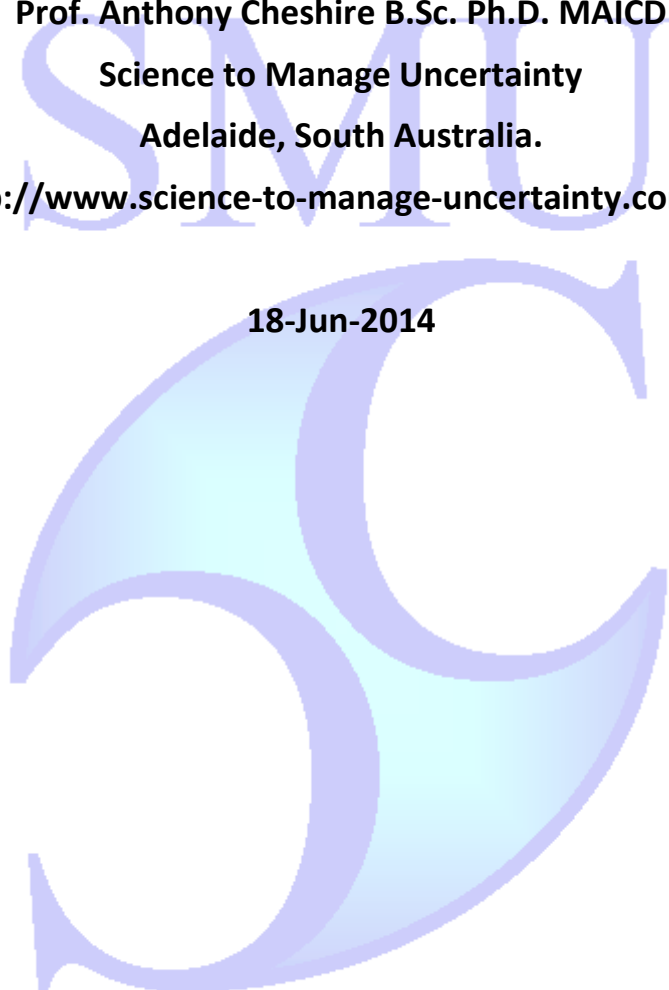


**Review of ADCP (currents) monitoring licence conditions for the
Adelaide Desalination Plant:
June 2014**

**Prepared for
AdelaideAqua Pty Ltd
Report number 18 in the series**

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EXECUTIVE SUMMARY

Purpose

This document represents a report on the extent to which monitoring of ADCP (currents) 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 currents monitoring encompassed a study of all documentation provided by AdelaideAqua Pty Ltd which comprised a series of 14 monitoring reports each of which was produced by staff at AAD&C, AAPL or by experts contracted by the parties for that purpose.

Each 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 Licences 26902 & 39143: Measure current speed and direction every 10 minutes at either MP1, MP2, MP3 or MP4.

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

The measurement of current speed and direction is largely consistent with the licence conditions in that data have been collected using an ADCP (Acoustic Doppler Current Profiler) starting in 13-Jan-2011 (prior to the commencement of any construction work) and continues over the period to 25-Feb-2014 (a total of just over 3 years). Collection of these data was intended to provide calibration data that was used in validating the performance of the diffuser as such while the data coverage is not continuous over this period it is considered sufficient to meet the objectives of the licence condition.

LICENCE CONDITION: CURRENTS MONITORING

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

Documents reviewed for this licence condition:

