NEWGEN POWER STATION KWINANA

FINAL DIFFUSER LOCATION AND DESIGN MANAGEMENT PLAN (FDLADMP)

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1. Element/issue

Cooling water outflows from the NewGen Power Kwinana Gas-fired Power Station will be warmer than background and have potential to adversely affect environmental values in Cockburn Sound and the health, welfare and amenity of people and marine uses.

This Final Diffuser Location and Design Environmental Management Plan (FDLAD) discusses the results of modelling to predict the performance of the outfall system measured against the relevant Cockburn Sound Environmental Quality Criteria (EQCs) and likely effects on adjacent intake / outfall systems.

Other information on environmental management for Cockburn Sound by NewGen Power can be found in documents such as the Marine Environment Temperature Elevation Management Plan, the Marine Works Construction Environmental Management Plan and the marine management section of the Environmental Protection Statement for the Project.

2. Current Status

2.1 Project Description

NewGen Power are to construct and operate a 320 MW natural gas-fired power station on a site in the Kwinana Industrial Area adjacent to other power stations owned and operated by Verve Energy. The site is located on the eastern shores of Cockburn Sound and also immediately adjacent to Water Corporation's recently constructed Perth Seawater Desalination Plant. Figure 1 provides an overview of the location.

Figure 1 Site location for NewGen Power Station in the Kwinana Industrial Area

The NewGen Power Kwinana Gas-Fired Power Station will supply base load power using combined cycle gas turbine (CCGT) technology with supplementary gas firing of the heat recovery steam generator (HRSG). The power station will utilise approximately 158 gigalitres of seawater per year (flow rate of 5m^3/sec) to cool and condense the superheated steam that drives the steam turbine.

Seawater used for condenser cooling has no direct contact with process fluids or wastes. A chlorine system is used to control marine growth (mussel) in the inlet structures, pumping equipment, condensers and the outfall structures. The level of chlorine is managed to a limit of 0.5ppm at the outlet. The seawater increases in temperature as it exchanges heat with the steam in the pipes around the condenser and is then piped offshore and passed through a diffuser located on the seabed to achieve rapid dilution with ambient seawater.

2.2 Existing conditions and users

Average water temperature in Cockburn Sound varies from about 16˚C in winter to 24˚C in summer (Oceanica 2005). Surface temperatures generally have more variation than bottom temperatures.

A recent report found surface temperatures of the shallows of the eastern shelf near the diffuser location were around 1˚C warmer in summer than central basin sites. Water temperatures rose between 1˚C and 3 ˚C from 13 December 2005 through to 15 February 2006 with a maximum temperature of 24˚C. Bottom temperatures rose from around 20˚C to 23˚C during that time (Oceanica 2006).

The area immediately offshore from the NewGen Power Station site is currently used by Verve Energy for power station cooling water and also by Water Corporation's Perth Seawater Desalination Plant. Verve Energy currently utilises two outlet canals for returning cooling water to Cockburn Sound and these can be seen in Figure 1 and in part in Figure 2 (top right).

NewGen Power Station will utilise the existing Verve Energy intake which have sufficient inflow capacity. Modifications to the existing pumping basin and associated structures will enable cooling water to be piped from these facilities to the adjacent NewGen Power site.

The outflow diffusers are shown in Figure 2. The location for Cockburn 2 is based on the approval information as this project has been approved but has not yet been built.

Also shown in Figure 2, as a white line, is part of the boundary of the Low Environmental Protection Area (LEPA) designated in the *State Environmental (Cockburn Sound) Policy* 2005 (SEP) (Government of Western Australia 2005). The SEP designates three areas of environmental protection in Cockburn Sound – high, medium and low. These are shown in Figure 3.

