	Metropolitan Cebu Water District		Index No.	OP-WQC-WDI-003
	<b>Quality Management System Procedures Manual</b>		Page No.	1 of 3
			Issue No.	1
			Revision No.	0
	Section		Microbiological and Chemical Analysis of Water Sample from Designated Areas	Effective Date
Subject				

**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.

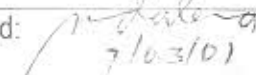
**TOTAL COLIFORM** – refers to any rod-shaped, non-spore forming, gram negative bacteria capable of growth in the presence of bile salts, or other surface-active agents with similar growth-inhibiting properties which are cytochrome –oxidase negative and able to ferment lactose at either 35°C to 37° with the production of gas and aldehyde within 24-48 hours.

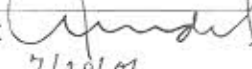
**ESCHERRICHIA COLI** – a fecal coliform which is thermotolerant and is used as an index of fecal contamination in water.

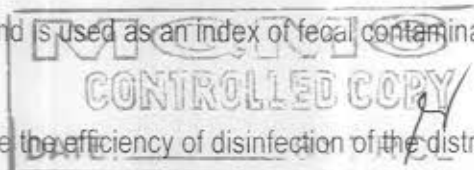
**HPC** – Heterotrophic Plate Count, a pour-plate method to determine the efficiency of disinfection of the distribution network


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

Prepared:   
Date: 6/28/01

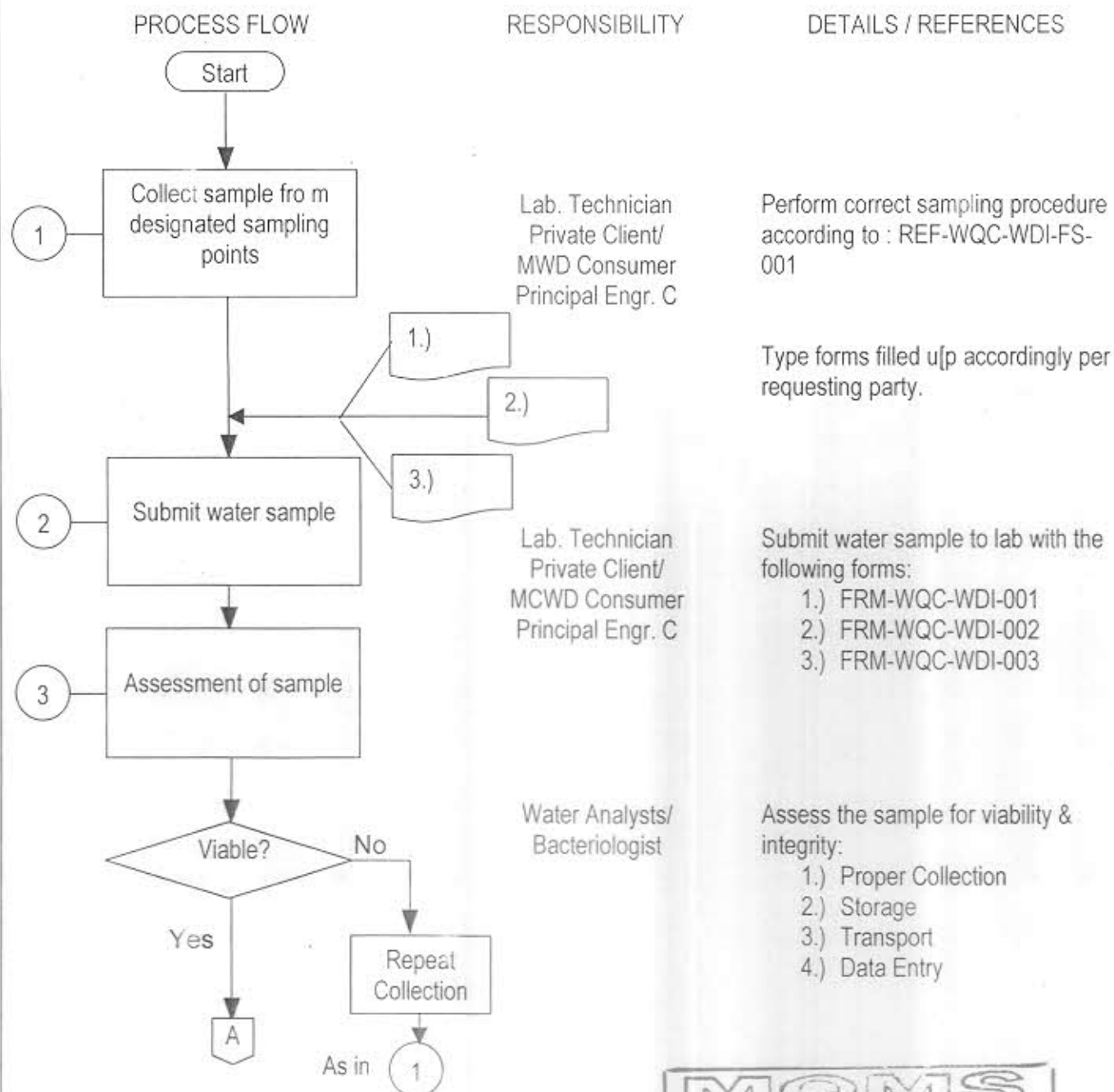
Reviewed:   
Date: 7/10/01

Approved:   
Date: 7/20/01



	Metropolitan Cebu Water District		Index No.	OP-WQC-WDI-003
	<b>Quality Management System Procedures Manual</b>		Page No.	2 of 3
			Issue No.	1
			Revision No.	0
	Section		Microbiological and Chemical Analysis of Water Sample from Designated Areas	Effective Date


## 4.0 PROCEDURE



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Date: 6/20/01

Reviewed: *[Signature]*  
Date: 7/13/01

Approved: *[Signature]*  
Date: 7/20/01

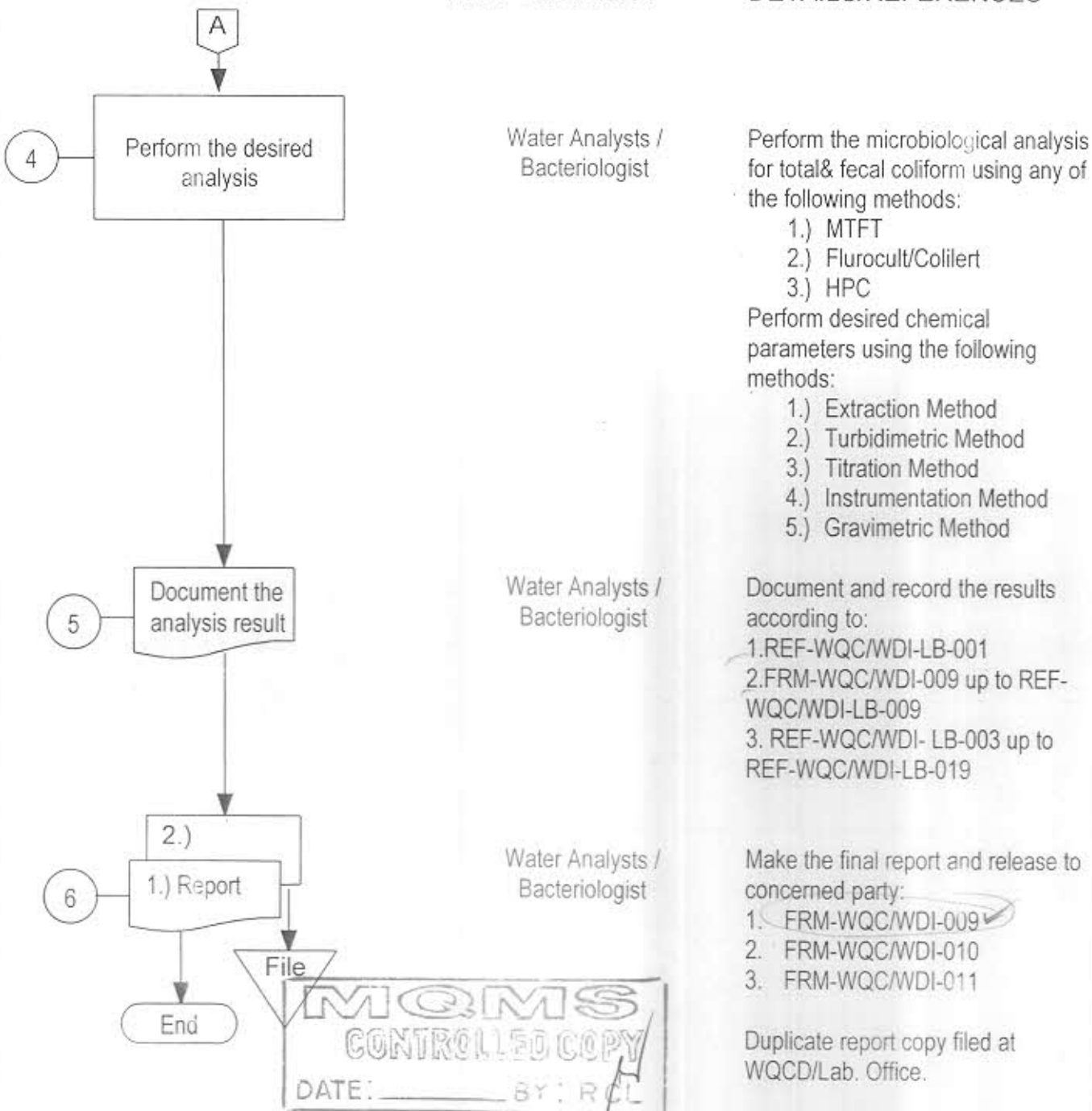
	Metropolitan Cebu Water District		Index No.	OP-WQC-WDI-003
	<b>Quality Management System Procedures Manual</b>		Page No.	3 of 3
			Issue No.	1
	Section	Water Quality Management	Revision No.	0
	Subject	Microbiological and Chemical Analysis of Water Sample from Designated Areas	Effective Date	Jan. 01,01

