only recently from new research and are based on sampling data or literature review. With a 200 times dilution at the edge of the 100 m zone it was demonstrated that the ANZECC & ARMCANZ 99% species protection criteria for toxicants can be met under both typical and worst case discharge concentrations at the edge of the 100 m zone, with the exception of cobalt. It was decided that the 95% species protection guideline for cobalt should be used for this assessment, and on an interim basis for operations, as the 99% species protection guideline has been derived from an inadequate toxicological data set and requires refinement. For the calculations the assumptions were made that at least half the copper present in the wastewater is not bio-available and that the chromium in the wastewater is mostly in the form of tri-valent chromium. These assumptions are based on previous investigations by the proponent and Seligman and Zirino, (1998), for copper and on Moore and Ramamoorthy, (1984), for chromium. Whole-of-effluent toxicity testing will be undertaken with the actual combined effluents and treated wastewater to confirm that the 99% species protection criteria are met after dilution.

Within 100 m from the diffuser there will be a low ecological protection zone (Figure 2). In the low ecological protection zone, ANZECC 80% species protection criteria for mercury and cadmium, which can bio-accumulate, apply. It was calculated that the criteria are met at end of pipe for these contaminants under the predicted ‘typical’ operating conditions. The low ecological protection criterion number for mercury is slightly exceeded (12%) in 2004 at the end of pipe under the very unlikely ‘worst case’ scenario where all three industries simultaneously discharge at maximum flow *and* worst effluent quality. The possibility that this scenario will occur is very small. The low ecological protection criterion number for mercury is also slightly exceeded in the worst case 2019 scenario, which also has a low probability.

There are no environmental criteria available for application to anti-scalants to be used in the KWRP but anticipated discharge concentrations are low. Whole-of-effluent toxicity testing will be undertaken to ensure that anti-scalants do not cause adverse impact to marine species.



(Source: Water Corporation)

Figure 2 Sepia Depression Ocean Outlet Toxicant Boundary

Toxicant loads

The proposal does not allow any of the specified industries to increase their discharges of current contaminant loads to the marine environment. The industries' discharges will continue to be licensed under Part V of the *Environmental Protection Act 1986*, for discharge to the Water Corporation's pipeline.

The proponent anticipates that the addition of industrial wastewater to the treated wastewater discharge from wastewater treatment plants will not increase the potential for contaminants to accumulate in sediments. This conclusion is based on the observation that previous discharge of primary treated wastewater from 1985 to 2002 which contained similar or greater loads of metals, has not caused any detectable accumulation of metals in sediments adjacent to the outlet.

Nutrients

Industrial wastewater discharge should not add substantially to the nutrient load already resulting from the discharge of treated domestic sewage at the proponent's wastewater treatment plants.

Other Physical and Chemical Stressors

Water quality parameters for suspended solids and biological oxygen demand are described in the characteristics table and are not anticipated to impact on the ecological objectives due to the addition of industrial effluent to the discharge.

Submissions

The Cockburn Sound Management Council supported the proposal as it will improve the Cockburn Sound environment.

CSBP and BP (Kwinana) supported the proposal. BP indicated that a correction was needed to Table 6-3 and commented on the proposed concentration limit and necessity for load limits.

The City of Rockingham expressed concerns about the accumulation of new chemical discharges, comparisons to previously 'unsuitable' levels of nutrients, assessment of future industrial wastewater discharge proposals, reduced waste discharge controls, monitoring of discharges, identification of trigger limits, higher concentrations of contaminants and monitoring of the marine environment.

Assessment

The area considered for assessment of this factor is the marine environment impacted by the discharge of wastewater.

The EPA's environmental objective for this factor is maintenance of marine ecosystem integrity.

The EPA acknowledges that the proposal will be an environmental benefit for Cockburn Sound as it will remove some industrial discharges from a partially enclosed system to a more energetic and deeper environment and hence reduce the environmental impact.

Toxicant concentrations

The EPA notes that the proposal will allow for a low ecological protection zone within 100 m of the diffuser, due to toxicant discharge. It is the EPA's objective that a high level of ecosystem protection should be maintained throughout Perth's coastal waters, except in areas designated moderate or low protection. It is recognised that the use of the marine environment to dispose of wastewater provides a social benefit. It is considered that the low ecological protection zone area of approximately 10.5 hectares (calculated from the length of diffuser of 324m and 100 m radius dilution zone) is reasonable for this benefit.

It should be noted that the numerical criteria for toxicants described in ANZECC & ARMCANZ 2000 are environmental quality guidelines (EQGs), not statutory limits. Therefore if the guidelines are exceeded, this will not trigger prosecution but will trigger an investigation by the proponent. The cause of the exceedance will be investigated and either the cause will be remedied or further investigations undertaken to demonstrate that exceedance of the guidelines is not causing the environmental quality standards (EQSs) to be exceeded. Exceedance of an EQS would trigger a management response to rectify the exceedance. The EQG and EQSs are collectively described as environmental quality criteria (EQCs).

The EPA recommends that the proponent establishes a monitoring and management plan in consultation with the Department of Environment and Department of Conservation and Land Management for the Sepia Depression Ocean Outlet. The plan would address the EQGs and EQSs to be met and actions to be taken should monitoring show that these criteria are being exceeded.

The EPA advises that adequate monitoring of the wastewater prior to discharge is an important element of the project. The EPA notes that the proponent intends to monitor flow rate, pH, conductivity, turbidity and temperature using real-time monitors. This will identify any major process upsets but may not identify increases in low concentration toxicants. The EPA notes that the proponent has also committed to routine monitoring of the levels of toxicants, agreed from time to time under the monitoring plan, prior to discharge from the SDOOL, as well as periodic whole-of-effluent testing. It is the proponent's responsibility to ensure that the proponent is aware of the quality of the effluent being accepted. The discharge of the combined streams of wastewater must also be operated so that at least a 200 times dilution is obtained 99% of the time at a distance of 100 m from the diffuser. The dilutions obtained should be confirmed under various marine and flow conditions to ensure that this requirement is being met. The Water Corporation is responsible for the collection, mixing and discharge of the wastewater to the environment and for ensuring that this discharge does not cause unacceptable impacts.

Toxicant loads

The EPA notes that none of the industries described in the PER will be permitted to increase their loads of contaminants being discharged to the environment. However few loads of contaminants are specified in the industry licences under Part V of the *Environmental Protection Act 1986* and industry waste streams are not fully characterised. The EPA notes that these waste streams are not currently the cause of

environmental problems in Cockburn Sound (CSMC 2003) and therefore believes that they will not result in environmental damage in the more energetic Sepia Depression environment. For known contaminants where loads have been measured but not specified as limits in licences, the EPA considers that a limit of not more than the average discharge over the past three years should apply to those industries in this proposal.

Any proposal to change the loads or character of the existing industrial discharges beyond those in this assessment will be required to be referred to the EPA. Any proposal to add a new industrial discharge to the SDOOL will also be required to be referred to the EPA. A level of assessment for the proposal will be advertised to ensure that the public is informed of any proposals for new or changed discharges.

The toxicant load to be discharged in 2019 is capped at a maximum permissible level of three and one half times the typical load in 2004. This does not imply that it is acceptable to discharge toxicants up to this level. The load limit has been set to encourage an overall reduction in waste discharge from existing and/or new industries and because concentration criteria do not address levels of accumulation of toxicants in the environment. The three and one half times limit is regarded as a useful management tool rather than an ecologically derived limit. Continual improvement and load reduction is expected to apply to existing industries, through Part V licensing. For new industrial discharges that are proposed for the Sepia Depression best practice waste minimisation principles should be applied and the proposal will need to be referred to the EPA. Load limits may be reviewed should monitoring show environmental impacts are likely or that the EQS are exceeded.

Sediment quality which may be affected by contaminant loads should be monitored to ensure that it meets the Interim Sediment Quality Guidelines-low trigger levels (ANZECC & ARMCANZ 2000) for toxicants in sediments. In the low ecological protection area only bio-accumulants have guideline trigger levels in sediments.

Nutrients

In accordance with commitments made previously by the proponent, nitrogen discharge to the Sepia Depression will not exceed the 1994 load of 1778 tonnes/year and the proponent will have the capacity to enable a further nitrogen reduction to 75% of 1994 loadings at any time should monitoring show that the nitrogen load is having an adverse environmental impact.

Other Physical and Chemical Stressors

Changes to water quality due to suspended solids and biochemical oxygen demand are not anticipated to have adverse environmental impacts.

Summary

Having particular regard to the:

(a) Proponent's commitment to operate the SDOOL to attain a 200 times dilution 99% of the time of the discharged wastewater 100 m from the diffuser;

(b) Proponent's commitment to meet environmental quality criteria at 100 m from diffuser;

(c) Proponent's commitment to a monitoring and management plan for wastewater streams prior to discharge;

(d) Proponent's commitment to whole-of-effluent testing; and

(e) Proponent's commitment to environmental monitoring,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor provided that:

(a) A plan for monitoring and management of the Sepia Depression Ocean Outlet is developed;

(b) Low and high ecological protection areas and the toxicant criteria applying in these are defined;

(c) New proposals or changes to existing discharges are referred to the EPA;

(d) Limitations are set on contaminant loads from existing industry participants and new participants;

(e) Limitations are set on nutrient load discharge according to previous commitments made by the Water Corporation; and

(f) Sediment quality around the outlet is protected.

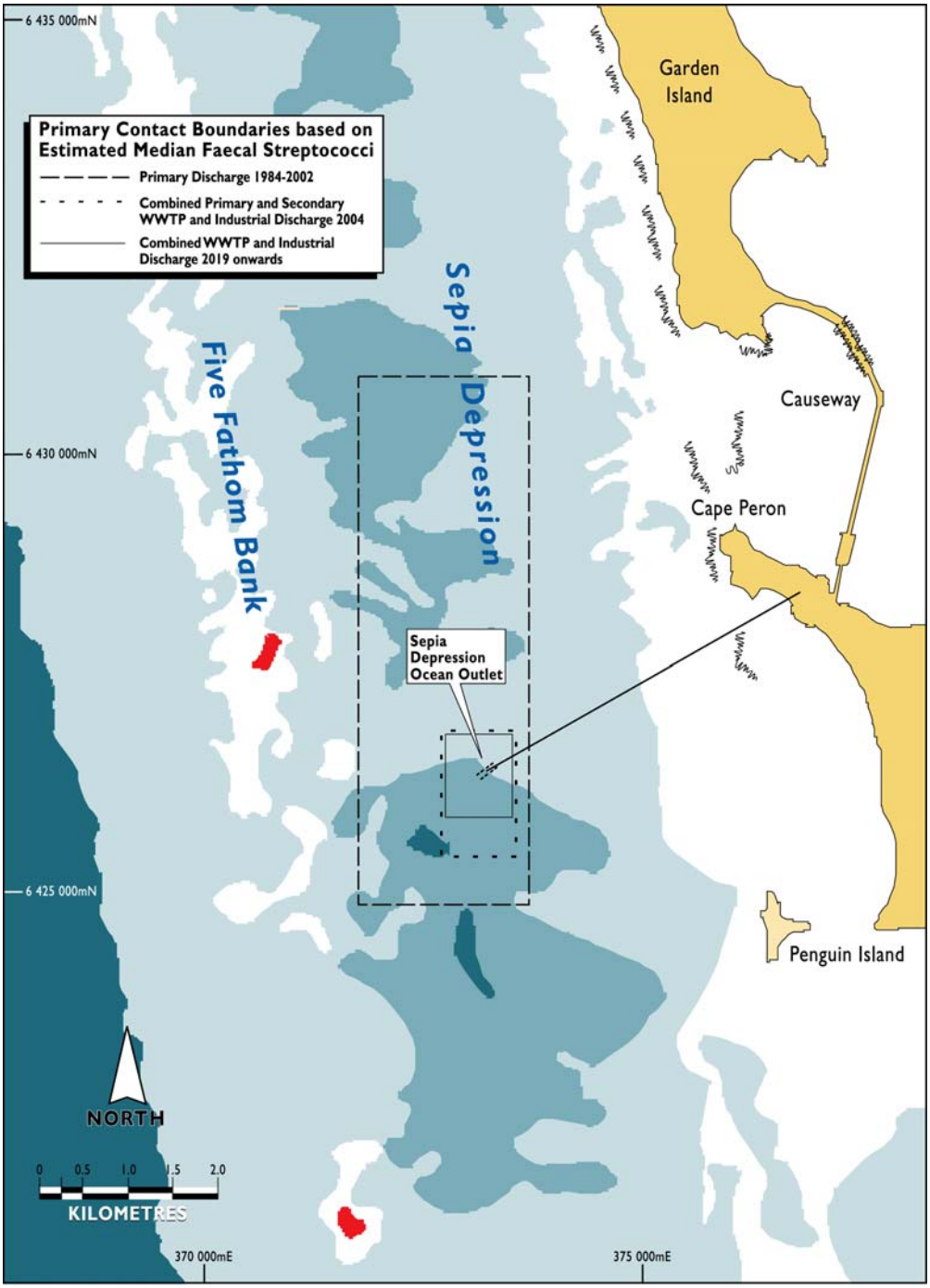
3.2 Marine environment: social values

Description

Industrial wastewater discharges have the potential to impact the suitability of surrounding waters for primary recreation and seafood harvesting and the aesthetics of the area. Toxicants may make areas unsuitable for primary recreation as the toxicants may have a health impact if water is swallowed or may cause skin irritation. There is the potential for seafood to bio-accumulate toxicants and be tainted by substances such as hydrocarbons and phenol. The aesthetic appearance of the marine water may be impacted by loss of clarity due to suspended solids in the discharge or by a surface oil sheen.

