THE PORTFOLIO OF DEVELOPMENT AND NATURAL RESOURCES.

THE WATER AUTHORITY

1985 ANNUAL REPORT

INDEX

General

During 1985 very signifcant progress was made in the implimentation of the function and duties of the Water Authority. Much of the progress could be directly attributable to the committment Government made to the staffing of the Department.

During the year four full Authority meetings were held. The Members of the Authority are as follows:-

Chairman:	Member, Development and Nat. Res. Hon V.G. Johnson JP CBE.
Members:	Member, Commun., Works & Dist Admin Hon. C. Kirkconnell.
	Financial Secretary Hon. T. Jefferson.
	Chief Engineer Mr. D. Ebanks.
	Chief Environmental Health Officer Mr. P. Foye.
	Mr. R. Flowers.
	Mr. V. Jackson.
	Mr. B. Watler.
Secretary:	Director, Water Authority Mr. R. Beswick.

2.0 Administration

2.1 Staffing

The staff compliment is now as follows:-

a.	Director	S3
b.	Project Manager	AP3-4
c.	Sewerage Design Engineer	AP3-4
d.	Water Supply Design Engineer	AP3-4
e.	Superintendent Water Supply	T8
f.	Senior Engineering Technician	T8
g.	Senior Draughtsman	T8
h.	Hydrogeologist	AP3-4
i.	Hydrogeological Assistant	T1-2
j.	Laboratory Technician	T3-4
k.	Trainee Draughtsman	T3-4
l.	Graduate Research Assistant	T1
m.	Executive Officer	E1-2
n.	Clerical Officer	C1-4

o.	Accountant	AP1-2
p.	UN Associate Expert(Sewerage)	No cost
q.	UN Associate Expert(Water)	No cost
r.	Plumber	D2
s.	Mason	C2
u.	Labourer	A2

The following staff movement took place during the year.

Staff left:

Mr. David Brown, Senior Project Engineer left at the end of his contract. The post of Senior Project Engineer was changed to Sewerage Design Engineer after Mr. Brown's leaving.

Mr. Sean Bodden, Laboratory Technician, left to take up a full-time art course overseas.

Mr. Leo de Waal, UN Associate Expert(Water), left at the end of his two year contract.

Mr. Antoney Reid, Hydrogeological Assistant, left to take up a UN sponsored two year, engineering scholarship in Miami.

Miss Beverly Faulknor, Clerical Officer, left to take up a career in teaching.

Staff recruited:

Ms Kathy Seymour was recruited in January to take position (k).

Mr Antoney Reid was recruited in January to take up position (i).

Mr Alan Jones was recruited in January to take up position (f), he was subsequently promoted to position (d) in June.

Mr Geof Page was recruited in March to take up position (g).

Mr Thomas Hill was recruited in April to take up position (e).

Mr Grant Anderson was recruited in March to take up position (b).

Mr Boris Bermes was recruited in June to take up position (h).

Ms Juliette Nicholas was recruited in September to take up position (n).

Mr Cornelius Westerbeek was recruited in September to take up position (c).

Mr Sam Ng was recruited in May to take up position (l).

Mr Micheal Hislop was recruited in October to take up position (j).

Ms Annette Cree was recruited on a temporary contract to assist with the West Bay Beach Contract Documentation and to cover for the Executive Secretary's maternity leave.

Mr Norman Josephs was recruited nominally as a labourer to train as a hydrogeological field assistant.

2.2 Finance

EXPENDITURE

	HEAD	ALLOCATION	EXPENDITURE
01	Personal Emoluments	252,427	250,867.10
02	Travelling and subsistence	4,535	2,529.72
03	Supplies and Materials	21,407	18,661.61
04	Rent of Property	5,000	5,000.00
06	Utilities	23,893	20,132.30
07	Other Operating Costs	9,600	8,845.27
08	Grants Contributions and subscriptions	15,000	15,000.00
09	Interdepartmental Purchases	38,000	35,338.88
14	Equipment	12,750	11,915,91
41-024	Capital, Water and Sewerage	111,000	61,631.43
	TOTAL	493,612	429,917.22

REVENUE

During 1985 revenue was made up of the following:-

Water Sales	78,970.72
Water Resources Licences	21,900.91
Water Operators Licences	2,530.00
Plumbing Inspection	3,792.50
Miscellaneous	1,527.50
Cayman Water Co Royalty	128,992.23
TOTAL	237,723.86

The cost to Government of operating the Water Authority during 1985 was therefore **CI$192,193.36**

2.3 Conferences and Seminars

The Director attended a UNDP sponsored symposium in Curacao, on the use of unconventional water sources.