Document Name	Reference
ADCP 20110113_20110401.000	AdelaideAqua, (2011). Acoustic Doppler Current Profiler Data for 13 January 2011 through 01 April 2011. AdelaideAqua Pty Ltd.
ADCP 20110406_20110511.000	AdelaideAqua, (2011). Acoustic Doppler Current Profiler Data for 06 April 2011 through 11 May 2011. AdelaideAqua Pty Ltd.
ADCP 20110517_20110718.000	AdelaideAqua, (2011). Acoustic Doppler Current Profiler Data for 17 May 2011 through 18 July 2011. AdelaideAqua Pty Ltd.
ADCP 20110721_20110913.000	AdelaideAqua, (2011). Acoustic Doppler Current Profiler Data for 21 July 2011 through 13 September 2011. AdelaideAqua Pty Ltd.
ADCP 20110915_20111013.000	AdelaideAqua, (2011). Acoustic Doppler Current Profiler Data for 15 September 2011 through 13 October 2011. AdelaideAqua Pty Ltd.
ADCP 20120109_20120404.000	AdelaideAqua, (2012). Acoustic Doppler Current Profiler Data for 09 January 2012 through 04 April 2012. AdelaideAqua Pty Ltd.
ADCP 20120831_20121012.000	AdelaideAqua, (2012). Acoustic Doppler Current Profiler Data for 31 August 2012 through 12 October 2012. AdelaideAqua Pty Ltd.
ADCP 20121012_20121029.000	AdelaideAqua, (2012). Acoustic Doppler Current Profiler Data for 12 October 2012 through 29 October 2012. AdelaideAqua Pty Ltd.
ADCP 20121030_20130213.000	AdelaideAqua, (2012). Acoustic Doppler Current Profiler Data for 30 October 2012 through 13 February 2013. AdelaideAqua Pty Ltd.
ADCP 20130213_20130423.000	AdelaideAqua, (2013). Acoustic Doppler Current Profiler Data for 13 February 2013 through 23 April 2013. AdelaideAqua Pty Ltd.
ADCP 20130423_20130508.000	AdelaideAqua, (2013). Acoustic Doppler Current Profiler Data for 23 April 2013 through 08 May 2013. AdelaideAqua Pty Ltd.
ADCP 20130527_20130828.000	AdelaideAqua, (2013). Acoustic Doppler Current Profiler Data for 27 May 2013 through 28 August 2013. AdelaideAqua Pty Ltd.
ADCP 20130828_20131025.000	AdelaideAqua, (2013). Acoustic Doppler Current Profiler Data for 28 August 2013 through 25 October 2013. AdelaideAqua Pty Ltd.
ADCP 20131024_20131218.000	AdelaideAqua, (2013). Acoustic Doppler Current Profiler Data for 24 October 2013 through 18 December 2013. AdelaideAqua Pty Ltd.

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

EPA Licences 26902 & 39143: Measure current speed and direction every 10 minutes at either MP1, MP2, MP3 or MP4.

Overall summary in relation to currents monitoring

An ADCP (current profiler) was moored at the seabed near the ADP outfall using one of the 100m buoy sites described (MP1, MP2, MP3 or MP4). The current data was used to calibrate the model which was used in the review of the diffuser performance.

Over the period starting in 13-Jan-2011 (prior to the commencement of any construction work) and over the period to 25-Feb-2014 (a total of just over 3 years) the ADCP was used to measure current speed and direction at a point 100 m from the ADP diffuser. While the data coverage over this period is not continuous (Table 1) it is considered sufficient to meet the objectives of the licence condition.

The timeframe over which data collection has been undertaken covers the entire period from before operational testing of the plant through to full-scale operational production. Notwithstanding, there are a number of notable gaps in the data (Table 1) particularly for two periods:

1. 13-Oct-2011 to 9-Jan-2012 (87 days) and
2. 4-Apr-2012 to 31-Aug-2012 (150 days).

Collectively these two periods represent around 21% of the total period over which data were supposed to have been collected.

Furthermore, the licence condition specified that data was to be collected at 10 minute intervals but there were a number of periods when data were collected at either 20 or 60 minute intervals (Table 1). As a consequence, the compliance performance based on the number of data records collected ($40\% = \frac{\text{number data records collected}}{\text{number data records expected}}$) is somewhat lower than the compliance performance based on the time period covered (63%).

Table 1 – Condition 18 – ADCP data validation.

