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1 November 2005

Dear Director

**Reference Number 2005/2331: Sydney Water Corporation/Water management and use/Kurnell/NSW/Sydney Desalination Plant**

### **Introduction**

I refer to the Sydney Water Corporation's referral under the Environment and Protection and Biodiversity Conservation Act 1999 (EPBC Act) to construct and operate a seawater reverse osmosis desalination plant at Kurnell, NSW. The EPBC reference number is 2005/2331.

Clean Up Australia submits that the Sydney Water proposal to build and operate a desalination plant at Kurnell will have a significant impact on matters of National Environmental Significance.

### **Summary**

Sydney Water Corporation's proposed actions are likely to have a significant impact on matters of National Environmental Significance and require environmental assessment and approval under the EPBC Act. Specifically, the proposed actions and publicly available information:

- Does not provide sufficient information or any scientific information to demonstrate that the proposed action does not impact on matters of National Environmental Significance,

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- Show no evidence the precautionary principle has been applied, and
- Exceeds the Greenhouse trigger.

## **Background**

Clean Up Australia's mission is to inspire and work with communities to clean up, fix up and conserve the environment.

Clean Up Australia is dedicated to developing and implementing practical and sustainable solutions that address both local and global environmental issues with specific emphasis in the areas of waste, water and climate change.

Clean Up Australia has, for the past 15 years, helped improve Australia's waterways. From local clean up activities; educating the community; lobbying local, state and federal agencies; to fixing-up polluted waterways – Clean Up fights to safeguard our drinking water; protect, preserve and restore our rivers, streams, lakes, wetland and coastal waters; prevent marine debris and promote water conservation and better water management.

Now a national initiative, the Clean Up Australia Clean Water Campaign aims to continue to repair, restore and maintain healthy waterways by promoting efficient water use, reducing water pollution through the use of practical action and encouraging innovative technologies. It's about a new approach to water management, creating urgent water reform in the way we currently use water in this, the driest inhabited continent.

Five major technology-based projects, costing over \$30million have already been completed by Clean Up's collaborative approach to bringing together the community, business and government.

- Taronga Zoo Waste Water Treatment Plant (NSW)
- Karkarook Park Wetland Restoration (VIC)
- Richmond Water Reuse (NSW)
- Parsley Bay Remediation (NSW)
- Moonee Ponds Stormwater Initiative (VIC)

Current water issues of concern to Clean Up Australia include inefficient water use, wastewater reuse, stormwater management, marine debris, sewerage treatment, ocean outfalls and degrading riverine environments.

### **1. Insufficient publicly available scientific information to determine if a significant impact is likely.**

The Referral Form and other publicly available information about the proposed action on the Sydney Water web site make numerous statements about the likely environmental impact of the proposed action, but none of these statements are independently substantiated.

For example,

1. The Metropolitan Water Plan Seawater Desalination Plan Fact Sheet 2 reports the impact of the marine environment as follows:

*'Seawater is pumped into the desalination plant through a careful screening process designed to protect the marine environment. The rate of seawater intake will be slowed to minimise the likelihood of drawing fish and larvae into the intake structure. Currents occurring in the vicinity of the intake would exceed the pace of the intake most of the time. Concentrated seawater is produced as a by-product of the desalination process. Discharge outlets would be designed to work with currents to quickly disperse and dilute seawater concentration and protect the marine environment.'*

There is no evidence or reference to scientific reports to substantiate that the intake of seawater and discharge of water from the desalination plant will not impact marine species.

International experience suggests there will be immediate and direct impact on marine life within the vicinity of a desalination plant.

The California Coastal Commission March 2004 report on Seawater Desalination<sup>1</sup> reports that "*desalination facilities can cause significant adverse effects on marine organisms unless properly designed, sited and operated.*" As well as, '*Common examples of these impacts range from the loss of species diversity to a decline in the number of organisms in a given area to beach closures caused by bacterial contamination in the water.*

*'The two components of desalination with the most potential for causing direct adverse impacts to marine life and water quality are the facility's seawater intake and its discharge. The intake system can cause significant levels of impingement and entrainment that can degrade the local or regional marine ecosystem and the facility's discharge of brine and possible other contaminants can be harmful to marine life.'*

The report discussed the '*impacts associated with intake – entrainment and impingement*<sup>2</sup> – and then discusses the impacts associated with the discharge – primarily increased salinity and the presence of chemicals or various contaminants.'

