




REPUBLIC OF THE PHILIPPINES  
METROPOLITAN NAGA WATER DISTRICT  
40 J. MIRANDA AVENUE, NAGA CITY

# PIPELINE, LEAKAGE CONTROL & NON- REVENUE WATER MANAGEMENT DIVISION

## PROCEDURES AND WORK INSTRUCTIONS MANUAL (PAWIM)

**(PAMDPW04) NON-REVENUE WATER MANAGEMENT**

	<b>METROPOLITAN NAGA WATER DISTRICT</b>		Document Code: <b>PAMPDW04</b>	
	<b>PROCEDURE</b>		Revision No.:	0
	<b>NON-REVENUE WATER MANAGEMENT</b>		Effectivity Date:	March 2017
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### Revision Status

This list identifies the revisions made in this section. The date refers to the date this section was made effective and implemented and not to the date the document was signed or printed.

Rev. No.	Pages	Details	Date of Issuance and Effectivity
00	All	First issuance / release of procedure	13Mar2017

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Metropolitan Naga Water District Quality Management System

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## 1. PURPOSE

**1.1.** This document describes the procedures for Non-Revenue Water Management as one of the core processes of the MNWD.

**1.2.** The objectives of the Non-Revenue Water Management process are:

**1.2.1.** To reduce Non-Revenue Water of MNWD

**1.2.2.** To manage and balance water pressure in the MNWD distribution network.

## 2. SCOPE

This procedure will apply to the MNWD Quality Management System one of the core processes which is Non-Revenue Water Management, which focuses on the:

Non-Revenue Water Management

**2.1.1.** Minimum Night Flow Meter Reading

**2.1.2.** Leak Detection

**2.1.3.** Pressure Management

**2.1.4.** Valve Exercise and Control

## 3. DEFINITION OF TERMS AND ACRONYMS

Refer to "[Annex A](#)" for the GLOSSARY OF TERMS and "[Annex B](#)" ACRONYMS.

## 4. RESPONSIBILITIES

### 4.1. NON-REVENUE WATER MANAGEMENT SECTION

**4.1.1.** Commit in reducing NRW to increase both financial resources and the water available to utilities.

**4.1.2.** To ensure the efficient conduct of Minimum Night Flow Meter Reading either manually or using logged data at the Meter Point of a DMA.


**4.1.3.** Conducts regular leak detection within the distribution network using various leak detectors.

**4.1.4.** Conducts regular Pressure Management to manage and maintain balance in water pressure in the distribution network.

**4.1.5.** Locate and exercise water valves to ensure that they function or operate properly; Reduce leak run time and area or residents affected by leakage through valve control.

## 5. PROCEDURE DETAILS:NON REVENUE WATER MANAGEMENT

This section describes the procedures involved in one of the core process of the District which is the Non-Revenue Water Management.


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## 5.1. MINIMUM NIGHT FLOW METER READING (MNFM) ([Figure 1](#))

- 5.1.1. Approved schedule prepared and submitted by the SWUMO.
- 5.1.2. NRWMS encoder prepares, prints and records the A/I.O and forward it to the WMH.
- 5.1.3. WMH reviews and evaluates A/I.O and forward it to the WMF.
- 5.1.4. WMF assist implement received A/I.O. and distributes it to assigned plumbers.
- 5.1.5. Personnel in charge conduct inspection and verification of DMA flow meter.
- 5.1.6. Plumber manually read or used data logger in gathering data. If, it is manually read the assigned plumbers will conduct hourly reading of flow meter from 10:00 PM to 2:00 AM of the following day. But if, a data logger is used it will be retrieve the following day.
- 5.1.7. IT analyzed the data gathered and if the resulting flow will determine the MNFM consumption of the DMA; if it exceeded or did not exceed the LWUA acceptable consumption limit.
- 5.1.8. IT prepares and submit the report of the MNFM reading to the WMH. If it exceeded the LWUA acceptable consumption limit it is recommended to conduct a leak detection.
- 5.1.9. WMH checks and signs the accomplishment reports and submit to SWUMO.
- 5.1.10. SWUMO evaluates and signs the accomplishment reports and submit it to the DMA.
- 5.1.11. DMA reviews and signs the accomplished AIO's and forwards the said accomplishment report to NRWMS encoder for filing.

