

WATER RESOURCES COMMISSION



ANNUAL REPORT 2012

ANNUAL REPORT 2012

WATER RESOURCES COMMISSION

Published 2012 by Water Resources Commission of Ghana



Water Resources Commission	Phone	+233 0302 763651
No. E4 Leshie Crescent	Fax	+233 0302 763649
Labone Estates, Accra	E-mail	watrecom@wrc-gh.org
P. O. Box CT 5630, Cantonments – Accra	Website	www.wrc-gh.org

Densu Basin Secretariat	Phone	+233 03420 2195
Ministries Road, Oguaa	Fax	+233 03420 21964
Koforidua – Eastern Region	E-mail	densu@wrc-gh.com
P. O. Box 278		
Koforidua		

White Volta Basin Secretariat	Phone	+233 03820 24074
Upper East RCC Office	Fax	+233 03820 33931
P. O. Box 489	Email	wvolta@wrc-gh.com
Bolgatanga		

Ankobra Basin Secretariat	Phone	+233 03123 92815/92431
Abosso Road	E-mail:	ankobra@wrc-gh.org
P.O. Box 475		
Tarkwa		

Pra (Offin) Basin Secretariat	Phone:	+233 0322 040517
P. O. Box PC 53,	Fax:	+233 0322 040371
Kumasi	Email:	prabasin@wrc-gh.org

Tano Basin Secretariat	Phone:	+233 0352 028096
P. O. Box SY 180,	Fax:	+233 0352 028096
Sunyani	Email:	tanobasin@wrc-gh.org

ISBN: 978 - 9988 – 8237 – 1 – 9

TABLE OF CONTENTS

TABLE OF CONTENTS.....	3
LIST OF FIGURES.....	5
LIST OF TABLES.....	5
ACRONYMS	6
FOREWORD	8
EXECUTIVE SUMMARY	9
CHAPTER 1 - COMMISSION PROFILE AND INFORMATION.....	15
1.1 Mandate	15
1.2 Vision.....	15
1.3 Mission Statement	15
1.4 The Commission	15
1.5 Focus Areas for 2012.....	15
CHAPTER 2 - ADMINISTRATION OF REGULATIONS.....	16
2.1 Administration of Water Use Regulations	16
2.2 Water Use Register	16
2.3 Compliance Monitoring.....	16
2.4 Administration of Drillers Licence and Groundwater Development Regulations.....	18
CHAPTER 3 - MANAGEMENT OF PRIORITY RIVER BASINS	20
3.1 Densu Basin	20
3.1.1 Densu Basin Board	20
3.1.2 Regulatory Activities	20
3.1.3 Awareness Creation, Education and Training	20
3.1.4 Collaborative and Coordinative Activities.....	20
3.1.5 Implementation of the Densu Basin IWRM Plan.....	21
3.2 White Volta Basin.....	21
3.2.1 White Volta Basin Board	21
3.2.2 Collaborative and Coordinative Activities.....	21
3.3 Ankobra Basin	21
3.3.1 Ankobra Basin Board.....	21
3.3.2 Regulatory Activities	21
3.3.3 Collaborative and Coordinating Activities.....	21
3.4 Pra Basin.....	22
3.4.1 Pra Basin Board	22
3.4.2 Ecological Monitoring.....	22
3.4.3 Regulatory Activities	22
3.4.4 Awareness Creation, Education and Training	23
CHAPTER 4 - PUBLIC AWARENESS AND EDUCATION.....	25
4.1 Review of Communication Strategy.....	25
4.2 Public Awareness Creation in IWRM.....	25
4.3 Educational Materials and Publications.....	25
4.4 World Water Day.....	25

CHAPTER 5 - WATER GOVERNANCE ACTIVITIES	26
5.1 Policy Development	26
5.2 Development and Review of Legislative Instruments.....	26
5.3 Establishment of Water Governance Institutions.....	26
CHAPTER 6 - WATER RESOURCES ASSESSMENT AND PLANNING PROGRAMS.....	28
6.1 Water Quality Assessment	28
6.2 Hydrogeological Assessment.....	29
6.3 National and River Basin IWRM Plans.....	29
6.4 Climate Variability and Change Initiatives	30
6.5 Flood Hazard Assessment - White Volta Basin.....	32
CHAPTER 7 - TRANSBOUNDARY WATER MANAGEMENT	33
7.1 The Volta Basin Authority	33
7.2 Ghana/Burkina Faso Joint-Technical Committee on IWRM.....	34
7.3 ECOWAS Water Resources Coordination Centre	35
7.4 Transboundary UNEP/GEF Volta Project.....	35
CHAPTER 8 - ADMINISTRATIVE AND HUMAN RESOURCES.....	38
8.1 Training Courses	38
8.2 Academic Courses	38
8.3 Workshops, Meetings and Conferences	38
8.4 Human Resources.....	39
CHAPTER 9 - TECHNICAL ASSISTANCE.....	41
9.1 Danish International Development Assistance	41
9.2 Norwegian Agency for Development Cooperation	41
9.3 Africa Water Facility	41
9.4 World Bank.....	41
CHAPTER 10 - FINANCIAL STATUS.....	42
10.1 Audited Financial Statements	42
Appendix: Members of the Water Resources Commission.....	45
Appendix 2: Water Use Register for 2012	46
Appendix 3: Well Drilling License Register - 2012	52

LIST OF FIGURES

Figure 1: Distribution of Water Use Permits per purpose for 2012	16
Figure 2: Students uploading data after the WWMD field work	23
Figure 3: The Densu Basin Officer giving a demonstration to students during the WWMD	23
Figure 4: Monitoring equipment donated to the Weija Lake Protection Association.....	23
Figure 5: Carrying out routine monitoring with the donated Equipment on the Weija Lake	23
Figure 6: Compliance Monitoring; a water dam at Noble Gold	24
Figure 7: Some suspected foreign nationals involved in illegal mining	24
Figure 8: The Assistant Ankobra Basin Officer making a presentation at the Traditional Council	24
Figure 9: Fairly good water quality of River Oda at Ejisu	24
Figure 10: Assistant Pra Basin Officer assisting in measuring the buffer width along the River Offin	24
Figure 11: Pra Basin Officer testing water quality of Aboaso Stream at Asuofua Asamang	24
Figure 12: Spillway of a small reservoir at Apatanga in the Bongo District	30
Figure 13: Before and after covering of rainwater harvesting facility at Daboya community	30
Figure 14: Before and after rehabilitation of flood water harvesting facility at Sooba.....	31
Figure 15: Toilet facilities provided to Sooba and Bunyamo communities	31
Figure 16: Awareness campaign at Bale	37
Figure 18: Awareness campaign at Senyeri	37
Figure 17: Awareness campaign at Chache	37
Figure 19: Bushfire outbreak at Senyeri	37

LIST OF TABLES

Table 1: Compliant Permit Holders for 2012	17
Table 2: Site Verification Visits for 2012	17
Table 3: Summary of New Drilling Licenses issued in 2012	19
Table 4: River Stations Water Quality Index (WQI) for River Systems (2010-2012)	28

ACRONYMS

ABB	-	Ankobra Basin Board
AWF	-	Africa Water Facility
CBO	-	Community Based Organisation
CIWA	-	Consortium for International Water in Africa
CONIWAS	-	Coalition of NGOs in the Water and Sanitation Sector
CWSA	-	Community Water and Sanitation Agency
DA		District Assembly
DANIDA	-	Danish International Development Agency
DBB	-	Densu Basin Board
DGRE	-	Directorate General for Water Resources (Burkina Faso)
DTM	-	Digital Terrain Model
ECOWAS	-	Economic Community of West African States
EPA	-	Environmental Protection Agency
FEWS	-	Flood Early Warning System
GIDA	-	Ghana Irrigation Development Authority
GEF	-	Global Environment Facility
GMet	-	Ghana Meteorological Agency
GOFA	-	Global Organisation for Fundamental Aid
GoG		Government of Ghana
GWCL	-	Ghana Water Company Limited
HSD	-	Hydrological Services Department
ICH	-	International Centre for Hydropower
IGF	-	Internally Generated Funds
IUCN	-	International Union for Conservation of Nature
IWMI	-	International Water Management Institute
IWRM	-	Integrated Water Resources Management
JTC	-	Joint Technical Committee
LI	-	Legislative Instrument
MWRWH	-	Ministry of Water Resources, Works and Housing
NCRC	-	Nature Conservation Research Centre
NDSU	-	National Dam Safety Unit
NGO	-	Non-Governmental Organisation
NORAD	-	Norwegian Agency for Development Cooperation
PAGEV	-	Project on Improving Water Governance in the Volta Basin

PFCM	-	Permanent Framework for Coordination and Monitoring
PBB	-	Pra Basin Board
SHEP	-	School Health Educational Programme
SIDA	-	Swedish International Development Agency
TAC	-	Technical Advisory Committee
TBB	-	Tano Basin Board
TRMM	-	Tropical Rainfall Measuring Mission
UNEP	-	United Nations Environment Program
VBA	-	Volta Basin Authority
VRA	-	Volta River Authority
WHO	-	World Health Organisation
WLPA	-	Weija Lake Protection Association
WQI	-	Water Quality Index
WRC	-	Water Resources Commission
WRCC	-	Water Resources Coordination Centre
WRI	-	Water Research Institute
WVBB	-	White Volta Basin Board
WWMD	-	World Water Monitoring Day
ZYF	-	Zongo Youth Foundation

FOREWORD

The year 2012 marked the 2nd full year in office for the 3rd Commission. There is no gainsaying the fact, that it was a year that oodles of significant insights were gained. These gains contributed to inform the decisions towards the efficient delivery of plans, programs, and projects at the basin, national and international levels.

This 14th Annual Report of the Water Resources Commission (WRC) therefore presents the achievements and also a growing picture of the Commission in terms of relations outside Ghana. The Integrated Water Resources Management (IWRM) programme has been carried further to other river basins. The Tano basin has come on stream while the Black Volta and Birim basins have been identified in terms of introducing practical local level IWRM interventions and establishing WRC's physical presence.

WRC's efforts at developing a Flood Early Warning System for the White Volta Basin can only be said to be timely, notwithstanding that national growth and development strategies including medium term development plans have had no significant place for flooding as a developmental challenge. The WRC is enjoined to stay focused and develop concrete actions that would address this issue.

Our international relations with respect to the use of water resources continue to be at the fore. The establishment of the Volta Basin Authority continues to provide Ghana and the other five riparian countries with a forum to effectively manage the resources of the Volta River System. However, this could only be sustained if we make the conscious effort to make international cooperation and the management of our transboundary waters a priority.

On behalf of my colleagues and the staff of the Secretariat, I would like to extend my sincere thanks and appreciation to the Government, through the Minister of Water Resources Works and Housing, for the sustained support to WRC in particular. We also thank our development partners and national collaborative institutions for their continued support and encouragement to the Commission in carrying out its mandate.

Mr. Paul Derigubaa
Chairman, Water Resources Commission

EXECUTIVE SUMMARY

INTRODUCTION

The Water Resources Commission (WRC) was established by Act 522 of 1996 with a mandate to regulate and manage Ghana's freshwater resources and to coordinate any policy in relation to them. The 3rd Commission has been in office since July 2010.

This is the 14th Annual Report of the WRC. The Report highlights the regulatory and water resources assessment and management activities, administrative matters, manpower, technical assistance, and financial status of the Commission during the year 2012.

ADMINISTRATION OF REGULATIONS

Administration of Water Use Regulations

The Commission continued with the processing and approval of water rights under the Water Use Regulations, Legislative Instrument (LI) 1692 of 2001. Nineteen (19) new water use permits were issued bringing the total number of water use permit holders to one hundred and fifty-three (153).

The 7th Water Use Register was published at the end of 2012. Analysis of the registered water users shows that one hundred and one (101) of the total number of 153 permitted water users were engaged in domestic and/or municipal water supply, whereas one each was engaged in power generation, and underwater wood harvesting. The number of raw water users for industrial (food processing), mining and aquaculture purposes were nine (9), twenty-six (26) and thirteen (13) respectively.

In relation to water use compliance, fifteen (15) permit holders complied with their permit conditions of which nine (9) are mining companies.

Drilling Licence and Groundwater Development Regulations

The administration of the Drilling Licence and Groundwater Development Regulations LI 1827 of 2006 also continued. Twenty-four (24) well drilling licenses were issued in 2012 bringing the total to one hundred and eight (108) as compared to the one-hundred and two (102) in 2011.

MANAGEMENT OF PRIORITY RIVER BASINS

The focus was on the Densu, White Volta, Ankobra, and Pra Basins towards ensuring functionality of basin secretariats and their boards in managing the water resources of their respective basins.

Densu Basin

The Densu Basin Board undertook three (3) ecological monitoring programmes on current ecological trends within and around the Basin.

The awareness creation, education and training activities were generally geared towards enhancing the public's knowledge and appreciation of IWRM-related issues at the basin level. For instance, six of the seven micro projects approved during the year were for sensitization and education of communities and other relevant stakeholders within the Basin. Two (2) CBOs and nine (9) schools were also educated on the use of water monitoring kits as part of the World Water Monitoring Day program.

The Secretariat actively collaborated with the Ga South Municipal Assembly, the military and police to enforce laws to protect the Weija Dam, and also donated monitoring equipment including an Outboard Motor and life jackets to the Weija Lake Protection Association to assist in the monitoring of illegal activities on the lake.

White Volta Basin

Most of the activities within the basin were undertaken in relation to the review of the Climate Change Adaptation interventions and the development of Flood Early Warning Systems.

Ankobra Basin

The Ankobra Basin Board focused on the impact of illegal mining, especially the alluvial mining in the water bodies. Collaboration with the Regional Security Council resulted in a reconnaissance survey and field operation with the Regional Police and the Army Commands to abate illegal alluvial mining activities. A strategic meeting was also held with the Wassa-Fiase Traditional Council on the same issue.

The Secretariat also assisted in the administration and compliance monitoring of regulations by undertaking regular and continuous inspection of water abstraction points.

Pra Basin

The Pra Basin Board met three times during the year, while the Basin Secretariat monitored over fifteen (15) water sampling sites to observe the water quality trends and interacted with host communities within the basin on IWRM challenges to inform solutions.

The Secretariat assisted in the identification of five (5) new water users and initiated action to cease the operations of an illegal cage aquaculture project sited on the Lake Bosomtwe.

With regards to public awareness and education, the activities included the training of the board members to engage in active awareness creation in the Basin; and the organisation of radio programs to educate the public to assist in water resources management.

PUBLIC AWARENESS AND EDUCATION

The revised WRC Communication Strategy and Action Plan 2012-2016 were published and implementation commenced.

About 60 police prosecutors from the three northern regions and the Volta region were trained on the enforcement of water laws and the management of water resources. Another training workshop was organised for about 40 key water managers including traditional authorities in Wa, Upper West Region. As part of promoting and increasing awareness on IWRM 5,000 Densu Basin flyers and 1,500 branded Tee shirts on the World Water Day were printed for distribution.

The theme for the 2012 World Water Day celebrations was 'Water and Food Security: Call for Solutions'. Activities to mark the Day included radio and television programmes, publication of feature articles and editorials in newspapers, inter schools debate, essay and drawing competitions in the Dangme West district, a water awareness walk and health screening exercise, and a flag-hoisting ceremony.

WATER GOVERNANCE ACTIVITIES

The main policy initiated by the WRC, the harmonized Buffer Zone Policy, seeks to ensure that land strips/areas along open water bodies (rivers, streams, lakes) are designated and managed as conservation areas to restore, conserve and maintain the ecological integrity and provide optimal socio-economic benefits of such designated areas. Cabinet finally adopted the Buffer Zone Policy in December 2012 for implementation.

