




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

PRODUCTION DEPARTMENT

PROCEDURES AND WORK INSTRUCTIONS MANUAL (PAWIM)

(PDPW01) WATER SUPPLY

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1. PURPOSE

- 1.1. This document describe the procedures for water supply as one of the support processes of the MNWD.
- 1.2. The objectives of the Water Supply is:
 - 1.2.1. To deliver adequate, safe and potable drinking water for the consuming public.
 - 1.2.2. To ensure the operability of submersible pump and motor for continuous water supply for the consuming public.

2. SCOPE

This procedure will apply to the MNWD – Quality Management System on one support process which is the Water Supply, which focuses on the:


- 2.1. Standard Pumping Operation Procedure
- 2.2. Maintenance of Submersible Pump and Motor
 - 2.2.1. Preventive Maintenance to prevent recurrence
 - 2.2.2. Corrective Maintenance for previous adjustment
 - 2.2.3. Emergency Repair to troubleshoot reported problem
- 2.3. Maintenance of Filtration Tanks
- 2.4. Maintenance of Reservoir Tanks

3. DEFINITION OF TERMS AND ACRONYMS

Refer to “[Annex A](#)” for the ACRONYMS, and “[Annex B](#)” for DEFINITION OF TERMS

4. RESPONSIBILITIES

- 4.1. WATER PRODUCTION AND ELECTRO-MECHANICAL DIVISION (WPEMD)
 - 4.1.1. Ensures the right quantity of water supply produced by all water sources
 - 4.1.2. Ensures that the pumping equipment and facilities are in good running condition for the continuous supply of water
 - 4.1.3. Ensures the potability of water supplied to MNWD Concessionaires
- 4.2. WATER QUALITY DIVISION (WQD)
 - 4.2.1. Ensures that the water quality produced by the water sources guaranteed in accordance with the PNSDW Standards.
- 4.3. PUBLIC RELATIONS AND EXTERNAL AFFAIRS SECTION (PREAS)
 - 4.3.1. Ensures that the public service announcement with regards to maintenance and repairs are properly disseminated to all MNWD Concessionaires

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5. PROCEDURES

This section describes the procedures involved in one of the support processes of the District which is the Water Supply.

A. PROCEDURE DETAILS: **STANDARD PUMPING OPERATION PROCEDURE** ([Figure 1](#))

5.1. GATE VALVE MANIPULATION: STARTING PROCEDURE

- 5.1.1. Pump Operator checks bypass valve if in “open” position
- 5.1.2. Pump Operator checks discharge valve if in “close” position

5.2. MOTOR CONTROLLER: STARTING PROCEDURE

- 5.2.1. Pump operator turns circuit breaker to “on” position
- 5.2.2. Pump operator turns selector switch to “on” position
- 5.2.3. Pump operator checks the voltages thru the Voltmeter
- 5.2.4. If found three (3) phase connection is balanced, press the “start” button to proceed with the flushing activity. Pump Operator then checks the amperes thru the Ammeter.
- 5.2.5. If found unbalanced, proceed to Generator Set Operation
 - Pump operator switches the MTS from Local Power Utility to Generator Set Power
 - Pump operator turns “off” all the switches that have been turned on earlier.
 - Pump operator warms up Generator Set for at least 10 minutes
 - Pump operator switches circuit breaker “on” of the Generator Set to transfer power. (Repeat Procedures 5.2.1 to 5.2.4)

5.3. WATER QUALITY MONITORING


- 5.3.1. Pump operator checks water quality output to determine whether color and odor will pass the operating standard
- 5.3.2. Pump operator checks whether there are presence of sand particles

5.4. CHLORINATION

- 5.4.1. Pump operator mixes a certain amount of chlorine granules in a drum filled water
 - Accumulated chlorine granules must be recorded in the Chlorine Consumption Monitoring Log Sheet

5.5. GATE VALVE MANIPULATION: INJECTING PROCEDURE

- 5.5.1. Pump operator turns the discharge valve to “open” position
- 5.5.2. Pump operator turns the bypass valve to “close” position
 - Flow meter reading and sand filter condition must be in normal status

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5.6. ACTIVATION OF CHLORINATOR

- 5.6.1. Pump Operator turns the Chlorinator to “on” to inject chlorine and water solution in the distribution line

5.7. DATA RECORDING

- 5.7.1. Pump operator records data of voltages, amperes, pressure and flow meter reading to the “Daily Operation Log Sheet Form” every thirty (30) minutes and the Daily Logbook for other data regarding the operation. For Generator Set Operation, a “Generator Set Operation Log Sheet Form” as well as the Generator Set Logbook is accomplished whenever in Generator Set operation

5.8. GATE VALVE MANIPULATION: STOPPING PROCEDURE

- 5.8.1. Pump operator turns the bypass valve to “open” position
- 5.8.2. Pump operator turns the discharge valve to “close” position

5.9. MOTOR CONTROLLER: STOPPING PROCEDURE

- 5.9.1. Pump operator shuts down the motor by pressing the “stop” button in the control panel
- 5.9.2. Pump operator turns the selector switch to “off” position
- 5.9.3. Pump operator switches the circuit breaker to “off” position
 - After Generator Set Operation, pump operator must turn/switch “off” the motor first before shutting off the Generator Set.

