Analysis of Water Sample from Designated Sample Areas

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	Metropolitan Cebu Water District	Index No.	OP-W	QC-WDI-003
Quality Management System Procedures Manual		Page No. Issue No.		1 of 3
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Section	(n)	Revis	ion No.	0
Subject	Microbiological and Chemical Analysis of Water Sample from Designated Areas	Effectiv	ve Date	Jan. 01,01

#### 1.0 OBJECTIVE:

To perform microbiological and chemical analysis in samples collected from-designated sampling area such as: fixed sampling points, random, private, potability and production sources.

#### 2.0 SCOPE:

All water samples submitted by private clients, potability test, production & observation wells, as well as those collected for purposes of monitoring the quality of water in the distribution network.

### 3.0 DEFINITION OF TERMS:

- FIXED SAMPLING POINT an MCWD concessionaires who is selected as a sampling point due to its strategic location to represent the are for purposes of monitoring the quality of water in the distribution system.
- RANDOM SAMPLING POINT a randomly selected concessionaires used as a monitoring point to detects sudden upsurges of contamination.
- PRIVATE SAMPLE a sample for a privately owned deep well or pump submitted by individuals to monitor the quality of their water.
- MTFT Multiple Tube Fermentation Technique the accepted standard test for the coliform group or microorganism, in which examination results in terms of Most Probable Number, as estimate of the mean density of coliform in the sample.
- FLUROCULT/COLILERT- an alternative accepted method for the rapid detection of coliform organism.
- TOTAL COLIFORM refers to any rod-shaped, non-spire forming, gram negative bacteria capable of growth in the presence of bile salts, or other surface-active agents with similar growth-inhibiting properties which are cytochrome –oxidase negative and able to ferment lactose at either 35°C to 37° with the production of gas and aldehyde within 24-48 hours.

ESCHERRICHIA COLI – a fecal coliform which is thermotolerant and is used as an index of fecal contamination in water.

HPC – Heterotrophic Plate Count, a pour-plate method to determine the efficiency of disinfection of the distribution network

CHEMICAL PARAMETERS – refers to the different chemical tests requested for analysis in the water sample.

Prepared: Dete: Reviewed: Partie of Date: 7/20/01 Date: 7/20/01

Analysis of Water Sample from Designated Sample Areas Metropolitan Cebu Water District OP-WQC-WDI-003 Index No. Quality Management System Page No. 2 of 3 Procedures Manual Issue No. 0 Revision No. Section Microbiological and Chemical Analysis of Effective Date Jan. 01,01 Subject Water Sample from Designated Areas 4.0 PROCEDURE PROCESS FLOW RESPONSIBILITY DETAILS / REFERENCES Start Collect sample fro m Lab. Technician Perform correct sampling procedure designated sampling 1 Private Client/ according to : REF-WQC-WDI-FSpoints MWD Consumer 001 Principal Engr. C 1.) Type forms filled u[p accordingly per requesting party. 2.) 3.) Submit water sample Lab. Technician Submit water sample to lab with the Private Client/ following forms: MCWD Consumer 1.) FRM-WQC-WDI-001 Principal Engr. C 2.) FRM-WQC-WDI-002 3.) FRM-WQC-WDI-003 Assessment of sample 3 Water Analysts/ Assess the sample for viability & No Bacteriologist integrity: Viable? 1.) Proper Collection 2.) Storage 3.) Transport Yes Repeat 4.) Data Entry Collection As in

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Reviewed: Date: 7/1:3/01

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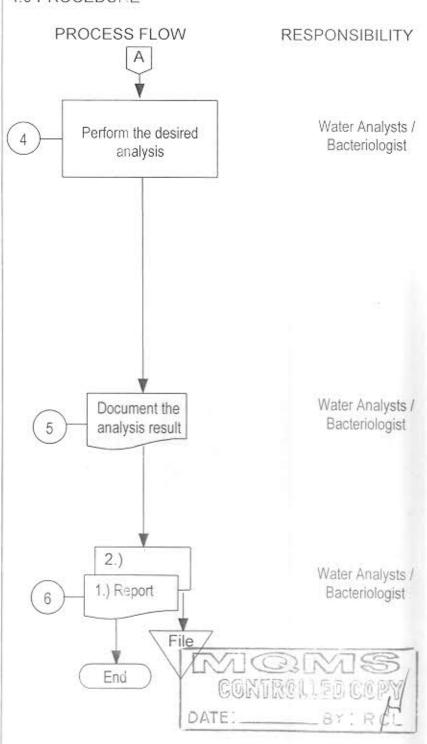
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Analysis of Water Sample from Designated Sample Areas



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Subject	Microbiological and Chemical Analysis of Water Sample from Designated Areas	Effective D	ate	Jan. 01,01

### 4.0 PROCEDURE



## **DETAILS/REFERENCES**

Perform the microbiological analysis for total& fecal coliform using any of the following methods:

- 1.) MTFT
- 2.) Flurocult/Colilert
- 3.) HPC

Perform desired chemical parameters using the following methods:

- 1.) Extraction Method
- 2.) Turbidimetric Method
- 3.) Titration Method
- 4.) Instrumentation Method
- 5.) Gravimetric Method

Document and record the results according to:

- 1.REF-WQC/WDI-LB-001
- 2.FRM-WQC/WDI-009 up to REF-
- WQC/WDI-LB-009
- 3. REF-WQC/WDI- LB-003 up to

REF-WQC/WDI-LB-019

Make the final report and release to concerned party:

- 1. FRM-WQC/WDI-009
- 2. FRM-WQC/WDI-010
- FRM-WQC/WDI-011

Duplicate report copy filed at WQCD/Lab. Office.

