

CWIP

**Guidelines for Instituting a
Certification Program for
Wastewater Operations**

Coastal Water Quality Improvement Project

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GUIDELINES FOR INSTITUTING A CERTIFICATION PROGRAM FOR WASTEWATER OPERATORS

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Government of Jamaica's
National Environment and Planning Agency

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United States Agency for International Development

Implemented by:

Associates in Rural Development, Inc.
P.O. Box 1397
Burlington, Vermont 05402

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1.0 INTRODUCTION

The provisions described in this document are intended to act as a guide for the establishment of a certification program for wastewater Operators island-wide. They are promulgated in recognition that there is a need for the employment and deployment of suitably trained operators whose competencies adhere to an approved set of professional standards promulgated as a means of ensuring the production and discharge of wastewater effluent meeting regulatory standards.

In May of 1999, CWIP convened a stakeholders meeting to deliberate on the issue of certification for wastewater plant personnel. The meeting participants agreed that such a program was necessary to build professionalism within the ranks of wastewater plant operators, and that minimum competencies and professional standards should be applied to govern performance in order to ensure the production and discharge of satisfactorily treated sewage effluent. Since then, CWIP has been building understanding and consensus for the establishment of such a program among a wider stakeholder group, as the introduction of this concept would be new to Jamaica. The draft sewage regulations that have since been promulgated by the National Environment and Planning Agency (NEPA) have contributed to the acceptance of the necessity for instituting this program. The time is now opportune for initiating the process leading to certification. The nation's largest wastewater service provider, the National Water Commission, has already made commitments to improving their wastewater services while ensuring that wastewater operations personnel are sufficiently trained to attend to their duties.

2.0 BACKGROUND

Poor attention to wastewater services generally, coupled with under-funding of the sector have largely been responsible for the poor performance of wastewater facilities in Jamaica, and have resulted in the discharge of poor quality effluent to the nation's waterways. This situation has been acknowledged as being one of the main contributors to coastal zone degradation in Jamaica, and has consequences for the nation's economy. The situation, coupled with the public's perception of a bureaucratic wastewater service provider, has from time to time invoked public anger, protests, and confrontations. Most wastewater facilities require extensive rehabilitation before they can be properly operated. The NWC presently represents the largest wastewater service provider, and owns and operates over 49 wastewater systems. Private sector entities operate a few small systems confined mainly to hotels and housing subdivisions. NWC systems serve approximately 15% of Jamaica's population. Overall, treatment processes range from primary to a mix of secondary processes. Tertiary treatment is practiced at one location.

At the same time, the employment of untrained and inadequately trained operations personnel at the various wastewater treatment plants has contributed to the production and discharge of improperly treated wastewater as these individuals are unable to properly operate and maintain these plants.

A serious commitment to reversing present trends in environmental degradation is required to ensuring economic vitality, as well as maintaining a healthy environment. Because the discharge of improperly treated wastewater is one of the main contributors to coastal zone degradation, it is considered prudent that more attention be given to the wastewater sector in order to ensure effective operations and maintenance of the already established wastewater systems. Significant components of this attention is the deployment of properly trained operations personnel and the establishment of a close and responsive relationship with the constituted environment and health regulatory agencies, namely the Natural Resources and Conservation Authority and the Environmental health Unit of the Ministry of Health (EHU).

3.0 POLICY FRAMEWORK

Proper wastewater management, including effective operation and maintenance practices, is dependent on the policy framework impacting the sector generally, and the performance of wastewater service providers. Enacted policy promotes effective wastewater operations while minimizing any tendency for neglect.

The historical policy framework impacting the wastewater sector has been weak. There are longstanding provisions under the Public Health Act that addresses minimum standards for the treatment and disposal of sewage, but enforcement has been weak. Within the last five years increased attention has been focused on this sector by the NEPA and the Ministry of Water/National Water Commission to bring about drastic changes within the sector. The two policy developments described below are supportive of an improved wastewater sector.