This example from California raises questions about the impact of seawater intake and discharge into the sea from the desalination plant. These issues have not been addressed in the Referral Form or the information available on the Sydney Water web site.

2. The main *Planning for Desalination* report by GHD Fitchner on the Sydney Water web site states,

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<sup>1</sup> <http://www.coastal.ca.gov/energy/14a-3-2004-desalination.pdf> p65

<sup>2</sup> Impingement occurs when fish or larger marine animals are pulled into a seawater intake and are trapped against screens within the intake. They die or are injured due to water pressure, abrasion, thermal effects or other causes. Entrainment occurs when an intake draws in small organisms such as plankton, larvae, fish eggs and other animals along with seawater. These organisms are small enough to be pulled through the intake screens, and they are then heated or crushed as they are drawn through the facility. Entrainment is considered to cause 100% mortality of the entrained organisms, which occurs either as the organisms pass through the facility or shortly after they are discharged alive but injured.

In Chapter 7 *the following criteria were used to shortlist the 14 sites to 3* (for location of a desalination plant), criteria such as *effective discharge of seawater* was nominated, but the report does not quantify, support or reference what is effective discharge.

Further, in section 7.3.3 Environmental Issues of the same report: the statement is made that... *at this stage no site appears to have any environmental issues that cannot be managed.*

Again, there is no supporting evidence or reference to other material that verifies this statement in any scientific or other way.

3. The Referral Form reports that *modelling of the dilution and dispersion of the seawater concentration indicates that Commonwealth marine areas would not be affected.... The increase in salinity at the edge of the Near Field (End of Regulatory Mixing Zone which is approximately 50-75 metres from the point of discharge) is likely to be in the order of 1ppt which itself is within the natural variation in salinity experienced off the coast.*

This would indicate that there is some quantification of the impact, but there is no evidence as to how figures were arrived at, its accuracy, or indeed what is the concentration at the point of discharge? The reader has to accept at face value that the modelling is accurate and appropriate.

4. Further, Section 2.4 of the Referral Form indicates *filter backwash that does not pass through the RO process will be discharge to the ocean.*

There is no indication if this discharge will have any environmental impact.

5. Section 3.2 of the Referral Form in the section Any marine area, reports survey have been undertaken to *identify fish assemblages and that this are common to the area and more generally to temperate reefs in NSW.*

There is no public reference to this survey to support this statement.

With the frequency of unsubstantiated statements about the environmental impact, it leaves one wondering;

- Will marine species be affected?
- What impact will salinity have within 50-75 m of the discharge point?
- Will salinity spikes expand the area of impact from the discharge point?
- Are different life stages of marine species likely to be more sensitive, ie larval stages?
- What impact apart from salinity could the discharge have, ie entrained organisms and chemicals?
- What impact do sublethal doses in the discharge have on marine organisms that might already be stressed from other pollutants?
- What is the expected impact under typical operating conditions and a worse

case scenario?

Yet, the Referral Form reports *the operational regime is yet to be finalised*.

If the operational regime is yet to be finalised, how can the proponents be certain that there will not be any significant impact on matters of National Environmental Significance?

And how then, can the statement that '*at this stage no site appears to have any environmental issues that can not be managed*', be made without knowing how the desalination plant will operate when there is experience from other desalination plants that *desalination facilities can cause significant adverse effects on marine organism, and that significant adverse effects can occur at the local or regional scale that can diminish the ecosystem value and its value to society?*<sup>3</sup>

## **Environmental assessment delayed**

Further The Metropolitan Water Plan Fact Sheet 2 states an Environmental Assessment Report will be completed and available for public comment in September/October. As at 27 October 2005 this report was not available and inquiry to the Sydney Water desalination hotline<sup>4</sup> reported that the Environmental Assessment Report was indeed not yet available.

