Commissioning Report for the MICO Submersible Well

THE MICO UNIVERSITY COLLEGE, MARESCAUX ROAD, KINGSTON

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Introduction

The Mico University College recently restored an on-site well to augment is supply of domestic water. A water treatment facility along with storage capacity are to be installed at a later date however, this report documents the start-up and commissioning of the well for service.

Methodology

The following methodology was engaged in obtaining a baseline performance for the pump motor installation:

- A physical inspection conducted on all of the main components such as:
  - Circuit breakers & fuses
  - VFD's Motor starters/contactors & coils
  - Cables and connections.
- Size or values of Circuit breakers, fuses etc..
- Compare the installation with industry standards.
- The system is put into service and the following parameters monitored over a period of approximately 2 hours to simulate steady state conditions
  - System flows/pressures
  - Motor Load Current, Voltage
  - System parameters during "Full Flow" conditions

Operating Philosophy

Currently there is no system downstream of the pump and so this test was just to confirm the pumps functionality and capacity. It is believed that a water treatment system and storage facilities will be added at a later date after which controls will be added to the pump motor controls,

Electrical Infrastructure

The system consists of a standard submersible pump with the power being supplied via a Variable Speed Drive controller. Fig's 1 and 2 show the installation of the VFD and the VFD & Breaker Panel together.

Fig 1 – VFD – Control Panel

Fig 2 – Breaker Panel & VFD Control Panel

The design characteristics for the well are as follows:

Well Depth: 235 Ft

Pump Capacity: 70 GPM

Motor HP: 15

Volts: 220 – 240 Volts

Phase: 3

Frequency 50 Hz

Summary of Assessment Observations

The following table summarizes the observed performance of the pump.

Table No 1

Operating Parameter	Prior to Start Up	Start Up Conditions	Steady State Conditions
Voltage Phase 1 to 2	238 Volts	238 Volts	238 Volts
Voltage Phase 2 to 3	238 Volts	238 Volts	238 Volts
Voltage Phase 1 to 3	238 Volts	238 Volts	238 Volts
Current Phase 1	0 Amps	28.9 Amps	28.9 Amps
Current Phase 2	0 Amps	29.3 Amps	29.3 Amps
Current Phase 3	0 Amps	34.3 Amps	34.3 Amps
Flow (GPM)	0 GPM	70 GPM *	70 GPM *

Notes

*- Flows were obtained indirectly, measured using a container of fixed capacity and stopwatch to calculate the filling rate.

All electrical parameters were measured using a Fluke Voltmeter

We observed that when the pump was allowed to pump unrestricted, it achieved the design performance of 70 GPM. The motor operated at full load under these conditions

Evaluation & Recommendations

Based on the results observed during the test period, the pump performance was compared with that of the design specifications (see appendix). This comparison confirmed that the pump is performing as per the manufacturers specifications and can therefore be commissioned into operation.

APPENDICIES – PUMP SPECIFICATIONS

Franklin Electric **Pump Performance Datasheet**

Company name	: Coast Pump Water Technologies
Company contact name	: Brian Thompson
Company contact number	: 954-583-6202
Quote number	: VANTO080118-01
Inquiry received date	:

Model/Order No	: 100 GPM 6" 20 HP SS GR Sub-Turbine	Based on curve number	: 1000R20F66-1363
Stages	: 13	Date last saved	: 01 Aug 2018 2:13 PM
Quantity of pumps in parallel	: 1		

Operating Conditions		**Liquid**	
Flow, rated	: 70.00 USgpm	Liquid type	: Water
Differential head / pressure, rated (requested)	: 390.0 ft	Additional liquid description	:
Differential head / pressure, rated (actual)	: 410.4 ft	Solids diameter, max	: 0.00 in
Suction pressure, rated / max	: 0.00 / 0.00 psi.g	Solids concentration, by volume	: 0.00 %
NPSH available, rated	: Ample	Temperature, max	: 68.00 deg F
Frequency	: 50 Hz	Fluid density, rated / max	: 1.000 / 1.000 SG
Performance		Viscosity, rated	: 1.00 cP
Speed, rated	: 2875 rpm	Vapor pressure, rated	: 0.34 psi.a
Impeller diameter, rated	: 6.00 in	**Material**	
Impeller diameter, maximum	: 6.00 in	Material selected	: Standard
Impeller diameter, minimum	: 6.00 in	**Pressure Data**	
Efficiency	: 65.56 %	Maximum working pressure	: 224.1 psi.g
NPSH required / margin required	: 9.53 / 0.00 ft	Maximum allowable working pressure	: N/A
Ns (Imp. eye flow) / Nss (Imp. eye flow)	: 2,202 / 4,029 US Units	Maximum allowable suction pressure	: N/A
MCSF	: 33.33 USgpm	Hydrostatic test pressure	: N/A
Head, maximum, rated diameter	: 517.8 ft	**Driver & Power Data (@Max density)**	
Head rise to shutoff	: 26.14 %	Driver sizing specification	: Maximum power
Flow, best eff. point	: 85.40 USgpm	Margin over specification	: 0.00 %
Flow ratio, rated / BEP	: 81.96 %	Service factor	: 1.15 (used)
Diameter ratio (rated / max)	: 100.00 %	Power, hydraulic	: 7.25 hp
Head ratio (rated dia / max dia)	: 100.00 %	Power, rated	: 11.06 hp
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00	Power, maximum, rated diameter	: 11.45 hp
Selection status	: Acceptable	Minimum recommended motor rating	: 20.00 hp / 14.91 kW (Fixed)