

CONTRACT NO: JBALB/HQ/K004/2024

**SARAWAK WATER SUPPLY GRID PROGRAM – STRESSED AREAS IMPROVEMENT
OF WATER SUPPLY SYSTEM IN BETONG DIVISION
PACKAGE 4–UPGRADING OF LUBAU WTP (RE-TENDER)**

**Appendix D:
Standard Site Form for Mechanical & Electrical Work**

FORM M-GE-1	SECTIONAL PIPE PRESSURE TEST FORM
FORM M-GE-2	PIPE WELDED JOINT AIR TEST
FORM M-GE-3	PRE-COMMISSIONING OF PUMPS - INSTALLATION CHECK - CABLE INSULATION
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FORM M-GE-18	FLOW METER TEST FORM
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Appendix D:
Standard Site Form for Mechanical & Electrical Work

FORM E-LV-1	TESTING AND COMMISSIONING OF SWITCH BOARD
FORM E-LV-2	TESTING AND COMMISSIONING OF GENERATOR SETS
FORM E-LV-3	MAIN POWER CABLE INSULATION TEST
FORM E-LV-4	EARTH RESISTANCY TEST
FORM E-LV-5	DISTRIBUTION BOARD SUB-CIRCUIT TEST
FORM E-LV-6	AIR CONDITIONING UNIT TEST

MAIN CONTRACTOR:  GROUP ENGINEERS MALAYSIA SDN BHD	PROJECT TITLE:	CLIENT:  JABATAN BEKALAN AIR LUAR BANDAR SARAWAK
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FORM M-GE-6

TESTING AND COMMISSIONING OF PUMPS
SUBMERSIBLE PUMP (MAS) CONTROLLER PROTECTION SETTING

Pump No. / Location: _____

Equipment Tag No. : _____

Serial No. : _____

Date : _____

PUMP MAS PROTECTION		Pre-Set Value		
		Warning	Trip	Unit
a)	Temperature Stator ph 1			°C
b)	Temperature Stator ph 2			°C
c)	Temperature Stator ph 3			°C
d)	Temperature Main Bearing			°C
e)	Leakage Stator Housing			mA
f)	Leakage Junction Box			mA
g)	Vibration			mm/s
h)	Pump Current			Amp
g)	Current Unbalance			%
h)	Voltage Unbalance			%
i)	Low Power			kW
PUMP OPERATION PROTECTION		Pre-Set Value		
a)	Low Water Level in Suction Chamber / Reservoir			m
b)	Discharge Main Pipe High Pressure Stop - Pressure Sensor			Bar
c)	Discharge Header High Pressure Stop - Pressure switch			Bar

Remarks :

Tested By:	Witnessed By:	
Contractor Representative	Consultant Representative	Client Representative
Name:	Name:	Name:
Date :	Date :	Date :

MAIN CONTRACTOR:  GROUP ENGINEERS MALAYSIA SDN BHD	PROJECT TITLE: 	CLIENT:  JABATAN BEKALAN AIR LUAR BANDAR SARAWAK
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FORM M-GE-7

- Sheet 1/2

TESTING AND COMMISSIONING OF PUMPS **HORIZONTAL SPLIT CASING PUMP & MOTOR PROTECTION SETTING**

Pump No. / Location : _____

Equipment Tag No. : _____

Serial No. : _____

Date : _____

PUMP & MOTOR PROTECTION		Pre-Set Value		
a)	Low Water Level in Suction Reservoir	m		
b)	Valve Closed Interlock			
		Warning	Trip	Unit
c)	Motor Winding			°C
d)	Motor NDE Bearing			°C
e)	Motor DE Bearing			°C
f)	Pump NDE Bearing			°C
g)	Pump DE Bearing			mA
h)	Heater connection			
i)	Pump Discharge Pressure Switch			
j)	Discharge Main Pipeline Pressure Sensor			

Remarks :

Tested By:	Witnessed By:	
Contractor Representative	Consultant Representative	Client Representative
Name:	Name:	Name:
Date :	Date :	Date :

MAIN CONTRACTOR:  GEM GROUP ENGINEERS MALAYSIA SDN BHD	PROJECT TITLE: 	CLIENT:  JABATAN BEKALAN AIR LUAR BANDAR SARAWAK
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FORM M-GE-7