The Commission is developing Dam Safety Regulations to regulate all relevant activities related to dam design, construction, operations, maintenance, and decommissioning to ensure uniform and adequate level of safety for all dams in Ghana. The Dam Safety Regulations document was finalised

and submitted to the Ministry of Water Resources, Works and Housing to be forwarded to the Attorney General's Department.

WRC also initiated the review of WRC (1996) Act 522 and the Water Use Regulation LI 1692 and to propose amendments to address some practical difficulties regarding the operations/implementation of these legal enactments. The proposed amendments were submitted to the Attorney General and Minister of Justice.

Set up of the Tano Basin office was completed with the recruitment of staff and inauguration of the Tano Basin Board. The Birim and Black Volta River Basins were identified as new priority basins that required decentralised secretariats and Basin Boards to assist in the management of the water resources. Consultations with selected stakeholders in the two basins started, but practical actions are scheduled to commence in 2013.

The National Dam Safety Unit (NDSU) is envisaged to be the centralised body responsible for administering regulations and coordinating dam safety activities. During 2012, WRC continued with the provision of secretarial and technical backup towards the formal establishment of the NDSU.

WATER RESOURCES ASSESSMENT AND PLANNING PROGRAMS

Water Quality Assessment

The water quality-monitoring program covered 40 monitoring stations over the whole country. In all, thirty-one (31) river stations and nine (9) reservoir/lakes stations were monitored, analysed and classified according to the Water Quality Index (WQI). The WQI is the general water quality indices type in which various physical, chemical and microbiological variables are aggregated to produce an overall index of water quality that describes the state of water quality of the water bodies.

The quality of the waters deteriorated with only 45 % of waters found in Class II (fairly good water quality) and the remaining 55% classified under Class III (poor water quality). This could be due to 'galamsey' and improper disposal of waste and degraded banks of the rivers.

Hydrogeological Assessment

Most of the hydrogeological assessment activities focused on improving the knowledge base and comprehension of the hydro-geological make-up of the three (3) regions in Northern Ghana. One field monitoring and sampling campaign was undertaken on the 37 monitoring wells. However, data gaps were experienced in the groundwater level data due to the failure of field recording devices and inadequate spares to replace the dysfunctional devices.

There was also not much progress in updating the database for analyzing the trends in groundwater resources systems. The non-availability of personnel responsible for database update remains the major challenge to the database management.

National and River Basin IWRM Plans

The National IWRM Plan was completed and published in 2012. The plan sets out the direction and implementation framework for the legal and institutional development to achieve the overall goal of the water resources management part of the National Water Policy. The IWRM Plans for the Pra and Tano River basins were finalised and published, while that for the Dayi river basin was completed, but is yet to be published.

Climate Variability and Change Initiatives

The 'Climate Change Adaptation through Integrated Water Resources Management' project ended in 2011. However, follow up observations noted that some facilities in some beneficiary communities required additional works for functionality. WRC initiated action to complete the

'unfinished business' in six beneficiary communities including Apatanga, Penda, Daboya, Soba, Kukobila and Tali.

Flood Hazard Assessment - White Volta Basin

A World Bank supported project was initiated in 2011 to perform a Flood Hazard Assessment study for the White Volta River. The study was to investigate the scale and severity of flood hazards, assess the effectiveness of structural and non-structural measures to mitigate flood damages in the future, and develop a Flood Early Warning System (FEWS) for flood forecasting, flood warning and flood crisis management.

The end of 2012 had realized completion of the FEWS model based upon a thorough understanding of the hydrology and river hydraulics using a custom built dynamic model of the river system. The FEWS-evaluation was carried out during the wet season. Flood hazard and risk maps were produced at scales 1:50.000 and 1: 25.000, depicting flood duration, expected depth and inundated areas for 2 to 5 year return periods and 10 to 100 years return periods.

The identified flood mitigation measures include the Pwalugu reservoir (including various management options); retention in tributaries; and restoring old river arms. Furthermore, the FEWS model has demonstrated that it is capable of assessing a vast number of flood mitigation measures.

In addition, officers from the partner implementing institutions were trained in morphological and model building to develop a preliminary morphological model of the White Volta and to increase national capacity and awareness in the field of morphological processes and morphological tools.

TRANSBOUNDARY WATER MANAGEMENT

The WRC continued facilitating collaboration and cooperation at the international level to encourage the effective and resourceful exploitation and management of transboundary water resources.

The Volta Basin Authority

The Volta Basin Authority (VBA) seeks to ensure international cooperation for the rational and sustainable management of the water resources of the Volta basin shared by six (6) countries. During the year 2012, VBA undertook activities towards fulfilling its strategic objectives:

The 4th session of the Council of Ministers of the VBA, the meeting of the ad hoc recruitment committee consisting of VBA National Focal Points and the preparatory session of the VBA Experts Committee were held from 21 to 27 February 2012, in Abidjan, Cote d'Ivoire.

The Forum of Parties Involved in the Development of the Volta Basin was established and held its 1st meeting from 18 to 19 January 2012 in Ouagadougou, Burkina Faso. It was attended by 22 Members representing water users, civil society concerned with the management of water resources and local communities of each national portion of the Basin, and led by the Focal Point of each Member State.

Under the Volta Hycos project, some hydrometric installations were visited in Burkina Faso, Benin, Ghana and Togo. Other collaboration initiatives with institutions, projects and programmes that progressed during the year include the Tilapia Volta Project, UNEP/GEF Volta River Project, CPWF Volta Basin Development Challenge, the ECOWAS/WRCC Dialogue for Infrastructure Development, and the TIGER Initiative.

The study on identification of stakeholders in the basin was completed in 2012 and the 1st meeting between VBA and the Civil Society Organisations operating in the area of water resources management and environmental monitoring in the basin was organised.

Ghana/Burkina Faso Joint-Technical Committee on IWRM

The Ghana-Burkina Faso Joint Technical Committee on IWRM seeks to strengthen the consultation mechanism for the joint management of the natural resources of the Volta Basin and to advise the Ministers in charge of water of the two countries.

No formal meeting or activity was held in the year. However, the exchange of hydrological information between the two countries continued especially with respect to the water levels of the Bagre and Komienga Dams during the wet season.

ECOWAS Water Resources Coordination Centre

The ECOWAS Water Resources Coordination Centre (WRCC) is one of the four organs of the Permanent Framework for Coordination and Monitoring of IWRM in West Africa.

During the year, WRCC produced a manual on 'Guidelines for the Development of Water Infrastructure in West Africa'. The major activities that WRC participated in were the:

- Validation workshop of the pilot study on the 'Indicators of IWRM in Five Countries' held in Ouagadougou from 20-21 April 2012.
- Meeting to validate the studies for the promotion of 3 new transboundary basin organizations in West Africa including the Comoe-Bia-Tano Basins on 11th July 2012 in Abidjan.
- 8th Meeting of the Technical Advisory Committee of the WRCC.

Transboundary UNEP/GEF Volta Project

The 4-year UNEP/GEF Volta project is a regional initiative of the six riparian countries and is designed to promote a more sectorally-coordinated management approach, based on the principles of IWRM, at the national and regional levels. In 2012, the Demonstration 3 project in the Black Volta Basin implemented the following:

1. Four (4) sets of awareness raising campaign materials were developed for the sensitization and training of local stakeholders on forest and water resources management, land degradation, efficient charcoal production and bush fire issues.
2. About 420 persons (55% were women) took part in the awareness forum organized Bale, Mandari, Senyeri, and Chache communities. Participants acquired knowledge on the practical causes of environmental degradation and how to reverse the trend; the efficient production of charcoal using improved local methods and practiced during the training on improved charcoal production; and bush fires and how to reduce their destructive effects on crops and woodlands.
3. Plantations were established and maintained at different hot spots identified along the Gbongbong and Doli rivers (tributaries of the Black Volta River) as well as the degraded banks of the main Black Volta.
4. The 1st Bilateral Steering Committee meeting involving Ghana and Cote d'Ivoire was also held on 14 December 2012 at Bole.

ADMINISTRATIVE AND HUMAN RESOURCES

During the course of the year, the Commission organised internal and external workshops, meetings and conferences. Targeted staff training programs were undertaken both at the national and international levels with the main focus on competency-based training mainly in water resources management, international water law, dam safety inspection, records keeping, and database management.

During the year 2012, the Commission had 31 staff members (19 male and 12 female) at post. The number of senior staff was 19 with the remaining 12 as junior staff. One staff left the Commission through resignation.

TECHNICAL ASSISTANCE

Danish International Development Assistance: A 2-year Danida support program ended in 2011. The program was designed to address climate variability and change by introducing adaptation measures in water resources management to improve livelihoods of the vulnerable in the three northern regions. Additional activities were carried out in 2012 to ensure completion and/or rehabilitation of some works on the facilities provided to selected communities

Norwegian Agency for Development Cooperation: The Norwegian Agency for Development Cooperation (NORAD) is providing a 3-year assistance for the establishment of a National Dam Safety Unit and the development of Dam Safety Regulations. The project will end in 2013.

Africa Water Facility (AWF): WRC is implementing two (2) Africa Water Facility (AWF) supported projects:

Re-optimization of Operations of Akosombo and Kpong Dams on the Volta River Project - to explore how the two dams could be re-operated to achieve simultaneous outcomes of restoring downstream ecosystems and human livelihoods, increasing the total electric power output; and reducing the incidence of water borne disease vectors.

Design For Reuse – Harvesting the Value of Effluent and Nutrients for Sustaining the Operation of Sanitation Facilities Project aimed at improving the public health and environmental integrity in urban and peri-urban Ghana through the provision of reliable and complete sanitation by increasing the reuse of treated effluent and nutrients.

World Bank

The WRC is hosting the World Bank supported 2-year White Volta Flood Hazard Assessment project, which technically ended in 2012 but practical field tests will continue in 2013. The White Volta Flood Hazard Assessment covered the genesis of the floods of the White Volta, the exposures of various assets and communities to floods, the effectiveness of structural and nonstructural measures to reduce flood impacts, and an operational flood forecasting system for the White Volta from its border with Burkina Faso to the Volta Lake.

FINANCIAL STATUS

The audited financial statements indicate that total income for 2012 was GH¢3,118,474. Details of expenditure show that general administrative expenditure for the period amounted to GH¢1,779,031 showing a net gain of GH¢1,339,443. The balance as at 1 January 2012 was GH¢1,294,086 hence the recorded balance as at 31 December 2012 was GH¢2,633,529.

CHAPTER 1 - COMMISSION PROFILE AND INFORMATION

1.1 Mandate

The Water Resources Commission was established by an Act of Parliament (ACT 522 of 1996) as the institution generally responsible for the management of Ghana's fresh water resources. It is specifically mandated to regulate and manage the water resources and to co-ordinate related government policies. Thus, the responsibilities of WRC, which are spelt out in Section 2 (2) of the Act, can be categorized as:

- Developing and administering of Regulations on water utilisation and management;
- Planning for water resources development and management at the national and transboundary levels;
- Collecting, collating, storing and disseminating data and information on water resources;
- Monitoring and assessing activities and programmes for the sustainable utilisation and conservation of water resources.

1.2 Vision

The vision of the WRC is "Sustainable water management by all for all".

1.3 Mission Statement

WRC has the mission to 'regulate and manage the sustainable utilization of water resources and to coordinate related policies by combining our core competencies and hard work through effective participation, monitoring and awareness creation for socio-economic development of Ghana'.

1.4 The Commission

As a public sector organisation the WRC is governed by a Commission, which represents a forum for the integration, cooperation and coordination of diverse interests and comprises the major stakeholders in the water sector. The Commission consists of 15 members including the Chairman, the Executive Secretary, and a representative each for women and NGOs in the water sector. The major stakeholder institutions represented on the Commission are the Hydrological Services Department (HSD), Ghana Meteorological Agency (GMet), Water Research Institute (WRI), Ghana Water Company Limited (GWCL), Ghana Irrigation Development Authority (GIDA), Volta River Authority (VRA), Environmental Protection Agency (EPA), Forestry Commission (FC), Minerals Commission (MC), and a Traditional Ruler (Chief). Community Water and Sanitation Agency (CWSA) represents other organisations that produce potable water.

The list of members of the 3rd Commission is presented in Appendix 1 of this Report.

1.5 Focus Areas for 2012

This 14th Annual Report of the WRC underscores the following for the year 2012:

- Administration of Regulations;
- Management of priority River Basins;
- Public awareness and education;
- Water governance initiatives;
- Water resources assessment and planning programs;
- Transboundary water management initiatives;
- Administration and human resources; and
- Financial status of the Commission.

CHAPTER 2 - ADMINISTRATION OF REGULATIONS

2.1 Administration of Water Use Regulations

The administration of the Water Use Regulations, Legislative Instrument (LI) 1692 of 2001 continued with the processing and issuance of water use permits. Nineteen (19) new water use permits were issued bringing the total to one hundred and fifty-one (151) by the end of 2012. Of the new nineteen (19) permits granted, ten (10) were for mining, three (3) for industrial/ environmental purpose, four (4) for aquaculture and two (2) for irrigation purposes.

2.2 Water Use Register

The WRC, in fulfilment of the provisions of section 11 (5) of the Water Use Regulations 1692 of 2001, published the 7th Water Use Register at the end of 2012. A summary of the water use register is presented in Appendix 2.

As shown in Table 1, the total number of permit holders reduced from one hundred and seventy one (171) in 2011 to one hundred and fifty three (153) in 2012 due to the removal of redundant holders from the list. Analysis of the registered water users, which is presented in Figure 1, shows that one hundred and one (101) of the total number of 153 permitted water users were engaged in domestic and/or municipal water supply, whereas one each was engaged in power generation, and underwater wood harvesting. The number of raw water users for industrial (food processing), mining and aquaculture purposes were nine (9), twenty-six (26) and thirteen (13) respectively.

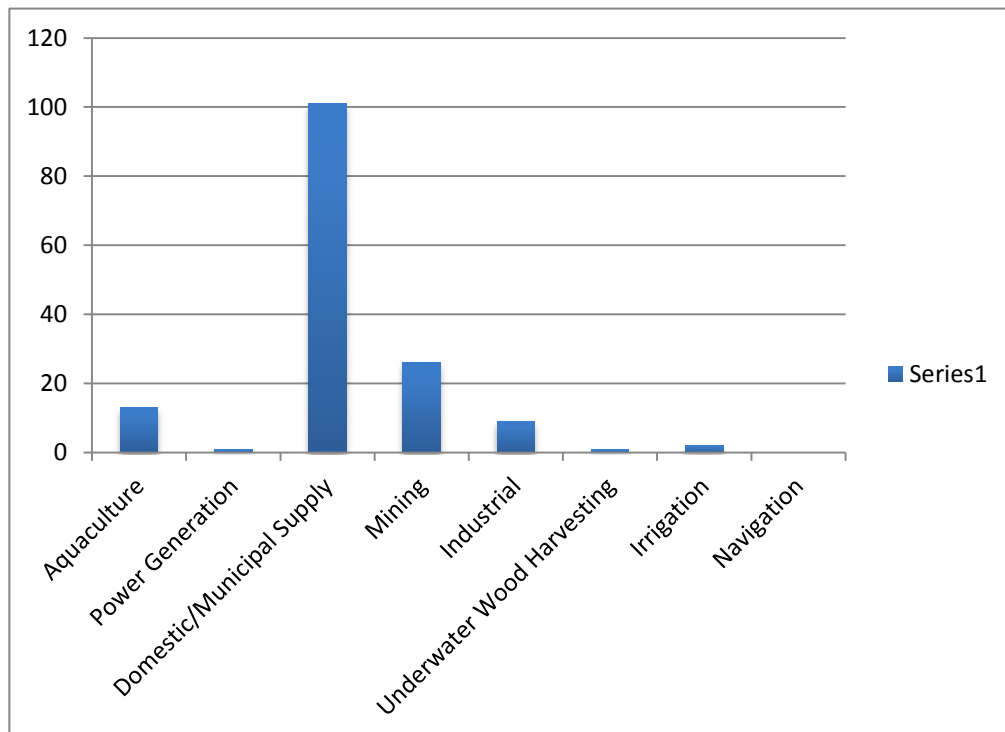


Figure 1: Distribution of Water Use Permits per purpose for 2012

2.3 Compliance Monitoring

Compliance was basically carried out through routine monitoring of reports from permit holders in compliance with their permit conditions. Targeted field monitoring exercises were also undertaken to verify accuracy of records submitted by some permit holders.