Currently the area in which primary recreation is not advisable is defined by the bacterial content of the treated wastewater discharged from the wastewater treatment plants. Industrial wastewater discharge will not add to this area as it will not contain measurable levels of bacteria. In the future when the Cape Peron wastewater treatment plant is upgraded or closed the area unsuitable for primary recreation will be smaller (Figure 3). Areas outside of the 100 m low ecological zone due to industrial discharges will meet primary contact criteria. This zone is smaller than the future bacterial exclusion zone and therefore the discharge of industrial wastewater will not have additional social effect to that of the sewage wastewater.

Similarly, the area unsuitable for seafood harvesting is determined by the bacterial content of the treated wastewater from the wastewater treatment plants, and is unlikely to change due to the additional industrial wastewater discharge. The proponent will carry out monitoring with sentinel mussels to determine areas suitable for seafood harvesting.



Source: Water Corporation

Figure 3: Notional boundaries where contact recreation is not recommended near the Sepia Depression Ocean Outlet, 1984 to 2019 (adapted from Figure 5, EPA 2000)

As the concentration of hydrocarbons discharged is expected to be low and dilution and dispersion in the Sepia Depression will be high, the proponent does not anticipate a surface sheen from hydrocarbons. No sheen is visible currently in Cockburn Sound due to discharges from BP (Kwinana) and CSBP. The suspended solid concentration will be limited to 42 mg/L in the worst case and should not be visible.

Submissions

The Department of Health requested that the proponent outline the actions being taken to inform the public of the unsuitability of areas for primary recreational contact and shellfish harvesting due to discharges from the Sepia Depression Ocean Outlet (SDOO).

The City of Rockingham was concerned for the image of the City as an aquatic playground, beaches and health impacts and requested monitoring of sediment, biota and mussels.

Assessment

The area considered for assessment of this factor is the marine environment impacted by the discharge of wastewater.

The EPA's environmental objective for this factor is to protect the social environmental values of recreation, fishing and aquaculture and aesthetics for marine waters. Currently the long-term social environmental quality objectives proposed for Perth Coastal Waters (EPA 2000) are not met in the vicinity of the SDOO. It is the EPA's objective that the area affected by bacterial discharge from the SDOO is reduced in the future to meet the objectives described in the position statement (EPA 2000).

The EPA notes that the addition of industrial wastewater discharge to the Sepia Depression will not affect the areas which are already deemed unsuitable for primary recreation and seafood harvesting due to the bacterial content of sewage wastewater discharge. This is likely to be the case even after the reduction of the area affected by bacteria due to the upgrade of the Cape Peron wastewater treatment plant. The discharge of industrial wastewater therefore will not prevent the attainment of the EPA's objective in future.

Summary

Having particular regard to the:

(a) Proponent's commitment to further refine the environmental quality criteria values and boundaries for the social objectives of maintenance of seafood for human consumption and recreational and aesthetic values in agreement with the Department of Environment, Department of Health and the Department of Conservation and Land Management;

(b) Proponent's commitment to notify the Department of Planning and Infrastructure , from time to time, of the spatial extent of the area in proximity to the Sepia Depression Ocean Outlet where primary contact recreation and taking of seafood is not recommended, with a request for inclusion on relevant Maritime Charts;

(c) Proponent's intention to monitor seafood quality with sentinel mussels; and

(d) Expectation that the area unsuitable for seafood harvesting or contact recreation will not be increased by industrial wastewater discharge from that affected by wastewater discharge from wastewater treatment plants now or in the future,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

4. Conditions and Commitments

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal and, following discussion with the proponent, the EPA may seek additional commitments. The commitments, modified if necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject, if it is to be implemented.

4.1 Proponent's commitments

The proponent's commitments as set in the PER and subsequently modified, as shown in Appendix 5, should be made enforceable. These address:

(a) the dilution of the wastewater discharged to be obtained at 100 m from the diffuser;

(b) conditions for the acceptance of wastewater;

(c) management of the discharge of treated wastewater to the Sepia Depression to meet agreed environmental quality criteria;

(d) monitoring of environmental impacts of the discharge;

(e) investigating and addressing toxicant concentrations that exceed trigger environmental quality guidelines;

(f) undertaking whole-of-effluent testing;

(g) refining values and boundaries for social environmental quality objectives;

(h) notifying the Department of Infrastructure and Planning of areas where primary contact recreation and seafood harvesting is not advisable for inclusion on Maritime Charts;

(i) preparing and implementing a monitoring and management plan for receiving and discharging wastewater from all sources; and

(j) community engagement.

4.2 Recommended conditions

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by the Water Corporation to discharge up to 30 ML/day of industrial wastewater, in addition to treated wastewater from Woodman Point and Cape Peron wastewater treatment plants and water from the Jervoise Bay Groundwater Recovery Scheme, to the Sepia Depression via the Cape Peron outlet is implemented.

These conditions are presented in Appendix 5. Matters addressed in the conditions include the following:

(a) that the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 5;

(b) standard conditions for proponent nomination, time limits of approval, compliance audit and performance review, and decommissioning plans;

(c) Preparation of a Monitoring and Management Plan for the Sepia Depression Ocean Outlet;

(d) the spatial extent of low and high ecological protection zones and toxicant criteria;

(e) the procedure for new or changes to industrial wastewater discharge;

(f) limitations on the annual toxicant loads from participating industries;

(g) limitations on nutrient loads; and

(h) protection of sediment quality.

It should be noted that other regulatory mechanisms relevant to the proposal are:

- licensing of industry discharges to the SDOOL under Part V of the *Environmental Protection Act 1986*.

5. Other Advice

The EPA recommends that, for industries discharging to the SDOOL, Part V licences should be standardized to include concentration and load limits on all contaminants of concern in the marine environment to facilitate monitoring of wastewater discharge to the Sepia Depression. However, not withstanding this recommendation, the Water Corporation as proponent for the proposal is responsible for ensuring that environmental harm does not occur and that the EQS are not breached due to the combined discharges.

While this proposal does not allow for an existing industry to increase the load of contaminants that it currently discharges, the EPA expects that industries will strive for continuous improvement and will endeavour to reduce their load of contaminants discharged to the environment. The EPA also expects that Part V licences under the *Environmental Protection Act 1986* will reflect the need for continuous improvement and waste minimisation.

Any proposal to accept industrial effluent from industries other than those nominated in this proposal or to change the character and contaminant load of effluent from the nominated industries must be referred to the EPA. The SDOOL is not subject to a licence under Part V of the *Environmental Protection Act 1986* and therefore new or changes to industrial effluent discharge cannot be regulated by that process.

New industries will be expected to apply best practice and waste minimisation principles to waste discharge. The amount of industrial wastewater that may be accepted is 30 ML/day, which is five times the amount from those industries considered in this assessment. The load limit for toxicants has been set at three and one half times the typical 2004 load. This figure does not imply that industries seeking to discharge to the Sepia Depression do not need to minimise their discharge to the greatest extent possible. The load limit has been set to encourage an overall reduction in waste discharge from existing and/or new industries and because concentration criteria do not address levels of accumulation of toxicants in the environment.

The EPA considers that the governance model in the PER is not an issue for consideration by the EPA, but needs to be resolved by processes coming under Part V of the *Environmental Protection Act 1986*.

6 Conclusions

The EPA has considered the proposal by the Water Corporation to discharge up to 30 ML per day of industrial wastewater to the Sepia Depression via the Cape Peron outlet.

The EPA notes that due to the cumulative discharge of industrial and treated wastewater from wastewater treatment plants, the proposal will result in a low ecological protection zone for toxicants within a 100 metre radius of the diffuser and outside of this, a zone of high ecological protection. The proposal allows for the addition of further sources of industrial wastewater besides that from industries considered in this assessment, provided proposals for further industrial discharges are referred to the EPA. Industries currently operating will not be permitted to increase their load of toxicants discharged from current levels and any change to the load or character of their discharge will need to be referred to the EPA. Annual loads from future industry sources must not exceed three and one half times the annual typical 2004 levels. The maximum volume of industrial wastewater discharge in future will be up to five times the 2004 volume and therefore a three and one half times limit is a less than proportional increase in load. The load limit has been set to encourage an overall reduction in waste discharge from existing and/or new industries and because concentration criteria do not address levels of accumulation of toxicants in the environment. The cumulative nitrogen load from industrial and treated wastewater from wastewater treatment plants is limited to 1994 levels, in accordance with previous commitments made by the proponent. The discharge of industrial wastewater will not increase the area where primary recreation and seafood harvesting are not recommended due to the existing discharge of treated wastewater from wastewater treatment plants. No aesthetic impact is anticipated from the discharge of industrial wastewater.

With regard to primary recreation and seafood harvesting the EPA has set long-term objectives, after extensive community consultation (EPA 2000), which will result in these unsuitable areas being reduced over time. Discharge of industrial wastewater will not prevent the EPA's long-term objectives being attained.

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 5, and summarized in Section 4.

7 Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for the discharge by the Water Corporation of up to 30 megalitres per day of industrial wastewater, in addition to treated wastewater from wastewater treatment plants and water from the Jervoise Bay Groundwater Recovery Scheme, to the Sepia Depression via the Cape Peron outlet;
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 5, and summarised in Section 4, including the proponent's commitments.
4. That the Minister imposes the conditions and procedures recommended in Appendix 5 of this report.

Abbreviations

ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
CSMC	Cockburn Sound Management Council
DoE	Department of Environment
EPA	Environmental Protection Authority
EQC	environmental quality criteria
EQG	environmental quality guidelines
EQS	environmental quality standards
KWRP	Kwinana Wastewater Reclamation Plant
m	metres
ML/day	megalitres per day
PER	Public Environmental Review
PLOOM	Perth Long-term Ocean Outlet Monitoring
SDOO	Sepia Depression Ocean Outlet
SDOOL	Sepia Depression Ocean Outlet Landline

Appendix 1

List of submitters

Organisations:

Department of Health
City of Rockingham
Cockburn Sound Management Council
BP
CSBP Limited
Tiwest Joint Venture

Appendix 2

References

ANZECC & ARMCANZ 2000 *Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)*

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State Water Quality Management Strategy No 6 *Implementation Framework for Western Australia for the Australian and New Zealand Guidelines for Fresh and Marine Water Quality and Water Quality Monitoring and Reporting (Guidelines Nos 4 & 7: National Water Quality Management Strategy*)

Appendix 3

Summary of identification of relevant environmental factors

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
BIOPHYSICAL			
Marine ecology	Discharge of toxicants and nutrients contained in industrial wastewater	Cockburn Sound Management Council: proposal will improve Cockburn Sound environment. City of Rockingham: concern about accumulation of new chemicals discharged, comparisons to previously 'unsuitable' levels of nutrients, assessment of future industrial wastewater discharge proposals, reduced waste discharge controls, monitoring of discharges, identification of trigger limits, higher concentrations of contaminants and monitoring of marine environment. CSBP: support for proposal BP: support for proposal, correction to Table 6-3, proposed concentration limit and necessity for load limits	Marine environment considered to be a relevant environmental factor
SOCIAL SURROUNDINGS			
Contact recreation	Discharge of toxicants contained in industrial wastewater	Dept of Health: proponent should outline actions being taken to inform the public of the unsuitability for primary recreational contact within the boundaries of the diffuser City of Rockingham: concern for image of City as aquatic playground, beaches and health impacts	Contact recreation considered to be a relevant environmental factor
Harvesting of seafood	Discharge of toxicants contained in industrial wastewater	Dept of Health: proponent should outline actions being taken to inform the public of the unsuitability for shellfish harvesting within the boundaries of the diffuser City of Rockingham: monitoring of sediment, biota and mussels required	Seafood harvesting considered to be a relevant environmental factor
Visual amenity	Discharge of wastewater		Relevant factor but no impact anticipated
OTHER			
Industry contingency plans		Cockburn Sound Management Council: PER lacks details relating to contingency arrangements of industries regarding likely discharge into Cockburn Sound City of Rockingham: need contingency plans for accidental spills from industry	Third party arrangements, not under the control of proponent
Stakeholders		City of Rockingham: City should be acknowledged as a stakeholder	Relevant but not an environmental factor

Alternative use of wastewater		City of Rockingham re-use of wastewater for irrigation should be considered	Not part of this proposal
Noise	Noise from recycling plant	City of Rockingham: concern about noise from recycling plant	Not included in this proposal
Amendment of licences/new users		CSBP: need for procedure to allow amendment of licences City of Rockingham: procedure for additional discharges and controls on cumulative loads	Relevant aspect of proposal, to be addressed in assessment (procedures outlined in section 3.1)
Governance model		CSBP: central in ensuring effluent management system operates effectively BP: does not object to change in licensing approach	Not an environmental factor. Governance model to be addressed under Part V processes
Tiwest		Tiwest: expressed concern at the description of its wastewater as unsafe to dispose of via the SDOOL	Not included in this proposal
ANZECC criteria	Environmental criteria less than background levels	Cockburn Sound Management Council: expressed concern that target criteria were less than marine background levels	This has been addressed by the results of new research and the use of the 95% species protection criterion for Cobalt

Appendix 4

Amended background quality figures for coastal marine waters of Perth, Western Australia

Best-estimates of natural background metal concentrations recommended for marine waters of the Perth metropolitan area (except Cockburn Sound)
Based on sampling data

Metal	**Perth marine waters** (estimated natural background) **(mg/L)**
Arsenic	0.0018
Cadmium	0.0000045
Chromium	0.0002
Cobalt	0.000013
Copper	0.000085
Lead	0.000019
Mercury	0.0000004
Silver	0.00000026
Zinc	0.000502
Phenols	0

Best-estimates of natural background metal concentrations recommended for marine waters of the Perth metropolitan area (except Cockburn Sound)
Based on literature values

Metal	**Perth marine waters** (estimated natural background) **(mg/L)**
Nickel	0.004
Vanadium	0.0025

Appendix 5

Recommended Environmental Conditions and Proponent's Consolidated Commitments

Statement No.