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On-Site Chlorine Residual, PH, and Conductivity Testings at the Water Dist. Net.

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Section	6 "I Halibut"	Revisio	n No.	0
Subject	On-Site Chlorine Residual, pH, and Conductivity Testing at the Water Distribution Network	Effective	Date	Jan. 01,01

## 1.0 OBJECTIVE:

To implement and properly observe the standard procedures for on-site testings of chlorine residual, pH and conductivity of water samples in the distribution network.

## 2.0 SCOPE:

This limits to the on-site analysis of chlorine residual, pH, and conductivity at the distribution network employing field –type instruments and test kits

#### 3.0 DEFINITION OF TERMS:

On Site- Testing

 refers to an analytical activity conducted to test water samples and obtain results directly from the site where samples are collected; also referred as in-situ analysis.

#### Note:

- 1. Refer to procedure III P -10-00 for the definition of ph meter and TDS meter
- 2. Refer to procedure II P 04 -00 for the definition of ph and conductivity

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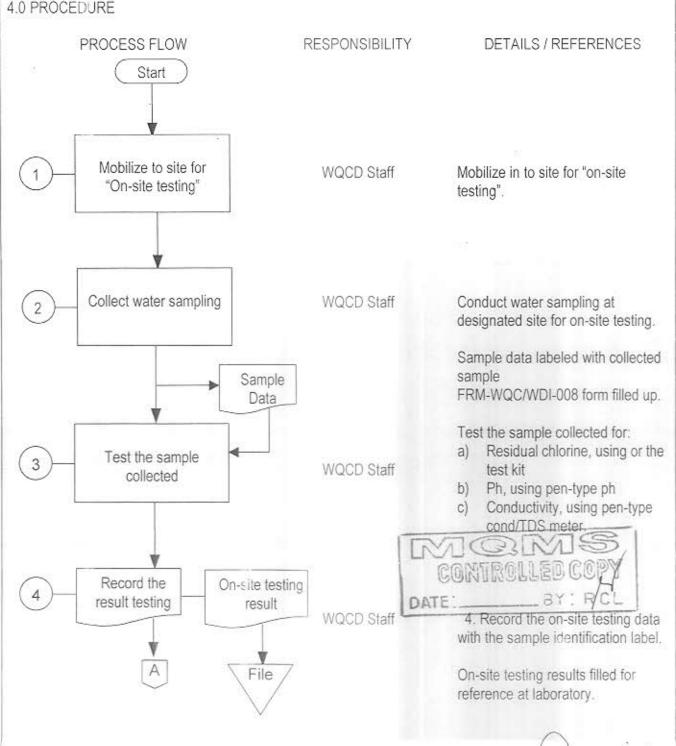
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	Subject	On-Site Chlorine Residual, pH, and Conductivity Testing at the Water Distribution Network	Effective	Date

### 4.0 PROCEDURE

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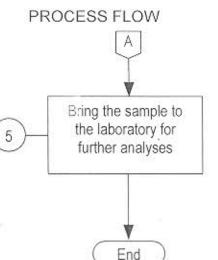
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Testing at the Water Distribution Network

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Subject	On-Site Chlorine Residual, pH, and Conductivity	Effective	Date	Jan. 01,01

## 4.0 PROCEDURE



RESPONSIBILITY

DETAILS/REFERENCES

WQCD Staff Analyst

Bring the sample to the laboratory for further analyses

DATE:

Prepared Date:

Reviewed: Date:

Approved:

1/20/01 Date:

Intralaboratory Quality Assurance Implementation and Assessment

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Quality Management System Procedures Manual		Page No. Issue No.		1 of 4
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Section	17 day = 2 day	Revis	ion No.	0
Subject	Intralaboratory Quality Assurance Implementation and Assessment			Jan.01,01

#### 1.0 OBJECTIVE:

To implement an effective quality assurance plan and control in all aspect of laboratory work for precession and accuracy of test results.

#### 2.0 SCOPE:

All scope of laboratory work from sample collection, preservation, storage, analysis, equipment monitoring and all other integral factors, which will affect the efficiency and accuracy of test results.

#### 3.0 DEFINITION OF TERMS:

- QUALITY ASSURANCE a set of operating principles, that, if strictly followed during sample collection and analysis will produce data of known and defensible quality
- QUALITY CONTROL (INTERNAL) Set of measures within a sample analysis methodology to assure that the process is in control.
- PRECISION measure of the degree of agreement among replicate analyses of sample, usually expressed as the standard deviation.
- QUALITY ASSESSMENT Procedure for determining the quality of laboratory measurements by use of data from internal and external quality control methods.
- BIAS a consistent deviation of measured values from the true value, caused by systematic errors in a procedure.
- ACCURACY combination of bias and precision of an analytical procedure, which reflects the closeness of a measured value to a true value.
- INTERNAL STANDARD- a pure compound added to a sample extract just before instrumental analysis to permit correction for inefficiencies.

LABORATORY CONTROL STANDARD - a standard usually certified by an outside agency, used to measure the bias in a procedure.

REPLICATE ANALYSIS – repeated operation occurring within an analytical procedure, two or more analytical for the same constituent in an extract of a single sample.

