



Republic of the Philippines
DEPARTMENT OF AGRICULTURE
Office of the Secretary
Elliptical Road, Diliman, Quezon City

Administrative Order No. 26 Series of 2007

**GUIDELINES ON THE PROCEDURES
AND TECHNICAL REQUIREMENTS
FOR THE ISSUANCE OF A
CERTIFICATION ALLOWING THE
SAFE RE-USE OF WASTEWATER FOR
PURPOSES OF IRRIGATION AND
OTHER AGRICULTURAL USES**

TEXT and ANNEXES

A Production of the
**TRAINING AND INFORMATION DISSEMINATION
SERVICES (TIDS)**

Through the
WATER RESOURCES MANAGEMENT DIVISION
Bureau of Soils and Water Management



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Administrative Order No. **26**
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SUBJECT: “GUIDELINES ON THE PROCEDURES AND TECHNICAL REQUIREMENTS FOR THE ISSUANCE OF A CERTIFICATION ALLOWING THE SAFE RE-USE OF WASTEWATER FOR PURPOSES OF IRRIGATION AND OTHER AGRICULTURAL USES, PURSUANT TO SECTION 22.C OF R.A. 9275 OTHERWISE KNOWN AS THE PHILIPPINE CLEAN WATER ACT OF 2004.”

WHEREAS, it is the policy of the State to carry out agriculture and fisheries development compatible with the preservation of ecosystems and care and judicious use of the country’s resources, under the framework of sustainable development;

WHEREAS, water is an important component of agriculture activities which account for 80% of the total freshwater withdrawal;

WHEREAS, freshwater is becoming scarce to sufficiently support the demands of increasing population, agriculture and other activities, while increased population and economic growth has led to a corresponding increase in wastewater production;

WHEREAS, wastewater irrigation and fertilization is an established agricultural practice worldwide, and agriculture and fisheries sector can benefit from the proper use of wastewater as an additional resource for irrigation, as liquid fertilizer and for aquaculture activities;

WHEREAS, all wastewater generators of wastewater for the purposes of irrigation, fertilization, aquaculture, and other agricultural uses shall secure a discharge permit from the DENR;

WHEREAS, the discharge permit requires submission of a certification of safe wastewater re-use from the DA;

ACKNOWLEDGEMENT

The Department of Agriculture (DA) acknowledges the unselfish and expert contribution of the following professionals from the government and private sectors that provided support to the DA National TWG in the formulation of the “Guidelines on the Safe Re-use of Wastewater for Irrigation, Aquaculture and Fertilization” from its conception until its completion:

- **Dr. Veronica P. Migo** - Research Associate Professor and Head Chemist, CASL, BIOTECH, UP Los Banos, College, Laguna
- **Engr. Nicanor F. Mendoza** - Engineer IV
WQMS, Environmental Management Bureau
Diliman, Quezon City
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WQMS, Environmental Management Bureau Diliman, Quezon City
- **Engr. Edna P. Tatel** - Policy Advocacy Consultatnt
Philippine Sugar Millers Association
Makati City
- **Mr. Oscar Cortez** - Deputy Director for Technology
Philippine Sugar Millers Association
Makati City

WHEREAS, Section 22.c of RA 9275 provides that DA shall coordinate with DENR in the formulation of guidelines for the re-use of wastewater for irrigation and other agricultural uses;

NOW, THEREFORE, I, ARTHUR C. YAP, Secretary of the DA in accordance with RA 9275, otherwise known as the Philippine Clean Water Act of 2004 and Section 13, Rule 13.3 of the Implementing Rules and Regulations hereby issue in coping with increasing scarcity of freshwater, this Order governing the re-use of wastewater for irrigation, as liquid fertilizer and aquaculture purposes.

PART I GENERAL PROVISIONS

Section 1 Definition of Terms

The following terms when used in this Administrative Order shall mean as follows:

- Access areas** – in landscape irrigation, are areas open for public entry such as golf courses, public and private parks, playgrounds, schoolyards and playing fields, residential landscapes and industrial park landscapes.
- Agricultural land application** - the incorporation and/or application of wastewater through safe available methods for its distribution into the land surface for agricultural production and utilization purposes.
- Agriculture** - the art and science or practice of producing food, feed, fiber and many other desired goods by systematic raising of plants and animals. It denotes a broad array of activities essential to food and material production, including all techniques for raising and processing livestock and those essential to crop planting and harvesting.
- Applicant** – a wastewater generator who applied for certification to re-use wastewater for irrigation, fertilization, aquaculture, and other agricultural purposes.

- E. **Aquaculture** - fishery operation involving all forms of raising and culturing fish and other fishery species in fresh, brackish and marine water areas.
- F. **Aquifer** - a layer of water-bearing rock (e.g. *sandstone, limestone, and heavily fractured rock*) and unconsolidated materials (e.g., *sand and gravel*) located underground that transmits water in sufficient quantity to supply pumping wells or natural springs.
- G. **Contamination** - the introduction of substances not found in the natural composition of water that make the water less desirable or unfit for intended use.
- H. **Crop irrigation** – includes the irrigation of areas for food crops (consumed raw and/or not commercially processed, or commercially processed) and non-food crops. Food crops that are commercially processed refer to those food crops that have undergone chemical or physical processing prior to sale to public or others.
- I. **DA** - the Department of Agriculture.
- J. **Discharge** - includes, but is not limited to, the act of spilling, leaking, pumping, pouring, emitting, emptying releasing or dumping of any material into a water body or onto land from which it might flow or drain into said water
- K. **Disinfection** - destruction, inactivation, or removal of pathogenic microorganisms by physical, chemical, biological and/or other means; that may be accomplished for example: by chlorination, UV radiation, ozonation, other chemical disinfectants, membrane processes, or other processes.
- L. **Drip irrigation system** - refers to the slow application of water to the soil or individual plant through small orifices or emitters.
- M. **Effluent** - discharges from known sources which is passed into a body of water or land, or wastewater flowing out of a manufacturing plant, industrial plant including domestic, commercial and recreational facilities.
- N. **Effluent standard** - any legal restriction or limitation on quantities, rates, and/or concentrations or any combination thereof, of physical, chemical or biological parameters of effluent which a person or point

Inter-Agency Committee for the Formulation of the Implementing Guidelines for the Re-use of Wastewater for Irrigation and Other Agricultural Purposes
(S.O. # 396, Series of 2005)

Chairman: **Dr. ROGELIO N CONCEPCION (BSWM)**
September 8, 2005—March 8, 2007

Director SILVINO Q. TEJADA (BSWM)
March 9, 2007—Present

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PROCESO T. DOMINGO (NIA)
MALCOLM I. SARMIENTO (BFAR)
MINDA S. MANANTAN (NMIS)
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Technical Working Group for the Formulation of the Implementing Guidelines for the Re-use of Treated Wastewater for Agricultural Purposes
(S.O. # 566, Series of 2005)

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Engr. Paul Victor R. Rotor BPI
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Ms. Mercedita A. Bantaya BFAR
Engr. Mario M. Sagum NIA
Ms. Juliet Lansangan FPA
Ms. Amparo Ampil DA. PRS
Ms. Marga Morales DA-PRS
Mr. Richard Leano DA-FOS

Secretariat: **Engr. Dolores Mae Gicana** BSWM
Ms. Leilani G. Naga BSWM
Ms. Florfina Sanchez BSWM
Ms. Beatriz C. Magno BSWM
Engr. Patrick Benson B. Espanto BSWM
Ms. Maureen D. Malabanan BSWM
Ms. Rosemelinda R. Reforma BSWM

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source is allowed to delivery into a body of water or land.

