THE REPUBLIC OF UGANDA

OFFICE OF THE AUDITOR GENERAL

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REGULATION OF THE ABSTRACTION AND DISCHARGE OF WATER BY MINISTRY OF WATER AND ENVIRONMENT

A REPORT BY THE AUDITOR GENERAL

DECEMBER, 2015

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AUDITOR GENERAL'S MESSAGE

31st December 2015

The Rt. Hon. Speaker of Parliament
Parliament of Uganda
Kampala

VALUE FOR MONEY AUDIT REPORT ON REGULATION OF THE ABSTRACTION AND DISCHARGE OF WATER BY MINISTRY OF WATER AND ENVIRONMENT

In accordance with Article 163 (3) of the Constitution of the Republic of Uganda 1995 (as amended), I hereby submit my report on the value for money audit undertaken on the Regulation of the Abstraction and Discharge of water by Directorate of Water Resources Management, Ministry of Water and Environment.

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My office intends to carry out a follow – up at an appropriate time regarding actions taken in relation to the recommendations in this report. I would like to thank my staff who undertook this audit and the staff of Ministry of Water and Environment for the assistance offered to my staff during the period of the audit.

John F. S. Muwanga
AUDITOR GENERAL

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ABBREVIATIONS AND ACRONYMS

BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
DWRM	Directorate of Water Resources Management
EFT	Effluent Treatment Plant
MoWE	Ministry of Water and Environment
NEMA	National Environment Management Authority
NWSC	National Water and Sewerage Corporation
SPR	Sector Performance Report
UBOS	Uganda Bureau of Statistics
WPC	Water Policy Committee
WMZ	Water Management Zones

EXECUTIVE SUMMARY

Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment. Managing the quality and quantity of water is important to sustaining the fisheries resource, reducing the cost of treating domestic water supply and for environmental sustainability, while managing the quantity of water is essential for the health and wellbeing of people, livelihoods and the economy both in the short and the long run. The Directorate of Water Resources Management (DWRM) of the Ministry of Water and Environment (MWE) is mandated through the Water Act (1998) to ensure optimal use of water resources through issuance of permits for abstraction and discharge of water and monitoring compliance with stipulated conditions for water abstraction and discharge.

The objective of the audit was to assess the extent to which the Directorate of Water Resources Management (DWRM) of the Ministry of Water and Environment (MoWE) is regulating the abstraction of water and discharge of wastewater.

KEY AUDIT FINDINGS

It was noted that DWRM had made good strides in ensuring that all abstraction of water and discharge of wastewater activities across the country are regulated through the issuance of permits and subsequent monitoring of permit holders.
However, in spite of the achievements made, the audit identified some areas for improvement as summarized below;-

1. Waste discharge fees and issuance of permits

DWRM levies waste discharge fees based on only the water quality parameter of Biochemical Oxygen Demand (BOD) as a result the fees charged do not take into consideration the other characteristics and components of the wastewater such as heavy metals, oil effluent and other chemicals which are toxic and equally expensive to treat yet the principle behind the waste discharge fees is to ensure that the polluter bears the true and total costs of environmental pollution. This has resulted in DWRM charging fees that do not deter pollution of the water resources by the permit holders; and therefore not meeting their objective of ensuring that water resources are not polluted.

The DWRM takes longer than the timelines stipulated in the MoWE clients' charter to assess applications and issue permits for abstraction and discharge of water which results in unauthorized abstraction/ discharge of water which increases risks for pollution and unsustainable use of water resources.

2. Designation of laboratories for water quality testing

DWRM had not designated laboratories from where testing of samples for water quality by permit holders can be undertaken as a requirement to comply with permit conditions.. Failure to designate credible laboratories may raise questions regarding the credibility of the periodical sample results that are presented to DWRM by the permit holders. It was also observed that the DWRM national laboratory at Entebbe has not yet achieved international accreditation .Without this accreditation, the testing undertaken at the laboratory may not have international credibility.

3. Compliance with Permit Conditions

Some permit holders do not adhere to the permit conditions such as installing facilities for measuring and recording of water levels and water abstraction volumes, submitting water use data to DWRM on a quarterly basis, payment of annual fees and water quality test results for water abstraction. Non-compliance with the permit conditions results in over abstraction of water and discharge of wastewater that does not meet the National effluent standards resulting in pollution.

4. Monitoring by the DWRM

The DWRM has not effectively carried out its monitoring role to ensure compliance with permit conditions as only 50% of the sampled files had been monitored. Monitoring activities are undertaken without documented monitoring guidelines resulting in non-prioritization of those firms that require immediate follow up. It was also noted that there were inconsistencies between the planned and achieved results disclosed in the MoWE Sector Performance Reports and DWRM annual work plans and, consequently, it was not possible to establish the number of permit holders DWRM had planned to monitor and the actual numbers that were monitored for compliance during the period under review. Inadequate monitoring increases chances of non-compliance as illegal practices are left unchecked for long periods of time. This also makes it difficult to assess the impact of DWRM's regulation activities.

KEY RECOMMENDATIONS

The DWRM should:

1. Ensure that the waste discharge fees charged incorporates parameters that impact on pollution as required by Section 18(2) of water regulations 1998; the fees charged should be a deterrent to pollution and adequate to restore the polluted water bodies. Additionally, The DWRM should offer support to permit applicants in order to ensure that their applications include all the required information to hasten the process of assessment and subsequent issuance of permits.

2. DWRM should designate water quality testing laboratories across the country to make

it easier for permit holders to test water quality in fulfilment of permit requirements and to ensure that DWRM receives credible test results from the permit holders. To enhance international credibility of the water testing undertaken by DWRM, the Ministry should continue to pursue international accreditation of its laboratory.

3. Strengthen the enforcement mechanism by taking more stringent actions on non-complaint permit holders, such as, heavy penalties and legal action.

4. DWRM should strengthen the Monitoring function by developing the monitoring guidelines and setting up a proper system for tracking and following up the monitoring activities. Such a system should be able to provide accurate information and reports about the performance of the monitoring function. DWRM should ensure that a consolidated report is prepared periodically on its monitoring activities.

CHAPTER ONE

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INTRODUCTION

1.1 BACKGROUND

The Directorate of Water Resources Management (DWRM) of the Ministry of Water and Environment (MWE) is mandated through the Water Act (1998) to ensure optimal use of water resources through issuance of permits for abstraction and discharge of water and monitoring compliance with stipulated conditions for water abstraction and discharge.

Abstraction of water refers to the extraction of water from both surface and ground water resources while discharge of waste water refers to the release of treated or untreated effluent into the environment. The Government of Uganda (GoU) through the Ministry of Water and Environment (MoWE) regulates the abstraction of water and the discharge of waste water. This is principally done through preparation of water use plans and strategies, allocation of water resources to various users through issuance of water abstraction permits and wastewater discharge permits and monitoring compliance to water policies, laws and permit conditions.

The purpose of regulation of these activities is to ensure that water is used and discharged in a manner that ensures sustainability in regard to the available water resources whilst minimising the adverse impacts to the environment that may result from discharge of waste water.

1.2 MOTIVATION

Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment. Rapid population growth, increased agricultural, urbanization and industrial activities, and the poverty in rural and peri-urban areas and habits of ''environmental carelessness'' are causing a serious depletion and degradation of the available water resources.[1]

Managing the quality and quantity of water is important to sustaining the fisheries resource, reducing the cost of treating domestic water supply and for environmental sustainability[2]; while managing the quantity of water is essential for the health and wellbeing of people, livelihoods and the economy both in the short and the long run.

The Ministry of Water and Environment has established regulations and guidelines for the regulation of the abstraction of water and discharge of waste water, namely: the Water Act (1997), the Water Resources Regulations (1998), the National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, the Water (Waste Discharge)

1 National Water Policy, 1999, Pg. 3

2 State of the Environment Report for Uganda 2010, pg. 79

Regulations, 1998 and others. These regulations are meant to ensure that abstraction of water and discharge of waste water are carried out in a sustainable manner and that water resources are protected from over exploitation and pollution. This is done through preparation of water use plans and strategies, issuance of water permits, and monitoring compliance with water policies, laws and permit conditions. However, there are reports of increased pollution of the environment resulting from discharge of pollutants.

The audit was motivated by the following factors:

- The reported fluctuating water levels of some of the major surface water bodies in the country.
- Indications of non-compliance by permit holders with the conditions stated in their water abstraction and /or wastewater discharge permits.
- Reports of continued pollution of the water resources from industrial and institutional activities; as indicated in the Annual Water Sector Performance reports for the period under review.

There has been significant fluctuation of water levels in some of the major surface water bodies, such as Lakes Victoria and Kyoga (statistics for levels). In addition, the ground water resources have also been on a declining trend[3]. The fluctuation in the levels of the surface and ground water resources may be attributed to various factors, such, as climate change, overexploitation of water resources etc. According to the Water Sector Performance Report 2014, 32% of the monitored surface and ground water abstraction permit holders abstracted beyond the permitted amount. A reduction in the levels of water resources negatively affects the economy of the country, for example in 2005, the lowering of Lake Victoria water levels, significantly affected hydropower generation. The consequences peaked with a severe shortfall in hydropower of 148MW; equivalent to about UGX. 37billion.

The quality of water resources and drinking water supplies in Uganda is on a decline[4]. The decline in the quality of the water resources can be attributed to the discharge of waste water that does not meet the national standards. According to the Water Sector Performance report 2014, 50% of waste water dischargers are discharging waste water that does not meet the stipulated waste water discharge permit conditions. Some of the biggest waste water dischargers that do not meet the national standards include National Water and Sewerage Corporation facilities, sugar manufacturing companies and leather tanning industries. Furthermore, media reports have indicated that as a result of increased pollution in the inner Murchison Bay, the cost of water treatment by NWSC has trebled within the last ten years[5].

It is, therefore, against this background that a study of the regulation of the abstraction of water and discharge of wastewater by the Directorate of Water Resources Management (DWRM) was undertaken to ascertain the extent to which DWRM has executed its regulatory role in order to achieve the objectives of the Water Policy 1999 and the Water Act 1997.