5.10. DEACTIVATION OF CHLORINATOR


- 5.10.1. Pump Operator switches the Chlorinator “off”

B. PROCEDURE DETAILS: MAINTENANCE OF SUBMERSIBLE PUMP AND MOTOR

- **PREVENTIVE MAINTENANCE** ([Figure 2](#))

Duly approved Preventive Maintenance Schedule is the basis for the Submersible Pump and Motor Preventive Maintenance


- 5.11. Clerk Processor B/Administration Services Aide prepares and submits Request for Public Service Announcement to PREAS before starting the maintenance
- 5.12. PREAS disseminates Public Service Information to the MNWD Concessionaires via Radio Stations and Bandillo
- 5.13. Maintenance Personnel prepares and requests tools and materials needed for the activity

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- 5.14. Maintenance Personnel mobilizes tools, materials and equipment needed for the Maintenance to the concerned Water Source
- 5.15. Maintenance Personnel pulls out Submersible Pumps and Motor
- 5.16. Supervisors evaluates pulled out Submersible Pump and Motor
- 5.17. Supervisors prepares reports for the findings and its corresponding action submitted to the DMA
- 5.18. Maintenance Personnel re-installs the Submersible Pump and Motor
- 5.19. Maintenance Personnel conducts Test Run
- 5.20. Supervisors prepares and submits Accomplishment Reports duly signed and noted by the DMA
- 5.21. Clerk Processor B/Administration Services Aide files the Accomplishment Report for future reference

- **CORRECTIVE MAINTENANCE** ([Figure 3](#))

- 5.22. Pump operator on-duty reports to the Telephone/Radio Operator the problem encountered at the pumping station
- 5.23. Telephone/Radio Operator fill-out and submits a Status Report Form to the SWUM/DO of Electro-Mechanical Section
- 5.24. SWUM/DO reports the incident to the DMA to delegate the maintenance work plan to the concerned W/SMH or W/SMF
- 5.25. W/SMH or W/SMF evaluates the reported incident
- 5.26. W/SMH or W/SMF submits an Evaluation Report and Recommendation to SWUM/DO
- 5.27. SWUM/DO relays the findings and submits schedule of work to the DMA
- 5.28. DMA approves the schedule of work
- 5.29. Clerk Processor B/Administration Services Aide prepares and submits Request for Public Service Announcement to PREAS before starting the maintenance
- 5.30. PREAS disseminates Public Service Information to the MNWD Concessionaires via Radio Stations and Bandillo
- 5.31. W/SMH or W/SMF distribute assignment to Maintenance Personnel
- 5.32. Maintenance Personnel prepares and requests tools and materials needed for the activity
- 5.33. Maintenance Personnel mobilizes tools, materials and equipment needed for the Maintenance to the concerned Water Source
- 5.34. Maintenance Personnel pulls out submersible pump and motor
 - If the Insulation Resistance measurement falls down to 2mΩ and below, then it is subject for pull out and replacement of submersible motor
 - If the pump efficiency test results falls down to 30% compared to the original efficiency, therefore, it is subject for pull out and replacement of submersible pump
 - If the result of the SDT falls down to 30% of the discharge capacity compared to the design capacity, therefore, it is subject for pull out and replacement of submersible pump and motor
- 5.35. Maintenance Personnel re-installs the Submersible Pump and Motor
- 5.36. Maintenance Personnel conducts Test Run

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- 5.37. Supervisors prepares and submits Accomplishment Report duly signed and noted by the DMA
- 5.38. Clerk Processor B/Administration Services Aide files the Accomplishment Report for future reference


- **EMERGENCY REPAIR** ([Figure 4](#))

