

Water Governance Benchmarking Criteria

Click on each red number in order to link to the corresponding paragraph.
Click again on the red number in order to return to criteria page.
Numbers found next to an article or item title correspond to the entire article or item.
Numbers found next to document title correspond to the entire document.

A. GOVERNANCE FUNCTIONS

- 1. Organizing and building capacity in the water sector**
 - 1.1 Creating and modifying an organizational structure
 - 1.2 Assigning roles and responsibilities
 - 1.3 Setting national water policy [1](#)
 - 1.4 Establishing linkages among sub-sectors, levels, and national sub-regions
 - 1.5 Establishing linkages with neighboring riparian countries
 - 1.6 Building public and political awareness of water sector issues
 - 1.7 Securing and allocating funding for the sector
 - 1.8 Developing and utilizing well-trained water sector professionals
- 2. Planning strategically**
 - 2.1 Collecting, managing, storing and utilizing water-relevant data [2](#), [3](#)
 - 2.2 Projecting future supply and demand for water
 - 2.3 Designing strategies for matching expected long-term water supply an demand and dealing with shortfalls (including drought mitigation strategies)
 - 2.4 Developing planning and management tools to support decision making
- 3. Allocating water**
 - 3.1 Awarding and recording water rights and corollary responsibilities
 - 3.2 Establishing water and water rights transfer mechanisms
 - 3.3 Adjudicating disputes
 - 3.4 Assessing and managing third party impacts of water and water rights transactions
- 4. Developing and managing water resources**
 - 4.1 Constructing public infrastructure and authorizing private infrastructure development
 - 4.2 Forecasting seasonal supply and demand and matching the two
 - 4.3 Operating and maintaining public infrastructure according to established plans and strategic priorities
 - 4.4 Applying incentives and sanctions to achieve long and short term supply/demand matching (including water pricing)
 - 4.5 Forecasting and managing floods and flood impacts
- 5. Regulating water resources and services**
 - 5.1 Issuing and monitoring operating concessions to water service providers
 - 5.2 Enforcing withdrawal limits associated with water rights
 - 5.3 Regulating water quality in waterways, water bodies, and aquifers (including enforcement) [4](#), [5](#), [6](#), [7](#), [8](#), [9](#), [10](#), [11](#), [12](#), [13](#)
 - 5.4 Protecting aquatic ecosystems
 - 5.5 Monitoring and enforcing water service standards [14](#), [15](#), [16](#), [17](#), [18](#)

B. GOVERNANCE PROCESS CHARACTERISTICS

- 1. Transparency.**
- 2. Participation.**
- 3. Accountability and Integrity.** 19, 20, 21
- 4. Rule of law.**
- 5. Coherency and Integration.**
- 6. Responsiveness.**

C. CROSS CUTTING CATEGORIES

1. Water Sources

- 1.1 Surface water 22, 23, 24
- 1.2 Groundwater 25, 26, 27, 28
- 1.3 Derivative water (reclaimed, reused, desalinated) 29

2. Water Uses

- 2.1 Irrigation 30, 31, 32, 33
- 2.2 Municipal 34, 35
- 2.3 Industrial
- 2.4 Environmental
- 2.5 Hydropower
- 2.6 Fisheries, navigation, recreation
- 2.7 Other uses (including social, esthetic, and religious uses) 36

Jordan Institution for Standards and Metrology
Standardization Directorate

Voting Card
on
A Final Project

Project's No.: 893 / 2002
Project's Name: Water –Reclaimed Wastewater
Secretary of the Committee: Engineer Ghazi Sabbagh
Party Conducting the Voting:
Date:

- Approval (No comments)
- Approval with the attached comments that could be taken into consideration or not as the case may be.
- Disapproval due to the attached technical reasons upon the removal of which the voting will become an approval.

Signature of the person in Charge

- If there are any comments, please furnish us with the references on which the comments were based.

