

# **APPENDIX C-2**

## **HYDROLOGICAL MONITORING REPORT FOR MARCH 2005**

**By: Department of Geology, Mines  
and Water Resources**

# Hydrological Studies

March 2005

*(DGMWR Report No. 2)*



A Report prepared by the Department of Geology, Mines and Water  
Resources

30<sup>th</sup> march 2005

Report Prepared by:

*Morris Stephen.*  
*Water Technician*

*Thomas Steel*  
*Assistant Water Technician*

## Table of Contents

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>3</b>
<b>2.0</b>	<b>FIELD ACTIVITIES .....</b>	<b>3</b>
2.1	FANAFALL STATION SARAKATA .....	4
2.2	FANADAM STATION, SARAKATA .....	4
2.3	FANAFO STATION, SARAKATA.....	4
<b>3.0</b>	<b>RESULTS.....</b>	<b>4</b>
3.1	FANAFO .....	4
3.2	FANADAM.....	4
3.3	FANAFALL .....	5
3.4	WATER QUALITY TEST RESULT .....	5
<b>4.0</b>	<b>CONCLUSION .....</b>	<b>5</b>

## 1.0 Introduction

In March 2005 representatives of the Vanuatu Department of Geology, Mines and Water Resources (DGMWR) completed a Field Trip to the Island of Santo as part of the 3<sup>rd</sup> Phase Hydropower Project Studies. The following sections of this report provide a background summary of the field activities completed prior to the March 2005 field trip, a summary of the field activities conducted during the subject field trip, presentation of the hydrological and water quality results, and discussion regarding future field activities and project needs. Figures are presented following the text. Gauging Calculations Sheets are provided in Appendix.

## 2.0 Field Activities

The purpose of Mach 5<sup>th</sup> to 11<sup>th</sup> 2005 field trip was the inspection of the three gauging stations, downloading of water level data, replacement of batteries and reading of totalizer at Fanafo station and to conduct water quality test at each stations. The location of each of the recording stations is shown on Figure 1. The following sections summarize the field activities conducted at each of the project sites.

*Figure 1: Location of Study Spots along the Sarakata River*



## **2.1 Fanafall Station, Sarakata River**

Personnel from the DGMWR arrived at Fanafall Station (Site No 2230103) on March 9th 2005 at 1 pm. The installation of a new water level recorder by the technicians was done successfully. The recorder's reading was 279 mm at 13.00 hours and the Staff gauge reading was 320 mm at 13.00 hours. Staff performed one stream gauging at a stage height of 320 mm, but due to malfunctioning of the current meter counter (the counter was then recharged), stream gauging was not completed. Staff also performed a water quality test where results are presented in section 3.4. Staff returned to this Station on the 11<sup>th</sup> of March at 14H09 to reconduct the stream gauging at the height of 310 mm at the staff gauge. Staffs also download the water level recorder and the reading was 267 mm at 13H15.

## **2.2 Fanadam Station, Sarakata River**

Personnel from the DGMWR arrived at Fanadam Station (Site No 2230104) on March 11<sup>th</sup> 2005 at 13h00. Staff performed one stream gauging at a stage height of 620 mm. Staff also performed a water quality test where results are presented in section 3.2.

## **2.3 Fanafo Station, Sarakata River**

Personnel from the DGMWR arrived at Fanafo Station (Site No 2230102) on March 11th 2005 at 11H00. Staff found that the water level recording equipment, installed in February 2005 was in excellent condition. The automated Tipping Bucket Rain gauge that was also installed in February 2005 was found to be in excellent condition. Data from the recording station was successfully downloaded. Staff performed one stream gauging at a stage height of 350 mm, the results of which are presented in section 3.1 and also performed a water quality test where results are presented in section 3.2.

## **3.0 Results**

The following section summarizes the results of the ongoing monitoring of water levels, flow, rainfall and water quality at the Fanafo, Fanadam and Fanafall Stations.

### **3.1 Fanafo Station**

One stream gauging was performed at a stage height of 350 mm and the discharge at this height was calculated to be 4475 l/s. Water level data downloaded from Fanafo station for the recording period, March 5<sup>th</sup>, 2005 through to March 11<sup>th</sup>, 2005 will be presented in the next report.