3.1 NEPA: Proposed Sewage Regulations

NEPA has completed a final draft of their National Sewage Effluent Regulations, which is expected to be in effect within the latter half of year 2001.

The proposed regulations identify entities covered by the regulations and require conformance to permit and licensing conditions. Guidelines are outlined on effluent discharge requirements, and operations and maintenance issues are addressed, in addition to monitoring and reporting requirements, also penalties and incentives. There is also comprehensive treatment of compliance issues. With respect to operations personnel, the proposed regulations state the following:

1. All operators shall be trained in the general principles of wastewater treatment. They shall receive such training from an approved institution.
2. All operators shall be certified as having attained the competence to operate the treatment plant. Operators shall be certified as Operator I, II, III, in accordance with levels of certification to be agreed between the NEPA and the Ministry of Health that define the various levels of competence.
3. Competent operators shall be employed to operate the plant. Such operators shall be in place within two years of the date of these regulations.
4. Competent personnel shall be employed to maintain the plant.
5. The training and staffing levels for operating the sewage treatment plants and their associated capacities shall be in accordance with the following schedule:

<u>Plant Size</u>	<u>Certification</u>
a) <200 m ³ /day (<52,800 usgpd)	Operator I
b) 200-399 m ³ /day (52,000-105,400 usgpd)	Operator II, Engineer Part time
c) 400-1000 m ³ /day (105,700-264,200 usgpd)	Operator III, Engineer Part time
d) >1000 m ³ /day (>264,200 usgpd)	Operator II or III, Engineer Full time

Such engineers shall also be certified to operate a sewage treatment plant and have a minimum two (2) years of experience in operations.

The promulgation of clear guidelines for the wastewater sector in the form of the National Sewage Regulations stated in unambiguous terms provides for a clear understanding of NEPA's requirements to mitigate against pollution episodes where wastewater generated from permitted facilities are concerned. The adherence to these guidelines will significantly contribute to Jamaica's sanitation program.

3.2 Actions to Improve Wastewater Service Delivery and Operations and Maintenance Practices

3.2.1 Water Policy

The Water Policy created in January 1999 by the GOJ saw the formal adoption of the concept of Private Sector Participation (PSP) as an alternative management strategy for wastewater programs administered through the NWC. This management alternative would provide for the injection of private capital into the operation and maintenance of the water/wastewater sector, and would enable the conduct of operational programs as per a set of established and agreed upon standards.

According to the policy, privatization is but a part of the strategies of Government to secure economic benefits for Jamaica and not an end in itself. Private sector participation in the water and sewerage sector is expected to bring improvements, in the availability, quality and cost effectiveness of services being delivered. The policy further states that Private Sector Participation arrangements should meet the following criteria:

- a) Terms for privatization should be in the country's best interest;
- b) Improved economic efficiency in the sector, in both operating performance and the use of capital investments;
- c) Technical and managerial expertise and new technology into the sector to achieve productivity improvements;
- d) Injection of large scale investment capital into the sector and/or access to private capital markets, thereby reducing public investment;
- e) Insulation of the sector from short term political intervention in utility operations and limitation of opportunities for intervention by powerful interest groups;
- f) Transfer of the risks and responsibilities of ownership from Government to the private sector over the long term;
- g) Delivery of a reliable and efficient service to communities throughout the island; and
- h) Making the sector more responsive to consumers' needs and preferences.

A strategy with which to implement the Water Policy is being developed by the Ministry of Water with assistance from the Inter-American Development Bank.

The NWC has since been strengthening its capacity to deal with issues associated with private sector partnerships, and the government has since been negotiating with private sector entities interested in administering selected water and wastewater programs.

4.0 WASTEWATER OPERATOR CERTIFICATION PROGRAM – FACTORS FOR CONSIDERATION

Wastewater treatment requires the application of a set of skills that can reasonably ensure the production and disposal of effluent meeting regulatory requirements. These skills are linked to the various treatment processes, the size and complexity of treatment systems, and the training and experience of operators.