- Sheet 2/2

TESTING AND COMMISSIONING OF PUMPS **HORIZONTAL SPLIT CASING PUMP & MOTOR PROTECTION SETTING**

System: _____ Location : _____

m) Instruments Signal Output Scaling:

System Level Sensor
System Pressure Sensor

Minimum	Maximum
() mA	() mA
() mA	() mA

* Data obtain from sensor name plate

n) Instruments / Sensors Signal Record

System Level Sensor
System Pressure Sensor

Sensor Signal Output (Min)	Sensors Reading	Sensor Signal Output (Max)	Sensors Reading
4 mA	() m	20 mA	() m
4 mA	() Bar	20 mA	() Bar

* Reding obtain from sensor name plate or logged in to sensor's system parameter

Remarks :

Tested By:	Witnessed By:	
Contractor Representative	Consultant Representative	Client Representative
Name:	Name:	Name:
Date :	Date :	Date :

MAIN CONTRACTOR:  GROUP ENGINEERS MALAYSIA SDN BHD	PROJECT TITLE:	CLIENT:  JABATAN BEKALAN AIR LUAR BANDAR SARAWAK
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FORM M-GE-7-2

- Sheet 1/1

TESTING AND COMMISSIONING OF AUXILLARY PUMPS

Location : _____	Equipment Tag No. : _____
Type: _____	Service: _____
Brand : _____	Model : _____
Power (kw) : _____	Capacity: _____
Serial No. : _____	Date : _____

PUMP & MOTOR PROTECTION		Result	
		Pump 1	Pump 2
a)	Low Water Level in Suction Chamber - Operation Prohibited (m)		
b)	High Water Level in Suction Chamber - Operation allow (m)		
c)	Emergency Stop Function		
d)	Float Switch Function		
TEST DESCRIPTION			
e)	Closed Valve Current (A)		
f)	Fully Open Valve Current (A)		
g)	Pressure (m)		
h)	Voltage (V)		
i)	Correct Rotation Check		
j)	Observed any abnormal vibration/ sound during operation?		

Remarks :

Tested By:	Witnessed By:	
Contractor Representative	Consultant Representative	Client Representative
Name:	Name:	Name:
Date :	Date :	Date :

MAIN CONTRACTOR:  GROUP ENGINEERS MALAYSIA SDN BHD	PROJECT TITLE:	CLIENT:  JABATAN BEKALAN AIR LUAR BANDAR SARAWAK
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FORM M-GE-8

SURGE SUPPRESSION SYSTEM TEST FORM

Location: _____

A Air Compressor Functionality Test (Unit ___ of ___)

Equipment Information:

Manufacturer : _____

Rating: _____

Model : _____

Compressor S/N: _____

Motor S/N: _____

Capacity : _____

Air Compressor Operation Test

- | | | |
|-----|-----------------------------|----------------------|
| i | Manual Start/Stop | <input type="text"/> |
| ii | Auto Start/Stop by pres.sw. | <input type="text"/> |
| iii | Running Voltage (V) | <input type="text"/> |
| v | Running Current (A) | <input type="text"/> |

- | | | |
|------|---|----------------------|
| vi | Overload Trip Test | <input type="text"/> |
| vii | Overload Trip Set (A) | <input type="text"/> |
| viii | Tank Safety Air Valve functionality Test | <input type="text"/> |
| | - Compressed air safety relief valve set at | <input type="text"/> |

B Surge Vessel Functionality Test

- i. Verification of Water Level Electrode cables connection correct.

Electrode designation
Panel Terminal Correct
Length (m)

COM	HHWL	HWL	NWL	LWL	LLWL

- ii. Detected Water Levels Functioning Test



Status	Change of water level							
HHWL								
HWL								
NWL								
LWL								
LLWL								
ARV on (Open)								
ARV off (Closed)								
AC Start; Solenoid Valve Open								
AC Stop; Solenoid Valve Close								
LLWL Alarm Cut off Signal Outpost								
HHWL Alarm Cut off signal Outpost								
Eq. Response Action (a/r)								

- vi Interlock Signal to stop RWP operation

Yes/No _____

Comment:

Tested By:	Witnessed By:	
Contractor Representative	Consultant Representative	Client Representative
Name:	Name:	Name:
Date :	Date :	Date :