Filename	Start (date and time)	End (date and time)	Data record interval (mins)	Records expected (@ interval)	Records expected (@10 mins)	Records Provided	Minutes covered
ADCP 20110113_20110401.000	13/01/11 07:41:33	01/04/11 02:41:33	10	11,203	11,203	11,203	112,020
DATA GAP	01/04/11 02:41:33	06/04/11 00:27:03	10	706	706	-	7,065
ADCP 20110406_20110511.000	06/04/11 00:27:03	11/05/11 03:37:03	10	5,060	5,060	5,060	50,590
DATA GAP	11/05/11 03:37:03	17/05/11 01:32:15	10	851	851	-	8,515
ADCP 20110517_20110718.000	17/05/11 01:32:15	18/07/11 06:52:28	10	8,961	8,961	8,961	89,600
DATA GAP	18/07/11 06:52:28	21/07/11 04:40:12	10	418	418	-	4,188
ADCP 20110721_20110913.000	21/07/11 04:40:12	13/09/11 03:30:12	10	7,770	7,770	7,770	77,690
DATA GAP	13/09/11 03:30:12	15/09/11 07:09:12	10	309	309	-	3,099
ADCP 20110915_20111013.000	15/09/11 07:09:12	13/10/11 23:59:12	10	4,134	4,134	4,134	41,330
DATA GAP	13/10/11 23:59:12	09/01/12 04:33:03	10	12,554	12,554	-	125,554
ADCP 20120109_20120404.000	09/01/12 04:33:03	04/04/12 06:24:07	10	12,396	12,396	12,394	123,951
DATA GAP	04/04/12 06:24:07	31/08/12 15:38:09	10	21,510	21,510	-	215,114
ADCP 20120831_20121012.000	31/08/12 15:38:09	12/10/12 11:38:09	60	1,005	6,030	1,005	60,240
DATA GAP	12/10/12 11:38:09	12/10/12 13:42:17	10	11	11	-	124
ADCP 20121012_20121029.000	12/10/12 13:42:17	29/10/12 14:42:17	60	410	2,460	410	24,540
DATA GAP	29/10/12 14:42:17	30/10/12 09:16:29	10	110	110	-	1,114
ADCP 20121030_20130213.000	30/10/12 09:16:29	13/02/13 10:16:29	60	2,546	15,276	2,546	152,700
DATA GAP	13/02/13 10:16:29	13/02/13 13:00:03	10	15	15	-	164
ADCP 20130213_20130423.000	13/02/13 13:00:03	23/04/13 09:00:03	60	1,653	9,918	1,653	99,120
DATA GAP	23/04/13 09:00:03	23/04/13 12:45:00	10	21	21	-	225
ADCP 20130423_20130508.000	23/04/13 12:45:00	08/05/13 13:45:00	20	1,084	2,168	1,084	21,660
DATA GAP	08/05/13 13:45:00	27/05/13 09:14:00	10	2,708	2,708	-	27,089

Filename	Start (date and time)	End (date and time)	Data record interval (mins)	Records expected (@ interval)	Records expected (@10 mins)	Records Provided	Minutes covered
ADCP 20130527_20130828.000	27/05/13 09:14:00	28/08/13 08:14:00	60	2,232	13,392	2,232	133,860
DATA GAP	28/08/13 08:14:00	28/08/13 10:31:38	10	13	13	-	138
ADCP 20130828_20131025.000	28/08/13 10:31:38	25/10/13 10:31:38	20	4,177	8,354	4,177	83,520
DATA GAP	25/10/13 10:31:38	25/10/13 11:25:45	10	4	4	-	54
ADCP 20131024_20131218.000	25/10/13 11:25:45	18/12/13 07:25:45	60	1,293	7,758	1,293	77,520
DATA GAP	18/12/13 07:25:45	18/12/13 08:52:30	10	8	8	-	87
ADCP 20131218_20140225.000	18/12/13 08:52:30	25/02/14 07:52:30	60	1,656	9,936	1,656	99,300
Summary totals	13/01/11 07:41:33	25/02/14 07:52:30		104,819	164,055	65,578	1,640,171

Compliance performance		Period covered	63%	9-Jan-2011	25-Feb-2014
		Overall %	40%	@ 10 min intervals	

Data record interval (mins) – the period between measurements of current speed and direction

Records expected (@ interval) – the number of data records expected in the file based on the time period of data recording and the data record interval.

Records expected (@ 10 mins) – the number of data records expected in the file based on the time period of data recording assuming 1 data record every 10 mins as per the licence condition

Records provided – number of data records actually recorded.

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