RECOMMENDED CONDITIONS AND PROCEDURES

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

USE OF THE CAPE PERON OUTLET PIPELINE TO DISPOSE OF INDUSTRIAL WASTEWATER TO SEPIA DEPRESSION, KWINANA

Proposal: To dispose of up to 30 megalitres per day of industrial effluent in addition to treated wastewater from the Water Corporation's wastewater treatment plants and water from the Jervoise Bay Groundwater Recovery Scheme, up to a combined maximum of 208 megalitres per day through the Sepia Depression Ocean Outlet Landline, into the Sepia Depression, 4.1 km offshore west south west of Point Peron, as documented in Schedule 1 of this Statement.

Proponent: Water Corporation

Proponent Address: 629 Newcastle Street, LEEDERVILLE, WA 6007

Assessment Number: 1471

Report of the Environmental Protection Authority: Bulletin 1135

The proposal referred to above may be implemented by the proponent subject to the following conditions and procedures:

1 Implementation

1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.

2 Proponent Commitments

2-1 The proponent shall implement the environmental management commitments documented in schedule 2 of this statement.

3 Proponent Nomination and Contact Details

3-1 The proponent for the time being nominated by the Minister for the Environment under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal until such time as the

Minister for the Environment has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.

3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.

3-3 The nominated proponent shall notify the Department of Environmental Protection of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

4-1 The proponent shall substantially commence the proposal within five years of the date of this statement or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment will determine any dispute as to whether the proposal has been substantially commenced.

4-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for the Environment, prior to the expiration of the five-year period referred to in condition 4-1.

The application shall demonstrate that:

1. the environmental factors of the proposal have not changed significantly;

2. new, significant, environmental issues have not arisen; and

3. all relevant government authorities have been consulted.

Note: The Minister for the Environment may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

5 Compliance Audit and Performance Review

5-1 The proponent shall prepare an audit program and submit compliance reports to the Department of Environmental Protection which address:

1. the status of implementation of the proposal as defined in schedule 1 of this statement;

2. evidence of compliance with the conditions and commitments; and

3. the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environmental Protection is empowered to audit the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this statement.

5-2 The proponent shall submit a performance review report every five years after the start of operations, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority, which addresses:

1. the major environmental issues associated with the project; the targets for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those targets;

2. the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable;

3. significant improvements gained in environmental management, including the use of external peer reviews;

4. stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and

5. the proposed environmental targets over the next five years, including improvements in technology and management processes.

5-3 The proponent may submit a report prepared by an auditor approved by the Department of Environmental Protection under the "Compliance Auditor Accreditation Scheme" to the Chief Executive Office of the Department of Environmental Protection on each condition/commitment of this statement which requires the preparation of a management plan, programme, strategy or system, stating that the requirements of each condition/commitment have been fulfilled within the timeframe stated within each condition/commitment.

6 Monitoring and Management of the Outlet

6-1 Prior to the acceptance of industrial effluent into the Sepia Depression Ocean Outlet Landline, the proponent shall prepare a Preliminary Sepia Depression Ocean Outlet Monitoring and Management Plan to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority and the Department of Conservation and Land Management.

The objective of this plan is to ensure that agreed ecological and social environmental values for marine waters in the vicinity of the Sepia Depression are maintained.

The plan shall include:

1 the monitoring and evaluation of the environmental effects of discharging treated wastewater into the Sepia Depression;
2 long-term environmental quality objectives and their spatial application consistent with the Environmental Protection Authority's objectives as described in the publication "Perth's Coastal Waters, Environmental Values and Objectives, 2000";
3 a programme to achieve long-term environmental quality objectives through short to medium term targets;
4 agreed "trigger" levels for further investigations (environmental quality guidelines);
5 agreed "trigger" levels for remedial and/or preventative actions to protect the water quality and the environment of the Sepia Depression (environmental quality standards); and
6 management actions to be taken in the event that environmental quality guidelines or environmental quality standards are exceeded.

6-2 Within twelve months from the acceptance of industrial effluent into the Sepia Depression Ocean Outlet Landline, the proponent shall prepare a Sepia Depression Ocean Outlet Monitoring and Management Plan to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority and the Department of Conservation and Land Management.

Note:
This Plan shall address the items 1-6 contained in condition 6-1 and any matters arising during the twelve months of operation and be subject to amendment from time to time.

6-3 The proponent shall implement the Monitoring and Management Plan, required by condition 6-2, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

6-4 The proponent shall make the Monitoring and Management Plan, required by condition 6-2 publicly available, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

7. Ecological Protection Zones and Toxicant Criteria

7-1 The proponent shall determine and report whether the ANZECC & ARMCANZ[1] 80% species protection guideline "trigger" levels (as published from time to time) for bio-accumulating toxicants are being achieved at the diffuser, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

7-2 In the event that a guideline "trigger" level is exceeded, the proponent shall report the matter to the Department of Environmental Protection within one working day of determining that the exceedance has occurred and initiate an investigation against the environmental quality standards and into the cause of the exceedance in accordance with the framework developed in Revised Environmental Quality Criteria Reference Document (Cockburn Sound)[2], to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

7-3 If an environmental quality standard is exceeded the proponent shall initiate a management response to determine the source and remedy the exceedance in accordance with the implementation framework for the National Water Quality Management Strategy[3], to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

7-4 The proponent shall determine and report whether the ANZECC & ARMCANZ 99% species protection guideline "trigger" levels (as published from time to time) for toxicants, with the exception of Cobalt, where the 95% guideline shall apply, are met within the Zone of High Ecological Protection (i.e. beyond a 100 metre radius of the diffuser), to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

7-5 In the event that a guideline "trigger" level is exceeded, the proponent shall report the matter to the Department of Environmental Protection within one working day of determining that the exceedance has occurred and initiate an investigation against the environmental quality standards and into the cause of the exceedance in accordance with the framework developed in Revised Environmental Quality Criteria Reference Document (Cockburn Sound)[2], to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

7-6 If an environmental quality standard is exceeded the proponent shall initiate a management response to determine the source and remedy the exceedance in accordance with the implementation framework for the National Water Quality Management Strategy[3], to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

Note:

1 ANZECC & ARMCANZ guidelines are published in *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.*

2 *Revised Environmental Quality Criteria Reference Document (Cockburn Sound), A supporting document to the draft Environmental Protection (Cockburn Sound) Policy 2002,* Environmental Protection Authority Report 20, November 2002.

3 *Implementation framework for Western Australia for the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Guidelines Nos 4 & 7: National Water Quality Management Strategy),* Report of the Environmental Protection Authority, Bulletin 1078, November 2002

8. New Discharges and Changes to Industrial Wastewater Discharge

8-1 The proponent shall not accept industrial effluent from industries not in Schedule 1 unless a proposal has been referred to the Environmental Protection Authority.

8-2 The proponent shall not accept industrial effluent that has increased in contaminant load or altered in character unless a proposal has been referred to the Environmental Protection Authority.

9. Toxicant Loads

9-1 The proponent shall only accept industrial effluent for conveyance and discharge to the Sepia Depression which meets the toxicant load limits specified in relevant individual industry Environmental Protection Act Part V licences.

9-2 The proponent shall not accept unlicensed discharges to the Sepia Depression Ocean Outlet Landline for disposal to the Sepia Depression.

9-3 The proponent shall only accept and convey effluent from the industry participants to Sepia Depression where industrial toxicant loads to be discharged do not exceed those authorised for discharge to Cockburn Sound by the relevant individual industry Environmental Protection Act Part V licences.

9-3 For contaminants that are monitored but for which no loads are specified in the Environmental Protection Act Part V licences, the proponent shall not accept for discharge from an industry loads in excess of the annual load, averaged over the past three years, that has been discharged by the industry to Cockburn Sound.

9-4 For any proposed increases in loads from existing or additional industry participants, the proponent shall only accept and convey effluent from the industry participants such that the maximum annual cumulative toxicant loads discharged to the Sepia Depression do not exceed three and one half times the annual 2004 cumulative toxicant loads.

10 Nitrogen Loads

10-1 The proponent shall operate the Sepia Depression Ocean Outlet Landline to ensure that nitrogen loads to Sepia Depression do not exceed 1994 loads.

10-2 In the event that subsequent monitoring shows an adverse environmental impact at the 1994 load level, the proponent shall reduce the nitrogen load to 75% of 1994 load.

11 Sediment quality

11-1 The proponent shall monitor sediment quality within and at the boundary of the zone of low ecological protection and report whether sediments meet the ANZECC & ARMCANZ[1] Interim Sediment Quality Guidelines-low “trigger”

levels, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

11-2 In the event that a guideline "trigger" level is exceeded, the proponent shall report the matter to the Department of Environmental Protection within one working day of determining that the exceedance has occurred and initiate an investigation against the environmental quality standards and into the cause of the exceedance in accordance with the framework developed in Revised Environmental Quality Criteria Reference Document (Cockburn Sound)[2], to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

11-3 If an environmental quality standard is exceeded the proponent shall initiate a management response to determine the source and act to prevent further sediment quality degradation, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

Note:
1 ANZECC & ARMCANZ guidelines are published in *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.*
2 *Revised Environmental Quality Criteria Reference Document (Cockburn Sound), A supporting document to the draft Environmental Protection (Cockburn Sound) Policy 2002*, Environmental Protection Authority Report 20, November 2002.

12 Decommissioning Plans

12-1 The proponent shall prepare a Preliminary Decommissioning Plan within six months of the date of this Statement, which provides the framework to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The Preliminary Decommissioning Plan shall address:

1 conceptual plans for the removal or, if appropriate, retention of infrastructure; and

2 long-term management of systems affected by the discharge of waste.

12-2 At least 12 months prior to the anticipated date of decommissioning, or at a time agreed with the Environmental Protection Authority, the proponent shall prepare a Final Decommissioning Plan designed to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The Final Decommissioning Plan shall address:

1 conceptual plans for the removal or, if appropriate, retention of infrastructure; and

2 long-term management of systems affected by the discharge of waste.

12-3 The proponent shall implement the Final Decommissioning Plan required by condition 12-2 until such time as the Minister for the Environment determines, on advice of the Environmental Protection Authority, that the proponent's decommissioning responsibilities have been fulfilled.

Procedures

1 Where a condition states "to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority", the Environmental Protection Authority will provide that advice to the Department of Environmental Protection for the preparation of written notice to the proponent.

2 The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environmental Protection.

3 Where a condition lists advisory bodies, it is expected that the proponent will obtain the advice of those listed as part of its compliance reporting to the Department of Environmental Protection.

Notes

1 The Minister for the Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environmental Protection over the fulfilment of the requirements of the conditions.

Schedule 1

The Proposal (Assessment No. 1471)

The proposal is to discharge up to 30 megalitres per day (ML/day) of industrial wastewater, in addition to treated wastewater from Woodman Point and Cape Peron wastewater treatment plants and water from the Jervoise Bay Groundwater Recovery Scheme, to the Sepia Depression via the Cape Peron outlet line from the following specified sources and further unspecified sources:

- the Kwinana Wastewater Reclamation Plant (KWRP);
- BP Refinery (Kwinana);
- CSBP Limited; and
- Edison Mission Energy.

The proposal also takes into account the cumulative environmental impacts of replacing the Cape Peron wastewater treatment plant with a new East Rockingham wastewater treatment plant.