## 4.0 PROCEDURE

## PROCESS FLOW

## RESPONSIBILITY

## DETAILS/REFERENCES



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6/28/01

Reviewed:  
Date:

*[Signature]*  
7/03/01

Approved:  
Date:

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7/20/01

	Metropolitan Cebu Water District <b>Quality Management System Procedures Manual</b>		Index No.	OP-WQC / WDI-004
			Page No.	1 of 3
			Issue No.	1
	Section	Water Distribution	Revision 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



Prepared: 	Reviewed: 	Approved: 
Date: 6/28/01	Date: 7/03/01	Date: 7/20/01

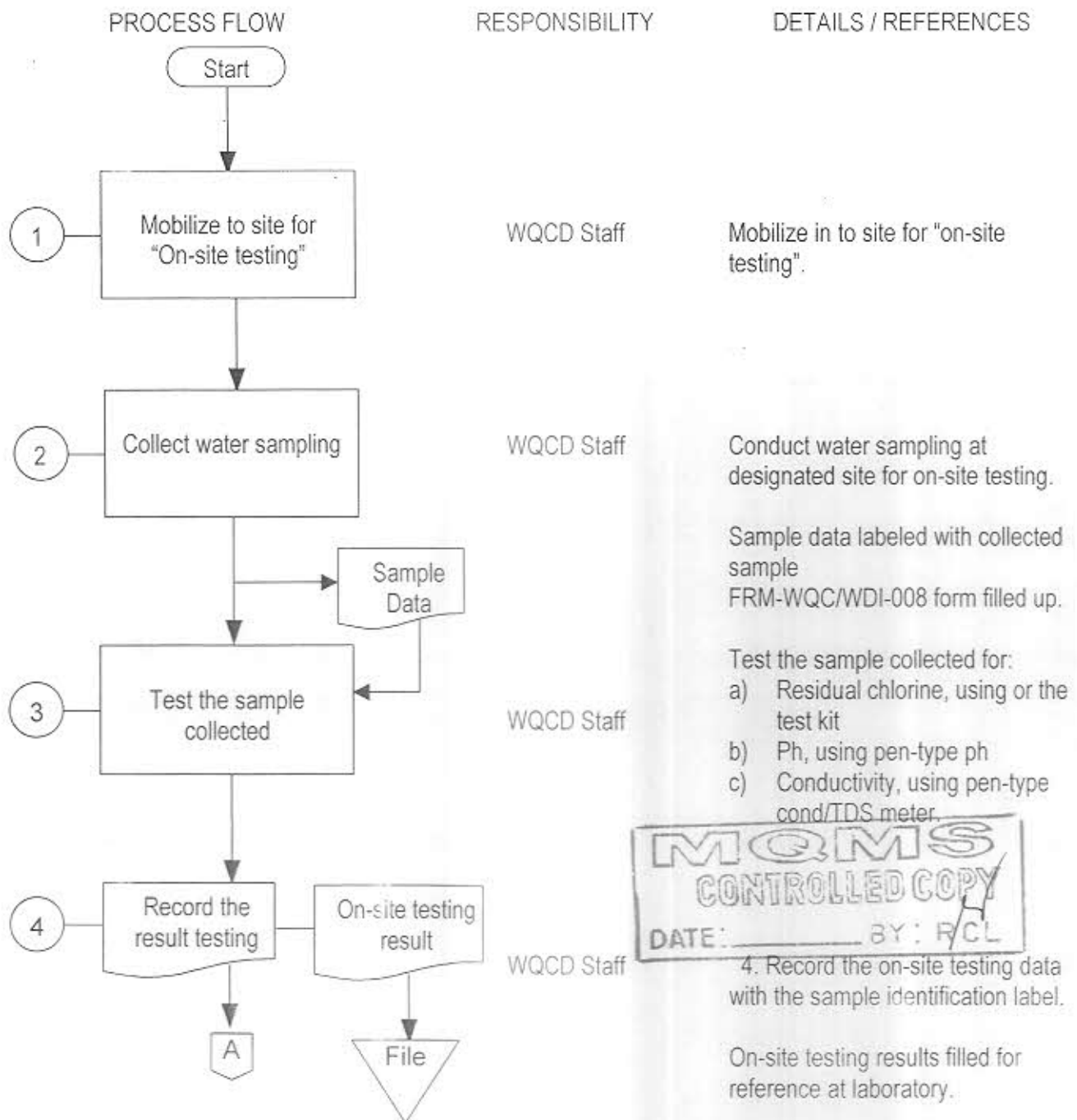


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Index No.	OP-WQC / WDI-004
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Revision No.	0
Effective Date	Jan. 01, 01

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


## 4.0 PROCEDURE



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 Date: 6/28/01

Reviewed: *[Signature]*  
 Date: 7/03/01

Approved: *[Signature]*  
 Date: 7/20/01

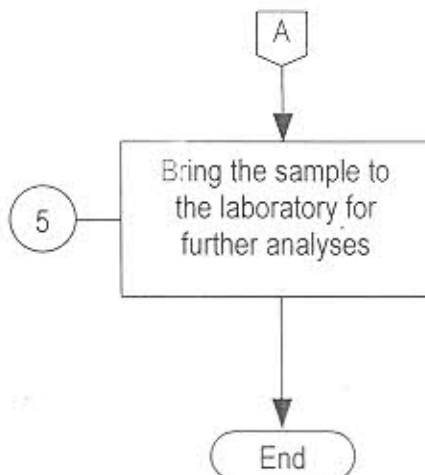
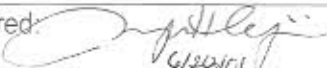
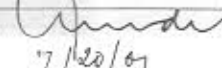
	Metropolitan Cebu Water District <b>Quality Management System Procedures Manual</b>		Index No.	OP-WQC / WDI-004
			Page No.	3 of 3
	Section		Issue No.	1
	Subject	On-Site Chlorine Residual, pH, and Conductivity Testing at the Water Distribution Network	Revision No.	0
		Effective Date	Jan. 01, 01	


## 4.0 PROCEDURE

## PROCESS FLOW

## RESPONSIBILITY

## DETAILS/REFERENCES

WQCD Staff  
AnalystBring the sample to the laboratory  
for further analysesPrepared:  
Date:
  
 6/22/01
Reviewed:  
Date:
  
 7/03/01
Approved:  
Date:
  
 7/12/01

	Metropolitan Cebu Water District <b>Quality Management System Procedures Manual</b>		Index No.	OP-WQC-WDI-005
			Page No.	1 of 4
			Issue No.	1
	Section		Revision No.	0
Subject	Intralaboratory Quality Assurance Implementation and Assessment	Effective Date	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.

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



Prepared:   
Date: 4/28/01

Reviewed:   
Date: 7/03/01

Approved:   
Date: 7/20/01





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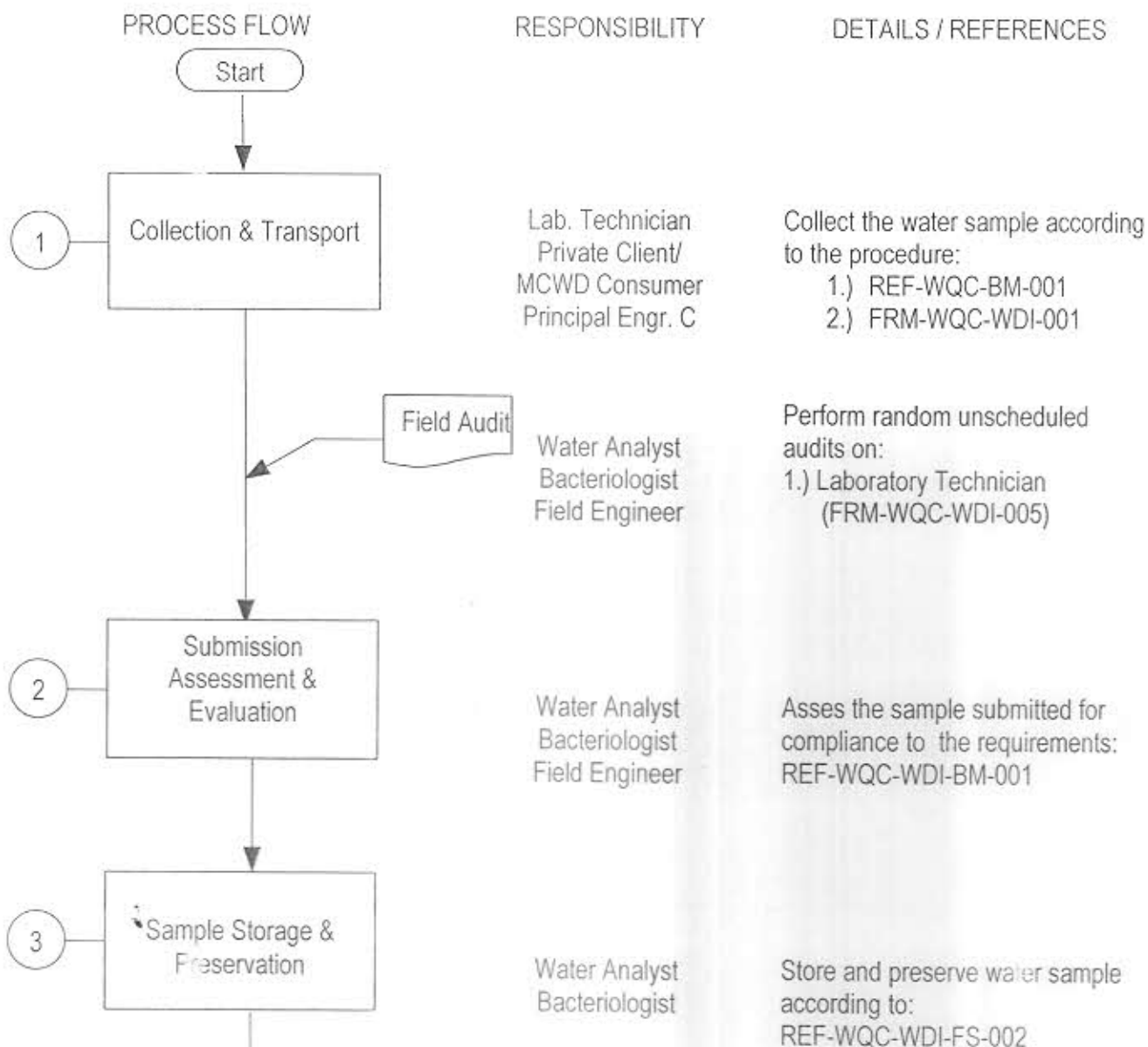
Effective Date Jan. 01, 01