## 5.2. LEAK DETECTION ([Figure 2](#))

- 5.2.1. Approved schedule prepared and submitted by the SWUMO based on the result of MNFM Reading.
- 5.2.2. NRWMS encoder prepares, prints and records the A/I.O and forward it to the WMH.
- 5.2.3. WMH reviews and evaluates A/I.O and forward it to the WMF.
- 5.2.4. WMF assist implement received A/I.O. and distributes it to assigned plumbers.
- 5.2.5. Assigned plumber prepare and utilize the appropriate equipment to be used before proceeding to the area.
- 5.2.6. Leak Detection Team use three step strategy for active leak detection by using various equipment such as Correlating Radio Loggers (Zonescan 820), Leak Noise Correlator (Aquascan 610), Listening Stick and Ground Microphone (Aquascope 3).
- 5.2.7. Assigned plumbers set up and deploy correlating radio loggers in the DMA for at least 1-2 hours and retrieved data from loggers to LOCALIZE the leakage down to a specific area or zone in the distribution network.
- 5.2.8. Assigned plumbers deploy and prepares Leak Noise Correlator for correlation to LOCATE the position of the leak in the distribution network. (Note: This is usually done during midnight where there is minimal noise)

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- 5.2.9. Assigned plumbers PINPOINT the position of the leak through walking along the distribution network line by either using listening stick or ground microphone.
- 5.2.10. Assigned plumbers and submit the report of leak detection to the WMH.
- 5.2.11. WMH checks and signs the accomplishment reports and submit to SWUMO.
- 5.2.12. SWUMO evaluates and signs the accomplishment reports and submit it to the DMA.
- 5.2.13. DMA reviews and signs the accomplished AIO's and forwards the said accomplishment report to NRWMS encoder for filing.

### 5.3. PRESSURE MANAGEMENT ([Figure 3](#))

- 5.3.1. Approved schedule prepared and submitted by the SWUMO.
- 5.3.2. NRWMS encoder prepares, prints and records the A/I.O and forward it to the WMH.
- 5.3.3. WMH reviews and evaluates A/I.O and forward it to the WMF.
- 5.3.4. WMF assist implement received A/I.O. and distributes it to assigned plumbers.
- 5.3.5. Assigned plumber prepare and utilize the appropriate equipment to be used before proceeding to the area.
- 5.3.6. Assigned plumber can either manually read or used data logger in gather data. If, it is manually read the assigned plumbers will conduct hourly reading of pressure gauge or PRV-PSV depending on the time duration required. But if, a data logger is used it will be retrieve the following day.
- 5.3.7. Assigned plumber analyzed the data gathered and the resulting pressure will determine if a particular area or zone in the distribution network have a low or high pressure.
- 5.3.8. Assigned plumber prepares and submit report of the pressure monitoring result to the WMH. The resulting pressure will be used as reference weather a valve control activity will be conducted or if there will be a need for adjustment in the various PRV-PSV settings.
- 5.3.9. WMH checks and signs the accomplishment reports and submit to SWUMO.
- 5.3.10. SWUMO evaluates and signs the accomplishment reports and submit it to the DMA.
- 5.3.11. DMA reviews and signs the accomplished AIO's and forwards the said accomplishment report to NRWMS encoder for filing.

### 5.4. VALVE EXERCISE AND CONTROL ([Figure 4](#))

- 5.4.1. Approved schedule prepared and submitted by the SWUMO.
- 5.4.2. NRWMS encoder prepares, prints and records the A/I.O and forward it to the WMH.
- 5.4.3. WMH reviews and evaluates A/I.O and forward it to the WMF.
- 5.4.4. WMF assist implement received A/I.O. and distributes it to assigned plumbers.
- 5.4.5. Assigned plumbers prepare and utilize the appropriate equipment and tools to be used before proceeding the area.
- 5.4.6. Assigned plumbers locate the valve to be exercise or control.