## **2. Lack of evidence of application of the Precautionary Principle**

The guidelines provided by the Department<sup>5</sup> states "the Act provides that the Minister must, in deciding whether an action is likely to have a significant impact on a matter of national environmental significance, take account of the precautionary principle."

The Precautionary Principle argues the lack of scientific certainty about the potential impacts of an action will not itself justify a decision that the action is not likely to have a significant impact on the environment.

The latest guidelines for applying the Precautionary Principle<sup>6</sup> to conservation and natural resource management set out a framework on applying the Principles.

The Guidelines demonstrate that Sydney Water has failed to apply the Precautionary Principle in the planning of the desalination plant. There is no evidence in the either in the Referral Form or on the Sydney Water web site.

Specifically the Precautionary Principle as it applies to matters of National Environmental Significance does not appear to have been addressed.

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<sup>3</sup> [Http://www.coastal.ca.gov/energy/14a-3-2004-desalination.pdf](http://www.coastal.ca.gov/energy/14a-3-2004-desalination.pdf) pages 65-78 accessed 28 Oct 2005

<sup>4</sup> Sydney Water desalination 1800 685 833, 27 October 2005, Judith

<sup>5</sup> EPBC Act Administrative guidelines on significance, accessed <http://www.deh.gov.au/epbc/policy/administrative/index.html> accessed 29 Oct 2005

<sup>6</sup> Dr Rosie Cooney Coordinator Precautionary Principle Project, A joint initiative of FFI, IUCN, TRAFFIC and Resource Africa <http://www.pprinciple.net>

Referral to the Guidelines below illustrates specifically how the Precautionary Principle has not been applied.

**Guideline 2: Integrate application of the Precautionary Principle with the application of and support for other relevant principles and rights.**

How has Sydney Water taken into account other principles and rights, including prevention, liability for environmental damage, inter-generational and intra-generational equity, the right to development, the right to a healthy environment and human rights to food, water, health and shelter? These other rights and principles must be borne in mind when applying the Precautionary Principle. In some circumstances they may strengthen the case for precautionary action, while in others the Precautionary Principle may need to be weighed against these other rights and principles.

**Guideline 4: Include all relevant stakeholders and rightholders in a transparent process of assessment, decision-making and implementation**

Precautionary decision-making involves consideration of uncertainty about the underlying threat. This means that judgments, values and cultural perceptions of risk, threat and required action must play a role.

So, it is important to include stakeholders and rightholders and to be transparent throughout the process of assessment, decision-making and implementation. Key stakeholders include those who bear the costs of the potential threat, e.g. those who will be impacted by degradation or loss of biodiversity or natural resources, and those who bear costs of precautionary action (if any), e.g. whose legitimate use of natural resources will be restricted. Indigenous peoples and local communities often play a very important role in NRM or rely on biodiversity and natural resources, and should be included. They should have the opportunity and resources to represent themselves and their interests effectively, and this should not be precluded by logistical, technical or language barriers. The imperative of including key stakeholders should, however, be balanced against potential conservation costs of delaying a decision.

For example, Sydney Water has not involved all relevant stakeholders and rightholders. There has been no opportunity for judgements, values and cultural perceptions of risk to be taken into consideration. The decision to build and locate a desalination plant has been made in haste and without stakeholder participation. Delaying the decision to build a desalination plant will not incur any conservation cost nor will there be any environmental impact. The outcomes can only be positive for the environment.

**Guideline 5: Use the best information available**

All relevant information should be taken into account, including that relating to human drivers of threats to biodiversity, as well as biological and ecological information. The best available scientific information should be used. In addition, traditional and indigenous knowledge and practices may also be relevant and should therefore be taken into account in decision-making. Efforts should be made to ensure evidence and information is independent, free of bias, and gathered in a transparent fashion. This can be facilitated by ensuring it is gathered by independent and publicly accountable institutions without conflict of interest. In addition, taking into account multiple sources of information

can help minimise bias.

For example, what evidence is there that Sydney Water has considered all relevant information? Has the organisation got the best available scientific information from local councils, authorities and other government organisations and businesses in the Kurnell area? Where is the transparency? Has information been gathered by publicly accountable institutions without a conflict of interest?