- O. **Evapotranspiration** - the process by which water is evaporated from the soil surface and actively transpired from plants.
- P. **Fertilization** – the act or process of applying fertilizer with essential elements to promote growth and yield of a crop.
- Q. **Filtration** - the passing of water through natural undisturbed soils or filter media such as sand and or anthracite, filter cloth, or the passing of water through micro filters or other membrane processes.
- R. **Freshwater** - water containing less than 500 ppm dissolved salts, such as that in groundwater, rivers, ponds and lakes.
- S. **Grantee** – an applicant who was granted a certification to re-use wastewater for irrigation, fertilization, aquaculture, and other agricultural purposes.
- T. **Groundwater** - subsurface water in soils and rocks, or in other geological formations.
- U. **Groundwater vulnerability** - relative ease with which contaminant located at or near the land surface can migrate to the aquifer or deep well.
- V. **Irrigation** – the application of water to the soil to supplement low rainfall and to provide moisture timely and appropriate in quantity and distribution for plant growth.
- W. **Irrigation demand** - the amount of water required to satisfy the needs of the crop including system losses, which consist of percolation, surface water runoff, and conveyance and distribution losses.
- X. **Landscape irrigation** - includes the irrigation of non-agricultural areas that include but are not limited to access and restricted areas.
- Y. **Liquid/Foliar fertilizer** – any liquid that contains macronutrients and/or micronutrients, which may be applied into the soil or be sprayed into the aerial portion of the plant. The effectiveness and the method of application of the liquid fertilizer shall be determined from the results of the efficacy test done before the registration of the fertilizer product.

Z. **Loading limit** - the allowable pollutant-loading limit per unit of time, which the wastewater generator is permitted to discharge into any receiving body of water or land.

AA. **Pollutant** - any substance, whether solid, liquid, gaseous or radioactive, which directly or indirectly:

- alters the quality of any segment of the receiving water body or land resource so as to affect or tend to affect adversely any beneficial use thereof, or
- is hazardous or potentially hazardous to health, or
- imparts objectionable odor, temperature change or physical, chemical or biological change to any segment of the water body or land, or
- is in excess of the allowable limits or concentrations or quality standards specified, or in contravention of the condition, limitation or restriction prescribed in these guidelines.

BB. **Recycling** – the act of using treated wastewater within the same system.

CC. **Restricted Areas** – in landscape irrigation, are areas with limited entry such as freeway landscape, highway medians and other similar areas.

DD. **Re-use** – means taking wastewater from one industry or process, treating it and then using it in another process or industry such as for irrigation, as liquid fertilizer and for aquaculture.

EE. **Secretary** - the Secretary of DA.

FF. **Small volume wastewater re-user** – an entity that re-uses all or a portion of wastewater generated for irrigation not exceeding 10 m³/day for a minimum area of 1000 m².

GG. **Sprinkler system** - the application of water to the surface of the soil in the form of spray, simulating that of rain. The spray is produced by the flow of water under pressure through small orifices or nozzles.

HH. **Surface irrigation system** - refers to water application that depends on gravity to spread water across the surface of the land (e.g. furrow, border or basin).

LIST OF ABBREVIATIONS

AOAC	-	Association of Official Analytical Chemist
APHA	-	American Public Health Association
AQD	-	Aquaculture Department
ANZECC	-	Australian and New Zealand Environment and Conservation Council
ARMCANZ	-	Agriculture and Resource Management Council of Australia and New Zealand
ASMR	-	Agri/Aqua Self-Monitoring Report
AWWA	-	American Water Works Association
BFAR	-	Bureau of Fisheries and Aquatic Resources
BSWM	-	Bureau of Soils and Water Management
DA	-	Department of Agriculture
DA-RFU	-	Department of Agriculture – Regional Field Unit
DENR	-	Department of Environment and Natural Resources
EMB	-	Environmental Management Bureau
FPA	-	Fertilizer and Pesticides Authority
HACCP	-	Hazard Analysis and Critical Control Points
LGU	-	Local Government Unit
NFARMC	-	National Fisheries Resource Management Council
NIA	-	National Irrigation Administrator
PIO	-	Provincial Irrigation Office
RED	-	Regional Executive Director
RIM	-	Regional Irrigation Manager
SEAFDEC	-	South East Asian Fisheries Development Center
USDA	-	United States Department of Agriculture
US-EPA	-	United States Environmental Protection Agency
WEF	-	Water Environment Federation
WHO	-	World Health Organization

Environmental Impact Monitoring for Pond Culture

FIELD MONITORING FORM

Requested by: _____
 Name of Farmer/Owner: _____
 Physical Area (has/square meters): _____
 Source of Water: River () Tidal River ()
 Type of Aqua Farm: Pond: Freshwater () Brackish water ()
 Tank: Freshwater () Brackish water ()
 Culture System: Monoculture () Poly-culture () Others _____
 Management System: Extensive () Intensive () Semi-Intensive ()
 Stocking Density: _____

Description of the Aquaculture Site:

- a. Location and access: _____
- b. Physical Area (size and topography): _____
- c. Farm design and construction: _____

Plan on the Re-use of Wastewater: (description of wastewater treatment and settling pond lay-out, wastewater delivery and treatment process)

Input Utilization:

Feeds: Commercial () Trash Fish () Others: _____
 Fertilizer: _____
 Pesticides: _____
 Antibiotics /Probiotics: _____
 Others: _____

Problems Encountered:

Disease Occurrence: Yes () No ()
 Specify causes: Parasites () Bacteria () Fungi () Virus ()
 Pollution: Yes () No ()
 Specify causes: _____

 Fish Kill: Yes () No ()
 Specify causes: _____

Remarks: _____

Inspected/verified by: _____ **Date:** _____

II. **Surface water** - all water that is open to the atmosphere and subject to surface runoff.

JJ. **Treatment** - any method, technique, or process designed to alter the physical, chemical, biological, or radiological character or composition of any waste or wastewater to reduce or prevent pollution, or maximize and/or optimize its re-use potential.

KK. **Waste** - any material either solid, liquid, semi-solid, contained gas or other forms resulting from industrial, commercial, mining, or agricultural operations, or from community and household activities that is devoid of usage and discarded.

LL. **Wastewater** - waste in liquid state containing pollutants.

MM. **Water quality** - the characteristics of water, which define its use in terms of physical, chemical, biological, bacteriological or radiological characteristics by which the acceptability of water is evaluated.

NN. **Water body** - means both natural and man-made bodies of fresh, brackish and saline waters, and includes, but is not limited to, aquifers, groundwater, springs, creeks, streams, rivers, ponds, lagoons, water reservoirs, lakes, bays, estuarine, coastal and marine waters. It does not refer to those constructed, developed and used purposely as water treatment facilities and/or water storage for recycling and re-use which are integral to process industry or manufacturing.

**Section 2
 Framework**

This Order is formulated within a framework that considers the protection of environment, human and animal health; and attainment of safe agriculture and fishery production while utilizing wastewater for agriculture and aquaculture purposes. (Wastewater generators shall include but not limited to the different primary users enumerated in Section 5 of this Order.)

The quality and quantity of wastewater and the method of application shall conform to the limits and guidelines set herein. Wastewater shall be subjected to a treatment process, as may be required, to achieve the

Form 1: IPM Impact Monitoring

PEST AND DISEASE MONITORING

Date: _____

Name of Grantee _____
 Address _____
 Location of Farm: _____
 Crop/s Planted: _____
 Area irrigated/fertilized: _____

Observed Beneficial Insects:

- | | |
|----------|-----------|
| 1. _____ | 6. _____ |
| 2. _____ | 7. _____ |
| 3. _____ | 8. _____ |
| 4. _____ | 9. _____ |
| 5. _____ | 10. _____ |



Observed Major Pests and Diseases Present in the Farm

(Insects, Vertebrates e.g. rats, others)

- | | |
|----------|-----------|
| 1. _____ | 7. _____ |
| 2. _____ | 8. _____ |
| 3. _____ | 9. _____ |
| 4. _____ | 10. _____ |
| 5. _____ | 11. _____ |
| 6. _____ | 12. _____ |

Pest Management Practices

For Insects/Arthropod Pest (Identify the Pest Managed)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

For Diseases (Identify the Disease Managed)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

4. Domestic and municipal sewage
5. Other industrial and commercial establishments

The DA shall issue certification for the re-use of wastewater from these sources provided that they comply with the requirements as provided for in this Order.

**PART II
 GENERAL REQUIREMENTS AND PROCEDURE FOR
 THE ISSUANCE OF CERTIFICATION**

**Section 6
 General Requirements for the Issuance of Certification**

The DA shall issue a certification for the re-use of wastewater for irrigation, fertilization, aquaculture, and other agricultural purposes upon compliance with the prescribed general requirements.

