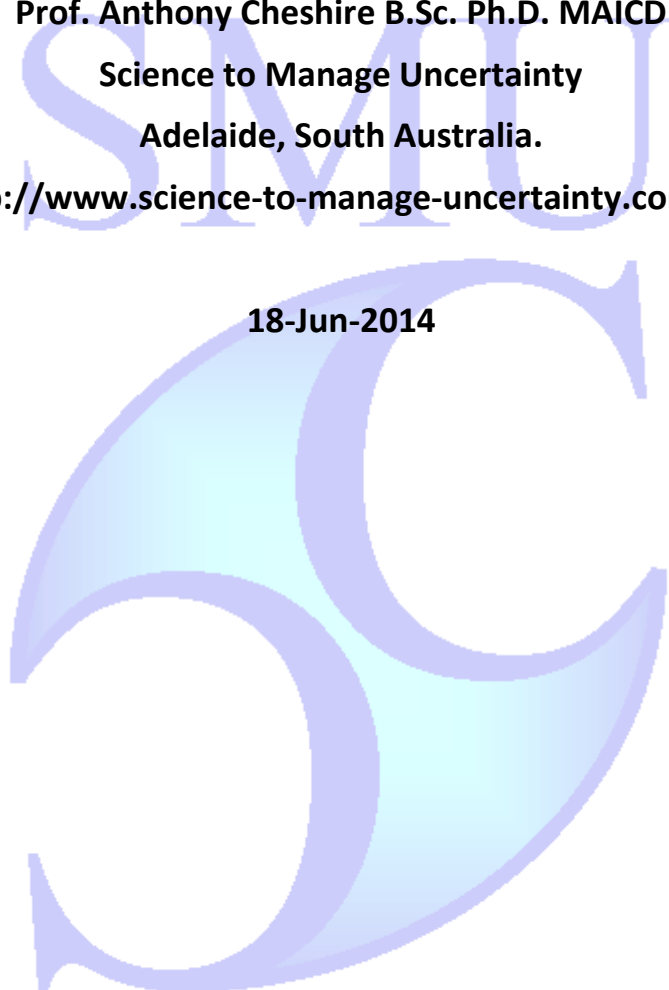


**Review of diffuser performance validation (a) monitoring licence  
conditions for the Adelaide Desalination Plant:  
June 2014**

**Prepared for  
AdelaideAqua Pty Ltd  
Report number 20 in the series**

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## EXECUTIVE SUMMARY

### Purpose

This document represents a report on the extent to which monitoring of diffuser performance validation (a) from selected sites in the vicinity of Port Stanvac meets with the EPA Licence Conditions for the construction and operation of the Adelaide Desalination Plant (ADP) over the period February 2009 to 12-Dec-2013. The monitoring reports were associated with the construction (including commissioning) of the desalination plant (by AdelaideAqua D&C Consortium – AAD&C) from February 2009 to 12-Dec-2012 and to the operation of the desalination plant (AdelaideAqua Pty Ltd) from 12-Dec-2012 to 12-Dec-2013.

### Background

AdelaideAqua Pty Ltd is the operator of the Adelaide Desalination Plant at Port Stanvac South Australia. Operation of the ADP requires the discharge of reject water to the marine environment; this activity was originally conducted under a licence issued to AAD&C by the Environment Protection Authority of South Australia (EPA Licence Number 26902) and subsequently under another licence issued to AAPL (EPA Licence Number 39143). These licences authorised AAD&C and AAPL to undertake a series of activities of environmental significance under Schedule 1 Part A of the Environment Protection Act 1993 (the Act). The licences had specific requirements in relation to “Discharges to Marine Waters” that are the subject of this report.

Section 14 (305-626) of the licence requires that the licensee must ensure that:

1. An independent review of all marine monitoring is conducted by independent specialist(s) as approved in writing by the EPA prior to the review commencing;
2. All marine monitoring from the period commencing with the issue of the licence and ending 12 months after project handover of the 100 GL desalination plant is included in the review; and
3. The full results of the review are provided to the EPA not more than 18 months after project handover of the 100 GL desalination plant.

The EPA has also advised that prior to appointment, the independent reviewer must be able to demonstrate to the EPA that:

1. They will use their own professional judgment;
2. They will take appropriate specialised advice when the issue is outside their expertise;
3. Their opinions will be reached independently;
4. In forming opinions, they will not be unduly influenced by the views or actions of others who may have an interest in the outcome of the review; and
5. They must declare any real or apparent conflict of interest.

