Independent Environmental Representative Environmental Audit Report

ACTEW

MURRUMBIDGEE TO GOOGONG WATER TRANSFER

4TH AUDIT (PIPELINE OPERATION / OEMP IMPLEMENTATION)

ngh environmental

SEPTEMBER 2014

AUDIT DETAILS

AUDITED ORGANISATION	PROJECT
ACTEW	Murrumbidgee to Googong Water Transfer
ADDRESS	**CONTACT DETAILS**
Stromlo	Ben Bryant
DEPTH OF AUDIT	**SCOPE OF AUDIT**
Environmental	Pipeline Operation / OEMP Implementation
DATE OF AUDIT	**AUDIT CRITERIA**
26th August 2014	OEMP (version 1 and 2 (draft)), Flow Management Plan, Extraction and Gauging Plan, Geomorphological Monitoring Subplan, Stream Flow and Water Quality Monitoring Subplan, Project Approval 08_0160, EPL 13322, EPBC Approval 2009/5124
PERSONS CONTACTED	**AUDIT TEAM**
Ben Bryant	Erwin Budde, nghenvironmental – Lead auditor
PREVIOUS AUDIT DATE	**PREVIOUS AUDIT REFERENCE**
February 2013, August 2013 and February 2014	**ngh**environmental (March 2013, August 2013, February 2014)
NOTE:	
This audit was conducted specifically on the implementation of the OEMP and subplans in relation to a maintenance flow event.	

AUDIT SUMMARY

Environment:

This was the fourth audit of the operation phase of the Murrumbidgee to Googong Water Transfer Project (M2G) by the Independent Environmental Representative (ER). This audit was different to previous audits, in that it focussed entirely on the implementation of the OEMP and subplans during a planned maintenance flow event. It was decided to structure the audit in this way for several reasons:

1. Previous audits have focussed on the OEMP and subplan contents and implementation of the Approval. As the project is yet to operate as intended, a further audit on these aspects of the project was not considered likely to add any value to the project, nor identify any operational non-conformities.
2. The auditor has previously asked questions about how decisions are made in the lead up to a water transfer event, be it a maintenance flow or an operational flow. It was considered useful to specifically audit the decision making process in relation to a water transfer event.

The audit included interviews with key operational staff and a review of operational procedures at the High Lift Pump Station where water transfer events are run from. A demonstration of the SCADA computer system was also provided to the auditor. The focus was on the key decision making processes relating to the environmental requirements of the Project.

Thee (3) Observations of Concern were issued at the close out meeting.

Signed: _____ **Principal's Representative**	**Date:**
Signed:  **Lead Auditor**	**Date: 17/09/2014**

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1. REPORT SUMMARY

1.1 INTRODUCTION

This audit represents the fourth (4th) independent environmental representative audit conducted on the operational phase of the M2G Project.

At the time of the audit, staff were preparing for a maintenance transfer event (known as an APPLE run).

1.2 SCOPE OF AUDIT

The audit scope for this audit was the implementation of Operational Environmental Management Plan (OEMP), the relevant subplans and relevant licence and project approval documents in relation to a water transfer event. As the revision of the OEMP/subplans have not yet been approved by all the regulators, both the Approved version and the revised version of the OEMP/subplans were audited:

- OEMP
- Extraction and Gauging Plan
- Geomorphological Monitoring Subplan
- Flow Management Plan
- Stream Flow and Water Quality Monitoring Subplan
- Project Approval 08_0160
- Environmental Protection Licence 13322
- EPBC Approval 2009/5124

1.3 SUMMARY OF CORRECTIVE ACTIONS

There were no Corrective Action Requests (CARs) during the audit.

1.4 SUMMARY OF OBSERVATIONS OF CONCERN

The following Observations of Concern (OoC) were identified and explained to ACTEW during the audit Closing Meeting. They are considered to be deficiencies in meeting specified requirements, which if not addressed, may lead to a risk of non-compliance.

OoC No.	Section of Report	Details
001	3.3.1	This audit finds that the way in which E&S formulates its response to the 4-week Notification could be improved. A more systematic approach, such as a checklist, a prompt-list, or a procedure, could be used to ensure a more thorough consideration of any issues is given.

OoC No.	Section of Report	Details
002	3.3.3	The remote Plant Operator is required to undertake pre-start checks. A checklist is used to complete these checks. This checklist does not appear to be a controlled form or have any document controls.
003	3.3.4	It is considered that the reliance on the Incident Management System to report out-of-spec readings in Burra Creek is insufficient. A better approach would be for regular communications between Operations and Environmental staff during a water transfer event, such that trends can be analysed and exceedances can be pre-empted. WI1011 should include communication protocols to be implemented during a water transfer event.

2 AUDIT PROCESS

2.1 OPENING MEETING

An opening meeting was held on the morning of the 29th August at the High Lift Pump Station. Present were Chris Pulkkinen, Ben Bryant, Richard Bailey and Elizabeth Turner. The scope of the audit was outlined to those present, as well as a general outline of how the audit will be conducted.

2.2 CLOSING MEETING

A closing meeting was held in the afternoon of the 29th August. Present were Chris Pulkkinen and Ben Bryant.

2.2 SITE INSPECTION

A visit to the High Lift Pump Station, Low Lift Pump Station and the pipeline outlet were conducted.