Jordan Institution for Standards and Metrology

Number of the Project: 9N 893/ 2002
Name of the Technical Committee: The Permanent Committee on Water and Wastewater
Secretary of the Committee: Engineer Ghazi Sabbagh
Date of Circulation: April 15 th , 2002
Closing Date for Response: June 15 th , 2002

Final Project

Amendment

Water – Reclaimed Wastewater

Jordan Institution for Standards and Metrology
(JISM)

Final Project

(Amendment)

Water: Reclaimed Wastewater

Contents

■ Introduction

1. Field
2. Definitions
3. General Requirements
4. Standard Requirements
5. Quality Control and Evaluation Mechanism
6. Technical Terminology
7. Scientific References

Water: Reclaimed Wastewater 29

1. Field:

This standard is purposely prepared to specify the conditions to be met by effluent water discharged from wastewater treatment plants which can be used in the various fields appearing in table (1).⁴

2. Definitions:

2.1 Wastewater

This definition applies to water resulting from households use that could be mixed with industrial wastewater having a quality in line with the guidelines issued by official parties for connection to the wastewater network.

2.3 Reclaimed Water

This definition applies to treated wastewater to be reused according to what is specified in this standard.

2.4 Open Green Areas

This applies to green areas meant for decoration and beautification and not those used for recreational purposes.

2.5 Industrial Crops

This applies to crops used for industrial purposes such as wood trees, cotton and others.

2.6 Mechanical Treatment Systems

This definition applies to the mechanical methods with which water is treated including aeration, precipitation such as the activated sludge process, the rotating biological contactors, the biological filters and others.

2.7 Natural Treatment Systems

This means the natural methods with which water is treated whether through aeration or anaerobic or maturation ponds or others.

2.8 Disinfection

This applies to the methods used to get rid of the harmful microorganisms polluting the water by using disinfectants such as chlorine or chlorine dioxide or ultraviolet rays or the ozone or any other disinfectant approved by the official parties.

2.9 Direct Use

This means the direct use of effluent water discharged from water treatment plants in accordance with the categories appearing in table (1).

3. General Requirements:

- 3.1** Effluent water must comply with specifications stated in table (1) for each of its planned final use. **1**
- 3.2** Irrigation should be stopped two weeks before collecting the harvest when reclaimed water is used for irrigating fruit trees and before cutting field or fodder crops. Falling fruits or those in contact with the soil should be eliminated. **30**
- 3.3** It is not permitted to use effluent water for irrigating agricultural products which are eaten uncooked. **31**
- 3.4** In the event where effluent water passes in areas under which there are groundwater basins, necessary arrangements should be taken to prevent seepage of reclaimed water into the groundwater. **5, 25**
- 3.5** It is not permitted to dilute effluent water in water treatment plants by mixing the effluent with pure water in order to meet the requirements appearing in this standard. **6**
- 3.6** It is not permitted to use effluent water to replenish groundwater used for drinking. **26, 34**
- 3.7** Should effluent water be used for purposes other than those mentioned in this standard (such as for cooling or for fire distinguishing), special standard specifications or guidelines are to be applied in each case after conducting the necessary studies provided the health and environmental dimension is taken into consideration by the party using such water. **14, 19, 36**

4. Standard Requirements and Guidelines:

4.1 This standard for reclaimed wastewater is composed of two main groups which are the specifications and the guidelines:

*** Standard Specifications Group:**

This item is composed of operating, health and environmental specifications. The operating parties must produce water that meets the requirements of the specifications stated in this standard for each category of water use as appears in tables (1) and (2) **15**

*** Guidelines Group:**

These guidelines are considered inference values in the case reclaimed water is being used for irrigation. Should such values exceed those appearing in table (2), the party using such water must conduct scientific studies to clarify the effect of the reclaimed water on public health and the environment. The user must also suggest the scientific measures to ensure protection of public health and the environment from any harm. **20, 32**

*** In the event reclaimed water is discharged into valleys and streams or being used to replenish groundwater, which is not used for drinking, the guideline values will become binding specifications on the operating party to which it must adhere. **22, 27****

4.2 Should the technical capability for conducting an Escherichia Coli test be not available, a fecal coliforms test will be sufficient. **7**

4.3 Should the chlorine be used as a final disinfectant, the values appearing in table (1) have to be adopted. **8**

4.4 Irrigation by means of sprinklers is prohibited for C and D categories of water use except for the irrigation of open green areas.

4.5 Should the sprinkler system be used for irrigating crops falling under category B and for open green areas, irrigation should be made during night time with movable sprinklers which are not used during daytime.