- 5.39. Pump operator on-duty reports to the Telephone/Radio Operator the problem encountered at the pumping station
- 5.40. Telephone/Radio Operator fills-out and submits a Status Report Form to the SWUM/DO of Electro-Mechanical Section
- 5.41. SWUM/DO reports the incident to the DMA to delegate the maintenance work plan to the concerned W/SMH or W/SMF
- 5.42. W/SMH or W/SMF evaluates the reported incident
- 5.43. W/SMH or W/SMF submits an Evaluation Report and Recommendation to SWUM/DO
- 5.44. SWUM/DO relays the findings and submits schedule of work to the DMA
- 5.45. DMA approves the schedule of work
- 5.46. Clerk Processor B/Administration Services Aide prepares and submits Request for Public Service Announcement to PREAS before starting the maintenance
- 5.47. PREAS disseminates Public Service Information to the MNWD Concessionaires via Radio Stations and Bandillo
- 5.48. Maintenance Personnel prepares and requests tools and materials needed for the activity
- 5.49. Maintenance Personnel mobilizes tools, materials and equipment needed for the Maintenance to the concerned Water Source
- 5.50. Maintenance Personnel pulls out Submersible Pumps and Motor
- 5.51. Supervisors evaluates pulled out Submersible Pump and Motor
- 5.52. Supervisors prepares reports for the findings and its corresponding action submitted to the DMA
- 5.53. Maintenance Personnel re-installs the Submersible Pump and Motor
- 5.54. Maintenance Personnel conducts Test Run
- 5.55. Supervisors prepares and submits Accomplishment Reports duly signed and noted by the DMA
- 5.56. Clerk Processor B/Administration Services Aide files the Accomplishment Report for future reference

C. PROCEDURE DETAILS: MAINTENANCE OF FILTRATION TANKS ([Figure 5](#))

To conduct Filtration Tank Maintenance, the following are needed to be considered, to wit:

- For Capilihan Pumping Station, when pressure difference from the inlet and outlet pressure gauge is twenty (20) psi, backwashing and rinsing must be conducted for each tanks
- For Jardin Real Pumping Station, when pressure difference from the inlet and outlet pressure gauge is seven (7) psi, backwashing and rinsing must be conducted for each tanks

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- 5.57. Pump operator manipulates gate valve to perform Backwashing
 - 5.57.1. Pump operator checks the presence of Odor and Color
 - If present, pump operator continues Backwashing
 - If not, pump operator proceeds to Rinsing
- 5.58. Pump operator manipulates gate valve from Backwashing to perform Rinsing
 - 5.58.1. Pump Operator checks the presence of Odor and Color
 - If present, pump operator continues Rinsing
 - If not, pump operator proceeds to Air Release Valve Manipulation
 - 5.58.2. Pump operator manipulates air release valve and checks whether there are still trapped air
 - If present, pump operator continues air release
 - If not, pump operator proceeds to operation
- 5.59. Pump operator manipulates gate valve from air release to operational
- 5.60. Pump operator mixes a certain amount of chlorine with water into the drum
 - 5.60.1. Accumulated chlorine granules must be recorded in the Chlorine Consumption Monitoring Log Sheet
- 5.61. Pump operator injects the water to the system (please refer to the Standard Pumping Operation Procedure in this PAWIM)

D. PROCEDURE DETAILS: MAINTENANCE OF RESERVOIR TANKS ([Figure 6](#))

The Water Production Section of WPEMD is tasked to maintain reservoir tanks of MNWD. Its maintenance is scheduled every three (3) months or quarterly.


- 5.62. Maintenance Personnel prepares and requests tools and materials needed for the activity
- 5.63. Maintenance Personnel mobilizes tools, materials and equipment needed for the Maintenance to the concerned Reservoir
- 5.64. Pump Operator on-duty drains the tank
- 5.65. Maintenance Personnel cleans the tank
- 5.66. Maintenance Personnel disinfect the tank using Chlorine Dioxide Tablet/ Chlorine Granules
- 5.67. Maintenance Personnel rinses the tank
- 5.68. Supervisors prepares and submits Accomplishment Reports duly signed and noted by the DMA
- 5.69. Clerk Processor B/Administration Services Aide files the Accomplishment Report for future reference

6. FORMS AND TEMPLATES

6.1.CHLORINE CONSUMPTION

- 6.1.1. Chlorine Consumption Monitoring Log Sheet - "[PDF01](#)"

6.2.OPERATION

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6.2.1. Daily Operation Log Sheet - “[PDF02](#)”