2.3 DESIGNATED FOLLOW-UP

A follow-up of the audit findings will be managed by the ACTEW Environment Manager to verify the completion of all corrective actions. The next IER Audit will be conducted in August 2016.

2.4 PREVIOUS ENVIRONMENTAL AUDIT

This audit followed-up Observations of Concern (OOC's) raised at the previous environmental compliance audit and is summarised below:

Table 2-1: Summary of Observations of Concern raised on the previous environmental audit (Feb 2013)

OoC No.	Details	Closed Out Y/N	Comment
001	*Reference: Noise Management Plan* The Noise Management Plan does not outline a procedure for responding to noise complaints. By way of background, it is noted that a Noise Compliance Study was conducted which found noise levels at several locations during the monitoring event were above the Approved Project levels. After consultation with NSW and ACT agencies, it was agreed that no further noise mitigation would be undertaken unless complaints were received.	Y	The procedure is outlined in Sections 3 and 5.4 of the revised Community Information Plan, approved by NSW and the Commonwealth and pending approval from ACT.

OoC No.	Details	Closed Out Y/N	Comment
002	*Reference: OEMP Section 3.1.7 and ISO14001 Management Review* The OEMP requires an annual management review be conducted of the environmental management system. The details provided in the OEMP reflect the requirements of ISO 14001:2008 in relation to Management Reviews. It is noted that ACTEW have completed a full review of the OEMP. However, this is not considered to constitute a Management Review in accordance with the OEMP or ISO 14001.	N	ACTEW ISO 14001 EMS Management Review is scheduled for 3rd October 2014.
003	*Reference: OEMP Roles and Responsibilities Section 3.1 (Draft OEMP)* The Manager, Regulations, Compliance and Quality is noted to have the responsibility for ensuring compliance of the project against legal and other requirements. This responsibility is not considered appropriate to sit with this person, instead it should be at a higher managerial level.	Y	Responsibility for ensuring compliance of the project is shown in both CEO and Environment & Sustainability Manager roles in the revised OEMP Appendix B consistent with the Corporate Legal Register (CMO).
004	*Reference: OEMP Internal Auditing Section 8.1* The OEMP requires a program for internal auditing be undertaken, with the OEMP and subplans audited at least once per year. It is noted that ACTEW have relied on the independent audits conducted by the ER to fulfil this latter commitment. Notwithstanding this, a program of internal auditing of compliance with the OEMP and subplans has not been initiated.	*Y*	Internal auditing of the OEMP and Sub Plans is now included in the Management System Internal Audit Schedule 2014/15 (Audit #13). This will be included annually.

A list of outstanding items from the February 2013 audit are detailed below. Note, it is understood that the revised OEMP and subplans have been submitted to the regulators. It is understood that the NSW Department of Planning and Environment have approved them. Responses and still pending from ACT and Commonwealth regulators.

Table 2-2 Summary of Observations of Concern raised on the previous environmental audit (Feb 2013)

OoC No.	Details	Closed Out Y/N	Comment
001	*Reference: overall environmental management system for the M2G* This audit has found that the management system for the environmental management of the M2G project is reasonably complex, with duplication of management activities across several key areas including ecological monitoring and terrestrial ecology management. The system could be simplified by combining and integrating plans, thus minimising the potential for overlooking commitments and actions due to duplication. The audit has also found that a number of plans relied upon by ACTEW in the operational phase were developed for construction (namely the Landscape Rehabilitation Management Plan, the Noise and Vibration Management Plan and the Terrestrial Ecology Management Pan). These plans contain irrelevant information and may contribute unnecessarily towards the complexity of the system mentioned above. It is noted that the operational management actions contained in these plans are mostly due to be completed within the next 6 months.	N	OEMP has been revised and ER has reviewed revisions. The OEMP has not yet been provided to the regulators for their Approval.
002	*Reference: OEMP (Draft Jan 2013) Section 3.1.7 Responsibility of the Manager Ecological Monitoring and Biodiversity and Manager Environmental Impacts and Sustainability* One of the stated responsibilities in the draft OEMP (Jan 2013) for the Manager Ecological Monitoring and Biodiversity and Manager Environmental Impacts and Sustainability is 'ensuring that the OEMP is implemented and maintained'. Given the distribution of roles within ACTEW, resulting in several people having implementation responsibilities for different parts of the OEMP, it is considered that this statement is ambiguous and does not reflect the actual distribution of responsibility for implementing components of the OEMP across ACTEW.	N	OEMP has been revised and ER has reviewed revisions. The OEMP has not yet been provided to the regulators for their Approval.
003	*Reference: OEMP Section 5 – Standards and Performance Measures* Objectives 1 and 2 have targets which are considered impractical and unachievable. Whilst these targets could conceivably be objectives, it is considered that more tangible, achievable and realistic targets should be set.	N	OEMP has been revised and ER has reviewed revisions. The OEMP has not yet been provided to the regulators for their Approval.