2.3 Previous modelling

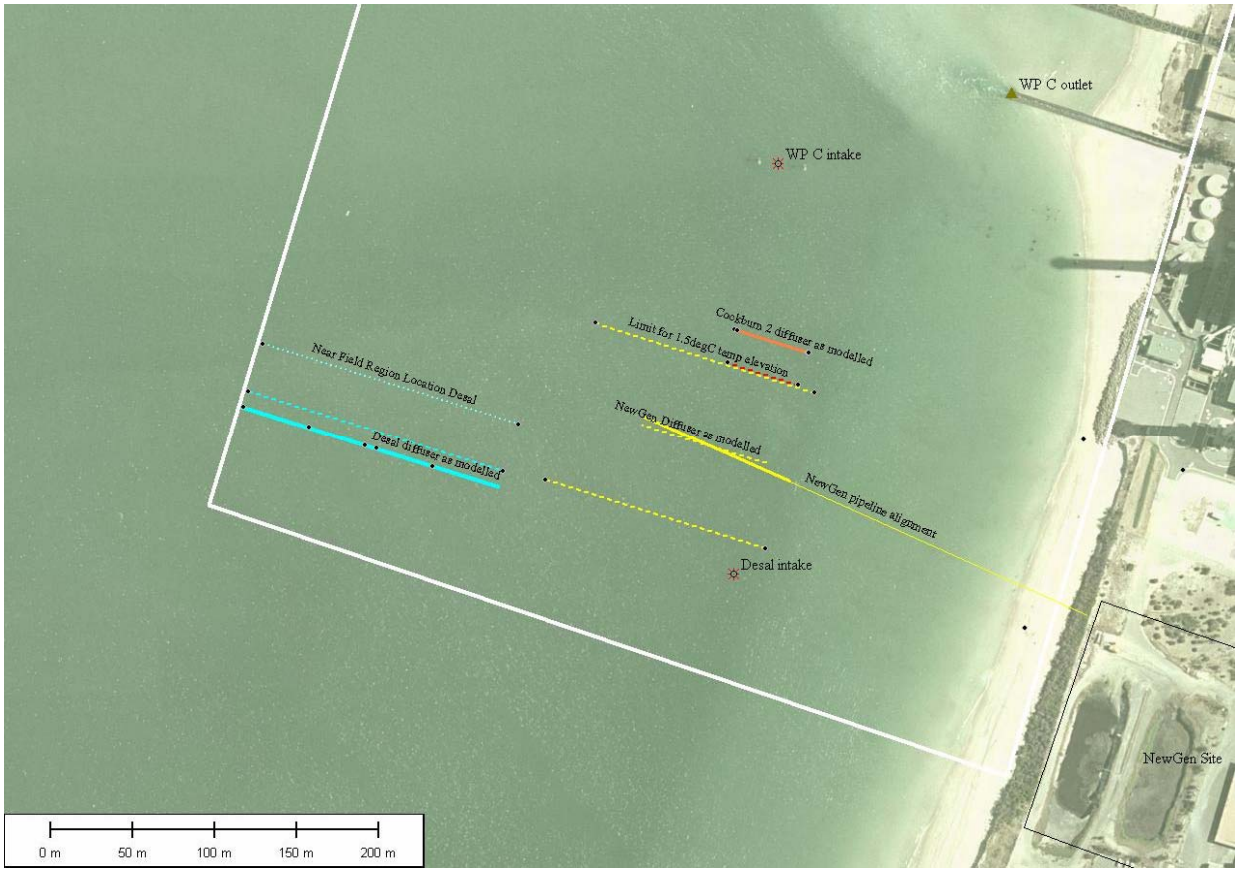


Figure 2 Location of other modelled facilities adjacent to NewGen Power diffuser (yellow solid line) including other diffusers (solid lines) and intakes (black circles). White line is the boundary of the LEPA. Mixing zones indicated by dashed lines. Verve Energy stage A/B intake is some meters north of the WP C intake shown.)

In a previous study (WorleyParsons 2005), a conceptual arrangement for the outfall and diffuser was modelled and reported upon in the Environmental Protection Statement for the Project. The results predicted that the cooling water outflow would comply with the temperature elevation requirements for marine waters subject to the *State Environmental (Cockburn Sound) Policy* 2005 (SEP) (Government of Western Australia 2005). One of the key issues identified in the modelling study was the ability of the model then being used to reconcile the relative proximity of the outflows and the potential for interaction between the various plumes.

The limitations of the model were accepted for the conceptual modelling, however, further modelling was recommended by the EPA in Bulletin 1190 and specified in Ministerial Statement 698:

6.1 Prior to disturbance of the marine environment, the proponent shall submit to the Environmental Protection authority details of a final diffuser location and design, and the results of detailed discharge plume modelling which:

6.1.1 predicts the size and minimum dilutions achieved at the edge of the near-field mixing zone about the diffuser, and specifies the location of the mixing zone boundaries;

6.1.2 demonstrates that the proposed separation between the diffuser and other existing or approved discharges at the time of issuing the works approval, will be sufficient to ensure that there is no overlap between the near-field mixing zone about the diffuser and the near-field mixing zones associated with other existing and approved discharges,
6.1.3 includes an evaluation of the influence of the proposed discharge on seawater characteristics at seawater intakes for existing or approved activities;

Further modelling has been conducted that focused on providing higher resolution to better simulate the potential transport and dilution of proposed and existing industrial outflows in the vicinity of the NewGen cooling water diffuser.

3. Potential Impacts

Approximately 430,000 m^3/day of seawater is returned to Cockburn Sound at increased temperatures and has the potential to adversely affect environmental values and adjacent industrial users.

4. Environmental Objectives

The cooling water pipeline and diffuser has been located and designed to meet the environmental objectives of the State Environmental (Cockburn Sound) Policy 2005 (SEP) (Government of Western Australia 2005). These are summarised in Table 1.

Table 1 Environmental values and objectives of State Environmental (Cockburn Sound) Policy 2005

Environmental values	Environmental objectives
Ecosystem health	Maintenance of ecosystem integrity in terms of structure (e.g. biodiversity, biomass and abundance of biota) and function (e.g. food chains and nutrient cycles).
Seafood safe for eating	Maintenance of aquatic life for human consumption, such that seafood is safe for human consumption when collected or grown.
Aquaculture	Maintenance of aquaculture, such that water is of a suitable quality for aquaculture purposes.
Recreation and aesthetics	Maintenance of primary contact recreation values, such that primary contact recreation (e.g. swimming) is safe. Maintenance of secondary contact recreation values, such that secondary contact recreation (e.g. boating) is safe. Maintenance of aesthetic values, such that the aesthetic values are protected.
Industrial water supply	Maintenance of industrial water supply values, such that water is of suitable quality for industrial water supply purposes.

Environmental quality criteria have been specifically developed for Cockburn Sound and provide the quantitative benchmarks for measuring success in achieving the environmental quality objectives set in the SEP (EPA 2005).

The objective of this Final Diffuser Location and Design Environmental Management Plan (FDLAD) is to predict the performance of the outfall system measured against the relevant Cockburn Sound Environmental Quality Criteria (EQCs) and likely effects on adjacent intake / outfall systems.