MAIN CONTRACTOR: <div style="text-align: center;">  GEM GROUP ENGINEERS MALAYSIA SDN BHD </div>	PROJECT TITLE: 	CLIENT: <div style="text-align: center;">  JABATAN BEKALAN AIR LUAR BANDAR SARAWAK </div>
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TREATED WATER PUMP OPERATION RECORD

FORM M-GE-12

Total Pump On Duty : _____ Equipment Tag No: _____ Location: _____ <u>Pump Information</u> Make : _____ Model : _____ Duty Point : _____	Pump/ motor SN: _____ / _____ Date: _____ <u>Motor Information</u> Motor Speed : _____ rpm Motor : _____ kW Electrical characteristics: _____ A
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Time	Individual Pump Discharge Pressure (m)	Main Discharge Header Pressure (m)	Inlet Tank/Channel Water Level (m)	Flow (m3/Hr)	Running Current (Amp)	Voltage (Vac)	Running Speed (Rpm/Hz)	Bearing Temperature (°C)				Motor Winding Temperature (°C)	Vibration (mm/s)	
								Pump		Motor			Motor	Pump
								Drive End (DE)	Non Drive End (NDE)	Drive End (DE)	Non Drive End (NDE)			

Comment :		
Tested By: _____ <i>Contractor Representative</i>	Witnessed By: _____ <i>Consultant Representative</i>	
_____ <i>Contractor Representative</i>	_____ <i>Client Representative</i>	
Name:	Name:	Name:
Date:	Date:	Date :

MAIN CONTRACTOR:  GROUP ENGINEERS MALAYSIA SDN BHD	PROJECT TITLE: 	CLIENT:  JABATAN BEKALAN AIR LUAR BANDAR SARAWAK
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TOP ENTRY MIXER TEST FORM

Equipment Tag No. : _____
Location : _____

FORM M-GE-13

1. Equipment Details

MIXER		MOTOR	
Manufacturer	MIXTEC	Manufacturer	
Model		Serial No.	
SerialL No.		Voltage/ Ph/ V	
Tank turnover		Power / Current	kW Amp
Superficial velocity		Speed	

2. Visual Inspection:	YES	NO	Remark
a) Mixer Frame mounting check			
b) Mixer shaft alignment check			
c) Rotation check			
d) Cable entry & termination			
e) Emergency stop			
f) Local Start/Stop			
g) Operation protection			
h) Motor installed with shed? (if applicable)			

3 Cable Insulation Test

Power Cable	R-Y	R-B	Y-B	R-E	Y-E	B-E
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4. Operational Test	YES	NO	Remark
Mixer Stator Method: Variable Speed Drive <input type="checkbox"/> DOL <input type="checkbox"/> AT <input type="checkbox"/>			
a) Manual operation test			
b) Auto operation test			
c) Remote operation test			
d) Emergency stop functionality test			
e) Low Water Level Start Prohibited Test			
f) Local Start/Stop			
g) Motor installed with Shed? (if applicable)			

5. Operation Data

Voltage (Vac)			Current (Amp)		
R-Y	R-B	Y-B	R	Y	B
Regulated Speed (rpm/Hz) :					

Remarks:

Prepared By:	Witnessed By:	
Contractor Representative	Consultant Representative	Client Representative
Name:.....	Name:.....	Name:.....
Date:.....	Date:.....	Date:.....

MAIN CONTRACTOR:  GROUP ENGINEERS MALAYSIA SDN BHD	PROJECT TITLE:	CLIENT:  JABATAN BEKALAN AIR LUAR BANDAR SARAWAK
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FORM M-GE-14

METERING PUMP TEST FORM

1. EQUIPMENT:		2. LOCATION	
3. EQUIPMENT DETAIL			
PUMP		MOTOR	
MANUFACTURER	PROMINENT	VOLTAGE / PH / Hz	415V/3ph/50Hz
MODEL		POWER	
SERIAL No.		SERIAL No.	
DESIGN CAPACITY		TYPE ENCLOSURE	IP55
4. VISUAL INSPECTION:		YES	NO
a) Dosing skids frame mounting check			Remark
b) Pipeline leakage check			
c) Cable entry & termination check			
d) Emergency stop			
e) Local Start/Stop			
f) Rotation check			
g) Pump suction tank level switch installation			
h) Motor c/w with force cooling fan (if applicable)			