Irrigation

An applicant for the re-use of wastewater for irrigation shall submit the following documents:

1. Description of the proposed irrigation site.
 - a. Location and access
 - b. Topographic map of the area
 - c. Soils and land use map
 - d. Distance to surface water including their names
 - e. Distance to existing wells including their number
2. Characteristics of wastewater based on the parameters listed in [Table 1](#) (Section 9) of this Order.
3. Plan on the re-use of wastewater:
 - a. Area to be irrigated, proposed crop/s, irrigation system, method of application and layout of distribution facilities
 - b. Calculated water requirements for irrigation through water balance analysis or equivalent methods
 - c. Quantity of wastewater to be re-used for irrigation
 - d. Schedule of irrigation
 - e. Nutrient management plan

- f. Storage or impoundment provision during rainy months or when irrigation is not permitted.

4. Baseline conditions for the following using the prescribed form (Annex 4):
 - a. Surface water
 - b. Groundwater
 - c. Soils

An applicant for small volume re-use shall not be required to submit items 1b, 1c, 3b, 3f and all items under 4.

Fertilization

For commercial purposes, the applicant shall apply for Registration Certificate (RC) directly to the FPA following the procedures in the FPA Service Guide. This RC shall be the basis for the issuance of certification from the DA including the information on volume of wastewater allocated for fertilization.

For non-commercial purposes, an applicant shall submit the following:

1. Description of the proposed application site
 - a. Location and access
 - b. Topographic map of the area
 - c. Soil and land use maps
 - d. Distance to surface water including their names
 - e. Distance to existing wells including their number
2. Characteristics of wastewater
 - a. Concentration of
 - Macronutrients
 - Micronutrients
 - Heavy metals, if applicable
 - b. pH level and Electrical Conductivity (EC)
 - c. Presence of pathogens, if applicable
3. Plan on the re-use of wastewater
 - a. Area to be fertilized, proposed crop/s, method of application
 - b. Quantity of wastewater to be re-used for fertilization
 - c. Schedule of application
 - d. Nutrient management plan

IV. Characteristics of Wastewater Reused for Aquaculture

PARAMETERS	VALUES
FOR FISH PRODUCTIVITY	
1. Alkalinity (CaCO ₃) (mg/L)	
2. Ammonia-Nitrogen (NH ₃ N) (mg/L)	
3. Bacterial Count Vibrio sp. (cfu/ mL) Luminous Bacteria (cfu/mL)	
5. BOD ₅ (mg/L)	
4. Carbon Dioxide (CO ₂) mg/L)	
6. Dissolved Oxygen (mg/L)	
7. Hydrogen Sulfide (H ₂ S) (mg/L)	
8. Nitrate-Nitrogen (NO ₃ N) (mg/L)	
9. pH	
10. Phosphate (PO ₄ ³⁻) (mg/L)	
11. Salinity (ppt)	
12. Temperature (°C)	
13. TSS (mg/L)	
FOR HUMAN HEALTH	
1. Antibiotic Residues Chloramphenicol Nitrofurans	
2. Coliform bacteria (MPN/100mL)	

I hereby certify that the above information is true and correct to the best of my knowledge. Done this _____ day of _____ of 20_____.

Name and Signature of PCO

Name and Signature of Managing Head

SUBSCRIBED AND SWORN to before a Notary Public. This ____ day of ____, 20__ .
Affiant exhibiting to me his/her Community Tax Receipt as follows:

Name	Community Tax Receipt No.	Place Issued	Date Issued

III. Characteristics of Wastewater Reused for Fertilization

PARAMETERS	VALUES
FOR CROP PRODUCTIVITY AND PROTECTION OF ENVIRONMENT	
Macro nutrients (+_2% of declared value)	
Micro nutrients(+_2% of declared value)	
pH	
Electrical Conductivity (µS/cm)	
MAXIMUM CONCENTRATIONS OF TRACE ELEMENTS (mg/L) (including heavy metals)	
Aluminum	
Arsenic	
Beryllium	
Boron	
Cadmium	
Chromium	
Cobalt	
Copper	
Flouride	
Iron	
Lead	
Lithium	
Manganese	
Mercury	
Molybdenum	
Nickel	
Selenium	
Vanadium	
Zinc	

e. Storage or impoundment provision during rainy months or when fertilization is not permitted.

4. Baseline conditions for the following using the prescribed forms (Annex 4)
 - a. Surface water
 - b. Groundwater
 - c. Soils

Aquaculture

An applicant who will re-use wastewater for aquaculture shall submit the following documents:

1. Description of the aquaculture site
 - a. Location and access
 - b. Topographic map of the area
 - c. Distance to surface water including their names
2. Characteristics of wastewater based on the parameters listed in Table 2 (Section 9) of this Order.
3. Plan on the re-use of wastewater
 - a. Total area of the farm
 - b. Farm design and construction
 - c. Lay-out of treatment ponds
 - d. Distribution system
 - e. Culture system and species to be cultured
4. Baseline data on the following:
 - a. Adjacent surface water
 - b. Pond bottom soils
 - c. Pests and diseases of aquatic species
 - d. Quantity and quality of wastewater to be discharged to the environment.

Section 7

Fees and Other Expenses for the Issuance of Certification

The concerned DA-RFU shall collect an application fee in the amount of Six Hundred Pesos (PhP 600.00), and an additional Six Hundred Pesos (PhP 600.00) for the actual issuance of the certification.

The cost of evaluation and validation of documents related to the certification, which includes but not limited to, transportation, laboratory analysis and site inspection shall also be borne by the applicant.

Section 8

Application Procedure for the Issuance of Certification

The procedure for applying the Certification for the re-use of wastewater is presented in a flow chart in Annex 1. An applicant shall apply for and secure certification from the DA-RFU, which covers the area where the wastewater is generated.

The DA-RFU, which is headed by the RED shall accept application for evaluation and issuance of the certificate upon the recommendations of the concerned DA agencies. The RED shall assign a unit that shall accept and evaluate the completeness of the applicant's documents. If the documents are found complete, the RED shall endorse the application to the concerned DA bureau/agency as prescribed below:

Irrigation

To the NIA Regional office that shall evaluate the substance of submitted documents and shall undertake evaluation and field validation of the quality of wastewater to be re-used for irrigation. Field inspection of proposed site shall also be undertaken to evaluate physical features of site and technical feasibility of land application. The findings of the evaluation and field inspection shall be the basis for issuance of recommendation to the RED, whether to issue or not the certification.

An applicant for small volume re-use shall submit accomplished form and the required documents to the Provincial Irrigation Office (PIO) that shall evaluate and recommend the same within fifteen (15) working days to the Regional Irrigation Manager (RIM) for endorsement to the DA-RFU RED for issuance of certification. Failure to comply with the requirements indicated above shall be the basis for the non-issuance of the certification.

Fertilization

To the FPA Regional office that shall evaluate the substance of the submitted documents and shall undertake evaluation and field

Continuation of II. Characteristics of Wastewater Re-used for Irrigation

PARAMETERS	VALUES
FOR PROTECTION OF ANIMAL AND HUMAN HEALTH	
Ascaris (MPN/100ml)	
Fecal coliform (MPN/100 mL)	
Nematode (MPN/100 mL)	
TRACE ELEMENTS (including heavy metals) (mg/L)	
Aluminum	
Arsenic	
Beryllium	
Boron	
Cadmium	
Chromium	
Cobalt	
Copper	
Flouride	
Iron	
Lead	
Lithium	
Manganese	
Mercury	
Molybdenum	
Nickel	
Selenium	
Vanadium	
Zinc	

AGRI/AQUA SELF MONITORING REPORT FORM

Name of Grantee: _____

Type of Establishment: _____

Address: _____

Quarter: _____ Year: _____

I. Wastewater Reuse for Irrigation and Other Agricultural Purposes

Type of Wastewater Reuse	Site of Irrigation/ Other Agricultural Purposes	Average Rate of WW Delivered (m ³ /day) x days	Volume of wastewater for Irrigation and Other Agricultural Purposes (m ³ /month)		
			__20__	__20__	__20__
		____(m ³ /d) x _____	__20__	__20__	__20__
		____(m ³ /d) x _____			
		____(m ³ /d) x _____			
		____(m ³ /d) x _____			
		____(m ³ /d) x _____			

II. Characteristics of Wastewater Re-used for Irrigation

PARAMETERS	VALUES
FOR CROP PRODUCTIVITY AND PROTECTION OF ENVIRONMENT	
Bicarbonates (mg/L)	
Biochemical Oxygen Demand (BOD ₅) (mg/L)	
Electrical Conductivity (µS/cm)	
Free residual chlorine (mg/L)	
pH	
Sodium Adsorption Ratio (SAR)	
Sodium (Na) (meq/L)	
Total Nitrogen (TN) (mg/L)	
Total Phosphorous (TP) (mg/L)	
Total Suspended Solids (mg/L)	

validation of the quality/nutrients of wastewater to be re-used for fertilization. Field inspection of the proposed site shall also be undertaken to evaluate physical features of the site and technical feasibility of land application. The findings of the evaluation and field inspection shall be the basis for issuance of recommendation to the RED, whether to issue or not the certification.