The submitted quarterly environmental reports contained data on the following, amongst others:

- Monthly records of water quality monitoring of surface and ground water sources
- Monthly ground and surface water abstraction volumes
- Monthly effluent discharge volumes into the environment
- Monthly groundwater levels
- Monthly rainfall measurements and volumes of rainwater harvested

Fifteen (15) companies complied with the conditions in their permits through the submission of environmental reports. Nine (9) of the 15 are mining companies; four (4) are industrial; one (1) is domestic/municipal water supply and one is aquaculture. List of compliant permit holders is presented in Table 1.

Table 1: Compliant Permit Holders for 2012

No	Company	Business Activity
1.	Adamus Resources Limited	Mining
2.	ADM Ghana Cocoa	Industrial
3.	Akosombo Textiles Limited	Industrial
4.	Anglogold Ashanti (GH) – Obuasi	Mining
5.	Cargill Ghana Limited	Industrial
6.	Chirano Gold	Mining
7.	Clark Sustainable Resource Development (GH) Ltd	Industrial (Under-Water Wood Harvesting)
8.	Golden Star (Wassa) Limited	Mining
9.	Golden Star Bogoso Prestea Limited (GSBPL)	Mining
10.	Laveroff Farms Limited	Aquaculture
11.	Newmont Ghana Gold Limited	Mining
12.	Newmont Golden Ridge – Akyem	Mining
13.	Noble Gold Bibiani Limited	Mining
14.	Perseus Mining Ghana Limited	Mining
15.	Water Health Ghana Limited	Domestic/Municipal Water Supply

Thirty-two (32) site verification visits, listed in Table 2 were carried during the year as part of the process leading to the grant of permits. Twenty-two (22) were carried out in the Eastern Region, four (4) each in the Volta and Ashanti Regions, and one (1) each in the Brong-Ahafo and Western Regions. Twenty-five (25) out of the 32 visits were to companies proposing to carry out aquaculture activities.

Table 2: Site Verification Visits for 2012

No	Company	Business Activity	Region
1.	African Plantation for Sustainable Development (Ghana) Ltd	Irrigation	Brong-Ahafo
2.	Archid Investments Limited	Aquaculture	Eastern
3.	Bassy Farms Limited	Aquaculture	Eastern
4.	COBA Industries Limited	Industrial	Western
5.	Everglades Company Limited	Aquaculture	Eastern
6.	E-Square Farms Limited	Aquaculture	Eastern
7.	Fishreit Ghana Limited	Aquaculture	Eastern
8.	Global Agri-Development Company Ghana Limited	Irrigation	Volta

No	Company	Business Activity	Region
9.	Grace Fish Farm & Supply	Aquaculture	Eastern
10.	Lee W Farms Limited	Aquaculture	Eastern
11.	Linmpata Company Limited	Aquaculture	Eastern
12.	Maleka Farms Limited	Aquaculture	Eastern
13.	Maximum Victory Limited	Aquaculture	Eastern
14.	Naak Farms	Aquaculture	Eastern
15.	Nahym Farms	Aquaculture	Eastern
16.	National Fish Farmers Brigade	Aquaculture	Volta
17.	Novi Farms Limited	Aquaculture	Volta
18.	Nyame Kokroko Farms	Aquaculture	Ashanti
19.	Patasi Spring Water Limited	Domestic/Municipal Water Supply	Ashanti
20.	Pillbrook Aquatic Volta Fish Farms Limited	Aquaculture	Eastern
21.	Reeba Farms Limited	Aquaculture	Eastern
22.	Rehobothgoshen Fisheries	Aquaculture	Eastern
23.	Royal Cruise Enterprise	Recreation	Ashanti
24.	Safeway Estates Limited	Aquaculture	Eastern
25.	S-Hoint Limited	Aquaculture	Eastern
26.	Tokorozawa Enterprise	Aquaculture	Eastern
27.	Tropo Farms Limited	Aquaculture	Eastern
28.	US Fisheries (Sedorm)	Aquaculture	Eastern
29.	Vegpro Ghana Limited	Irrigation	Volta
30.	Vision 2000 Company Limited	Aquaculture	Eastern
31.	West African Fish Limited	Aquaculture	Eastern
32.	Wofa Kissi Herbal Product	Recreational	Ashanti

As part of efforts to improve compliance monitoring, WRC initiated the process of acquiring simple and inexpensive but effective water testing equipment. The equipment is expected to be available for use in 2013.

2.4 Administration of Drillers Licence and Groundwater Development Regulations

A total of twenty-four (24) well drilling licenses were issued in the following categories:

- Category A: Companies with 5 or more water well drilling rigs – 2 licenses
- Category B: Companies with at least 2 water well drilling rigs – 2 licenses; and
- Category C: Companies with leased or 1 water well drilling equipment – 20 licenses

The WRC also published the 4th Drilling Licence Register at the end of 2012, which showed a total of 108 registered drilling licence holders as against the 102 registered in 2011.

Table 3 gives a summary of the licences issued, while details of the Drillers' Licence register are presented in Appendix 3.

Table 3: Summary of New Drilling Licenses issued in 2012

No.	Organisation	Category	License Number
1	Aquamasters Company Limited	A	WRC/WDL/100/12
2	Indo-Ghana Borehole Services Limited (renewal)	A	WRC/WDL/060/12
3	MTL Boreholes Limited	B	WRC/WDL/103/12
4	Gemrock Drill Ghana Limited	B	WRC/WDL/121/12
5	Sem Equipment Limited	C	WRC/WDL/101/12
6	Bengyee Water Works Company Limited	C	WRC/WDL/102/12
7	Andeg Limited	C	WRC/WDL/104/12
8	Heisa Engineering Company Limited	C	WRC/WDL/105/12
9	Akira Limited	C	WRC/WDL/106/12
10	Joanasco Company Limited	C	WRC/WDL/107/12
11	Multi-Hydro Technique Limited	C	WRC/WDL/108/12
12	Abowta and Sons Company Limited	C	WRC/WDL/109/12
13	ERSFA Limited	C	WRC/WDL/110/12
14	Blessed Field Limited	C	WRC/WDL/111/12
15	Dadick Limited	C	WRC/WDL/112/12
16	IP Engineering & Consultancy Limited	C	WRC/WDL/113/12
17	Hydronomics Limited	C	WRC/WDL/114/12
18	IB - Max Company Limited	C	WRC/WDL/115/12
19	Springer Ghana Limited	C	WRC/WDL/116/12
20	Country Water Limited	C	WRC/WDL/117/12
21	GC Bescom Limited	C	WRC/WDL/118/12
22	Geocoast Engineering Services Limited	C	WRC/WDL/119/12
23	Amazing Tramensco Limited	C	WRC/WDL/120/12
24	EE & E Construct Limited (renewal)	C	WRC/WDL/014/12

CHAPTER 3 - MANAGEMENT OF PRIORITY RIVER BASINS

Programs and activities such as the administration of regulations, public awareness creation and education, and monitoring continued in the functional priority river basins of the Densu, White Volta, Ankobra and Pra (Offin). These were towards improving the processes of implementing IWRM in Ghana.

3.1 Densu Basin

3.1.1 Densu Basin Board

The Densu Basin Board (DBB) held three meetings and undertook three (3) ecological monitoring programmes on current ecological trends within and around the Basin.

3.1.2 Regulatory Activities

The Densu Basin Secretariat assisted with the identification of new major and minor water users. Three (3) new users were identified within the basin including Boi Water Company Limited at Pantang and two other water tanker companies that are abstracting water from boreholes for sale at Kwabenya. These users have begun the application processes to enable them acquire water use permits.

3.1.3 Awareness Creation, Education and Training

Activities held were generally geared towards enhancing the public's knowledge and appreciation of IWRM-related issues at the basin level:

- Three (3) radio and one (1) television programmes were carried out, while two print media houses (Daily Graphic and Ghanaian Times) were engaged for the handing over ceremony of equipment for monitoring the Weija Lake.
- Seven micro projects were approved during the year. Six of the projects were on sensitization and education of communities and other relevant stakeholders within the Basin. The community groups and NGOs that undertook the micro-projects were:
 1. Global Organization for Fundamental Aid (GOFA)
 2. School Health Educational Programme (SHEP)
 3. Earth Service
 4. Zongo Youth Foundation (ZYF)
 5. Center for National Culture
 6. Fianko Foundation
 7. Weija Lake Protection Association (WLPA)
- 2 CBOs and 9 schools were educated on the use of water monitoring kits as part of the World Water Monitoring Day (WWMD) program (Figures 2 and 3).

3.1.4 Collaborative and Coordinative Activities

A number of collaborative and coordination activities were organised with DAs, the general public and stakeholder organizations to deal with issues such as encroachment, inappropriate fishing practices, stone quarry, and sand winning. The activities included:

- Continued collaboration with the Ga South Municipal Assembly, the military and police to enforce laws to protect the Weija Dam. However, legal (land ownership and

compensation) issues relating to the demolition of unauthorized buildings at the Joma portion of the Weija Acquisition have not been resolved.

- Equipment including Outboard Motor and life jackets were donated to the WLPA to assist in the monitoring of illegal activities and to promote conservation activities on the lake (Figures 4 and 5).
- Continuous monitoring of the utilization and maintenance of sanitation facilities provided under the Urban Catchment Management Project.
- Collaboration with the Nsawam Adoagyiri Municipal Assembly and GOFA to find solutions to the pollution of the Densu River by the Nsawam Prisons.

3.1.5 Implementation of the Densu Basin IWRM Plan

The Densu Basin IWRM Plan has a list of prioritised actions and measures, which attempts to address a broad spectrum of water management issues identified for the Densu Basin. The routine actions and measures were undertaken as part of the Secretariat's activities.

3.2 White Volta Basin

3.2.1 White Volta Basin Board

The 17-member White Volta Basin Board (WVBB) held one meeting during the reporting year.

3.2.2 Collaborative and Coordinative Activities

Most activities within the basin were undertaken in relation to the review of the Climate Change Adaptation interventions and the development of Flood Early Warning Systems. The results are elaborated under the chapter on Water Resources Assessment and Planning Programs.

3.3 Ankobra Basin

3.3.1 Ankobra Basin Board

The Ankobra Basin Board (ABB) met once focusing on the impact of illegal mining, especially the alluvial mining in the water bodies. The Technical Committee of the ABB also met specifically to develop strategies towards addressing the illegal mining.

3.3.2 Regulatory Activities

The Secretariat assisted in the administration and compliance monitoring of regulations by undertaking regular and continuous inspection of water abstraction points and process applications (Figure 6).

3.3.3 Collaborative and Coordinating Activities

Collaboration with the Regional Security Council on the illegal alluvial mining activities resulted in a reconnaissance survey with the Regional Police and the Army Commands. A combined team of Police, Army, Navy, Immigration and the Press went on an operation in February 2012 and arrested about 32 foreign and local illegal alluvial miners (Figure 7).

A consultative meeting was held with the President of the Wassa-Fiase Traditional Council on December 4, 2012. The meeting agreed to initiate steps to flush out illegal miners, especially alluvial miners, in the Ankobra River and its tributaries such as the Bonsa River (Figure 8).

3.4 Pra Basin

3.4.1 Pra Basin Board

The Pra Basin Board (PBB) met three times during the year. The three (3) working committees namely: Programs and Budget, Public Awareness and Education, and Technical also met and developed their respective Terms of Reference and programs for the year.

3.4.2 Ecological Monitoring

The Pra Basin Secretariat, as part of the periodic ecological monitoring activities, visited various water bodies and communities to observe trends in the water quality and interacted with host communities within the basin on IWRM challenges to inform solutions. Monitoring was carried out upstream and mid-stream of the Offin sub-basin. The rivers/streams and locations at which the monitoring took place included:

River Offin	-	Offinso
River Oda	-	Ejisu
River Dwashen	-	Boko
River Asuoabena	-	Akyeremade
River Anomakosa and Aboaso Stream	-	Asuofua Asamang
River Pra	-	Twifo Praso
River Oda	-	Asumanya
River Dankran	-	Dwumakro
River Atakorowa	-	Kokyerekrom
Aprapo Stream	-	Aprapo
Unknown Stream at Asokwa	-	Before the SDA Senior High School
Unknown Stream	-	Sawaaba
Adankraja Stream	-	Adankraja
River Owabi	-	Owabi Head works
River Sisa	-	Asaago and Sokoban
River Daban	-	Daban and Sokoban
River Suatem	-	Odeneho Kwadaso, Dakwadwom and Adiebeba

Most of the water bodies had been polluted and their buffer zones encroached on. Nonetheless, the quality of some of the rivers such as River Oda at Ejisu was fairly good. The buffer widths were measured in some instances to ensure that they conformed to the stated widths in the Buffer Zone Policy, while in some instances the water quality parameters were tested (Figures 9 and 10).

3.4.3 Regulatory Activities

The Secretariat assisted in the site visits of five (5) new water users (refer to Table 2). The application of Juaben Oil Mills was being processed as at the end of 2012.

The PBB initiated action that confirmed the report that an illegal cage aquaculture project was ongoing on the Lake Bosomtwe and the secretariat proceeded with actions to halt the project. The operator was initially given twenty-one (21) days to remove the fish cages from the Lake, but after an appeal by the operator, the enforcement notice was extended to five (5) months ending 31 December 2012.

3.4.4 Awareness Creation, Education and Training

The public awareness and education activities that were undertaken in the basin during the year were as follows:

- Members of the Public Awareness and Education Committee of the PBB were trained to be able to engage in active awareness creation in the Basin;
- Introductory letters and flyers were sent to all Metropolitan/Municipal/District Assemblies within the Offin Sub-Basin;
- Radio programs were organized at three (3) radio stations in Kumasi to educate the public to assist in water resources management. After the radio program a ‘water ambassador’ was selected based on her immense contributions during the phone-in session;
- Honoured an invitation to another Kumasi-based radio station (K Fm) to educate the public on the WWMD program; and
- Used the opportunities at workshops attended as platforms to educate participants on water management issues and also the operations of WRC.