1.3 DESCRIPTION OF THE AUDIT AREA

1.3.1 General Description

The Directorate of Water Resources Management (DWRM) is one of the three directorates under the Ministry of Water and Environment (MoWE). It is charged with the monitoring, assessment, planning and regulation of the country's surface and ground water resources and coordinating Uganda's

3 State of the Environment Report for Uganda 2010, pg. 71&75

4 2014 Water Sector Performance Report, Pg. 117

5 http://www.newvision.co.ug/D/8/13/713744

participation in joint management of Trans-boundary water resources and peaceful cooperation with Nile Basin riparian countries.

The Department of Water Resources Planning and Regulation under the DWRM has the responsibility of ensuring that that policies and strategies for sound water use planning and regulation are continuously developed and implemented. The Department regulates the use and allocation of water resources through issuance of water abstraction and waste water discharge permits, in order to ensure that water resources are rationally used and protected from overexploitation and pollution through monitoring compliance to water policies, laws and permit conditions.

1.3.2 Legal Framework

The legal framework for the management of water resources in Uganda is enshrined in the Constitution of the Republic of Uganda, 1995 (as amended), and several Acts of Parliament and accompanying Regulations. Article 245(a) of the Constitution of Uganda, 1995 (as amended) authorizes Parliament to provide for measures intended to protect and preserve the environment from abuse, pollution and degradation.

In order to control water depletion and pollution as well as mitigation of climate change impacts, government put in place an enabling legal framework in form of the following:

- The Water Act (1997) Cap 152 legislates on the use, protection and management of water resources and supply;
- Water Resources Regulations (1998) provides guidance on the use of water; and
- Water (Waste Discharge) Regulations (1998) stipulates the standards of effluent permitted to be discharged into the environment.

In addition the Environment Act, with its accompanying Regulations: Environmental Impact Assessment Regulations 1998; the National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations 1999; and the National Environment (Waste Management) Regulations of 1999 were put in place to ensure sustainable use of environment and natural resources across the country. The Water Act has been under implementation by the Ministry of Water and Environment since 1998 when the various laws and regulations were operationalized.

1.3.3 Vision Statement of Directorate of Water Resources Management (DWRM)

The DWRM supports the Ministry's vision which is "Sound management and sustainable utilization of water and environment resources for the betterment of the population of Uganda."

1.3.4 Mission

The Ministry's Mission is "To promote and ensure rational and sustainable utilization, development and effective management of water and environment resources for socio-economic development of the country".

1.3.5 Objective and activities of DWRM

The Objective of DWRM is to manage and develop the water resources of Uganda in an integrated and sustainable manner in order to provide water of adequate quality and quantity for socio-economic needs both for both the present and future generations.

The activities carried out by DWRM include:

- Assessment and monitoring of water resources.
- Planning the use and regulating the use of water resources.
- Water quality assessment and monitoring.

1.3.6 Organization Structure

At the time of the audit commenced the Directorate of Water Resources Management (DWRM) comprised three (3) departments, namely: Water Resources Monitoring and Assessments, Water Resources Planning and Regulation and Water Quality Management; and 6 divisions as presented in the organogram structure in Appendix IV. However, the Directorate currently has a fourth department of International and Transboundary Water Resources Affairs that become operation with effect from July 2015. The Directorate is headed by a Director who reports to the Permanent Secretary of MoWE. Each department is headed by a commissioner. Key activities of the Water Resources Planning and Regulation department include water resources planning and allocation, assessment of applications for various water permits (groundwater and surface water abstraction, drilling, wastewater discharge), reviewing environmental impact assessment reports, monitoring compliance to water laws, regulations and permit conditions; and raising awareness about the role and importance of water resources management.

1.3.7 Funding for Water Resources Regulation Activities

The funding for water resources regulation activities is from the Government of Uganda (GoU) and donor funds under Joint Partnership Fund (JFP) through the Joint Water and Environment Support Programme. The funding for the Financial Years 2011/2012, 2012/2013 and 2013/2014 from GoU and Donor funds is presented in Table 2 below:

Table 2: Funding for the Department of Water Resources Planning and Regulation.

Financial year	2011-12		2012-13		2013-14	
Activity	JPF (Mil)	GOU (million)	JPF (Mil)	GOU (million)	JPF (Mil)	GOU (million)
Water use Planning	175		158		256	
Permits Administration	111		129		113	
Reservoir Management and Dam Safety	4		32		-	
National IWRM Strategies and Plans	252.2		320.8		0	
Compliance and Enforcement	163.8		151.45		143.56	
Water Policy Committee	70.08		0		0	
Water Laws, Policies and Regulations	17.1		28.2		0	
Administrationand Management	753.5		293.49		61.11	

Recurrent regulation department(11) GOU	0	100	0	47.5	-	44
TOTAL	1546.68	100	1112.94	47.5	576.67	44
GRAND TOTAL	**1646.68**		**1160.44**		**620.67**	

Source SWRM Activity Budget Report 2011-2014

From the above table it can be noted that most of the funds for implementing departmental activities come from donors under the Joint Partnership Fund while GOU finding is minimal and continues to reduce annually. The total funding to the department has also been fluctuating but is generally on a declining trend.

1.4 AUDIT OBJECTIVES

The main objective of the audit was to assess the extent to which the DWRM is regulating the abstraction of water and discharge of wastewater.

Audit Questions

(i) To what extent has DWRM put in place the necessary regulatory framework for abstraction and discharge of water activities?

(ii) Does DWRM adequately assess and issue permits to permit applicants?

(iii) To what extent has DWRM monitored permit holders?

(iv) To what extent have the permit holders complied with the abstraction and discharge permit conditions?

1.5 AUDIT SCOPE

The study focused on the regulation of the abstraction of water and discharge of wastewater by the Directorate of Water Resources Management under the Ministry of Water and Environment.

The study was carried out at the DWRM headquarters as well as the existing four zonal offices in Mbale, Mbarara, Lira and Fort Portal, and abstraction/discharge permit holders were selected from the total population of permit holders for inspection.

The study covered three financial years namely: 2011/12, 2012/13 and 2013/14 in order to assess the trends in regulation efforts and compliance levels to the abstraction / discharge conditions over this period.

Audit Criteria

The audit criteria used were the relevant laws and regulations for the abstraction of water and discharge of wastewater, that is: the Water Resources Regulations (1998), the National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, and the Water (Waste Discharge) Regulations, 1998.

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AUDIT METHODOLOGY

The audit was conducted in accordance with the International Organization of Supreme Audit Institutions (INTOSAI) Performance Auditing Standards and Value for Money (VFM) Auditing guidelines prescribed in the Office of the Auditor General (OAG) VFM audit manual. The standards require that the audit is planned in a manner which ensures that an audit of high quality is carried out in an economic, efficient, effective and in a timely manner.

2.1 SAMPLING

Samples of permit holders from both categories of water abstraction and wastewater discharge were used to conduct this study. Stratified random sampling methodology was used to select the samples. The permit holders were stratified into the four water catchment zones/basins i.e. upper Nile basin, Victoria basin, Kyoga basin and the Albert basin. Then, within each stratum, a sample was randomly selected. A total of fifty five (55) permit holders were selected as detailed in Table 1 below. The detailed list of sampled permits is attached as APPENDIX VI.

Table 1: Audit Sample

Permit type	Population	sample selected
Water abstraction	735	31
Waste Water discharge	191	24
Total	**926**	**55**

2.2 DATA COLLECTION METHODS

The data collection methods used to obtain audit evidence were:

2.2.1 Document review

Documents were reviewed with the aim of obtaining an understanding of the entity's operations, identifying the problems and challenges faced by DWRM and to gather documentary evidence to support the audit findings. Some of the documents reviewed include: The Water Act (1998), The National Water policy (1999), The Water Resources Regulations, The Water Resources (Wastewater) Discharge Regulations, Annual performance reports, etcetera. A detailed list of the documents reviewed is attached in Appendix I.

2.2.2 Interviews

The Audit team conducted interviews at the DWRM head offices, the zonal offices and at the permit holders' premises. DWRM management, DWRM field officers, National Water and Sewerage Corporation Management, zonal officers and permit holders were interviewed as detailed in Appendix II. The purpose of the interviews was to corroborate information obtained through document review as well as obtaining information and seeking clarification.

2.2.3 Field inspections

Field visits were carried out at twenty five(25) abstraction/ discharge permit holders' premises to confirm the information gathered through other data collection methods and to verify the activities implemented on site. Inspection of the permit holders' premises was carried out in order to ascertain, verify and corroborate the following:

- The availability of water measuring equipment for abstraction, volume of abstraction and frequency of measurement.
- The availability of wastewater/ effluent treatment plants and processes as described in the discharge permits, the volume of discharge, the quality of discharge (if tested) and frequency of measurement.
- The zonal offices were visited in order to ascertain, verify and corroborate the following data:
- The availability of functional equipment for the monitoring and assessment of water resources.
- The state of the equipment at gauging stations.
- The quality of data kept and the frequency of data collection/ update.

A detailed list of the sites visited is attached in Appendix III.

In order to address the audit questions, the following section details the methodology employed:

(i) To what extent has DWRM put in place the necessary regulatory framework for abstraction and discharge of water activities?

In order to assess whether the regulation of abstraction of water and discharge of waste water is adequately planned by DWRM, the audit reviewed the legal framework, policies, guidelines and work plans prepared over the audit period .These were assessed for adequacy in achieving the planned objectives through comparison of work plans with the requirements in the regulations and guidelines. Audit also reviewed the monitoring and enforcement framework employed by DWRM in executing their role.

(ii) Does DWRM adequately assess and issue permits to permit applicants?

The process of permit assessment and issuance by DWRM was reviewed for the sampled clients' files to establish whether DWRM adheres to stated guidelines. The audit also reviewed the comprehensiveness and timeliness of the assessment process.

(iii) To what extent has DWRM monitored permit holders?

Monitoring of permit holders was assessed through review of annual work plans, annual performance reports and monitoring reports on clients' files. Through interviews of sampled permit holders, the frequency of monitoring by DWRM was assessed at the clients' premises.

(iv) To what extent have the permit holders complied with the abstraction and discharge permit conditions?

In order to assess compliance to permit conditions by the permit holders, audit reviewed the clients' files to assess compliance to self-monitoring reporting and also compliance levels to stated conditions in their permits. Site visits were carried out at the permit holders' premises to verify the activities carried out that require water or result into discharge of effluent. The reported facilities like measuring devices for water and discharge volumes and the existence of effluent treatment plants/ processes were verified for existence during the field inspections.