The Sepia Depression Ocean Outlet is situated 4.1 kilometres offshore west south west of Point Peron. (Figure 1). No construction or marine ecological disturbance of the existing pipeline or diffuser will take place. The proposal includes the instruments and controls, telemetry and shutdown systems between industries and the Kwinana Wastewater Reclamation Plant and Sepia Depression Ocean Outlet Landline as described in Section 2 of the Public Environmental Review, which are relevant to monitoring and controlling wastewater input to the Sepia Depression.

Industrial wastewater will only be accepted with the aim that the quality of the combined wastewater stream meets the ANZECC & ARMCANZ 80% species protection guidelines for toxicants at discharge and the ANZECC & ARMCANZ 99% species protection guidelines for toxicants (excepting cobalt where the 95% species protection guideline shall apply) 100 metres from the diffuser (Figure 2).

The proposal does not allow any of the specified industries to increase their discharge of current contaminant loads to the marine environment without prior referral to the Environmental Protection Authority. Predicted annual loads of toxicants for 2004 and maximum permissible toxicant loads are detailed in Table 2. Load limits will be reviewed if monitoring shows environmental impacts or exceedance of environmental quality standards.

The key characteristics of the proposal are set out in Table 1.

Table 1 – Key Proposal Characteristics

Parameter	Description		
Location	Sepia Depression Ocean Outlet; approximately 4.1 kilometres offshore west south west of Point Peron, Western Australia		
	Current (2003)	**Current plus initial KWRP (2004)**	**Possible expansion (2019)**
Industry Reclaimed Water Reuse	0	17 ML/day	up to 27 ML/day
Industry Wastewater Discharge to SDOOL Typical Maximum	 0 0	 6 ML/day 13 ML/day	 up to 30 ML/day
Combined Treated Wastewater Quantity and Quality			
Average Volume Typical***** Maximum******	 124 ML/day 124 ML/day	 113 ML/day 122 ML/day	 up to 200 ML/day up to 208 ML/day
Suspended Solids	34 mg/L	39 - 42 mg/L	35****** mg/L
Biochemical Oxygen Demand (BOD_5)	22 mg/L	24 - 32 mg/L	16****** mg/L
Total Nitrogen (TN)	18 mg/L	22 - 32 mg/L	22***** -27****** mg/L
Total Phosphorus (TP)	10 mg/L	11 - 12 mg/L	11***** - 12****** mg/L
Dilutions	~	Average dilution of the SDOOL wastewater stream will be at least 1:300 with the dilution being above 1:200 99% of the time within 100 metres of the Sepia Depression Ocean Outlet (SDOO) diffuser.	
Annual Toxicant Loads from Industrial Participants		Toxicant loads from industries nominated in this proposal, will not increase beyond that currently permitted to be discharged to Cockburn Sound, unless the proposal for a change to loads is referred to the EPA.	Annual cumulative toxicant loads to be within 3.5 times the 2004 loads, estimated from typical projected flows with typical toxicant concentrations. New proposals for discharges to Sepia Depression Ocean Outlet Landline to be referred to the EPA.
Toxicant Concentrations	as per PLOOM reporting, 1992 to 2002	Projected loads and flows will result in toxicant concentrations meeting the ANZECC & ARMCANZ 80% species protection guideline values for bio-accumulating toxicants at the diffuser.	
	as per PLOOM reporting, 1992 to 2002	Projected loads and flows will result in toxicant concentrations meeting the ANZECC & ARMCANZ 99% species protection guideline values (with the exception of Cobalt, where the 95% guideline shall apply) beyond 100 metres from the Sepia Depression Ocean Outlet diffuser.	
Nutrient Loads	Nutrient loads from the SDOO to Sepia Depression will be no greater than 1994 loads, and should subsequent monitoring show an adverse environmental impact at that level, it will be reduced to 75% of 1994 loads.		
Sediment	ANZECC & ARMCANZ Interim Sediment Quality Guideline-low levels to be used as trigger for management action and investigation for bio-accumulating substances within the zone of low ecological protection, and generally outside the zone of low ecological protection.		
Protection of Social Values			
Contact recreation	The area not meeting the guidelines for contact recreation due to domestic wastewater discharge will not increase because of the addition of industrial effluent.		
Aesthetic value	Visual amenity will not deteriorate because of the addition of industrial effluent.		
Seafood for Human Consumption	The industrial wastewater discharge will not increase area not meeting the guidelines for seafood harvesting due to domestic wastewater discharge.		

***** Typical means the expected average daily operating parameter.

****** Maximum means the expected infrequent highest (peak) operating condition reflecting "normal" operational variability.

Abbreviations:
KWRP Kwinana Water Reclamation Plant
ML/day Megalitres per day
mg/L milligrams per litre
SDOOL Sepia Depression Ocean Outlet Landline
PLOOM Perth Long-term Ocean Outlet Monitoring
ANZECC & ARMCANZ *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.*

Table 2 Annual industry toxicant loads

	Proposed Loads 2004 (Tonnes/year)	Future Maximum Permissible Loads (Tonnes/year)
Arsenic (III)	0.029	0.102
Cadmium	0.017	0.060
Chromium	0.034	0.119
Cobalt	0.027	0.095
Copper	0.179	0.627
Lead	0.026	0.091
Mercury	0.002	0.007
Molybdenum	0.337	1.18
Nickel	0.059	0.207
Selenium	0.006	0.021
Silver	0.007	0.025
Vanadium	0.078	0.273
Zinc	0.884	3.09
Cyanide (total)	0.333	1.17
Hydrocarbons	0.623	2.20
Phenols	0.026	0.091
Absorbable organic halogens	0.001	0.004

Figures (attached)

Figure 1 – *Location of the Sepia Depression Ocean Outlet*
Figure 2 –*Sepia Depression Ocean Outlet Toxicant Boundary*

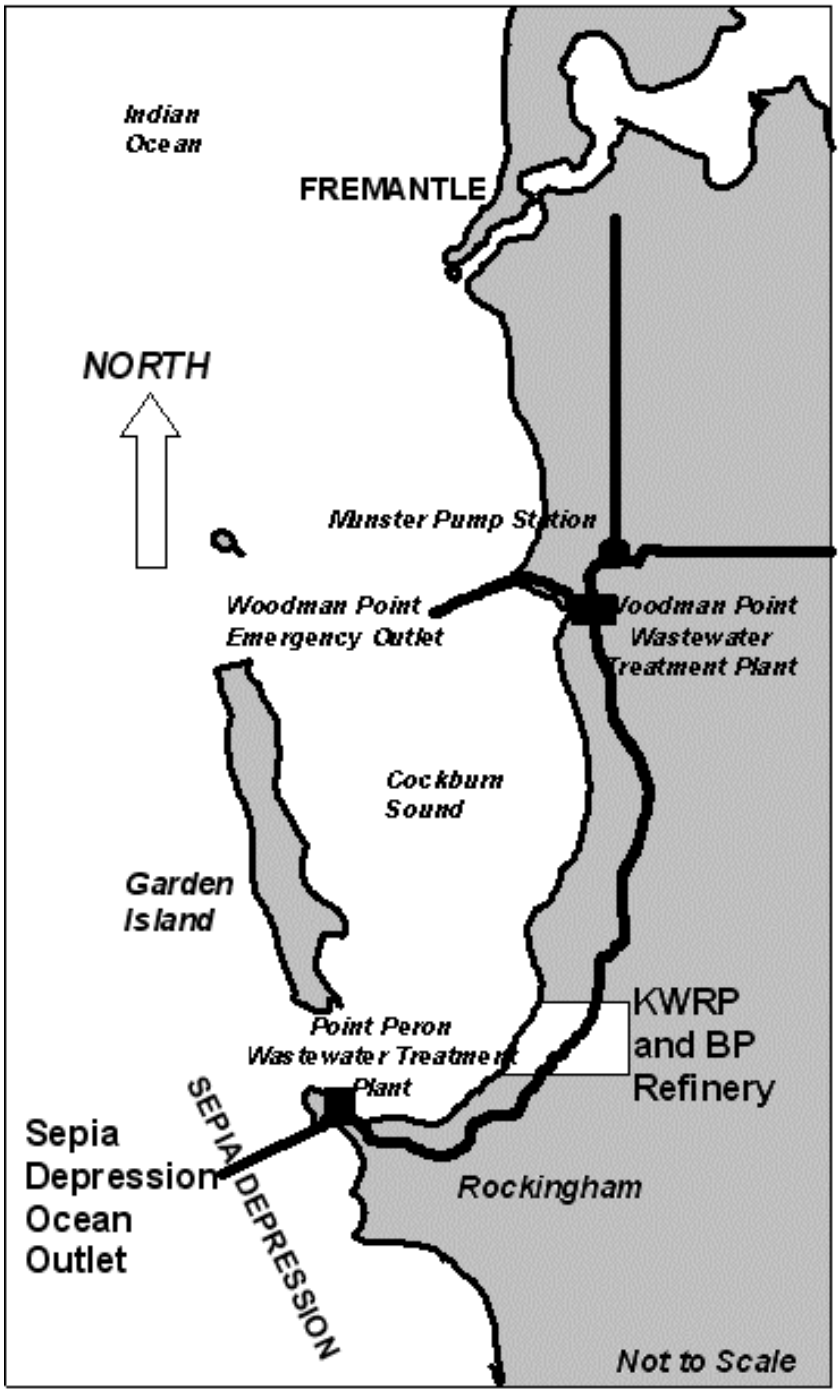

Figure 1 – Location of the Sepia Depression Ocean Outlet

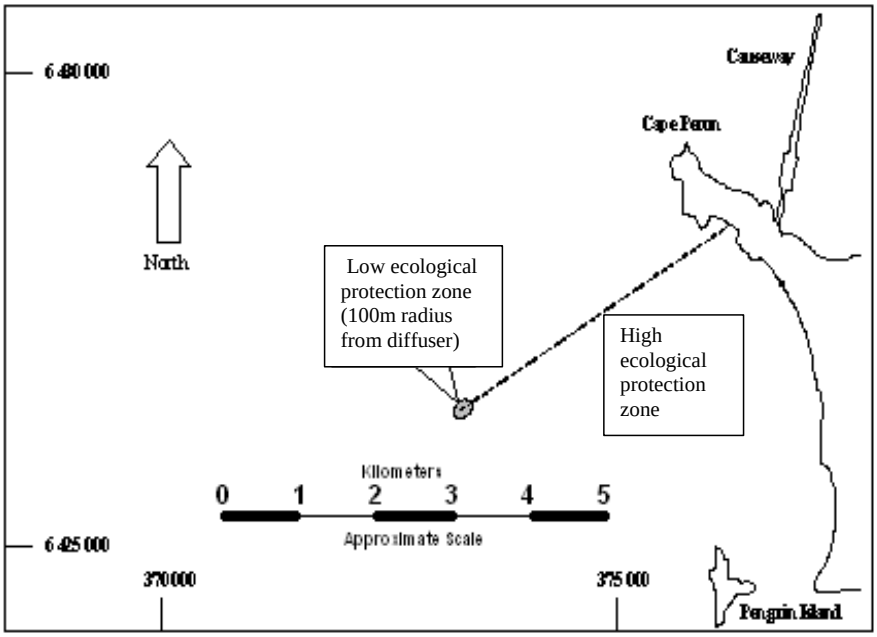

Figure 2 –Sepia Depression Ocean Outlet Toxicant Boundary

Schedule 2

Proponent's Environmental Management Commitments

28 April 2004

USE OF THE CAPE PERON OUTLET PIPELINE TO DISPOSE OF INDUSTRIAL WASTEWATER TO SEPIA DEPRESSION, KWINANA

(Assessment No. 1471)

Water Corporation

Proponent's Environmental Management Commitments 28 April 2004

USE OF THE CAPE PERON OUTLET PIPELINE TO DISPOSE OF INDUSTRIAL WASTEWATER TO SEPIA DEPRESSION, KWINANA **(Assessment No. 1471)**

Note: The term "commitment" as used in this schedule includes the entire row of the table and its six separate parts as follows:

- a commitment number;
- a commitment topic;
- the objective of the commitment;
- the 'action' to be undertaken by the proponent;
- the timing requirements of the commitment; and
- the body/agency to provide technical advice to the Department of Environmental Protection.