Section

Subject

Intralaboratory Quality Assurance  
Implementation and Assessment

## 4.0 PROCEDURE



Prepared:

Date:

Reviewed:

Date:

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Date:

6/26/01

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Effective Date Jan. 01, 01

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Subject

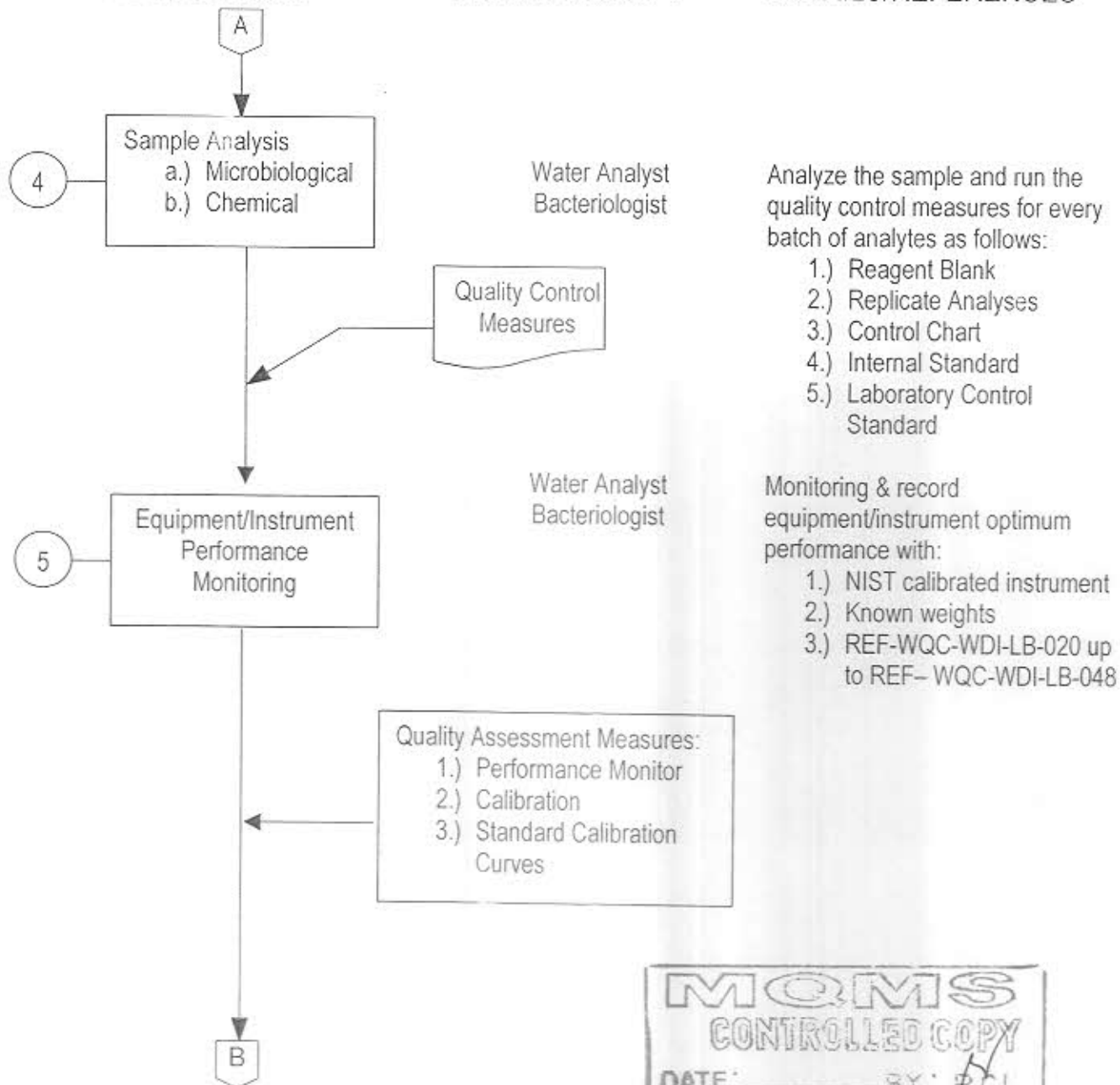
Intralaboratory Quality Assurance  
Implementation and Assessment

## 4.0 PROCEDURE

## PROCESS FLOW

## RESPONSIBILITY

## DETAILS/REFERENCES



Prepared:

Date:

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Effective Date	Jan. 01, 01

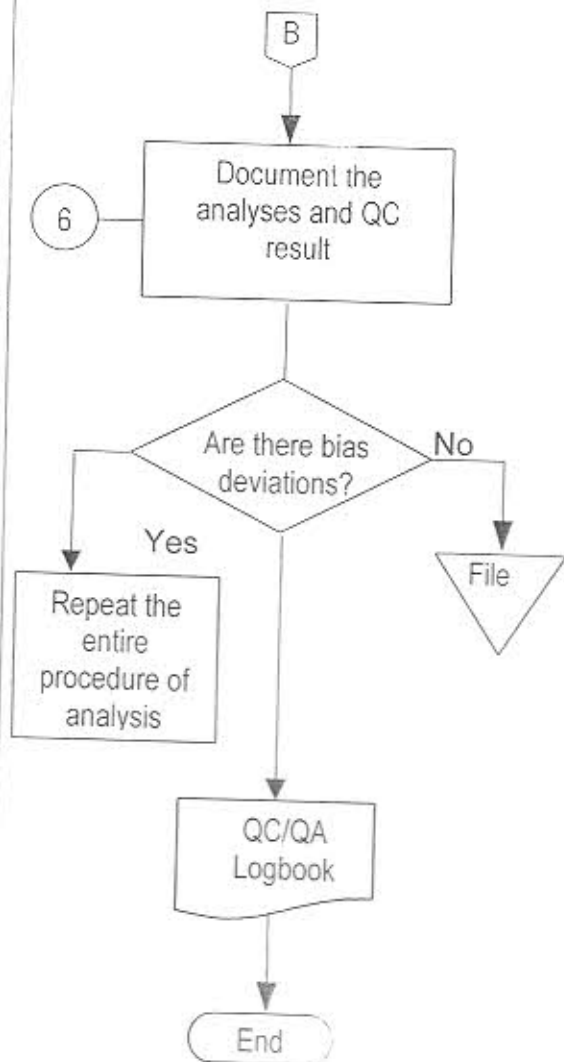
Section	Water Quality Assurance
Subject	Intralaboratory Quality Assurance Implementation and Assessment

4.0 PROCEDURE

PROCESS FLOW

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



Prepared:  
Date:

Reviewed:  
Date:


Approved:  
Date:

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# Evaluation, Interpretation & Documentation of Analytical Results

	Metropolitan Cebu Water District <b>Quality Management System                  Procedures Manual</b>		Index No.	OP-WQC-WDI-006
			Page No.	1 of 2
			Issue No.	1
	Section		Revision No.	0
Subject	Evaluation, Interpretation & Documentation of Analytical Results	Effective 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.