OoC No.	Details	Closed Out Y/N	Comment
004	*Reference: OEMP Section 5 – Standards and Performance Measures* The OEMP does not include any mechanisms for tracking, and reporting, performance of the objectives. Performance measures and targets should be tracked, regularly reviewed, and reported to management to demonstrate the effectiveness of the OEMP in managing the environmental performance of the project.	N	OEMP has been revised and ER has reviewed revisions. The OEMP has not yet been provided to the regulators for their Approval.
005	*Reference: OEMP Section 6 – Compliance Tracking Program – Operations (Routine Monitoring)* The OEMP states that the results of routine monitoring will be provided to NSW DP&I, OEH and DPI, as required. 'As required' is considered too ambiguous in the context of reporting important information, and a more specific table of reporting commitments should be provided in the OEMP to ensure ACTEW meets all reporting requirements and expectations of external agencies.	N	OEMP has been revised and ER has reviewed revisions. The OEMP has not yet been provided to the regulators for their Approval.
006	*Reference: OEMP Section 10 Record Keeping and Document Control* The Document Control Procedures are not consistent with the ACTEW corporate document control procedures.	N	OEMP has been revised and ER has reviewed revisions. The OEMP has not yet been provided to the regulators for their Approval.
009	*Reference: Geomorphologic Monitoring Sub Plan (GMP)* The GMP does not define 'operation', and hence the monitoring frequency/program is ambiguous. As it reads, it would appear that monitoring is to occur 2-monthly for several parameters, whereas it appears the intent is to monitor two-monthly when the project is transferring water.	N	Addressed in letter to agency. GMP will be incorporated into AEMP – this reflects the detail of the letter.
010	*Reference: Ecological Management Plan Section 8* The roles and responsibilities stated in the Plan do not reflect the actual roles and responsibilities of staff in charge of overseeing and implementing this plan.	N	OEMP has been revised and ER has reviewed revisions. The OEMP has not yet been provided to the regulators for their Approval.

3 DETAILS OF AUDIT FINDINGS – ENVIRONMENT

This section details the findings of the audit report. It only details those findings requiring action.

3.1 PREVIOUS AUDITS

Three previous audits on operational environmental compliance were conducted on 13th and 14th February 2013, the 29th August 2013 and the 7th February 2014.

3.2 GENERAL MANAGEMENT FRAMEWORK

Environmental management requirements for the M2G pipeline are documented in the OEMP and associated subplans.

In addition to this, procedures used by operations staff to operate the pipeline are contained in:

- Work Instruction WI1010 – M2G maintenance
- Work Instruction WI1011 – M2G Operations
- Work Instruction - M2G Environmental Investigation and Notification

A desktop review of the Work Instructions was completed as part of this audit to determine whether they fully and completely include the environmental management requirements of the relevant sections of the OEMP and subplans.

3.3 WORK INSTRUCTION WI1011 – M2G OPERATIONS

3.3.1 Section 3.4 – Start Date-4 weeks: Advance Warning of Operation

The -4-week Notification was sent to all internal stakeholders notifying them of the proposed maintenance transfer event on 30th July. A copy of this e-mail is contained in Appendix A.

The notification contains some general advice on the proposed transfer, including start and finish dates, proposed pumping rates and scheduled associated maintenance activities. In addition, it provides a list of specific responses that are required from internal stakeholder groups.

In relation to the environment and sustainability stakeholder group, the action was to "*Advice that there are no outstanding issues, eg. Review any remedial works*". Discussions were had with Chris and Ben about how their group deals with this request. The response is formulated relatively informally, by consulting with people within the E&S group either verbally or via e-mail.

It is noted that if no response is received from a stakeholder group, Operations staff would re-attempt communications in a more direct manner (ie phone call).

This audit finds that the way in which E&S formulates its response to the 4-week Notification could be improved. A more systematic approach, such as a checklist, a prompt-list, or a procedure, could be used to ensure a more thorough consideration of any issues is given. **Observation of Concern 001**

3.3.2 Section 3.6 – Start Date-2 weeks: Decision to Operate

The 2-week Notification was sent out on 12th August. A copy of this e-mail is contained in Appendix B. It is noted that the e-mail contained several issues that needed resolution before the APPLE run.

Landowner notification was sent on 19th August. This is within the 7 day timeframe required by the Work Instruction.

3.3.3 Section 3.8 – Start Date- Day 0 (day of pump start up)

The remote Plant Operator is required to undertake pre-start checks. A checklist is used to complete these checks. This checklist does not appear to be a controlled form or have any document controls. **Observation of Concern 2.**

The checklist is essentially a mechanical checklist and contains prompts to check several environmentally-relevant items including the working condition of water quality analysers, the presence of the fish egg filters and the state of the CO2 dosing system.

Unfortunately, mechanical faults meant that the water transfer event planned for the day of the audit was aborted without the transfer of any water.

3.3.4 During Operations Communication

Work Instruction WI1011 does not include any guidance on communicating to internal stakeholders during a transfer event. In particular, it does not include any reporting or communication requirements back to environmental staff on any faults, alarms, out-of-spec readings or similar. The auditee explained that the Incident Management System would be utilised for any environmental incidents.

The SFWQMP addresses the management response to out-of-spec readings within Burra Creek. The Plan acknowledges that an out-of-spec reading in Burra Creek does not automatically mean that the water transfer has caused an environmental issue, as natural fluctuations in Burra Creek could be behind the reading. Hence, the SFWQMP requires an investigative response to an out-of-spec reading in Burra Creek, before making any decisions on whether the ramp down the water transfer. Monitoring responses are detailed in the SFWQMP (Section 7.5).