6.3.GENERATOR SET OPERATION AND DIESEL FUEL CONSUMPTION

6.3.1. Generator Set Operation Monitoring Log Sheet - “[PDF03](#)”

6.4.SCHEDULE


6.4.1. Preventive Maintenance Schedule - “[PDF04](#)”

6.5.PUBLIC SERVICE ANNOUNCEMENT

6.5.1. Request for Public Service Announcement Form - “[PDF05](#)”

6.6.STATUS REPORT

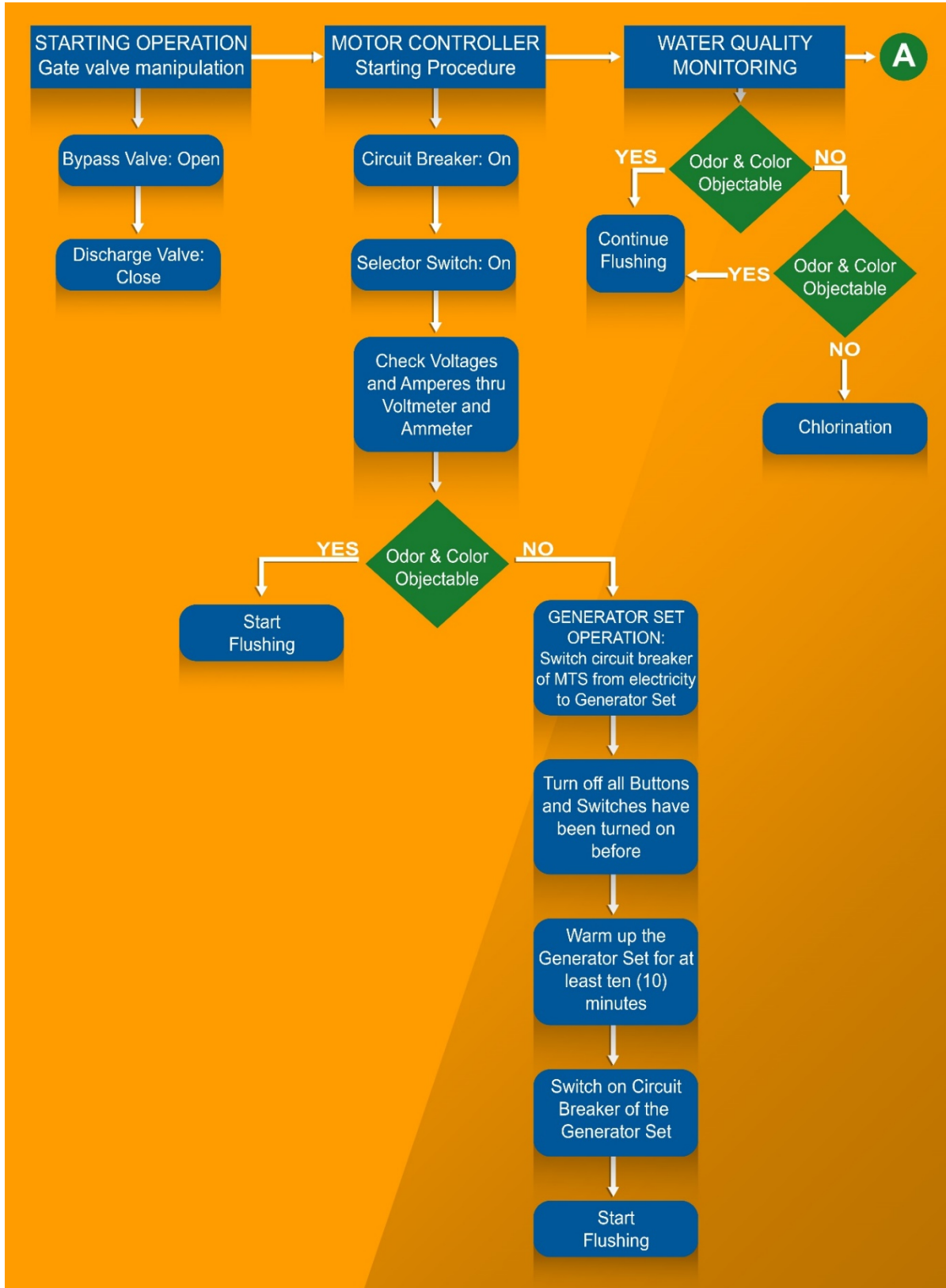
6.6.1. Daily Pumping Station Status Report Form - “[PDF06](#)”