The concept of a Certification program for wastewater operations personnel, though new to Jamaica, is seen as an essential component in the mix of factors enabling wastewater providers to meet NEPA's Sewage Regulations. Such a program would ensure the provision and availability of skilled personnel with training and experience in the operations and maintenance of wastewater treatment plants. Qualifications established for this category of personnel would be in accordance with established minimum competency levels. The criteria against which this determination is made allows for the categorization of required skills and plant type into classes. Certified operators would ensure optimal operations of treatment systems and would ensure that regulatory provisions are met. The practice would be governed by regulations that would prescribe sanctions for operational breaches and professional misconduct. For a Certification program to proceed, however, an in depth study would have to be done of the sector to identify deficiencies and to outline a path that should be followed to make the implementation of the program a reality given the present status of the wastewater sector. A survey is needed of the types of plants in existence and the skills required to operate these plants with consideration given to the practices pursued in other countries, especially countries within the region. Notice should also be given to the subject of reciprocity of this program with those in other neighboring countries including the Caribbean and the United States of America.

This survey should also determine the level of support that would be obtained from authoritative sources and professional bodies within the wastewater sector. A determination should also be made of the type of wastewater worker that should be certified – whether plant operator, assistant or trainee plant operator, and/or collection systems personnel. This determination should be made outside of the provisions made in draft in the proposed Sewage promulgated by the NEPA, resulting in either confirmation of NEPA's proposal or a modification of this provision.

4.1 Additional Factors for Consideration

4.1.1 Compilation of the Types of Existing Wastewater Facilities as well as Competency Levels of Attendant Operations Personnel

Before any certification program can proceed, there is need to create an inventory of existing facilities. The information collected should include the type of plant (treatment process employed), size and capacity, location, as well as the method employed for the disposal of effluent and the treatment and disposal of sludge. An analysis of the competency levels of the operators should also be determined to facilitate placement in suitable training programs as necessary.

4.1.2 Legal Framework for Establishing the Certification Program and Mechanism for Institutionalizing Program

The adoption of a wastewater licensing/certification program would make it mandatory for the appropriate category of wastewater personnel to be certified as a condition for the practice of this profession, whether in the public or private sector. It would be necessary for the requirements for this program to be vested within the laws and regulations of Jamaica, with provisions for a set of sanctions to address shortcomings in competency and non compliance and/or breaches in professional conduct.. The new draft sewage regulations promulgated by the NEPA for adoption late 2001 makes a stipulation that wastewater operators should be certified. A determination should be made as to whether these regulations are sufficient to institutionalize this certification

program and whether or not additional regulations or new laws are needed to address this requirement. This determination should address provisions of how the laws and/or regulations should be constituted and how these provisions should be administered. A process for institutionalizing the program should also be identified.

4.1.3 Self Regulation

A professional body should have provisions for self-regulation. With such a provision, there would be confidence that the practice of that profession is being conducted with reasonable care, while adhering to established professional standards.

A determination should be made of how self-regulation could be achieved and administered among wastewater operations personnel. It could be that this process could be initiated through the formation of an informal association of wastewater personnel that could later develop into a professional body. Such a body could also act as a medium for the dissemination of pertinent information and a medium for the upgrading of professional skills.

4.1.4 Optimization of Training Programs

Training programs for wastewater personnel have been developed and implemented over the years without the coordination necessary to avoid overlaps in programming. With the limited financial resources available for this type of training generally, collaboration would be advantageous among wastewater trainers to create and implement a comprehensive program that would more effectively address the needs of wastewater personnel within Jamaica, and which would enjoy the support of beneficiary institutions and international funding agencies.