### **3.2 Fanadam Station**

One stream gauging was performed at a stage height of 620 mm and the discharge at this height was calculated to be 1594 l/s

### 3.3 Fanafall Station

One stream gauging was performed at a stage height of 310 mm and the discharge at this height was calculated to be 5061 l/s. Water level data downloaded from Fanafall station for the recording period, March 09<sup>th</sup>, 2005 through to March 11<sup>th</sup>, 2005 will be presented in the next report.

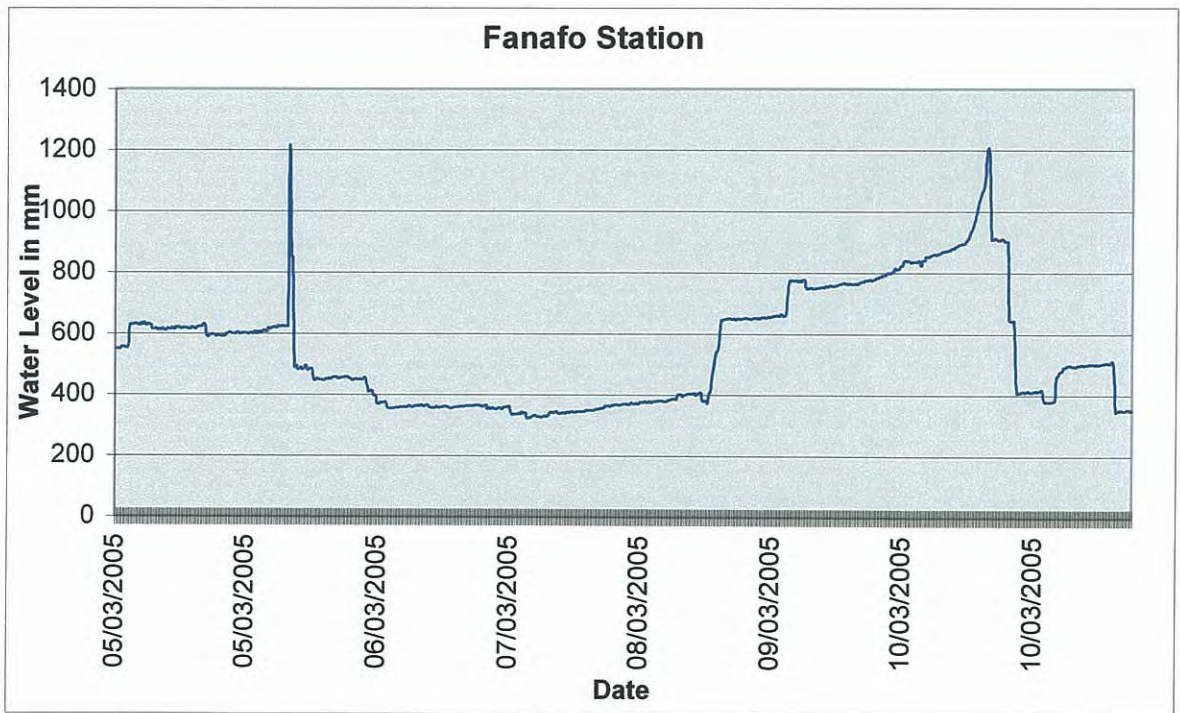
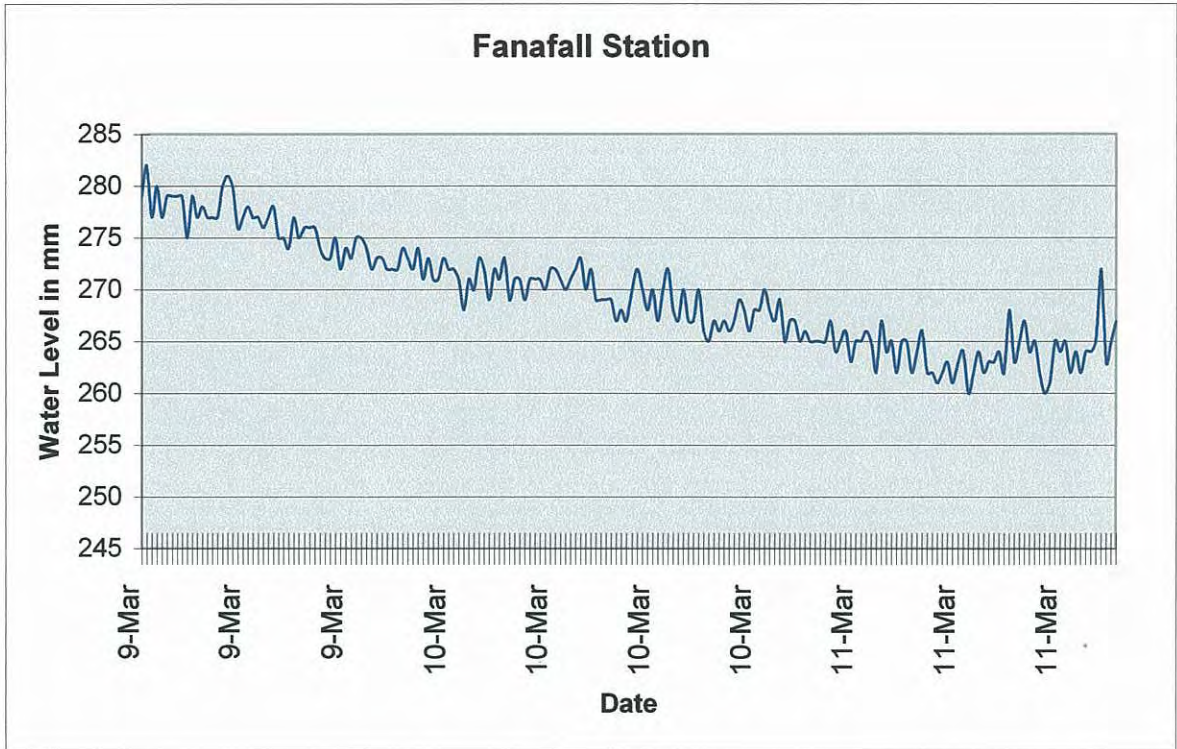
### 3.4 Water quality Test Results