CHAPTER THREE

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CHAPTER THREE

SYSTEMS AND PROCESS DESCRIPTION

3.1 ROLES AND RESPONSIBILITIES OF KEY PLAYERS

The Water Policy Committee

The Water Policy Committee (WPC) was established under section 9 of the Water Act 2000 (Water Statute 1995) and the composition and role are spelt out in the law. It consists of the Permanent Secretary MoWE as the chairperson, the Executive Director NEMA ,the Director responsible for irrigation, the Director responsible for animal industry and fisheries, the Commissioner responsible for industry, the Commissioner responsible for hydropower, one District Council Chairperson, one Chief Administrative Officer, the Managing Director NWSC, two persons having special qualifications or experience relevant to the functions of the Water Policy Committee and the Director Water Development. The roles of the WPC with regards to water resources management include:

(i) Assisting the Minister of Water and Environment in the coordination of hydrological and hydrogeological investigations;

(ii) Coordinating the preparation, implementation and amendment of the water action plan and to recommend the water action plan to the Minister;

(iii) Advising the Minister in charge of water resources on issues of policy relevant to the investigation, use, control, protection, management or administration of water;

(iv) Reviewing the law relating to water and advise the Minister on any amendments that may be required for the improvement or better administration of that law; and

(v) Advising the responsible Minister, on any dispute between agencies involved in water management that may be referred to it.

Ministry of Water and Environment (MoWE)

With regard to water resources, MoWE is responsible for setting national policies and standards, managing and regulating water resource and determining priorities for water development and management. It also monitors and evaluates sector development programmes to keep track of their performance, efficiency and effectiveness in service delivery.

Directorate of Water Development

According to the Water Act, the Director, Directorate of Water Development (DWD) is responsible for issuing abstraction and discharge permits and setting conditions within the permits that should be adhered to. However, with the creation of the Directorate of Water Resources Management (DWRM) out of the Directorate of Water Development the functions of licensing water abstraction and waste water discharge fall under the mandate of DWRM

and should ideally have been performed by the Director, DWRM. However, since the Water Act is still undergoing review and update the Director, DWD only signs the Water Permits but actual work related to assessment of abstraction and discharge permits applications and monitoring compliance to permit conditions is done by the Directorate of Water Resources Management. In this regard the Directorate of Water Resources Management is also the secretariat of the Water Policy Committee.

The Directorate of Water Resources Management (DWRM)

The Directorate of Water Resources Management (DWRM) is one of the three directorates within the Ministry of Water and Environment. DWRM is responsible for implementing the provisions of the Water Act related to regulating water abstraction and discharge of waste water into the environment. It does this through water use allocation (abstraction and waste water discharge), water service regulation (drilling, construction, dam safety, easement), compliance monitoring and enforcement of water laws, review of Environmental Impacts Assessment reports related to water and awareness raising and information dissemination. The DWRM comprises 3 departments and 6 divisions, activities of the relevant department are summarised below;

i. Department of Water Resources Monitoring and Assessment

   This is a department under the DWRM responsible for monitoring and assessment of the quantity of all water resources at national and trans-boundary levels. Under this department are two divisions, namely (a) monitoring and assessment division which is responsible for hydrology, hydrogeology and data and information management, and (b) transboundary water resource management division which is responsible for regional and international coordination.

ii. Department of Water Quality Management

   The Department is responsible for the generation of data and information, provision of technical advice on the management of the quality of the country's water resources. This is achieved through the implementation of the National Water Quality Management Strategy and in close collaboration with stakeholders. The Department operates a National Water Quality Monitoring Network of 119 Stations, a state of the art Water Quality Reference Laboratories, Regional Water Quality Laboratories and a National Water Quality Database. The department provides analytical back-up support to NEMA, Water Resources Planning and Regulation Department and laboratory services at a cost to the private sector, NGOs, Local Governments and public.

iii. Department of Water Resources Planning and Regulation

   This is a department under the DWRM that ensures that policies and legislation for the sound water use planning and regulation are developed and implemented. Under this department are two divisions, namely: (a) Water Use Planning and Allocation(WPA) division which responsible for water use planning, reservoir regulation and permit administration, and (b) Compliance and Enforcement division, which is responsible for compliance and enforcement, including evaluation of Environmental Impact Assessments (EIAs), and provides secretariat services for the water policy committee.

National Environment Management Authority

The National Environment Management Authority (NEMA) is a semi-autonomous government agency charged with ensuring that the environment is utilized in a sustainable manner. NEMA liaises with DWRM during the review of Environmental Impact Assessment reports submitted by various developers of water resources related projects and programs.

National Water and Sewerage Corporation

The National Water and Sewerage Corporation (NWSC) is a public utility company owned by the Government of Uganda. NWSC is responsible for the provision of water and sewerage services to the larger urban centres in Uganda. Where permit applicant wishes to abstract water in areas served by the NWSC, they need to obtain a "No Objection" from the NWSC before an abstraction permit is issued. NWSC has representation on the water policy committee

District Water and Environment Offices

The District Water Offices are responsible for the development and management of water resources within their Districts. With the deconcentration of water resources management to Water Management Zones and catchments, the District Water and Environment Offices are actively involved in water resources management and interface with DWRM through the respective Water Management Zones.

General Public/Permit holders

The general public/permit holders are the abstractors/dischargers of water into the environment. Their roles include;

(i) To apply for water abstraction and wastewater discharge permits

(ii) To adhere to the conditions attached to issued permits

(iii) To carry out self-monitoring activities such as recording daily volumes of water abstracted or discharged.

3.2 PROCESS DESCRIPTION

1. Water use planning

Water use planning involves establishing water resources availability, quantification of water demand, and developing and implementing appropriate water allocation tools to ensure equitable water use for all activities.The process of water use planning involves the mapping of permitted and non-permitted water users and wastewater dischargers for purposes of estimating current water use and future water use demand by catchment and basin systems, as well as pollution loads. From 2014 the DWRM has started the mapping of water users and waste water dischargers in Victoria WMZ and Albert WMZs. the activity of Mapping of water users and waste water dischargers involves the capture of data from water users grouped into different zones, the data is then processed and stored in the database. Data collected includes who is using water or discharging wastewater, where and how much, and whether they have permits or not. The purpose of this activity is that the information captured indicates the actual water usage requirement which when compared to the available water resource facilitates water use planning. In addition, the information helps in identifying those using water or discharge waste water without permits and who need to be brought into compliance with the law.

2. Regulation of the use of water resources

Regulation of the use of water is carried out through issuance of water use permits and monitoring compliance to the conditions in the permits as detailed in the following sections.

a) Permits Administration

Permits Administration is performed by water use planning and allocation division. Permits Administration involves processing of applications for water permits, permits printing, storage of water permits data in a hard copy registry and

in an electronic database. Data from the field collected through compliance monitoring, and that from drillers and self-regulated water abstractors and waste water dischargers is captured and stored in the permits database. Details of permit application, assessment and issuance process is detailed below:

Permit Application

The company/individual/firm in need of an abstraction, discharge, drilling or construction permit applies to the Director DWD for a water permit detailing the type of permit required, and the conditions under which they intend to undertake activities linked to water resources. The application is only reviewed after a permit application fee has been paid to Uganda Revenue Authority and a copy of the receipt provided to DWRM. The purpose of the application fee is to facilitate the permit assessment process.

Permit Application Assessment

On receipt, the permit application is assessed by officers of the water resources planning and regulation department as per the permit application guidelines to check whether it meets the minimum application requirements for that particular type of permit. An authorised officer then visits the location where the planned permit applicants intends to discharge/abstract water to confirm the information presented in the permit application. For water abstraction permits, assessment makes reference to the database maintained by the water resources monitoring and assessment department to check whether there is available water for all users. Preference is given to water for domestic use as per the Constitution of Republic of Uganda and the National Water Policy before all other uses.

For a waste discharge permit, the client's premises are visited to ascertain whether the effluent treatment system in place meets the National Effluent Standards before discharge of wastewater. The assessing officer collects samples of wastewater for testing at the laboratory to check for consistency with the supplied results in the permit application. In case the applicant is required to conduct an Environmental Impact Assessment (EIA), the DWRM crosschecks to ensure that the EIA has been reviewed and approved by NEMA.

Permit Issuance

A permit is issued by the Director DWD within 90 days of receipt of a fully constituted permit application once the relevant permit application assessment is conducted and the permit applicant meets the requirements. The issued permits have conditions that the permit holder shall adhere to during discharge, abstraction or construction activities. Water Resources Regulations 1998 and Wastewater discharge Regulations 1998 require that an Annual fee is paid by permit holders for the use of water resources and discharge of wastewater. In addition, the wastewater discharge permit holders are required to pay wastewater discharge fees. The wastewater discharge fees are fixed with regard to the volume, characteristics and components of waste to be discharged; the principle that the true and total costs of environmental pollution should be borne by the polluter.

Permit Monitoring

The permits are issued with conditions which the permit holders are obliged to adhere to. Monitoring is carried out by both the department of water

resources planning and regulation and the permit holders through compliance monitoring and self-monitoring respectively.

iv. Self- Monitoring for water abstraction includes the installation of measurement devices to facilitate the recording of daily abstraction volumes and water levels. For wastewater discharge, the permit holders are required to record daily discharge volumes and weekly wastewater quality tests. The self-monitoring information is submitted on quarterly basis to DWRM.

v. Compliance monitoring of permits is carried out by the department of water resources planning and regulation to check for adherence by permit holders to the conditions in their permits. This is conducted through monthly and quarterly inspections to the permit holders' premises. For high risk permit holders, monitoring is done on the basis of "as and when".

The DWRM carries out awareness activities on the importance of water resources management in order to improve regulation of use and pollution of water resources. A number of activities are implemented as follows:

1. Workshops targeting permit holders, central and local government officials, Nongovernmental organisations, private organisations etc.
2. Radio/TV/Newspaper adverts in different languages to capture the different ethnic groups of Uganda.
3. Newspaper adverts and supplements targeting the literate population
4. Brochures and leaflets availed to the general public, permit holders and key institutions.
5. Environmental stickers to contain catching words.

b) Reservoir Regulation and Dam safety

The reservoir regulation and dam safety function aims at improving regulation and management procedures of small and large hydraulic works, water reservoirs and man-made lakes through licensing, safety monitoring and inspection, and reservoir lake management and maintenance procedures and strategies.