A description of the training programs presently available is as follows:

a) Training Administered by the Ministry of Health

A number of training programs presently exists to elevate the competency levels of wastewater treatment plant operators and to strengthen the capacity of these individuals to properly attend to their duties. One such program is presented by the Ministry of Health each year through the University of Technology, Jamaica (UTech) This program has been operating for over twenty-two years and has had participation from water and wastewater plant operators from the NWC, limited private sector entities, also from other Caribbean countries. There has also been participation from the Public Health sector. The program has been of six weeks duration each year and has sought to build skills within the water and wastewater disciplines at the basic levels.

The UTech program has, however, seen a drop in participation especially from the NWC, and now enjoys participation only from other Caribbean countries and from the Public Health sector in Jamaica. Participants who have withdrawn from the program have inadequacies of the program to address present day challenges.

Program costs have been defrayed by the Pan American Health Organization (PAHO) and the Caribbean Environmental Health Institute (CEHI). CWIP granted sponsorship to three individuals in 2000.

b) UTech/NWC Program in Water Resources Engineering

In an effort to upgrade the competency levels of its technical staff, the NWC has sought to partner with the University of Technology to design and implement an Associates degree program in Water Resources Engineering. This program targets personnel working within the Operations and Maintenance Division of the NWC who lack formal training in this area. In-house instruction addressing basic literacy skills is provided to those in need of this training, and to prepare those

individuals wishing to enter the degree program. The NWC has, in large measure, substituted this program for the MOH/PAHO program. Costs associated with the implementation of this program are being borne by the NWC.

c) Development of Occupational Standards for Wastewater Treatment Operations by NWC/HEART Trust/NTA

In October 2000, the HEART Trust/NTA completed a document describing occupational standards applicable to wastewater treatment process operations. The preparation of this document, which was commissioned by the NWC for application to that Company's wastewater operations, outlined the skills required to address the range of activities specific to the wastewater treatment process.

This document will be submitted to the NWC Board of Commissioners for adoption and implementation.

d) Ministry of Health/US Peace Corps Summer Program in Wastewater Operations

Over the past two years (1999-2000), the Ministry of Health and the US Peace Corps has offered two-week training programs in wastewater operations to wastewater operators and wastewater operations supervisory personnel within the private sector. This program has had the support of the Coastal Water Quality Improvement Program (CWIP), the US Environmental Protection Agency (USEPA), and the NWC. CWIP has provided both funding and technical assistance to the program over the past two years, with the USEPA providing funding, and the NWC providing technical assistance.

The program, which addresses rudimentary skills needed to address wastewater treatment operations, has been targeting operations personnel who lack this knowledge and training. This program has not yet been institutionalized as a regular offering.

e) Wastewater Engineering Program Offered by the Scientific Research Council

The Scientific Research Council through that Agency's Wastewater Management Project has been offering ad hoc courses in various aspects of wastewater engineering and operations over the past two years, with particular emphasis on wastewater treatment. This program is supported by the German Agency for Technical Cooperation (GTZ), and addresses the subjects taught at an advanced level. Costs associated with this program are paid directly by program participants or from sponsoring agencies.

4.1.5 Identification of Training Institutions and Associated training Costs

As noted earlier, a number of wastewater training programs already exist with different training providers. Once the contents of a definitive training program are identified, the provider or providers of this program should be identified. It may be that different providers are identified to provide different levels of training in a unified program package. Costs associated with a recommended program should also be identified.

4.1.6 Agency Responsible for Certification

Both the NEPA and the MOH have responsibility for wastewater regulation. The MOH has a responsibility under the Public Health Act to ensure the proper disposal of sewage. This ministry also plays a role in the review and approval of plans for the treatment and disposal of sewage.

The NEPA has responsibility for permitting the construction of sewage facilities and for granting licenses to discharge effluent. Both institutions collaborate in the approval process for these facilities.

An authority would be needed to authenticate the Certification process thus giving credibility to the License issued for the discharge of effluent meeting stipulated standard. There is need for this authority to be identified. It may be that the NEPA and The MOH could collaborate in granting certification

4.1.7 Determination of Potential Problems Associated with Implementation of Wastewater Operators' Certification Program

Problems that may be associated with the introduction of the Certification program should be identified so that these can be attended. A potential problem may be with the Trade Unions who may interpret the certification program as an attempt to displace employed workers. Possible solutions to this problem could be the replacement of retiring operators with those acquiring certification, and the re-deployment of non-licensed operators to other areas. Some of these individuals could be retained as mentors until they retire.