Figure 2: Students uploading data after the WWMD field work



Figure 3: The Densu Basin Officer giving a demonstration to students during the WWMD



Figure 4: Monitoring equipment donated to the Weija Lake Protection Association



Figure 5: Carrying out routine monitoring with the donated Equipment on the Weija Lake



Figure 6: Compliance Monitoring; a water dam at Noble Gold



Figure 7: Some suspected foreign nationals involved in illegal mining



Figure 8: The Assistant Ankobra Basin Officer making a presentation at the Traditional Council meeting



Figure 9: Fairly good water quality of River Oda at Ejisu



Figure 10: Assistant Pra Basin Officer assisting in measuring the buffer width along the River Offin at Offinso



Figure 11: Pra Basin Officer testing water quality parameters of Aboaso Stream at Asuofua Asamang

CHAPTER 4 - PUBLIC AWARENESS AND EDUCATION

Public awareness and education activities that were specific to each of the functional River Basin offices and boards have been put out under their respective section in chapter 3 of this report. The activities and programs presented in this chapter were undertaken at the national level.

4.1 Review of Communication Strategy

The revised WRC Communication Strategy and Action Plan 2012-2016 were published and implementation commenced. The strategy serves as a 'guideline' to deliver structured and professional communication interventions to facilitate a wider reach to the intended targets.

4.2 Public Awareness Creation in IWRM

A number of awareness creation and education workshops were organized for target groups to promote and facilitate IWRM awareness at all levels. Two training workshops were held in August and November 2012 for about 60 police prosecutors in the three northern regions and the Volta region respectively. The sensitization of police prosecutors focused on the enforcement of water laws, and strengthened the capacity of law enforcement agencies in the management of water resources.

Another workshop was organised in collaboration with Care International on water laws and regulations for about 40 key water managers including traditional authorities in Wa in the Upper West Region.

4.3 Educational Materials and Publications

As part of promoting and increasing awareness on IWRM 5,000 Densu Basin flyers and 1,500 branded Tee shirts on the World Water Day were printed for distribution.

4.4 World Water Day

The theme for the 2012 World Water Day celebrations was 'Water and Food Security: Call for Solutions'. The celebration in Ghana drew national attention to the relationship between water and food security.

A durbar and flag-hoisting ceremony was held on the actual day March 22, 2012 at Asutuare, Greater Accra region to climax the celebrations. The event attracted a cross section of stakeholders including community members, students, traditional leaders, assemblymen and women, private companies, and allied governmental agencies.

Other activities that were carried out included:

- Radio and television programmes in Accra and on a local radio station at Asutuare before the day.
- Publication of feature articles and editorials in newspapers on the theme.
- Inter schools debate, essay, and drawing competitions for selected senior high, junior high and basic schools respectively in the Dangme West district.
- A water awareness walk and health screening exercise in Accra on Saturday March 17, 2012.

CHAPTER 5 - WATER GOVERNANCE ACTIVITIES

5.1 Policy Development

The main policy initiated by the WRC, the harmonized Buffer Zone Policy, seeks to ensure that land strips/areas along open water bodies (rivers, streams, lakes) are designated and managed as conservation areas to restore, conserve and maintain the ecological integrity and provide optimal socio-economic benefits of such designated areas.

Cabinet finally adopted the Buffer Zone Policy in December 2012 for implementation.

5.2 Development and Review of Legislative Instruments

The Commission is developing the third Regulations, which is on dam safety. The aim is to regulate all relevant activities related to dam design, construction, operations, maintenance, and decommissioning to ensure uniform and adequate level of safety for all dams in Ghana.

The Dam Safety Regulations document was finalised and submitted to the Ministry of Water Resources, Works and Housing to be forwarded to the Attorney General's Department.

Furthermore, the proposed amendments to the WRC Act 522 and Water Use Regulations LI 1692 were submitted to the Attorney General and Minister of Justice. The proposed amendments are with respect to the following:

- a. Membership of the Commission - Section 3 of Act 522;
- b. Grant of Water right - Section 16(3) of Act 522;
- c. Parliamentary Ratification - Section 16 (8)(9) of Act 522;
- d. Penalty for Offences - Sections 24 and 34 of Act 522; and
- e. Water uses exempted from permitting but to be registered (Water Use Regulations L.I. 1692 (2001) - 10 (1a).

5.3 Establishment of Water Governance Institutions

WRC continued with the process of establishing new governance institutions in the form of river basin secretariats and their functional Boards as well as a dam safety unit.

- (i) **Tano Basin Office:** the Tano Basin office was completed and two staff made up of the Basin Officer and the Assistant Basin Officer were recruited for the day-to-day management of the basin activities. The Tano Basin Board (TBB) was also constituted and inaugurated on August 7, 2012.

Activities commenced with the staff undertaking familiarization visits and consultations with the Brong Ahafo Regional Coordinating Council, Municipal and District Assemblies, and partner institutions in the basin. Others included field visits to identify water users, and to ensure compliance of permit conditions by Newmont Ghana in Kenyasi, Pure Company Limited in Benkrom, and Ghana Nuts Company Limited in Techiman.

- (ii) **Birim and Black Volta Basin Offices:** The Birim and Black Volta River Basins were identified as new priority basins that require decentralised secretariats and Basin Boards to assist in the management of the water resources. Consultations with selected stakeholders in the two basins started, but practical actions would commence in 2013.

(iii) National Dam Safety Unit (NDSU): the NDSU is envisaged to be the centralised body responsible for administering the regulations and coordinating activities on dams to ensure that adequate and uniform level of dam safety is maintained with respect to the failure consequences the dam imposes. During 2012, WRC continued with the provision of secretarial and technical backup towards the formal establishment of the NDSU.

CHAPTER 6 - WATER RESOURCES ASSESSMENT AND PLANNING PROGRAMS

6.1 Water Quality Assessment

The water quality monitoring program covered 40 monitoring stations over the country. In all, thirty-one (31) river stations and nine (9) reservoir/lakes stations were monitored during the year. The breakdown of monitoring stations is as follows:

South-western System	- 19 stations;
Coastal System	- 8 stations;
Volta System	- 13 stations.

Sampling of the rivers and lakes was undertaken in the months of March and October 2012. Assessments were carried out on physico-chemical water quality parameters including Temperature; pH; Conductivity; Total Suspended Solids; Transparency; Nutrients; Major Ions; Micro-Organic Pollutants; Trace metals in water and fish; and sediment analysis.

Fish were analysed for five trace metals, Fe, Zn, Pb, Cd and Hg from 6 stations out of the planned 12 stations. All fish analysed were *Tilapia sp.* The metal concentrations found in the fish were within the WHO guidelines and therefore will not have any implications on health.

Coliform bacteria was high in all the rivers analysed for the study period, making the rivers possible sources of gastro-intestinal disease infection if not treated before use for domestic purposes. The detection certain phytoplankton such as *Euglena*, *Phacus* and *Trachelomonas* is an indication of organic pollution and high human waste.

Table 4 shows that 22 of the waters monitored were classified as Class III (*poor water quality*), and the remaining 18 were in Class II (*fairly good water quality*). The quality of the waters, which has been deteriorating, worsened in 2012. This could be due to 'galamsey' and improper disposal of waste and degraded banks of the rivers.

Table 4: River Stations Water Quality Index (WQI) for River Systems (2010-2012)

Station	Mean-2010	Class	Mean-2011	Class	Mean -2012	Class
Weija Lake	61.5	II	53.2	II	49.0	III
Potroase - R. Densu	76.0	II	62.2	II	50.4	II
Mangoase - R. Densu	57.3	II	52.3	II	27.0	III
Nsawam - R. Densu	53.9	II	52.4	II	47.6	III
Mankrong J- R. Ayensu	58.9	II	59.5	II	50.4	II
Osino - R. Birim	56.8	II	51.2	II	51.8	II
Akim Oda-R Birim	58.3	II	53.5	II	44.9	III
A Brenase-R.Pra	64.2	II	57.1	II	46.2	III
Twifo-Praso - R. Pra	58.9	II	49.4	III	49.0	III
Daboase - R. Pra	56.8	II	55.3	II	46.2	III
Dunkwa-On-Offin -R. Offin	57.8	II	49.0	III	39.7	III
Adiembra - R. Offin	61.4	II	55.3	II	46.2	III
Lake Barekese - R. Offin	59.6	II	57.1	II	60.8	II
Lake Bosomtwe	56.3	II	49.8	III	43.6	III
Ekosi- R. Ochi-Nakwa	59.0	II	57.3	II	39.7	III
Mankesim- R. Ochi-Amisa	60.4	II	62.7	II	56.8	II
Baafikrom Reservoir	71.2	II	67.8	II	56.3	II
Lake Brimso- R. Kakum	59.7	II	60.7	II	54.8	II
Ewusijo- R. Butre	71.3	II	67.3	II	46.2	III
Bonsaso - R. Bonsa	65.7	II	58.3	II	47.6	III
Ampansie	59.6	II	48.5	III	40.9	III

Station	Mean-2010	Class	Mean-2011	Class	Mean –2012	Class
Dominase - R. Ankobra	55.2	II	57.2	II	51.8	II
Prestea - R. Ankobra	63.5	II	54.3	II	49.0	III
Elubo – R. Tano	64.3	II	61.0	II	38.4	III
Sefwi-Wiawso - R. Tano	59.2	II	59.5	II	54.8	II
Tanoso - R. Tano	63.4	II	61.0	II	51.9	II
Dadieso R. Bia	60.8	II	59.9	II	47.6	III
Aframso - R. Afram	55.8	II	63.5	II	54.3	II
Hohoe - R. Dayi	74.0	II	57.3	II	62.4	II
Damanko – Oti	61.5	II	63.1	II	47.6	III
Sabari - R. Oti	65.7	II	61.9	II	42.3	III
Saboba -R. Oti	64.0	II	58.1	II	46.2	III
Pwalugu -White Volta	55.8	II	59.9	II	62.4	II
Nabogo - White Volta	61.9	II	60.4	II	39.7	III
Daboya - White Volta	61.5	II	61.8	II	44.9	III
Buipe - Black Volta	63.8	II	67.4	II	50.4	II
Bamboi - Black Volta	68.5	II	64.4	II	54.8	II
Ajena - Main Volta	73.0	II	69.3	II	65.6	II
Kpong - Main Volta	70.6	II	68.5	II	64.0	II
Sogakope - Lower Volta	67.8	II	55.8	II	60.8	II

Water Quality Classification System

>80: Class I - Good water quality

25 – 50: Class III - Poor water quality

50 – 80: Class II - Fairly good water

< 25: Class IV- Grossly polluted water

6.2 Hydrogeological Assessment

Most of the hydrogeological assessment activities were on improving the knowledge base and comprehension of the hydro-geological make-up of the three (3) regions in Northern Ghana.

One field monitoring and sampling campaign was undertaken on the 37 monitoring wells and the groundwater levels made available in a report during the reporting period. However, data gaps were experienced in the groundwater level data due to the failure of field recording devices and inadequate spares to replace the dysfunctional devices.

In order to promote access to reliable hydrogeological /groundwater related information/data the hydrogeological database was put in place, is in a functioning state, and successfully harmonized. However, there was not much progress in updating the database for analyzing the trends in groundwater resources systems. The non-availability of personnel responsible for database update remains the major challenge to the database management.

6.3 National and River Basin IWRM Plans

At the end of 2012, the IWRM Plans for the Pra and Tano River basins were finalised and published. The IWRM plan for the Dayi river basin was completed but awaiting publication. Each of the river basin IWRM plans serves as a 'blue print' with prioritised list of actions and measures to address basin specific water management issues and to guide the utilisation and improvement of water resources.

The National IWRM Plan was also completed and published in 2012. The plan sets out the direction and implementation framework for the legal and institutional development to achieve the overall goal of the water resources management part of the National Water Policy.

6.4 Climate Variability and Change Initiatives

The 2-year Danida supported 'Climate Change Adaptation through Integrated Water Resources Management' project ended in 2011. However, follow up observations noted that some facilities required additional works for functionality in some beneficiary communities. After presentations by Danida to the effect that the 'unfinished business' needed to be completed, WRC initiated action to complete of the works in 2012.

Six beneficiary communities Apatanga, Penda, Daboya, Soba, Kukobila and Tali, had facilities that required either additional and/ or rehabilitation works. The additional and or rehabilitation works were satisfactorily completed as depicted in Figures 12-15.

Apatanga: Spillway before rehabilitation



Apatanga: Spillway after rehabilitation



Figures 12: Spillway of a small reservoir at Apatanga in the Bongo District

Daboya: Unroofed storage water tank



Daboya: Roofed with gutters on the sides



Figures 13: Before and after covering of rainwater harvesting facility at Daboya community

Sooba: Broken wall of water facility



Sooba: Water facility wall rehabilitated



Figures 14: Before and after rehabilitation of flood water harvesting facility at Sooba

Sooba: Toilet facility without gates



Sooba: Toilet facility gated and mounted with seats



Bunyamo: Toilet facility without gates



Bunyamo: Toilet facility gated and mounted with seats



Figure 15: Toilet facilities provided to Sooba and Bunyamo communities

6.5 Flood Hazard Assessment - White Volta Basin

A World Bank supported project was initiated in 2011 to perform a Flood Hazard Assessment study for the White Volta River. The study was to investigate the scale and severity of flood hazards, assess the effectiveness of structural and non-structural measures to mitigate flood damages in the future, and develop a Flood Early Warning System (FEWS) for flood forecasting, flood warning and flood crisis management.

The end of 2012 had realized most of the expected outputs including the following:

- FEWS model was developed based upon a thorough understanding of the hydrology and river hydraulics using a custom built dynamic model of the river system. The model is based on data from river gauges and meteorological stations in the White Volta, a Digital Terrain Model (DTM) for the flood-prone area based on SPOT Satellite Imaginary and a bathymetric survey of the White Volta and the downstream parts of the main tributaries. The model was further used to easily manage and statistically validate the vast amount of input data.
- The FEWS-evaluation was carried out during the wet season (August, September and part of October 2012). Forecasts were made and disseminated, field data were collected and FEWS was evaluated.
- Flood hazard and risk maps were produced at scales 1:50.000 and 1: 25.000, depicting flood duration, expected depth and inundated areas for 2 to 5 year return periods and 10 to 100 years return period. The flood hazard maps were clustered in 2-5 and 10-100 years return periods, because the maximum flood levels of these events were very similar.
- The results of the flood genesis indicated that floods in the White Volta build up gradually and are not triggered by a specific rainfall event; the effect of spilling from the Bagre dam is limited and may predominately play a role in the upstream areas close to the border with Burkina Faso; the total volume from Burkina Faso is about 20-30 % of the total volume at Yapei; individual tributaries have limited effect on the White Volta flood levels; and the Red Volta, Bagre spilling, and in general the White Volta flows from Burkina Faso have an effect on the White Volta between Yarugu and the confluence with the Kulpawn.
- The flood mitigation measures include the Pwalugu reservoir (including various management options); retention in tributaries; and restoring old river arms. Furthermore, the FEWS model has demonstrated that it is capable of assessing a vast number of flood mitigation measures.

Additional activities that were carried out include:

- Model building and morphological training of WRC, HSD, VRA and WRI officers to develop a preliminary morphological model of the White Volta and to increase national capacity and awareness in the field of morphological processes and morphological tools.
- Assessment of Tropical Rainfall Measuring Mission (TRMM) and its inclusion in the FEWS-Volta. It was realized that the TRMM provides satellite rainfall data and it improves the sustainability, robustness and accuracy compared to only using the forecast rainfall data.
- Hydrological models used in FEWS-Volta were re-calibrated on TRMM data within a project commissioned by Wienceo Ghana Ltd. The improved models were included in FEWS-Volta.
- Key staff of the participating institutions, including WRC, VRA, HSD, and GMet were trained in the use of the FEWS.