For the water abstractions for hydropower generation, the hydropower stations submit planned monthly discharges to DWRM. These are then assessed and depending on the monthly recorded water levels the proposed water discharges are approved or revised. Compliance monitoring of hydropower generation plans are handled through a multi-sectoral approach where the stake holders jointly carry out the monitoring. The stake holders involved in the multi sectoral monitoring exercise include representative of DWRM, NEMA, UETCL, Ministry of Tourism, Wildlife and Antiquities, UWA, NFA, MAAIF, Ministry of Energy and Mineral Development, Ministry of Labour, Gender and Social Development Department of Occupational Health and Safety, District Local Governments, and Academia ,the multi sectoral monitoring takes place once every quarter.

4

CHAPTER FOUR

CHAPTER FOUR

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents findings, conclusions and recommendations on regulation of the abstraction of water and discharge of wastewater by DWRM.

4.1 REGULATION OF ABSTRACTION AND DISCHARGE BY DWRM

4.1.1 Waste discharge fees

According to Section 18(2) of the Water (Waste Discharge) Regulations, 1998, annual waste discharge fees should be fixed having regard to: –

a) the volume, characteristics and components of waste to be discharged; the principle that the true and total costs of environmental pollution should be borne by the polluter; and
b) The principles set out in Form B of the Fourth Schedule to these regulations; which specifies the fees to be charged for permit processing, issuance and monitoring, and annual waste discharge fees.

These fees were instituted as an economic instrument to deter pollution of the environment through discharge of effluent. However, according to Form B of the Fourth schedule, the waste discharge fees are only based on the Biochemical Oxygen Demand (BOD) load in the effluent. Further, from interviews with officials from DWRM and a review of sampled wastewater discharge permits, it was noted that waste discharge fees are based only on the water quality parameter of BOD as indicated in the schedule. The calculations do not take into consideration the other characteristics and components of the wastewater, such, as heavy metals, oil effluent and other chemicals which are toxic and equally expensive to treat. Interviews with officials from National Water and Sewerage Corporation revealed that the BOD measure is only applicable in determination of pollutants in municipal waste and; for industrial waste .Chemical Oxygen Demand (COD) is the more preferred measure for pollutants than BOD because industrial processes require the use of chemicals which end up in high concentrations in the effluent discharged.

The charging of fees based only on the BOD characteristics was attributed to the fact that at the time of approving the waste discharge fees, municipal waste was the most prevalent waste discharged and the DWRM did not have the capacity in terms of laboratory services to determine the other parameters in the waste discharged, for instance, heavy metal. In addition,

the level of industrialisation in the country was low and therefore not much volume of heavy metals expected. However, the DWRM appreciated the fact that the industrialisation has increased and introduced new toxic pollutants such as fertilisers, pesticides and oil; all of which need to be catered for by revision of the parameters for charging for wastewater discharge.

Section 10(d) of the Water Act (1997) mandates the Water Policy committee (WPC) to review the wastewater discharge fees as required. However, review of the rates currently being used indicated that wastewater discharge fees were computed to correspond to 1.3% of the operation costs of treating wastes (based on 1994 operational costs of NWSC treatment work at Bugolobi); 20 years later, they have not been revised despite the fact that the cost of living (including price of inputs) has risen significantly since then. The current waste discharge fees are presented in Appendix IX .The WPC has not reviewed the wastewater discharge fees because they were pending the review of the National Water Policy and Water Act.

Management response

The existing national effluent standards are too stringent for certain parameters and hence their enforcement deters pollution of water resources. To ensure that this is realized a multi-sector approach to compliance and enforcement has been employed involving various entities such and NEMA, KCCA, UWA, NFA, NWSC, DEA etc. These agencies jointly monitor compliance and enforce various environmental laws and regulation in order to combat pollution.

With regard to the review of the wastewater discharge fees, this is being done as part of the review of the Water (Wastewater Discharge) Regulations 1998. Finalisation of this exercise is contingent on the completion and approval of the review/updating of the National Water Policy and the Water Act which is in advanced stages. In addition, the ongoing review of the National Environment Act has also considered various environmental regulations one of which is related to the national effluent standards. As part of this process a banding systems has been considered where fees will be charged based on the various parameters and not BOD as it is under the current regulations.

All these processes are highly participatory and adequate consultation of all key stakeholders in the fees setting process will continue to be considered to ensure adoptability and compliance.

It is expected that the final review and update of the National Water Policy, Water Act and relevant regulations and standards will be completed by the end of 2016.

Conclusion

Whereas the regulations require that the true and total costs of environmental pollution should be borne by the polluter; the waste discharge fees charged by DWRM do not adequately cater for the treatment costs of the polluted water due to the fact that they have not been revised since 1995 and also do not take into account all major contaminants in the wastewater This has resulted in charging fees that do not deter pollution of the water resources by the permit holders; and therefore not meeting the objective of ensuring that water resources are not polluted.

Recommendations

- The review of the wastewater discharge fees needs to be expedited. DWRM should ensure that the fees charged are in accordance to Section 18(2) of water (waste discharge) regulations 1998, and are deterrent to pollution and adequate to restore the polluted water bodies.
- In addition to BOD, other parameters impacting on pollution should be introduced in the assessment of the fees to be charged.
- The DWRM should also ensure that there is adequate consultation of all key stakeholders in the fees setting process to ensure adoptability and compliance.

4.1.2 Issuance of permits for abstraction of water and discharge of waste water

The MoWE clients' charter states that permits will be issued within 90 days from the date of receipt of the application. However, the review of clients' files revealed that the period for issuance of permits ranges from 30 days to more than 365 days. Delays were observed for 52.7% of the files reviewed as detailed in Appendix VII. The DWRM attributed the delays to the following factors:

- The timing of release of funds to facilitate application processing was not in synch with the time the applications are made.
- DWRM has staff shortages and therefore cannot carry out the activities on time; the structure of the water use planning department is only 35% filled, Appendix VIII refers. DWRM has resorted to enrollment of contract support staff to mitigate the effects of this staffing gap.
- Incomplete application forms submitted by the clients result in delays in application processing. Interviews held with the permit holders revealed that sometimes, the clients are ignorant about the applications requirements; which they attributed to inadequate support from the DWRM when preparing their application.
- Application of permits in gazetted areas, such as, areas operated by NWSC requires obtaining authorization from NWSC first, before permit assessment can commence.

The permit holders indicated that delays to receive permits hinders their operations, especially when they are required to have them to meet international standards for production or exportation e.g. the fish processing factories. This results in loss of tax revenue for the government when these firms fail to export their goods.

It was observed that whereas the clients' charter had been formulated stipulating that the Water Resources Planning and Regulation department should provide permits within 90 days from the date of receiving an application , there was no indication that this had been communicated to all the staff/ officers involved in the permit assessment process. In addition, there were no systematic measures in place to track the movement of applications through the application process over the 90 days period which would allow the directorate to identify the causes of delays.

Management response

It is true that there are cases where DWRM takes longer than the stated timelines to assess applications and issue permits for abstraction and discharge of water but this is sometimes beyond the control of DWRM. In some cases, the applicants submit applications that are incomplete and when they are followed up to provide the missing

information they take long to provide the required information thus affecting the processing of the applications. In other cases applicants submit applications without paying application fees and in such cases the process cannot continue without the permit applicant paying the fees. While the issue of timely release of operation funds for field visits is still a problem, the situation has improved with the creation of Water Management Zones (WMZs) which are located closer to the permit applicants and can easily follow up with permit applicants and undertake field assessments at relatively low costs compared to the previous practice (before July 2011) where all the staff were based in Entebbe and hence would require a lot of operation funds to undertake field visits. As a result of creation of WMZs the time taken to assess applications and issue permits for abstraction and discharge of water has greatly reduced.

The DWRM offers support to permit applicants in order to ensure that their applications include all the required information to hasten the process of assessment and subsequent issuance of permits. This is done through stakeholder's workshops where a session on how to complete permit application forms is included, through regular newspaper supplements where key steps of the permit application process are highlighted including key contacts where assistance can be sought, and through direct support where permit applicants visit DWRM offices. It is as a result of this increased support that the number of permits issued annually over the last 4 years has increased from an average of 100 to over 200 currently. With the creation of Water Management Zones which are closer to potential permit applicants DWRM staff now know the clients very well and work better with them to address issues of permit issuance and compliance.

The data in question monitored by the department is for either water usage or wastewater discharge quantity and quality which cannot be used as a basis for assessing, for instance, water availability at a given location of an abstraction point. Assessment looks at the overall resources in view of both potential and existing users and uses.
The ongoing mapping of water users and waste water dischargers by the Directorate is providing records of the potential and existing clients and the activities they are involved in so that they may be targeted for permit issuance and compliance monitoring. The data collected in this process and through regular compliance monitoring is feeding into the permit assessment process.

Conclusion

The DWRM takes longer than the stated timelines to assess applications and issue permits for abstraction and discharge of water, which results in non-regulated abstraction/ discharge of water which increases risks for pollution and unsustainable use of water resources.

Recommendation

- The establishment of Water management zones is a step in the right direction. Through this initiative, DWRM should continue offering support to permit applicants with the aim of ensuring that all applications are expedited within the timelines stipulated by

the MoWE charter. The DWRM should develop a know-your-client policy and maintain updated records of their clients' activities to enable quicker assessment of applications. Additionally, some of the parameters being monitored on regular basis can feed into the permit assessment process.

4.1.3 Designation of laboratories for water quality testing

Sections 82 and 83 of the National Environment Act 1995 require NEMA to designate analytical laboratories and reference laboratories; as well as analysts and reference analysts for purposes of ensuring quality and reliability of waste sample collection and laboratory results. In order for the results obtained from water quality laboratories to stand scrutiny, they need to upgrade to international standards and obtain accreditation. DWRM officials interviewed explained that the function of designating laboratories and analysts was delegated to DWRM by NEMA.