4.6 Crops that normally are eaten uncooked such as corn and chickpea are excluded from category D of water use.

-
- 4.7** Water treatment plants which apply natural methods shall be permitted to exceed the values relating to numbers of Escherichia Coli upon discharging such water in the valleys that lead to dams into which the stored water is to be used in full for irrigation. Should such water be used before arriving to the dams, water specifications appearing in table (1) must be complied with in accordance with the category of water use. **9, 33**
- 4.8** Bio oxygen demand (BOD) shall be computed after filtration of water in both water treatment stations whether using mechanical or natural methods. It is permissible to discharge reclaimed water into streams or valleys when the quality of such effluent is in compliance with water specifications appearing in table (1) and (2). Discharge of such water into valleys leading to Aqaba Gulf shall be excluded from the above. **10, 23**
- 4.9** upon using effluent water for replenishment of groundwater not used for irrigation, technical studies must be conducted to ensure that such water does not affect groundwater basins used for drinking. **28, 35**
- 5. Quality Control and Evaluation Mechanism: 16**
- 5.1** The owner party of the wastewater treatment station must ascertain that quality of effluent produced thereby is in compliance with the specifications accepted by official parties for its final use. The said owner must conduct the necessary laboratory tests and open registers to document the results of these tests in order to produce them before the governmental monitoring parties should it be asked to do so. **11, 21**
- 5.2** The operating party must undertake the responsibility of taking composite samples, which are to be collected every two hours over a period of twenty-four hours in accordance with the frequency stated in table No. (3), while the monitoring parties shall be entitled to take any samples in the manner they deem suitable.
- 5.3** As for evaluating the quality of effluent water to be used for the different purposes as shown in table (1), the time periods appearing in table (3) should be adhered to. Also the repetitive samples must maintain the same properties in compliance with the specifications and must be checked twice per year. **12**
- 5.4** Taking, Keeping, transporting and analyzing of samples should be made as stated in the reference book entitled (Standard Methods for the Examination of Water and Wastewater) which was prepared by “The American Public Health Association and the “American Water Research Association”. Samples should be monitored to make sure they are free of any contamination. Other internationally accepted examination methods for samples are to be resort to if such methods are not available in the above mentioned reference book. **2**

-
- 5.5** The engineering average should be used upon computing the results of Fecal Coliforms and Escherichia Coli tests upon evaluating the quality of reclaimed water.
- 5.6** Upon evaluating the nitrogen content in the effluent, the engineering average must be used provided the number of samples each time is not less than five.
- 5.7** Should the need arise for new specifications that are not mentioned in this standard, the Jordan Institution for Standards and Metrology is to be consulted in order to take the necessary measure.
- 5.8** In the case of epidemics, the monitoring parties must carry out an investigation into the intestinal germs that could be present in the water.

5.9 Quality Control Mechanism

- * **A, B categories of water use:** 3, 13, 17

In the event any of the specifications appearing in this standard has been exceeded, three additional samples must be taken from the effluent water at a rate of one daily. If laboratory tests of two of these samples have shown any excess of these specifications, the use of such water should be put on hold for the water use that have shown the non-adherence to the specifications. The use of such effluent shall be resumed for the purpose it was meant for whenever its quality has stabilized and once laboratory results of two consecutive samples have not shown any deviation from the already adopted specifications for that use.

- * **C, D categories of water use:** 18, 24

In the event of discharging the effluent into the valleys and streams, the evaluation periods referred to in tables (2) and (3) shall be complied with. Should any non-compliance with any of the specifications has appeared, the concerned party must be notified in order to take the necessary measure to rectify the situation as soon as possible.

*Translated by
Najla Al Ali
May 16, 2002*

Table (1) – Upper limits for standard specifications of properties of effluent water used for irrigation or for replenishment of groundwater or effluent discharged into valleys or torrential streams