CHAPTER 7 - TRANSBOUNDARY WATER MANAGEMENT

The WRC continued with its role as the national focal institution charged with coordinating international cooperation and initiatives to improve water governance at the transboundary level.

7.1 The Volta Basin Authority

The Volta Basin Authority (VBA), which was formally established in August 2009, seeks to ensure international cooperation for the rational and sustainable management of the water resources of the Volta basin shared by six (6) countries: Burkina Faso (42.95%), Ghana (41.63%), Togo (6.41%), Benin (3.42%), Mali (3.12%), and Ivory Coast (2.48%).

During the year 2012, VBA undertook activities towards the following strategic outcomes:

Council of Ministers Meeting

The 4th session of the Council of Ministers of the VBA was held on 27 February 2012, in Abidjan, Cote d'Ivoire. The meeting was preceded by that of an ad hoc recruitment committee consisting of VBA National Focal Points from 21 to 22 February 2012 and the preparatory session of the VBA Experts Committee from 23 to 25 February 2012.

The Council of Ministers agreed on the following:

- Approved the Report of the 1st meeting of the VBA Forum of Parties held on 17-19 January 2012 in Ouagadougou, Burkina Faso;
- Approved the VBA Progress Report (January 2010 to December 2011) and 2012 Work Plan and Budget;
- Invited the member States to pay their financial contributions for 2012 as well as the outstanding arrears for the period 2009, 2010 and 2011, where applicable, by the end of the 2nd quarter of 2012 to facilitate the functioning of VBA;
- Proposed the nomination of the Executive Director of the Volta Basin Authority, in the person of Dr. Charles A. Biney (Ghanaian), to the Summit of Heads of State and Government;
- Nominated the Deputy Executive Director, Mr. Yao Tete Mawussy Atikpo (Togolese);
- Nominated new recruitments for the positions of Director of Observatory, Head of Translation and Interpretation Unit, Web Master, Head of Finance and Accounts Unit and Bilingual Secretary;
- Instructed the Acting Executive Director to continue the recruitment of priority personnel for VBA;
- Authorized the change of name of the Fisheries Unit of the Volta Basin Authority to Fisheries and Aquaculture Unit;
- Instructed the Executive Directorate to initiate a study on sustainable and autonomous financing of the Volta Basin Authority and propose concrete mechanisms by the next meeting of the Council of Ministers; and
- Instructed the Executive Directorate to initiate a study on the revision of the salary levels of the Volta Basin Authority personnel.

Forum of Parties

The Forum of Parties Involved in the Development of the Volta Basin was established and held its 1st meeting from 18 to 19 January 2012 in Ouagadougou, Burkina Faso. The 1st meeting was within the framework of strengthening the institutional capacity of VBA and operationalising its permanent bodies. It was attended by twenty-two (22) Members of the Forum representing water users, civil

society concerned with the management of water resources and local communities of each national portion of the Basin, and led by the Focal Point of each Member State.

Recommendations were made to various organs of the VBA. However, those specific to the Members of the Forum were as follows:

- To collectively increase public interest in the management of water resources for the benefit of economic and social development of the Volta River Basin;
- To support the projects and activities of the VBA in the Basin;
- To maintain their role as interface between the grassroots communities, civil society and water users on one hand, and the local, national and regional authorities on the other hand;
- To encourage and participate in appropriate communication of current legislation at all levels including their extension to the grassroots;
- To be a platform for proposals for the common interest of the Basin; and
- To present the recommendations of the 1st meeting of the Forum of Parties to the next Council of Ministers on 27 February 2012 in Abidjan.

The presentation was made to the Council of Ministers who congratulated the Forum of Parties on its 1st meeting and urged the Forum to expand its activities to cover the grassroots in each Member State.

Establishing data management and sharing mechanisms

Country consultation and familiarisation visits were undertaken to assess the state of implementation of the Volta Hycos project under AFD funding in the VBA Member States. Some installations of hydrometric stations were visited in Burkina Faso, Benin, Ghana and Togo. The processes of acquisition of hydrological equipment and computers were well advanced in 2012 but have to be restarted in 2013 as a result of procedural differences and long administrative delays that resulted in the cancellation of the contract for the supply of computers and accessories.

Other collaboration initiatives with institutions, project and programmes that progressed during the year include the Tilapia Volta Project, IUCN/PAGEV, UNEP/GEF Volta River Project, CPWF Volta Basin Development Challenge, the ECOWAS/WRCC Dialogue for Infrastructure Development, and the TIGER Initiative.

Knowing the state of water and environmental resources

The study on identification of stakeholders in the basin was completed in 2012. The 1st meeting between VBA and the Civil Society Organisations operating in the area of water resources management and environmental monitoring in the basin was organised in December 2012. Following this meeting, VBA is to start signing MoUs with Civil Society Organizations in the basin.

Strengthening the capacity of VBA

VBA established new partnerships with Seine Normandy Water Agency and Green Cross Burkina Faso, among others.

7.2 Ghana/Burkina Faso Joint-Technical Committee on IWRM

The Ghana-Burkina Faso Joint Technical Committee on IWRM (JTC-IWRM) was set up in 2005 to strengthen the consultation mechanism for the joint management of the natural resources of the Volta Basin and to advise the Ministers in charge of water of the two countries. The WRC is the focal institution for Ghana while the DGRE acts for and on behalf of Burkina Faso.

No formal meeting or activity was held in the year. However, the exchange of hydrological information between the two countries continued especially with respect to the water levels of the Bagre and Komienga Dams during the wet season.

7.3 ECOWAS Water Resources Coordination Centre

The ECOWAS Water Resources Coordination Centre (WRCC) is one of the four organs of the Permanent Framework for Coordination and Monitoring (PFCM) of IWRM in West Africa. ECOWAS Heads of State and Government established the WRCC in December 2001 to promote, co-ordinate, and implement IWRM in West Africa in compliance with ECOWAS mission and policies.

During the year, WRCC produced a manual on 'Guidelines for the Development of Water Infrastructure in West Africa'.

The major activities that WRC participated in were the:

- Validation workshop of the pilot study on the 'Indicators of IWRM in Five Countries' held in Ouagadougou from 20-21 April 2012. It was agreed that a methodological guide with information specifying the definition of the indicators and the methods for calculation was needed to ensure harmonisation among the countries.
- Meeting to validate the studies for the promotion of three (3) new transboundary basin organizations in West Africa including the Comoe-Bia-Tano Basins on 11th July 2012 in Abidjan. The meeting agreed on two issues: the organization should be established as an Authority, and it should be one institution but with separate directorates for each of the three basins.
- 8th Meeting of the Technical Advisory Committee (TAC) of the WRCC. The meeting agreed to advance the following:
 - Implementation of ECOWAS recommendations on the development of water infrastructure in West Africa – the social aspects;
 - Development of methodological tools and approaches to support the practical guide for implementing the recommendations on large water sector infrastructure projects in West Africa;
 - Facilitate collaboration with the Consortium for International Water in Africa (CIWA), which is a new trust fund set up by the World Bank;
 - Validate the action plan for implementation of the Water Resource Policy in West Africa; and
 - Support from the Swedish International Development Agency (SIDA) to further develop aspects of IWRM in West Africa relating to the Mono River Basin Authority; gender; climate change, environmental and anthropogenic hazards; ECOWAS regional water monitoring platform; and capacity building.

7.4 Transboundary UNEP/GEF Volta Project

The UNEP/GEF Volta project, which commenced in January 2008, has been extended to December 2013. The Project is a regional imitative of the six riparian countries sharing the Volta basin and is designed to promote a more sectorally-coordinated management approach, based on the principles of IWRM, at the national and regional levels. The project intends to integrate environmental concerns into development plans of the basin and reduce human activities that lead to water scarcity.

In 2012, activities were carried out at two levels namely coordination of activities at the national level and implementation of the Demonstration 3 project in the Black Volta basin.

Coordination of National Level Activities:

Activities focused mainly on facilitating and supervising implementation of the Demonstration 3 project field interventions:

1. Monitoring mission to the project area and sites to assess and review progress of project implementation, discuss implementation challenges with project partners and make recommendations; and
2. Held the 2nd Project Steering Committee meeting in December 2012 to assess progress of project implementation and address challenges.

Implementation of the Demonstration 3 Project:

1. Four (4) sets of awareness raising campaign materials were developed for the sensitization and training of local stakeholders on forest and water resources management, land degradation, efficient charcoal production and bush fire issues (Figures 16 – 18).
2. About 420 persons (55% were women) took part in the awareness forum organized Bale, Mandari, Senyeri, and Chache communities. Participants acquired knowledge on the following:
 - a. The practical causes of environmental degradation and how to reverse the trend.
 - b. Efficient production of charcoal using improved local methods and practiced during the training on improved charcoal production, as well as the kiln method of charcoal production for commercial purposes.
 - c. Bush fires and how to reduce their destructive effects on crops and woodlands (Figure 19).
3. Plantations were established and maintained at different hot spots identified along the Gbongbong and Doli rivers (tributaries of the Black Volta River) as well as the degraded banks of the main Black Volta.
4. A Project Steering Committee meeting was held on 13 December 2012 at the Offices of Bole Forest District.
5. The 1st Bilateral Steering Committee meeting involving Ghana and Cote d'Ivoire was also held on 14 December 2012 at Bole.
6. Besides the steering committee meeting, the Project Implementing Partners and the Project Management Team held periodic meetings to deliberate on project implementation issues and other relevant matters.



Figure 16: Awareness campaign at Bale

Figure 17: Awareness campaign at Chache



Figure 18: Awareness campaign at Senyeri

Figure 19: Bushfire outbreak at Senyeri

CHAPTER 8 - ADMINISTRATIVE AND HUMAN RESOURCES

8.1 Training Courses

Targeted staff training programs were undertaken both at the national and international levels. The main focus was on competency-based training mainly in water resources management, international water law, dam safety inspection, records keeping, and database management.

Staff of the Commission benefited from the following training programmes and courses:

1. International Centre of Hydropower (ICH) course for Dam Safety Inspection, Trondheim, Norway, June.
2. International Water Laws and Regulations, University of Dundee, Dundee-Scotland, June
3. Mastering the Technique- Drafting Commercial Agreement, July
4. Managing Records in Business Environment, June
5. Personal Geographic Assistant, Mel Consult, Accra, September
6. Monitoring of the Environment for Sustainable Development (AMESD), EPA, December

8.2 Academic Courses

Two (2) staff members, Edwin Afosa Anim and Eric Muala, completed their MSc in Water Management; UNESCO-IHE, Institute for Water Education, Netherlands

Six (6) staff members continued their academic degree programs:

1. Mawuli Lumor: PhD in Climate Change and Land Use, WASCAL
2. Adwoa Dako: M.A. Communication Studies; University of Ghana
3. Joachim A. Abunga: MSc. Water Resources Management, KNUST
4. Florence Akpabli: BSc. Administration; Datalink University
5. Nicholas Owusu: BSc. Administration; IPS
6. Abigail Aziakpor: BSc. Administration; Methodist University

8.3 Workshops, Meetings and Conferences

During the course of 2012, WRC organized or was represented at the following meetings, workshops, and conferences:

1. 1st and 2nd meetings of the Steering Committee of the Sustainable Management of Lake Bosomtwe Project, *UNESCO Biosphere Reserve*, February and November
2. Climate Change Adaptation Experiences and Knowledge Sharing Forum, Centre for African Wetlands, Legon, December
3. Effective Monitoring and Sensitization for all Industrial Mineral Mining Companies and Stakeholders, Minerals Commission, Amasaman, August
4. Environmental Health and Management Training for Artisans from Bekwai, Kumasi, November
5. Estimating Cost of Environmental Degradation, EPA, February and May

6. Handover of the “Ghana National Aquaculture Development Plan” and other associated reports to the Ministry of Food and Agriculture: Technical Cooperation Programme Facility, FAO, Accra, April
7. Meeting of the Parties to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, 6th Session, Rome, November
8. Natural Resources Technical Review Committee meetings, EPA, Accra
9. Payment of Watershed Services, Nature Conservation Research Centre (NCRC), Accra, August
10. Public hearing on the proposed gold mining and processing project by Adansi Gold Company Limited, Manso Nkran, Amansie West District, July
11. Seminar on National and Trans-boundary Water Resources Management in Africa, United Nations University, Dodowa, March
12. Seminar on River Tordzie Biodiversity Conservation Initiative, ADICODE and CODEG (NGOs), Kpetoe, March
13. Stakeholder Consultation on the Draft National Biodiversity Strategy and Action Plan (NBSAP), EPA and National Biodiversity Committee, Kumasi, August
14. Stakeholder Consultative Meetings on the JICA Study of Comprehensive Urban Development Plan for Greater Kumasi organized by the Regional Town and Country Planning Department, Kumasi. April, June and November
15. Technical Committee meetings on the proposed dredging of the Owere River by two (2) small scale mining groups, Asante Akim Central Municipal Assembly, Konongo, Twenty-four (24) meetings from April – November
16. Workshop on Biodiversity Strategy and Action Plan, EPA, Akosombo, September
17. Workshop on Research into Strategic Action Platform (Re-SAP), International Water Management Institute (IWMI), Accra, May
18. WRC-EPA Working Group Meetings on streamlining of permitting processes/procedures and monitoring of permitted Volta Lake resource users, July – October

8.4 Human Resources

The Commission had 31 staff members (19 male and 12 female) at post. The number of senior staff was 19 with the remaining 12 as junior staff. One staff left the Commission through resignation. The staff members at post as at the end of the year were:

Non-Contract Appointments

- | | |
|----------------------------|-------------------------------------|
| 1. Ben Y. Ampomah | Ag. Executive Secretary (Economist) |
| 2. Dorcas A. Paintsil | Water Quality Specialist |
| 3. Francis Kwadade- Cudjoe | Information Technology Specialist |
| 4. Enoch B. Asare | Ground Water Specialist |
| 5. Bob Alfa | Surface Water Resources Engineer |
| 6. Bernadette Adjei | Lawyer |
| 7. Esi E. Biney | Ecologist |
| 8. Linda G. Ennison | Ag. Admin. Officer |
| 9. Adwoa M. Dako | Public Relations Officer |
| 10. Stephen A. Boateng | Accountant |

11. Aaron Bundi Aduna	Basin Officer, White Volta Basin
12. Mawuli Lumor	Basin Officer, Ankobra Basin
13. Ronald Abrahams	Basin Officer, Densu Basin
14. Dufie Adu Pako	Basin Officer, Pra Basin
15. Solomon Danso Ankomah	Basin Officer, Tano Basin
16. Edwin Afosah-Anim	Assistant Officer (Planning)
17. Eric Muala	Assistant Officer (Legal & Monitoring)
18. Joachim Ayiwe Abunga	Assistant Officer (White Volta Basin)
19. Fred Wiredu Bremang	Head Office, Accra
20. Edward A. Gyasi	Accounts Clerk
21. Dorcas Abban	Administrative Assistant, Densu Basin
22. Florence Akpabli	Secretary/Receptionist, Head Office, Accra
23. Nicholas Sakyi Owusu	Accounts Clerk II, Head Office, Accra
24. Laiza Sulley	Secretary, White Volta Basin, Bolgatanga
25. Emmanuel Mensah	Office Assistant, Head Office, Accra
26. Edward Toah	Driver Head Office, Accra
27. Samuel Quaye	Driver, Head Office, Accra
28. Daniel Botwe	Driver, Head Office, Accra
29. Abigail Aziakpor	Secretary/Receptionist, Head Office, Accra
30. Paapa Salifu	Cleaner/Gardener Head Office, Accra
31. Grace Quarcoe	Assistant Administrative Officer, Tarkwa

Contract Appointments

1. Brenda Ampomah	Assistant Officer, Densu Basin
2. Francis Swanzy	Assistant Officer, Ankobra Basin
3. Belinda Pra	Assistant Officer, Tano Basin
4. Yaw Boateng Opoku	Assistant Officer, Pra Basin
5. Kwadwo Twum Karikari	Accounts Clerk, Accra
6. Aminatu Mohammed	Assistant Officer, Admin, Head Office, Accra
7. Stella Awusi	Cleaner, Koforidua
8. Joyce Annor	Cleaner, Accra
9. Elizabeth Quicoe	Cleaner, Tarkwa
10. Pascalina Nsoh	Cleaner, Bolgatanga

Resignation

Christine Young	Assistant Officer (Legal and Monitoring)
-----------------	--

CHAPTER 9 - TECHNICAL ASSISTANCE

9.1 Danish International Development Assistance

A 2-year Danida support program was initiated in 2009 and ended in 2011. The program was designed to address climate variability and change by introducing adaptation measures in water resources management to improve livelihoods of the vulnerable in the three northern regions. However, additional activities were carried out in 2012 to ensure completion and/or rehabilitation of some works on the facilities provided to selected communities (Refer to section 6.4).