However, it was noted that DWRM had not designated laboratories from where testing of samples should be done, nor certified analysts to carry out these tests. From the interviews held with officials of DWRM, it was indicated that the delayed designation of laboratories was due to the lack of capacity by DWRM to monitor the designated laboratories and DWRM had set up regional laboratories that would help to monitor the designated laboratories.

In addition, it was noted that no laboratory in Uganda had attained international accreditation. Laboratory accreditation is done by the International Standards Organisation (ISO). For a laboratory to be accredited, there are stringent requirements in terms of equipment, reagents (types and volumes in stock), testing procedures, quality of infrastructure, clean power and well trained staff.

Since there are no accredited laboratories in Uganda, laboratory results conducted in Uganda may not be internationally accepted. This creates a challenge of DWRM not being able to successfully prosecute cases of pollution arising out of lack of acceptable evidence.

The Commissioner, Water Resources Planning and Regulation attributed the delayed accreditation to inadequate resources in terms of funds and manpower. In addition, he stated that DWRM also faces a challenge of maintaining the accredited status once it is achieved due to lack of required operational funds which he estimated at UGX.1,072,659,703 per annum.However, no evidence was availed to indicate that this activity had been prioritised, planned, costed and funds solicited.

Management response

DWRM has a designated Reference Laboratory (National Water Quality Reference Laboratory) in Entebbe under its mandate. Competent and well trained analysts, equipment and facilities to ensure the accuracy, reliability and timeliness of laboratory sample collection, analysis and reporting of test results are in place. The Laboratory implements and is compliant with International Standard for calibration and testing laboratories (ISO 17025). The laboratory applies validated test protocols; participates in inter-laboratory comparison programs (See certificate) and implements internal quality control procedures.

The National Water Quality Reference Laboratory has continued to be upgraded and equipped with state of the art equipment. It is able to test a wide range of parameters, including heavy metal. The National Water Quality Reference Laboratory, however, is not accredited but is pursuing accreditation with South African National Accreditation Services (SANAS). Three key Laboratory staff have been trained by SANAS in ISO 17045 and Quality System Auditing.

A draft National Laboratory Policy for water and environment quality services and strategic action plan is in place to strengthen the current policy framework and ensure that the water and environment quality services are regulated effectively and efficiently. However, not all laboratories shall require accreditation but performance of laboratories shall be regulated through participation in inter-laboratory comparison schemes.

Accreditation provides a higher level (International) of assurance to those using the laboratory that its testing is reliable and accurate.

Conclusion

Whereas DWRM has established a national reference laboratory at Entebbe, it has not designated other laboratories to carry out water testing for permit holders as required by the regulations. Lack of international accreditation of its laboratory also means that tests undertaken by DWRM may lack international credibility.

Recommendations

- The DWRM should designate laboratories where permit holders can test the quality of their discharge and regularly monitor these laboratories to ensure that they provide credible results.
- The DWRM should ensure that it expedites the process of getting accredited by ISO to be able to obtain credible results for purposes of prosecution of polluters. As a stop gap measure, DWRM should explore the possibility of using accredited laboratories in the region and the suspected polluters meet the costs of such tests.

4.2 COMPLIANCE WITH PERMIT CONDITIONS

4.2.1 Non-compliance to permit conditions by permit holders

All individual permits issued by DWRM have conditions that the permit holder is required to observe, such conditions include: the volumes of abstraction/ discharge, effluent quality, volume and quality monitoring mechanisms. The performance indicators for compliance with permit conditions are compliance to permitted water abstraction volumes and compliance with effluent quality for water abstraction and wastewater discharge respectively.

It was noted through review of permit holders' files and inspection of the permit holders, premises that some permit holders do not adhere to the permit conditions, such as, installing facilities for measuring and recording of water levels and water abstraction volumes, submitting water use data to DWRM on a quarterly basis, payment of annual fees and water quality test results for water abstraction.

The permit holders for waste water discharge equally do not comply with

the permit conditions such as measuring and recording waste water discharges, installing waste water treatment facilities, payment of annual fees and submission of waste water discharge data and quality results on quarterly basis.

The compliance levels for 2012/ 2013 (Water Sector Performance Report 12/13) stood at 60% of all permit holders as illustrated in Table 3 below. This was also confirmed through review of clients' files that some permit holders were exceeding their permitted abstraction volumes and not paying annual fees; while others had not installed meters to measure abstraction or discharge volumes.

Table 3: Compliance to permit conditions

Type of Permit	Permit Condition	No. of Permits	Percentage Compliance (%)	No. of Permits	Percentage Compliance (%)	No. of Permits	Percentage Compliance (%)
		2011/2012		2012/2013		2013/2014	
Surface Water	Abstraction within permitted amount	145	60	169	65	181	68
Groundwater	Abstraction within permitted amount	295	60	310	68	360	68
Wastewater discharge	Effluent discharge	94	49	101	48	131	50
Total		**534**	**Avg: 58**	**580**	**Avg: 60**	**672**	**Avg: 64**

Source; Water and Environment Sector Performance Report 2013

From the table above, it can be seen that on average, the compliance levels have slightly improved by 6% from FY 2011/2012 to 2013/2014. It is also noted that the lowest compliance levels are for wastewater discharge.

Through interviews with permit holders, the non-compliance with discharge quality standards was attributed to the following factors:

- The limits for the discharge parameters set by the DWRM are unrealistic and do not take into account the production processes of the different industries; it is, therefore, not possible to meet them. For example, in the tanning industry some of chemicals introduced in the processes are difficult to eliminate there by making it very expensive to achieve the specified standards
- Lack of compliance support from the DWRM. The permit holders were of the view that DWRM has information on the best techniques and processes for proper treatment of the industrial effluent. They revealed that the DWRM only informs them about their non-compliance but they do not provide any technical assistance on how best the specified discharge standards can be met even though DWRM does plan and budgets for awareness activities on monitoring requirements and compliance assistance to ensure efficient use of water sources.

- NWSC, the biggest discharger of effluent after the treatment of sewage was found not to be complying with the effluent quality standards. Through interviews with NWSC officers it was noted that the current effluent standards do not take into consideration the sewage treatment technologies used in the country. The treatment by NWSC mostly involves the use of filtration and lagoons to allow natural treatment using UV rays from the sun. This treatment method was previously sufficient, where any remaining BOD from filtration was eliminated through tertiary filtration by the swamps. However, the swamps have been degraded and therefore effluent goes directly to the water bodies. Further, the infrastructure used by NWSC is over 70 years old and is therefore not very efficient and up-to-date in the treatment of sewage.

According to the Water Sector Performance Report 2013, in depth assessment of the effluent quality in the receiving waters indicates that there is generally low compliance with effluent standards with respect to Total Suspended Solids (TSS), Total Nitrogen (TN), Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). Possible reasons are:

i) Poor maintenance of the treatment facilities, field inspections further revealed that some permit holders have too old infrastructure for effluent treatment while others had not de-sludged the settlement tanks for long periods rendering them useless;

ii) lack of trained personnel to operate these treatment plants; and

iii) Inefficiencies in the treatment of the wastewater loads partly due to under□designed treatment plants hence discharging effluents which do not meet the National Standards for discharge of wastewater into the environment.

Additionally, many of the permit holders do not measure their abstraction or discharge volumes; making it difficult to assess their water use or discharge compared to their permitted volumes. Of the groundwater permit holders visited/ reviewed, 84% of them did not have meters to record their abstraction volumes, and even those that had meters did not submit their abstraction volumes to DWRM as specified in the permit.
Non-compliance with the permit conditions results in over abstraction of water and discharge of wastewater that does not meet the National effluent standards resulting in pollution.

Management response

DWRM has continued to intensify monitoring and enforcement compliance by permit holders with the permit conditions with the introduction of Water Management Zone which can now easily reach areas of pollution and water overexploitation, since they are nearer to where action is taking place. In addition, a number of measures are being taken by DWRM to address pollution and sustainable water use. These include:

1. Working together with other agencies through a multi-sectoral monitoring technical team on oil and gas activities. Through this team, a number of environmental issues in the Albertine Graben are being followed up in a bid to control pollution, ensure sustainable use of the water resources and increase the coordination amongst government agencies. This kind of collaboration is being extended to other parts of the country.

2. DWRM, in collaboration with other relevant organizations / institutions (NEMA), Directorate of Environmental Affairs (DEA), NWSC, Kampala Capital City Authority (KCCA), Uganda Cleaner Production Centre (UCPC) and Uganda Manufacturers Association (UMA), has embarked on addressing and controlling pollution of the environment in the greater Kampala area. This has been done through establishment of a Pollution Task Force with the aim of increasing coordination amongst government agencies in regulating industrial pollution. This is done through joint inspections, sensitization and awareness campaigns, enforcement and public-private sector dialogue. This also ensures coordinated action through creation of synergy and establishing regular dialogue with the private sector on issues of pollution control. As part of this process key measures to control pollution such as restoration of wetlands to aid further purification of wastewater before it reaches the water bodies are identified and resources to implemented these measures sourced collaboratively
3. DWRM, in collaboration with NEMA and other agencies has continued to sensitize permit holders about best practice for effluent treatment and training or guiding them in the most efficient treatment processes. In addition, there has been lobbying for tax incentives on importation of waste treatment facility to ensure that waste permit holders install proper effluent treatment facilities that can ably treat effluent to the required national discharge standards.
4. DWRM has prioritised enforcement over the last one year and more stringent actions on non-compliant permit holders are being taken. As a result there has been a big improvement in compliance to water laws, regulation and permit conditions but a lot more needs to be done through heavy penalties and legal action. To strengthen this area, DWRM has, over the last few years, been lobbying for increased funding through a number of ways one of which is to retain permit fees at source to facilitate faster compliance monitoring and enforcement of permits conditions through various measures. The limited availability of operation funds and non-access to permit fees greatly hampers timely action with regard to compliance monitoring and enforcement.
5. Working together with the multi-sectoral monitoring technical committee on a number of hydropower schemes, such as, Karuma and Isimba. Collaboration has also been initiated with the Electricity Regulatory Authority to fasten permit issuance process and improving compliance to various permit conditions by developers.

Recommendations

- DWRM should further strengthen compliance enforcement by taking more stringent actions on non-compliant permit holders such as heavy penalties and legal action.
- DWRM should continue sensitizing waste permit holders about best practice for effluent treatment and installations of proper effluent treatment facilities that can ably treat effluent to the required national discharge standards. For instance NWSC should consider upgrading to a more modern efficient effluent treatment technologies.