5. Performance Indicators

5.1 Temperature elevations

Environmental quality criteria have been specifically developed for Cockburn Sound and provide the quantitative benchmarks for measuring success in achieving the environmental quality objectives set in the SEP (EPA 2005).

Two forms of environmental quality criteria have been developed - environmental quality guidelines; and environmental quality standards.

Environmental quality guidelines are threshold numerical values which, if met, indicate a high degree of certainty that the associated environmental quality objective has been achieved. If the guideline value is not met then a more detailed assessment process against an environmental quality standard is triggered.

Environmental quality standards are threshold numerical values that indicate a level beyond which there is a significant risk that the associated environment quality objective has not been achieved and a management response is triggered.

The areas designated in the SEP for each of the three protection levels are illustrated in Figure 3.

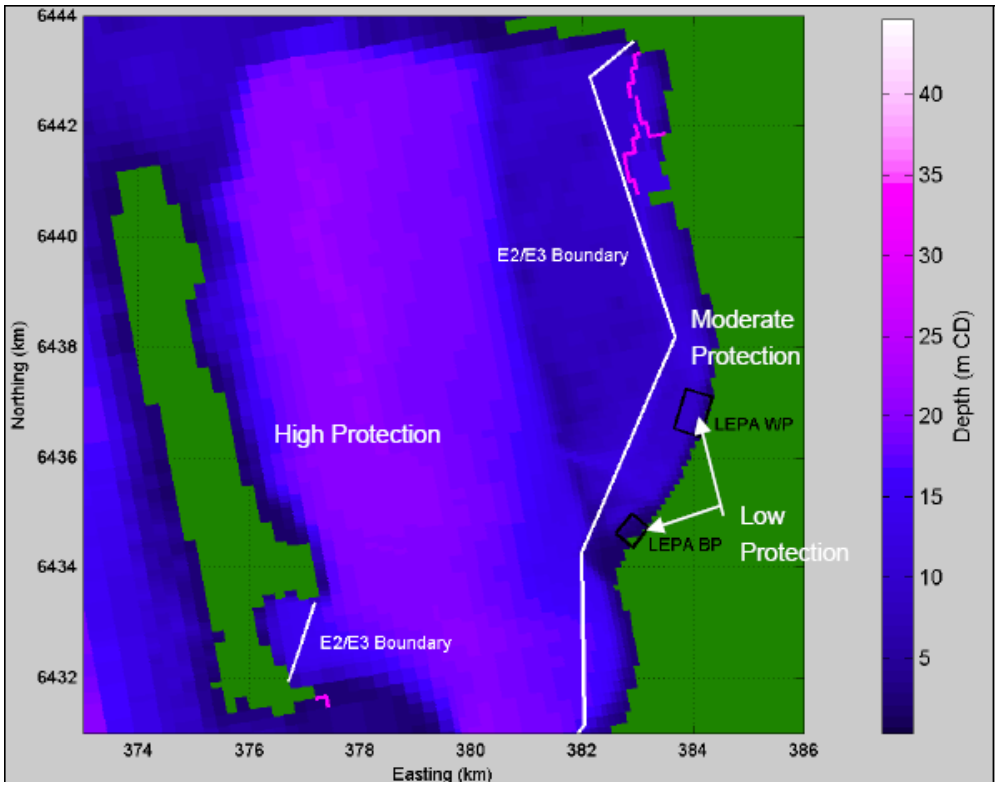


Figure 3 Designated low, moderate and high protection areas for Cockburn Sound

The diffuser has been designed to meet the environmental quality criteria for temperature increases specified in the SEP. These differ between seasons and protection areas and are summarised in Table 2.

Table 2 Environmental quality criteria for temperature

Season	E2 – High Protection Value (°C)	E3 – Moderate Protection Value (°C)
Spring	**1.2**	**3.0**
Summer	**0.8**	**1.6**
Autumn	**1.9**	**3.1**
Winter	**0.5**	**1.5**

The environmental quality criteria are applied in the following way:

- criteria represent allowable median temperature increase above normal background values;
- allowable median increase means meeting the criteria half the time over a specified analysis period;
- criteria are to be met at 0.5m from the surface and the seabed;

- normal background values refer to a no-discharge condition;
- E3 Criteria needs to be met at the boundary of the agreed LEPA (low environmental protection area); and
- E2 Criteria needs to be met at the EPA Cockburn Sound E2 boundary.

5.2 Separation from other mixing zones

Modelling is required to demonstrate that there is no overlap between the near-field mixing zone about the diffuser and the near-field mixing zones of other existing and approved diffusers.

5.3 Influence on other users

Modelling is required to evaluate the influence of the cooling water outflow on seawater characteristics at existing and approved seawater intakes.

6. Hydrodynamic Modelling

Hydrodynamic modelling was conducted to predict the performance of the cooling water diffuser measured against the relevant Cockburn Sound Environmental Quality Criteria (EQCs) and likely effects on adjacent intake / outfall systems. A description of the model used and the results obtained are provided below. The technical report is available at Appendix A and provides more detailed information on all aspects of the model and the results obtained.

Modelling has not been done for spring, and in previous investigations, as the environmental parameters used as model inputs are considered to be similar to summer whilst the EQC temperature elevation criteria are higher. It is therefore considered that if the EQC's are met under summer conditions they will also be met under spring conditions.