Aquaculture

To the BFAR Regional office that shall evaluate the substance of the documents and shall undertake field evaluation/validation and laboratory analyses of the quality of wastewater to be re-used for aquaculture. Field inspection of the proposed site shall be undertaken to evaluate the suitability of the water for aquaculture.

Within thirty (30) working days from receipt of the complete documents by the RED, the certification stating that the “quantity, quality and distribution methodology of application are suited for wastewater re-use being applied for (i.e., irrigation, fertilization and aquaculture purposes)” as per Rule 14.6 of the Clean Water Act IRR, shall be issued provided that all requirements set in this Order are met by the applicants.

Part III TECHNICAL REQUIREMENTS FOR THE RE-USE OF WASTEWATER

Section 9 Quality of Wastewater for Land Application

The quality of wastewater is herein set to safeguard crop/fish productivity, human and animal health and to protect the environment.

Irrigation

Table 1 outlines the major parameters of wastewater and the required quality or limits for irrigation re-use as set in this Order. Except for *fecal coliform* and EC, same limits were set for landscape and crop irrigation. Values exceeding these limits may cause detrimental impact to crop productivity, animal and human health, and environment.

Table 1. Limits on wastewater quality for irrigation

Parameters	Landscape Irrigation	Crop Irrigation		
		Foods eaten raw and not commercially processed	Food crops commercially processed	Non-food crops
For crop productivity and protection of environment				
Bicarbonates ¹ (mg/L)	<500	<500	<500	<500
Biochemical Oxygen Demand (BOD ₅) (mg/L)	< 150	< 150	< 150	< 150
Electrical Conductivity (µS/cm)	< 2000	< 1000	< 1000	< 2000
Free residual chlorine (mg/L)	< 1	< 1	< 1	< 1
pH	6.5 – 8.0	6.5 – 8.0	6.5 – 8.0	6.5 – 8.0
Sodium Adsorption Ratio (SAR)	<18	<18	<18	<18
Sodium (Na) (meq/L)	<3	<3	<3	<3
Total Nitrogen (TN) ¹ (mg/L)	<30	<30	<30	<30
Total Phosphorous (TP) ¹ (mg/L)	<30	<30	<30	<30
Total Suspended Solids (mg/L)	< 140	< 140	< 140	< 140
For protection of animal and human health				
Ascaris (MPN/100 mL)	0	0	0	0
Fecal coliform (MPN/100 mL)	<200	Not detectable ²	<200	<200
Nematodes (MPN/100 mL)	0	0	0	0

¹ None to moderate degree of restriction

² Not detectable – means the total number of fecal coliform organisms shall not exceed 14 MPN /100 mL in any sample

continuation of Annex 4

Required baseline data for soil quality impact monitoring for a specific soil type

Parameters	Concentration	Qualitative Description
Soil Bulk Density, (gm/cc)		
Soil pH		
Organic Matter Content (%)		
NO ₃ -N (%)		
Available P, ppm Cation Exchange Capacity (meq/100 gram)		
Exchangeable Bases (m.e/100 gram soil) Ca ²⁺ Mg ²⁺ K ⁺ Na ⁺		
Trace Elements (ppm) Zn ²⁺ Cu ⁺ Fe ²⁺ Mn ²⁺		
Heavy Metals (ppm) (if applicable) Cd ²⁺ Pb Hg		

Required baseline data for surface water impact monitoring

Parameters	Baseline Data	
	Upstream well	Downstream well
Name of river/creek:		
Distance to irrigated/ fertilized farm (m):		
Flow (cum/sec)		
EC (µs/cm)		
pH		
BOD ₅ (mg/L)		
Fecal coliform (cm/100 ml MPN)		
Total N (mg/L)		
Nitrate (mg/L)		
Ammonia (mg/L)		
Total Phosphorous (mg/ L)		
Orthophosphate (PO ₄) (mg/L)		
Heavy metals (mg/L), if applicable		

Limits of trace elements in irrigation waters

Parameters	Landscape/Crop Irrigation
Trace elements including heavy metals (mg/L) (If applicable)	
Aluminum ³	5.00
Arsenic	0.10
Beryllium	0.10
Boron	0.75
Cadmium ⁴	0.01
Chromium	0.10
Cobalt	0.05
Copper	0.20
Flouride	1.00
Iron	1.00
Lead	0.20
Lithium ⁵	2.50
Manganese	0.20
Mercury	0.002
Molybdenum	0.01
Nickel	0.20
Selenium	0.02
Vanadium	0.10
Zinc ⁶	2.00

³ High toxicity in acid soils, not a concern if soil pH > 6.5

⁴ Higher toxicity in acid soils

⁵ Citrus: 0.075 mg/L

⁶ 1 mg/L recommended for sandy soil (pH < 6)

Limits for heavy metals are required from industries whose wastewater has the potential for these constituents.

Methods of Analysis

Standard analytical procedures for measurement of wastewater quality requirements for irrigation purposes that must be used in the effluent quality monitoring are those specified in the Table 5 of DAO 34 Series of 1990 Revised Water Usage And Classification, or revisions thereof. The same methods of analyses are also specified in Table 4 of DAO 35 series of 1990, Revised Effluent Regulations, or revisions thereof.

In the absence of methods of analyses, the following references may be used:

1. Standard Methods for the Examination of Water and Wastewater (APHA, AWWA, WEF)
2. US-EPA Methods

Laboratory analysis shall be conducted by DA and DENR recognized laboratories.

Fertilization

The major constituents of wastewater for fertilizer used as foliar spray or applied in the soil are the following:

A. Crop Productivity

1. Macronutrients - groups of nutrients needed by plants in large amount.

Primary plant nutrients - include the readily available forms of nitrogen (N), phosphorus (P), and/or potassium (K) or any combinations of these nutrients.

Secondary plant nutrients - include readily available forms of sulfur (S), calcium (Ca) and magnesium (Mg).

2. Micronutrients - group of nutrients, which are essential for

BASELINE DATA FOR ENVIRONMENTAL IMPACT MONITORING

Name of Grantee: _____

Address: _____

Location of farm _____

Irrigated/fertilized area (has): _____

Crop/s/cropping pattern: _____

Date and time of sampling: _____

Weather condition: _____

Required baseline data for groundwater impact monitoring

Parameters	Baseline Data	
	Upstream well	Downstream well
No. of well		
Coordinates		
Distance from irrigated/ fertilized farm (m)		
Depth of monitoring well (m)		
Depth/water level (m)		
EC (µS/cm)		
pH		
Total N (mg/L)		
Nitrate (mg/L)		
Total Phosphorous (mg/L)		
Available Phosphorous (mg/L)		
Heavy metals (mg/L), if applicable		

Annex 3

GENERAL GUIDELINES AND REFERENCE ON THE MOVEMENT OF RE-USED WASTEWATER RELATIVE TO SOIL TYPES

Soil Types/ Textural Classification	Intake Rate ¹ , cm h ⁻¹	Classifi- cation ²	Hydraulic Conduc- tivity ³ , cm h ⁻¹	Classifi- cation ³	Remarks
Clay	0.01 – 0.8	Very Slow – Slow	<0.125- 0.5	Very Slow- Slow	Very high buffering potential, High ponding potential
Silty Clay	0.8 - 2.0	Moderately Slow	0.5 – 2.0	Moderately slow	Moderate buffering potential, Moderate ponding potential
Clay Loam	2.0 - 6.0	Moderate	2.0 – 6.25	Moderate	Moderate buffering potential, Moderate ponding potential
Loam	6.0 - 12.0	Moderately Rapid	6.25 – 12.5	Moderately Rapid	Moderate buffering potential, Low ponding potential
Sandy Loam	12.5 – 25.0	Rapid	12.5 – 25.0	Rapid	Low buffering potential, very low ponding potential
Sand	> 25.0	Very Rapid	> 25.0	Very Rapid	No buffering and ponding potential

Note:

¹ Refers to the initial surface vertical entry of water into the soil horizon, wherein water accumulates a result of the natural formation of a wetting front within the A- horizon;

² = based from C. Berryman (1973), and Israelsen and Hansen (1963);

³ = based from FAO (1963).

plant growth in small amount. These include readily available forms of iron (Fe) manganese (Mn), boron (B), molybdenum (Mo), copper (Cu), zinc (Zn), chlorine (Cl) and cobalt (Co).