Given the above, it is considered that the reliance on the Incident Management System to report out-of-spec readings in Burra Creek is insufficient. A better approach would be for regular communications between Operations and Environmental staff during a water transfer event, such that trends can be analysed and exceedances can be pre-empted. WI1011 should include communication protocols to be implemented during a water transfer event. **Observation of Concern 3**.

3.4 STREAM FLOW AND WATER QUALITY MANAGEMENT PLAN

One of the aims of this audit was to ascertain which of the flow rules are automatically programmed into SCADA, and which require manual intervention. A summary table of the results of this investigation is provided below.

The table includes reference to specific requirements in the OEMP/Subplans v1.0 (the Approved version), and a corresponding reference to OEMP/Subplans v2.0 (yet to be approved, but submitted to regulators for their approval).

No specific recommendations or audit outcomes were generated as a result of this investigation.

OEMP V1	OEMP V2	Audit Results
Water Transfer Start Up		
Googong Reservoir shall be below 80% capacity, as measured at the dam wall	Same. But contained in merged MP - SFWQMP	Manual determination by the Process Owners. Daily (8am) figures are used to monitor the capacity of Googong Dam.
ActewAGL, having assessed other conditions relevant to the water storage system, including total system capacity and predicted weather conditions, wish to proceed with commencement of pumping	Same. But contained in merged MP - SFWQMP	Manual determination by the Process Owners. It is understood that this is a complex are of decision making, with reference made to the complete water supply strategy in determining whether pumping is required.
Low flow variability is to be maintained such that commencement of pumping shall not take out all flow peaks from small to medium rainfall runoff events. Riffle and Pool maintenance flows to be protected	Same. But contained in merged MP - SFWQMP	Low flow protection is automated in SCADA by way of an alarm system. No automatic ramp-down is triggered, instead manual intervention is required. Riffle flow rules are not automated. It is noted that under the revised SFWQMP, riffle flow protection is not required when the pipeline is in standby mode.
On line water quality monitored at MURW2 in the Murrumbidgee River must be within acceptable levels for water transfer to occur	Same. But contained in merged MP - SFWQMP	Automated. System will not run if Murrumbidgee River water quality is out of specification. An automated step-down/stop sequence is activated if this condition is triggered during a flow.
The flow in Burra Creek must be below the level associated with a 1 in 2 year flood. The water transfer must not cause Burra Creek to exceed a 1 in 2 year flood level	Same. But contained in merged MP - SFWQMP	Automated. System will not run if Burra Creek water quality is out of specification. An automated step-down/stop sequence is activated if this condition is triggered during a flow.
Fish screens must be in place and fully functional at the abstraction point	Same. But contained in merged MP - SFWQMP	Automated. Inlet chamber can not operate without a fish egg filter in place. Any faults in the cleaning/pressure system during pumping do not affect the fish egg filters from functioning.
Management actions required to be taken to address ecological and/or geomorphological impact since the lst flow episode must have been completed.	Same. But contained in merged MP - SFWQMP	Manual determination through the 4-week notification. Note, recommendations have been made in this audit to systemise Environment and Community's response to the 4-week notification.

OEMP V1	OEMP V2	Audit Results
If water quality monitoring measured at MURW2/Lobbs Hole is above the trigger levels then additional aquatic ecology and water quality monitoring in Burra Creek is to be initiated.	Same. But contained in merged MP - SFWQMP	Manual response to a system alarm.
If the water transfer is permitted to take place, it must take place at a rate which: - Does not reduce flows downstream of Angle Crossing below those required to be protected under the e-flow rules - Does not cause flows in Burra Creek to exceed the 1 in 2 year ARI	Same. But contained in merged MP - SFWQMP	Automated. A step-down/stop sequence is commenced if these trigger values are breeched.
Maintain, regulate or cease water transfer		
The flow in Burra Creek must be below the level associated with a 1 in 2 year flood. Levels are to be checked in a timely manner or an alarm level set up at the gauging site (410774) The water transfer must not cause Burra Creek to exceed a 1 in 2 year flood level	Same. But contained in merged MP - SFWQMP	Automated. A step-down/stop sequence is commenced if these trigger values are breeched.
Flow in the Murrumbidgee River for the day (to the next 8am daily review) must protect environmental flow requirements	Same. But contained in merged MP - SFWQMP	Automated. A step-down/stop sequence is commenced if these trigger values are breeched.
If the water transfer is permitted to continue, at a rate which: - Does not reduce flows downstream of Angle Crossing below those required to be protected under the e-flow rules - Does not cause flows in Burra Creek to exceed the 1 in 2 year ARI - Does not exceed 100Ml/d	Same. But contained in merged MP - SFWQMP	Automated. A step-down/stop sequence is commenced if these trigger values are breeched.
Where possible introduce flow level changes to mimic natural flow variability. A constant flow shall not be maintained for a long period of time such that it would negatively impact establishing	Same. But contained in merged MP - SFWQMP	Manual determination. Could be automated but currently is not.