4.2.2 Monitoring by the DWRM

Whereas the DWRM is supposed to plan for the monitoring of permit holders every year, it was noted, through the review of fifty five clients' files that forty-four clients (51%) had not been monitored during the period under review, as there was no evidence on file to that effect. The officers at DWRM attributed the limited monitoring to lack of funds; however, the review of the Joint Water and Sanitation Sector Program Support (JWSSP) activity budget reports for the financial years 2011 to 2014 revealed that over 90% of the budgeted funds had been disbursed for compliance monitoring and enforcement as detailed in table 4 below;

Table 4: Compliance Monitoring and Enforcement Funding by JWSSP

Financial Year	Budget (UGX)	Actual (UGX)	% Received
2011/12	110,000,000	100,338,100	91.22
2012/13	114,750,000	113,773,000	99.15
2013/14	120,000,000	131,100,000	109.25

Source; JWSSP Activity Budget Reports for FYs 2011-2014

Therefore, the lack of funds for monitoring, as indicated by DWRM, was not substantiated. Further, the review of the Ministerial Policy Statements of FY's 2011-2014 shows that DWRM met or exceeded their planned monitoring targets as indicated in the table below:

Table 5: Compliance Monitoring Performance by DWRM

Financial Year	Planned Targets	Achieved Targets	% Achieved
2011/12	150	265	176.6
2012/13	180	287	159.4
2013/14	300	300	100

Source; Ministerial Policy Statements for FYs 2011-2014

However, review of Sector Performance Reports and DWRM annual work plans revealed inconsistencies in the planned and achieved target numbers as indicated in tables 6 and 7 below:

Table 6: Planned Compliance Monitoring Targets

Financial Year	Planned as per MPS	Planned as per DWRM annual Work Plans
2011/12	150	392
2012/13	180	406
2013/14	300	359

Source; Ministerial Policy Statements and DWRM work plans for FYs 2011-2014

Table 7: Achieved Compliance Monitoring Targets

Financial Year	Achieved as per MPS	Achieved as per SPR
2011/12	265	287
2012/13	287	368
2013/14	300	672

Source; Ministerial Policy Statements and SPRs for FYs 2011-2014

As a result, the audit team could not establish the number of permit holders DWRM had planned to monitor and the actual numbers that were monitored for compliance during the FY's under review. This problem was further amplified by the absence of an annual consolidated monitoring report showing the individual permit holders planned for monitoring and the results of the monitoring.

Furthermore, the audit team could not establish how the monitoring function was conducted as there were no documented monitoring guidelines/manuals detailing the monitoring process. Such guidelines would include a risk assessment guiding on parameters to be followed on the selection of permit holders to be monitored, check list indicating parameters to be tested for each category of permit holder, monitoring report formats, follow up and action points. Interviews held with DWRM officers revealed that the selection of permit holders for monitoring was influenced by low compliance levels and the receipt of complaints from the public. But no evidence was availed to support this practice.

Inadequate monitoring increases chances of non-compliance, as illegal practices are left unchecked for long periods of time. This also makes it difficult to assess the impact of DWRM's regulation activities as information is not regularly collected to make such an assessment. Lack of documented monitoring guidelines/manuals creates inconsistencies in the monitoring process and can in result inefficient allocation of monitoring resources.
The DWRM has a water quality monitoring department responsible for monitoring the quality of surface and groundwater. The impact of the regulation activities can only be determined from the trends in the levels of water quality and quantity. And monitoring efforts should be channeled to those areas that indicate poor quality of water in a given period to be able to investigate the sources of pollution.

Management response

DWRM has been carrying out its compliance monitoring role fairly well to ensure compliance with permit conditions as indicated in the continued annual increase on the number of permit holders monitored for compliance. However, documentation of compliance monitoring activities has not been well consolidated. It is for this reason that some performance figures reported in various documents such as Sector Performance Reports and DWRM annual work plans were noted to be different. Various permit holders are monitored for compliance and reports

are prepared for the particular permit holders monitored with key issues and recommended actions. Currently, compliance monitoring forms for each type of permit have been designed and are used to guide the compliance monitoring activities and the reporting is done for a specific permit holder rather than the consolidated for a number of permit holders. Thus, the shortfall has been on preparation of annual consolidated monitoring reports for all permit holders so as to track monitoring activities and all critical compliance issues for follow up and enforcement. This has also limited determination of the overall trends in the levels of water quality and quantity which would guide further monitoring efforts especially in those areas that show poor quality of water or overexploitation of water resources.

It is also true that, previously, DWRM used to select permit holders for compliance monitoring randomly and this would sometimes lead to non-prioritization of firms that require immediate follow-up or some firms being visited too often while others would not be visited at all. This issue was noted and became also a concern to staff and as a result it was decided that compliance monitoring be undertaken following sub-catchments in each WMZ to ensure that the selection is systematic and that all sub-catchments are covered every year. This has greatly improved not only the number of permit holders monitored for compliance but also has ensured that there is no duplication of monitoring efforts by staff.

Thus, the recommendation that DWRM should develop documented monitoring guidelines/ manuals to guide the monitoring process so that monitoring resources are efficiently utilized during monitoring is well appreciated. Similarly the recommended Monitoring System will help to track monitoring activities and identify critical compliance issues for follow up action and enforcement and be able to provide accurate information about monitoring performance. The proposed monitoring guidelines/manuals as well as the mmonitoring system will provide a holistic and accurate picture of compliance to permit conditions.

Conclusion

The DWRM has not effectively carried out its monitoring role to ensure compliance with permit conditions as only 50% of the sampled files had been monitored. Monitoring activities are undertaken without documented monitoring guidelines and there is a lack clear criteria of how the permit holders to be monitored are selected. This has resulted in non-prioritization of those firms that require immediate follow-up.

Recommendations

- The DWRM should develop documented monitoring guidelines/manuals to guide the monitoring process so that monitoring resources are efficiently utilized during monitoring.
- DWRM should strengthen the monitoring function by setting up a proper system for tracking and follow up the monitoring activities t. Such a system should be able to provide accurate information and reports about the performance of the monitoring function. DWRM should ensure that a consolidated report is prepared periodically on its monitoring activities.

OVERALL CONCLUSION

Overall DWRM has made good strides to ensure that the abstraction and discharge of waste water is properly regulated in the country through issuance of permits and undertaking monitoring activities. However, this regulatory role is still hampered by weaknesses in the legal framework that do not go far enough to deter water pollution by permit holders and weaknesses in the monitoring function. DWRM should make deliberate efforts to expedite the review of the legal framework, improve the water testing and monitoring activities in order to enhance its regulatory role and thus ensure that the risks to water pollution are mitigated.

APPENDICES

APPENDIX I: DOCUMENTS REVIEWED

Sn	Document	Purpose
1	The Water Act (1997)	To establish and understand the legal framework for the management of water resources by DWRM
2	Water Resources Regulations (1998)	To establish and understand the regulations that govern the abstraction of water from water resources
3	Waste Discharge Regulations (1998)	To establish and understand the regulations that govern the discharge of wastewater to the environment
4	The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations 1999	To determine the required standards for effluent discharge for the different parameters
5	The water policy 1999	To establish and understand the Country's policy on water resources management
6	Guidelines and Procedures for Processing Abstraction Permits under the Water Resources Regulations (1998)	To establish the guidelines and procedures for processing of a bstraction permits
7	Enforcement and compliance monitoring Strategy for Water Resources	To establish and understand the enforcement and compliance monitoring requirements for DWRM
8	Water and Environment Sector Performance Report 2013	To establish the performance of DWRM in achieving their objectives and to also identify the challenges encountered
9	Annual Work plan July 2013 to June 2014	To identify activities planned for the FY2013/14

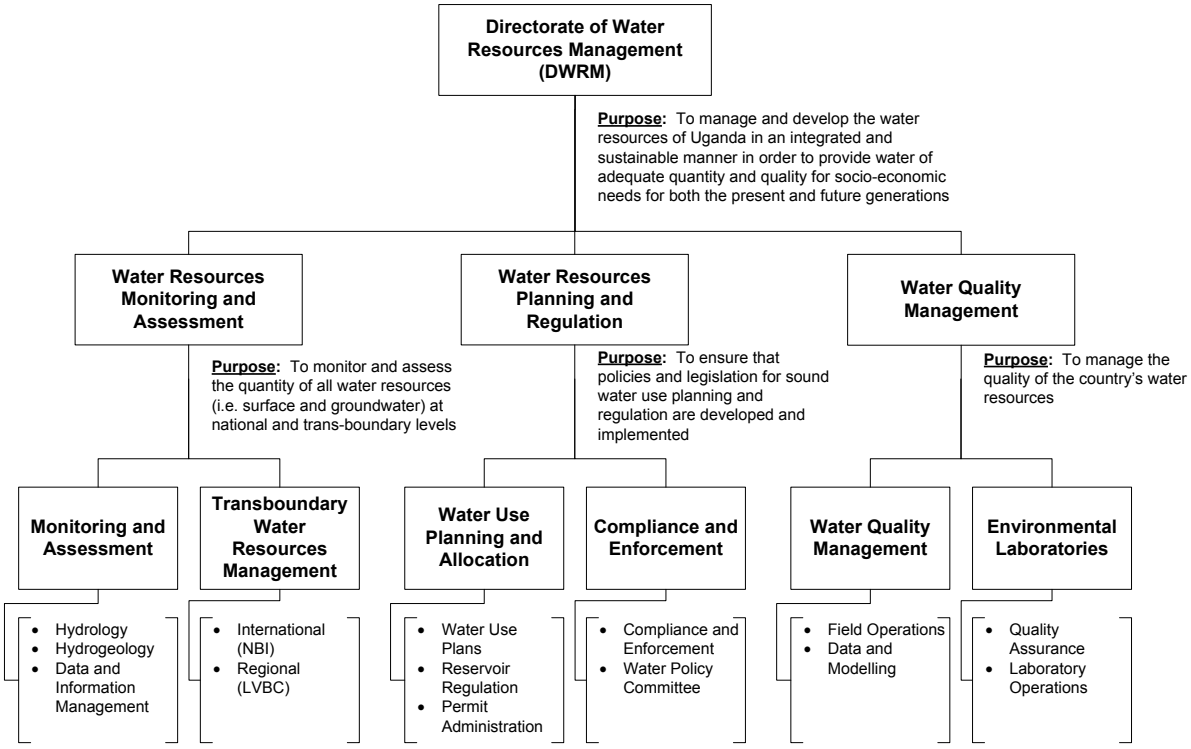
APPENDIX II: LIST OF PEOPLE INTERVIEWED

S/n	Designation	Purpose: to understand
1	Director Water Resources Development	the actives undertaken in the Directorate and identify challenges
2	Commissioner Water Resources Planning and Regulation	the functions of Water Resources planning and regulation and identify challenges
3	Commissioner Water Quality Management	the functions, activities undertaken in the department of Water quality management and also identify challenges
4	Commissioner Water Resources Monitoring and Assessment	the functions of water resources monitoring and assessment and identify challenges
5	Commissioner Transboundary Water Resources Management	the functions of the transboundary water resources management and identify challenges
6	Acting Principal Water officer	the functions of Water Resources planning and regulation and identify challenges
7	Senior Water Quality Analyst	the functions, activities undertaken in the department of Water quality management and also identify challenges
8	Deputy Managing Director Technical service. National Water and Sewerage Corporation	Treatment of water abstracted and water discharged and the associated costs