Commitment Number	Topic	Objective	Action	Timing	Advice
1.	Marine Environmental Values	To minimise impact on the marine environment	Attain an average dilution of the Sepia Depression Ocean Outlet Landline (SDOOL) wastewater stream of at least 1:300 with the dilution being above 1:200 at least 99% of the time within 100 metres of the Sepia Depression Ocean Outlet (SDOO) diffuser Dilution will be demonstrated by modelling and/or monitoring	During Operation	
2.			Accept only wastewater from industrial participants whose discharge is authorised by the relevant licence and/or Ministerial conditions issued to them, or as otherwise authorised in writing by the DoE from time to time. A Register of relevant industry's licences or Ministerial Statement numbers will be kept.	During Operation	
3.			Manage the discharge of treated wastewater to Sepia Depression, including that accepted from industrial participants and future expansion of the wastewater treatment	During Operation	

Commitment Number	Topic	Objective	Action	Timing	Advice
			system to ensure that the concentration of toxicants meets agreed EQC 100 metres from the diffuser. Compliance will be demonstrated by modelling and/or monitoring		
4.	Protection of Marine Flora and Fauna	To monitor for, and respond to potentially significant impacts to marine flora and fauna from discharges from SDOOL	Conduct specific investigations and annually report the effects of wastewater discharge to Sepia Depression through the Perth Long-term Ocean Outlet Monitoring programme or other agreements. Reporting will be through the Compliance Report.	During Operation	Marine Branch, Ecological Systems
5.			Conduct specific investigations in the event that toxicants in the treated wastewater exceed concentrations which will result in the EPA's relevant high protection EQG being exceeded following 1:200 initial dilution, with the relevant industrial participant/s and in consultation with the DoE to identify the source and cause of the identified condition. Report any exceedances in Compliance Report	During Operation	Industry Participants
6.			Undertake assessment of the risk presented to the ecological processes in Sepia Depression by the exceedance in Commitment 5, and undertake any measures necessary to mitigate those risks. Report any mitigation measures taken in the Compliance Report.	During operation	
7.	.	To demonstrate that the diluted effluent quality meets EQC's	Undertake Whole Effluent Toxicity (WET) testing using a method agreed with the DoE following the principles contained in the USEPA, APHA and ASTM protocols at a	During operation	Marine Branch, Ecological

Commitment Number	Topic	Objective	Action	Timing	Advice
			NATA accredited laboratory in accordance with the protocols set out in ANZECC/ARMCANZ 2000 and in accordance with Monitoring Program specified in the *Plan for Monitoring and Management of SDOO.* Report results in Compliance Report		Systems
8.	Public Health Values	To establish the relevant Social EQC's for discharge of treated wastewater to the Sepia Depression.	Participate in close consultation with the Department of Health, Department of Conservation and Land Management and DoE to further refine the notional social environmental quality objectives for the maintenance of seafood for human consumption and recreation and aesthetic EQC values and boundaries for treated wastewater discharge to the marine environment. It is proposed that sentinel mussels be deployed to monitor tissue coliform levels in accordance with Monitoring Program specified in the *Plan for Monitoring and Management of SDOO*. Report results in Compliance Report	During operation	Department of Health Department of Conservation and Land Management Marine Branch, Ecological Systems
9.		To delineate the area where primary contact recreation and the taking of seafood is not recommended	Notify the Department of Planning and Infrastructure of the spatial extent of the area in proximity to the Sepia Depression Ocean Outlet where primary contact recreation and taking of seafood is not recommended, with a request for inclusion on relevant Maritime Charts. Provide evidence of the notification.	Prior to industrial wastewater discharge and following any change to spatial extent of area	
. 10.	Environmental Management	To minimise environmental impacts from the implementation of the proposal, and to ensure that environmental approval requirements are met.	Prepare a monitoring and management plan to address the receipt and discharge of wastewater from the SDOOL, including: • The monitoring and evaluation of combined treated wastewater and industrial effluent into Sepia Depression. The monitoring will include as far as practicable;	Framework of the management plan agreed prior to industrial wastewater acceptance	Water Corporation, Industry Participants and Marine Branch, Ecological

Commitment Number	Topic	Objective	Action	Timing	Advice
			• Real-time monitoring of all streams of wastewater returned to the SDOOL and combined streams prior to discharge. Routine monitoring is to include flow-rate, pH, conductivity, turbidity and temperature; • Routine monitoring of prescribed contaminant levels in all streams of wastewater returned to the SDOOL and combined streams prior to discharge. Prescribed contaminants are those agreed from time to time under this Plan; • Procedures required to be implemented by the Water Corporation and KWRP participants if the wastewater contamination has the potential to cause the toxicant concentrations and loads specified in Table 1 of Schedule 1 to be exceeded; and • Mode of operation of the SDOOL to attain an average dilution of the combined wastewater stream of at least 1:300 with the dilution being above 1:200 at least 99% of the time within 100 metres of the diffuser. • Submit framework and plan to Audit Branch		Systems
11			Finalise the Plan referred to in commitment 10 Submit plan to Audit Branch	Plan finalised within 6 months of commencement of acceptance of Wastewater to SDOOL	Water Corporation, Industry Participants and Marine Branch, Ecological Systems
12.			Implement the Plan referred to in commitments 10 and 11 Report in Compliance Report.	During operation	
13	Community	To ensure that the public	Incorporate into the Water Corporation's Customer Service	During Operation	Water

Commitment Number	Topic	Objective	Action	Timing	Advice
	engagement	has open access to information regarding the environmental performance of SDOOL and KWRP, and an avenue to address any significant issues arising.	Program a community engagement plan to: • Promote awareness and understanding of the project; • Make reports on Kwinana Water Reclamation Plant environmental performance readily available to the public and advertise their availability; • Make the results of the Perth Long-term Ocean Outlet Monitoring programme readily available to the public and advertise their availability; and • Maintain a complaints/response record of actions taken to address matters arising from the project in accordance with the Water Corporation's Corporate Environmental Management System. Report monitoring results, complaints and responses in the Compliance Report.		Corporation

Abbreviations

ANZECC/ARMCANZ 2000: *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000.*

APHA :American Public Health Association

ASTM : The American Society for Testing and Materials

DoE : Department of Environment

EPA: Environmental Protection Authority

EQC: Environmental Quality Criteria

EQG : Environmental Quality Guidelines

EQO :Environmental Quality Objectives

KWRP : Kwinana Water Reclamation Plant

NATA : National Association of Testing Authorities

SDOO :Sepia Depression Ocean Outlet

SDOOL :Sepia Depression Ocean Outlet Landline

USEPA : United States Environmental Protection Agency

Appendix 6

Summary of Submissions and
Proponent's Response to Submissions

Summary of Submissions and Water Corporation Responses

1. TiWest's wastewater

Although TiWest's wastewater can be safely discharged to Cockburn Sound, could Water Corporation please explain why it is "unsafe" to dispose of it via the SDOOL?

Preliminary assessments by consultants engaged by the Water Corporation indicate that the current composition of the discharge water from Tiwest's operation at Kwinana has the potential for corrosion or scaling of the concrete and steel infrastructure which comprises the Sepia Depression Ocean Outlet Landline (SDOOL) and for reducing down stream reuse options because of higher salt levels. As such, in its current chemical composition, the Tiwest ocean discharge is 'unsuitable' to the Water Corporation for discharge through this facility.

Tiwest Joint venture and the Water Corporation are currently involved in discussions to determine the criteria for the Tiwest discharge to possibly be disposed through this facility.

2. Accumulation of (new) chemicals discharged

Additional chemicals from anti-scalants and backwash chemicals (from the KWRP) and industrial wastewater will be disposed of through the outfall. Whilst the report indicates that these levels will be low, the cumulative effect of these chemicals in the marine environment surrounding the Sepia Depression is not known (and there does not appear to be any environmental quality criteria for these chemicals). Of particular concern is the proposed discharge of chloramine, which will be used to control biological growth in the KWRP process. A concern is that the chloramine (even in small quantities) could effect biological growth of the marine life including micro-organisms. An intensive monitoring regime is requested (more than what is proposed), particularly as these chemicals have not been previously discharged into the marine environment (via the Cape Peron outlet), particularly if industrial wastewater is to be discharged through the SDOOL. *Could the Water Corporation please respond to this concern?*

The Water Corporation is committed to the monitoring of biological and ecological impacts through its PLOOM (Perth Long-term Ocean Outlet Monitoring) programme which has been operating for over 7 years. As part of the PLOOM program, sentinel organisms such as blue mussels will be suspended within the mixing plume from the diffusers. The tissues of these animals will be analysed for metals and trace organic substances, and any atypical responses investigated further. Chloramine levels will be very low (below limits of detection) in the waters of the Sepia Depression. Further, chloramine does not accumulate in natural waters, but breaks down to its non-toxic components relatively quickly. In addition, the Water Corporation is committed to a whole-of-effluent testing (WET) programme which involves subjecting 5 different species of marine animals to exposure studies using the actual effluent including the 'new' chemicals. Any adverse acute effects associated with these chemicals will be identified during such tests.

3. Comparisons to previously 'unsuitable' levels of nutrients

It is considered inappropriate to compare the proposed nutrient discharge concentrations with previous concentrations when wastewater from Woodman Point was only primary treated. There is some evidence that the previous level of nutrients disposed though the Sepia Depression may have been of concern eg the Coastal Waters Study 1991-1994 identified significant increases in nutrient concentrations and phytoplankton abundance from the outfall at Sepia Depression and noted that proposals to further increase nutrient loads to these waters from this source should be treated with "extreme caution". Therefore, comparisons of wastewater disposal should only be compared with the current loads and concentrations of contaminants and should not use historic levels as a benchmark for comparisons particularly as the 'business as usual' approach may have had potentially harmful consequences if no action was taken to remedy the situation. In addition, many community, government and industrial groups have continually undertaken projects and best practice methods to improve discharges and contaminants entering waterways in an effort to improve the quality of water in our marine environment. Whilst it is unlikely that the waters will ever return to pristine conditions, these efforts to improve water quality should be considered in raising the benchmarks for future users of the marine environment and levels should not be allowed to drop to the previous conditions when quality concerns were raised. Could the Water Corporation please respond to this comment?

The Water Corporation provided previous nutrient loads to provide a historical background. No deliberate attempt was made to use these as benchmarks.

As stated in the Executive Summary of the PER, the Water Corporation is fundamentally committed to continual improvement within the framework of its Triple Bottom Line (social, economic and environmental) approach to providing a service to society. As such, the Water Corporation does not seek to return to the former nutrient loads discharged to the Sepia Depression.

4. Individual PERs for future industries proposing to use the SDOOL

The 1982 Environmental Review and Management Programme for the Cape Peron Ocean Outlet stated that the planning and design for the outlet was based on the assumption that no major industrial effluents will be included. The report also stated that the Premier (Sir Charles Court), in response to public concern over the possible inclusion of industrial effluents publicly stated that "no effluents from Kwinana industries would be considered for the scheme without a separate and complete environmental review". This therefore raises two questions 1) Is the planning and design for the outlet sufficient to withstand the proposed industrial effluents? and, 2) Will separate PERs be prepared for each future industry that wishes to use the Cape Peron Outlet to dispose wastewater into the Sepia Depression (other than those mentioned in the current PER)?

As outlined in the PER, an important component of the Governance Model is protecting the Sepia Depression Ocean Outlet (SDOO) and the environment in the Sepia Depression. Based upon the Water Corporation's waste acceptance criteria, industrial effluent will not be accepted if it has the potential to harm the SDOO, or cause adverse environmental effects in Sepia Depression.

A level of formal review and approval of key relevant factors by the EPA is anticipated as a requirement for any future industry partners beyond those specifically named in this PER.

5. Reduced controls in a less sensitive environment

There is a concern that the lesser environmentally sensitive nature of the ocean waters over the Sound waters will ultimately result in less stringent controls over the quality of the wastewater, particularly when considering future industries who wish to discharge to the Sepia Depression. It is understood that existing industries will be maintaining their current discharge limits, however, other existing or future industries proposing to use the SDOOL should be required to meet strict wastewater criteria before approvals are given. In addition to this, the cumulative effects of wastewater discharges must also be considered in any future approvals for industrial discharges to the Sepia Depression. Could the Water Corporation please respond to this concern?

The Water Corporation recognises the importance of this matter and the governance model in the PER will actually result in more stringent monitoring and management than presently exists. Hence in the Governance Model as outlined in the PER, the Water Corporation will be bound to meet concentration criteria in and around the initial mixing zone (i.e. zone of initial dilution). In addition, the Water Corporation will only accept effluent from industry partners that have loads specified within DoE licences that may be discharged into Sepia Depression. For current industries this represents a no increase in load compared with their current discharges to Cockburn Sound. For future industries the loads specified within their licences should be set to ensure that the effects in Sepia Depression are acceptable. The setting of licence conditions is the responsibility of the Department of the Environment.

6. Monitoring to include wastewater with the cleaning chemicals

The PER report (page 5) states that the industrial wastewater will undergo 3^{+} fold variations in Total Dissolved Solid concentrations. Monitoring should therefore be undertaken during times of high concentrations to ensure that maximum readings are recorded and compared to the criteria limits. Table 8.1 states that monitoring will be undertaken but does not prescribe a specific regime. How often is monitoring proposed and will it be enough to pick up the variations in chemical discharges from the industries as well as the spikes in chemical concentrations from the KWRP such as from the Reverse Osmosis washings? The PER should

include an estimate of the concentration of contaminants in KWRP wastewater with and without the cleaning wastes.