<table>
<tr><th>OEMP V1</th><th>OEMP V2</th><th>Audit Results</th></tr>
<tr><td>a healthy ecological system</td><td></td><td></td></tr>
<tr><td>If flow cannot continue and needs to be stopped abruptly then monitoring of fish in Burra Creek should take place to identify any episodes of fish stranding.</td><td>Same. But contained in merged MP - SFWQMP</td><td>N/A</td></tr>
<tr><td>If turbidity at Angle Crossing is between HiHi value and the HiLo value, then pumping is to continue until the turbidity is below the HiLo value to ensure suspended material is transported to Googong reservoir</td><td>Same. But contained in merged MP - SFWQMP</td><td>Automated. A step-down/stop sequence is commenced if these trigger values are breeched.</td></tr>
<tr><td colspan="3">Pump Start Up/Shutdown</td></tr>
<tr><td>Previously not mentioned in FMP or SFWQMP</td><td>Table 3.1 step-up and step-down times for peak pumping rates from 21 to 109 ML/d.
<table><tr><th>Peak Pumping Rate</th><th>High Lift Pumps required for peak rate</th><th>Minimum Step-up time</th><th>Minimum Step-down time</th></tr><tr><td>21 ML/d</td><td>1 small pump</td><td>0 hrs</td><td>2 hrs</td></tr><tr><td>49 ML/d</td><td>1 large pump</td><td>0.5 hrs</td><td>4 hrs</td></tr><tr><td>68 ML/d*</td><td>1 small pump and 1 large pump</td><td>1 hr</td><td>6 hrs</td></tr><tr><td>94 ML/d*</td><td>2 large pumps</td><td>2 hrs</td><td>8hrs</td></tr><tr><td>109 ML/d*</td><td>1 small pump initially then add 2 Large pumps incrementally</td><td>2hrs</td><td>8hrs</td></tr></table>* Utilising more than the capacity of one large pump is not required for a maintenance standby run as the large pumps can be run consecutively. Flow rates above 49ML/d are expected during operational mode water transfer only.</td><td>Manually controlled</td></tr>
</table>

OEMP V1	OEMP V2	Audit Results
Previously no mention of SCADA in FMP or SFWQMP	SCADA will record all necessary data and log all events associated with the Water Transfer, including automatic alarms and/or automatic shut off if Water Transfer is not being operated in accordance with environmental flow rules or any other requirements	SCADA records this information. It is retained for the life of the pipeline.
SFWQMP		
Water quality, level and flow monitoring will be conducted at Burra Creek (1), Queanbeyan River (2) and London Bridge (3)	Same. But contained in section 6 of the SFWQMP	ALS have water quality and flow measurement stations at site 1 and 2. There is only a flow measuring station at site 3.
Grab samples shall be collected from BUR1, BUR2, BUR2a, BUR3 and QBY2 (MEMP Sites)	Same. But contained in section 6 of the SFWQMP	N/A
Key water quality parameters to be tested include: pH, EC, Dissolve O, Temp, TDS, NTU, TSS, Fe, Mn, Nutrients, Phytoplankton.	Key water quality parameters to be tested include: pH (online), EC (online), Dissolve O (Online), Temp (Online), TDS, Fe, Mn, Nutrients, Pathogens, Pesticides.	N/A
Not specifically detailed	Grab samples collected every 2-3 months	N/A
Reported in an integrated annual report	Reported with AEMP reporting framework	N/A

OEMP V1	OEMP V2	Audit Results

Table 4.2 Murrumbidgee River proposed water quality parameters and default trigger values

Parameter	Mean value in Murrumbidgee River (2008-2010)*	Proposed trigger Levels of inflow water to M2G	
		Autumn / Winter	Spring / Summer
Turbidity (NTU) (increase monitoring)	75 (median 24)	>80	>100
Turbidity Hi-Hi value (cease to pump)		800	800
Turbidity Hi-Lo value (flushing flow value)		150	150
Total Nitrogen (mg/L)	0.35(autumn) 0.8(spring)	>0.5	>0.8
Total Phosphorus (mg/L)	0.07	>0.10	>0.10
Dissolved Oxygen (%sat)	93-103	<80 or >110	<80 or >110
pH	7.3	<6.5 or > 8.0	<6.5 or > 8.0
EC (µs/cm)	95	> 600	> 400
Temperature 0C	21 (autumn)	< 5	> 24
Total Iron (mg/L)	2.02	>2.0	>2.0
Total Manganese (mg/L)	0.11	>0.15	>0.15
TDS	30(spring) 83(autumn)	>100	>50

Turbidity, pH, EC and Temperature are all automatically monitored and reported through SCADA.

The remaining parameters are manually checked during water quality monitoring.

<table>
<tr><th>OEMP V1</th><th>OEMP V2</th><th>Audit Results</th></tr>
<tr><td>

Table 4.3 Burra Creek proposed water quality parameters and default trigger values