6.1 Model description and inputs

Numerical modelling was performed using a the Danish Hydraulic Institute (DHI) propriety package MIKE 3. It is regarded as state-of-the-art for simulating three-dimensional free-surface flows and is well regarded internationally for modelling the dispersion of both dense and buoyant plumes.

A key advantage of MIKE 3 for this study is the ability to use a "flexible mesh" (FM) of triangular elements as a basis for the model grid. This allows localized areas of higher resolution within the model grid, giving more detail where desired, and larger elements used where less detail is needed, optimising information for a given amount of computational time."

The overall set up and calibration of the MIKE 3 model has aimed to achieve consistency with previous modelling of Cockburn Sound.

The hydrodynamic modelling considered the cumulative effects of outflows either in operation or previously approved by the EPA. The major flow rates and temperature elevations used as model inputs are:

- BP refinery – constant total flow rate of 5.4 m^3/s with constant elevation of 13.83 ˚C.
- NewGen Power gas fired power station – constant flow rate 5 m^3/s with seasonally and daily variable overheat of between 5˚C and 13.1˚C.
- Verve Energy Kwinana Power Station (Unit A/B and Unit C) and Cockburn Power Station – combined daily and seasonally variable flow rate of between 5 m^3/s and 29.36 m^3/s with a daily and seasonally variable elevation of between 7.2˚C and 11.25˚C.
- Verve Energy Cockburn 2 gas fired power station – constant flow rate of 5.1 m^3/s with constant elevation of 9˚C.
- Water Corporation Perth Seawater Desalination Plant - constant flow rate 2.483 m^3/s with constant elevation of 1˚C.

The outflows from Tiwest and CSBP were also included. Previous modelling has shown these outflows do not interact directly with the outflows listed above (WorleyParsons 2006a).

6.2 Modelling results of temperature elevations

Compliance with temperature EQCs has been assessed by calculating the difference between the predicted temperature for the specific outflow combinations and the predicted temperature for a no-discharges case. Results are shown diagrammatically for and the near surface and near bottom temperature elevations for each of the modeled summer, autumn and winter scenarios.

The following scenarios include all existing and approved outflows and the James Point Port Phase 1 wharves and breakwater.

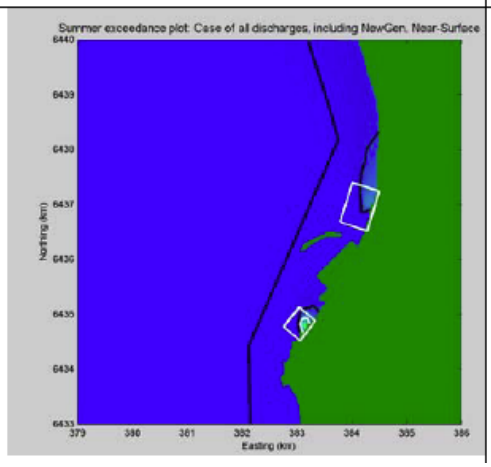
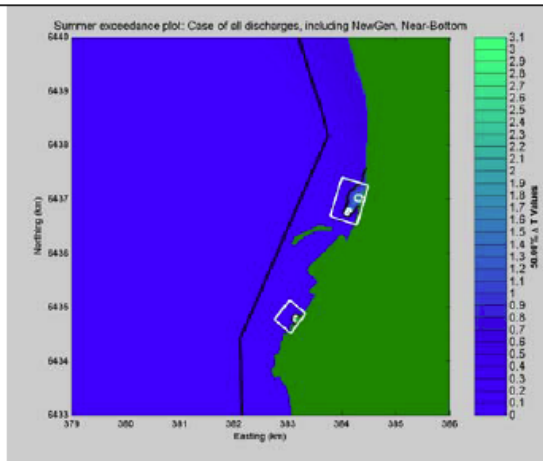
	Near Surface	Near Bottom
Summer (contoured temperature EQCs are 1.6°C and 0.8°C)		

Figure 4 Modelled spatial extent of temperature elevations in Summer (E2 boundary and contour is black lines, E3 boundary and contour is white lines)

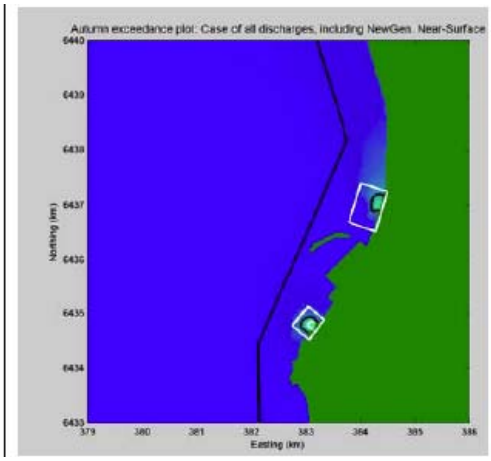
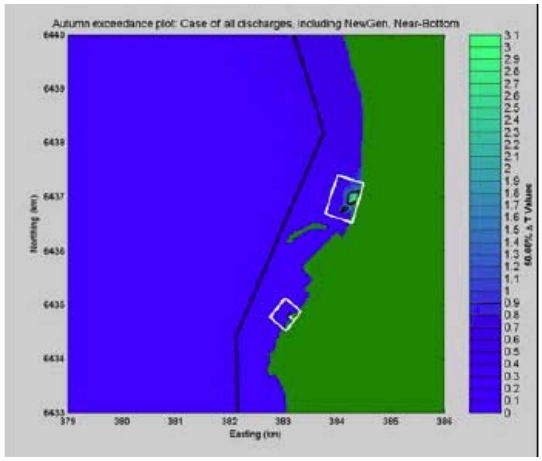
	Near Surface	Near Bottom
Autumn (contoured temperature EQCs are 3.1°C and 1.9°C)		

Figure 5 Modelled spatial extent of temperature elevations in Autumn (E2 boundary and contour is black lines, E3 boundary and contour is white lines)

In the results for Summer and Autumn, shown in Figures 4 and 5 respectively, the area of temperature elevations above the E3 criteria are contained within the boundaries of the LEPA. Also, the area of temperature elevation above the E2 criteria do not go beyond the E2 boundary.

