



**DEPARTMENT OF FINANCE WA**  
**50 M<sup>3</sup>/DAY EUCLA TOWN RO PLANT**

**COMMISSIONING**  
**PROCEDURES & RECORDS**

Tristar Project No	P1236
Client	Department of Finance WA
Site	Eucla Town
Client Representatives	Andrew Dooley
Tristar Project Manager	Denny Denny
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## 2 INTRODUCTION

The Eucla Town RO WTP is configured as a 1 x 100% system, designed to treat up to 50m<sup>3</sup>/day of RO Permeate, as detailed below:

Compound	Unit	Feed	Permeate
pH		7.9	6.5 – 8.5
TDS	mg/L	< 6730	< 600

### 2.1 REFERENCE DOCUMENTS

Document Tittle	Document Number
P&ID	P1236-P-101
P&ID	P1236-P-201
Control Philosophy	P1236-CP-001

### 2.2 COMMISSIONING SETUP

The following commissioning procedure outlines the method and parameters tested during the commissioning conducted at site. The purpose of the commissioning is to validate that key elements of system performance are met. These test procedures are designed to verify that the system is fully installed and commissioned on site meets required criteria in all respects of its design.

The system shall be fully installed and commissioned on site. All equipment and instrumentation will be started up and tested. If all respects of its design are satisfied, the system will run as normal operation after the commissioning.

### 3 PRE-COMMISSIONING

Item	Description	Completed By
1	Ensure the skid is clean, barricading is in place and it is safe to commence commissioning.	DR
2	Ensure that the power supply is wired into the control cabinet on the skid.	DR
3	Verify feed water conductivity.	DR
4	Load the media filter into Media Filter Vessel (MF-101). Loading Schedule from Bottom to Top Layer: <ul style="list-style-type: none"> <li>- 5/2 Gravel, 40 kg = 1.6 bags</li> <li>- 8/16 Sand #6 Sand, 25kg = 1 bag</li> <li>- AFM Glass Media, Grade 1, 0.4 - 1.0 mm, 136.5kg =6.5 bags</li> <li>- Australian Filter Coal 1.3 - 1.4mm (1.15cuft), 44kg = 2 bags</li> </ul>	DR
5	Load the Calcite media into Calcite Filter Vessel (CAL-101). Loading Schedule from Bottom to Top Layer: <ul style="list-style-type: none"> <li>- 6/3 Gravel, 40kg = 1.6 bags</li> <li>- 8/16 Sand #6 Sand, 25kg = 1 bag</li> <li>- Calcite, 247.5kg = 11 bags</li> </ul>	DR
6	Check that pipe work is secure and that additional supports are not required.	DR
7	Ensure all guards are in place including pump guards.	DR
8	Check all nuts and bolts are tight around pumps and that all unions and pipe-works connections are tight.	DR
9	Ensure Victaulic fittings are tight.	DR
10	Ensure that the level switches for Potable Water Tank is installed.	DR
11	Ensure that the Level Transmitter for Feed Water Tank is installed.	DR
12	Ensure that the existing feed water supply is plumbed to the inlet/suction of Low Pressure Pump.	DR
13	Ensure that the RO reject and backwash out is plumbed into the existing RO Reject and Backwash Pipe.	DR
14	Ensure the potable water outlet is plumbed into the existing Potable Water Pipe.	DR
15	Ensure the existing recirculation inlet is plumbed to the inlet/suction of Recirculation Pump.	DR
16	Ensure the recirculation outlet is plumbed into the existing recirculation pipe outlet.	DR
17	Calibrate Feed Water pH Analyser.	DR
18	Calibrate Potable Water pH and Chlorine Analyser.	DR
19	Calibrate Potable Water Turbidity Analyser.	DR
20	Open some underneath isolation manual valves: V-101, V-102, V-103, V-105, V-107, V-108, V-109, V-110, V-111, V-112, V-113, V-114, V-117, V-118, V-122, V-123, V-123, V-125, V-127, V-128, V-129, V-130, V-135, V-136, V-137, V-138, V-141, V-201, V-202, V-204, V-206, V-207, V-208, V-209, V-210, A quarter open of V-211, V-213, V-216. The rest of the valves are closed.	DR