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EQUIPMENT CALIBRATION STANDARD - a standard used to determine the state of calibration of an instrument between periodic recalibration.

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Date: 4/28/01	Date: 7/03/01	Date: 7/20/07

Intralaboratory Quality Assurance Implementation and Assessment Index No. OP-WQC-WDI-005 Metropolitan Cebu Water District Quality Management System Page No. 2 of 4 Procedures Manual Issue No. District III. Section Revision No. 0 Intralaboratory Quality Assurance Subject Effective Date Jan. 01,01 Implementation and Assessment 4.0 PROCEDURE PROCESS FLOW RESPONSIBILITY DETAILS / REFERENCES Start Lab. Technician Collect the water sample according Collection & Transport 1 Private Client/ to the procedure: MCWD Consumer 1.) REF-WQC-BM-001 Principal Engr. C FRM-WQC-WDI-001 Perform random unscheduled Field Audit Water Analyst audits on: Bacteriologist 1.) Laboratory Technician (FRM-WQC-WDI-005) Field Engineer Submission Assessment & 2 Water Analyst Asses the sample submitted for Evaluation compliance to the requirements: Bacteriologist Field Engineer REF-WQC-WDI-BM-001 Sample Storage & 3 Freservation Water Analyst Store and preserve water sample Bacteriologist according to: REF-WQC-WDI-FS-002 DATE! Prepared Reviewed: Approved:

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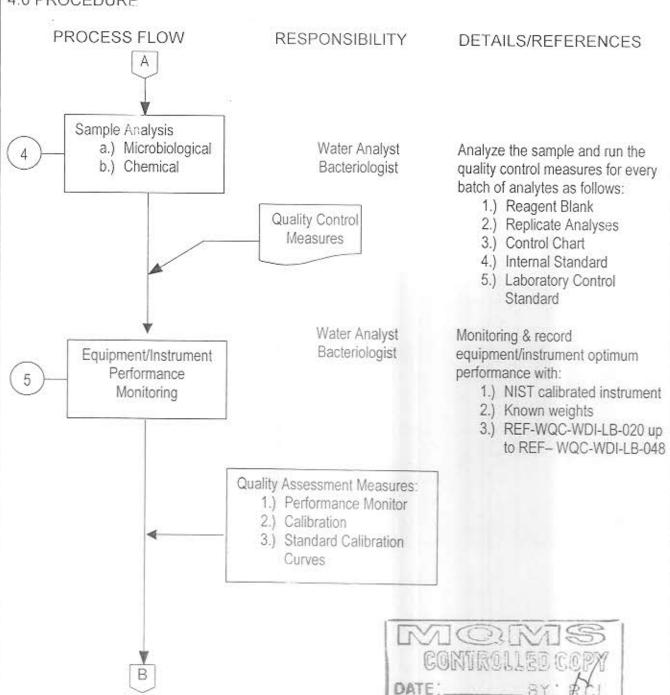
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Intralaboratory Quality Assurance Implementation and Assessment Index No. OP-WQC-WDI-005 Metropolitan Cebu Water District Quality Management System Page No. 3 of 4 Procedures Manual Issue No. 1 Section Revision No. 0 Intralaboratory Quality Assurance Subject Effective Date Implementation and Assessment Jan. 01,01 4.0 PROCEDURE PROCESS FLOW RESPONSIBILITY DETAILS/REFERENCES



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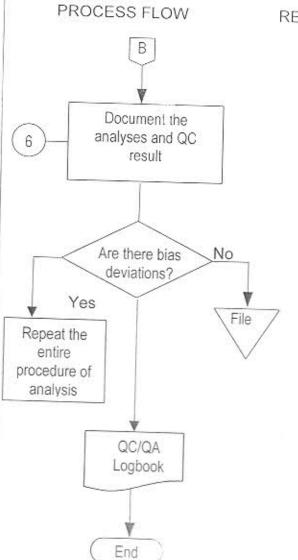
Intralaboratory Quality Assurance Implementation and Assessment



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#### C-WDI-005 4 of 4 1 Sec 0 alaboratory Quality Assurance Subject Effective Date | Jan. 01, 01 Implementation and Assessment

# 4.0 PROCEDURE



RESPONSIBILITY

DETAILS/REFERENCES

Water Analyst Bacteriologist

Document the analyses and QC results to monitor bias/deviation if any:

- 1.) REF-WQC/WDI-010
- 2.) REF-WQC/WDI-019

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Evaluation, Interpretation & Documentation of Analytical Results

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Subject	Evaluation, Interpretation & Documentation of Analytical Results	Effectiv	e Date	Jan.01,01

### 1.0 OBJECTIVE:

To evaluate, interpret and document the analytical results for appropriate application of corrective action when necessary.

#### 2.0 SCOPE:

All analytical test results for the microbiological and chemical analysis of drinking water within the responsibility of the company.

## 3.0 DEFINITION OF TERMS:

WHO - World Health Organization

NSDW – PHILS. 1993 – a document designed to guide waterworks officials, operators of water supply systems; both government and private entities, health and sanitation authorities and the general public in establishing the requirements for safe and potable water.

ABNORMAL RESULT - A result not conforming to the generally accepted or recognized standard value.