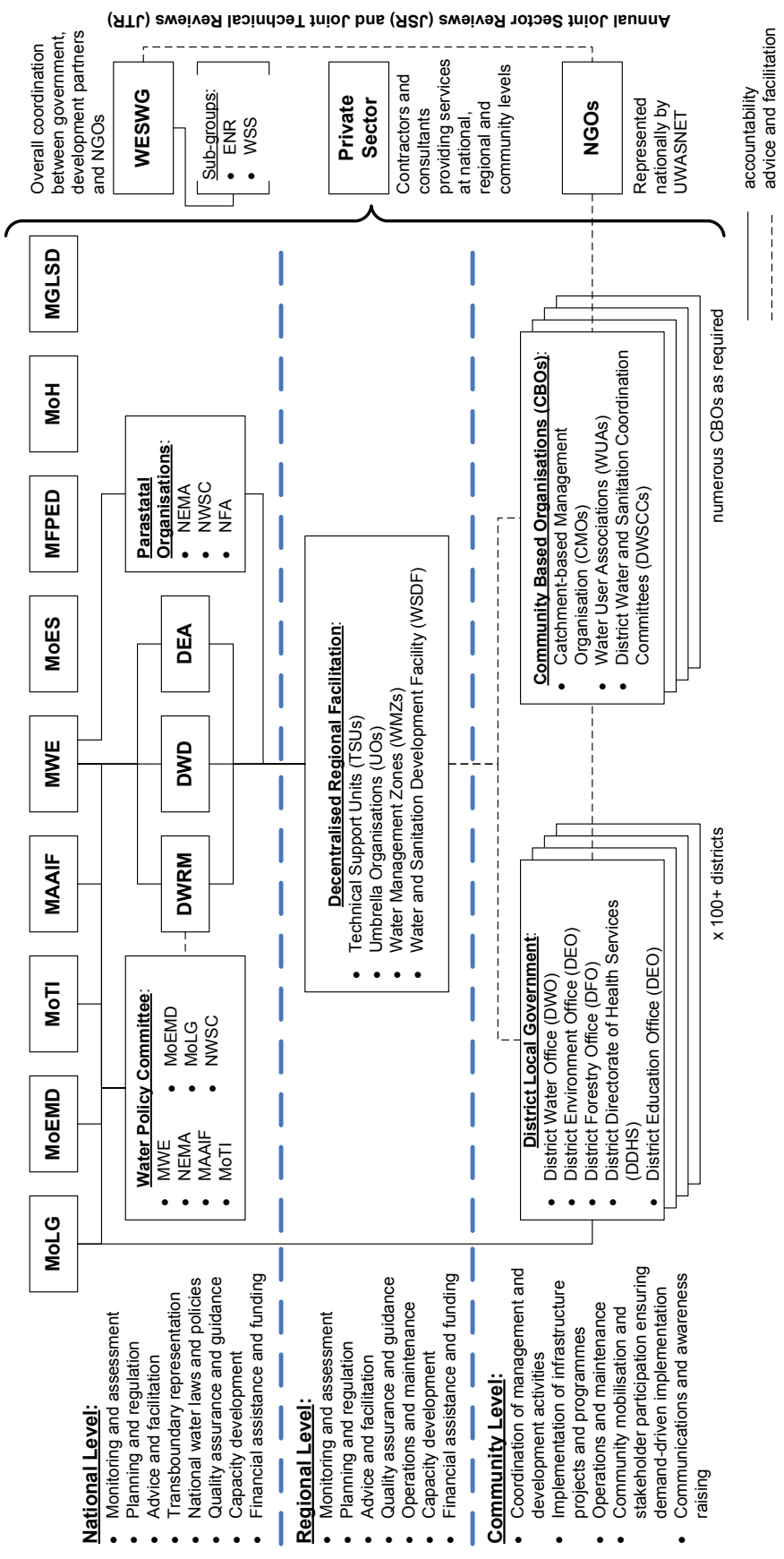
APPENDIX III: LIST OF ENTITIES VISITED

S/n	Permit Holder	Permit Type	Date of Visit	Purpose of Visit
1	Kinyara Sugar	Waste Discharge	29/05/2015	Inspect facility's waste water discharge infrastructure and conduct interviews with relevant authority in charge of waste water discharge
2	Kiko Tea Estate	Waste Discharge	28/05/2015	
3	Tian Tang Group	Waste Discharge	20/05/2015	
4	Abacus	Waste Discharge	20/05/2015	
5	Uganda Breweries Ltd	Waste Discharge	21/05/2015	
6	Sadolin Paints	Waste Discharge	21/05/2015	
7	Uganda Leather Industries	Waste Discharge	26/05/2015	
8	Kakira Sugar Ltd	Waste Discharge	26/05/2015	
9	Fish ways Uganda Ltd	Waste Discharge	19/05/2015	
10	Century Bottling Company	Waste Discharge	20/05/2015	
11	Rosebud Flowers	Waste Discharge	19/05/2015	
12	Kinyara Sugar	Surface Water	29/05/2015	Inspect facility's Surface water abstraction infrastructure and conduct interviews with relevant authority in charge of surface water abstraction
13	Tian Tang Group	Surface Water	20/05/2015	
14	Abacus	Surface Water	20/05/2015	
15	Uganda Breweries Ltd	Surface Water	21/05/2015	
16	Kakira Sugar Ltd	Surface Water	26/05/2015	
17	Fishways Uganda Ltd	Surface Water	19/05/2015	
18	Rosebud Flowers	Surface Water	19/05/2015	
19	Kiko Tea Estate	Ground Water	28/05/2015	Inspect facility's ground water abstraction infrastructure and conduct interviews with relevant authority in charge of ground water abstraction
20	Century Bottling Company	Ground Water	20/05/2015	
21	Parambot Distilleries	Ground Water Abstraction	21/05/2015	

APPENDIX IV: DWRM - ORGANISATIONAL STRUCTURE



APPENDIX V: LINKAGES OF THE KEY PLAYERS



- DEA: Directorate of Environment Affairs
- DWD: Directorate of Water Development
- DWRM: Directorate of Water Resources Management
- MAAIF: Ministry of Agriculture, Animal Industries and Fisheries
- MFPED: Ministry of Finance, Planning and Economic Development
- MGLSD: Ministry of Gender, Labour and Social Development
- MoEMD: Ministry of Energy and Mineral Development
- MoES: Ministry of Education and Sport
- MoH: Ministry of Health
- MoLG: Ministry of Local Government
- MoTI: Ministry of Trade and Industry
- MWE: Ministry of Water and Environment
- NEMA: National Environmental Management Authority
- NFA: National Forestry Authority
- NWSC: National Water and Sewerage Corporation
- UWASNET: Uganda Water and Sanitation NGO Network
- WESWG: Water and Environment Sector Working Group

Source: DWRM Work Plan 2012/2013

APPENDIX VI: PERMITS SAMPLED FOR MONITORING

S/n	Company	Permit	self-monitoring	compliance monitoring
1	Elgon Leather Company	Waste Discharge	NIL	PRESENT
2	Fishways	Waste Discharge	NIL	PRESENT
3	Gomba fishing industries	Waste Discharge	PRESENT	PRESENT
4	General mouldings	Waste Discharge	NIL	PRESENT
5	Hoopoe trading ltd	Waste Discharge	NIL	PRESENT
6	Tian Tang group	Waste Discharge	NIL	NIL
7	Tampa Fisheries	Surface Water	PRESENT	PRESENT
8	EMS Nyamwamba	Surface Water		PRESENT
9	Bwendero Dairy Farm	Surface Water	NIL	NIL
10	Bwindi community hydro power ltd	Surface Water	NIL	NIL
11	Elgon Hydro siti Ltd	Surface Water	NIL	NIL
12	Elemental energy ltd	Surface Water	NIL	NIL
13	Muvumbe Hydro Ltd	Surface Water	NIL	NIL
14	Mahoma U Ltd	Surface Water	NIL	NIL
15	Masese Fish Packers	Waste Discharge	PRESENT	PRESENT
16	Mayuge Sugar	Waste Discharge	NIL	PRESENT
17	Kiko Tea Estate	Waste Discharge	PRESENT	PRESENT
18	Uganda Leather Industries	Waste Discharge	PRESENT	PRESENT
19	Harris international Limited	Water discharge	Yes	PRESENT
20	Britania allied industries limited	Water discharge	PRESENT	PRESENT
21	CNOOC	Water discharge	NIL	NIL
22	Enviroserv	Water discharge	PRESENT	NIL
23	Hima cement -staff residence	Water discharge	NIL	PRESENT
24	Hima cement -quarry	Water discharge	NIL	NIL
25	Hoima sugar ltd	Water discharge	NIL	NIL
26	Bujagali energy limited	Water discharge	NIL	NIL