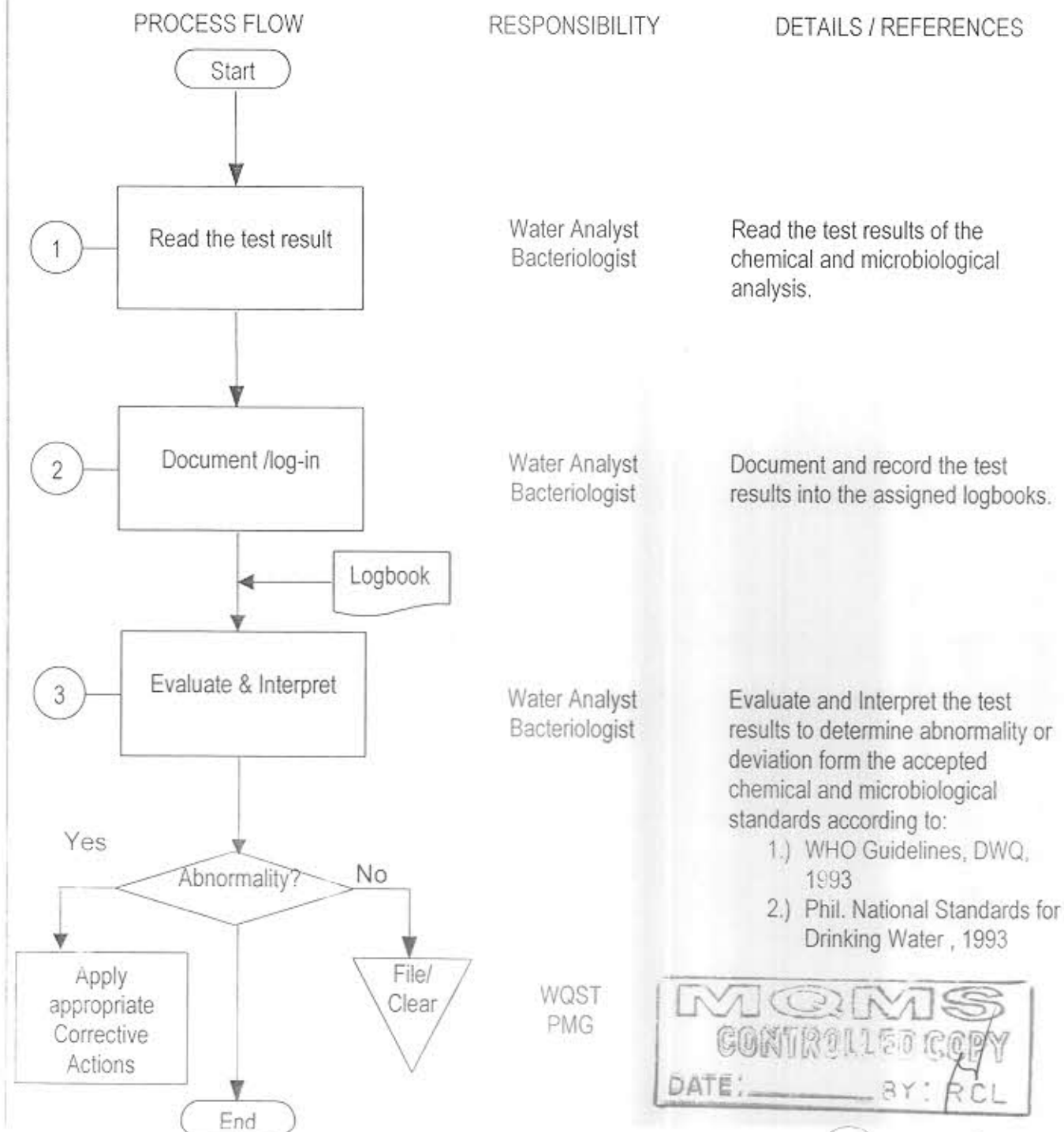
Prepared: *[Signature]*  
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Date: 7/03/01

Approved: *[Signature]*  
Date: 7/20/01

	Metropolitan Cebu Water District <b>Quality Management System</b> <b>Procedures Manual</b>	Index No.	OP-WQC-WDI-006
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	Subject	Revision No.	0
	Evaluation, Interpretation & Documentation of Analytical Results		Effective Date Jan. 01, 01


## 4.0 PROCEDURE



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Date: 6/28/01

Reviewed: *[Signature]*  
Date: 7/03/01

Approved: *[Signature]*  
Date: 7/20/01

	Metropolitan Cebu Water District <b>Quality Management System Procedures Manual</b>		Index No.	OP-WQC/WDI - 007
			Page No.	1 of 4
	Section		Issue No.	1
	Subject	Isolating an Area Affected by Microbiological Contamination at the Distribution Network	Revision No.	0
		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 disseminated 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.

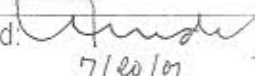
**Vicinity Sampling**

- 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 isolated.



Prepared:   
Date: 4/26/01

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Date: 7/03/01

Approved:   
Date: 7/20/01

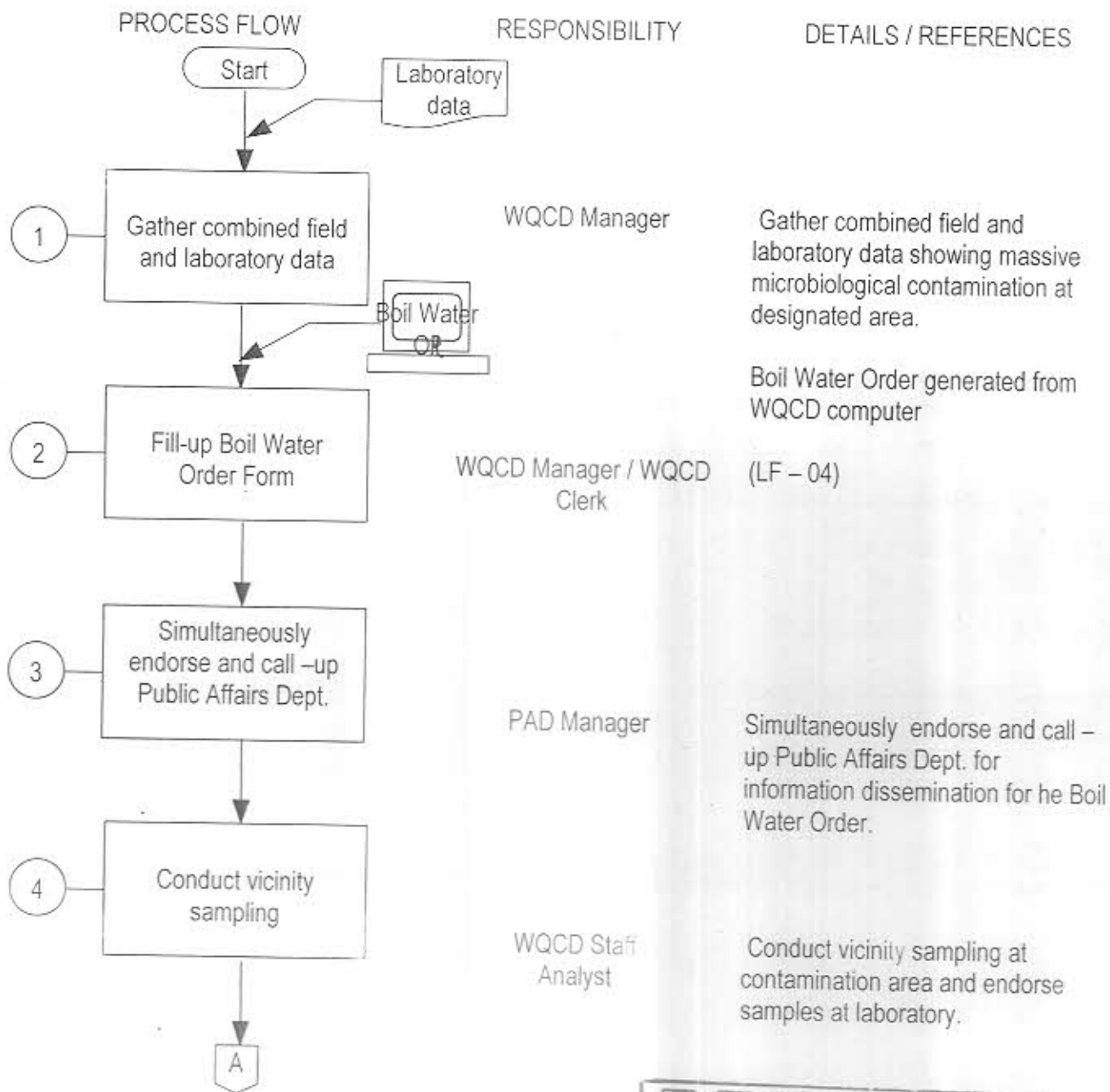


Metropolitan Cebu Water District  
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Issue No.	1
Revision No.	0
Effective Date	Jan. 01, 01

Section	
Subject	Isolating an Area Affected by Microbiological Contamination at the Distribution Network

4.0 PROCEDURE



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Date: 6/26/01

Reviewed: *[Signature]*  
Date: 7/03/01

Approved: *[Signature]*  
Date: 7/20/07



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**Quality Management System  
Procedures Manual**