9.2 Norwegian Agency for Development Cooperation

The Norwegian Agency for Development Cooperation (NORAD) is providing a 3-year assistance for the establishment of a National Dam Safety Unit and the development of Dam Safety Regulations. The project formally started in 2010 and is extended to end in 2013 (Refer to sections 5.2 and 5.3).

9.3 Africa Water Facility

WRC is the executing agency for two (2) projects supported by the African Development Bank through the Africa Water Facility (AWF):

- Re-optimization of Operations of Akosombo and Kpong Dams on the Volta River Project: seeks to explore how the two dams could be reoperated to achieve among others the simultaneous outcomes of restoring downstream ecosystems and human livelihoods; increasing the total electric power output; increasing the reliability of water supply for hydropower generation; and reducing the incidence of water borne disease vectors. It is being implemented with other local and external partners (Volta River Authority, Water Research Institute, Institute of Environment and Sanitation, Centre for African Wetlands, International Water Management Institute (IWMI), and National Heritage Institute of California).
- Design For Reuse – Harvesting the Value of Effluent and Nutrients for Sustaining the Operation of Sanitation Facilities Project. The project aims at improving the public health and environmental integrity in urban and peri-urban Ghana through the provision of reliable and complete sanitation by increasing the reuse of treated effluent and nutrients. IWMI is the main implementing partner.

9.4 World Bank

The WRC is hosting the World Bank supported 2-year White Volta Flood Hazard Assessment project, which technically ended in 2012 but practical field tests, will continue in 2013.

The White Volta Flood Hazard Assessment covered the genesis of the floods of the White Volta, the exposures of various assets and communities to floods, the effectiveness of structural and nonstructural measures to reduce flood impacts, and an operational flood forecasting system for the White Volta from its border with Burkina Faso to the Volta Lake.

CHAPTER 10 - FINANCIAL STATUS

10.1 Audited Financial Statements

The audited financial statements indicate that total income for 2012 was GH¢3,118,474. On the other hand, details of expenditure show that general administrative expenditure for the period amounted to GH¢1,779,031 showing a net gain of GH¢1,339,443. The balance as at 1 January 2012 was GH¢1,294,086 hence the recorded balance as at 31 December 2012 was GH¢2,633,529.

Details of the key components of the audited financial statements comprising the Income and Expenditure Account and Balance Sheet for the year ended 31st December 2012 are presented below.

INCOME STATEMENT FOR THE YEAR ENDED 31 DECEMBER 2012

	2012 GH¢	2011 GH¢
Income (IGF)	738,720	518,882
Other Income	<u>2,379,754</u>	<u>1,445,113</u>
Total Income	3,118,474	1,963,995
General administration expenses	(1,779,031)	(2,313,643)
Net income/ (loss) for the year	<u>(1,339,443)</u>	<u>(349,648)</u>

STATEMENT OF CHANGES IN EQUITY FOR THE YEAR ENDED DECEMBER 31, 2012

	Development Fund GH¢	Accumulated Fund GH¢	Total GH¢
Changes in equity for 2011			
Balance at 1 January 2011	59,845	1,583,889	1,643,7340
Net Income for the year	-	(349,648)	(349,648)
Balance at 31 December 2011	<u>59,845</u>	<u>1,234,241</u>	<u>1,294,086</u>
Changes in equity for 2012			
Balance at 1 January 2012	59,845	1,234,241	1,294,086
Net loss for the year	-	1,339,443	1,339,443
Balance at 31 December 2012	<u>59,845</u>	<u>2,573,684</u>	<u>2,633,529</u>

BALANCE SHEET AS AT 31 DECEMBER 31, 2012

ASSETS	NOTE	2012 GHC	2011 GHC
Non-current Assets			
Property, Plant & Equipment		611,311	651,042
White Volta Capital Expenditure		17,383	21,869
Pra capital expenditure		26,718	30,285
Tano Capital expenditure		64,444	72,499
		719,856	775,695
Current Assets			
Accounts Receivables		417,623	254,803
Deferred expenditure		2,880	5,761
Prepayment for Residence		4,830	-
Cash & cash equivalents		1,556,945	326,881
		1,982,278	587,445
Total Assets		2,702,134	1,363,140
EQUITIES AND LIABILITIES			
Equity			
Accumulated Fund		2,573,684	1,234,241
Development Fund		59,845	59,845
		2,633,529	1,294,086
Current Liabilities			
Account Payables		68,605	69,054
		68,605	69,054
Total Equity & Liabilities		2,702,134	1,363,140

STATEMENT OF CASH FLOWS FOR THE YEAR ENDED 31 DECEMBER 2012

	2012	2011
	GH¢	GH¢
Cash flow from Operating Activities		
Net Income/ (loss) for the year	1,339,443	(349,648)
Adjustments for Depreciation	175,556	150,429
(Profit)/Loss on disposal of property, plant and equipment	(22,600)	-
White Volta Capital expenditure written off	4,486	4,486
Pra Capital Expenditure written off	3,567	3,567
Tano capital expenditure written off	8,055	8,055
Deferred expenditure written off	2,881	2,881
Operating loss before working capital changes	1,511,388	(180,230)
Increase/decrease in accounts receivables	(162,820)	23,241
Increase/decrease in prepayments for residence	(4,830)	42,949
Increase/decrease in accounts receivables	(449)	29,440
Net cash flow from operating Activities	1,343,289	(84,600)
 Cash flow from investing activities		
Purchase of Property, plant and equipment		(353,968)
Pra capital expenditure		(17,388)
White Volta Capital expenditure		(7,849)
Tano capital expenditure		(80,554)
Receipt from sale of property, plant and equipment	22,600	-
Net cash flow from investing activities	(113,225)	(459,759)
 Net increase (decrease) in cash & cash equivalents	1,230,064	544,359)
 Cash & cash equivalents at 1 January (Note 1)	<u>326,881</u>	<u>871,240</u>
 Cash & cash equivalents at 31 December (Note 1)	<u>1,556,945</u>	<u>326,881</u>

Note 1

Notes to the statement of cash flows

Analysis cash and cash and cash equivalents as shown in the statement of financial position

	2012	2011	Change in year
	GH¢	GH¢	GH¢
Cash on hand	1,603	272,686	(271,083)
Cash at bank	1,556,945	54,195	1,501,147

Appendix 1 Members of the Water Resources Commission

At the end of the year 2012, membership of the Commission was as follows:

1. Mr. Paul Derigubaa - Chairman
2. Dr. Kwabena Kankam-Yeboah - Water Research Institute
3. Mr. Julius Wellens-Mensah - Hydrological Services Department
4. Mr. Zinedeme Minia - Ghana Meteorological Agency
5. Mr. Daniel S. Amlalo - Environmental Protection Agency
6. Mr. Raphael Yeboah - Forestry Commission
7. Mr. Jonathan Ahenkorah - Minerals Commission
8. Mr. Charles K. O. Addo - Volta River Authority
9. Mr. Clement Bugase - Community Water and Sanitation Agency
10. Ms. Victoria Daaku - CONIWAS (NGO Representative)
11. Mrs. Clare Banoeng-Yakubo - Women's Representative
12. Pe Oscar Batabi Tiwiamu II (Kayoro-Pio) - Representative, Traditional Authorities
13. Mr. Ben Ampomah - Acting Executive Secretary, WRC
14. Mr. Zachary Gbireh - Irrigation Development Authority
15. Mr. Ebenezer Garbrah - Ghana Water Company Limited

Appendix 2: Water Use Register for 2012

No	User Name	District/Municipal/Metro	Point of Use	Type of Source	Water Use Activity	Primary Purpose	Expiry date
1	Abosso Goldfields Limited	Prestea Huni-Valley	Damang	Stream	Diversion	Mining	1-Jan-13
2	Adamus Resources Limited	Ellembelle	Nzema Gold Plant	River Ankobra	Abstraction	Mining	1-Oct-13
3	ADM Cocoa Ghana Limited	Kumasi Metropolitan	Kaase	Groundwater	Abstraction	Industrial	1-Jan-15
4	Agricomah Enterprise	North Tongu	Mepe	Lower Volta	Fish Cage	Aquaculture	1-Jan-12
5	AngloGold Ashanti	Obuasi Municipality	Akrofuom, Obuasi	Jimi River	Abstraction	Mining	1-Jan-14
6	AngloGold Ashanti	Wassa West	Iduapriem	Groundwater	Damming	Mining	1-Jan-13
7	Benso Oil Palm Plantation Limited	Mpohor Wassa East	BOPP Estate	Groundwater	Abstraction	Industrial	1-Jan-13
8	Bonte Gold Mines Company Ltd	Amansie-West	Tetrem-Bontefufuo	River Ayensu	Damming	Mining	1-Oct-12
9	Bonte Gold Mines Company Ltd	Amansie West	Bonteso Bontefufuo	Bonte/Jeni Streams	Abstraction	Mining	1-Oct-12
10	Cargill Ghana Limited	Tema Municipal	Industrial	Groundwater	Abstraction	Industrial	1-Jan-14
11	Central Ashanti Gold Limited	Upper Denkyira West	Abnabna & Ayanfuri	Groundwater	Abstraction	Mining	1-Jan-13
12	Central Ashanti Gold Limited	Upper Denkyira West	Abnabna & Ayanfuri	Abnabna Stream	Abstraction	Mining	1-Jan-13
13	Clark Sustainable Resource Dev. (Ghana) Ltd.	Asuogyaman	Sedorm	Volta Lake	Underwater wood harvesting	Industrial	1-Sep-13
14	Clark Sustainable Resource Dev. (Ghana) Ltd.	Asuogyaman	Sedorm	Lake Volta and Groundwater	Abstraction	Industrial	1-Sep-13
15	Crystal Lake Fish Ltd	Asuogyaman	Dodi-Asantekrom	Volta Lake	Fish Cage	Aquaculture	1-Jan-12
16	DMFS Ventures	Ga East	Legon	Groundwater	Abstraction	Domestic/Municipal	1-Aug-12
17	Ghana Manganese Company Limited	Wassa West	Nsuta	Kawere River	Damming	Mining	1-Jan-13
18	Ghana Oil Palm Development Company Limited	Kwaebibirem	Kwae	Groundwater	Abstraction	Industrial	10-Mar-13
19	Ghana Rubber Estates Limited	Ahanta West	Apimenim & Abura	River Suoni & Tsibu/Groundwater	Abstraction	Irrigation	1/1/2014
20	Ghana Water Company Ltd	Asuogyaman	Kpong New	Volta Lake	Abstraction	Domestic/Municipal	31-Jan-17
21	Ghana Water Company Ltd	Asuogyaman	Kpong Old	Volta Lake	Abstraction	Domestic/Municipal	31-Jan-17
22	Ghana Water Company Ltd	Ga West	Weija -Adam Clark	Densu	Abstraction	Domestic/Municipal	31-Jan-17
23	Ghana Water Company Ltd	Ga West	Weija Candy	Densu	Abstraction	Domestic/Municipal	31-Jan-17
24	Ghana Water Company Ltd	Ga West	Weija -Bamag	Densu	Abstraction	Domestic/Municipal	31-Jan-17
25	Ghana Water Company Ltd	Dangme East	Keseve/Adafoah	Volta Lake	Abstraction	Domestic/Municipal	31-Jan-17

No	User Name	District/Municipal/Metro	Point of Use	Type of Source	Water Use Activity	Primary Purpose	Expiry date
26	Ghana Water Company Ltd	Atwima Nwabiagya	Barekese	River Offin	Abstraction	Domestic/Municipal	31-Jan-17
27	Ghana Water Company Ltd	Atwima Nwabiagya	Owabi	Owabi	Abstraction	Domestic/Municipal	31-Jan-17
28	Ghana Water Company Ltd	Sekyere West	Mampong	Kyeremea	Abstraction	Domestic/Municipal	31-Jan-17
29	Ghana Water Company Ltd	Ashanti-Akim North	Konongo	Anunu	Abstraction	Domestic/Municipal	31-Jan-17
30	Ghana Water Company Ltd	Sekyere East	Effiduase / Asokore	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
31	Ghana Water Company Ltd	Obuasi Municipality	Odaso / Obuasi	Odaso	Abstraction	Domestic/Municipal	31-Jan-17
32	Ghana Water Company Ltd	Adansi	New Edubiase	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
33	Ghana Water Company Ltd	Ahafo Ano North	Tepa	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
34	Ghana Water Company Ltd	Agona West	Agona	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
35	Ghana Water Company Ltd	Mpohor Wassa East	Daboase	Pra	Abstraction	Domestic/Municipal	31-Jan-17
36	Ghana Water Company Ltd	Shama Ahanta East	Inchaban	Anakwari	Abstraction	Domestic/Municipal	31-Jan-17
37	Ghana Water Company Ltd	Tarkwa Nsuaem	Bonsa / Tarkwa	Bonsa	Abstraction	Domestic/Municipal	31-Jan-17
38	Ghana Water Company Ltd	Wassa West	Prestea	Groundwater	Abstraction	Domestic/Municipal	31-Jan-17
39	Ghana Water Company Ltd	Wassa West	Bogoso	Groundwater	Abstraction	Domestic/Municipal	31-Jan-17
40	Ghana Water Company Ltd	Wassa West	Aboso	Groundwater	Abstraction	Domestic/Municipal	31-Jan-17
41	Ghana Water Company Ltd	Nzema East	Axim	Denkyemnsule	Abstraction	Domestic/Municipal	31-Jan-17
42	Ghana Water Company Ltd	Nzema East	Axim	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
43	Ghana Water Company Ltd	Jomoro	Elubo	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
44	Ghana Water Company Ltd	Cape Coast Municipality	Brimsu	River Kakum	Abstraction	Domestic/Municipal	31-Jan-17
45	Ghana Water Company Ltd	Twifo Hemang Lower Denkyira	Twifo Praso	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
46	Ghana Water Company Ltd	Mfantseman	Baifikrom	Ochi Amissa	Abstraction	Domestic/Municipal	31-Jan-17
47	Ghana Water Company Ltd	Awutu Effutu Senya	Winneba	Ayensu	Abstraction	Domestic/Municipal	31-Jan-17
48	Ghana Water Company Ltd	Agona	Kwayanku	Ayensu	Abstraction	Domestic/Municipal	31-Jan-17
49	Ghana Water Company Ltd	Asikum-Odoben-Brakwa	Breman - Asikuma	Ochi Nacho	Abstraction	Domestic/Municipal	31-Jan-17
50	Ghana Water Company Ltd	Upper Denkyira East	Dunkwa-Offin	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
51	Ghana Water Company Ltd	Shama	Sekyere - Heman	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
52	Ghana Water Company Ltd	West Akyem	Akim Aboabo	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
53	Ghana Water Company Ltd	Birim South	Akim Oda	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
54	Ghana Water Company Ltd	Birim South	Akim Asene	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
55	Ghana Water Company Ltd	Birim South	Akim Swedru	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17