The GRA attended a UNDP sponsored interregional seminar in Bermuda, on the development and management of island ground water resources.

The Project Manager and UN Associate Expert(Sewage) visted Jamacia to inspect various sewage treatment works installations which are similiar to that proposed for Cayman.

The Water Supply Engineer Design visted the Water Services of America sea water reverse osmosis plant in Key West, Florida.

2.4 Reports

The following reports and papers have been prepared during the year:-

West Bay Beach Sewerage and Sewage Treatment Works - A Technical Report.

George Town Water Supply, First Phase - A Technical Report.

Financial Review of Cayman Water Company's Operation, 1979 to 1984

Geological Aspects of Ground Water Exploitation in Grand Cayman. This paper was presented by Mr Sam Ng at the Bermuda symposium.

The Cayman Islands Water Supply - Country Situation Paper. This paper was presented by the Director at the Curacao Seminar.

West Bay Beach Sewerage and Sewage Treatment Works Funding Document and Rate Structure.

Investigation of Alternative for Managing the Estimated Impacts of MRCU Canals on the Ground Water Resources of Lower Valley.

George Town Water Supply, the Case of the Private or Public Sector.

George Town Well Monitoring - January to May 1985.

West Bay Beach Sewerage and Sewage Treatment Works - All Your Will Want To Know.

West Bay Beach Sewerage and Sewage Treatment Works, Consultants Tender Document.

West Bay Beach Sewerage and Sewage Treatment Works, Consultants Agreement Document.

West Bay Beach Sewerage and Sewage Treatment Works, Sewage Treatment Works Preliminary Earthworks Tender Document.

George Town Water Supply, First Phase Draft Feasibility Report.

Cayman Brac investigatory Drilling Project - Tender Document.

3.0 Water Resources

3.1 Monitoring

Comprehensive monitoring programmes have been established for the major ground water resources of Grand Cayman. During the year plans were formulated to instigate a proper system of monitoring and investigatory boreholes in Cayman Brac. These progammes had been established in previous years and no additional works associated with the main monitoring programme have been constructed during the year. However the the GRA, Mr Sam Ng, has been instrumental in rationalizing the system and developing it into a meaningful operation. It would now have appeared to have recovered from the disray in which it was left by the previous GRA, Mr P. Ravenscroft.

These programmes are on-going and comprise the following techniques:-

a. Observation open boreholes and piezometers, constructed on the major lenses and monitored on a weekly or bi-weekly schedule. Water samples are collected and tested for main chemical analysis at the laboratory.

b. Seven continuous water level recorders and one tide guage are presently in use through out the area.

c. A network of fifteen rain guages provide island wide rainfall information.

d. The quality and quantity of water produced by all the production wells are measured on a weekly basis.

e. Domestic wells in George Town, Lower Valley, East End and Cayman Brac continue to be monitored on a regular basis.

A preliminary drilling programme has been designed to better establish the ground water resources of Cayman Brac. Tender documents were written and were let in October. It was hoped that the work would be carried out before the end of the year, but constraints on funding delayed this work until 1986. At year end there had been no decision from the Public Tenders Board as to which contractor would be offered the work.

As part of this programme a comprehensive level survey was carried out to determine ground levels where the drilling was to take place and to establish temporary bench marks along the existing bluff road.

A house had been rented to accommodate staff and the drillers crew for the duration of this works.

The laboratory continues to satisfactorily meet the requirements of the department and also continues to offer water testing facilities to the general public. The Authority has been fortunate to obtain the services of Micheal Hislop, who is a science 'A' Level student from the High School and is proving to be most competent and reliable.