27	Buwembe brewers and distillers ltd	Water discharge	PRESENT	PRESENT
28	Bidco(u)ltd	Water discharge	NIL	PRESENT
29	Byansi fisheries	Water discharge	NIL	PRESENT
30	Global paper products ltd	Water discharge	NIL	NIL
31	Mcleod Russel u ltd- Bugambe tea estates	Water discharge	NIL	PRESENT
32	Mcleod Russel u ltd-Mwenge tea estates	Water discharge	NIL	PRESENT
33	Butama Hydro electricity co(ndugutu)	surface water	NIL	NIL
34	Butama Hydro electricity co(sindila)	surface water	NIL	NIL
35	Andrew Rugasira good coffee	surface water	NIL	NIL
36	African panther resources	surface water	NIL	NIL
37	Biyinzika 01462	Ground Water	NIL	NIL
38	Biyinzika 01463	Ground Water	NIL	NIL
39	Biyinzika 01464	Ground Water	NIL	NIL
40	Biyinzika 01465	Ground Water	NIL	NIL
41	Biyinzika 01466	Ground Water	NIL	NIL
42	Tan Industries Ltd	Ground Water	NIL	PRESENT
43	Ibuje Sub County Source II	Ground Water	NIL	NIL
44	Ibuje Sub County Source I	Ground Water	NIL	NIL
45	Hudani Manji Holdings Ltd	Ground Water	NIL	NIL
46	Buwenge Town Council	Ground Water	NIL	PRESENT
47	Boss Beverages International	Ground Water	PRESENT	PRESENT
48	Busia Sugar and Allied	Ground Water	NIL	NIL
49	Banabikira Industrial Development	Ground Water	NIL	PRESENT
50	Chief Distillers	Ground Water	NIL	NIL
51	Cipla Quality Chemicals Industries Ltd	Ground Water	PRESENT	PRESENT
52	Cementers Ltd	Ground Water	NIL	PRESENT
53	Cougar Industries Ltd	Ground Water	NIL	PRESENT
54	China Communications Construction Company	Ground Water	NIL	NIL
55	Cipla Quality Chemicals Industries Ltd	Ground Water	PRESENT	PRESENT

APPENDIX VII: PERMITS SAMPLED FOR DELAYS

S/n	Company	Permit	Date applied	Date Received	Delay
1	Elgon Leather Company	Waste Discharge	18/02/2014	04/09/2015	4 months
2	Fishways	Waste Discharge	22/06/2006	13/11/2006	2 months
3	Gomba fishing industries	Waste Discharge	22/06/2001	24/11/2005	4 years
4	general mouldings	Waste Discharge	04/11/2013	16/12/2013	none
5	Hoopoe trading ltd	Waste Discharge	21/10/2010	02/12/2014	2 years
6	Tian Tang group	Waste Discharge	17/09/2013	10/12/2013	NIL
7	Tampa Fisheries	Surface Water		18/03/2013	
8	EMS Nyamwamba	Surface Water	06/06/2010	26/04/2011	7 months
9	Bwendero Dairy Farm	Surface Water	20/04/2015	20/07/2015	NIL
10	Bwindi community hydro power ltd	Surface Water	23/04/2012	03/12/2012	5 months
11	Elgon Hydro siti Ltd	Surface Water	31/05/2013	04/07/2013	NIL
12	Elemental energy ltd	Surface Water	03/06/2015	30/07/2015	NIL
13	Muvumbe Hydro Ltd	Surface Water	22/01/2014	10/03/2014	NIL
14	Mahoma U Ltd	Surface Water	16/01/2015	08/04/2015	NIL
15	Masese Fish Packers	Waste Discharge	06/05/2007	19/08/2007	12 DAYS
16	Mayuge Sugar	Waste Discharge	15/01/2015	26/03/2015	10 DAYS
17	Kiko Tea Estate	Waste Discharge	08/02/2002	22/04/2002	13 DAYS

18	Uganda Leather Industries	Waste Discharge	21/06/2013	06/02/2014	5 months
19	Harris international Limited	Water discharge	10/04/2010	17/01/2011	4 months
20	Britania allied industries limited	Water discharge	14/9/2012	27/02/2013	2 months
21	CNOOC	Water discharge	26/03/2013	14/07/2013	4 months
22	Enviroserv	Water discharge	09/12/2013	22/12/2013	NIL
23	Hima cement -staff residence	Water discharge	31/05/2012	03/07/2013	10 months
24	Hima cement -quarry	Water discharge	31/05/2012	03/07/2013	10 months
25	Hoima sugar ltd	Water discharge	16/04/2015	04/09/2015	2 months
26	Bujagali energy limited	Water discharge	11/05/2014	26/3/2015	8 Months
27	Buwembe brewers and distillers ltd	Water discharge	25/09/2014	03/11/2015	11 months
28	Bidco(u)ltd	Water discharge	11/08/2010	21/06/2011	7 month
29	Byansi fisheries	Water discharge	10/06/2014	03/12/2015	15 months
30	Global paper products ltd	Water discharge	03/04/2013	14/11/2013	4 months
31	Mcleod russel u ltd-bugambe tea estates	Water discharge	03/08/2014	28/05/2015	6 months
32	Mcleod russel u ltd-mwenge tea estates	Water discharge	03/08/2014	28/05/2015	6 months
33	Butama hydro electricity co (ndugutu)	surface water	14/05/2012	27/08/2012	NIL
34	Butama hydro electricity co(sindila)	surface water	14/05/2012	12/10/2013	2 months
35	Andrew Rugasira good coffee	surface water	25/04/2014	19/01/2015	7 months
36	African panther resources	surface water	03/05/2015	30/07/2015	NIL

37	Biyinzika 01462	Ground Water	18/02/2015	08/04/2015	NIL
38	Biyinzika 01463	Ground Water	18/02/2015	20/03/2015	NIL
39	Biyinzika 01464	Ground Water	18/02/2015	20/03/2015	NIL
40	Biyinzika 01465	Ground Water	18/02/2015	20/03/2015	NIL
41	Biyinzika 01466	Ground Water	18/02/2015	20/03/2015	NIL
42	Tan Industries Ltd	Ground Water	20/06/2012	11/10/2012	1 Month
43	Ibuje Sub County Source II	Ground Water	14/01/2012	16/03/2014	NIL
44	Ibuje Sub County Source I	Ground Water	14/01/2012	16/02/2014	NIL
45	Hudani Manji Holdings Ltd	Ground Water	10/05/2015	10/09/2015	1 Month
46	Buwenge Town Council	Ground Water	14/08/2014	03/03/2009	
47	Boss Beverages International	Ground Water	13/10/2011	09/01/2012	NIL
48	Busia Sugar and Allied	Ground Water	25/06/2012	31/10/2012	1 Month
49	Banabikira Industrial Development	Ground Water	02/09/2010	24/02/2011	2 Months
50	Chief Distillers	Ground Water		28/03/2013	Application date not found
51	Cipla Quality Chemicals Industries Ltd	Ground Water	01/07/2008	18/07/2008	NIL
52	Cementers Ltd	Ground Water		07/09/2005	Application date not found
53	Cougar Industries Ltd	Ground Water		28/05/2014	Application date not found
54	China Communications Construction Company	Ground Water		02/12/2014	Application date not found
55	Cipla Quality Chemicals Industries Ltd	Ground Water	01/07/2008	18/07/2008	NIL

APPENDIX VIII: APPROVED STAFF STRUCTURE

S/N	Position	Status
1	Commissioner Water Resources Planning and Regulation	FILLED
2	Assistant Commissioner, Water use Planning and Allocation	FILLED
3	Assistant Commissioner, Compliance and Enforcement	VACANT
4	Assistant Commissioner, WMZ Water Resources Regulations	FILLED
5	Principal Water Officer, Water Use Plans	VACANT
6	Principal Water Officer, Reservoir Regulations	VACANT
7	Principal Water Officer, National Compliance	VACANT
8	Principal Water Officer, Water Policy Committee	FILLED
9	Principal Water Officer, Basin Plans	VACANT
10	Principal Water Officer, Permit Administration	VACANT
11	Principal Water Officer, Basin Compliance	VACANT
12	Principal Water Officer, Enforcement	VACANT
13	Principal Water Officer, National Plans	FILLED
14	Senior Water Officer, Dam Safety	FILLED
15	Senior Water Officer, Reservoir Maintenance & Operation	VACANT
16	Senior Water Officer, Compliance	FILLED
17	Senior Water Officer, Enforcement	FILLED
18	Senior Water Officer, Drilling Permits	FILLED
19	Senior Water Officer, Water Policy Committee	VACANT
20	Senior Water, Basin Plans	FILLED
21	Senior Water Officer, Permits Administration	VACANT
22	Senior Water Officer, Basin Compliance	FILLED
23	Senior Water Officer, Basin Compliance	FILLED
24	Senior Water Officer, Enforcement and EIA	VACANT
25	Water Officer, National Plans	FILLED
26	Water Officer, National Plans	FILLED
27	Water Officer, Dam Safety	VACANT
28	Water Officer, Reservoir Maintenance	VACANT
29	Water Officer, Reservoir Maintenance	VACANT
30	Water Officer, Basin Plans	VACANT
31	Water Officer, Permits Administration	VACANT
32	Water Officer, Basin Compliance	VACANT
33	Water Officer, Enforcement and EIA's	VACANT
34	Data Entry Clerk	FILLED
35	Data Entry Clerk	VACANT
36	Records Assistant	VACANT
37	Records Assistant	VACANT

APPENDIX IX: WASTE DISCHARGE FEES

BOD LOAD 10kg Oxygen/year	Unit Charge (U.Shs. Per Kg Oxygen demand	Annual Charge (U.Shs.)
100 and less	not charged	not charged
100-400	2.0	500.000
400 –600	2.0	1.000,000
600 - 1,800	2.1	2,500,000
1,800 - 3,000	2.1	5,000.000
3,000 - 3,800	2.2	7,500,000
3,800 - 5,200	2.2	10,000,000
5,200 and over	2.5	13.000,000

Notes:

1. Threshold Load 50m3/day; BOD5 50mg/L
2. Values in table are 1.3% of the operation costs of treating wastes (based on 1994 operational costs ofNWSC treatment work at Bugolobi).
3. Mbale NWSC sewerage effluent 7,300 m3/day; BOD5 89mg/L; Load 2.632x 103 kg/year; amount 500,000.

THE REPUBLIC OF UGANDA

OFFICE OF THE AUDITOR GENERAL

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