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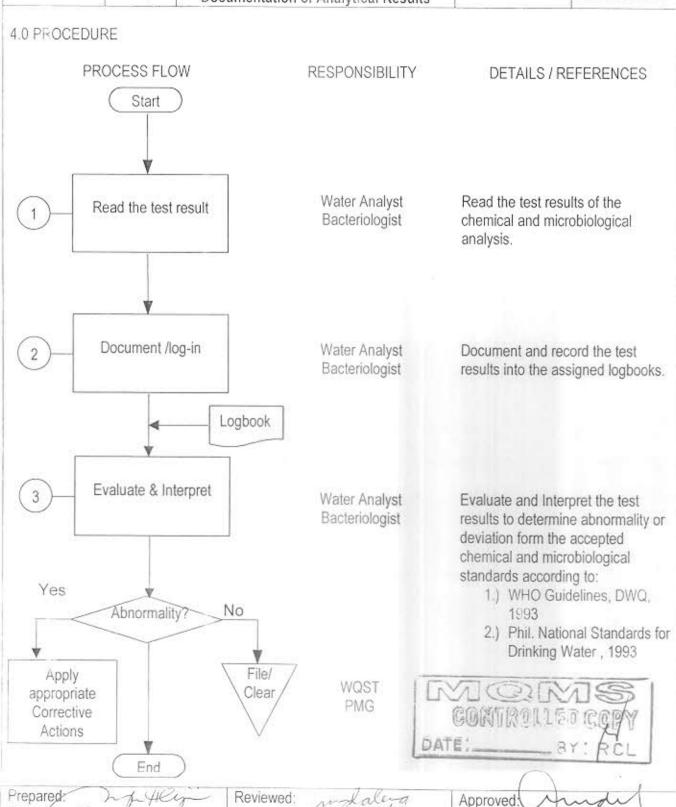
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Evaluation, Interpretation & Documentation of Analytical Results



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Isolating an Area Affected Area by Microbiological Contamination at the Dist. Network

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Quality Management System		Page	e No.	1 of 4	
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	Section	**	Revisio	n No.	0
	Subject	Isolating an Area Affected by Microbiological Contamination at the Distribution Network	Effective	Date	Jan. 01, 01

#### 1.0 OBJECTIVE:

To be able to respond to a critical problem of microbiological contamination in the distribution network by isolating and rehabilitating the identified area that is affected by this type of contamination.

#### 2.0 SCOPE:

This entails all water distribution areas that are found to be microbiologically contaminated by the Water Quality Control Division and the pertinent isolation and rehabilitation works required.

#### 3.0 DEFINITION OF TERMS:

Boil Water Order

- refers to job order that informs the generally-affected public and consumers to boil their water for at least 15 minutes before drinking in order to get rid of microbiological contamination in their water supply, which is usually dessiminated by the Public Affairs Department through newspapers, radio and T.V.

Leak Detection underground

- refers to activity employing sophisticated technical gadgets to locate

leaks.

Microbiological Contamination - refers to deleterious pollution of water by identified coliform microorganism.

Pipeline Leakage

- refers to either underground or surface water outflow from a pipeline due

to dilapidation of pipes.

PMG-LDT

- refers to the Leak Detection Team of the Pipelines Maintenance Group.

Vicinity Sampling

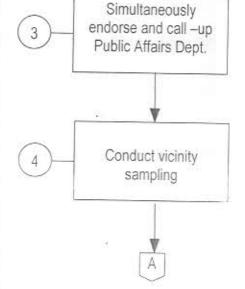
- refers to purposive water sampling activities conducted in a distribution area affected by microbiological contamination to identify the extent of water

degradation, so that affected area can be isol

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Isolating an Area Affected Area by Microbiological Contamination at the Dist. Network Metropolitan Cebu Water District Index No. OP-WQC/WDI-007 Quality Management System Page No. 2 of 4 Procedures Manual Issue No. Section Revision No. 0 Isolating an Area Affected by Microbiological Subject Effective Date Contamination at the Distribution Network Jan. 01, 01 4.0 PROCEDURE PROCESS FLOW RESPONSIBILITY DETAILS / REFERENCES Start Laboratory data WQCD Manager Gather combined field and Gather combined field 1 laboratory data showing massive and laboratory data microbiological contamination at Bbil Wat designated area. Boil Water Order generated from WQCD computer Fill-up Boil Water WQCD Manager / WQCD (LF - 04)Order Form Clerk



PAD Manager

Simultaneously endorse and call – up Public Affairs Dept. for information dissemination for he Boil Water Order.

WQCD Staff Analyst

Conduct vicinity sampling at contamination area and endorse samples at laboratory.

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Date: 6/26/01

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Date: 7/40/07

Isolating an Area Affected Area by Microbiological Contamination at the Dist. Network



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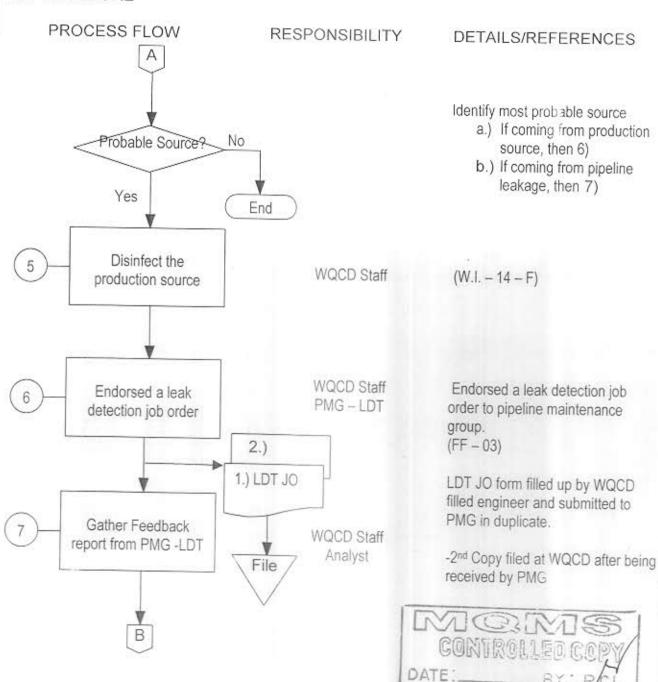
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# 4.0 PROCEDURE