Considerable time and energy has been expended on the investigation into the affects of the MRCU canals located in Duck Pond north of the Lower Valley lens. The Hydrogeologist has now completed his modelling and the report. It is hoped that the report will be put before the Authority and Government early in 1986. The report does conclude that the canalization will have a detrimental affect on the Lower Valley lens.

3.2 Water Resources Licencing

The Water Authority Regulations were promulgated in March 1985. Following their introduction the Authority was able to initiate many of its statutory functions.

The main statutory functions that were introduced were those associated with the licencing and permitting of actions affecting ground water resources.

a. Commercial ground water licences of Right.

b. Commercial ground water abstraction licences.

c. Effluent discharge permits

d. Quarry Permits.

e. Canal Permits.

a. Following the statutory requirment to register existing groundwater abstraction, 164 wells were registered and subsequently licenced during 1985.

b. 21 new commercial abstractions were licenced.

c. 99 effluent discharge permits were permitted.

d. No quarry permits.

e. No canal permits.

This system is now computerized and a satisfactory cross-check has been established with the Central Planning Authority in order to ensure full licencing is established.

This was the first year of operation and generally it operated well. The income generated is shown in Section, 2.2.

4.0 Water Supply

4.1 Lower Valley

Lower Valley wellfield completed its second full year of operation.

At year end 23 production wells were in operation, with a total pumping capacity of 52 US Gallons per minute or 74,880 US Gallons per day.

Total volume of groundwater abstracted was 60,200.88 cubic metres, (15,905,073 US Gallons).

Total water sales to the seven truckers was 54,623.29 cubic metres (14,431.473 US Gallons).

Allow for storage and well testing the approximate pipeline loss was 5%.

Demand for water during the year followed the rainfall distribution; sales varying from a low of 2,301 cubic metres in October to a high of 7,529 cubic metres in March.

The quality of product water remained fairly stable varying seasonally from 300 to 400 mg/l chloride. The higher concentration of chloride coinciding with the high tide season, not the high abstraction period.

The quantity of electricity utilized was 118,335 kwh, which corresponds to 1.97 kwh per cubic metre of water produced.

4.2 East End

The East End development was completed in March 1985 for a total cost of CI$216,936.93.

The ten production wells are capable of abstracting 62 US Gallons per min or 89,280 US GAllons per day. Storage capacity of the reservoir is 250 cubic metres (66,050 US Gallons).

Todate the performance of the wellfield has been excellent. All wells are of high yield relative to those of Lower Valley. Present data suggests that the East End lens has a greater storage capacity than previously estimated.

Total volume of ground water abstracted was 8,436.95 cubic metres (2,229,042 US Gallons).

Total water sales to the four truckers was 6,780.72 (1,791,413 US Gallons).

Allowing for storage and well testing the approximate pipeline loss is 5%.

The quality of the product water varied between 100 and 200 mg/l chloride.

The quantity of electricity used was 3920 kwhs, which corresponds to 0.46 kwh per cubic metre.

4.3 Cayman Water Company

A 185,000 US Gallon per day Meco vapour compression plant was commissioned in March. This brings the total production capacity to 685,000 US Gallons/day.

An additional 800,000 gallon storage reservoir was constructed, bringing the total storage capacity to 1.8 million gallons.

Annual water production was - 138,875,340 US Gallons

Annual water sales - 127,663,828 US Gallons

Allowing for storage of 1.8 million Gallons pipline losses were 7%.

Truckers purchased 14,153,412 US Gallons or 11% of the total sales.

The maximum monthly sales was 11,972,379 US Gallons. The average monthly sales was 10,838,652 US Gallons.

Assuming 80% availability average maximum production is 16,668,333 US Gallons.

Therefore the plant has at present, a 39% over production capacity.

The Company was granted a price increase in July. The pipeline price rose from CI$15.87 to CI$17.45 per 1000 US Gallons. The truckers price rose from CI$13.80 to CI$15.00 per 1000 US Gallons.

The maximum fuel adjustment factor was CI$2.27 with an average of CI$1.70.