The Referral Form does not demonstrate that Sydney Water has applied the Precautionary Principle framework in terms of matters of National Environmental Significance. There is no supporting evidence that Sydney Water has sought to include stakeholders or rightholders. There is no evidence that Sydney Water has sought to use the best information available.

**Guideline 6: Characterise the threat(s), and assess the uncertainties surrounding the ecological, social and economic drivers of changes in conservation status.**

No where does the Referral Form and information on the Sydney Water web site elaborate on the the direct or indirect threats, secondary and long-term threats, nor the incremental impacts of multiple or repeated actions or decisions. Underlying causes and potential severity should be assessed and efforts made to determine what is known and not known, what knowledge can be easily improved and what cannot.

While recognising there is a need to balance the benefits of delaying a decision to gather more information against the potential threats raised by such a delay, there should be explicit recognition of ignorance, areas of uncertainty, gaps in information, and limitations of the statistical power of available methods for detecting threats. Where threats may interact or be inter-related (e.g. action against one may exacerbate another) they should not be addressed in isolation.

For example, has Sydney Water considered the cumulative environmental impact from the desalination plant plus the Caltex oil refinery, plus other industrial businesses at Kurnell?

**Guideline 7: Identify the available actions to address threats, and assess the likely consequences of these various courses of action and inaction.**

This principle guides a constructive search for alternatives and practical solutions, while supporting positive measures to anticipate, prevent and mitigate threats. The potential benefits and threats raised by available courses of action and inaction should be assessed – these threats and benefits may be of various kinds, from various sources, and may be short or long term. There may be threats associated with all courses of action: often conservation and NRM decisions involve a choice between “risk and risk” rather than between “risk and caution”. In assessing the likely consequences of alternative courses of action and inaction the technical feasibility of different approaches should be taken into account.

For example: What actions have been taken or are proposed to be taken to address threats and assessment of the consequences? The Referral Form and Sydney Water web site only refer to plans of management. What certainty is there that these plans will consider the practical solutions for dealing with Sydney's water situation so that any

proposed action will not impact on matters of National Environmental Significance at Kurnell?

### **Guideline 8: Allocate responsibilities for providing evidence**

This guideline sets out that those who propose (Sydney Water) a potentially harmful activity and who benefit from an activity which raises threats of serious or irreversible harm should bear the responsibility and costs of providing evidence that those activities are, in fact, safe.

What evidence is there that the proposed desalination plant is safe?

The illustration of the Guidelines for application of the Precautionary Principle to environmental and natural resource issues demonstrates that the proposed action has not considered these matters, all of which causes concerns when dealing with matters of National Environmental Significance.

### **3. Greenhouse trigger is exceeded**

Under draft regulation the EPBC Act is triggered by a major new development likely to result in greenhouse gas emissions of more than 0.5 million tonnes of carbon dioxide equivalent in any 12 month period.<sup>7</sup>

Section 2.4 of the Referral Form states the desalination plant will source power from the grid. The plant will have a demand of 100 mega watts or 963 GWh (EPBC Referral Form). Based on the coefficient that 1kWh = 0.94kg CO<sub>2</sub>, the desalination plant would produce 907,000 tonnes CO<sub>2</sub> equivalent per annum. This equates to almost 20% of Australia's total increase in greenhouse gas emissions annual or an extra 200,000 cars!

This amount of CO<sub>2</sub> generated to operate the desalination plant is well in excess of the trigger of 0.5 million tonnes of CO<sub>2</sub> contained in the draft regulation.

Further, the proposal states that emissions will grow by 3% annually to meet demand. Given the life of the plant is 20 years<sup>8</sup> that is equivalent to a total of over 24,000 kt for the life of the plant!

### **Offset of greenhouse gas emissions is uncertain**

While the Referral Form says Sydney Water will offset 50% of greenhouse gas emissions there is a lack of information if this is even feasible.

It is doubtful that the current offset market is sufficient to meet this demand.

While Sydney Water<sup>8</sup> acknowledges that the current market can not meet the demand, they expect that the demand generated by the desalination plant will grow the market, over the 20 year life of the desalination plant.