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Mean value in Burra Ck (2008-2010)*</th><th colspan="2">Proposed Trigger Levels downstream of the Burra Creek discharge point during abstraction</th></tr>
<tr><th>Autumn / Winter</th><th>Spring / Summer</th></tr>
<tr><td>Turbidity (NTU)</td><td><5</td><td>>80</td><td>>100</td></tr>
<tr><td>Turbidity HiLo Value</td><td></td><td>150</td><td>150</td></tr>
<tr><td>Turbidity Hi Hi value</td><td></td><td>800</td><td>800</td></tr>
<tr><td>Total Nitrogen (mg/L)</td><td>0.45</td><td>>0.5</td><td>>0.8</td></tr>
<tr><td>Total Phosphorus(mg/L)</td><td>0.015</td><td>0.10</td><td>0.10</td></tr>
<tr><td>Dissolved Oxygen (%sat)</td><td>94.5</td><td><80 or >110</td><td><80 or >110</td></tr>
<tr><td>pH</td><td>7.4</td><td><6.5 or > 8.0</td><td><6.5 or > 8.0</td></tr>
<tr><td>EC</td><td>260</td><td>> 600</td><td>> 400</td></tr>
<tr><td>Temperature °C</td><td>21 (autumn)</td><td>< 5</td><td>> 24</td></tr>
<tr><td>Total Iron (mg/L)</td><td></td><td>>2.0</td><td>>2.0</td></tr>
<tr><td>Total Manganese (mg/L)</td><td></td><td>>0.15</td><td>>0.15</td></tr>
<tr><td>TDS</td><td>230</td><td>>150</td><td>>150</td></tr>
</table>

</td><td></td><td>Turbidity, pH, EC and Temperature are all automatically monitored and reported through SCADA.

The remaining parameters are manually checked during water quality monitoring.</td></tr>
<tr><td>If it is found that exceedance parameter is due to the water abstraction and is causing an unacceptable ecological health risk or reservoir water quality impact, then the pumping of water from the Murrumbidgee River shall cease until such time as the problem can be rectified or mitigation options put in place.</td><td>Same.</td><td>Manual determination. Alarms are activated where trigger levels are exceeded.</td></tr>
<tr><td>If the turbidity values from Angle Crossing or Lobbs Hole on the Murrrumbidgee River exceeds the Hi-Hi value then pumping is to cease until the turbidity drops to below the Hi-Low value.</td><td>Same.</td><td>Automated.</td></tr>
</table>

<table>
<tr><th>OEMP V1</th><th>OEMP V2</th><th>Audit Results</th></tr>
<tr><td>If the cause of the breach is not evident from the data or site information then additional sampling runs are required to determine the cause of the exceedance</td><td>Same.</td><td>Manual determination and response.</td></tr>
<tr><td>The monitoring program shall also be stepped up once pumping is recommenced to confirm that the action taken is successful in eliminating or reducing the parameters back into an acceptable range.</td><td>Same.</td><td>Manual determination and response.</td></tr>
<tr><td>Nil</td><td>Environmental flows rules are governed by an adaptive management framework allowing for refinement and updates of the rules over time.</td><td>N/A</td></tr>
<tr><td>Nil</td><td>Base flow protection rule (normal conditions)
Protect natural flows at the following volumes presented below (ML/d):<table><tr><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr><tr><td>32.5</td><td>22.4</td><td>15.7</td><td>35.0</td><td>54.8</td><td>64.8</td><td>78.9</td><td>98.6</td><td>169.1</td><td>127.6</td><td>130.3</td><td>53.4</td></tr></table></td><td>Programmed into SCADA</td></tr>
<tr><td>Nil</td><td>Base flow protection rule (drought conditions)
Protect natural flows (ML/d) shown below when the following 'drought rule' is triggered – where average flow in at least 15 of the 18 (~80%) past dry season months (Nov-April inclusive) is below the flows shown above.<table><tr><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th></tr><tr><td>115.7</td><td>93.4</td><td>95.2</td><td>75.9</td><td>355.3</td><td>190.9</td></tr></table></td><td>Not programmed into SCADA as too complex and is administered manually</td></tr>
<tr><td>Nil</td><td>Riffle maintenance flow rule - protect a minimum of 195ML/d natural flow, for a period of 24hrs, once every 30days, measured at Lobbs Hole (Stream flow station 410761). Extraction during this period cannot reduce flows to below 250ML/d</td><td>Not programmed into SCADA as a better understanding of the system is required to determine whether automation is possible and necessary.</td></tr>
</table>

3.5 INSTRUMENT CALIBRATION

Water quality instrumentation at the High Lift Pump Station are calibrated in-house by the ACTEW Water instrumentation technicians. The analysers are calibrated in the 7 days period prior to M2G operation. This has occurred 7 times to date (C Pulkkinen e-mail 17/9). Note, calibration records were not cited during this audit.

3.6 FISH EGG FILTERS

The auditor enquired specifically about the fish egg filters and what measures are in place to ensure the integrity of these filters. There are four fish egg filters in place at the Low Lift Pump Station, with a spare filter located at the High Lift Pump Station. The spare filter was observed by the auditor. The filter is essentially a large drum, perforated by many narrow horizontal slits. These are sized to exclude carp eggs. As the drum rotates, a rubber cleaning flap passes over the slits, pushing any particles (including eggs) off to the side where they are disposed of via the eductors back into the Murrumbidgee River.

The filters can only fail by way of physical damage leading to an increase in the size of the slits. Each filter is checked annually for damage.

The auto cleaning mechanism can fail which would lead to a build up of water pressure. This triggers an alarm in SCADA, which requires a manual over ride. However, such a failure would not lead to a failure to remove fish eggs due to the design of the filters.

3.7 CO2 DOSING SYSTEM

Whilst the pipeline is in standby mode, the CO2 dosing system is disengaged from the main pipeline. On the day of the water transfer event, the operator is required to manually open the valve.