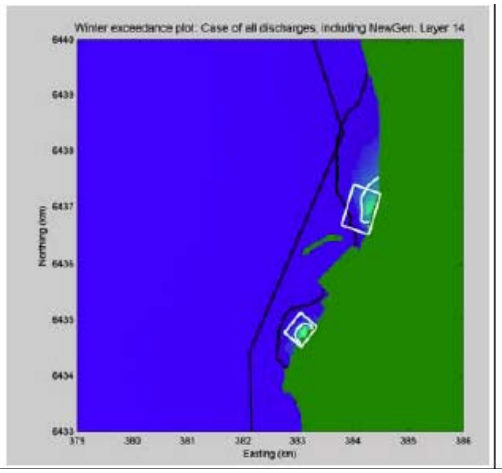
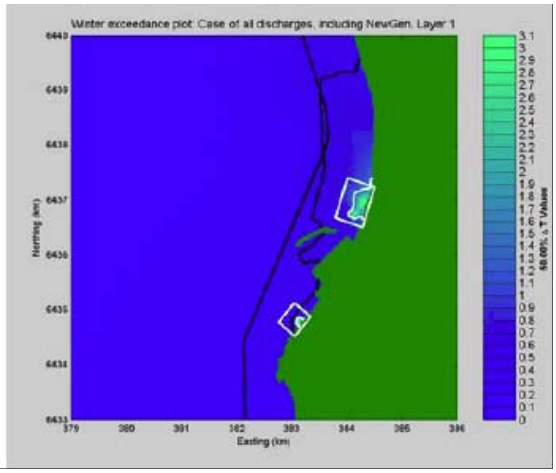
	Near Surface	Near Bottom
Winter (contoured temperature EQCs are 1.5°C and 0.5°C		

Figure 6 Modelled spatial extent of temperature elevations in Winter (E2 boundary and contour is black lines, E3 boundary and contour is white lines)

The results for Winter show some areas above the EQCs outside the E3 and E2 boundaries for both the near surface and near bottom layers. The size of these areas is small compared to the size of the protection areas. For example the near surface result predicts a total area above the E3 criteria of 18 Ha compared to the designated LEPA area of 36 Ha. The area inside the E2 boundary in the near bottom result is likely to be the result of a slight mis-alignment of the depth contour bathymetry for the edge of the Medina Channel that defines the E2 boundary in the SEP and the mapping co-ordinates input into the model to define the boundary.

The addition of NewGen Power into this scenario can be assessed by comparing it to the results of the scenario shown in Figure 7. This scenario is identical to Figure 6 but excludes the NewGen outflows.

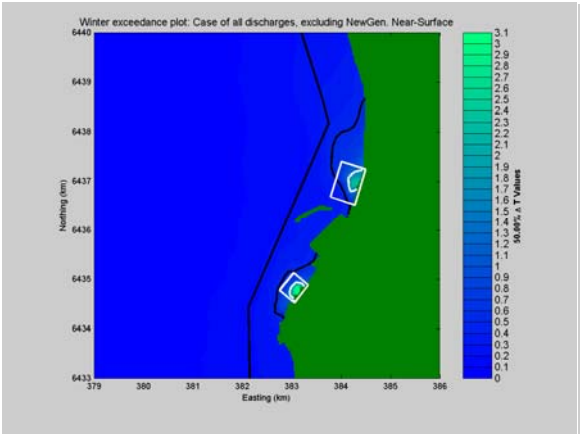
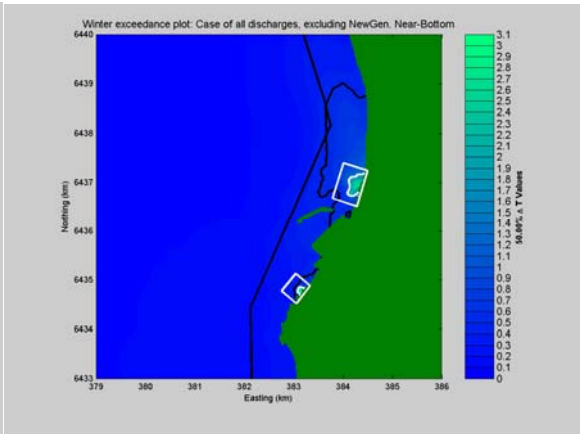
	Near Surface	Near Bottom
		

Figure 7 Modelled spatial extent of temperature elevations in Winter without NewGen outflow (E2 boundary and contour is black lines, E3 boundary and contour is white lines)

It can be seen in Figure 7 that prior to the addition of NewGen outflows, the predicted area of temperature elevation above the E3 criteria is at the northern boundary of the LEPA. The size of this area of elevation is still less than half the area of the LEPA. The boundary of the area of temperature elevation above the E2 criteria is also predicted to be inside the E2 protection area in the same location as in Figure 6, that is, on the edge of the Medina Channel. The addition of NewGen outflows into the modelled scenario creates relatively small incremental increases to the predicted areas of temperature elevations. The increases are on the northern boundary of the LEPA and the E2 protection area.