5.0 ILLUSTRATIVE SCHEDULE FOR THE IMPLEMENTATION PROGRAM COMPONENTS

The table below describes an illustrative path that would culminate in the institution of program under discussion. The schedule is termed illustrative at this point recognizing that it could vary *depending on circumstances*.

Activity	Responsible Entity	Facilitator	Proposed Schedule
Satisfaction of Terms of Reference to define scope of Certification program	CWIP	CWIP	Aug.1 – Sept. 21, 2001
Identify Requirements for legalizing Certification program and/or enshrining program within laws of Jamaica	NEPA	CWIP	Aug. 15 – Sept. 30, 2001
Confirmation of Consultants' findings and recommendations relating to scope of Certification program	NEPA, MOH, WRA, NWC, TPD	CWIP	Oct. 7, 2001
Creation and Implementation of process seeking stakeholder input and consensus	NEPA	NEPA	Oct. 14, '01 – Jan. 14. '02
Satisfy requirements for instituting program	NEPA	NEPA	Jan. 21 – April 31, 2001
Creation of Wastewater Operators' Association	MOH	MOH	June 1 – Sept. 30, 2001

TERMS OF REFERENCE TO DETERMINE SCOPE OF WASTEWATER OPERATORS' LICENSING/CERTIFICATION PROGRAM

Introduction

Up to April of 1998, over one hundred and twenty-five wastewater treatment plants existed on the island with the largest numbers concentrated in the parishes of Kingston and St. Catherine. Most of these plants are publicly owned and operated by the National Water Commission, a statutory body with responsibility for the provision of potable water and wastewater services in Jamaica. Others are owned and operated by other government agencies including the Ministry of Health, Ministry of Environment and Housing, and Ministry of Education. The rest belong to private entities and provide service to hotels and housing subdivisions.

General neglect and under-financing of the wastewater sector over the years has resulted in the deterioration of wastewater treatment facilities with the attendant discharge of untreated or improperly treated wastewater effluent to waterways and gully courses that drain to the sea. Inadequate allocation of resources for wastewater services has resulted in ineffective management, operation, and maintenance of these systems. Discharge standards established for wastewater effluent are continuously being breached thus presenting a threat to public health and the environment.

While the neglect of the wastewater system maintenance has resulted in the deterioration of wastewater facilities throughout the island generally, the improper treatment and disposal of wastewater from many of our wastewater facilities are due in part to the employment of untrained and improperly trained wastewater personnel. There is need to institute support programmes to assist environmental regulatory agencies such as the National Environment and Planning Agency and the Environmental Control Division to ensure compliance to discharge standards from wastewater service providers. One such avenue of assistance is the introduction and institutionalization of a properly regulated licensing programme for wastewater operators. Such a programme would lend to improvement in operations and maintenance through the employment of trained individuals who would be accountable.

Regulatory Agencies

The National Environment and Planning Agency (NEPA)

The NEPA is a statutory organization administered under the Ministry of the Environment and Housing. The organization has a mandate to conserve Jamaica's natural resources and protect against pollution. The discharge of sewage or any industrial wastewater, and the construction of works for any such discharge, require a license granted by the authority under section 12(1) of the NEPA Act. It is mandatory for a license to be obtained from the NEPA before a sewage plant can be operated. Regular monitoring describing the operations of these plants is also required. Whereas a compliance plan must be submitted to the NEPA for existing plants, new plants are expected to meet effluent standards established by the NEPA.

