START-UP AND COMMISSIONING”

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Introduction

- What is Start Up?
- What is Commissioning?
- Steps of a Start-Up
- Steps for Commissioning
- Q & A
START-UP VS. COMMISSIONING

- **Start-up = Equipment Functionality and Performance**

- **Commissioning = System or Facility Integration**
What is Start-Up?

- Pre-Demonstration Activities (Operational Check-out)
- Demonstration
- Equipment Acceptance
- Testing of All Features of Process/Equipment
- Performance Testing
- Testing of Various Modes of Operation
- Alarms and Interlocks
- Acceptance and Punch List Items
What is Start-Up?

- Initial Planning
- Pre-Demonstration Activities
- Pump Demonstration
Initial Planning:

- O&M Manual (proper off-loading, storage, maintenance, installation)
- Technician’s Qualifications
- Coordination:
  - General?
  - Mechanical Sub?
  - Electrician?
  - Controls Sub?
Ancillary Equipment:
Pre-Demonstration Activities
(Operational Check-out)

- Electrical Checkout - Power, Rotation, Voltage, Current, Power Factor
- Alignment, Vibration
- Connections – piping, anchors, grout, leaks
- Lubrication
- Seal Water connections, Bleed Air
- Belts, guards, etc.
- Anciallry Equipment Start-up
Pre-Demonstration Documentation:

- Maintenance Log
- Check-List – Functionality and Performance
- Certification of Proper Installation
- Alignment Report
- Vibration Report
- Ancially Equipment Start-up Reports
Demonstration

- Functionality

Performance
Functionality Demonstration

- Manual Controls
  - Local, remote, SCADA

- Alarms:
  - High level, Thermal, Moisture, vibration

- Interlocks:
  - Open/closed valve, screens / BFP, water,
Equipment “Bells & Whistles”

- **Switches**
  - Disconnects
  - Local-Remote
  - H-O-A

- **Status Lights**

- **Equipment Alarms**
  - Torque Overload Devices
  - Moisture and Thermal Protection

- **Equipment Indication/Gauges**
  - Pressure
  - Position
  - Output
Performance Demonstration

- Flow
- TDH - Suction and Discharge Pressure (wet well level)
- Efficiency
  - Current, Voltage, Power Factor
- Multiple Points
  - Throttle discharge valve
- Multiple Curves:
  - Adjust VFD Speed
Performance Test

Potential Data:

- Flow
- Level
- Pressure
- Temperature

- Amps, Volts, PF
- Vibration
- Noise
Equipment / Devices
(New and Existing)

- Flowmeter
- Pressure Gauges
- Level Devices
- Temperature Device
- Sound Decibel Recorder
- On-Line Analyzer
Other Testing Services

- Analytical Laboratory
- Vibration Specialists
Start-Up is Not Substantial Completion

Substantial Completion is:

- Successful Start-Up
- Training
- O&M Manuals
- Spare Parts
Examples of Start-Up Mishaps

- Equipment Not Set Up or Calibrated
- Missing Equipment (Pressure Gauges)
- Improper Sequence
- Missing Personnel
- No Flow, Chemicals, etc.
- Weather Delays
Facility Commissioning

All Pieces of the Puzzle (Equipment) Must Fit (Run) Together.

For A Complicated Project Consider:

- Dry Run
- Water Run
- Actual Run (Sludge, Chemicals, etc.)
Dry Run

- Identify What Is Supposed To Happen
- Dummy Signal - Check Response.
- Repeat With True Signals
FACILITY ACCEPTANCE

- Successful Completion of All Safety, Performance, and Equipment Protection Devices and Equipment
- Full Automation/Integration of Facility
- Punch List Identified
Questions and Answers

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