With the approval of the EPA, Anthony Cheshire (the author of this report) was selected by AdelaideAqua Pty Ltd (AAPL) to undertake this review.

## **Approach**

This review of diffuser performance validation (a) monitoring encompassed a study of all documentation provided by AdelaideAqua Pty Ltd which comprised a single monitoring report produced by staff at AAD&C, AAPL or by experts contracted by the parties for that purpose.

The report has been critically reviewed and key issues that pertain to compliance with the licence conditions have been aggregated into a summary that has been presented in this report.

### ***Specific requirements***

To consider the work done against the Scheduled Marine Monitoring Requirements detailed in Attachment A to Licences 26902 and 39143. These being:

EPA Licence 26902: Conduct a plume dispersion test during a dodge tide to validate dispersion at 10% production capacity.

### ***General requirements***

In addition the EPA require that the Independent Reviewer is to undertake a technical review of all marine monitoring results from the commencement date of the Licence 26902 (D&C) until 12 December 2013 (12 months after plant handover) in order to assess the environmental impact of the desalination plant. This matter will be addressed in a subsequent report.

## **Conclusion**

AAPL contracted Cardno to undertake a study of plume dispersion to validate diffuser performance; the study, as reported, is consistent with the requirements of the licence condition. Over the period 19-21 October 2011 (with field operations on 21-Oct-2011) Cardno undertook an assessment of diffuser performance during a period with low winds and a dodge tide that coincided with the day of field measurements. Over this period the plant was operating at around 10% capacity with an average saline discharge of 33 MLD.

## LICENCE CONDITION: DIFFUSER PERFORMANCE VALIDATION (A) MONITORING

In the following the specific requirements pertaining to the licence condition (diffuser performance validation (a)) are summarised along with information about the documents that have been reviewed.

Documents reviewed for this licence condition:

Document Name	Reference
plume_dispersion_rpt_Mar12.pdf	Daniel Strickland, (2012). Adelaide Desalination Plant Discharge Dispersion: Final Report Prepared for MAJV 2 March 2012 LJ15034/Rep1032pv2. Cardno (NSW/ACT) Pty Ltd.

### Specific requirement (see Attachment A – Marine Monitoring Schedule):

EPA Licence 26902: Conduct a plume dispersion test during a dodge tide to validate dispersion at 10% production capacity.

### Overall summary in relation to diffuser performance validation (a)

Cardno, on behalf of AAPL undertook a study on the plume dispersion from the ADP diffuser during the period 19-21 October 2011. Actual field operations were conducted on 21-Oct-2011, a day with low winds and a dodge tide. Prior to this date the plant was operating with a saline discharge so that the assessment could be made under more-or-less steady-state discharge conditions. The tide and weather were deemed to represent the “worst case scenario for ambient mixing” and therefore provided a good basis for evaluating the performance of the diffusers, in terms of plume dispersion, that was largely independent of wind or tide induced mixing.

Over the two-day period (prior to and on the day of the study) the inlet volume averaged 57.8 MLD which is around 10% of operating capacity while the average discharge volume over the period 19-21 October 2011 was 33 MLD.

The study involved a series of fixed vertical CTD profiles along with two horizontal profiles using a towed CTD that variously sampled at different depths through the water column. The data were processed to provide a 2D contour map of seabed salinity and dilution with increasing distance from the diffusers.

The contour map provided the basis for assessing the performance of the diffuser and allowed conclusions to be drawn on the effectiveness of the diffuser under these conditions of low ambient mixing.

## Appendix A KEY DATES IN PLANT CONSTRUCTION AND OPERATION

The following provides a list of key dates in the construction and operation of the plant. This material provides background to the review and in particular places the analysis and interpretation of each of the monitoring reports into context with the activities that were occurring on-site in the period leading up to the monitoring event.

Date	Activity
01-Feb-2009	Construction activities commenced
16-Nov-2009	Maritime platform arrived on site
08-Jul-2010	Maritime platform completed operations
01-Jun-2011	First discharge and first intake of seawater
14-Oct-2011	First Water – plant production was (30 MLD)
21-Mar-2012	SP1 – Full production from first half the plant (150 MLD)
31-May-2012	SP2 – Full production from second half of the plant (150 MLD)
24-Oct-2012	Performance test – plant running at full production for 7 days (150 MLD)
07-Nov-2012	Performance test – plant running at full production for 7 days (150 MLD)
21-Nov-2012	Reliability test – continuous running at various production rates
12-Dec-2012	Plant handover from commissioning