No	User Name	District/Municipal/Metro	Point of Use	Type of Source	Water Use Activity	Primary Purpose	Expiry date
56	Ghana Water Company Ltd	Kwaebibirim	Asuom	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
57	Ghana Water Company Ltd	Kwaebibirim	Kade	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
58	Ghana Water Company Ltd	New Juaben Municipality	Koforidua	Ayensu	Abstraction	Domestic/Municipal	31-Jan-17
59	Ghana Water Company Ltd	New Juaben Municipality	Koforidua	Volta Lake	Abstraction	Domestic/Municipal	31-Jan-17
60	Ghana Water Company Ltd	New Juaben Municipality	Koforidua	Groundwater	Abstraction	Domestic/Municipal	31-Jan-17
61	Ghana Water Company Ltd	New Juaben Municipality	Suhyen	Groundwater	Abstraction	Domestic/Municipal	31-Jan-17
62	Ghana Water Company Ltd	Asuogyaman	Anum Boso	Volta Lake	Abstraction	Domestic/Municipal	31-Jan-17
63	Ghana Water Company Ltd	Kwahu South	Kotoso	Volta Lake	Abstraction	Domestic/Municipal	31-Jan-17
64	Ghana Water Company Ltd	Kwahu West	Nkawkaw	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
65	Ghana Water Company Ltd	West Akim	Asamankese	Abuchem	Abstraction	Domestic/Municipal	31-Jan-17
66	Ghana Water Company Ltd	Akwapim South	Nsawam	Densu	Abstraction	Domestic/Municipal	31-Jan-17
67	Ghana Water Company Ltd	East Akim	Apedwa - Asafo	Densu	Abstraction	Domestic/Municipal	31-Jan-17
68	Ghana Water Company Ltd	East Akim	Kibi	Birim	Abstraction	Domestic/Municipal	31-Jan-17
69	Ghana Water Company Ltd	East Akim	Kibi	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
70	Ghana Water Company Ltd	Suhum Kraboa-Coaltar	Suhum	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
71	Ghana Water Company Ltd	Atiwa	Anyinam	Birim	Abstraction	Domestic/Municipal	31-Jan-17
72	Ghana Water Company Ltd	Fanteakwa	Begoro	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
73	Ghana Water Company Ltd	East Akim	Bunso	Birim	Abstraction	Domestic/Municipal	31-Jan-17
74	Ghana Water Company Ltd	Atiwa	Kwabeng	Awusu	Abstraction	Domestic/Municipal	31-Jan-17
75	Ghana Water Company Ltd	East Akim	New Tafo	River Bayira	Abstraction	Domestic/Municipal	31-Jan-17
76	Ghana Water Company Ltd	Fanteakwa	Osino	Birim	Abstraction	Domestic/Municipal	31-Jan-17
77	Ghana Water Company Ltd	Tamale Metro.	Dalun / Nawuni	White Volta	Abstraction	Domestic/Municipal	31-Jan-17
78	Ghana Water Company Ltd	Yendi	Yendi	Daka	Abstraction	Domestic/Municipal	31-Jan-17
79	Ghana Water Company Ltd	South Dayi	Kpeve	Volta Lake	Abstraction	Domestic/Municipal	31-Jan-17
80	Ghana Water Company Ltd	Ho Municipality	Tsito	Wuve	Abstraction	Domestic/Municipal	31-Jan-17
81	Ghana Water Company Ltd	Keta	Kpando & Keta	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
82	Ghana Water Company Ltd	Kpandu	Sovie	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
83	Ghana Water Company Ltd	Kpandu	Anfoega	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
84	Ghana Water Company Ltd	Kpandu	Nkonya - Ahenkro	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
85	Ghana Water Company Ltd	Hohoe	Hohoe	Dayi	Abstraction	Domestic/Municipal	31-Jan-17
86	Ghana Water Company Ltd	Ketu	Agordome / Sega	Volta Lake	Abstraction	Domestic/Municipal	31-Jan-17

No	User Name	District/Municipal/Metro	Point of Use	Type of Source	Water Use Activity	Primary Purpose	Expiry date
87	Ghana Water Company Ltd	Ketu	Aflao	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
88	Ghana Water Company Ltd	Ketu	Denu	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
89	Ghana Water Company Ltd	Ketu	Agbozume	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
90	Ghana Water Company Ltd	Akatsi	Abor	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
91	Ghana Water Company Ltd	Keta	Avenopeme/ Anyako	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
92	Ghana Water Company Ltd	Jasikan	Jasikan	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
93	Ghana Water Company Ltd	Jasikan	Worawora	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
94	Ghana Water Company Ltd	Kadjebi	Kadjebi / Juapong	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
95	Ghana Water Company Ltd	Sunyani Municipality	Abesim	Tano	Abstraction	Domestic/Municipal	31-Jan-17
96	Ghana Water Company Ltd	Berekum	Berekum	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
97	Ghana Water Company Ltd	Asutifi	Biaso	Biaso	Abstraction	Domestic/Municipal	31-Jan-17
98	Ghana Water Company Ltd	Tano North	Dwomo	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
99	Ghana Water Company Ltd	Asutifi	Acherensua	Tano	Abstraction	Domestic/Municipal	31-Jan-17
100	Ghana Water Company Ltd	Techiman Municipal	Techiman / Tonoso	Tano	Abstraction	Domestic/Municipal	31-Jan-17
101	Ghana Water Company Ltd	Techiman Municipal	Techiman Boreholes	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
102	Ghana Water Company Ltd	Bolgatanga Municipality	Bolgatanga	Vea Dam	Abstraction	Domestic/Municipal	31-Jan-17
103	Ghana Water Company Ltd	Bawku-East Municipality	Bawku	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
104	Ghana Water Company Ltd	Kasena-Nankana	Navrongo	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
105	Ghana Water Company Ltd	Bolgatanga Municipality	Zuarungu	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
106	Ghana Water Company Ltd	Wa Municipality	Wa	Ground Water	Abstraction	Domestic/Municipal	31-Jan-17
107	Global Agri-Development Company (Ghana) Limited	North Tongu	Torgome	Volta River	Abstraction	Irrigation	31-Dec-14
108	Golden Star (Wassa) Limited	Mpohor Wassa East	Wassa	Groundwater	Abstraction	Mining	1-Jan-13
109	Golden Star (Wassa) Limited	Mpohor Wassa East	Mpohor Wassa	Obraeybona stream	Abstraction	Mining	1-Jul-13
110	Jakdom Agricultural services Limited	Asuogyaman	Mpakadan	Volta Lake	Fish Cage	Aquaculture	1-Jan-12
111	Kibi Goldfields Limited	Fanteakwa	Saamang	Anoma River	Abstraction	Mining	1-Jan-14
112	Kibi Goldfields Limited	Fanteakwa	Saamang	Groundwater	Abstraction	Domestic/Municipal	1-Jan-14
113	Kibi Goldfields Limited	Fanteakwa	Saamang	Groundwater	Abstraction	Mining	1-Jan-14
114	Kingsmat Dan Fish Farm	Asuogyaman	Oframase-Gyakiti	Volta Lake	Fish Cage	Aquaculture	1-Dec-14
115	Laveroff Farms Limited	Asuogyaman	Apaatifi	Volta Lake	Fish Cage	Aquaculture	1-Jan-15
116	Laveroff Farms Limited	Asuogyaman	Apaatifi	Volta Lake	Abstraction	Aquaculture	1-Jan-15

No	User Name	District/Municipal/Metro	Point of Use	Type of Source	Water Use Activity	Primary Purpose	Expiry date
117	Lee's Farm Ghana Limited	Asuogyaman	Adjena	Volta Lake	Fish Cage	Aquaculture	1-Jan-13
118	Mairene Ventures	Ga – East	Kwabinya	Groundwater	Abstraction	Domestic/Municipal	1-Jan-13
119	Maleka Farms Limited	Dangbe West	Akuse	Lake Volta and Groundwater	Abstraction	Aquaculture	1-Jan-17
120	Ministry of Energy (Mini Hydro Power Plant, Hohoe)	Hohoe	Tsatsadu	Tsatsadu River	Diversion	Power Generation	1-Jan-13
121	Newmont Ghana Gold Ltd	Asutifi	Kenyase -Ntotroso	Subri stream	Damming	Mining	1-Jan-13
122	Newmont Ghana Gold Ltd	Asutifi	Subika, Kenyasi	Groundwater	Abstraction	Mining	1-Feb-13
123	Newmont Ghana Gold Ltd	Asutifi	Kenyase II	Tano River	Abstraction	Mining	1-Dec-12
124	Newmont Ghana Gold Ltd	Asutifi	Kenyase II	Groundwater	Abstraction	Mining	1-Jan-15
125	Newmont Ghana Gold Ltd	Abirem North	New Abirem (Akyem Project)	Groundwater	Abstraction	Mining	1-Jan-14
126	Newmont Ghana Gold Ltd	Birim North	Hweakwae	Groundwater	Abstraction	Mining	1-Jan-14
127	Newmont Golden Ridge Ltd	Birim North	Hweakwae	Pra River	Abstraction	Mining	31-Dec-14
128	Newmont Golden Ridge Ltd	Birim North	Hweakwae	Yaayaaso stream	Diversion	Mining	-
129	Newmont Golden Ridge Ltd	Birim North	-	Adenchensu stream	Diversion	Mining	-
130	Noble Gold Bibiani Limited	Bibiani/Anhwia/Bekwai	-	Mpokwampai	Diversion	Mining	-
131	Norpalm Ghana Limited	Ahanta West	Ewusiejoe	Groundwater and Butre	Abstraction	Industrial	15-Nov-14
132	Owere Mines Limited	Asante Akyem	Obenmabe	Groundwater	Abstraction	Mining	1-Jan-14
133	Peelco Limited	Awutu-Senya	Kwoshie Abbey Land	Ground water	Abstraction	Domestic/Municipal	31-Dec-12
134	Perseus Mining (Gh) Limited	Upper Denkyira	Ayamfuri	Asuafo Stream	Damming	Mining	31-Dec-14
135	Prestea Sankofa Gold Limited	Prestea Huni Valley	Bondaye, Prestea	Essuo Kofi stream, groundwater	Abstraction	Domestic/Municipal	1-Sep-13
136	Romex Mining Ghana Limited	Upper West Denkyira	Mpeasem	Offin stream	Abstraction	Domestic/Municipal	26-Nov-15
137	Romex Mining Ghana Limited	Upper West Denkyira		Ahensu stream	Diversion	Mining	-
138	Safeway Estates Limited	South Dayi	Tongo Bor	Volta Lake and groundwater	Abstraction	Aquaculture	1-Jan-17
139	Samuel Opoku & Sons Limited	Gomoa	Adjumako	Rain water	Abstraction	Industrial/Mining	31-Dec-17
140	Savanna Diamond Company Ltd	Central Gonja	Buipe	Groundwater	Abstraction	Industrial	1-Oct-15
141	Sithe Global Sustainable Oils Ghana Ltd	Nkwanta South	Nkwanta South	Asukokoo River	Abstraction	Irrigation	1/1/2013
142	Sun Woo Culturing System Ltd.	Asuogyaman	Akosombo	Volta Lake	Fish Cage	Aquaculture	1-Mar-14

No	User Name	District/Municipal/Metro	Point of Use	Type of Source	Water Use Activity	Primary Purpose	Expiry date
143	The Royal Senchi Limited	Asuogyaman	Senchi	Volta Lake	Abstraction	Recreation	30-Apr-15
144	Triton Aquaculture Africa Limited	Asuogyaman	Dodi Asantekrom	Volta Lake	Fish Cage	Aquaculture	1-Jun-14
145	Triton Aquaculture Africa Limited	Asuogyaman	Dodi Asantekrom	Volta Lake	Fish Pond	Aquaculture	1-Jan-15
146	Vegpro Ghana Limited	North Tongu	Torgome	Kpong Dam / Reservoir	Abstraction	Domestic/Municipal	1-Jan-15
147	Voltic (Gh) Limited	Bosomtwi	Nyameani	Groundwater	Abstraction	Domestic/Municipal	1-Jan-13
148	WaterHealth Ghana Limited	Ga West	Manhean	River Densu	Abstraction	Domestic/Municipal	1-Jan-14
149	WaterHealth Ghana Limited	Ga West	Afuaman	River Densu	Abstraction	Domestic/Municipal	1-Jan-14
150	WaterHealth Ghana Limited	West Akim	Adeiso	River Ntiribo	Abstraction	Domestic/Municipal	1-Jan-14
151	WaterHealth Ghana Limited	Ga West	Nsakina	River Nsaki	Abstraction	Domestic/Municipal	1-Jan-14
152	WaterHealth Ghana Limited	Akwapim South	Pakro	River Densu	Abstraction	Domestic/Municipal	1-Jan-14
153	West African Fish Limited	Asuogyaman	Domiabra	Volta Lake	Fish Cage	Aquaculture	1-Jun-15

Appendix 3: Well Drilling License Register - 2012

No	Permit Holder	Address	Company Regist. No.	Licence No.	Category	Expiry Date
1	7 A's Christian Construction and Dev't Consul Ltd	P. O. Box AN 5038, Accra-North	CA-74,771	WRC/WDL/081/11	C	26-Jun-14
2	Abdelco Limited	P. O. Box 9484, KIA, Airport-Accra	30,732	WRC/WDL/038/09	B	10-Dec-12
3	Abotwa and Sons Company Ltd.	P. O. Box 38, Tamale	CA-81,758	WRC/WDL/109/11	C	24-Jun-15
4	Afrihope Missions	P. O. Box 529, Berekum-Bia, Ghana	G-20,731	WRC/WDL/093/11	C	10-Oct-15
5	Aglawu Company Limited	P. O. Box SK 332, Tema	CA-56,869	WRC/WDL/094/11	C	12-Oct-14
6	Agricultural Materials Limited	P. O. Box 15097, Accra-North	44,142	WRC/WDL/09/008	C	15-Feb-12
7	Akira Limited	P. O. Box GT 6346, Accra-North	CA-57,608	WRC/WDL/106/12	C	22-May-15
8	Amazing Tramensco Limited	P. O. Box 8, Assin-Foso	CA-70,483	WRC/WDL/120/12	C	22-Oct-15
9	Andeg Limited	P. O. Box LG 893, Legon, Accra	CA-23,481	WRC/WDL/104/12	C	18-Mar-15
10	Aqua Galaxy Limited	P. O. Box GP 21493, Accra	CA-45,123	WRC/WDL/026/09	C	20-Oct-12
11	Aquamasters Company Ltd.	P. O. Box CO 1123, Tema	CA-81,820	WRC/WDL/100/12	A	22-Jan-15
12	Araco Construction Ltd.	P. O. Box 123, Bolgatanga, Upper East Region	CA-3,322	WRC/WDL/020/09	B	11-Oct-12
13	Bauer Resources Ghana Limited	P. O. Box MB 615, Ministries, Accra	CA -72,956	WRC/WDL/050/10	C	15-Aug-13
14	Bed-Rock Construction & Drilling Company Ltd.	P. O. Box OF 446, Ofankor-Accra	CA-33,969	WRC/WDL/019/09	C	19-Oct-12
15	Bizgeo Company Limited	PMB MD 127, Madina-Accra	CA-22,859	WRC/WDL/057/10	C	16-Aug-13
16	BlessedField Limited	P. O. Box AD 52, Adabraka, Accra	C-63,579	WRC/WDL/111/12	C	22-Aug-15
17	Bremsbouna Company Ltd	P. O. Box DS 653, Dansoman Estate, Accra	C-82,397	WRC/WDL/024/09	C	09-Nov-12
18	Brushwell Associates Limited	P. O. Box DC 439, Dansoman	CA-28,586	WRC/WDL/073/11	B	25-Apr-14
19	Caspian Energy Ghana Ltd.	P. O. Box OS 726, Osu-Accra	CA-65,594	WRC/WDL/041/10	B	25-Feb-13
20	Cephavick Limited	P. O. Box TL 2571 Tamale; P.O. Box MB 359 Mamprobi-Accra	CA-17,548	WRC/WDL/08/005	C	24-Jun-14
21	Champion Man Company Limited	P. O. Box KW 302, Kwadaso - Kumasi	CA-60,706	WRC/WDL/052/10	C	15-Aug-13
22	China Geo-Engineering Corporation(Gh) Ltd.	P. O. Box CT 3477, Cantonments-Accra	76,967	WRC/WDL/055/10	B	16-Aug-13
23	China Henan Geo-Construction Co. Ltd.	P.O. Box KS 12198, Kumasi	C-89,839	WRC/WDL/08/003	B	18-May-14