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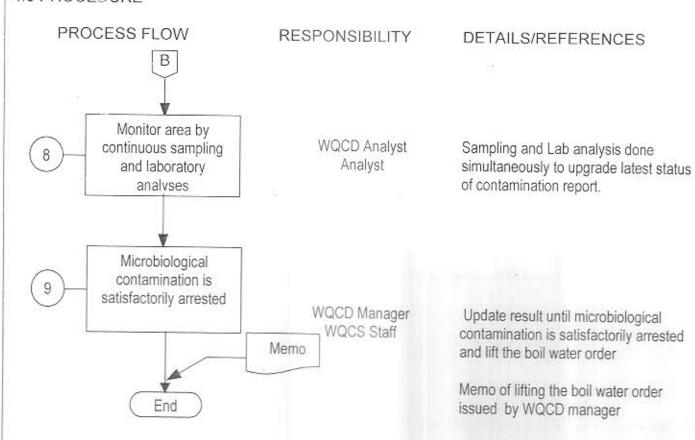
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Isolating an Area Affected Area by Microbiological Contamination at the Dist. Network



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## 4.0 PROCEDURE





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Handling Internal WQCD Job Order with History Cards at Dist. Sampling Point.



	Metropolitan Cebu Water District		OP -	-WQC / WDI - 008
Quality Management System		Page No.		1 of 3
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Subject	Handling Internal WQCD Job Order with History Cards at Distribution Sampling Point	Effective [	Date	Jan. 01, 01

### 1.0 OBJECTIVE:

To implement and observe standard operating procedures in handling internal job orders at WQCD for a contaminated sampling point in the distribution system, which is employing history cards to follow-through improvements in the water quality.

### 2.0 SCOPF

This limits to all sampling points in the distribution system that are registered in history cards with such cases being instigated by unsatisfactory results as advised by the laboratory.

# 3.0 DEFINITION OF TERMS:

Before -and-after-Meter-Sampling - refers to water sampling activity by getting the sample first the water sample at the faucet and, collecting another sample by disconnecting the water meter to represent that being serviced before the meter.

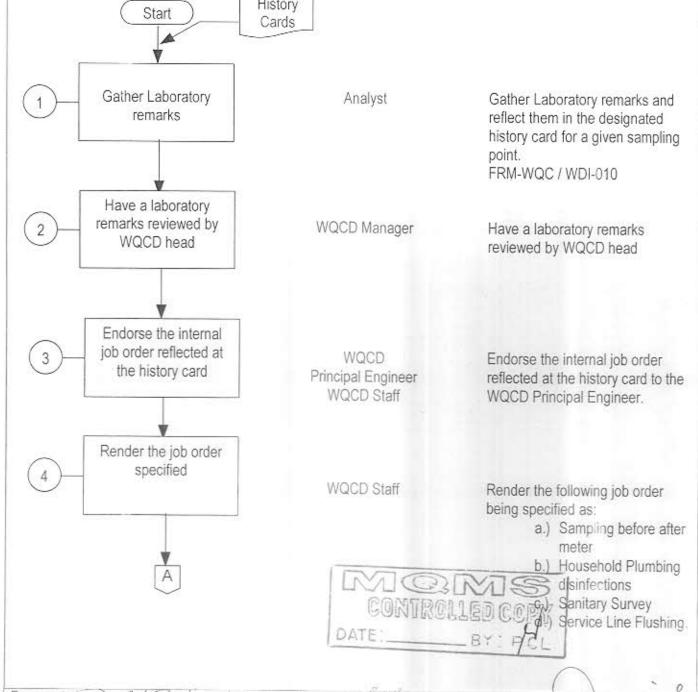
Household Plumbing Disinfections - refers to the introduction of chlorine solution into the service line/domestic connection with subsequent flushing after a minimum period of 30 minutes contact time.



Prepared Date:/

Reviewed: Date:

Approved Date: 7/20/07 Handling Internal WQCD Job Order with History Cards at Dist. Sampling Point. Index No. OP -WQC / WDI - 008 Metropolitan Cebu Water District Quality Management System Page No. 2 of 3 Procedures Manual Issue No. 1 Section 0 Revision No. Handling Internal WQCD Job Order with Subject Effective Date Jan. 01,01 History Cards at Distribution Sampling Point 4.0 PROCEDURE PROCESS FLOW RESPONSIBILITY DETAILS / REFERENCES History Start Cards Gather Laboratory Analyst Gather Laboratory remarks and 1 remarks reflect them in the designated history card for a given sampling point. FRM-WQC / WDI-010 Have a laboratory remarks reviewed by WQCD Manager Have a laboratory remarks WQCD head reviewed by WQCD head Endorse the internal