The declared nutrient composition shall be plus or minus two percent (2%) of the declared % content of each of the essential nutrients.

3. pH - 6.5 – 8.0

Methods of Analysis

Samples for the above parameters shall be analyzed by FPA recognized laboratories. Methods of analysis used shall include AOAC and other methods duly recognized by FPA.

Aquaculture

Pond water shall be free from toxic chemicals, heavy metals and microorganisms (e.g., bacteria, parasites, viruses and fungi), which are harmful to fishes. Potential danger of pathogen transmissions present in the fish and in the culture environment to handlers and the consumers must be prevented.

Wastewater for grow-out culture of fishes and other fishery resources must comply with the limits outlined in Table 2.

Table 2. Limits on wastewater quality for fresh and brackish water fish culture

Parameter	Quality requirements (concentration)	
	Freshwater	Brackishwater
For Fish Productivity		
1. Alkalinity (CaCO ₃) (mg/L)	20 – 300	> 80
2. Ammonia-Nitrogen (NH ₃ N) (mg/L)	≤ 0.06	≤ 0.01

Table 2: (continued)

Parameter	Quality requirements (concentration)	
	Freshwater	Brackishwater
3. Bacterial Count a. Vibrio sp. (cfu/ mL) b. Luminous Bacteria (cfu/mL)	Not applicable	$\leq 1.3 \times 10^3$ $\leq 2.0 \times 10^2$
4. BOD ₅ (mg/L)	≤ 9	≤ 9
5. Carbon Dioxide (CO ₂) (mg/L)	≤ 7	≤ 15
6. Dissolved Oxygen (mg/L)	> 5	> 5
7. Hydrogen Sulfide (H ₂ S) (mg/L)	≤ 0.003	≤ 0.02
8. Nitrate-Nitrogen (NO ₃ N) (mg/L)	≤ 0.067	≤ 0.4
9. pH	6.5 – 9.0	7.5 – 8.5
10. Phosphate (PO ₄ ³⁻) (mg/L)	≤ 0.025	0.2 - 0.4
11. Salinity (ppt)	> 5	25 – 30
12. Temperature (°C)	25 – 32	25 – 32
13. TSS (mg/L)	≤ 1000	≤ 1000
For Human Health		
1. Antibiotic Residues Chloramphenicol Nitrofurans	Negative Negative	Negative Negative
2. Coliform bacteria (MPN/100mL)	$\leq 5,000$	$\leq 1,000$

CHECKLIST OF DOCUMENTS FOR AQUACULTURE USE

1. Description of the proposed site: a. Topographic map of the area b. Soil and Land Use Map	<input type="checkbox"/> <input type="checkbox"/>
2. Characteristics of wastewater prior to use based on the parameters indicated in Table 2 of this Order	<input type="checkbox"/>
3. Plan on the re-use of wastewater: a. Lay-out of treatment ponds b. Distribution systems c. Description of wastewater delivery d. Description of wastewater process	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
4. Baseline conditions for the following: a. Surface Water b. Soils c. Pest and Diseases d. Quantity and quality of wastewater to be discharged to the environment	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

I hereby certify that the above information is true and correct to the best of my knowledge. Done this _____ day of _____ of 20____.

Name and Signature of Applicant Name and Signature of Managing Head

SUBSCRIBE AND SWORN to before a Notary Public. This _____ day of _____ of 20____. Affiant exhibiting to me his/her Community Tax Receipt as follows:

Name	Community Tax Receipt No.	Place Issued	Date Issued

NOTARY PUBLIC

Doc. No. _____
Page No. _____
Book No. _____
Series of _____

CHECKLIST OF DOCUMENTS REQUIRED FOR IRRIGATION USE

1. Description of the proposed irrigation site. a. Topographic map of the area b. Soil and Land Use Map	<input type="checkbox"/> <input type="checkbox"/>
2. Characteristics of wastewater prior to use based on the parameters indicated in Table 1 of this Order	<input type="checkbox"/>
3. Plan on the re-use of wastewater: a. Area, proposed crop/s, irrigation system, method of application and layout of distribution facilities b. Calculated water requirements for irrigation through water balance analysis or equivalent methods c. Nutrient management plan d. Storage or impoundment provision during rainy months or when irrigation is not permitted, if applicable.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
4. Baseline data for the following: a. Surface Water b. Groundwater c. Soils	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

CHECKLIST OF DOCUMENTS FOR FERTILIZATION USE

1. Description of the proposed application site: a. Topographic map of the area b. Soil and Land Use Map	<input type="checkbox"/> <input type="checkbox"/>
2. Characteristics of wastewater (macro and micro nutrients, ph, EC)	<input type="checkbox"/>
3. Plan on the re-use of wastewater: a. Area to be fertilized, proposed crop/s, method of application b. Quantity of treated wastewater available for fertilization c. Storage and impoundment provision during rainy season or when fertilization is not permitted.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
4. Baseline conditions for the following: a. Surface Water b. Groundwater c. Soils	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Methods of Analysis

Methods used for water quality analysis for aquaculture operation shall follow Laboratory Protocols for Fish Health Management and Water Quality Analysis using AOAC Method.

**Section 10
Quantity of Wastewater for Re-use**

Irrigation

Application rates of wastewater for irrigation shall be based on:

Hydraulic loading rate

Irrigation needs shall be used in setting hydraulic loading rates. As such, wastewater shall only be applied if soil moisture conditions will not allow runoff or ponding in the ground surface. Intake rate of different soils is outlined in Annex 2. Irrigation application shall only be carried out under dry weather conditions to satisfy the crop soil moisture deficit

Soil samples from the proposed irrigation area shall be collected for chemical characterization. Soil properties such as soil structure, texture, chemistry, and hydraulic characteristics shall be compatible with the wastewater land application system. Hence, the following points shall be considered in the design and selection of potential site:

1. The most suitable soils are moderately permeable and deep with good water holding capacity.
2. Avoid sandy and gravelly soils (i.e., highly permeable) and heavy clay soils of extremely low permeability.
3. Slightly acid soils (pH 5.5) are generally the most suitable as these could balance the slight alkalinity of wastewater; avoid soils that are too acidic (pH < 4) or too alkaline (pH > 8.5) that could restrict plant growth.
4. Soil depths of > 1.0 m are preferred for the efficient utilization of applied wastewater. Lesser depths can be considered for shallow rooted crops such as pasture grasses.

Fertilization

The quantity of liquid fertilizer to be used/applied shall depend on the crop's requirements. Soil analysis should be conducted to determine the quantity of nutrients to be supplied to the soil to meet crop's nutrient requirements. Application shall observe the crop requirement in Table 3 below.