The Water Quality test was done using the palintest kid. The other parameters were not measured due to malfunctioning of instrument.

	Fanafo	Fanadam	Fanafall
Temperature	24.12	24.88	24.86
Alkalinity	180	180	180
Hardness	140	140	140
Conductivity	260	270	290

### 5.0 Conclusion

The field activities carried out during the March 2005 field trip included the inspection of the three Stations. The Fanafo and Fanafall stations were found to be in excellent condition, the datas were successfully downloaded and entered into the Department's Water Resources Database. The Fanadam Station Ecologger is yet to be installed due to the shortage of time. Staffs had to return to Vila to prepare for another trip to Tanna the following week.



# **APPENDIX C-3**

## **HYDROLOGICAL MONITORING REPORT FOR APRIL 2005**

**By: Department of Geology, Mines  
and Water Resources**



**Hydrological Studies**  
**3<sup>rd</sup> Phase Hydropower Project**  
**April 2005 Field Trip Report**

*(DGMWR Report No. 3)*



**A Report prepared by the Department of Geology, Mines and Water  
Resources**

**29<sup>th</sup> April 2005**

**Report Prepared by:**

***Morris Stephen.***  
***Water Technician***

***Thomas Steel***  
***Assistant Water Technician***

## Table of Contents

<b>1.0</b>	<b>INTRODUCTION</b> .....	<b>4</b>
<b>2.0</b>	<b>FIELD ACTIVITIES</b> .....	<b>4</b>
2.1	FANAFALL STATION SARAKATA .....	5
2.2	FANADAM STATION, SARAKATA .....	5
2.3	FANAFO STATION, SARAKATA.....	5
2.3	WATER INTAKE CHANNEL, SARAKATA.....	5
<b>3.0</b>	<b>RESULTS</b> .....	<b>5</b>
3.1	WATER QUALITY TEST RESULT .....	6
<b>4.0</b>	<b>CONCLUSION</b> .....	<b>6</b>