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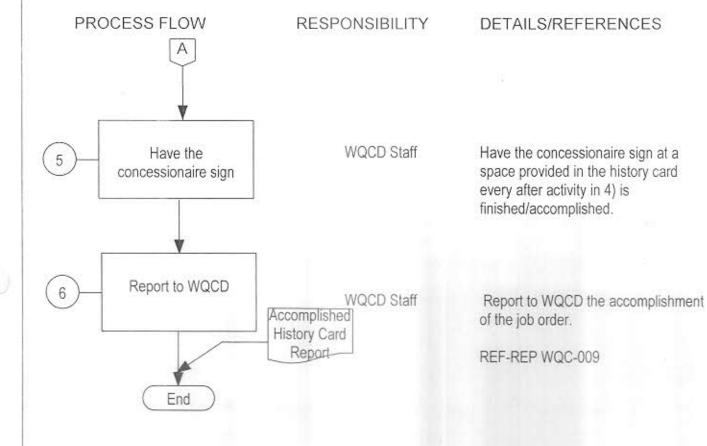
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Handling Internal WQCD Job Order with History Cards at Dist. Sampling Point.



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# 4.0 PROCEDURE





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Handling External WQ(D Job Order for Rehab Actvy. at Dist.

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	Section		Revisi	on No.
	Subject	Handling External WQCD Job Order for Rehab Activity at Distribution	Effectiv	e Date

## 1.0 OBJECTIVE:

To endorse external WQCD job order to PMG for rehab activity at Distribution sampling points that is contaminated with coliform microorganism.

### 2.0 SCOPE:

The activity limits to the WQCD's endorsement of job order to PMG and subsequent follow-up with intended rehab works rendered for a contaminated distribution points.

## 3.0 DEFINITION OF TERMS:

WQCD - refers to the Water Quality Control Division

PMG - refers to Pipelines Maintenance Group

REHAB - refers to any leak detection plumbing, and excavation works intended to repair pipelines leakages and to restore water quality in a given distribution network.

COLIFORM MICRORGANISMS - refer to both fecal and non- fecal bacteria, which are used as index for microbiological quality of water.

SAMPLING POINT – an appurtenance, such as the faucet, that is assessed for water quality in a distribution network.

CONTAMINATED - the state of drinking water, that is polluted with a substance that cause aesthetic and health effects to human consuming it, (e.g. coliform bacteria)

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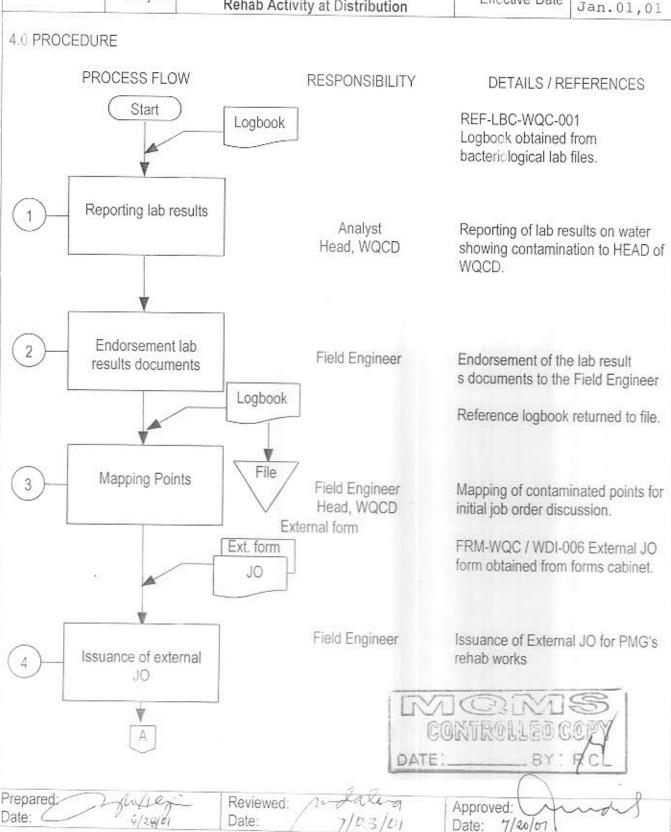
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Handling External WQCD Job Order for Rehab Actvy. at Dist.

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	Subject	Handling External WQCD Job Order for Rehab Activity at Distribution	Effective Da	ate Jan.01,01



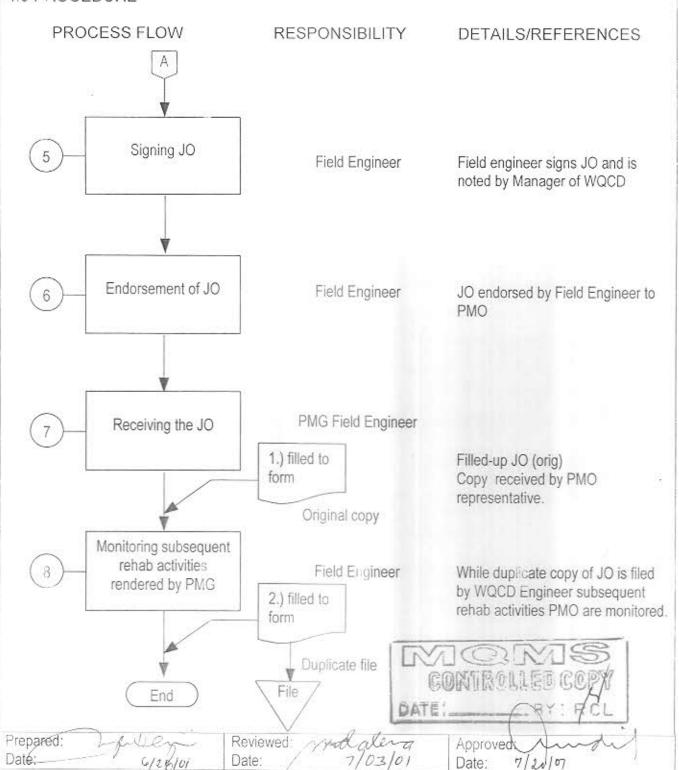
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Subject	Handling External WQCD Job Order for Rehab Activity at Distribution	Effective Dat	e Jan.01,01