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- 5.4.7. Assigned plumbers clean out the valve box.
- 5.4.8. Assigned plumbers exercise or control the valve through one entire cycle (Open & Close).
- 5.4.9. Assigned plumbers record the information of the valve such as location, size, depth to valve nut, number of turns and etc.
- 5.4.10. Assigned plumbers prepares and submit report of valve exercise or control status to the WMH. If it is operational or non-operational/defective. If, it is non-operational/defective a recommendation of repair or replacement will be forwarded to maintenance team.
- 5.4.11. WMH checks and signs the accomplishment reports and submit to SWUMO.
- 5.4.12. SWUMO evaluates and signs the accomplishment reports and submit it to the DMA.
- 5.4.13. DMA reviews and signs the accomplished AIO's and forwards the said accomplishment report to NRWMS encoder for filing.

## 6. FORMS AND TEMPLATES

- 6.1. Leak Report – “[PAMD08](#)”
- 6.2. Assignment/ Implementation Order Template – “[PAMD02](#)”
- 6.3. Valve Information Sheet – “[PAMD03](#)”
- 6.4. Daily Accomplishment Report Form – “[PAMD04](#)”
- 6.5. Requisition and Issue Slip – “[PAMD05](#)”

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**ANNEX A**

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**GLOSSARY OF TERMS**


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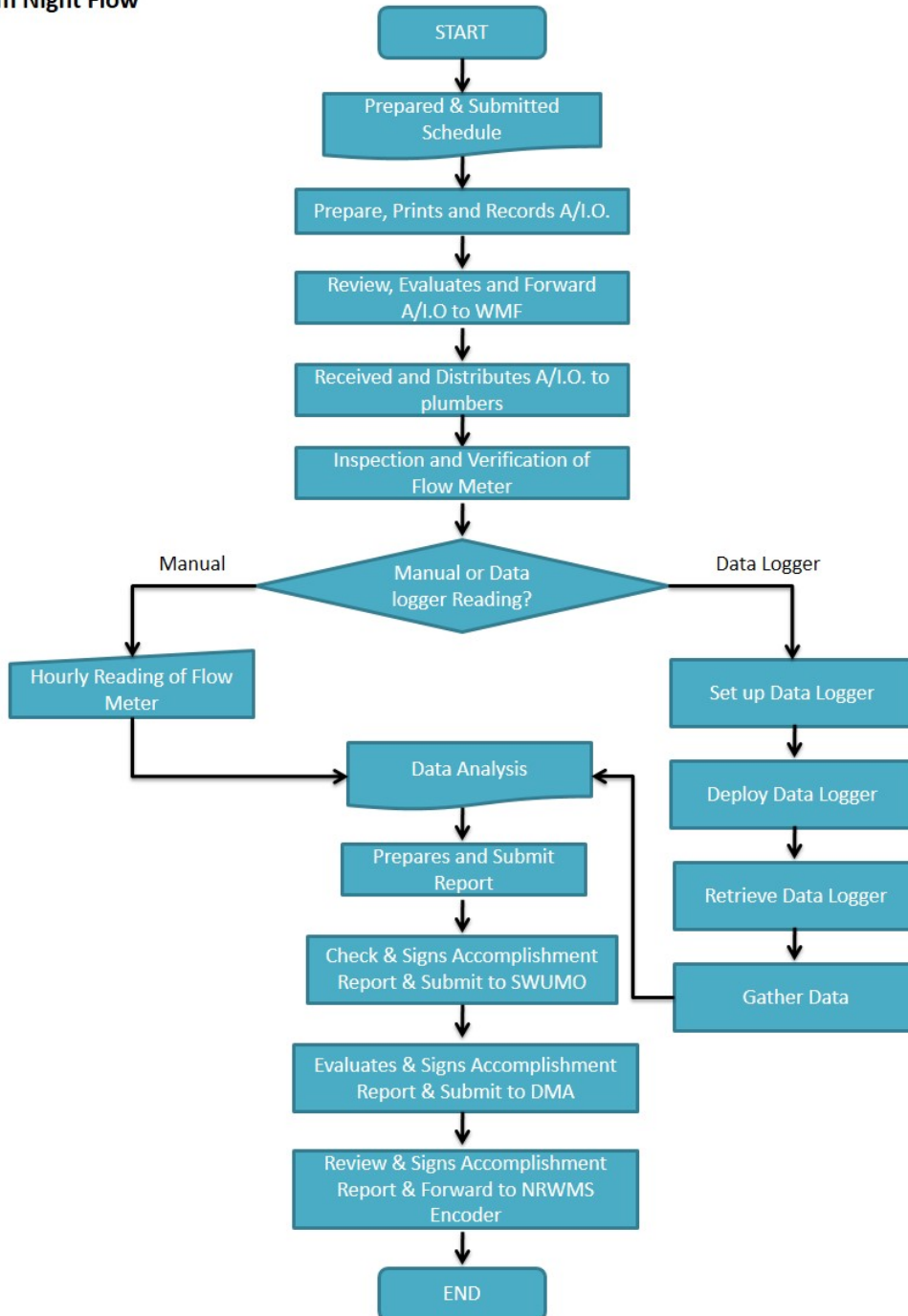
<b>TERMS</b>	<b>DEFINITION</b>
<b>DATA LOGGER</b>	A GADGET USED TO RECORD DATA SUCH AS PRESSURE AND FLOW AT PRE-DETERMINED TIME INTERVALS.
<b>DISTRICT METER AREA</b>	A DISCRETE AREA OF A WATER DISTRIBUTION NETWORK WITH ONLY ONE INFLOW AND COMPLETELY ISOLATED.
<b>GROUND MICROPHONE</b>	AN EQUIPMENT USED TO PINPOINT THE LOCATION OF A LEAK USUALLY AFTER CONDUCTING LEAK NOISE CORRELATION.