ATTACHMENT A

Observations of Concern Issued at the Close-Out Meeting

Observation of Concern (OoC) Form OoC No.: 001
Audit Date: 27th August 2014
Activities Under Review: Water transfer event
Audit Criteria: OEMP, SFWQMP, Planning Approvals
Type of Audit: X External Audit ☐ Internal Audit
Requirement (Standard Clause #, procedure #):
OEMP (v2) Section 3.7

Observation:
The way in which E&S formulates its response to the 4-week Notification could be improved. A more systematic approach, such as a checklist, a prompt-list, or a procedure, could be used to ensure a more thorough consideration of any issues is given.
Proposed Action:
Date action is to be completed by: Prior to next scheduled flow event

Action taken:
Client Representative Name: **Signature:**
Date:

ngh environmental

Observation of Concern (OoC) Form OoC No.: 002
Audit Date: 27th August 2014
Activities Under Review: Water transfer event
Audit Criteria: OEMP, SFWQMP, Planning Approvals
Type of Audit: X External Audit ☐ Internal Audit
Requirement (Standard Clause #, procedure #):
OEMP – Section 10

Observation:
The remote Plant Operator is required to undertake pre-start checks. A checklist is used to complete these checks. This checklist does not appear to be a controlled form or have any document controls.
Proposed Action:
Date action is to be completed by: Prior to next scheduled flow event

Action taken:	
Client Representative Name:	**Signature:**
Date:	

ngh environmental

Observation of Concern (OoC) Form OoC No.: 003
Audit Date: 27th February 2014
Activities Under Review: Water transfer event
Audit Criteria: OEMP, SFWQMP, Planning Approvals
Type of Audit: X External Audit ☐ Internal Audit
Requirement (Standard Clause #, procedure #):
SFWQMP – Section 7.5

Observation:
It is considered that the reliance on the Incident Management System to report out-of-spec readings in Burra Creek is insufficient. A better approach would be for regular communications between Operations and Environmental staff during a water transfer event, such that trends can be analysed and exceedances can be pre-empted. WI1011 should include communication protocols to be implemented during a water transfer event.
Proposed Action:
Date action is to be completed by: Prior to next scheduled flow event

Action taken:	
Client Representative Name:	**Signature:**
Date:	

ATTACHMENT B

Audit Documentation

Erwin Budde

From: ACTEW Water Talk To Us <TalkToUs@actew.com.au>
Sent: Tuesday, 19 August 2014 11:47 AM
To: ACTEW Water Talk To Us
Subject: Murrimbidgee to Googong (M2G) Pump Operations

Dear Customer

ACTEW Water will be exercising the equipment on the M2G pipeline to ensure its usability and functionality. This work is intended to commence on **25 August 2014** and be completed by **26 September 2014**. The works will include pumping within the first week and again at the completion of the maintenance.

The intended maximum flow during this period is 49 Megalitres (ML) per day.

In order to monitor the pipeline operation, our staff will require access to properties that are traversed by the pipeline. We will be following the agreed access arrangements as outlined in the Property Interaction Plan and Access, Construction and Easement Agreements.

We are committed to operating the pipeline in a manner that minimises disruption and inconvenience to the local community and environment.

Should you have any questions or feedback about the work, or an emergency, please contact us on (02) 6248 3111. Alternatively send us an email to talktous@actew.com.au.

Thank you for your cooperation in this matter.

Yours sincerely

Jeremy Jackson
Customer Services
Customer Solutions Group
ACTEW Water

GPO Box 366 Canberra ACT 2601
t 02 6248 3111 I **f** 02 6242 1459
www.actew.com.au

Erwin Budde

From: Bryant, Benjamin <Benjamin.Bryant@actew.com.au>
Sent: Friday, 22 August 2014 4:03 PM
To: Erwin Budde
Cc: Pulkkinen, Chris; Butterfield, Bronwen
Subject: FW: M2G APPLE Run - August 2014 UPDATE

FYI – stay tuned on Monday…

From: Turner, Elizabeth
Sent: Friday, 22 August 2014 4:00 PM
To: _M2G external Stakeholder Notifications; _M2G internal Stakeholder Notifications
Subject: M2G APPLE Run - August 2014 UPDATE

Hi All,

Currently turbidity in the Murrumbidgee River measured at Angle Crossing is slightly high. It is trending down and should be within target by the scheduled pump start date.

Forecasted rainfall will be monitored over the weekend and a large amount may result in a late deferral of the pump operation. Otherwise the pump operation will proceed as planned.

Regards,
Liz

From: Turner, Elizabeth
Sent: Tuesday, 12 August 2014 5:22 PM
To: _M2G external Stakeholder Notifications; _M2G internal Stakeholder Notifications
Subject: M2G APPLE Run - 2 week Notification for August 2014

Hi all,

This is a **2 week** notification as to a planned start up for a M2G APPLE run (Angle crossing Planned Pumped Lubrication Exercise). Commence pumping on **Tuesday 26 August** and ceasing by **Thursday 28 August**. Next email advice will be sent on **Friday 22 August**, 10 days away.

Please consider your responsibility for the M2G scheme and advise via email any issues that may prevent or delay the operation of the scheme. Response required by email to _WaterWDE@actew.com.au within 1 week of this email.