The Environmental Control Division of the Ministry of Health (ECD)

The Environmental Control Division of the Ministry of Health is responsible for the development and application of environmental standards toward the protection of public health, and serves in

an advisory capacity to the Minister of Health. The organization carries out national monitoring and assessment with respect to the control of water quality, sewage, industrial wastewater, solid waste, air pollution control, noise and industrial safety, and enforces these standards through the Public Health Act of 1974. All development proposals for wastewater and excreta are referred to the ECD for approval. The ECD also advises the Town Planning Department on matters concerning sewage and sewage disposal facilities as these relate to the processing of housing subdivision applications.

The Office of Utility Regulation (OUR)

The Office of Utility Regulation (OUR) is empowered under the OUR Act of 1995 to regulate and license utility service providers. The company attends more to the commercial aspects of utility operations but is empowered to ensure that the utility companies that are granted licenses will provide services that: (1) Meet the needs of the community; (2) Are efficiently provided in a manner designed to protect the health, and persons affected by its operations; (3) Take into account the need to protect the environment; (4) Are economical and reliable, and (5) Are operated on terms, which allow for a reasonable return on capital invested in providing the service.

Training Programmes and Training Providers

A number of organizations and institutions have, over the years initiated training programmes to enhance the skills of wastewater personnel. These programmes have been comprehensive and have, in large measure, been successful. Several of these organizations have continued today with training programmes for personnel in the wastewater sector. These include the Scientific Research Council, ECD, and VTDI. The NWC has instituted training programmes for its employees and has initiated an Associates Degree in Water and Wastewater Engineering with the University of Technology.

Stakeholders Meeting

Not much improvement in the treatment of wastewater can be expected from retrofitted or newly constructed plants if qualified system operators are not in place. Thus, a solution to this problem is to ensure that wastewater personnel are properly trained to attend to the tasks for which they are employed, and that there is a mechanism in place to ensure accountability. It is the belief of many stakeholders, including the National Environment and Planning Agency (NEPA), Environmental Control Division of the Ministry of Health (ECD), and National Water Commission (NWC) that more could be done to introduce the element of accountability for these personnel.

It was the consensus of stakeholders attending a meeting convened on May 13, 1999 to discuss the issue of training and licensing of wastewater treatment plant operators, that these operators should be properly trained and regulated through licensing. This practice would contribute significantly to an improvement in wastewater systems management, operations, and maintenance. In order to begin the process of instituting a licensing programme for wastewater personnel, a Working Committee was established to deliberate the issue and to create the framework and begin the process for such a programme to become reality.

Terms of Reference

1. Determine the existence, content and scope of wastewater operators' training and certification/licensing programs presently available in Jamaica, and identify the institutions and/or agencies offering such programs.

2. Develop and implement a process for optimizing training resources toward making a meaningful impact on wastewater training generally.
3. Research training and licensing requirements for wastewater personnel in neighboring countries and define requirements for Jamaica within the context of a regulatory program. Determine requirements for reciprocity.
4. Determine and label classes of wastewater treatment plants and determine academic and experience requirements for licensing with consideration given to the different classes of treatment plants.
5. Obtain information as to the types of wastewater treatment plants presently in operation in Jamaica.
6. Obtain information describing the present educational levels of employed wastewater plant operators.
7. Define the terms “Wastewater Treatment Plant”, “Wastewater Personnel”, and “Operator” as deliberated within the context of this assignment, and determine which class of operations personnel need to be licensed.
8. Review and research laws and regulations applicable to the wastewater sector and recommend the legal framework for the establishment of a regulatory mechanism for the wastewater operators and attendant treatment plant personnel, including licensure.
9. Explore factors that would constitute a breach of practice on the part of licensed wastewater personnel, and suggest disciplinary measures. Determine a mechanism to assess the performance of wastewater treatment plant operators.
10. Identify educational institution(s) that could provide required training.
11. Determine the cost of a suitable training and licensing program, and identify possible avenues and alternatives for funding.

Suggest which Agency should be responsible for licensing, and determine relevant mechanisms to institutionalize program nationally.

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Coastal Water Quality Improvement Project