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<sup>7</sup> <http://www.deh.gov.au/epbc/about/amendments/greenhouse.html> accessed 26Oct05

<sup>8</sup> Sydney Water desalination hot line, Judith 27 October 2005.

Sydney Water proposes that offsets will be sourced from multiple sources, but how realistic is this?

The Australia Institute<sup>9</sup> argues that the NSW Greenhouse Gas Abatement Scheme (NGACs) will make no difference to the state's greenhouse gas emissions if the desalination plant is built. This paper argues that there are *probably not enough NGACs to offset the normal growth in NSW electricity demand, let alone the additional needs of the desalination plant*. Further, the Australia Institute proposes *the increased demand for NGACs generated by the operation of the desalination plant will mean that electricity suppliers will probably pay fines (to the government) for failure to secure enough NGACs*.

The Australian Business Council for Sustainable Energy<sup>10</sup> reports that there is currently a national target of 9,500GWh which needs to be reached by 2010 however this has almost already been reached. There are incentives in place for investment in order to reach this quota. Once it has been reached there will be a slump. Those currently obliged to source renewable power will no longer be asked to invest.

Sydney Water also proposes using tree plantings as offset. The amount of CO<sub>2</sub> sequestered depends on the species of tree, age, site characteristics, rainfall and other factors. The offset amounts are calculated based on the trees full life cycle. What guarantee is there that the offset trees will be grown for the life to meet the offset requirements?

Also, this method of offset is a highly inaccurate science. One example of this can be taken from World Business Council on Sustainable Development who report *that the ability of forests to store large amounts of carbon and so help curb future climate change depends heavily on the tree species growing in them*<sup>11</sup>.

The offset plan is based on a lot of assumptions that not supported by current scientific knowledge or developments in the greenhouse offset market.

### **Offset proportion is arbitrary**

The offset target of 50% has been set at a level that would bring in line with the next best alternative water supply option<sup>12</sup>, without specifying what the next best alternative water supply option is. Inquiry to Sydney Water<sup>8</sup> reports that this alternative is recycled effluent pumped back to Warragamba Dam. This was reported to be calculated as a life cycle emissions calculation that covered construction and operation of the alternative water source. Information to support this assertion is not publicly available.

Greenhouse gas contribution from the desalination process is excessive and could create a significant impact on matters of National Environmental Significance. The precautionary principle applies here. That is, the lack of scientific data in the Sydney Water referral form on the impact of increased greenhouse gases is not sufficient justification that the

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<sup>9</sup> Greenhouse implications of the proposed Sydney desalination plant, web paper 2005, sourced [www.tai.org.au](http://www.tai.org.au) 28 Oct 05

<sup>10</sup> <http://www.bcse.org.au/default.asp?id=49&articleid=334>

<sup>11</sup> <http://www.wbcsd.org/includes/getTarget.asp?type=DocDet&id=16963>

<sup>12</sup> Metropolitan Water Plan Seawater Desalination Fact Sheet 1

desalination plant is not likely to have a significant impact on the environment.

This alone is sufficient reason to refer the Sydney Water desalination proposal to the Commonwealth for consideration under the EPBC Act.

## **Conclusion**

To date Sydney Water has not been able to justify that the proposed action will not have a significant impact on the environment and the associated matters of National Environmental Significance at the Kurnell site.

Specifically, the Referral Form and information on the Sydney Water web site does not consider matters such as:

- all on-site and offsite impacts,
- all direct and indirect impacts,
- the total impact which can be attributed to that action over the entire geographic area affected, and over time,
- the sensitivity of the receiving environment, and
- the degree of confidence with which the impacts of the action are known and understood.

Clean Up Australia has found in reviewing both the Referral Form and information on the proposed action available on the proponent's web site that:

- there is insufficient scientific information that the impact of the proposed action will not have a significant impact on matters of National Environmental Significance.
- The precautionary principle has not been applied or considered.
- The greenhouse trigger has been exceeded.

If you wish to discuss any of the issues raised in these comments, please contact Gabrielle Kay on (02) 9692 1024 or [Gabrielle@cleanup.com.au](mailto:Gabrielle@cleanup.com.au) .