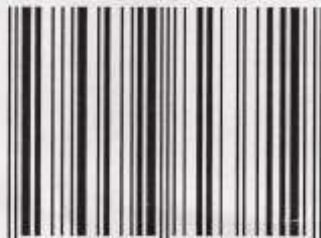
No	Permit Holder	Address	Company Regist. No.	Licence No.	Category	Expiry Date
24	China Zhong Hao (Gh) Limited	P. O. Box 649 OF, Accra (Plot No. 39, Dome-Accra)	CA-4,096	WRC/WDL/08/002	B	08-Jun-14
25	Chucatel Ghana Limited	P. O. Box TN 962, Teshie Nungua, Accra	CA-79,368	WRC/WDL/074/11	B	25-Apr-14
26	Church of Christ Rural Water Development Programme	P. O. Box AN 6017, Accra-North	G.3.785,D.S.W/59	WRC/WDL/08/001	B	08-Jun-14
27	Dadick Limited	P. O. Box DS 2044, Dansonman-Accra	88,007	WRC/WDL/112/12	C	22-Jul-15
28	Darkata Engineering Services Limited	P. O. Box 62, Trade Fair, Accra	71,666	WRC/WDL/097/11	C	03-Nov-14
29	Dextin Company Limited	P. O. Box CT 4329, Cantonments, Accra	CA-51,527	WRC/WDL/086/11	C	19-Jul-14
30	Doayin Services Limited	P. O. Box 650, Bolgatanga	C-81,059	WRC/WDL/030/09	C	20-Oct-12
31	E E & E Company	P. O. Box AE 1163, Accra	CA-18,392	WRC/WDL/014/12	C	06-Oct-15
32	Ebekae Limited	P. O. Box SE 1188, Suame -Kumasi	CA-41,887	WRC/WDL/068/11	C	07-Feb-14
33	Elektro Aquah Services	P. O. Box 518, Fante New Town-Kumasi	C-73,552	WRC/WDL/064/11	C	18-Jan-14
34	Elex Investments Ghana Limited	P. O. Box TL. 2299, Tamale	CA-70,832	WRC/WDL/066/11	C	18-Jan-14
35	Enacent Agency Limited	P. O. Box MD 438, Madina-Accra	75,913	WRC/WDL/054/10	C	16-Aug-13
36	Ersfa Limited	P. O. Box AN 10032, Accra-North	C-75,078	WRC/WDL/110/12	C	25-Jun-15
37	Espan Company Limited	P. O. Box MS 678, New Achimota,Accra	CA-3,802	WRC/WDL/013/09	B	06-Oct-12
38	F & F Maida Limited	P. O. Box 1510,Tamale	CA-63,485	WRC/WDL/015/09	C	06-Oct-12
39	Fadl Rahaman Enterprise Ltd.	P. O. Box AX 1651, Takoradi	CA-61,417	WRC/WDL/039/10	C	12-Jan-13
40	FBB Drilling & Construction (Gh) Ltd.	P. O. Box BC 169, Burma Camp, Accra	C-85,647	WRC/WDL/051/10	C	15-Aug-13
41	Galaxy Borehole Drilling (Gh) Ltd.	P.O. Box GP 3375, Accra, Ghana	CA-31,425	WRC/WDL/031/09	B	22-Oct-12
42	Gemrock Drills Ghana Limited	P. O. Box KS16456	CS032732012	WRC/WDL/121/12	B	31-Oct-15
43	Geosource Drilling Technologies Limited	P. O. Box AT 2264, Achimota	CA-22,285	WRC/WDL/096/11	C	01-Nov-14
44	Geosystems Consulting Limited	P. O. Box 28 Abuakwa-Kumasi	CA-40,567	WRC/WDL/069/11	C	07-Feb-14
45	Global Almas Limited	P. O. Box LG 825, Legon	CA-6,125	WRC/WDL/059/10	C	16-Aug-13
46	GM Projekts	P. O. Box 16157,Accra	CA-7,340	WRC/WDL/085/11	C	18-Jul-14
47	G-Mark Environmental Engineering Company Ltd	C/O Trustees Services Ltd, Box GP 1632, Accra	CA-91,243	WRC/WDL/095/11	C	01-Nov-14
48	Good Father & Mother Enterprise	P. O. Box 100 Wa	BN - 68,044B	WRC/WDL/077a/11	C	09-Jun-14

No	Permit Holder	Address	Company Regist. No.	Licence No.	Category	Expiry Date
49	Heisa Engineering Company Ltd.	P. O. Box JT 223, James Town, Accra	65,305	WRC/WDL/105/12	C	16-May-15
50	Hitesh Impex Limited	P. O. Box 4610-CT, Cantonment Accra	CA-88,981	WRC/WDL/022/09	B	21-Oct-12
51	Huchang Infrastructure Eng. Co. (Gh) Ltd.	P. O. Box 1470, Madina-Accra	CA-8,136	WRC/WDL/056/10	B	16-Aug-13
52	Hydrocom Limited	P. O. Box CE 12062,Tema	CA-69,655	WRC/WDL/028/09	C	20-Oct-12
53	Hydronomics Limited	P. O. Box LG 924, Legon, Accra	CA-10,929	WRC/WDL/114/12	C	22-Jun-15
54	IB-Max Company Ltd.	P. O. Box CT 426, Cantonments, Accra	CA-60,844	WRC/WDL/115/12	C	16-Aug-15
55	Indo-Ghana Borehole Services Ltd.	P. O. Box GP 4711, Accra-Ghana	CA-1,830	WRC/WDL/016/12	B	18-Oct-15
56	J. Adom Limited	P. O. Box KD 429, Kanda, Accra	C - 87,66	WRC/WDL/061/10	C	14-Oct-13
57	Jamesbury Trading and Construction Ltd.	P. O. Box GP 1632, Accra 6397, Accra-North	CA-10,562	WRC/WDL.076/11	C	15-May-14
58	JCR Drilling Ghana Limited	P. O. Box KB 792, Korle-Bu, Accra	CA-50,988	WRC/WDL/063/11	C	18-Jan-14
59	Jil and Jic Limited	P. O. Box DS 1920, Accra	CA-13,425	WRC/WDL/023/09	C	21-Oct-12
60	Joanasco Company Limited	P. O. Box 407, Madina, Accra	CA-38,367	WRC/WDL/107/12	C	23-May-15
61	Joissam Construction Ltd.	P. O. Box AD 1188 Adabraka-Accra	CA-16,243	WRC/WDL/049/10	B	15-Aug-13
62	Jokumaks Limited	P. O. Box 291, Sunyani	C-27,545	WRC/WDL/025/09	C	09-Nov-12
63	Kingaka Construction Ltd.	P. O. Box TN 385,Accra	61,309	WRC/WDL/058/10	B	16-Aug-13
64	Kinkubi Solutions	P. O. Box SN 366, Santasi-Kumasi	BN-29,924D	WRC/WDL/088/11	C	16-Aug-14
65	Kwik Silver Ghana Limited	May's Plaza, Community 8, Tema	C-69,898	WRC/WDL/053/10	C	16-Aug-13
66	Lardwin Company Limited	P. O. Box DC 94 Dansonman, Accra	CA-43,322	WRC/WDL/033/09	C	10-Nov-12
67	Leka Interactive Company Ltd	P. O. Box 474, Teshie-Nungua	CA-83,361	WWRC/WDL/083/11	C	03-Jul-14
68	Lovemak Ventures Ltd.	P. O. Box MA 188, Ho	CA-21,825	WRC/WDL/035/09	C	19-Nov-12
69	Marknoc Enterprise	P. O. Box Tkw 413, Tarkwa, W/R	BN-50,730C	WRC/WDL/099/11	C	13-Nov-14
70	Meridian Water Well Drilling Ltd	P. O. Box CT 5632, Accra	CA-74,412	WRC/WDL/072/11	B	04-Apr-14
71	Mikanbros Company Ltd	P. O. Box MB 687, Ministries-Accra	CA-77,893	WRC/WDL/080/11	C	26-Jun-14
72	Mowakari Trading and Construction Ltd	P. O. Box 468. Obuasi	CA-78,411	WRC/WDL/078/11	C	09-Jun-14
73	MTL Boreholes Limited	P. O. Box 2264, Opp. ABC, Achimota	CA-51,269	WRC/WDL/103/12	B	22-Feb-15
74	Multi-Hydro Technique Limited	P. O. Box TA 312, Taifa, Accra	95,844	WRC/WDL/108/12	C	17-Jun-15

No	Permit Holder	Address	Company Regist. No.	Licence No.	Category	Expiry Date
75	Oti Yeboah Complex Ltd.	P. O. Box 244 Sunyani, Brong Ahafo	30,777	WRC/WDL/040/10	C	12-Jan-13
76	Pamicor Limited	DTD P11 Coastal Estates, Off Spintex Rd, Baatsona	CA-30,525	WRC/WDL/098/11	C	07-Nov-14
77	Pekwapong Company Ltd	P. O. Box P531, Kumasi	CA-69,855	WRC/WDL/071/11	B	17-Mar-14
78	Plumblin Global Service Ltd.	P. O. Box LG 1069, Legon, Accra	CA-62,100	WRC/WDL/090/11	C	21-Sep-14
79	Posen Enterprise Limited	P. O. Box MP 1697, Mamprobi-Accra	CA-56,784	WRC/WDL/042/10	C	17-Mar-13
80	PRD Rigs Ghana Ltd	P. O. Box CT 5285, Cantonments-Accra	CA-46,471	WRC/WRL/084/11	C	05-Jul-14
81	Prefan Investments Company Ltd	P. O. Box 1694, Kumasi	CA-81,470	WRC/WDL/082/11	C	26-Jun-14
82	Quay Hydro Consult Limited	P. O. Box OD 293, Odorkor, Accra	CA - 71,027	WRC/WDL/062/10	C	14-Oct-13
83	Rahmex Enterprise Ltd.	P. O. Box 410, Wa	81,479	WRC/WDL/045/10	C	22-Mar-13
84	Rays Boat Company Ltd.	P. O. Box 3308, Kumasi	CA-61,834	WRC/WDL/027/09	C	10-Nov-12
85	Sabailo Ltd	P. O. Box 93, Bolgatanga	CA-21,576	WRCL/WDL/072/11	C	10-Apr-14
86	Sabfex Enterprise	P. O. Box 77, Wassa Nsuta Tarkwa	TIN-1240023975	WRC/WDL/099-a/11	C	08-Dec-14
87	Sages Consult (Ghana) Ltd.	P. O. Box 1231, Sunyani -Brong Ahafo	CA-52,314	WRC/WDL/092/11	c	09-Oct-14
88	Samjust Engineering Co. Ltd.	P. O. Box 837, Kenten, Techiman-B/A	CA-8,158	WRC/WDL/087/11	C	01-Aug-14
89	Sandimax Company Ltd	P. O. Box NG 59, Nungua-Accra	CA-18,692	WRC/WRL/079/11	C	23-Jun-14
90	Savana Construction Company Ltd.	P. O. Box 276, Tamale	CA-20,114	WRC/WDL/032/09	C	22-Oct-12
91	Savanstar Limited	P. O. Box CT 5100, Cantonment, Accra	CA-35,347	WRC/WDL/017/09	C	11-Oct-12
92	Sem Equipment Limited	P. O. Box 15447, Accra-North	CA-84,237	WRC/WDL/101/12	C	22-Feb-15
93	Springer Ghana Limited	P. O. Box 2439, Tamale	CB-696	WRC/WDL/116/12	C	16-Aug-15
94	Stanton Limited	P. O. Box KS 6613 Kumasi-Ghana	C-46,734	WRC/WDL/047/10	C	26-May-13
95	Starco Ventures Limited	P. O. Box 1235, Koforidua	CA-17,860	WRC/WDL/044/10	B	17-Mar-13
96	TBL Resources Limited	P. O. Box CT 6109, Cantonments-Accra	CA-9,686	WRC/WDL/09/012	B	23-Mar-15
97	Tech-2 Resources Limited	P. O. Box 882, Tamale	CA-39,729	WRC/WDL/075/11	C	02-May-14
98	Tedson Drilling & Construction Limited	P. O. Box HP 582, Ho, Volta Region	C-90,609	WRC/WDL/018/09	C	15-Oct-12
99	Time Heals Enterprise Limited	P. O. Box 261, Bawku	CA-7008	WRC/WDL/065/11	C	18-Jan-14
100	To-Time Ghana Limited	P. O. Box SN 501, Santasi-Kumasi	CA-41,409	WRC/WDL/012/09	C	06-Oct-12

No	Permit Holder	Address	Company Regist. No.	Licence No.	Category	Expiry Date
101	Trust Water Works Limited	P. O. Box 05 1852, Osu-Accra	CA-12,033	WRC/WDL/011/11	C	18-Jan-14
102	Unipumps Nigeria Limited	P. O. Box 5732 Accra, North	EXT. 1,510	WRC/WDL/122/12	B	12-Nov-15
103	Waale Construction Works Limited	P. O. Box 250, Bolgatanga	CA-19,730	WRC/WDL/046/10	C	22-Mar-13
104	Water Vision Technology Limited	P. O. Box 621, Bolgatanga	CA-90,741	WRC/WDL/029/09	C	20-Oct-12
105	Waterside Ghana Limited	P. O. Box 1099 Madina-Accra	CA-61,583	WRC/WDL/021/09	C	19-Oct-12
106	Weddi Africa Ltd.	P. O. Box CT 6401, Accra	C-17,581	WRC/WDL/037/09	C	01-Dec-12
107	Western Water Works Limited	P. O. Box 181, Sekondi –Western Region	CA - 8,272	WRC/WDL/036/09	B	19-Nov-12
108	Zegor Limited	P. O. Box LG 629, Legon, Accra	CA - 21,945	WRC/WDL/043/10	C	17-Mar-13

ISBN: 978-9988-8237-1-9



9 789988 823719