NOTE: Once this run is completed, there are some maintenance activities to be completed on the pipeline. The small pump will then need to be restarted to refill the main within 2 weeks.

The planned pumping schedule is to enable an operator to attend site during pump changeover:

August 22 Friday
Review parameters pertaining to the permission to perform a maintenance run.

August 26 Tuesday 8am – Refill main
Start pumping at nominal 21 ML/d.

August 26 Tuesday 11am (approx.) – 0.5hr after discharge from the pipeline into Burra Creek. Hydro to start prior to pump increase

Increase flow to nominal 49 ML/d

August 26 Tuesday 3pm – after first pump has operated for at least 4hrs

Change over large pump and continue pumping at nominal 49 ML/d

August 27 Wednesday morning – after second pump has operated for at least 4hrs (Day 1 of DQS Audit)

Continue operating at 49ML/d until auditors are onsite to witness pump step down

Reduce flow to nominal 21 ML/d and run at this flow for at least 4hrs

August 28 Thursday Pump shutdown

The following maintenance activities are to be carried out in the next two weeks:

- Scour valve replacement on the rising main side
- Leak detection on the penstock side with correlator
- CO2 drain down sequence testing

Up to 2 weeks after August 28

Start small pump to refill pipeline after maintenance activates

Once pipeline is full, cease pumping and park system

Outstanding issues that could defer the APPLE run:

Current issues that should be resolved before the APPLE run:

- **WQ sample pump has arrived but is yet to be installed by fitters**
- **Instrumentation calibration requires sample pump to be operational**

Please let me know if there are any other issues that may affect the APPLE run going ahead.

Regards,
Liz

Elizabeth Turner
Water Distribution Engineer
ACTEW Water

GPO Box 366 Canberra ACT 2601
t 02 6242 1424 I **f** 02 6242 1486 I **m** 0406 376 087
www.actew.com.au

Erwin Budde

From: Bryant, Benjamin <Benjamin.Bryant@actew.com.au>
Sent: Wednesday, 30 July 2014 8:50 AM
To: Erwin Budde
Cc: Pulkkinen, Chris
Subject: FW: M2G APPLE Run - 4 week Notification for August 2014

FYI Erwin
Ben

Benjamin Bryant
Team Leader Impact Assessment and Approvals
Environment & Sustainability
ACTEW Water

GPO Box 366 Canberra ACT 2601
t 02 6270 7661 **| m** 0420 536 556 **| f** 02 6175 2322
www.actew.com.au

From: Turner, Elizabeth
Sent: Tuesday, 29 July 2014 3:41 PM
To: _M2G internal Stakeholder Notifications
Cc: _M2G external Stakeholder Notifications
Subject: M2G APPLE Run - 4 week Notification for August 2014

Hi all,

This is a **4 week** notification as to a planned start up for a M2G APPLE run (Angle crossing Planned Pumped Lubrication Exercise). Commence pumping on **Tuesday 26 August** and ceasing by **Thursday 28 August**. Next email advice will be sent on **Monday 11 August**, two weeks away.

Please consider your responsibility for the M2G scheme and advise via email any issues that may prevent or delay the operation of the scheme. Response required by email to _WaterWDE@actew.com.au within 1 week of this email.

NOTE: Once this run is completed, there are some maintenance activities to be completed on the pipeline. The small pump will then need to be restarted to refill the main within 2 weeks.

The planned pumping schedule is to enable an operator to attend site during pump changeover:
(schedule may be delayed by one day at the external auditors request)

August 22 Friday
Review parameters pertaining to the permission to perform a maintenance run.

August 26 Tuesday 8am – Refill main
Start pumping at nominal 21 ML/d.

August 26 Tuesday 11am (approx.) – 0.5hr after discharge from the pipeline into Burra Creek. Hydro to start prior to pump increase
Increase flow to nominal 49 ML/d

August 26 Tuesday 3pm – after first pump has operated for at least 4hrs
Change over large pump and continue pumping at nominal 49 ML/d

August 27 Wednesday morning – after second pump has operated for at least 4hrs
Reduce flow to nominal 21 ML/d and run at this flow for at least 4hrs

August 28 Thursday Pump shutdown

The following maintenance activities are to be carried out in the next two weeks:

- Scour valve replacement on the rising main side
- Leak detection on the penstock side with correlator
- CO2 drain down sequence testing

Up to 2 weeks after August 28

Start small pump to refill pipeline after maintenance activates
Once pipeline is full, cease pumping and park system

Specific responses are required in response to the following actions:

Stakeholder	Action required
Remote plant operators	check availability
Maintenance Services – Headwork's	check availability
Maintenance Services – Instrumentation, Electrical, Fitters and non-trades	check availability of assets and resources
Water Quality	check WQ conditions are suitable
Automation	confirm if there are any outstanding automation changes that are required
Customer Service	prepare to notify
Environment & Sustainability	Advice that there are no outstanding issues, eg. Review any remedial works
Quality and Compliance	Check whether an internal M2G system audit is due
Management	for info
'Person in Charge' under NSW Pipeline Licence No. 37	for info
Energy Networks	Confirm if there are any planned power interruptions in the next two months that would affect the M2G system

Please let me know if there are any other issues that may affect the APPLE run going ahead.

Regards,
Liz

Elizabeth Turner
Water Distribution Engineer
ACTEW Water

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