The Water Corporation will be conducting continuous real-time monitoring of turbidity, flow rate, conductivity (Total Dissolved Solids), temperature and pH at the locations specified in Figure 6-1 of the PER including on the individual industry and KWRP effluents prior to entry to SDOOL (Sepia Depression Ocean Outlet Landline). This will enable close identification of the spikes, if any, in the substances that are specifically monitored. If such spikes occur further monitoring including additional parameters will be undertaken.

The quantities of cleaning chemicals to be used are specified in Table 2-1. After use they will be neutralised in a neutralisation pit as specified on Page 15 of the PER. As such, the concentrations of active constituents that are discharged are not likely to be measurable following initial dilution. For this reason, discharge concentrations with and without cleaning agents were not specified in the PER.

7. Operational limits

The number of limits and scenarios as presented on pages 62 and 63 appear to be a little ambiguous. There does not appear to be a discernable difference in the consequences between Scenarios 1 and 2 (ie 'Below Notification Limit' and 'Above Notification Limit but below Review Limit'). Therefore, the Notification Limit is likely to be ineffective in creating any concerns or compliance responses from industries (as any action only appears to be required at the 'Above Review Limit'). Scenarios 3 and 4 (ie. 'Above Review Limit and poses no significant risk', and 'Above Review Limit and poses a significant risk') are similar to each other in that the Water Corporation will determine if inputs (above the Review Limit) to the SDOOL are acceptable, and Scenarios 5-7 ('Above the Review Limit and Above Regulatory Upper Concentration Limits', 'Discharging to Cockburn Sound and Above the Cockburn Sound Regulatory Concentration Limits' and 'Discharging to Cockburn Sound or the SDOOL and Above the Regulatory Load Limits') are similar to Scenarios 3 and 4 although the decision to keep discharging to the SDOOL is made by the Department of Environment (DoE).

Scenario one represents satisfactory operations with no responses required. Scenario two (between the notification limit but below the review limit) triggers the need for the waste producer and the Water Corporation to confer to consider likely trends and causes, and to jointly formulate mitigating strategies as considered necessary. This forces a proactive approach to controlling discharges before exceeding the review limit.

Scenarios three and four are similar and were included to demonstrate the increasing level of intervention that would be applied as discharge concentrations increase above the review limit.

Scenarios five, six and seven present different cases above the Part V licence limits of the individual industry partners where a decision to keep discharging to the SDOOL is made by the Department of Environment (DoE). It should be noted that in these instances, the Water Corporation does not have the statutory power to authorise alternative emergency discharges for these participants.

Whilst the need for having limits is not questioned, the management approach taken to accept industrial discharge should be based on the description as stated on page 63. ie. "yes", "yes if…", "no, unless…" and "no". In all the scenarios presented there does not appear to be an outright "no" if the upper limit has been breached or cannot be achieved. This management response is considered to be too loose in its application and tighter controls should be used to ensure that industries meet the standard criteria (and do not exceed their licence limits).

The Water Corporation does not have the statutory power to enforce the absolute "no" - this rests with the Department of Environment (DoE) as the Part V licence regulator for individual industry participants. Thus it is imperative that the load and concentration licence limits for individual industry participants are applied and enforced by the DoE. It is important to emphasise that industrial discharges to Cockburn Sound have been controlled by existing licences, and that monitoring shows that harm is not being caused and that ambient metal levels in the Cockburn Sound seawater are very low. Sepia Depression is much better flushed than Cockburn Sound and is even less likely to suffer harm than Cockburn Sound.

The management response presented in the Cockburn Sound Environment Management Plan, prepared by the Cockburn Sound Management Council (CSMC) is considered a preferable process than the one stated in the Use of Cape Peron Outlet to Dispose of Industrial Wastewater PER. This is particularly with respect to the use of simplified terminology of the limits and a reduced number of limits. For example, "Notification, Review and Upper" limits are relatively difficult to interpret whereas 'guidelines' and 'standards' as used by the CSMC more obviously indicate a difference in the management response required (ie. 'Guideline' being a lower limit for investigation and 'Standard' being an upper limit for action). If a third limit is preferable it should be an upper limit which indicates "No further discharge allowed" rather than the upper limit in the PER which can still allow discharge, pending the decision from the DoE. Could the Water Corporation please respond to this comment?

The Governance Model presented in the PER serves multiple purposes (protection of the environment; protection of assets; protection of reuse options) as outlined on page 57 of the PER. The CSMC model does not adequately address the multiple needs of the KWRP project.

8. Higher concentrations of contamination

Whilst it is anticipated that there will be reduced nutrient loads from the outfall (from existing operations), the concentrations of the nutrients and heavy metals

will be higher. Therefore, the dilution effect will be reduced and the chance of environmental harm could actually be greater than with higher nutrient loads. Again, an intensive monitoring regime to determine the effects of the increased concentration rates should be undertaken, particularly during the first year or two of commissioning the KWRP, particularly if industrial wastewater is to be discharged through the SDOOL. Could the Water Corporation please comment on this?

The concentrations presented in Tables 4-2, 4-3 and 4-4 in the PER fully take into account any reduced dilution effects. In turn, these concentrations must meet concentration criteria in and around the initial mixing zone (i.e. zone of initial dilution).

As a percentage change, the commissioning of KWRP and the introduction of industry waste will not result in a significant step increase in concentrations. For this reason, is anticipated that the PLOOM (Perth Long Term Ocean Outlet Monitoring) programme will enable the identification of adverse effects in sufficient time to implement any required mitigation. In addition, the Water Corporation is committed to a whole-of-effluent testing (WET) programme which involves subjecting 5 marine animal species to exposure studies using the actual effluent including the 'new' chemicals. Any adverse effects associated with these chemicals will be identified during such tests.

The Water Corporation is confident that the commissioning of KWRP and the introduction of industry waste will not result in adverse effects warranting additional monitoring beyond that it has already committed to. This is because prior to the upgrading of the Woodman Point treatment Plant in 2002, considerably higher concentrations occurred in Sepia Depression without any unacceptable environmental impacts.

9. <u>Proposed contingency plans and monitoring for the individual industries</u>

The PER (for this and future industries proposing to dispose wastewater via the Cape Peron Outlet) should clarify in more detail what and how often each industry proposes to monitor the wastewater as well as the individual contingency plans for accidental spills. The PER describes the proposed action of the Water Corporation in terms of monitoring and shut-downs, however, it is assumed that any potential contamination of the wastewater will most likely be from industrial sources (as domestic wastewater doesn't alter in character much). Therefore, it is the monitoring and contingency plans of the contributing industries that are more crucial. This is considered to be a critical issue.

Continuously during operation, the Water Corporation and industry will collectively conduct <u>real-time</u> monitoring of turbidity, flow rate, conductivity (Total Dissolved Solids), temperature and pH at the locations specified in Figure 6-1 of the PER including on the individual industry and KWRP effluents prior to

entry to SDOOL (Sepia Depression Ocean Outlet Landline). If a spike or atypical behaviour is identified beyond the review limits as identified in the Governance model in the PER, then more detailed monitoring (i.e. more parameters) and investigation of the discharge will be triggered. Further, the Governance Model relies upon Part V licences for individual industries and it is envisaged that these licences will require contaminant specific data to be routinely collected and/or calculated and be available for review in the event of an atypical discharge.

In addition, the PLOOM programme will continue to monitor the environment in Sepia Depression. In the event of a major contingency a special investigation will be initiated to evaluate the effects of abnormal discharges on Sepia Depression.

In addition, individual companies are required to monitor and report accidental spills as required by their Department of Environment (DoE) licences and the *Environmental Protection Act 1986*. Similarly, contingency plans are a matter for the individual industry and the DoE as the Water Corporation has no authority to direct the operations and procedures of third parties in such circumstances.

The Water Corporation is satisfied that the three-tiered approach reflected in the Governance Model (Chapter 6 of the PER) provides sufficient monitoring of the discharge to enable timely management and/or regulatory intervention.

10. Increased monitoring of sediments, biota and mussels for heavy metals

The PER states (pg 29) that the most recent survey of contaminants in sediments, natural biota and deployed mussels around the SDOOL was in summer of 1997/98. This suggests that it has been six years since contaminant concentrations in sediments and biota have been monitored. Despite the records of previous monitoring, this lack of testing is not satisfactory considering nearby areas are used regularly for recreational fishing. Any proposed monitoring regimes should improve on this previous timeframe, particularly if the SDOOL will be taking industrial wastewater. Even the actions recommended in Table 8.1 state that mussels will only be deployed every 3 years. This does not seem regular enough considering the uncertainty of the effects of the additional chemicals that will be entering the Sepia Depression from the KWRP and industrial wastewater.

In addition, the South Metropolitan Coastal Waters Study 1991-1994 found the concentration of cadmium and zinc in mussels at sites up to 4km from the outfall exceeded the values indicative of contamination. The study further stated that these findings indicate that proposals to increase heavy metal loads from the Cape Peron outfall should be treated with caution. This highlights the need for a more regular monitoring regime to be carried out and that alternative arrangements for the industrial wastewater should be employed should the heavy metal loads exceed the specified criteria.

The PLOOM (Perth Long-term Ocean Outlet Monitoring) programme monitoring results and reports have been submitted regularly to the DoE since 1996. There has not been any response to the monitoring procedures in response to these submissions nor any specific concerns raised in relation to the data contained therein. However, the Water Corporation is committed to having a relevant and scientifically robust monitoring programme and welcomes any comments which can be used to improve the programme.

The Water Corporation notes that the Whole-of-effluent testing (WET) ensures that any toxicological effects on biota are within acceptable limits. Deployment of sentinel mussels on a three year basis is simply a separate check of the WET testing results.

The South Metropolitan Coastal Waters Study cited above was conducted prior to the upgrading of the Woodman Point Wastewater Sewage Treatment Plant and, as such, much higher metal loads were discharged at that time. The elevated results reported in the South Metropolitan Coastal Waters Study for cadmium and zinc in mussels only occurred once and were shown to the satisfaction of the Department of Environmental Protection to be erroneous and as a result of laboratory analytical error. These data are not reliable indictors for the current and future scenarios as described in the PER.

11. Increased monitoring for nutrients

Further to the heavy metal investigations as mentioned in point (8) above, the Coastal Waters Study 1991-1994 also stated that:-

"nutrient inputs from the Cape Peron wastewater outfall into Sepia Depression are causing significant increases in nutrient concentrations and phytoplankton abundance up to about 5km from the outfall. The long-term ecological implications of these changes are unknown but the very presence and extent of the changes indicate that proposals to further increase nutrient loads to these waters from this source should be treated with extreme caution".

The current PER estimates that nutrient and heavy metal concentrations from the outfall will be well under the EPA quality criteria limits. Given the above statements from the mid 1990's expressing concerns over levels of nutrient and heavy metal concentrations, there is concern that the additional industrial wastewater proposed to be discharged through the SDOOL is likely to contribute significant levels of nutrients when the KWRP is operating at full capacity in the future. It is understood that the introduction of the secondary treatment of wastewater through the Woodman Point Plant has commenced since this study and that existing industries proposing to use the pipeline are likely to satisfy EPA criteria for disposal of wastewater through the Cape Peron Outlet, however the EPA and the Water Corporation must undertake a strict evaluation of other

existing or future industries that may wish to dispose wastewater through the SDOOL, particularly if future industries using the Cape Peron Outlet will not be required to prepare formal public environmental reviews. Could the Water Corporation please respond to this?

Even though the effects of nutrient enrichment from wastewater discharges were detectable up to 5km from the SDOO, no environmental harm was caused, and the phytoplankton populations immediately declined in response to the lower nutrient loads resulting from the Woodman Point Wastewater Treatment Plant upgrade. However, the Water Corporation recognises that nutrient loads are an issue of general concern in coastal marine ecosystems and, as such, the Water Corporation agrees that the environmental effects of nutrient discharges should be monitored - hence its commitment to the ongoing PLOOM (Perth Long-term Ocean Outlet Monitoring) programme. This programme includes periphyton collectors which accurately measure the extent of nutrient enrichment in three dimensions. This and other monitoring will provide sufficient warning of ecological changes to enable management and investigation actions to be implemented.

The requirement for a level of formal review and approval of key relevant factors by the EPA is anticipated for any future industry partners beyond those specifically named in the PER.

12. Noise

Will noise impact from this proposal be an issue that needs to be addressed? Industrial noise from the Kwinana Industrial Strip has been and is a most significant environmental issue, in particular, the impact on residents in North Rockingham. No mention of noise impact including cumulative noise from the KWRP has been estimated in the PER.

As determined by the EPA, the PER focuses on impacts to the environment from discharges to the Sepia Depression. For this reason, noise from the KWRP plant is not a key relevant factor and is not discussed in detail in the PER. However, the Water Corporation has required its construction contractors to demonstrate compliance with Environmental Protection (Noise) Regulations and Occupational Health, Safety and Welfare provisions. Modelling conducted by an independent acoustic consultant, Herring Storer Acoustics, has demonstrated that the noise emissions from KWRP plant will not exceed 65 dBA at the boundary of the plant. The predicted noise levels at the most critical residences is up to 14 dBA at Hope Valley and 18 dBA at Medina. The assigned noise levels at Hope Valley and Medina are 45 dBA and 35 dBA respectively during the nighttime. As other industries contribute to exceedences at these locations the proposed KWRP site is considered to be in compliance with the noise regulations. From an occupational health and safety point of view, noise levels will not exceed 85 dBA at 1 m from operating machinery within the plant.