<b>LEAK NOISE CORRELATOR</b>	AN EQUIPMENT USED TO LOCATE THE POSSIBLE POINT OF THE LEAKAGE
<b>LEAK DETECTION</b>	A METHOD IN WHICH THE EXISTENCE OF A LEAK WITHIN A DISTRIBUTION NETWORK IS DETERMINED.
<b>LISTENING STICK</b>	A SMALL COMPACT ELECTRONIC DESIGNED FOR USED BY LEAKAGE TECHNICIANS ON LEAKAGE SURVEYS FOR PINPOINTING THE LOCATION OF THE LEAK.
<b>MINIMUM NIGHT FLOW</b>	THE MEASURED RATE OF FLOW INTO ANY DISTRIBUTION NETWORK OR DISTRICT METER AREA DURING THE MINIMUM DEMAND PERIOD ON A GIVEN NIGHT.
<b>NON-REVENUE WATER</b>	A WATER THAT HAS BEEN PRODUCED AND IS "LOST" BEFORE IT REACHES THE CUSTOMER.
<b>PRESSURE MANAGEMENT</b>	ONE OF THE MOST IMPORTANT WATER DEMAND MANAGEMENT INTERVENTIONS THAT CAN BE IMPLEMENTED BY A WATER UTILITY IN ITS EFFORTS TO REDUCE LEAKAGE.
<b>PRESSURE RELIEF VALVE</b>	A TYPE OF VALVE USED TO CONTROL OR LIMIT THE PRESSURE IN A DISTRIBUTION SYSTEM.
<b>PRESSURE SUSTAINING VALVE</b>	A TYPE OF VALVE USED TO MAINTAIN A MINIMUM PRESSURE.

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	<b>ACRONYMS</b>	Effectivity Date:	March 2017
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<b>ACRONYM</b>	<b>DEFINITION</b>
<b>DMA</b>	DISTRICT METER AREA
<b>IT</b>	INSTRUMENT TECHNICIAN
<b>LWUA</b>	LOCAL WATER UTILITIES ADMINISTRATION
<b>NRW</b>	NON-REVENUE WATER
<b>NRWMS</b>	NON-REVENUE WATER MANAGEMENT SECTION
<b>PRV</b>	PRESSURE RELIEF VALVE
<b>PSV</b>	PRESSURE SUSTAINING VALVE
<b>SWUMO</b>	SUPERVISING WATER UTILITIES MANAGEMENT OFFICER
<b>MNWD</b>	METROPOLITAN NAGA WATER DISTRICT
<b>NRWMS</b>	NON-REVENUE WATER MANAGEMENT SECTION
<b>AIO</b>	ASSIGNMENT/IMPLEMENTATION ORDER
<b>RIS</b>	REQUISITION AND ISSUE SLIP
<b>DAR</b>	DAILY ACCOMPLISHMENT REPORT
<b>WMF</b>	WATER MAINTENANCE FOREMAN
<b>WMH</b>	WATER MAINTENANCE HEAD
<b>DM-A</b>	DIVISION MANAGER A
<b>AD</b>	ADMINISTRATIVE DIVISION