### 4.0 PROCEDURE



Strategic Hydrant Flushing Activity in the Water Distribution Network.doc

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Subject	Strategic Hydrant / Blow-Off Valve Flushing Activity in the Water Distribution Network	Effectiv	e Date	Jan.01,01

#### 1.0 OBJECTIVE:

To establish and conform with the standard operating procedures employed in the hydrant flushing activity for the strategically located fire hydrants and blow-off valves in the water distribution network.

#### 2.0 SCOPE:

This limits to the flushing activities of all fire hydrants and blow-off valves installed at MCWD water distribution network.

## 3.0 DEFINITION OF TERMS

Blow-off Valve

 a horizontally installed water appurtenance that is usually located at dead-ends of a distribution system or at low -elevation distribution system, which can be opened by

pipe wrench.

Fire Hydrant

- a vertically erected water appurtenances in the distribution network, that is installed For fitting the hose caps of fire trucks to access water in case of a fire incident, Which can be opened and sealed using a wrench that is fitted into a spindle-type Valve.

Flushing

- refer to water discharging activities in hydrant and blow-off valves to drive -off sand

And silt in order to elean -up a particular distribution system.

Silts

- refer to any sediment-like accumulations in low elevation distribution systems that is

of Organic and inorganic origin.

Zone Area

- a particular area identified with boundaries by the Water Quality Control Division for the purpose of evaluating the quality of isolated water in a given

Distribution system.

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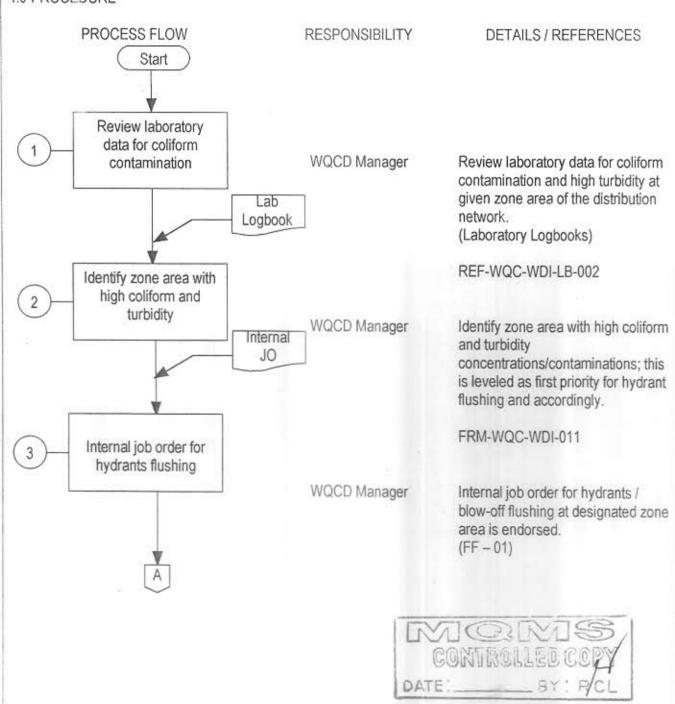


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	Procedures Manual	Issue N	10.	1
Section	MARK IN TO SECUL	Revision N	lo.	0
Subject	Strategic Hydrant / Blow-Off Valve Flushing Activity in the Water Distribution Network	Effective Da	ate	Jan.01,01

## 4.0 PROCEDURE

Prepared:

Date:



Reviewed:

Date:

6/20/01

1- Halera

7/03/01

Approved

Date:

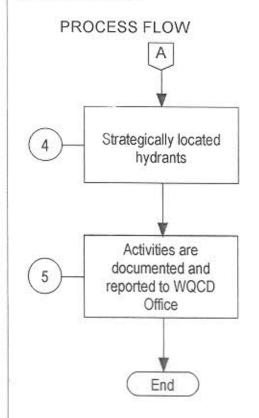
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Strategic Hydrant Flushing Activity in the Water Distribution Network doc



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Subject	Strategic Hydrant / Blow-Off Valve Flushing Activity in the Water Distribution Network	Effective Da	ate Jan.01,01

## 4.0 PROCEDURE



# RESPONSIBILITY

**DETAILS/REFERENCES** 

WQCD Staff

Strategically located hydrants at designated zone area are flushed – out.

(W.I. – 01 – F)

WQCD Staff

5. (FF-02)



Prepared: J. A.C.

Reviewed: Date: -Jale-a 7/03/01 Approved:

roved: 7/4/07

Reassessment of Contaminated Distribution Network After Rehab Work

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	Procedures Manual	Iss	ue No.	1
Section		Revisi	on No.	0
Subject	Re-assessment of Contaminated Distribution Network After Rehab Works	Effectiv	e Date	Jan. 01,0

#### 1.0 OBJECTIVE:

To determine if the rehab works rendered at contaminated distribution network have addressed the elimination of contaminants form distributed drinking water.