13. Stakeholders to include City of Rockingham

Rockingham identifies itself as an 'Aquatic Playground' given its abundant Marina Park areas, surf beaches and calm Cockburn Sound waters. Any proposal with the potential to have negative impacts on these important elements of Rockingham is of most concern.

The City of Rockingham, because it is downstream from Industry discharge into the pipeline and its proximity to the discharge point at the Sepia Depression, is at particular risk of any harm resulting from the proposal.

The Water Corporation supports the high values that the City of Rockingham places upon its beaches and Cockburn Sound. The benefits to the City of Rockingham from the removal of industrial discharges from Cockburn Sound far outweigh any effects due to discharge from Sepia Depression, particularly as the City of Rockingham is not "downstream" of the Sepia depression discharge point which is more than 4 km offshore in a strongly north-south flushed environment. Historically, monitoring conducted by the Department of Health and the Water Corporation have demonstrated that discharges into Sepia Depression do not affect the recreational amenity of City of Rockingham's coastal assets. Overall, the Water Corporation considers that the proposal provides a significant benefit to the City of Rockingham.

The City considers itself a relevant stakeholder in the proposal and requests being noted in the Management Model described in pg 57 of the PER.

The Water Corporation agrees that the City of Rockingham is an important stakeholder and, for this reason, in December 2003 wrote to Rockingham CEO Gary Holland offering the City of Rockingham a briefing on the Kwinana Water Reclamation Plant advising that the Public Environmental Review process was under way for the project. The Corporation did not receive a response and assumed the City of Rockingham had sufficient background information on the proposal and that there were no major issues to address.

The stakeholders, as listed on page 57 of the PER (i.e. Department of Environment, the Water Corporation and participating industries), are either the regulator or are being regulated. The City of Rockingham does not fall in either category and is not a stakeholder in that sense.

However, the Water Corporation agrees that the City of Rockingham should be a continuing stakeholder in so far as the conduct of an annual review of operations and assessment of performance of the SDOOL as per Section 6.5 on page 68 of the PER. Further, the Water Corporation is happy to involve the City of Rockingham in briefings and review processes in relation to discharges from the Sepia Depression ocean outlet at any time in the future.

14. <u>Alternative reuse of wastewater – irrigating grassed areas</u>
The management framework section of the report identifies an objective to:

"protect potential downstream reuse options in the Rockingham area. Reuse would primarily be irrigation of open grassed areas".

Subject to appropriate and full environmental assessments, this option appears to have merit. This would support the ethos of reusing wastewater, reduce discharge to the ocean and would also benefit the City as the groundwater in the beachfront area is experiencing salt water encroachment from Cockburn Sound, following an increase in uptake of groundwater from new developments in the area. Re-using the wastewater for irrigating these park areas will reduce Council's reliance on groundwater or scheme water, will reduce the need to relocate existing bores, will reduce the contaminant loads entering Sepia Depression and, as mentioned will further support the wastewater reuse options recommended in the Cape Peron Outlet Pipe EPA Report (1982). Could the Water Corporation please comment on the re-use option?

The KWRP Project is the only major wastewater recycling project in the metropolitan area that is in an advanced stage of development. To follow on from this, the Water Corporation has developed a general strategy for developing and implementing additional projects to meet the State Government's target of 20% recycling of treated wastewater by 2012 (here 'recycling' refers to wastewater reuse, recycling and reclamation).

There are a number of options to achieve the 20% target, and these can be described under four scheme categories:

- Category 1 – Industrial (mostly located in Kwinana)
- Category 2 – Green Space – irrigation of public parks, golf courses and possibly domestic back gardens
- Category 3 – Agricultural - irrigation of agricultural areas
- Category 4 – Indirect Potable - use of recycled water to augment scheme water supplies.

However, for practical purposes, the 20% target will be achieved principally through industrial application in Kwinana where water recycling schemes are commercially viable. Following this, Category 2 options will be pursued and the Water Corporation will explore the opportunities available to it in the region, including in the City of Rockingham.

15. <u>Endocrine disruptors</u>

ES viii - Present Level of Environmental Impact – identifies pathogens, toxicants and nutrients as main categories. No statement has been given about the presence of endocrine disruptors in the combined effluent stream and their potential environmental impacts. Could the Water Corporation please comment?.

There are many chemicals present in trace amounts in sewage which are suspected of disrupting normal hormonal processes. These substances include herbicides, pesticides, pthalates, polyaromatic hydrocarbons, PCBs, pharmaceuticals and a number of other substances. It is important to note that:

- Synthetic environmental endocrine disrupting compounds tend to be weakly active.
- Human dietary exposure to synthetic environmental endocrine disrupting compounds are several thousandfold less than for normal intakes of naturally occurring estrogenic compounds found in typical foods (Earth Report 2000).
- The sewage treatment process substantially reduces the level of endocrine disrupting chemicals.
- Dilution, degradation and sorption processes substantially reduce estrogenic effects (Birkett & Lester 2003).

Given the high level of treatment of sewage and the high level of dilution in the ocean, it is not considered likely that any observable estrogenic effects will occur. Further, whole-of-effluent testing (WET) will include sea urchin fertilisation and doughboy scallop larval abnormality tests. In addition, sentinel mussels deployed within the diffusing plume of wastewater will be examined for developmental and reproductive abnormalities. Any endocrine disruptor effects should become apparent during these tests.

Earth Report 2000, R. Bailey ed,, McGraw-Hill New York.
Birkett J W & J N Lester 2003, Endocrine Disruptors in Wastewater and Sludge Treatment Processes, Lewis Publishers, New York.

16. Chromium

For chromium, there are two guidelines, one for Chromium 3 and one for Chromium 6. There are no data provided in the PER to show what species of chromium is likely to be present in the combined effluent stream. Could the Water Corporation please advise on the likely contribution of each chromium species (ie 3 and 6) to the total chromium concentration in the effluent stream?

Measurements on municipal wastewaters indicate that Cr VI forms less than 1% of the total chromium load (Moore & Ramamoorthy, 1984 p. 63). For this reason, the Water Corporation measures total chromium in sewage and does not differentiate between the species (i.e. Cr III and Cr VI). The industry partners proposing to discharge to the Sepia Depression also only measure total chromium - as required by their existing licences for discharges to Cockburn Sound. For this reason, the relative contribution of the different species in the industrial wastewater is unknown at this time.

The Water Corporation notes that for oceanic waters, Cr VI forms around one-quarter to one-half of total chromium (Moore & Ramamoorthy 1984 p. 63;

Sander, Koschinsky & Halbach 2003). This suggests that the background value for total chromium of 0.15 μg/L recorded for Perth marine waters can be conservatively assumed to be around 0.07 μg/L Cr VI. As such, the discharge into the Sepia Depression will meet the ANZECC 99%ile criteria.

The Water Corporation will cooperate with the DoE to increase understanding of Chromium levels and speciation in Perth Marine Waters.

The Water Corporation has advised that the chromium concentrations in treated wastewater from the Woodman Point and Cape Peron treatment plants can be revised downwards to 3 and 17 μg/L respectively (the values of 9.1 and 20 μg/L used in the PER document were overly conservative as they included a number of low resolution measurements).

Moore J. W. & S. Ramamoorthy, 1984, *Heavy Metals in Natural Waters, Applied Monitoring and Impact Assessment*, Springer-Verlag, New York.
Sander S., Koschinsky A. & P. Halbach 2003, Redox speciation of chromium in the oceanic water column of the Lesser Antilles and offshore Otago Peninsula, New Zealand, *Marine Freshwater Research*, 54(6),745-754.

17. Sediment testing

P29 – Table 3-3 – sediment contamination values are from 150 – 300 m from the outfall.
For metals, the sediment contamination levels are well below the sediment EQG. For organics in sediments the analytical levels of detection are not sufficient to determine whether the sediment EQG are met.
Sediment EQG should be tested within and at the edge of the low ecological protection zone, to better demonstrate that there is no toxicant accumulation in sediments about the outlet. The PLOOM monitoring program should be adjusted to this end. Could the Water Corporation please comment on this?

The PLOOM (Perth Long-term Ocean Outlet Monitoring) programme monitoring results and reports have been submitted regularly to the DoE since 1996. There has not been any criticism of the monitoring procedures in response to these submissions nor any specific concerns raised in relation to the data contained therein. However, the Water Corporation is committed to having a relevant and scientifically robust, peer reviewed monitoring programme and welcomes any comments which can be used to improve the programme. Accordingly, the Water Corporation would be pleased to discuss the justification for any amendments proposed to the PLOOM programme.

18. Nutrients

P 31, 32, 46 Nitrogen – Industry total nitrogen additions will be typically 200 to 500 kg/day. Primary treated TN inputs (pre 2000) were 5400 – 6500 kg/d. Total nitrogen flows from 2003 to 2019 (including the additional contributions from industry) will be 2300 – 3300 kg/d. That is, less than about 60 % of 1994 values.

The additional nitrogen load from industry associated with this proposal is not currently considered to be a significant environmental issue. However the potential for nutrient impacts of the outlet on the ecosystem should be kept under review in the context of the PLOOM program (see next comment (P32) re potential for nutrient effects on reef macroalgae). Could the Water Corporation please comment on this?

The Water Corporation agrees that the effects of nutrient discharged to Sepia Depression should be monitored. Hence its commitment to the ongoing PLOOM (Perth Long-term Ocean Outlet Monitoring) programme. This programme includes the monitoring of phytoplankton and periphyton collectors, and will provide sufficient warning of ecological changes to enable management and investigation actions to be implemented. (See also the response to Item 11).

19. Copper

Could the Water Corporation please provide information on what proportion of the copper in the effluent will be bio-available?

To be bioavailable and exert toxic effects, the amount of copper in the water must exceed the combined capability of;

- The organic material in wastewater to bind the copper;
- The amount of calcium in the water to out-compete the copper uptake by the organism;
- The water chemistry to transform the copper into other non-toxic inorganic forms;
- The particulate organic carbon to adsorb copper; and,
- The mineral particles to incorporate copper into their matrices.

What is left is the excess copper that is present in the water as the free cupric ion (Cu^{2+}). This is effectively the bioavailable copper.

Seawater measurements typically have free cupric ion being less than 1% of the total or dissolved copper (Seligman & Zirino 1998). Further, biologically treated wastewater effluents eliminate copper toxicity with significant additional complexing capability in reserve with the result that virtually no toxic copper will be present (www.hall-associates.com/Articles/Copper/copper.html). More specifically, it has been reported that copper is up to 26 times less toxic in water influenced by wastewater, suggesting that bioavailable copper only represents a few percent of the total copper.

Once discharged to the ocean, any remaining Cu^{2+} will be rapidly complexed by the high carbonate levels in seawater, by the dissolved organic matter, and diluted and transported away from the discharge zone. The PLOOM (Perth Long-term Ocean Outlet Monitoring) program has shown that local accumulation of Copper does not occur.

Seligman & Zirino 1998, Chemistry, Toxicity, and Biovailabilty of Copper and its Relationship to Regulation in the Marine Environment, Office of Naval Research Workshop Report, Technical Document 3044, San Diego.

20. Contaminant loads

Best practice waste discharge minimisation should be encouraged. Allowable loads should not be calculated from the EQG. In particular, using the 95 % species protection EQG alone (as suggested in the PER) would "allow" huge additional loads for some toxicants. Could the Water Corporation please comment on this?

The Water Corporation agrees that best practice waste discharge minimisation should be encouraged.

The use of a concentration based EQG to calculate loads was suggested in the PER as method of establishing an upper-bound load for consideration by the DoE when determining industry licence conditions. It is expected that the DoE will take into account this upper bound load along with relevant environmental factors when determining the permitted (licensed) loads.

21. Contingency plans

The PER lacks detailed information relating to the contingency arrangements of industries involved regarding likely discharge of wastewater to Cockburn Sound. Such information should include procedures for discharge back into Cockburn Sound (such as licensing and notification requirements), and include information on the likely frequency of discharge and length of time discharges are likely to occur. Could the Water Corporation respond please?

The Water Corporation as the proponent and operator of SDOOL cannot assume responsibility for the production of third party contingency plans. However, it will review these as they are prepared to ensure suitability for the protection of the Water Corporation's assets and protection of the marine environment in Sepia Depression. These plans are the statutory responsibilities of the individual industry participants.

Individual companies are required to monitor and report operating incidents by their Department of Environment (DoE) licences and the Environmental Protection Act. Such incidents are unpredictable by their very nature and the Water Corporation is not able to include information on the likely frequency of discharge or the length of time discharges are likely to occur.