Index No.	OP - WQC / WDI - 007
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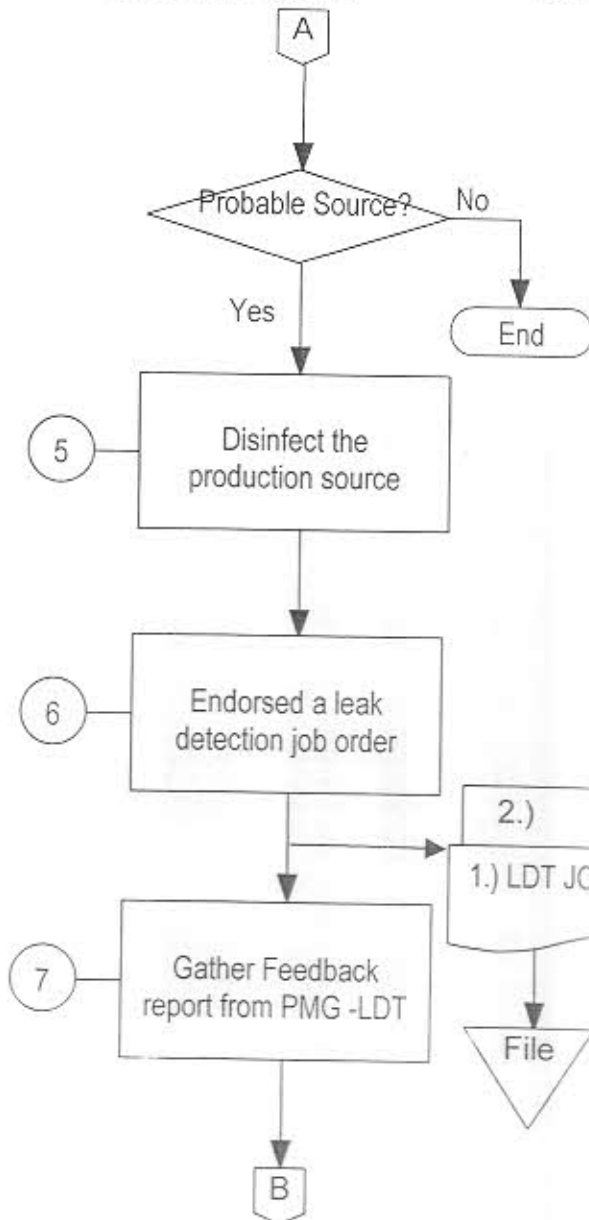
Section	Water Distribution
Subject	Isolating an Area Affected by Microbiological Contamination at the Distribution Network

#### 4.0 PROCEDURE

##### PROCESS FLOW

##### RESPONSIBILITY

##### DETAILS/REFERENCES



Identify most probable source  
a.) If coming from production source, then 6)  
b.) If coming from pipeline leakage, then 7)

WQCD Staff

(W.I. - 14 - F)

WQCD Staff  
PMG - LDT

Endorsed a leak detection job order to pipeline maintenance group.  
(FF - 03)

WQCD Staff  
Analyst

LDT JO form filled up by WQCD filled engineer and submitted to PMG in duplicate.

-2<sup>nd</sup> Copy filed at WQCD after being received by PMG




Prepared: *[Signature]*  
Date: 6/20/01

Reviewed: *[Signature]*  
Date: 7/03/01

Approved: *[Signature]*  
Date: 7/20/01



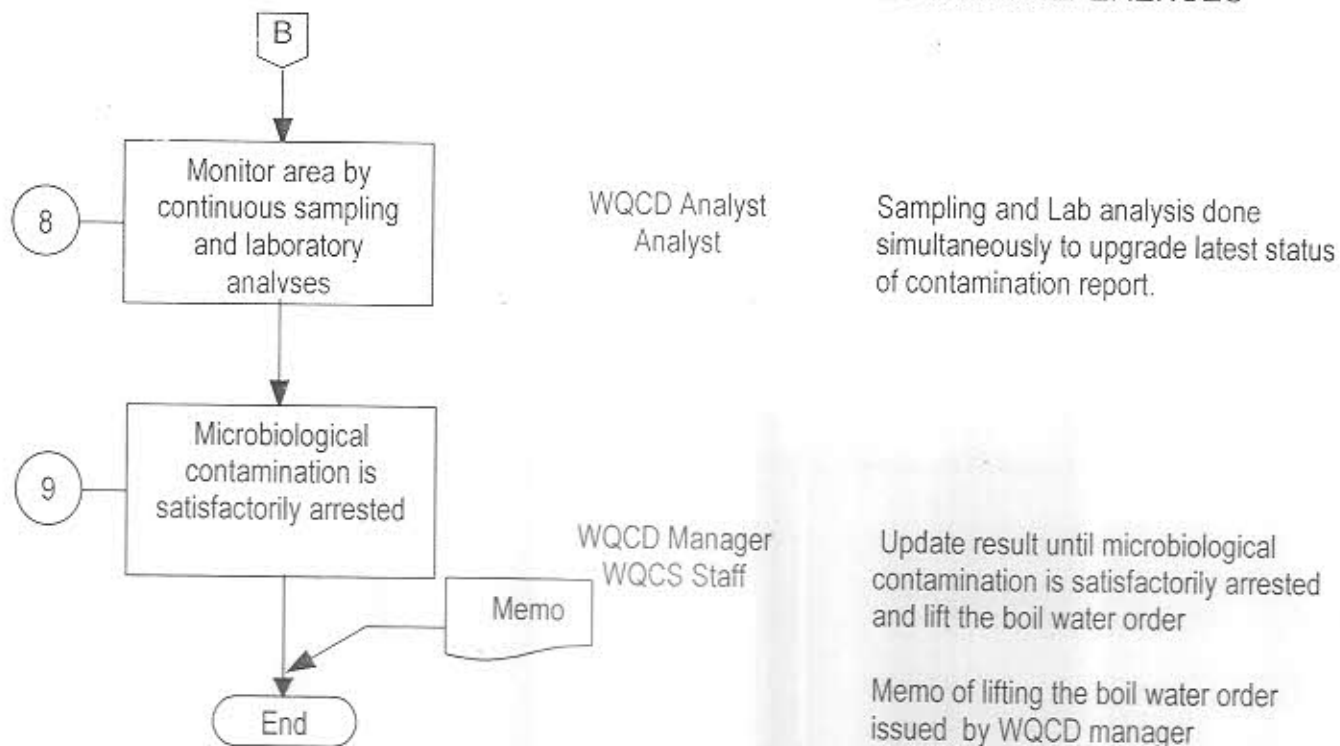
	Metropolitan Cebu Water District <b>Quality Management System Procedures Manual</b>	Index No.	OP - WQC / WDI - 007
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	Section	Issue No.	1
	Subject	Revision No.	0
		Effective Date	Jan. 01, 01

#### 4.0 PROCEDURE

##### PROCESS FLOW

##### RESPONSIBILITY

##### DETAILS/REFERENCES



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	Metropolitan Cebu Water District <b>Quality Management System Procedures Manual</b>		Index No.	OP-WQC / WDI - 008
			Page No.	1 of 3
			Issue No.	1
	Section	Water Distribution	Revision No.	0
	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 SCOPE:

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.



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Date:


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6/28/01

Reviewed:  
Date:

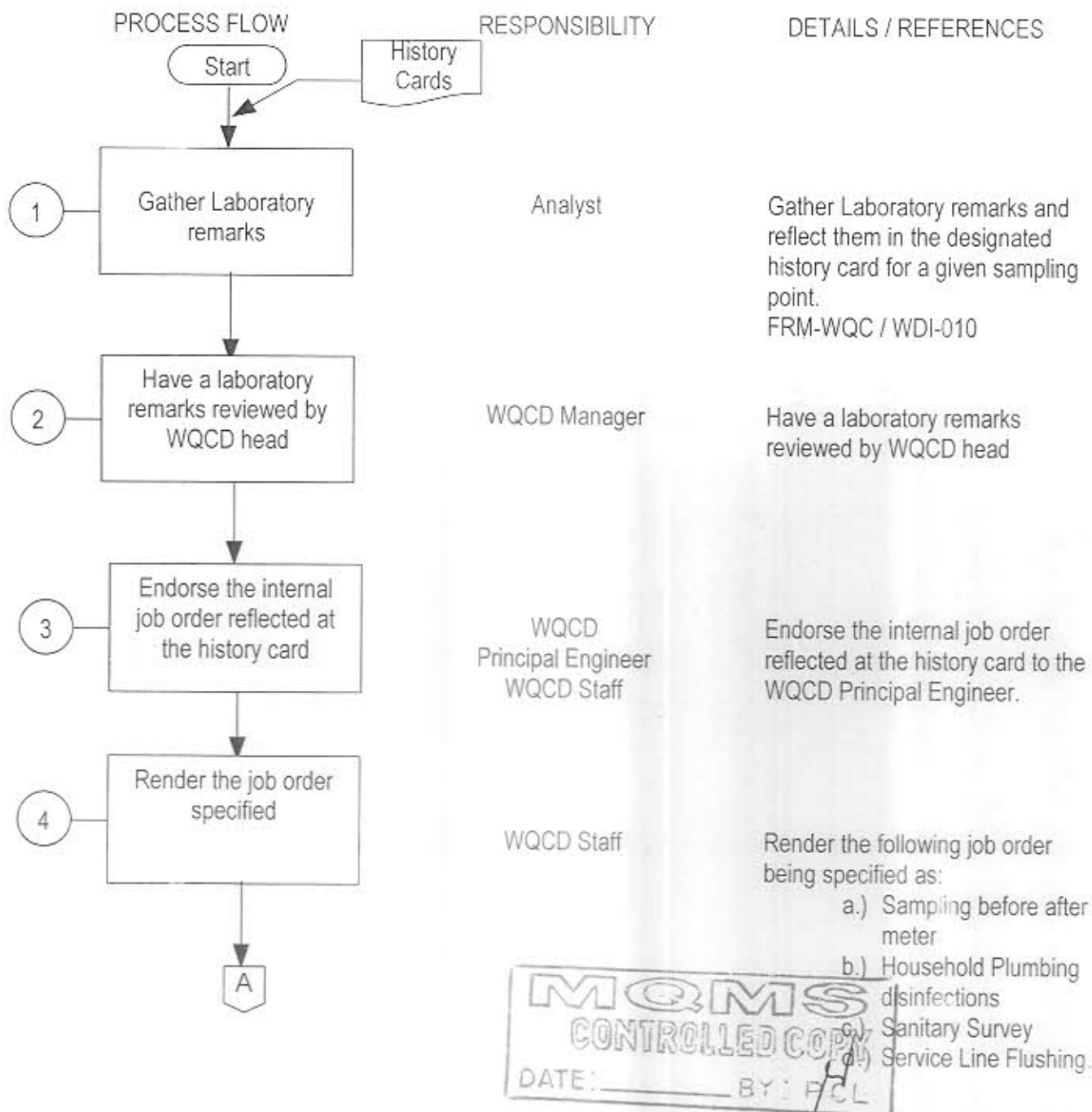
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Approved:  
Date:

*[Signature]*  
7/20/01

	Metropolitan Cebu Water District <b>Quality Management System Procedures Manual</b>	Index No.	OP-WQC / WDI - 008
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	Section	Issue No.	1
	Subject	Revision No.	0
		Effective Date	Jan. 01,01


#### 4.0 PROCEDURE



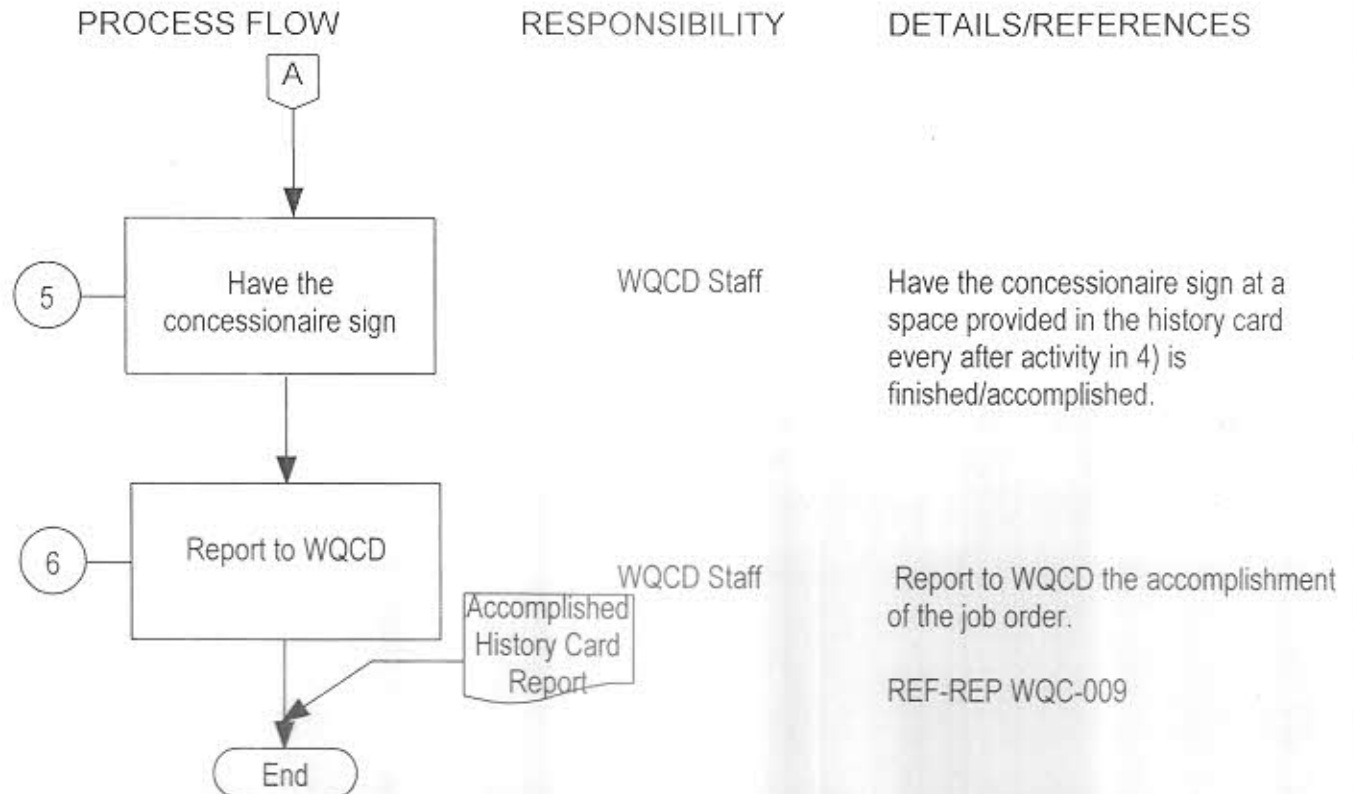
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Date: 6/20/01

Reviewed: *[Signature]*  
Date: 7/03/01


Approved: *[Signature]*  
Date: 7/20/01

	Metropolitan Cebu Water District <b>Quality Management System Procedures Manual</b>	Index No.	OP-WQC / WDI -008
		Page No.	3 of 3
	Section	Issue No.	1
	Subject	Revision No.	0
		Effective Date	Jan. 01,01

#### 4.0 PROCEDURE



Prepared: Date: <i>6/28/01</i>	Reviewed: Date: <i>7/03/01</i>	Approved: Date: <i>7/20/01</i>
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	Metropolitan Cebu Water District <b>Quality Management System Procedures Manual</b>		Index No.	OP-WQC-WDI-009
			Page No.	1 of 3
	Section		Issue No.	1
	Subject	Handling External WQCD Job Order for Rehab Activity at Distribution	Revision No.	0
			Effective Date	Jan. 01, 01

### 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.

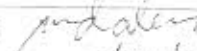
**COLIFORM MICRORGANISMS** - refer to both fecal and non- fecal bacteria, which are used as index for microbiological quality of water.

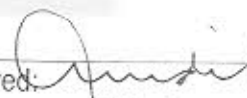
**SAMPLING POINT** – an appurtenance, such as the faucet, that is assessed for water quality in a distribution network.

**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)



Prepared:   
Date: 6/20/01

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Date: 7/03/01

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Date: 7/20/01



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Section

Subject

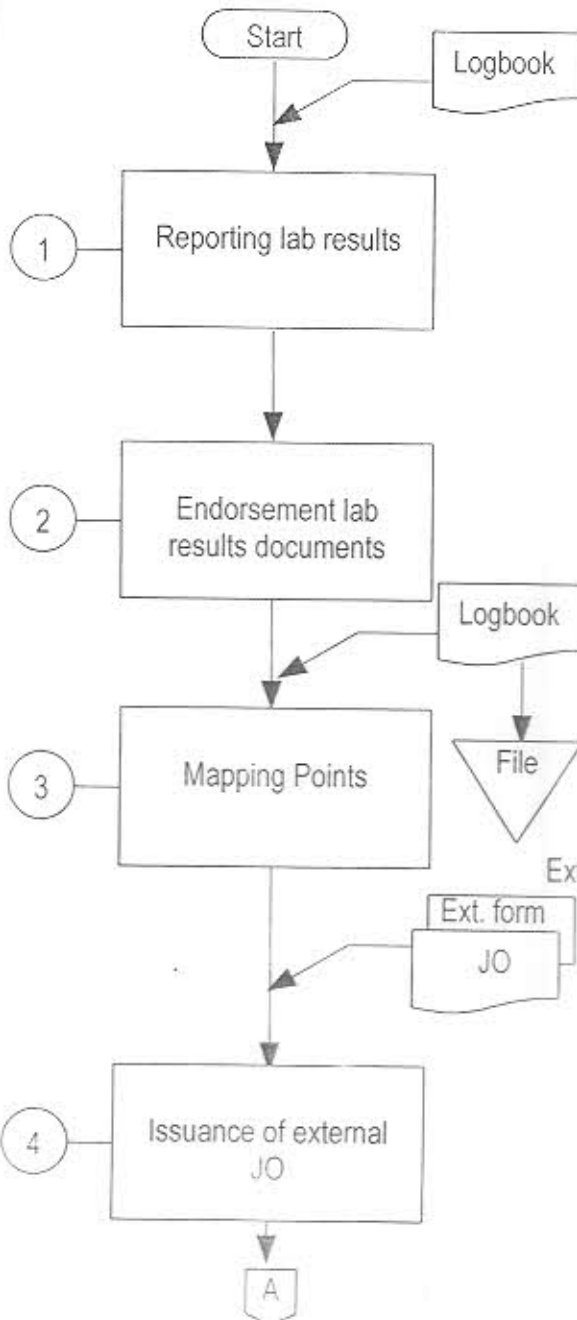
Handling External WQCD Job Order for  
Rehab Activity at Distribution

4.0 PROCEDURE

PROCESS FLOW

RESPONSIBILITY

DETAILS / REFERENCES



REF-LBC-WQC-001  
Logbook obtained from  
bacteriological lab files.

Reporting of lab results on water  
showing contamination to HEAD of  
WQCD.

Endorsement of the lab result  
s documents to the Field Engineer  
  
Reference logbook returned to file.

Mapping of contaminated points for  
initial job order discussion.

FRM-WQC / WDI-006 External JO  
form obtained from forms cabinet.