## 4 COMMISSIONING PROCEDURE

Item	Description	Completed By
1	Verify that the emergency stop button is functioning and registers as an alarm.	DR
2	Verify Low Pressure Pump 1 (PU-101A) start and stop manually and motor rotation is correct.	DR
3	Verify Low Pressure Pump 2 (PU-101B) start and stop manually and motor rotation is correct.	DR
4	Verify Anti Scalant Dosing Pump 1 (PU-102A) start and stop manually. Ensure Anti Scalant Dosing Pump 1 (PU-102A) delivers the correct flowrate. Use cylinder to confirm flowrate. Confirm dosing point is correct.	DR
5	Verify Anti Scalant Dosing Pump 2 (PU-102B) start and stop manually. Ensure Anti Scalant Dosing Pump 2 (PU-102B) delivers the correct flowrate. Use cylinder to confirm flowrate. Confirm dosing point is correct.	DR
6	Verify High Pressure Pump 1 (PU-103A) start and stop manually and motor rotation is correct.	DR
7	Verify High Pressure Pump 2 (PU-103B) start and stop manually and motor rotation is correct.	DR
8	Verify Sulphuric Acid Dosing Pump 1 (PU-104A) start and stop manually. Ensure Sulphuric Acid Dosing Pump 1 (PU-104A) delivers the correct flowrate. Use cylinder to confirm flowrate. Confirm dosing point is correct.	DR
9	Verify Sulphuric Acid Dosing Pump 2 (PU-104B) start and stop manually. Ensure Sulphuric Acid Dosing Pump 2 (PU-104B) delivers the correct flowrate. Use cylinder to confirm flowrate. Confirm dosing point is correct.	DR
10	Verify Recirculation Pump 1 (PU-201A) start and stop manually and motor rotation is correct.	DR
11	Verify Recirculation Pump 2 (PU-201B) start and stop manually and motor rotation is correct.	DR
12	Verify Sodium Hypochlorite Dosing Pump 1 (PU-202A) start and stop manually. Confirm dosing point is correct.	DR
13	Verify Sodium Hypochlorite Dosing Pump 2 (PU-202B) start and stop manually. Confirm dosing point is correct.	DR
14	Verify Inlet Feed Water Automatic Valve (AV-101) open/close function works manually.	DR
15	Verify CIP/Flush Inlet Automatic Valve (AV-102) open/close function works manually.	DR
16	Verify Let Down Bypass Automatic Valve (AV-103) open/close function works manually.	DR
17	Verify Inlet pH Analyser (pH-101) is installed and registered on HMI.	DR
18	Verify Inlet Feed Conductivity Analyser (KI-101) is installed and registered on HMI.	DR
19	Verify RO Permeate Conductivity Analyser (KI-102) is installed and registered on HMI.	DR
20	Verify Potable Water Conductivity Analyser (KI-201) is installed and registered on HMI.	DR
21	Verify Potable Water Turbidity Analyser (TUR-201) is installed and registered on HMI.	DR

Item	Description	Completed By
22	Verify Potable Water pH and Chlorine Analyser (pH-201/CL-201) is installed and registered on HMI.	DR
23	Verify Feed Tank Level Transmitter (LT-101) is installed and registered on HMI.	DR
24	Verify Low Level Float Switch (LS-101) inside Anti Scalant Tank is installed and registered on HMI.	DR
25	Verify Low Level Float Switch (LS-102) inside Sulphuric Acid Tank is installed and registered on HMI.	DR
26	Verify Low Level Float Switch (LS-103) inside CIP Tank is installed and registered on HMI.	DR
27	Verify Low Level Float Switch (LS-201 & LS-202) inside Sodium Hypochlorite Tank is installed and registered on HMI.	DR
28	Verify High Level Float Switch (LS-203) inside Potable Water Tank is installed and registered on HMI.	DR
29	Verify Working Level Float Switch (LS-204) inside Potable Water Tank is installed and registered on HMI.	DR
30	Verify Low-Low Level Float Switch (LS-205) inside Potable Water Tank is installed and registered on HMI.	DR
31	Verify Media Filter Inlet Pressure Indicator Transmitter (PIT-101) is installed and registered on HMI.	DR
32	Verify Media Filter Outlet Pressure Indicator Transmitter (PIT-102) is installed and registered on HMI.	DR
33	Verify 1 Micron Cartridge Filter Outlet Pressure Indicator Transmitter (PIT-103) is installed and registered on HMI.	DR
34	Verify RO Inlet Pressure Indicator Transmitter (PIT-104) is installed and registered on HMI.	DR
35	Verify RO Concentrate Pressure Indicator Transmitter (PIT-105) is installed and registered on HMI.	DR
36	Verify Recirculation Pump Discharge Pressure Indicator Transmitter (PIT-201) is installed and registered on HMI.	DR
37	Verify RO Permeate Flow Indicator Transmitter (FIT-101) is installed and registered on HMI.	DR
38	Verify RO Reject Flow Indicator Transmitter (FIT-102) is installed and registered on HMI.	DR
39	Verify RO Concentrate Recirculation Flow Indicator Transmitter (FIT-103) is installed and registered on HMI.	DR
40	Backwash Media Filter Vessel (MF-101) until backwash water out is clear.	DR
41	Flush out all preserved media from RO system for 10 minutes until there is no any preserved media inside RO system.	DR
42	Start-up RO Plant in Manual mode and run for 15 minutes.	DR
43	Ensure all leaks in RO System are rectified.	DR
44	Set all flow rates / pressures as per RO simulation and record in table below.	DR
45	Once the RO plant is manually tested and verified, run the system in Automatic mode. Ensure RO plant starts/stops automatically as per control philosophy.	DR
46	Verify Remineralisation (Calcite and Sulphuric Acid dosing System) operation.	DR
47	Verify Media Filtration Backwash trigger activation by timer and High Differential Pressure.	DR
48	Put RO system in offline. Ensure plant offline as per control philosophy.	DR