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	ANNEX A	Revision No.:	0
	ACRONYMS	Effectivity Date:	15 Jan 2017
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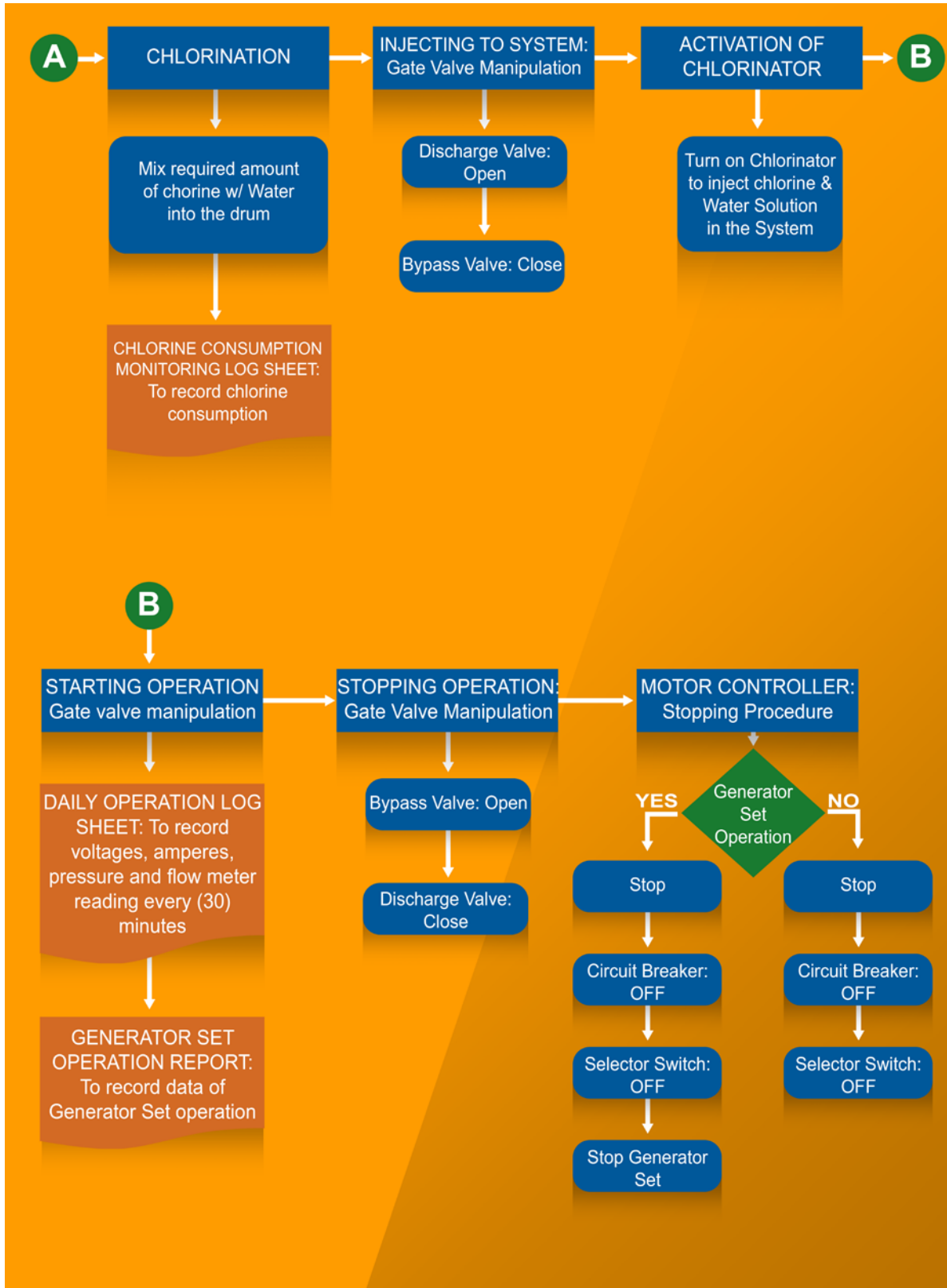
ACRONYM	DEFINITION
MNWD	METROPOLITAN NAGA WATER DISTRICT
PNSDW	PHILIPPINE NATIONAL STANDARDS FOR DRINKING WATER
WPEMD	WATER PRODUCTION AND ELECTRO-MECHANICAL DIVISION
WQD	WATER QUALITY DIVISION
PREAS	PUBLIC RELATIONS AND EXTERNAL AFFAIRS SECTION
MTS	MANUAL TRANSFER SWITCH
DMA	DIVISION MANAGER A
SWUM/DO	SUPERVISING WATER UTILITIES MANAGEMENT/DEVELOPMENT OFFICER
W/SMH	WATER/SEWERAGE MAINTENANCE HEAD
W/SMF	WATER/SEWERAGE MAINTENANCE FOREMAN
PSI	POUNDS PER SQUARE INCH