Table 3. Nutrient requirements for various upland crops

CROPS	Nutrient Requirements (kg/ha)		
	N	P ₂ O ₅	K ₂ O
1. Plantation Crops			
Banana	75-160	50-60	50-120
Pineapple (1 mo)	50-60	50-60	50-150
Sugarcane	100-170	75-120	75-240
Coconut (1 - 2 yrs)	50-85	30-40	50-180
Coconut (5 yrs and above)	150-335	30-40	100-480
2. Grain Crops			
Rice (Upland) wet season	60-90	50-60	30-45
Corn	60-90	25-30	20-30
Sorghum	50-60	30-40	20-30
3. Vegetables			
Fruiting (eggplant)	60-120	60-130	30-90
Leafy (pechay)	90-240	50-60	20-60

Declared guaranteed composition _____
 Crops to be fertilized _____
 Distribution methodology _____

Aquaculture
 Location of farm/point of use _____
 Distance of pond from wastewater source _____
 Culture system and species to be cultured _____
 Distribution methodology _____

GENERAL INFORMATION

Name of Applicant: _____
 Name of Establishment: _____
 Type of Establishment: _____
 Address: _____
 Contact No.: Phone _____ Fax: _____
 E-mail _____ Cellphone: _____
 Legal Classification: Single Proprietorship
 Private Corporation Partnership

Sources of Water Supply	Average Water Consumption (m ³)		Water Use/ Sources of Wastewater	Estimated Flow (m ³ / day)	
	Daily	Annual		Water Consumed	Wastewater Generated
MWCI/ MWSI (MWSS)			Livestock and Poultry		
Local Water District			Agriculture and Food industrial processes		
Deep Well			Aquaculture		
Surface Water (lake, river, creek, etc.)			Domestic and municipal sewage		
Others (Specify)			Others (Specify)		
Total			Total		
			Maximum Daily Flow Rate		

Annex 2



Republic of the Philippines
DEPARTMENT OF AGRICULTURE
Regional Field Unit - ____
(Address)

Telephone: (_____) Fax: (_____)

**APPLICATION FOR CERTIFICATION FOR
WASTEWATER RE-USE**

Application No.: ____ Date of Application: _____

INSTRUCTION: Fill in all appropriate spaces. Mark all appropriate boxes with an "X."

NOTE: Checklist of documents required for application of certification for different agricultural purposes is found on the latter part of this form. The Office will not accept/process an improperly filled-up application form and incomplete supporting documents.

Purpose:

Irrigation

Location of farm/point of use

Distance of farm from wastewater source

Distance to nearest surface water and
name _____

Distance to existing wells and
number _____

Crops to be irrigated

Distribution methodology

Irrigation system

Fertilization

Location of farm/point of use

Distance of farm from wastewater source

Distance to nearest surface water and
name _____

Distance to existing wells and
number _____

Table 3. (continued)

CROPS	Nutrient Requirements (kg/ha)		
	N	P ₂ O ₅	K ₂ O
4. Root Crops			
Cassava	60-100	60-100	40-100
Potatoes	60-120	75-190	50-190
Gabi	60-90	60-90	30-90
5. Non-Food Crops			
Rubber (12 months)	50-65	60-65	20-65
Rubber (30 months and above)	200-500	200-500	100-500
Abaca	100-200	50-60	50-200
Cotton	50-90	20-25	10-25
Tobacco	25-30	40-60	30-60

Aquaculture

Wastewater for culture of fish shall maintain a level of at least 1 meter depending on the type of species being cultured. During abnormal/ adverse water condition (e.g. occurrence of disease, very turbid water, abnormal water coloration, etc.), at least 1/3 of the pond water shall be replaced.

**Section 11
Distribution Methodology and Design**

Irrigation

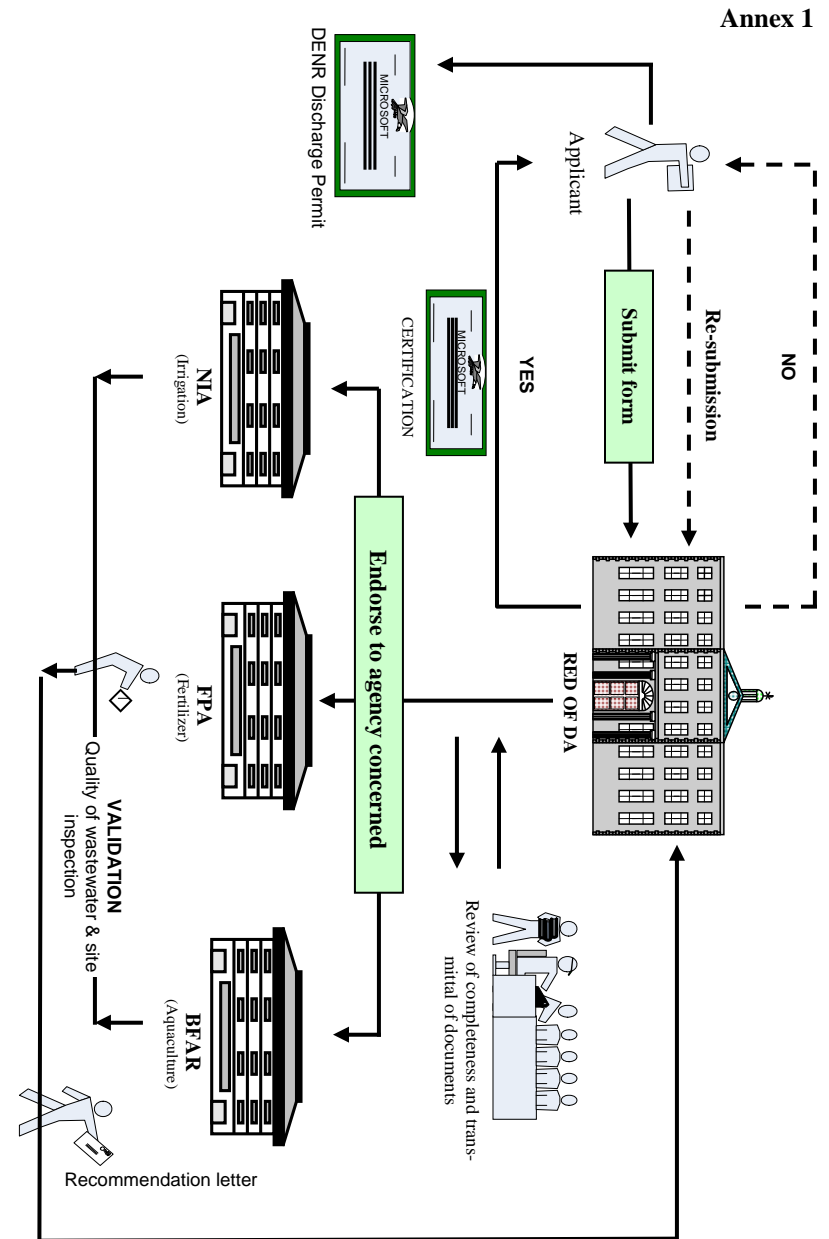
Delivery and Conveyance Method

Delivery of wastewater from the source to the users' farm could either

be through a pipeline or tanker trucks and shall follow the requirements below:

1. When using pipelines in conveying wastewater from the source to the point of use, the following conditions shall be satisfied:
 - a. The pipes should be properly marked (i.e., can be easily viewed and recognizable) within its length of its owners name and the kind of water (wastewater) it is delivering;
 - b. The wastewater generator shall always ensure that there are no leaks in between both ends and should be free from tampering of mischievous elements.
 - c. Schedules of delivery shall be in strict adherence to the irrigation plan submitted in the application for use. Should there be a need to deviate from schedule for valid reasons; the wastewater generator shall inform the responsible government entity in writing or through e-mail at least a day before the delivery.
 - d. The pipes shall in no way store/keep wastewater after the volume approved for the schedule was delivered.
2. When using tanker trucks or to deliver wastewater from the source to the to the users' farm/pond as agreed upon by both parties, said tanker truck shall:
 - a. Carry complete documentation of its cargo which includes among others:
 - i. Permit to carry and transport wastewater to a specified place of use
 - ii. Source (from where and from whom) and destination (to where and for whom)
 - iii. Volume and purpose of wastewater cargo (for irrigation, fertilization or fish culture)
 - b. Be properly labeled (The kind of cargo and the generator's name are easily recognizable and viewed)

Flow Chart on Application to DA for Certification for Re-Use of Wastewater



adequate, based on actual data, and are in conformity with international standards and practices.

Section 18 Procedural Guidelines

Procedural guidelines to facilitate the application of Technical Requirements set in this Order shall be prepared subsequent to the approval of this Order.