Item	Description	Completed By
49	Run CIP mode and ensure operability.	DR
50	Start-up Potable Water Recirculation system in Manual mode and run for 15 minutes.	DR
51	Ensure all leaks in Recirculation System are rectified.	DR
52	Once the Recirculation system is manually tested and verified, run the system in Automatic mode. Ensure Recirculation System starts/stops automatically as per control philosophy.	DR
53	Verify Aeration system (Ejector) operation.	DR
54	Put Recirculation system in offline. Ensure plant offline as per control philosophy.	DR
55	Run the RO and Recirculation System in Auto Mode.	DR
56	After Recirculation System is running in Auto mode for 24 hours, calibrate the pH/Cl probe.	DR
57	Test Remote Monitoring Connection System	DR



## 5 COMMISSIONING DATA

Item	Parameter	Units	Design	Actual
1	Feed Water Tank Level Transmitter (LT-101)	%	< 30	85
2	Inlet Feed Water Temperature (TG-101)	°C	15 - 35	25
3	Inlet Feed Water pH (pH-101)	pH	7.8	7.8
4	Inlet Feed Water Conductivity (KI-101)	uS/cm	≤11,000	10878
5	RO Permeate Conductivity (KI-102)	uS/cm	≤200	182
6	Potable Water Conductivity (KI-201)	uS/cm	≤800	200
7	Potable Water Turbidity (TUR-201)	NTU	<1.0	0.5
8	Potable Water pH (pH-201)	pH	6.5 - 8.5	7.5
9	Potable Water Chlorine (CL-201)	mg/L	0.2 - 0.6	0.59
10	Media Filter Inlet Pressure (PIT-101)	kPa	300 - 500	280
11	Media Filter Outlet Pressure (PIT-102)	kPa	200 - 400	240
12	Media Filter Differential Pressure	kPa	<100	40
13	1 Micron Cartridge Filter Pressure (PIT-103)	kPa	120 - 320	220
14	1 Micron Cartridge Filter Differential Pressure	kPa	<80	20
15	RO Inlet Pressure (PIT-104)	kPa	1300 - 1400	1325
16	RO Concentrate Pressure (PIT-105)	kPa	1280 - 1380	1285
17	Recirculation Pump Discharge Pressure (PT-201)	kPa	200	256
18	RO Permeate Flow (FIT-101)	M <sup>3</sup> /h	2.2	2.2
19	RO Reject Flow (FIT-102)	M <sup>3</sup> /h	2.2	2.2
20	RO Concentrate Recirculation (FIT-103)	M <sup>3</sup> /h	2.5	2.5
21	Potable Water Aeration Ejector Flow (FI-201)	L/h	1,200	1200
22	Anti Scalant Dosing Pumps stroke (PU-102A/B)	%	35	35
23	Sulphuric Acid Dosing Pumps stroke (PU-104A/B)	%	1	1
24	Sodium Hypochlorite Pumps Flow (PU-202A/B)	mL/h	20	20



## 6 CONSUMABLES AVAILABILITY RECORD

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Stocktake of Consumables on Site at time of departure:

- 30" x 1micron cartridge filters

2 boxes

- Anti Scalant

4 x 200 L

- Sulphuric Acid

3 x 200 L

- Alkaline cleaner

3 x 16 L

- Citric acid membrane cleaner

8 x 20 L

- Sodium Hypochlorite

15 x 20 L

## 7 COMMISSIONING SIGNED OFF

### Operator Training & Documentation

Operator training was provided to the following Site personnel:-

Signature: _____	Signature: _____
Name: <u>RUSSEL C</u>	Name: _____
Position: _____	Position: _____
Company: _____	Company: _____
Date: _____	Date: _____

Hard copy of manual available on Site? YES/NO  
Hard and Electronic copy of log sheet available on Site? YES/NO

(Draft)

### Plant Commissioned By

Signature: [Signature]  
Name: DENNY DENNY  
Position: LEAD ENGINEER  
Company: TWS  
Date: 19.10.2019

### Client's Representatives (as Commissioning Witness)

Signature: \_\_\_\_\_  
Name: \_\_\_\_\_  
Position: \_\_\_\_\_  
Company: \_\_\_\_\_  
Date: \_\_\_\_\_

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## 8 COMMISSIONING NOTES

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