5. INSULATION RESISTANCE TEST			
PHASE TO EARTH	R to E:	Y to E:	B to E:

6. CHEMICAL METERING PUMP RUNNING DATA			
CHEMICAL PUMP STROKE (%)	FLOWRATE (L/MIN)		RUNNING CURRENT (Amp)
50			
40			
30			
20			

7. MANUAL START / STOP FUNCTIONALITY TEST	ACCEPTED :	FAILED :
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8. PUMP RUNNING CHECK		9. PUMP ACCESSORIES SETTINGS	
CALIBRATION CYLINDER (Y/N) :		BACK PRESSURE VALVE SETTING (Bar):	
ABNORMAL NOISE (Y/N) :		PRESSURE RELIEF VALVE SETTING (Bar):	
SUCTION WITH STRAINER (Y/N) :		SAFETY RELIEF PIPE CONNECTED (Y/N)	

Prepared By:	Witnessed By:	
Contractor Representative	Consultant Representative	Client Representative
Name:.....	Name:.....	Name:.....
Date:.....	Date:.....	Date:.....

MAIN CONTRACTOR:  GROUP ENGINEERS MALAYSIA SDN BHD	PROJECT TITLE:	CLIENT:  JABATAN BEKALAN AIR LUAR BANDAR SARAWAK
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FORM M-GE-20
- Sheet 1/1

FILTER VALVE/ PENSTOCK OPERATION TEST FORM

Location	Valve/ Penstock Tag No.	Serial No.	Fully Open Function	Fully Close Operation	Water Tightness Check
FILTER TANK NO.1	FIV NO.1				
	FOV NO.1				
	BWV NO.1				
	ASV NO.1				
	WOV NO.1				



Location	Valve/ Penstock Tag No.	Serial No.	Fully Open Function	Fully Close Operation	Water Tightness Check
FILTER TANK NO.2	FIV NO.2				
	FOV NO.2				
	BWV NO.2				
	ASV NO.2				
	WOV NO.2				

Location	Valve/ Penstock Tag No.	Serial No.	Fully Open Function	Fully Close Operation	Water Tightness Check
FILTER TANK NO.3	FIV NO.3				
	FOV NO.3				
	BWV NO.3				
	ASV NO.3				
	WOV NO.3				

Location	Valve/ Penstock Tag No.	Serial No.	Fully Open Function	Fully Close Operation	Water Tightness Check
FILTER TANK NO.4	FIV NO.4				
	FOV NO.4				
	BWV NO.4				
	ASV NO.4				
	WOV NO.4				

Remarks :

Tested By:		Witnessed By:	
Contractor Representative		Consultant Representative	
Name:		Name:	
Date :		Date :	

MAIN CONTRACTOR:  GROUP ENGINEERS MALAYSIA SDN BHD	PROJECT TITLE: 	CLIENT:  JABATAN BEKALAN AIR LUAR BANDAR SARAWAK
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FORM E-LV-3

MAIN POWER CABLE INSULATION TEST

Location: _____

Insulation Tester Detail

Model: _____

Serial No: _____

Cal. Certificate No: _____

Voltage Inject : _____

Item	From Point (Eq.Tag)	To Point (Eq.Tag)	Cable Detail			Service	Results (Mega Ohm)	DATE TESTED
			Core	Size (mm ²)	Type			
R1-R2								
R1-R3								
R1-Y1								
R1-Y2								
R1-Y3								
R1-B1								
R1-B2								
R1-B3								
R1-N1								
R1-N2								
R2-R3								
R2-Y1								
R2-Y2								
R2-Y3								
R2-B1								
R2-B2								
R2-B3								
R2-N1								
R2-N2								
R3-Y1								
R3-Y2								
R3-Y3								
R3-B1								
R3-B2								
R3-B3								
R3-N1								
R3-N2								
Y1-Y2								
Y1-Y3								
Y1-B1								
Y1-B2								
Y1-B3								

Tested Result :	<input type="checkbox"/>	ACCEPTED	<input type="checkbox"/>	REJECTED
Remarks :				

Tested By:	Witnessed By:	
<i>Contractor Representative</i>	<i>Consultant Representative</i>	<i>Client Representative</i>
Name:.....	Name:.....	Name:.....
Date:.....	Date:.....	Date :