TERM	DEFINITION
BYPASS VALVE	A VALVE PLACED TO CONTROL THE FLOW OF FLUID THROUGH BYPASS
DISCHARGE VALVE	A VALVE WHICH CONTROLS THE FLOW OF A FLUID FROM A PIPE OR CENTRIFUGAL PUMP. IT REGULATES OR CLOSES OFF THE FLOW OF A FLUID
CONTROL PANEL	AN ELECTRICAL COMPONENT THAT IS USED TO POWER UP AND CONTROLS THE OPERATION OF SUBMERSIBLE PUMP AND MOTOR
CIRCUIT BREAKER	AN ELECTRICAL DEVICE USED AS A DISCONNECT SWITCH THAT AUTOMATICALLY INTERRUPTS THE FLOW OF CURRENT WHEN THERE IS SHORT CIRCUIT AND OVERLOAD CONDITION.
SELECTOR SWITCH	A SWITCH TO SELECT WHETHER OPERATION IS IN MANUAL (H), OFF (O), OR AUTOMATIC (A)
THREE (3) PHASE	A COMMON METHOD OF ALTERNATING CURRENT ELECTRIC POWER GENERATION, TRANSMISSION AND GENERATION. USUALLY WITH THREE (3) DISTRIBUTION TRANSFORMER.
SINGLE PHASE	THE DISTRIBUTION OF ALTERNATING CURRENT ELECTRIC POWER USING A SYSTEM IN WHICH ALL THE VOLTAGES OF THE SUPPLY VARY IN UNISON. SINGLE-PHASE DISTRIBUTION IS USED WHEN LOADS ARE MOSTLY LIGHTING AND HEATING, WITH FEW LARGE ELECTRIC MOTORS.
AMMETER	INSTRUMENT USE TO MEASURE ELECTRIC CURRENT
VOLTMETER	A DEVICE USED TO MEASURE VOLTAGE
FLOW METER	A DEVICE USED TO MEASURE THE FLOW OF FLUIDS
BACKWASHING	REFERS TO PUMPING WATER BACKWARDS THROUGH THE FILTERS MEDIA, SOMETIMES INCLUDING INTERMITTENT USE OF COMPRESSED AIR DURING THE PROCESS. BACKWASHING IS A FORM OF PREVENTIVE MAINTENANCE SO THAT THE FILTER MEDIA CAN BE REUSED
RINSING	TO WASH LIGHTLY, AS BY POURING WATER INTO OR OVER OR BY DIPPING IN WATER



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	STANDARD PUMPING OPERATION PROCEDURE (FIGURE 1)	Effectivity Date:	March 2017
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FLOWCHART

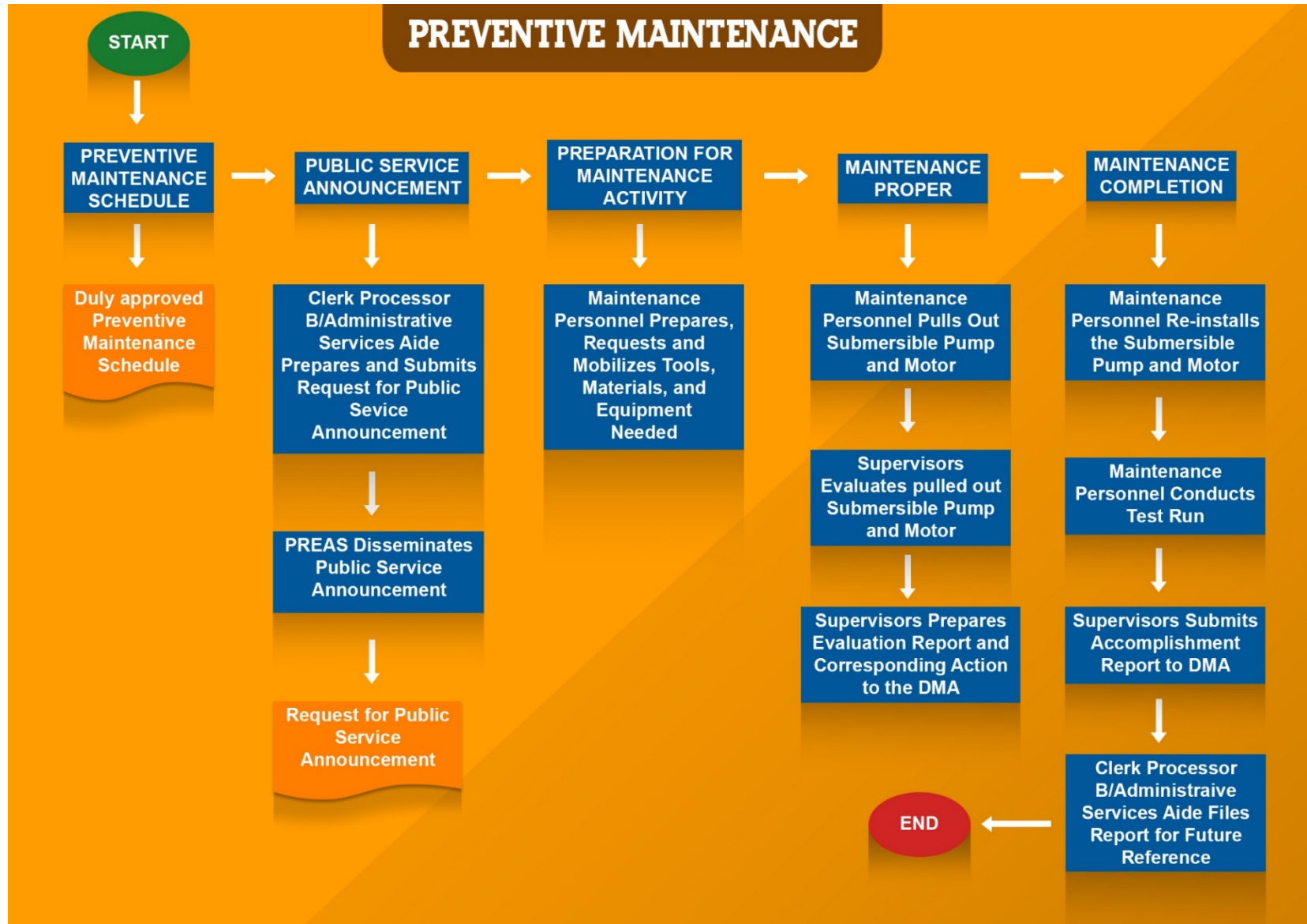
PREVENTIVE MAINTENANCE (FIGURE 2)