Section 19 Creation of DA Oversight Committee

An oversight committee within the DA shall be created to oversee the smooth implementation and enforcement of this Order. The committee shall be headed by DA Undersecretary for Field Operations with BSWM, NIA, FPA, BFAR, BPI, BPRE, NMIS, BAI, and other concerned agencies as members.

Section 20 Separability

The provisions of this Order are hereby declared to be separable. In the event that one or more of its provisions are held to be invalid, the validity of the other provisions shall not be affected thereby.

Section 21 Effectivity of this Order

This Order shall take effect fifteen (15) days after publication of the same in two (2) newspapers of general circulation at least once a week for period of not less than one (1) month, and its filing with the UP Law Center. Registration with the Office of the National Administrative Register.



ARTHUR C. YAP
Secretary

-
- c. Free from leaks and should ensure there will be no spill at any time and place between the generator's place to the users' pond or field.
 - d. In case where the wastewater is to be directly applied from the trucks to the field, the trucks should be equipped with booms or hose to distribute wastewater to the field. Persons applying the water should wear safety garments with nametags and the generator's name easily recognizable.
 - e. Schedules of application should be in strict adherence to the approved irrigation plan. Should there be a need to deviate from schedule for valid reasons; the wastewater generator shall inform the responsible government entity in writing or through e-mail at least a day before the application.

Selection of Irrigation Methods

Under normal conditions the type of irrigation method selected will depend on water supply conditions, climate, soil, crops to be grown, cost of irrigation method and the ability of the farmer to manage the system. However, when using wastewater as the source of irrigation, other factors such as contamination of plants and harvested product, farm workers and the environment, and salinity and toxicity hazards need to be considered. The choice of irrigation method in using wastewater shall be governed by the following technical factors:

1. choice of crops,
2. wetting of foliage, fruits and aerial parts,
3. distribution of water, salts and contaminants in the soil,
4. ease with which high soil water potential could be maintained,
5. efficiency of application, and
6. potential to expose farm workers and the environment to contamination or pollutants. Set back distances shall be established based in Table 4.

Table 4. Required type of irrigation and setback distances

	Landscape irrigation		Crop irrigation		
	Restricted Area	Access Area	Foods eaten raw and not commercially processed	Food crops commercially processed	Non-food crops
Type of irrigation system	Sprinkler and drip	Sprinkler and drip	Surface (e.g. furrow), drip	Surface (e.g. furrow), sprinkler	Surface (e.g. furrow), sprinkler
Set back distances	90 m away from potable water supply wells 30 m away from area accessible to the public if sprinkler or spray irrigation	25 m away from potable water supply wells*	25 m away from potable water supply wells*	90 m away from potable water supply wells 30 m away from area accessible to the public if sprinkler or spray irrigation	90 m away from potable water supply wells 30 m away from area accessible to the public if sprinkler or spray irrigation

Set back distance – is the distance from the perimeter of the irrigation area to the community or area of concern that is sensitive to contamination.

Precautionary measures when re-using wastewater for irrigation

The following precautions shall be required to protect the health of workers and others that may be affected:

- a. Direct contact of irrigation water with people shall be avoided.
- b. One of the important considerations in sprinkler system is spray drift. Sprinklers that produce coarser droplets shall be used instead of fine mist for spray to minimize the risk of aerosol dispersion by wind drift.

- a) violation of any condition as stipulated in the certification
- b) non-submission of ASMR for four (4) consecutive quarters
- c) refusal to allow inspection by DA duly authorized monitoring and validation team;

The period of preventive suspension shall not exceed thirty (30) working days from receipt of the order of suspension.

Upon receipt of notice of preventive suspension from DA-RED, the grantee shall be given fifteen (15) working days to submit in writing all the facts and reasons why certification should not be revoked. Failure to comply shall result to outright revocation of certification.

The DA-RED shall inform the grantee of the decision within fifteen (15) working days upon receipt of the written explanation.

In the event of suspension or revocation of certification, concerned Regional Offices of the EMB shall be officially informed. Facilities whose certificates were revoked shall be subject to sanctions under R.A. 9275 and its IRR.

**Part VI
MISCELLANEOUS PROVISIONS**

**Section 16
Research and Training**

The BFAR, FPA, NIA and BSWM are mandated to identify their research and training needs for the effective implementation of this Order. These agencies are instructed to include these needs in their proposed regular annual budgets. Costs for research and training may also be sourced from fees that will be collected from the implementation of this Order as may be allowed.

**Section 17
Review and Updating of Technical Requirements**

The DA through BFAR, FPA, NIA, and BSWM on the basis of new information, research and other developments shall conduct a periodic review of this Order so as to ensure that the technical requirements for the issuance of a certification for the safe use of treated water are sufficient,

the cultural management activities which will be required from the applicator or wastewater generator.

Monitoring shall be weekly except for outbreaks wherein monitoring will be done on a daily basis. Reporting shall be done monthly (except for outbreaks where the concerned agency will be informed immediately) and reports submitted to the Crop Protection Division of the Bureau of Plant Industry (BPI) with a copy furnished to the Regional Crop Protection Center (RCPC) covering the farm. Report shall include a narrative on the actions taken to manage/control the pest if any and an accomplished Pest Monitoring form attached as Annex 6.

Aquaculture

Monitoring of different water quality parameters in the culture pond shall be done during aquaculture operation for at least twice in every culture operation to determine its suitability for fish culture. Monitoring forms are attached as Annex 7.

Part V ADMINISTRATIVE PROVISIONS

Section 14 Validity of Certification

The initial certification shall have a validity period of one (1) year. Thereafter, the certification issued shall have a maximum validity period of five (5) years. Renewal of certification shall be applied for at least 90 working days before expiration. Issued Certificate shall be displayed/posted in conspicuous locations in the office or facility of the applicant.

Section 15 Procedures for Revocation of Certification

The DA-RED, upon recommendation of concerned agencies and after proper evaluation, may suspend or revoke the issued certification.

Upon recommendation of concerned agencies, of the commission of any of the following, the DA-RED shall preventively suspend the certification of a grantee pending investigation:

c. In case wastewater is be conveyed through pipe network, appropriate measures shall be made such that wastewater pipe will be not be mistaken for a potable water supply pipe.

- Appropriate pipeline identification shall be made, which shall be reflected in a written plan for the maintenance of the whole system.
- Operation and maintenance personnel shall be properly informed to avoid cross/improper connection.
- Potable and wastewater lines shall not cross-connect.
- All pipes for wastewater shall be clearly identifiable and each outlet shall be color coded and marked that the water is not for drinking.
- For both above and below ground installation, wastewater pipeline shall be installed far enough from a parallel potable water pipeline.

d. Storage facilities shall be carefully designed to prevent seepage (e.g., lining with compacted clay, P. E. sheets) and to maintain adequate freeboard. Analyses of monthly precipitation and evaporation shall be done to determine the time of cessation of wastewater irrigation and storage requirements.

Wastewater containing nutrients when stored for a long period may result to algal bloom. Once this situation is observed, irrigation with wastewater shall be stopped immediately.

Design of irrigation system

Design of the irrigation system shall be undertaken by a competent registered Agricultural Engineer. The following factors shall be considered in designing sprinkler and drip system:

- a. *Application rate.* Water shall not be applied at a rate faster than the soil can absorb it, but fast enough to prevent excessive evaporation losses.
- b. *Depth of application.* The amount of water applied shall not exceed the field capacity of the soil within the root zone of the crop. Field capacity refers to the percentage of water remaining in a soil two or three days after having been saturated and after free drainage has practically ceased.

-
- c. *System capacity.* There shall be enough equipment, and of sufficient size, to replenish the soil moisture at a rate that shall not exceed the peak rate of water use of the crop.
 - d. *Uniformity of application.* The point of lightest application usually shall have a depth of application of at least 80 % of the average depth applied over the field.
 - e. *Water losses.* These are results of wind drift and evaporation and shall not exceed 15 %.