6.3 Modelling results of separation from other mixing zones

A primary concern when choosing a site for the NewGen diffuser was to limit the potential for interaction with the Desalination plant outflow. Waste brine from the PSDP diffusers is denser than the ambient seawater. As the relative influence of heat on density is less than the influence of salinity on density, situating a dense and a heated discharge in close proximity creates the potential for entrainment of heat into a negatively buoyant plume. This may lead to trapping of heated water near the seabed and result in a potential to exceed temperature guidelines for the near bottom layers.

Heat transfer from the surface waters to the bottom occurs naturally due to vertical mixing of the water column. Vertical mixing within Cockburn Sound varies seasonally, peaking during summer when analysis suggests the Sound is vertically mixed every 1-2 days on average. Given the relatively shallow water depth in the LEPA area and the expectation of regular vertical mixing, there is potential for interactions between the dense brine from the PSDP diffusers and the heated Western Power, Cockburn 2 and NewGen cooling water outflows.

The model results were checked to ensure that in calm conditions the thermal and saline outflows were forming distinct surface and bottom plumes. This was confirmed by taking vertical profiles along the northern boundary of the LEPA for both temperature and salinity.

While the modelling shows distinct plumes have formed at the boundary of the LEPA, as previously discussed, the key concern for plume interaction in Cockburn Sound is the close proximity of the dense brine from the PSDP. The NewGen diffuser has been designed to reduce this potential by ensuring the predicted near-field mixing zones of the two discharges do not overlap and by bettering the previously agreed temperature guidelines for initial dilution of their discharge (from 1.5^0C to 0.8^0C).

Modelling results show the temperature near-bottom is predicted to increase due to some transfer of heat, the area affected is only predicted to extend beyond the boundary of the Moderate Protection Area during winter. The heat trapping effect is predicted to occur prior to the addition of the NewGen discharge and it is not predicted to significantly

increase in total area after NewGen commences operation. This is illustrated in Figure 8 below.

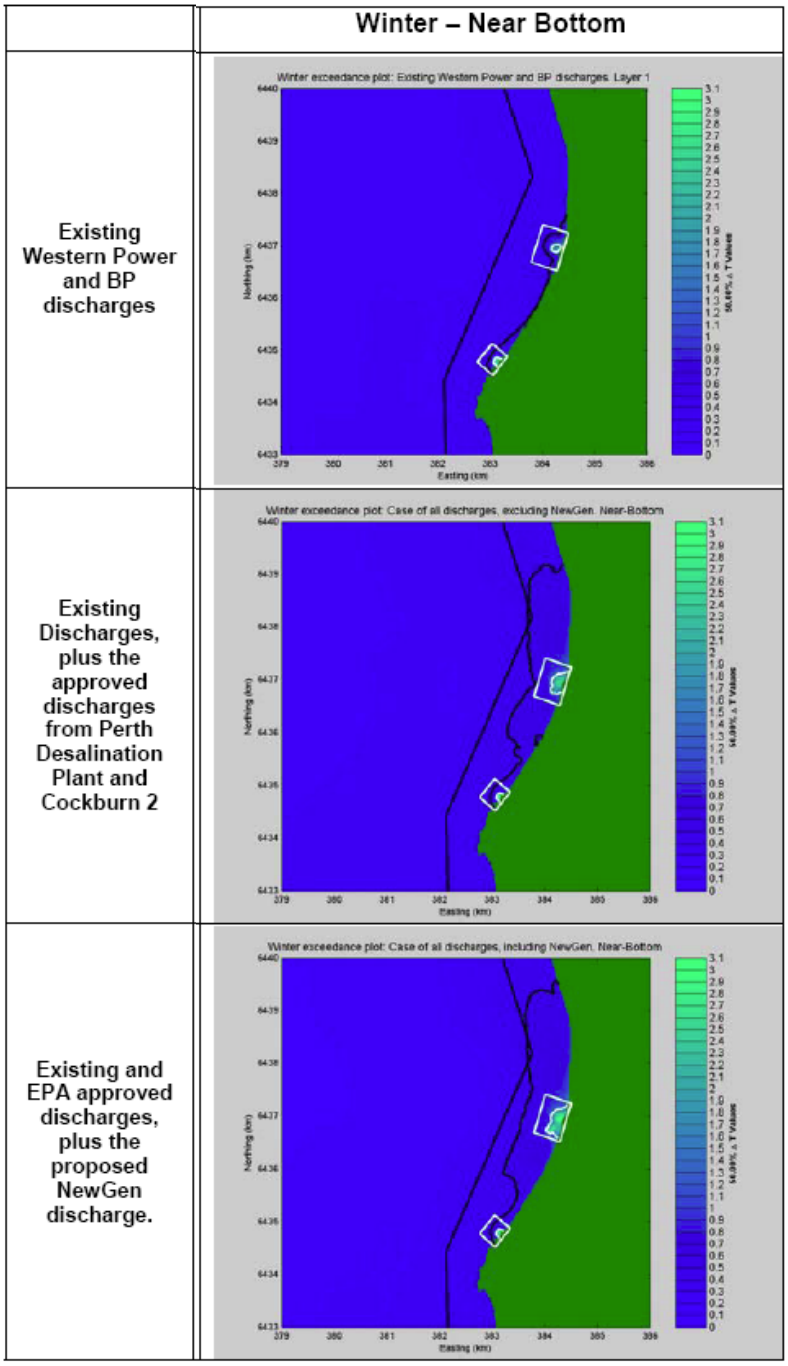


Figure 8 Modelled spatial extent of temperature elevations in Winter near bottom layer (E2 boundary and contour is black lines, E3 boundary and contour is white lines) Note: Reference to Western Power means Verve Energy.