Issuance of External JO for PMG's  
rehab works



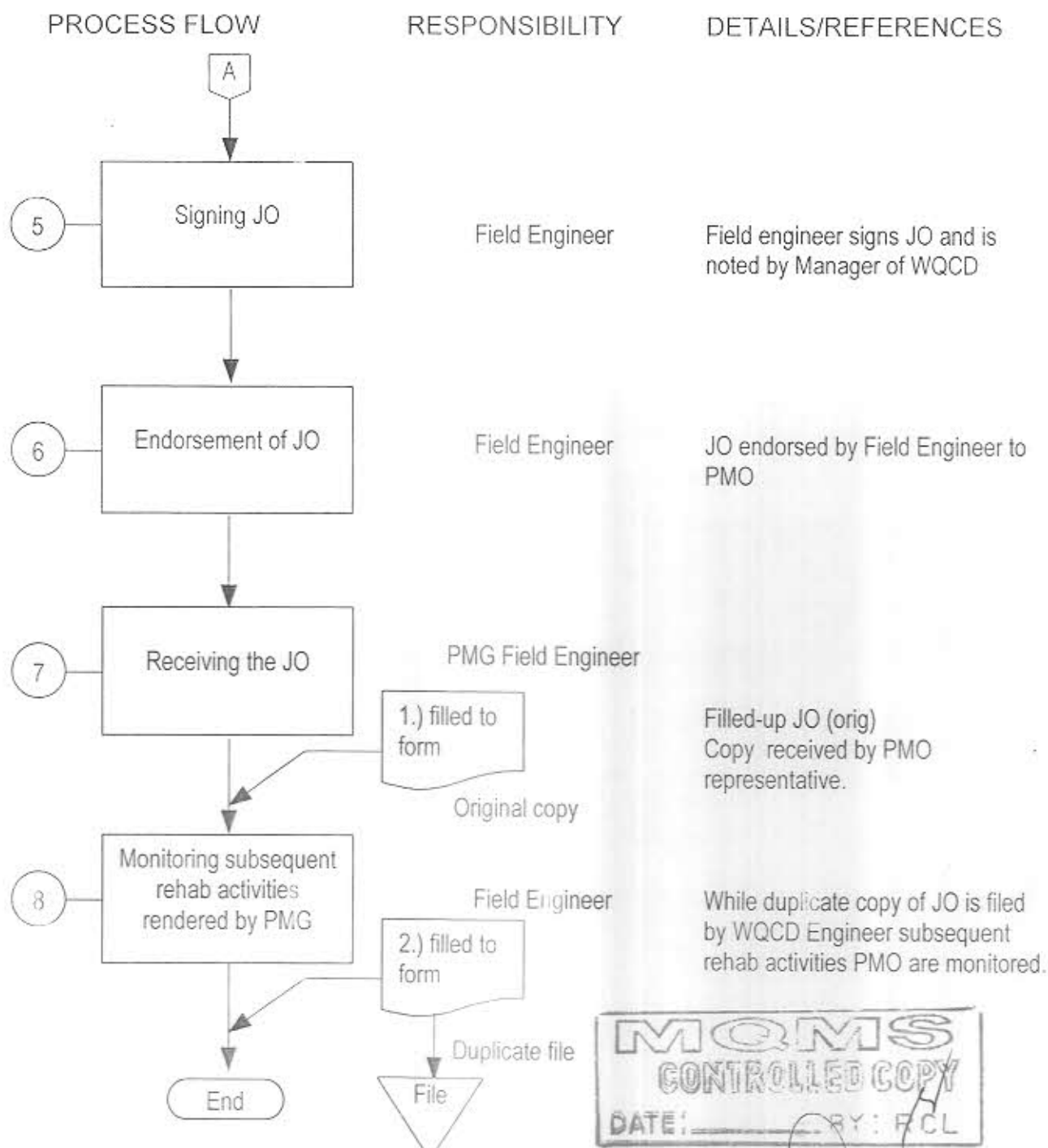
Prepared: *[Signature]*  
Date: 6/29/01

Reviewed: *[Signature]*  
Date: 7/23/01

Approved: *[Signature]*  
Date: 7/20/01

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## 4.0 PROCEDURE




Prepared: *[Signature]*  
 Date: 6/26/01

Reviewed: *[Signature]*  
 Date: 7/03/01

Approved: *[Signature]*  
 Date: 7/20/01



	Metropolitan Cebu Water District <b>Quality Management System</b> <b>Procedures Manual</b>		Index No.	OP-WQC/WDI-010
			Page No.	1 of 3
			Issue No.	1
	Section		Revision No.	0
Subject	Strategic Hydrant / Blow-Off Valve Flushing Activity in the Water Distribution Network	Effective 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 clean -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.



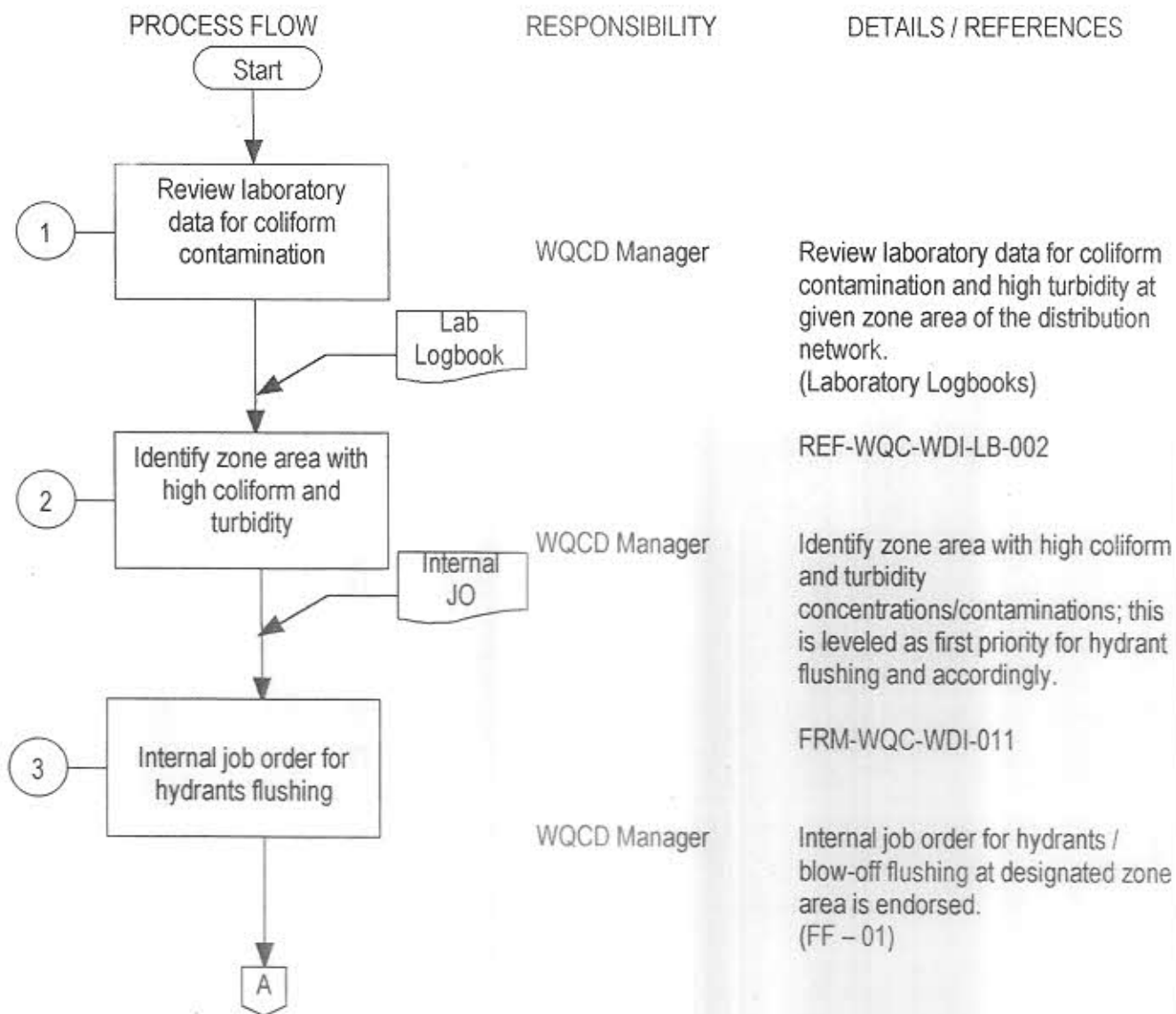
Prepared:   
 Date: 6/26/01

Reviewed:   
 Date: 7/03/01

Approved:   
 Date: 7/20/01

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	Section	Revision No.	0
	Subject	Effective Date	Jan. 01, 01
	Strategic Hydrant / Blow-Off Valve Flushing Activity in the Water Distribution Network		