## 2.0 SCOPE:

The activity covers cluster sampling and resampling at contaminated points and distribution area with substantial reassessment with or further recommendations.

## 3.0 DEFINITION OF TERMS:

ELIMINATION - refers to the process of getting rid of something, such as that of contaminant in drinking water.

CLUSTER SAMPLING – refers to random system of reassigning 5 or more new sampling points that closely coordinated with a contaminated sampling point in a given distribution area, in order to reassess that elimination of contaminants due to some recent rehab works made.

**RESAMPLING** – refers to water sample collection from a contaminated point that is made about 3 to5 days from previous sampling activity being made.

LABORATORY RESULTS – refers to documented reports made by laboratory that described the findings of analytical testing being conducted for a certain sample submitted, such as water.

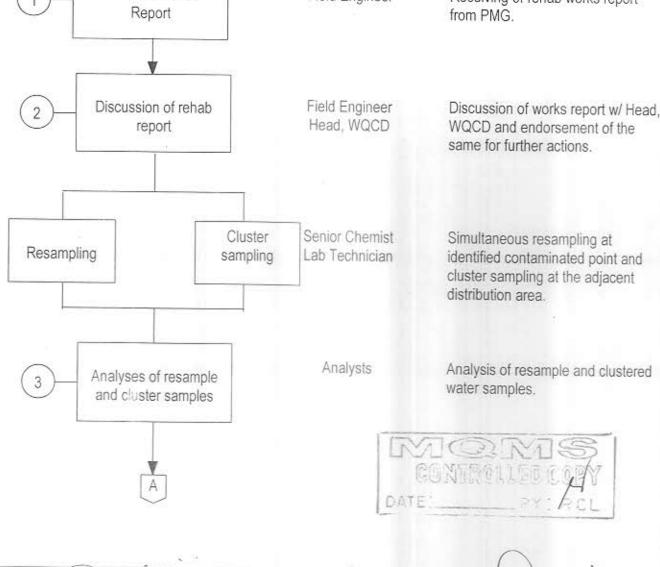


Prepared: 744 Gg

Reviewed: Malera 7/03/01

Approved 7/20/09

Reassessment of Contaminated Distribution Network After Rehab Work Index No. OP-WQC/WDI-011 Metropolitan Cebu Water District Quality Management System Page No. 2 of 4 Procedures Manual Issue No. 1 Section Revision No. Re-assessment of Contaminated Subject Effective Date Jan 01.01 Distribution Network After Rehab Works 4.0 PROCEDURE PROCESS FLOW RESPONSIBILITY DETAILS / REFERENCES Start Rehab Rehab report received from PMG. Report Received Rehab Receiving of rehab works report Field Engineer Report from PMG. Discussion of rehab Field Engineer Discussion of works report w/ Head, Head, WQCD report WQCD and endorsement of the same for further actions



Approved

7/20/00

Date:

Reviewed:

Date:

6/20/01

Prepared:

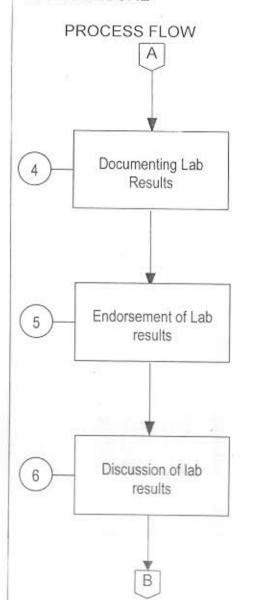
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Reassessment of Contaminated Distribution Network After Rehab Work

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# 4.0 PROCEDURE



RESPONSIBILITY

DETAILS/REFERENCES

Analysts

Documenting Lab results. REF-WQC-WDI-LB-005 REF-WQC-WDI-LB-006

Analysts Head, WQCD Endorsement of lab results to Head, WQCD.

Field Engineer

Discussion of lab results with Field

Engineer.

DATE:

Prepared Date: 4

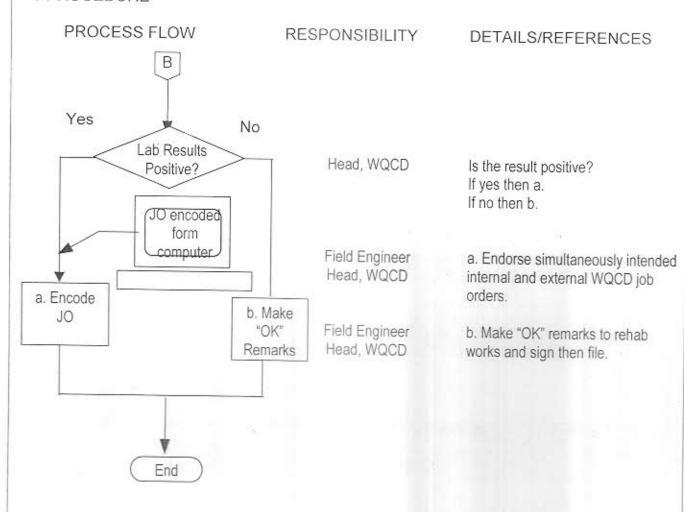
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Approved Date: 7/20/07 Reassessment of Contaminated Distribution Network After Rehab Work



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					Section
Subject	Re-assessment of Contaminated Distribution Network After Rehab Works	Effective Da	ate	Jan. 01,01	

## 4.0 PROCEDURE





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