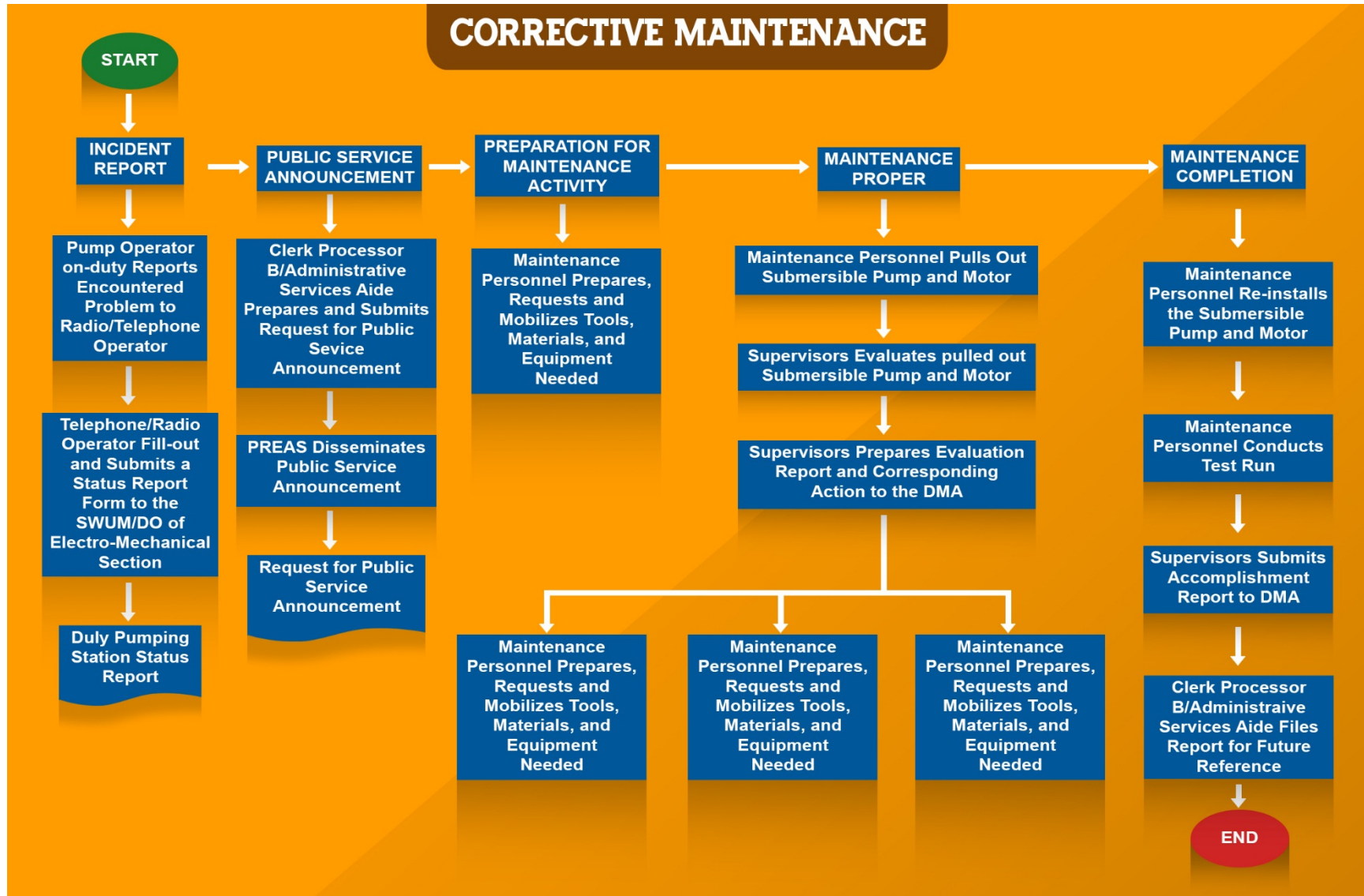
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FLOWCHART