6.4 Modelling results of influence on other users

The influence of the location and design of the NewGen cooling water outflow on seawater characteristics at intakes for adjacent existing or approved activities has been considered by examining time-series graphs of water temperatures at each of the following intakes:

- Verve Energy a&b
- Verve Energy c
- Water Corporation PSDP
- BP.

For each intake, the temperature is shown when each outflow is added to the modelling scenario. The temperature time-series graphs generally demonstrate that as each outflow is added to the model scenarios, there is an overall increase in the predicted temperature of the water withdrawn at each intake location. This reflects the total increase in heat load and relatively shallow water locations of the intakes. The time-series plots also indicate the duration of higher temperature events is predicted to be longer in autumn and winter than in summer. However, over the course of the modeled month, the predicted temperature at the intake is not progressively increasing and shows the same overall trend of rising and falling temperatures as the reference (no outflows) case, thereby indicating the intake of heated water is not predicted to result in "short-circuiting" or compounding heat load.

Whilst the NewGen outflow represents an additional heat load in the LEPA it will not lead to recirculation and a change in the characteristics of seawater at intakes by other users in the LEPA.

At the PSDP intake, the cumulative maximum predicted intake water temperature (includes Cockburn 2 at maximum generation capacity) is 24ºC in Summer. The temperature is predicted to be greater than 23ºC for approximately eight hours whilst the peak of 24 ºC occurs for two hours. In the low energy conditions of Winter with a low background current, the dilution at the PSDP intake is predicted to be around 15 to 17 times from the NewGen diffuser. As the chlorine concentration is expected to be no more than 0.5 ppm at the NewGen outlet, the level at the PSDP intake is therefore expected to be less than 0.03 ppm, and as this calculation makes no allowance for the chlorine demand of seawater, the concentration at the intake is likely to be zero.

At the two Verve intakes the largest increase in temperature is from the addition of Cockburn 2 whilst the additional NewGen outflow results in a further temperature rise. The increase in temperature observed at all of the intakes is quantified and discussed in Appendix A (Section 6.2 Worley Parsons 2006).

7. Implementation Strategy

7.1 Design/construct

The design and location of the cooling water pipeline and diffuser is the result of careful consideration of the requirements of the LEPA and adjacent users. The following design parameters have been selected:

- Single concrete pipeline about 1.8m diameter around 110m in length offshore;
- Gravity fed from a seal pit;
- Discharge flow rate of around 5 m^3/s;
- Pipeline buried under the beach and most of the offshore length;
- Pipeline joins to a diffuser about 100m long in about 10m water depth;
- Diffuser orientated approximately perpendicular to coastline; and
- Diffuser consists of 20 ports of 0.25m diameter.

Design drawings for the pipeline and diffuser are shown in Appendix C including an arrangement plan and longitudinal section and cross sections for the pipeline and diffuser. The co-ordinates for the start of the pipeline are Easting 384328.324 Northing 6436607.985 and for the end of the diffuser are Easting 384039.049 Northing 6436741.928. A detailed description of the construction program and methodology can be found in the Marine Works Construction Environmental Management Plan (NewGen 2006C).

7.2 Operation

Power station operations will not cause EQCs to be exceeded outside the relevant protection zones. Whilst the results of hydrodynamic modelling indicate that such an event may occur in Winter, NewGen Power are confident the modelling is conservative and are committed to monitoring in Cockburn Sound to demonstrate that the EQC's are being met throughout the seasons. The monitoring program is detailed in the METEMP.

The model scenario that predicts median temperature elevations outside the designated protection areas in Winter has the following features that will result in over-estimation of actual conditions:

- The outflow for Cockburn 2 is modelled as continuously flowing at maximum over-heat whereas it is almost certain the station will have a variable generation output and therefore a variable over-heat load.
- The model includes Cockburn 2 being added to all existing Verve generation assets whereas it is likely that some retirement of old plant will accompany the development of the Cockburn 2 power station. This could be for economic reasons as well as the legislated maximum generation capacity on Verve Energy.
- The Winter E2 criteria is 0.5^0C whilst the model validation showed it to be conservative by around 0.3^0C.

- The overheat temperatures used are from design criteria at the condenser whereas they are modelled as outputs at the diffuser and the heat loss from cooling water going through the seal pit and 200m pipeline is ignored.

Therefore NewGen Power is confident its operations will always be able to demonstrate compliance with the SEP EQC and this will be verified by the monitoring programme as outlined in the METEMP.

8. Monitoring

8.1 Thermal outflows

Marine monitoring of thermal outflows shall be undertaken as described in the METEMP.