## LIST OF FIGURES

Figure 1: Station Sites

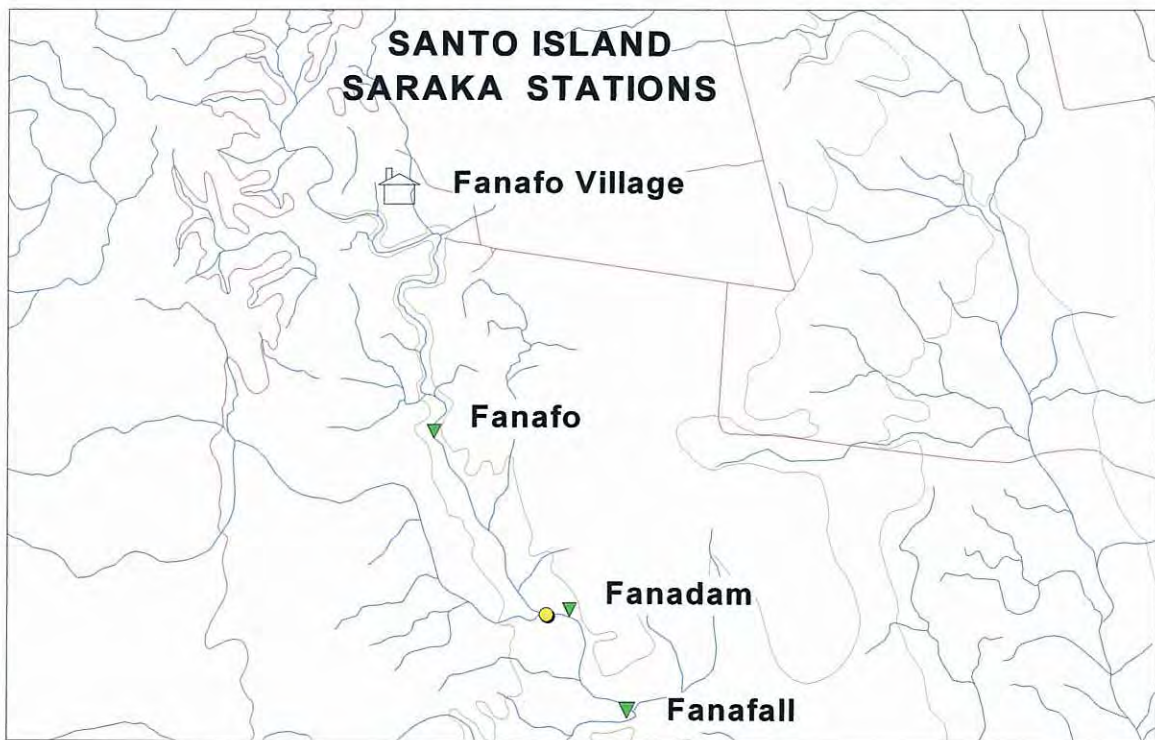
## 1.0 Introduction

In April 2005 representatives of the Vanuatu Department of Geology, Mines and Water Resources (DGMWR) completed a Field Trip to the Island of Santo as part of the 3<sup>rd</sup> Phase Hydropower Project Studies. The following sections of this report provide a background summary of the field activities completed prior to the April 2005 field trip, a summary of the field activities conducted during the subject field trip, presentation of the hydrological and water quality results, and discussion regarding future field activities and project needs. Figures are presented following the text. Gauging Calculations Sheets are provided in Appendix.

## 2.0 Field Activities

The purpose of April 2005 field trip was to inspect the three gauging stations, downloading of water level data, replacement of batteries and reading of totalizer at Fanafo station and to conduct water quality test at each stations. The location of each of the recording stations is shown on Figure 1. The following sections summarize the field activities conducted at each of the project sites.

*Figure 1*



## **2.1 Fanafall Station, Sarakata River**

Personnel from the DGMWR arrived at Fanafall Station (Site No 2230103) on the 29<sup>th</sup> of April 2005 at 10H51 pm. Staff found that the water level recording equipment, installed in March 2005 was in excellent condition. Data from the recording station was successfully downloaded. The recorder's reading was mm at 13.00 hours and the Staff gauge reading was 700 mm at 10H30 hours. The stream gauging was not conducted because the water level was too high. Staff also performed a water quality test where results are presented in section 3.4.

## **2.2 Fanadam Station, Sarakata River**

Personnel from the DGMWR arrived at Fanadam Station (Site No 2230104) on the 29<sup>th</sup> of April 2005 at 11h00. The stream gauging was not conducted because the water level was too high. The staff gauge reading was 1.19 m at 11H30. Staff also performed a water quality test where results are presented in section 3.2.