Fertilization

In general, the following protocol for application of wastewater for fertilization shall be observed:

Application:

1. Avoid application of liquid by-product fertilizer when wind direction is gusting towards urban residential areas, in order to avoid potential odor issues, toxic contamination, etc.
2. Avoid application to fields near residential areas early in the morning or late in the evening where noise and dust may pose a nuisance to nearby residents,
3. Match application rates to crop needs through soil and leaf testing analysis,
4. Apply to dry or moist soil to minimize potential losses occurring through unexpected heavy rainfall.

Storage for Liquid By-Product Fertilizer

1. Tank materials should be non-corrosive, non-porous, well maintained and have lockable inspection hatches,
2. Located on level land, free of potential flooding and more than 40m away from waterways, banded to contain 110% of maximum storage capacity,
3. Easily accessed by contract delivery tankers away from overhead power lines,
4. Emergency procedures for spillage from tanks should be posted in conspicuous places, along with product material safety data sheets (MSDS), and
5. Sandbags, sawdust, rice hulls, or any inert adsorbents should be located 2-3 meters from the storage facility for clean-up operations in the event of tank spillage or rupture.

The minimum requirement for monitoring of well for groundwater quality shall be as follows:

- a. One well upstream of the field of application or outside the area of influence of the land application site for baseline or background monitoring
- b. One well downstream of the field of application
- c. All monitoring wells must extend to sufficient depth to sample seasonal fluctuations of the water table.
- d. Monitoring wells shall be provided with a casing and properly designed screens.

Establishment of monitoring wells shall be the responsibility of the grantee. Monitoring of the groundwater under the permit may require measurement of the different critical parameters as applicable to the type of wastewater source.

Gathering of data shall be taken from monitoring wells at least once a year during dry season. However for groundwater level, pH and EC, monitoring shall be done every 3 months. If the groundwater depth is shallow (less than 6 meters from the ground) or where the soils are highly permeable, monthly monitoring maybe required.

Surface Water Monitoring

Monitoring shall be conducted following DENR standard protocols for sampling, handling and preservation of water samples. It shall be done twice a year, during rainy and dry season.

Soil

Soil monitoring in the application site shall be conducted annually. Composite samples shall be analyzed for the different parameters identified by the concerned agency of the DA.

Crops

Monitoring for crops would deal on the incidence of pests and diseases that is possibly due by the application of wastewater. Monitoring of pests e.g., insects, fungi, vertebrates and diseases, their types and population in the area, will be one component of

-
- they have degraded/dissipated or until the compound have naturally decomposed to non-toxic form;
- c. Records shall be maintained regarding the use of chemicals in ponds as suggested by the HACCP method;
 - d. Banned chemicals shall not be used for any purpose;
 - e. Drugs, antibiotics and other chemical treatments shall be in accordance with recommended practices and comply with national and international regulations;
 - f. Aquaculture producers shall follow the information on product labels regarding dosage, withdrawal period, proper use, storage, disposal and other uses of the chemicals to safeguard environmental and human safety.

Part IV MONITORING AND REPORTING

Section 12 Agri/Aqua Self-Monitoring Report

The grantee shall submit an Agri/Aqua Self-monitoring Reports (ASMR) using the prescribed forms (Annex 5) every quarter to be signed by its Pollution Control Officer (PCO) to the DA-RFU. The submitted ASMR shall be validated by the DA concerned agencies.

Section 13 Impact Monitoring

An Impact Monitoring (IM) shall be conducted by the DA concerned agencies periodically on the following:

- Groundwater
- Surface water
- Soils

The impact monitoring and reporting on plant's pest and diseases as well as on the aquaculture shall be conducted by the grantee. The agency concerned shall provide training and assistance on how to conduct the field monitoring.

Groundwater Monitoring

Monitoring of groundwater is required if the depth of the static water level is within 10 meters below the ground surface and existing field conditions indicate that the groundwater quality is at risk from the effluent irrigation scheme.

On-Farm Record Keeping

A system of record keeping should be implemented to record information on nutrient inputs, changes in soil fertility, weather records, crop details, soil and leaf test results, and crop productivity.

Environmental Protection

1. Do not exceed recommended fertilizer application rates,
2. Ensure that the contractor delivering the fertilizer has calibrated application equipment and applies the product as recommended,
3. Do not apply liquid fertilizer when heavy rainfall is expected,
4. Apply liquid fertilizer to dry or moist soils in order to minimize any potential losses that may occur during unexpected rainfall events,
5. Manage irrigation to minimize runoff,
6. Ensure that liquid fertilizer products stored for short durations on farm are in secure locations,
7. Ensure that any unused fertilizer or wastes resulting from clean up of a fertilizer spill are disposed of in a suitable manner and location.
8. Implement measures to reduce the potential for odor or noise nuisance caused when applying liquid fertilizers near residential areas.
9. If near surface water bodies such as creeks, rivers, lakes, irrigation canals, etc:
maintain and enhance buffer areas in order to intercept nutrients and enhance dissolved oxygen levels in water ways through lower water temperatures and
10. Establish and maintain vegetated headlands and filter strips in order to slow down and trap particulates.

Safety Considerations

It is recommended that gloves and safety glasses are worn when handling liquid fertilizer to avoid contact with the skin. However, in the event of spilling or splashing liquid fertilizer onto the skin, it is important to wash off the affected area thoroughly with water. It is mandatory for all people to wear closed in shoes, long trousers, a long sleeve shirt, high visibility vest (provided) and safety glasses while on the site.

Smoking is not permitted anytime on site.

In addition, applicators of liquid fertilizer shall follow the direction

of use in the label for crops that were used in the registration. The direction of use shall be based on the result from the bioefficacy tests as required in the registration procedure.

Aquaculture

To attain an environmentally-sound aquaculture operation, distribution methodology and design shall follow good aquaculture practices pursuant to Fisheries Administrative Order (FAO) 214, Series of 2001, otherwise known as the Code of Practice for Aquaculture:

1. Site selection / evaluation:

Potential sites for aquaculture shall be thoroughly evaluated by BFAR in consultation with the DENR, LGUs, and the NFARMC to ensure that the ecological and social conditions are sustained and protected. The following practices shall ensure that sites selected are appropriate for aquaculture farms:

- a. Water source in the area shall be evaluated as to its quality and quantity;
- b. Tidal patterns, freshwater influences and flood levels, offshore currents and existing water uses shall be determined
- c. Alternatives to mitigate potential negative environmental and social impacts shall be considered.

2. Farm design and construction:

Proven and accepted designs and construction procedures shall be adopted to overcome problems related to flood levels, storms, erosion, seepage, water intake and delivery points and encroachment on mangroves and wetlands as well as social impacts.

- a. Farm shall be properly designed. Arrangement of the pond compartments, water control structures and all other facilities are mutually harmonized with each other giving the most efficient water management and manipulation of stocks.
- b. An ideal farm shall have wastewater treatment and settling pond areas, which are necessary for conditioning intake water as well as settling wastewater before discharging to the environment.

3. Water usage:

A good environment within the pond system shall be influenced by the following practices on water usage as well as the pond water quality management:

- a. Closed re-circulating water system shall be considered in the intensive and semi-intensive farming systems;
- b. Water exchange shall be minimized by maintaining good water quality through moderate stocking densities and feeding rates, using high quality feeds and good feeding practices.

4. Water delivery and sludge/effluent management

There shall be emphasized increased awareness of proper waste management in the aquaculture industry that shall enhance the protection of coastal land and water resources through the following practices:

- a. Effluents, sediments and other wastes shall be properly disposed of through the use of wastewater treatment and settling ponds;
- b. Delivered water shall meet water quality standards (determined qualitatively and quantitatively). Qualitative standards shall include prohibition of the release of turbid and odorous water to the receiving water while quantitative standards shall include the maximum and/or minimum levels of suspended solids, measure of acidity, dissolved oxygen, ammonia and other nitrogenous compounds, phosphorous, carbon dioxide, BOD, etc. as provided in DENR AO 90-34 and 90-35.

5. Use of drugs, chemicals, potentially toxic pesticides and fertilizers:

The following shall be practiced to foster awareness on the proper use of therapeutic agents and other chemicals without endangering food safety or threatening the environment:

- a. Drugs, chemicals, pesticides and fertilizers including lime shall be used only when clearly justified to treat specific problems;
- b. If chemicals are used, pondwater shall not be discharged until