The maximum fuel:water conversion was 1:327 the minimum 1:288 with an average of 1:308.

The present average cost of water to the pipeline consumer is now CI$19.15 per 1000 US Gallons.

4.4 Water Truckers

Six companies now operate as water truckers. Five of these companies obtain water only from the Water Company and the Water Authority. The sixth also obtains water from two private wells on Walkers Road.

Following the introduction of the commerical groundwater abstraction licencing system, the abstraction from the two wells in Walkers Road was brought under control. Licences have been issued which allow 6,000 US Gallons per day to be abstracted from each of these wells. Water meters have been placed on these wells and are read on a daily basis.

The total quantity of water moved by the truckers in the year was 34,876,298 US Gallons or approximately 3.0 million US Gallons per month.

4.5 Water Quality Monitoring Programmes

The on-going programme of monitoring domestic well water in George Town, East End, Lower Valley and Cayman Brac continued. All areas were sampled on two occasions throughout the year.

The results of these surveys have been placed in various reports.

4.6 Water Shortage

The water shortage experienced at the end of 1984 carried over for the first four months of 1985. The commissioning of East End wellfield and reservoir in March and the provision of the new plant at CWC prevented the shortage becoming a critical problem.

4.7 George Town Water Supply

The year began with a joint proposal between Caribbean Utilities Company (CUC) and the Water Authority to appoint a

consultant to make recommendations on the utilization of CUC's waste heat for the production of potable water.

The consultants Kennedy and Donkin (K & D) report was incomplete, badly prepared, and totally biased in favour of Sasakura's Low Temperature Vapour Compresssion Units, (LTVC) and as such was not accepted by either the Water Authority or CUC.

A proposal by Israeli Desalination Engineers (IDE) to utilize CUC's waste heat to produce potable water by means of their Multi-effect Distillation (MED) equipment was given serious consideration by CUC. Other proposals by Sasakura (LTVC) and Atlantis Energy Multi-stage Flash (MSF) were considered by CUC and rejected in favour of the IDE proposals.

Following the appointment of a Water Supply Engineer by the Water Authority on 1.6.85 a number of papers on different aspects of the project were prepared. A number of students were recruited on a temporary basis to help carry out a water demand survey, together with survey work on possible pipeline routes.

Information from these surveys was incorporated in a preliminary report entitled "GTWS - The Case of Public or Private Sector".

Following the presentation of the preliminary report to the Water Authority, and the completion of the demand study, a further report "GTWS - Phase 1, Draft Feasibility Report" was prepared. This report included an analysis of CUC's offer to sell water produced by an IDE MED plant. It concluded that given the fact that CUC were requiring a guaranteed sale of 320,000 IGPD from day 1 of operation, and that demand in GT was not expected to reach that level until the third year of operation, that the project was totally unfeasible unless CUC were prepared to drastically amend their proposal.

Shortly after this, the Director of the Water Authority was presented with a proposal by Water Services of America (WSA), a manufacturer and designer of Reverse Osmosis (R.O) plants. The proposal involved the Water Authority entering into a seven year agreement with WSA. This agreement allowed for a two tier payment system, based on a fixed monthly charge in addition to a payment for any water produced. It did not require a minimum quantity of water to be purchased and therefore allowed improved cash flow and viability.

This proposal was investigated further, a site was indentified for a desalination plant and a trial feedwater well and a disposal well were drilled and cased. A connecting pipeline was then installed and a 3 week continuous pumping test was carried out. In order to determine more about the economics of R.O plants and their operation, it was decided to prepare a bid document and allow another company to bid in order to get some comparison

with the WSA proposal. Unfortunately, this strategy was somewhat vitiated when the other company failed to return the bid document by the closing date.

In the meantime CUC had come back with a modified offer in which their price for water had been reduced to US$13/1000 IG and the minimum guaranteed quantity had been reduced to 200,000 IGPD. However when compared to the cost of purchasing water from WSA, the CUC offer was still hopelessly uneconomic.