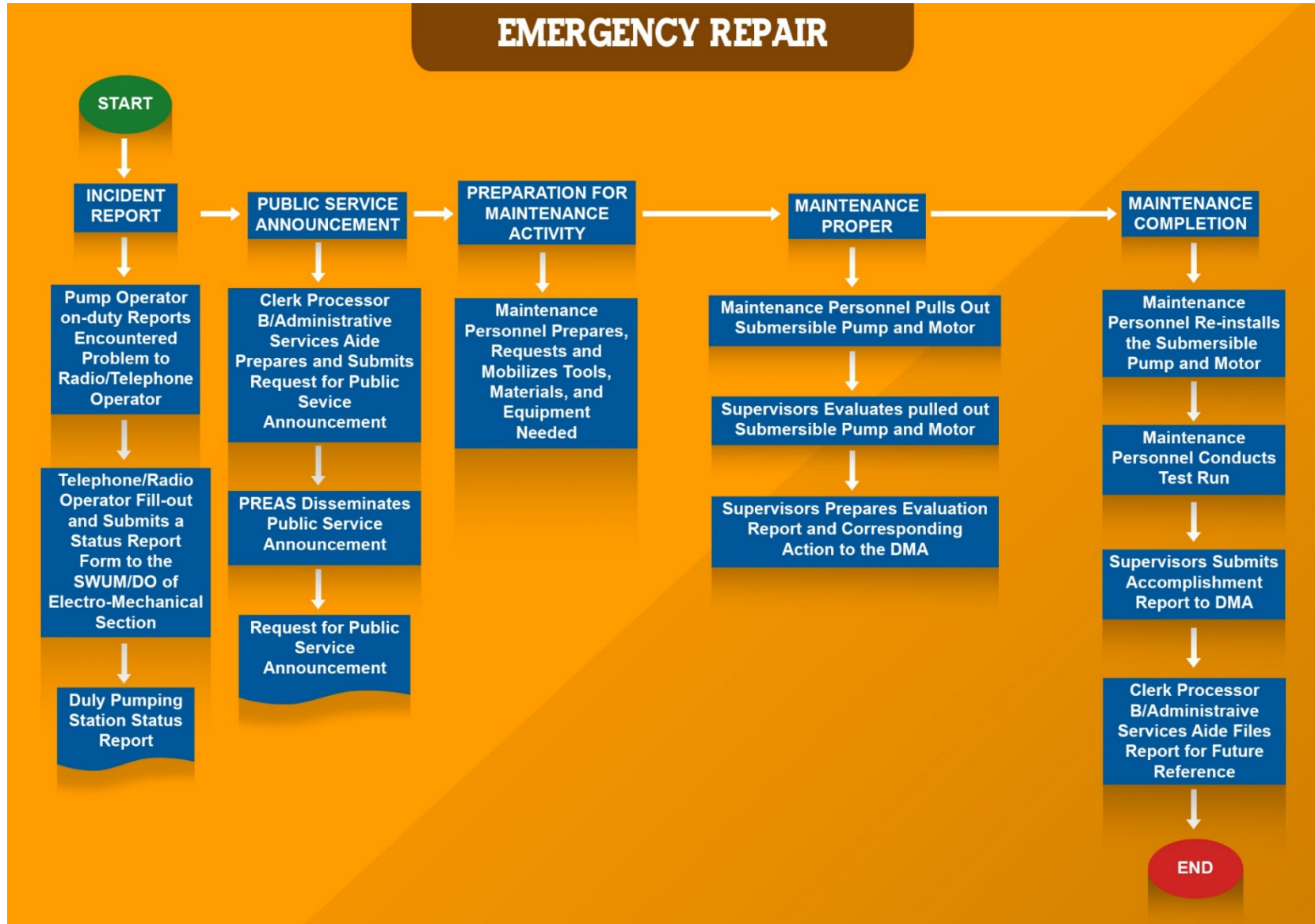
EMERGENCY REPAIR (FIGURE 4)


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	MAINTENANCE OF RESERVOIR TANKS	Effectivity Date:	March 2017
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