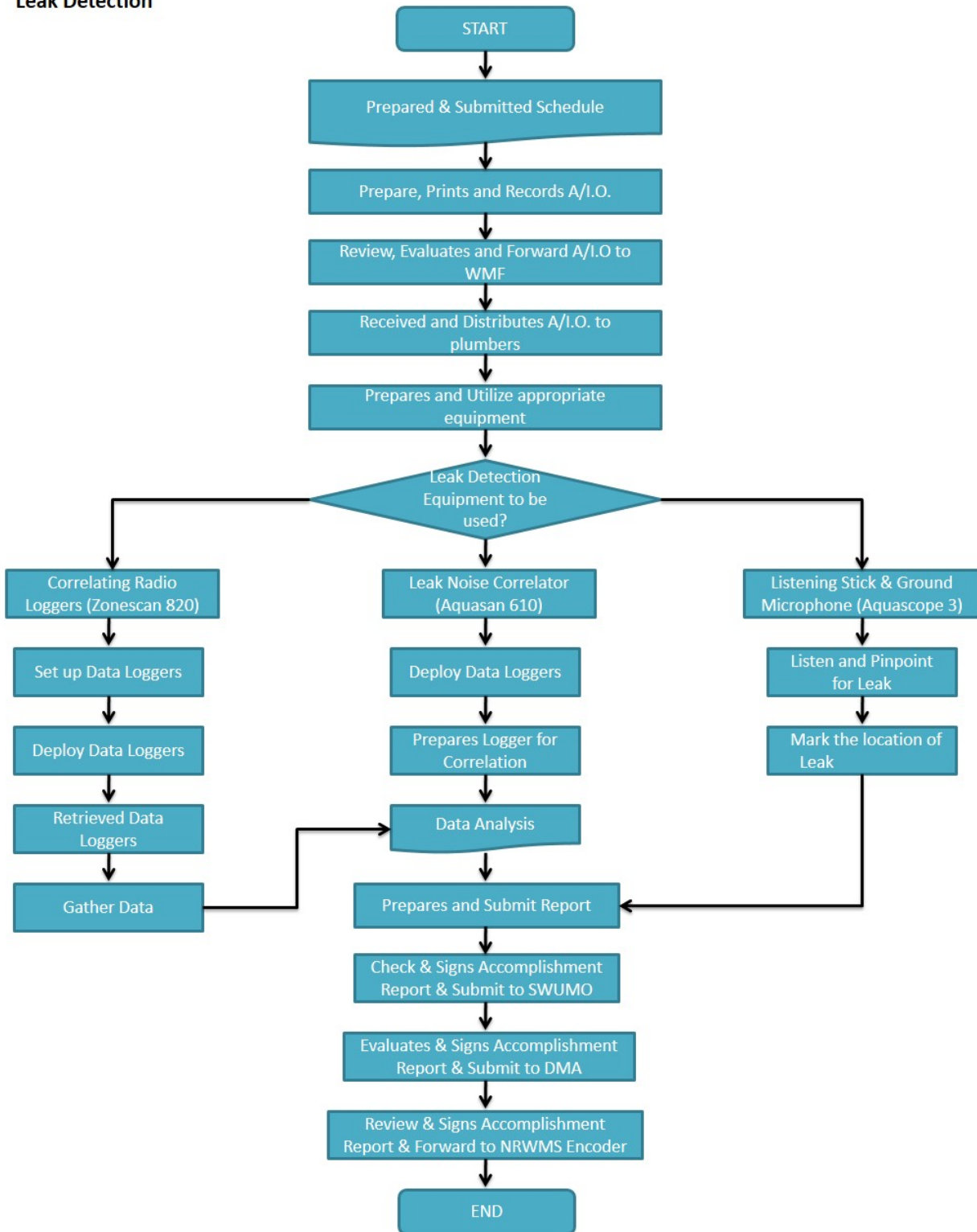



### Minimum Night Flow



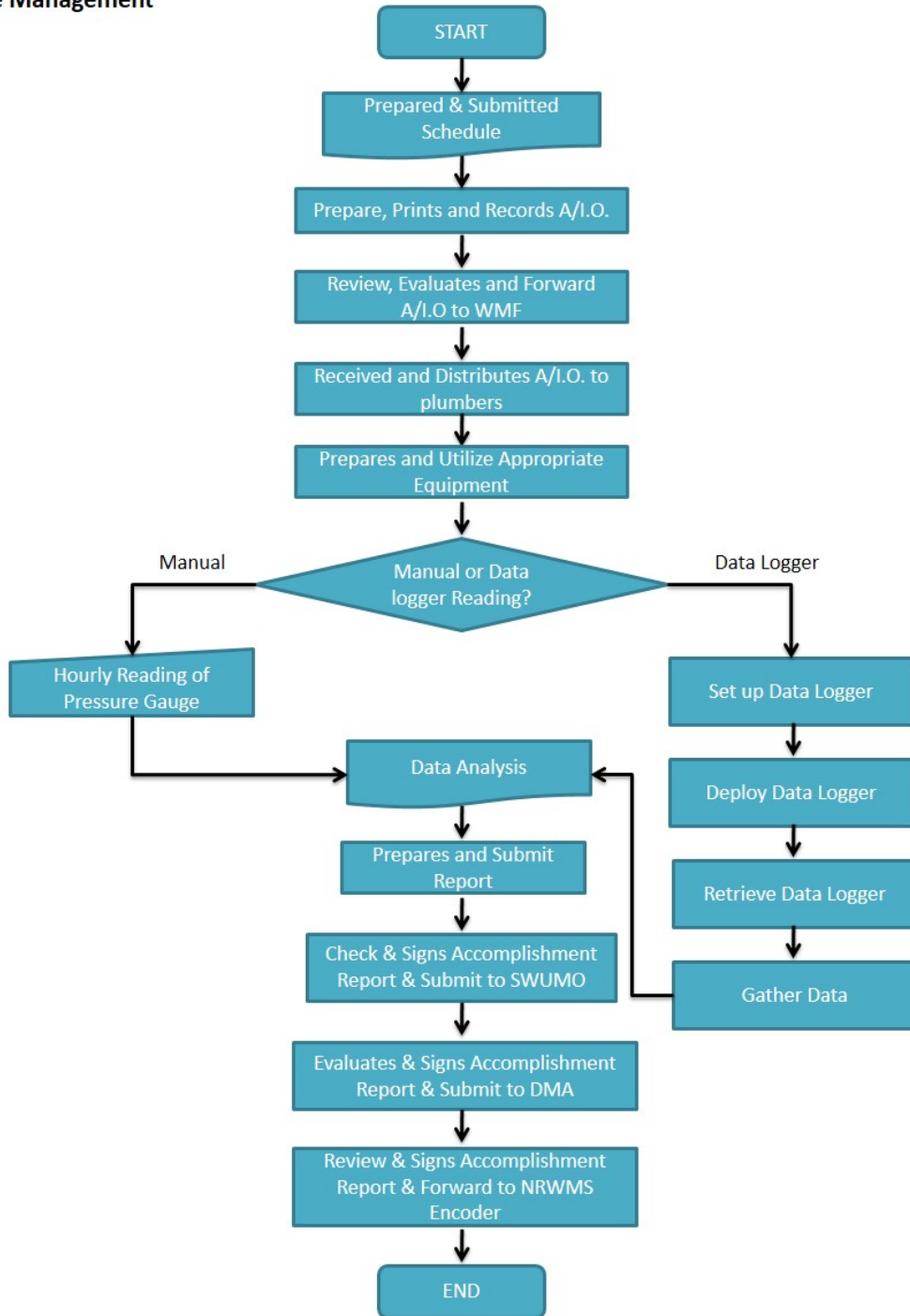



**Leak Detection**



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	<b>PRESSURE MANAGEMENT (FIGURE 3)</b>		Effectivity Date: March 2017
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### Pressure Management



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### Valve Exercise and Control