The Authority was dubious about the reliability of the RO system. As CUC were still too costly it was decided to investigate other forms of desalination. The most suitable appeared to be low temperature vapour compression. IDE were asked to submit a budget price based on a similiar agreement to that proposed by WSA.

A report entitled George Town Water Supply - First Phase, was produced which detailed the water supply problems in George Town and suggested methods of solving these problems. The three desalination proposals were reviewed and recommendations made. This report will be presented to the Water Authority and Government early in 1986.

The source of feedwater for the George Town Water Supply is expected to be determined early in 1986, at which time it is hoped a definite committment will be made to the implimentation of the first phase of the George Town Supply.

5.0 Sewerage

In 1985 The West Bay Beach Sewerage and Sewage Treatment Works Project moved from a concept to a reality.

The Project Team of Senior Project Engineer and UN Associate Expert brought to full strength with the arrival of Senior Draughtsman and Project Manager in March pushed forward with the final detailed design of the Project.

The Senior Project Engineer left the Authority in July and a Sewerage Engineer joined the team in September.

The Project Report detailing the magnitude and cost of the project, completed in July was approved by the Water Authority and Council in August committed the CI Government to proceed with the project.

Negotiations took place with the Caribbean Development Bank regarding financing and the loan agreement for the project was signed in December.

The Authority intends to purchase all plant and materials for the project and all suppliers will require to be prequalified.

In November Prequalification Notices were circulated worldwide inviting suppliers to apply for prequalification.

A similar procedure was undertaken for Civil Engineering Contractors for the main civils contract.

A CDB requirement of the loan it to employ Consultants to assist the Water Authority in prequalification tender evaluation and supervise construction of the works and in October bids were received from selected Consultants. After evaluation and approval the Authority finally negotiated a contract for this project with Camp Dresser and McKee of the U.S.A and this was signed at the end of December.

On site, the clearing operations for the sewage treatment works site commenced in July and by September the site was almost cleared.

Tender documents were sent in December to all local contractors who responded to the Authority's advertisement inviting contractors to apply for tenders and to two invited foreign Contractors (this being a Bank requirement), to submit prices for completing the site clearance and preliminary filling of the site.

On the Public Relations front all affected owners were sent notices in April to update existing ownership records and in December a "hand out" document entitled "West Bay Beach Sewerage and Sewage Treatment Works - ALL YOU WILL WANT TO KNOW - was circulated to the updated list of affected owners.

The project is on programme and it is anticipated a similar progress in 1986.

6.0 Licencing of Water and Sanitation Operation

The statutory requirement to licence plumbers, septic tank emptiers and welldrillers was instigated. During the year there were five meetings of the Plumbers Examination Board held. There were a total of 69 applications resulting in the following:-

Apprentices	-	3
Journeymen	-	43
Masters	-	13
Deferred	-	10

Four septic tank emptiers licences were issued.

Three well drillers licences were issued.

7.0 Development Control

Following approximately twelve months operation of a temporary system of plumbing and sanitation review and

approval, the system proper was introduced on October 1st. The new system allowed for the collection of revenue for the service.

During the three months of proper operation 55 applications were received, reviewed and dealt with. Which now includes the site inspection of works during and after construction. The system was introduced only after full consultation with the plumbers, architects, developers, Planning Authority and CEHO.

The general reaction to the service is that it is long overdue and being carried out in an acceptable manner.

It must be added that the success of the service is due in no small part to the dedication and ability of Mr Thomas Hill, the Chief Plumbing Inspector designate.

8.0 United Nations

The Authority continued to benefit from being part of the United Nations Smaller Islands Water Resources and Management Project.

The Authority participated on a 100% cost sharing basis, the 1985 cost was CI$15,000.

The UN provided the full time services of two Associate Experts, Mr Leo de Waal, and Mr Tom van Zanten. Mr Leo de Waal left in April at the end of his contract. The UN have arranged a replacement to arrive in 1986.

Mr Peter Hadwen the Project Manager, visited on two occasions.

Equipment purchased by the UN was one additional Apple IIE computer and ancillery equipment and a Toyota four wheel drive truck.

The drilling rig which had been previously provided by the UN proved to be unsuitable and was transferred within the project to Bermuda.