Purposes of Water Use	Artificial Ground Replenishment	Cooked Vegetables	Recreation Grounds, Courses and road sides inside the cities	Golf Courses	Fruit Trees	Road Sides Outside the Cities	Open Green Areas	Cereals and Fodder Crops	Industrial Crops	Forest Trees	Discharge into Valleys and Torrential Streams	
Category of Water use	A	B			C			D			Mechanical System	Natural System
Operating Specifications												
BOD (mg/1)	15	30			200			300			60	120
COD (mg/1)	100	100			500			500			150	300
DO (mg/1)	>2	>2			--			--			>1	>1
TSS (mg/1)	50	50			150			150			**100	--
PH (unit)	6-9	6-9			6-9			6-9			6-9	6-9
Cl ₂ Residual	0.5-1.0	0.5-1.0			--			--			0.5-1.0	--
Turbidity (NTU)*	2	10			--			--			--	--
NO ₃ (mg/1)	45	45			70			70			45	45
NH ₄ (mg/1)	5	10			--			--			--	--
T-N (mg/1)	30	45			45			45			45	45
Environmental and Health Specifications												
E coli MPN or CFU / 100ml	<2.2	100			1000			--			500	1000
Intestinal Helminthes Eggs (egg/1)	< or = 1	< or = 1			< or = 1			< or = 1			< or = 1	< or = 1

NTU: The unit to measure turbidity of water by the Typhillometer (Turbidity meter).

Water treatment stations that use mechanical methods and have polishing ponds are allowed to exceed two times TSS standard.

Table (2) – Upper limits of guideline values concerning properties of effluent used for irrigation purposes and values of standard specifications in the event effluent water is discharged into valleys and streams or used for groundwater replenishment

Tested Elements	Guideline Values for Irrigation	Standard Specifications *
FOG (mg/1)	8	5.0
Phenol (mg/1)	< 0.002	< 0.002
MBAS (mg/1)	100	25
TDS (mg/1)	1500	1500
Total PO ₄ (mg/1)	30	15
Cl (mg/1)	400	350
SO ₄ (mg/1)	500	300
HCO ³ (mg/1)	400	400
Na (mg/1)	230	200
Mg (mg/1)	100	60
Ca (mg/1)	230	200
SAR (mg/1)	6-9	6
Al (mg/1)	5	2
As (mg/1)	0.1	0.05
Be (mg/1)	0.1	0.1
CU (mg/1)	0.2	0.2
F (mg/1)	1.5	1.5
Fe (mg/1)	5.0	5.0
Li (mg/1)	2.5 (0.075 for citrus crop)	2.5

Table (2) – Continued

Tested Elements	Guide Values for Irrigation	Standard Specifications *
Mn (mg/1)	0.2	0.2
Mo (mg/1)	0.01	0.01
Ni (mg/1)	0.2	0.2
Pb (mg/1)	5	0.2
Se (mg/1)	0.05	0.05
Cd (mg/1)	0.01	0.01
Zn (mg/1)	5	5
Cr (mg/1)	0.1	0.02
Hg (mg/1)	0.002	0.002
V (mg/1)	0.1	0.1
Co (mg/1)	0.05	0.05
B (mg/1)	1.0	1.0

la standard specifications should be adhered to upon discharging effluent water into valleys or steams or used for groundwater replenishment

Table (3) – Number of samples of reclaimed water taken monthly from wastewater treatment stations for evaluation purposes and types of chemical, physical and biological tests conducted on these samples*****

Water Treatment Stations	Operating Specifications/ Frequency of Sampling Per Month		Health Standards/ Frequency of Sampling Per month		Evaluation Period
	Operating Party	Monitoring Party	Operating Party	Monitoring Party	
Mechanical	Routine tests □ 8 Physiochemical Properties daily 1	Routine tests □ ₂ Physiochemical Properties 2	Intestinal Helminthes Eggs □ 4 Escherichia Coli * 8	Intestinal Helminthes Eggs □ ₂ Escherichia Coli * 2	** 3 months
Natural	Routine tests □ ₄ Physiochemical Properties daily 1	Routine tests □ ₍₁₎ Physiochemical Properties (1)	Intestinal Helminthes Eggs □ ₂ Escherichia Coli * 4	Intestinal Helminthes Eggs □ ₍₁₎ Escherichia Coli * (1)	*** six months

* Grab Sample

□ Composite Sample

Routine tests: No³, BOD, COD, TSS, NH₄, T-N.

Physiochemical Properties: PH, DO, RC₁₂, Turbidity, Temperature.

** Depending on the seasons (December, February, March, May, June, August, September, November)

*** In summer and winter (In the summer, as of May until October). In the winter (as of November up till April)

At least three samples should be taken daily

**** As for the guideline specifications appearing in table 2, the frequency should be at a rate of twice per year for the operating and monitoring parties