## 4.0 PROCEDURE



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Date: 6/20/01

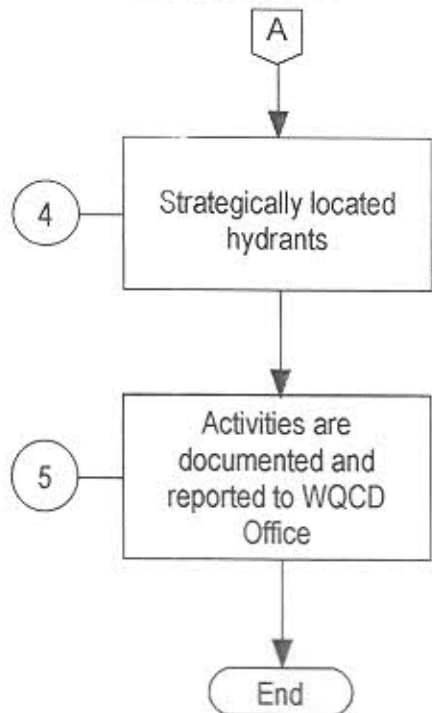
Reviewed: *[Signature]*  
Date: 7/03/01

Approved: *[Signature]*  
Date: 7/20/01

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

## 4.0 PROCEDURE

## PROCESS FLOW



## RESPONSIBILITY

WQCD Staff

WQCD Staff

## DETAILS/REFERENCES

Strategically located hydrants at designated zone area are flushed – out.  
(W.I. – 01 – F)


5. (FF- 02)



Prepared:   
Date: 6/28/01

Reviewed:   
Date: 7/03/01

Approved:   
Date: 7/26/01

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			Issue No.	1
	Section		Revision No.	0
Subject	Re-assessment of Contaminated Distribution Network After Rehab Works	Effective Date	Jan. 01,01	

**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 to 5 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:  
Date:

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6/28/01

Reviewed:  
Date:

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7/03/01

Approved:  
Date:

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7/20/01



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Effective Date

Jan 01,01

Section

Subject

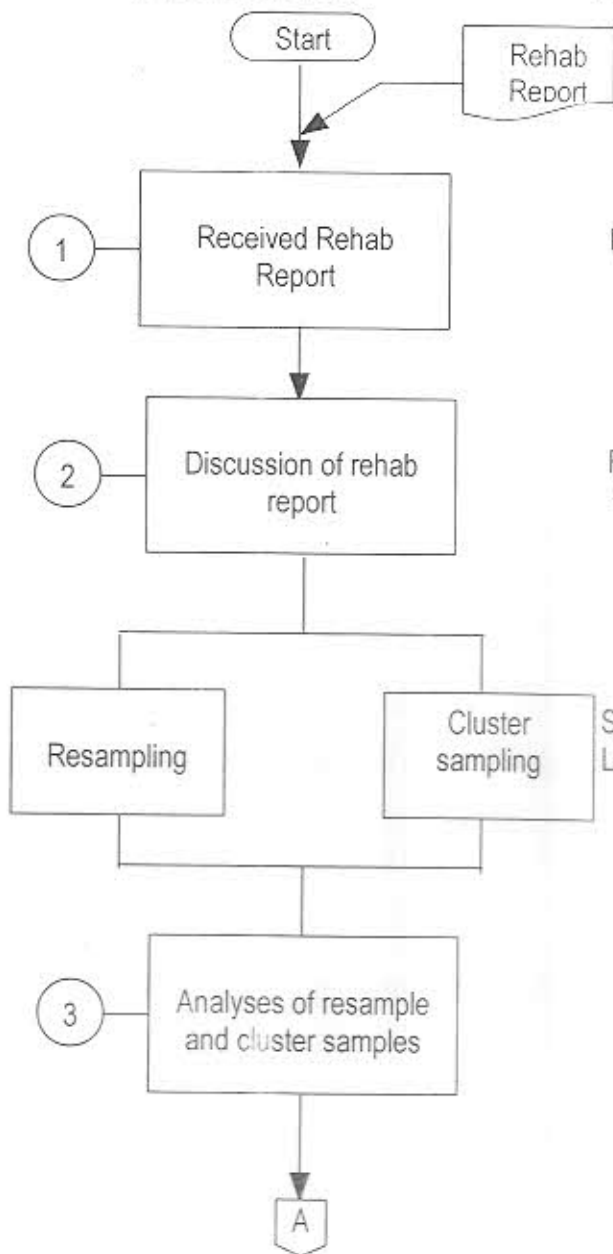
**Re-assessment of Contaminated  
 Distribution Network After Rehab Works**

# 4.0 PROCEDURE

## PROCESS FLOW

## RESPONSIBILITY

## DETAILS / REFERENCES



Rehab report received from PMG.

Field Engineer

Receiving of rehab works report from PMG.

Field Engineer  
 Head, WQCD

Discussion of works report w/ Head, WQCD and endorsement of the same for further actions.

Senior Chemist  
 Lab Technician

Simultaneous resampling at identified contaminated point and cluster sampling at the adjacent distribution area.

Analysts

Analysis of resample and clustered water samples.



Prepared:

Date:

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 6/20/01

Reviewed:


Date:

*[Signature]*  
 7/03/01

Approved:

Date:

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 7/20/01

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#### 4.0 PROCEDURE

PROCESS FLOW	RESPONSIBILITY	DETAILS/REFERENCES
<p>A</p> <p>4 Documenting Lab Results</p> <p>5 Endorsement of Lab results</p> <p>6 Discussion of lab results</p> <p>B</p>	<p>Analysts</p> <p>Analysts Head, WQCD</p> <p>Field Engineer</p>	<p>Documenting Lab results. REF-WQC-WDI-LB-005 REF-WQC-WDI-LB-006</p> <p>Endorsement of lab results to Head, WQCD.</p> <p>Discussion of lab results with Field Engineer.</p>


Prepared:  
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6/28/01

Reviewed:  
Date:

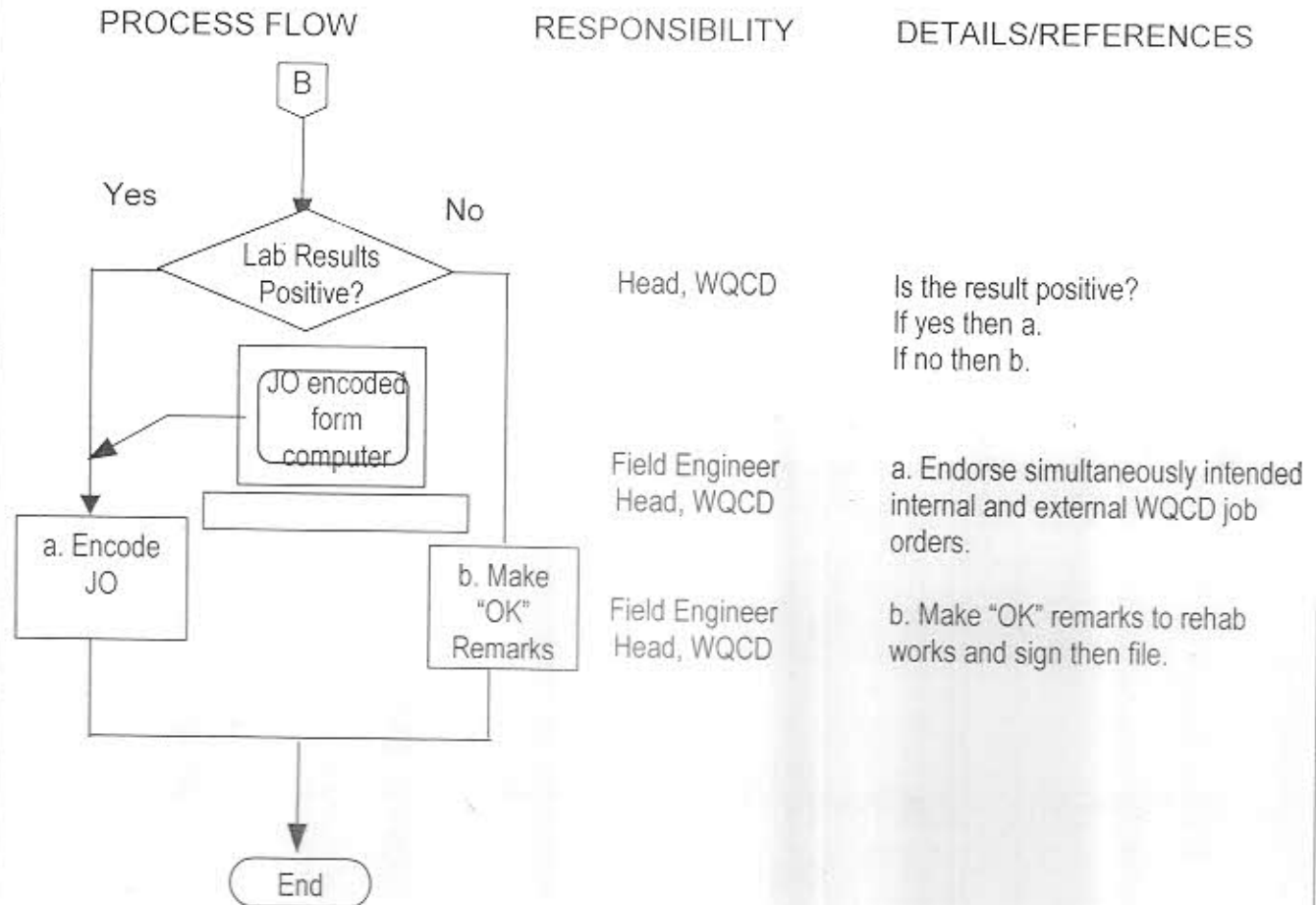
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Approved:  
Date:

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7/26/01

	Metropolitan Cebu Water District <b>Quality Management System</b> <b>Procedures Manual</b>	Index No.	OP-WQC/WDI-011
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#### 4.0 PROCEDURE



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