8.2 Operational parameters

Cooling water outflow temperatures will be monitored in-line on a continuous basis at the outflow from the condenser as part of the Distributed Control System (DCS). Monitoring and recording of the cooling water outflow will be compared to the instantaneous and daily average cooling water outflow temperatures used in the pipeline and diffuser design studies.

9. Contingencies

The following mechanisms will be established to identify actual and apparent non-conformance with the FDLADMP:

(a) The dilution performance of the diffuser will be assessed on two sampling occasions during commissioning of the station. The results will be compared against the near-field mixing performance of the diffuser predicted by the hydrodynamic modeling.
(b) Background temperature data recently collected in Cockburn Sound and made publicly available by Water Corporation will be compared to the data used as input data for modeling.
(c) Seasonal water quality monitoring (i.e. water temperature) will be undertaken as detailed in the METEMP.
(d) If seasonal temperature monitoring indicates exceedance of EQGs, actions identified in METEMP will be taken.

10. Stakeholder Consultation

NewGen Power has sought comments on this FDLADMP from Verve Energy, Water Corporation and the Cockburn Sound Management Council. Comments received are contained in Appendix B with NewGen's responses.

The FDLADMP will be made publicly available. This will include the following:

- Free copies of the FDLADMP, when approved by the DEC for release, will be provided to – the DEC library (2 copies), Town of Kwinana public library (2 copies), and JS Battye library (2 copies);
- The FDLADMP will be posted on the NewGen Power website www.newgenpower.com.au ;
- DEC will be requested to advertise the availability of the FDLADMP in the "West Australian" newspaper.

NewGen Power will respond directly to all comments received from stakeholders on the FDLADMP.

11. Auditing

Internal audits will be conducted to assess compliance with this FDLADMP.

12. Reporting

12.1 Annual report

NewGen Power is committed to reporting annually on its environmental performance and compliance. The first report will be prepared within twelve months of completion of the first year of operation and annually thereafter. The content will include:

- Compliance with the FDLADMP commitments.
- Incidents of non-compliance.
- Results of further hydrodynamic modelling.
- Outcomes of compliance auditing.

The report will be prepared in accordance with the Department of Environment and Conservation's guidelines for performance and compliance reporting.

12.2 Record keeping

The following records will be made available to an EPA representative on request:

- Thermal monitoring reports and data;
- Environmental complaints and incident information; and
- Daily, monthly or seasonal compliance checklists.

13. Key Management Actions

Table 3: Key management Actions

Ref #	Timing/Phase	Key Management Action	DEC Reporting/Evidence	Status
FDLADMP1	During commissioning	Monitor diffuser performance against model prediction	Result submitted to DEC in post-commissioning compliance report	
FDLADMP2	Post-commissioning	Monitor seasonal temperatures as described in METEMP	Result submitted to DEC in post-commissioning compliance report	
FDLADMP3	Post-commissioning	Evaluate use of satellite thermal imaging of sea surface temperatures for confirming modelling predictions	Result submitted to DEC in post-commissioning compliance report	
FDLADMP4	Post-commissioning	Develop a monitoring and dosing program for chlorine in conjunction with Verve Energy	Results summarised in Annual Report	
FDLADMP5	Post-commissioning	Investigate potential exceedances of EQG for temperature	Results submitted to DEC within 7 days of final investigation and verification studies	
FDLADMP6	Ongoing	Preventative maintenance of diffuser to prevent fouling by marine organisms	Complete maintenance log, logged data available on request	

14. References

ANZECC/ARMCANZ. 2000; *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Environment and Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand, National Water Quality Management Strategy No. 4.

Environmental Protection Authority of Western Australia 2005; *Environmental Quality Criteria Reference Document for Cockburn Sound (2003-2004). A supporting document to the State Environmental (Cockburn Sound) Policy 2005.*

Environmental Protection Authority of Western Australia 2005b; *Manual of Standard Operating Procedures for Cockburn Sound.*

Government of Western Australia 2005; *State Environmental (Cockburn Sound) Policy*

NewGen Power 2005; *Proposed Development of NewGen Power Station in the Kwinana Industrial Area, Western Australia: Seawater Cooled Condenser*, Environmental Protection Statement.

NewGen Power 2006A; *Final Diffuser Location and Design Management Plan*.

NewGen Power 2006B; *Marine Environment Temperature Elevation Management Plan (METEMP).*

NewGen Power 2006C; *Marine Works Construction Environmental Management Plan (MWCEMP).*

Oceanica 2005; Marine Environment, Part B Chapter 5 in *Proposed Development of NewGen Power Station in the Kwinana Industrial Area, Western Australia: Seawater Cooled Condenser*, Environmental Protection Statement, NewGen Power Pty Ltd (2005).

Oceanica 2006; *Perth Seawater Desalination Plant 1, Water Quality Monitoring Programme – Baseline Component Data Report* (Dec 2005 – Feb 2006).

WorleyParsons 2006; NewGen Kwinana Power Station Fine Scale Hydrodynamic Modelling in *Final Diffuser Location and Design Management Plan.*

15. Acronyms

EPA	Environmental Protection Authority of Western Australia
FDLADMP	Final Diffuser Location and Design Management Plan
LEPA	Low Environmental Protection Area as defined in the State Environmental (Cockburn Sound) Policy 2005
METEMP	Marine Environment Temperature Elevation Management Plan
MIKE3	Marine modeling package from the Danish Hydraulic Institute
PSDP	Water Corporation's Perth Seawater Desalination Plant
SEP	State Environmental (Cockburn Sound) Policy 2005

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