The Water Corporation is confident that the three-tiered approach reflected in the governance model (Chapter 6 of the PER) provides sufficient monitoring of the discharge to enable timely management and/or regulatory intervention.

22. Discharge to Cockburn Sound

Industries who discharge into Cockburn Sound who are currently not involved in the KWRP project should be encouraged to participate in such projects, with the aim of further reducing the impacts of industrial wastewater discharge on the marine waters of Cockburn Sound. Could the Water Corporation comment please?

The Water Corporation agrees and strongly supports the reduction of inputs to Cockburn Sound where this can be accommodated in an environmentally and operationally acceptable manner as outlined in EPA Guidance Statement 55. It is for this reason that the Water Corporation upgraded the Woodman Point Wastewater Treatment Plant to exceed world's best practice in terms of its performance.

Questions already provided.

23. *Question: Will there be any bacterial contributions from industry - sewage?*

No. Industrial discharges do not contain measurable levels of bacteria and the human sewage from industrial premises will not be directed to SDOOL (the Kwinana industrial area uses septic tanks).

24. *P32 Is Buache Bay a genuine control for studies of nutrient effects on reef macroalgae ? - it is only 5 km along Garden Island, arguably within the influence of nutrients from the outlet.*

The definition and selection of "control" sites is always a vexed issue in monitoring studies. The deployment of periphyton collectors provided a direct three-dimensional measurement of the extent of enrichment effects of the SDOO (Sepia Depression Ocean Outlet) discharge, and is preferred by the Water Corporation to "natural" control sites, which are very complex to interpret.

The PLOOM (Perth Long-term Ocean Outlet Monitoring) programme monitoring results and reports have been submitted regularly to the DoE since 1996. There has not been any criticism of the monitoring procedures in response to these submissions nor any specific concerns raised in relation to the data contained therein. However, the Water Corporation is committed to having a relevant and scientifically robust monitoring programme and welcomes any comments which can be used to improve the programme. Accordingly, the Water Corporation would be pleased to discuss the justification for any proposed amendments to the PLOOM programme.

25. *P33 Periphyton - was there any attempt to look further than 1 km to the north for an effect*?

See the response to Item 24. Periphyton monitoring accurately defines the geographic limit of the encroachment response by macroalgae, so monitoring beyond 1km is considered unnecessary.

26. *P36 - What would be the worst case duration of each industry's worst case contaminant discharge conditions ? Will the contaminant loads and concentrations for these worst case incidents be quantifiably be resolved by the monitoring programs to be put in place? Response from Water Corporation requested.*

It is considered highly unlikely that all worst case discharge conditions as presented in the PER will occur simultaneously or at the levels projected. The worst case scenario was used to introduce extreme conservatism in the estimation of impacts. Worst case incidents are unpredictable by their very nature and the Water Corporation is not able to include information on the likely frequency of discharge and/or length of time discharges are likely to occur.

However, over time, the monitoring programme as described in or required under the Governance Model in the PER will provide statistical information on contaminant loads and concentrations for worst case incidents. For instance, if a spike or atypical behaviour is identified beyond the review limits as identified in the Governance model in the PER, then more detailed monitoring (i.e. more parameters) and investigation of the discharge will be triggered. Further, the Governance Model relies upon Part V licences for individual industries and it is envisaged that these licences will require contaminant specific data to be routinely collected and/or calculated and be available for review in the event of an atypical discharge.

27. *P42 Antiscalants - no discussion of which antiscalants and other water treatment chemicals are used by industry, WPWWTP and PPWWTP. The industry water treatment chemicals will be in addition to the KWRP water treatment chemicals, and are of relevance to this proposal. Response by Water Corporation requested.*

Antiscalants and other water treatment chemicals as used by industry are already incorporated in the data as presented in Tables 4-2, 4-3 and 4-4. In addition, the Water Corporation is committed to a whole-of-effluent testing (WET) programme which involves subjecting 5 marine animal species to exposure studies using the actual effluent including the 'new' chemicals. Any acute adverse effects associated with these chemicals including antiscalants will be identified during such tests.

28. *P46 What guarantee can be given about oil and grease - surface sheen - that it will not be inconsistent with Aesthetics EQOs ? Water Corp response required - do they expect a resultant sheen?*

Because of the low hydrocarbon loads and the high dilution and dispersion occurring in the Sepia Depression, the Water Corporation does not expect a surface sheen resulting from the discharge of oil and grease. There is currently no sheen visible from the Water Corporation discharge in Sepia Depression or from the BP or CSBP discharges into Cockburn Sound.

29. *P54 Figure 5-3 There are discrepancies between this diagram and Figure 5 in EPA (2000) which was supplied by Water Corporation.*
    - *intermediate box (to be realised in 2004) is much smaller than intermediate box (Fig 5). Can Water Corp confirm that it is currently getting this better than predicted bacterial performance*
    - *intermediate box has a southern bias rather than northern bias - is this realistic?*
    - *Inner box (2019) is larger than predicted in EPA (2000) - 1 km vs 600 m*
    - *There is no reference to the effect of the PPWWTP on these boxes*
    - *Given that the bacterial concentrations in the effluent will reduce to 7 % of current concentrations upon upgrade, I would have expected the intermediate and inner boxes to differ more in size than shown.*

Please explain discrepancy and clarify.

Figure 5-3 in the PER is based upon validated modelling of dispersion and die-off of faecal microbiological organisms as shown in Schedule 1 of the Best Practice Environmental Licence 4201 for the Woodman Point Wastewater Treatment Plant issued by the Department of Environmental Protection on 28 June 2001. As such this represents an update of Figure 5 in EPA 2000. Accordingly, the figure caption for Figure 5-3 of the PER is in error, and should read:

Notional boundaries where contact recreation is not recommended near the Sepia Depression Ocean Outlet, 1984 to 2019 (this is based upon validated modelling of dispersion and die-off of faecal microbiological organisms as shown in Schedule 1 of the Best Practice Environmental Licence 4201 for the Woodman Point Wastewater Treatment Plant issued by the Department of Environmental Protection on 28 June 2001 and as such represents a validated update of Figure 5 in EPA 2000).

It should be noted that the modelling results are consistent with data collected as part of the PLOOM (Perth Long-term Ocean Outlet Monitoring) program. Further, the boundaries are considered to be conservative, because they represent an area where contact recreation is not recommended.

The Water Corporation anticipates that the Point Peron Wastewater Treatment Plant will be decommissioned and replaced by a new Wastewater Treatment Plant (East Rockingham) before 2019. The exact timing will be determined by the Water Corporation based upon societal needs, efficiency and economics of the

system. Consistent with this, the 2019 boundary in Figure 5-3 of the PER is based upon the Point Peron Wastewater Treatment Plant being decommissioned and replaced by the East Rockingham Wastewater Treatment Plant (see also Tables 3-1 and 4-4 of the PER for additional details)

30. *P58 The approach outlined in p58 advocates ecosystem monitoring and "real time" monitoring of a set of indicator wastewater effluent variables (flow rates, conductivity, turbidity, temperature and pH)? It may be argued that more intensive (and adequate) monitoring of contaminants of concern is required in order to interpret the ecosystem modelling.*

- *Will all industry participants be required to monitor the indicator wastewater variables ?*
- *If these indicator variables are out of specification, will this occasion immediate implementation of intensive sampling of the out of specification effluent for detailed analysis for toxicants and other contaminants of concern?*

The Water Corporation would like to point out that the full Governance model contains details beyond those than presented in the PER.

The Water Corporation agrees that it is necessary to maintain an adequate level of monitoring of the effluent disposal system requiring:

1. Individual industries to monitor and report their contaminant loads with a frequency as specified in their individual licences;
2. Real-time monitoring for each indicator (flow rate, conductivity, turbidity temperature, and pH) at locations as specified in figure 6-1 of the PER *viz* on individual industry discharges prior to entry to SDOOL; and
3. Management, intervention and enforcement in accordance with figure 6-2 of the PER when the notification, review and upper limits are exceeded.

If a spike or atypical behaviour is identified beyond the review limits as identified in the Governance model in the PER, then more detailed monitoring (i.e. more parameters) and investigation of the discharge will be triggered. In addition, the PLOOM programme will continue to monitor the environment in Sepia Depression. In the event of a major contingency a special investigation will be initiated to evaluate the effects of abnormal discharges on Sepia Depression.

The monitoring described above will enable the Water Corporation to maintain shared contractual, operational and procedural obligations enabling it to demonstrate at any time that discharge to Sepia Depression has been managed in accordance with best practice principles. This will also enable "back tracking" of any out-of-specification discharges by any participants, to enable responsibility to be assigned to the non-conforming party and not simply to the Water Corporation as the owner of the conveyancing and disposal system. Timely intervention to mitigate any operational or environmental risk that may develop will be facilitated

by this approach, particularly as the Water Corporation has no authority to direct the operations and procedures of third parties in such circumstances.

In addition to the requirements of the Governance Model, individual companies are required to monitor and report accidental spills as required by their Department of Environment (DoE) licences and the *Environmental Protection Act 1986*. Contingency plans for individual industries are a matter for the individual industry and the DoE.

31. Management of Industry Discharge

Submission from CSBP.

CSBP strongly supports the proposal and notes:

- *the proposal will greatly reduce the disposal of industrial effluent streams into Cockburn Sound;*
- *effluent discharges to the Cape Peron pipeline will e regulated and licensed under Part V of the Environmental Protection Act 1986;*
- *the proposed Governance Model described in chapter 6 of the PER is central to ensuring the effluent management system operates effectively.*

The Water Corporation concurs that:

- There are benefits in effluent disposal to the open ocean, rather than a marine embayment such as Cockburn Sound.

- That proposed Governance Model is central for ensuring that the effluent measurement system operates effectively and forms a key part of the public accountability of the proposal.

- That EPA support of the Governance Model will help facilitate subsequent amendments to discharge licences and avoid difficulties in the future.

BP (Kwinana) submission

a) Table 6-3 outlines BPRK's proposed regulatory load limits. This table incorrectly states that this includes Edison Mission Energy (EME). EME currently discharges through BPRK property via the BPRK Salt Cooling Water System to Cockburn Sound.

The Water Corporation notes the data in Table 6-3 within the PER states that the loads for BP Refinery (Kwinana) include the loads for Edison Mission Energy in error. Table 6.3 was included in the PER to illustrate the use of load limits on Part V licence conditions as a means of assuring no increase in the loads discharged to the environment by the individual participants. This error should be corrected by deleting reference to EME within the heading within the table. The error does not

result in any material misrepresentation in the impact of discharges to Sepia Depression by the industry participants.

b) The Notification and Review Concentration Limits allow the Water Corporation to manage its asset (the pipeline) to ensure integrity and reliability. The Regulatory Concentration Limit for both Cockburn Sound and the Sepia Depression ensures that the environment will not be harmed and that protection of species will be sustained.

The Regulatory Load limits ensure that each participant must manage their wastewater streams to minimise impact on the environment, ensures that marine species are protected and is a powerful tool in managing the participants to best available environmental performance.

The benefit of using load limits is that it directs policing of the breach of a regulatory load limit to carry enforcement action appropriate to poor environmental performance, while the breaching of a regulatory concentration limit indicates that the participant has breached a limit that protects key species and as such appropriate enforcement action can be taken.

The Water Corporation gratefully acknowledges the contribution of BP Refinery (Kwinana) in the formulation of the governance model, and in particular the use of load limits as a means of regulatory control of emissions to the environment. The regulatory load limit, as envisaged in the governance model, should remain finite regardless of the entry point to the environment (Cockburn Sound or Sepia Depression). This concept is central to the good environmental management of discharges to Sepia Depression, in that it rules out the possibility of industry participants potentially misusing the higher concentration limits to increase loads. It also simplifies licensing and measurement of environmental performance. The Water Corporation believes that load limits are central to protecting the marine environment in Sepia Depression, and protecting the public good.

c) We would like to confirm that the PER currently proposes that each individual participant maintains its own environmental licence for discharge to a pipeline. BPRK does not object to this shift in policy that a waste producer may be licenced for discharging to a third party pipeline as opposed to discharging to the environment, provided that this is applied equally in the future.

The Water Corporation notes that BP Refinery (Kwinana) has confirmed that it has no objection to the shift in licensing policy proposed within the governance model. This is consistent with the Water Corporations view that the three categories of control (*viz.* regulatory, asset protection and reuse options) proposed within the governance model cannot be considered independently of one another if acceptable environmental outcomes in Sepia Depression are to be achieved.

32. <u>Recreational contact and shellfish harvesting</u>

Submission from the Department of Health.

Could the proponent outline what actions are being taken to inform the public of the areas unsuitability for primary recreational contact and shellfish harvesting due to the diffuser located in the Sepia Depression?

The Water Corporation will advise the Department of Planning and Infrastructure of the unsuitability for primary recreational contact and shellfish harvesting within the boundaries of the diffuser in the Sepia Depression so that Marine Charts can be amended consistent with figure 5-3 on page 54 of the PER and Schedule 1 of the current Woodman Point Wastewater Treatment Plant best practice licence.