## **2.3 Fanafo Station, Sarakata River**

Personnel from the DGMWR arrived at Fanafo Station (Site No 2230102) on the 29<sup>th</sup> of April at 12H00. Staff found that the water level recording equipment, installed in February 2005 was in excellent condition. The automated Tipping Bucket Rain gauge that was also installed in February 2005 was found to be in excellent condition. Data from the recording station was successfully downloaded. The stream gauging was not conducted because the water level was too high. The stage height was 1.325 m. Staff also performed a water quality test where results are presented in section 3.1.

## **2.4 Water intake channel, Sarakata River**

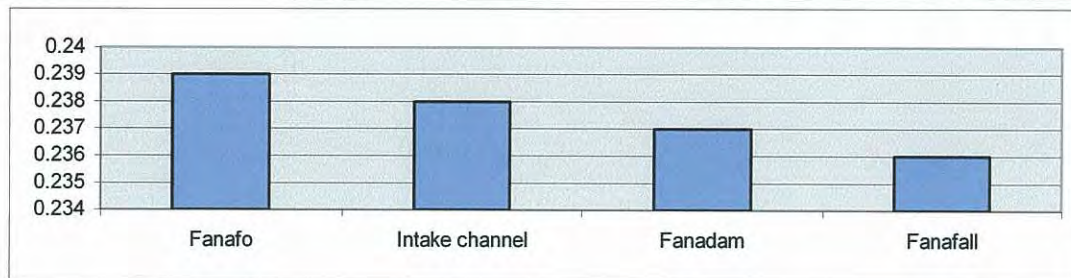
Water quality test was performed on this site and results are presented in section 3.1.

### 3.0 Results

#### 3.1 Water quality test Results

The Water Quality test was done using the palintest kid and the Quanta probe.

	Fanafo	Intake channel	Fanadam	Fanafall
Temperature (°C)	23.61	23.59	23.61	23.61
Conductivity (ms/cm)	0.239	0.238	0.237	0.236
Dissolved Ox. (mg/L)	6.37	6.31	6.19	5.65
PH	9.25	9.28	9.29	9.29
Salinity (PSS)	0.12	0.11	0.11	0.11
%Dissolved Oxygen	71.5	73.6	70.6	67.00
ORP (mV)	186	188	184	182
% Clarity				
Depth (m)	0.2	0.2	0.9	0.8
Alkalinity	140	140	140	140
Hardness	140	140	140	140



#### 4.0 Conclusion

The field activities carried out during the March 2005 field trip included the inspection of the three Stations. The Fanafo and Fanafall stations were found to be in excellent condition, the datas were successfully downloaded and entered into the Department's Water Resources Database. The Fanadam Station will only need a staff gauge to read the water level and flow gauging to be conducted, automated water level recorder is not really necessary (TOR).



# **APPENDIX C-4**

## **HYDROLOGICAL MONITORING REPORT FOR JULY 2005**

**By: Department of Geology, Mines  
and Water Resources**

**Hydrological Studies**  
**3<sup>rd</sup> Phase Hydropower Project**  
**July 2005 Field Trip Report**

*(DGMWR Report No. 6)*



**A Report prepared by the Department of Geology, Mines and Water  
Resources**

**06<sup>rd</sup> July 2005**

**Report Prepared by:**

*Morris Stephen.*  
*Water Technician*

*Thomas Steel*  
*Assistant Water Technician*



## Table of Contents

<b>1.0</b>	<b>INTRODUCTION</b> .....	<b>4</b>
<b>2.0</b>	<b>FIELD ACTIVITIES</b> .....	<b>4</b>
2.1	FANAFALL STATION SARAKATA .....	5
2.2	FANADAM STATION, SARAKATA .....	5
2.3	FANAFO STATION, SARAKATA.....	5
<b>3.0</b>	<b>RESULTS</b> .....	<b>5</b>
3.1	WATER QUALITY TEST RESULT .....	6
<b>4.0</b>	<b>CONCLUSION</b> .....	<b>6</b>

## LIST OF FIGURES

Figure 1: Station Sites

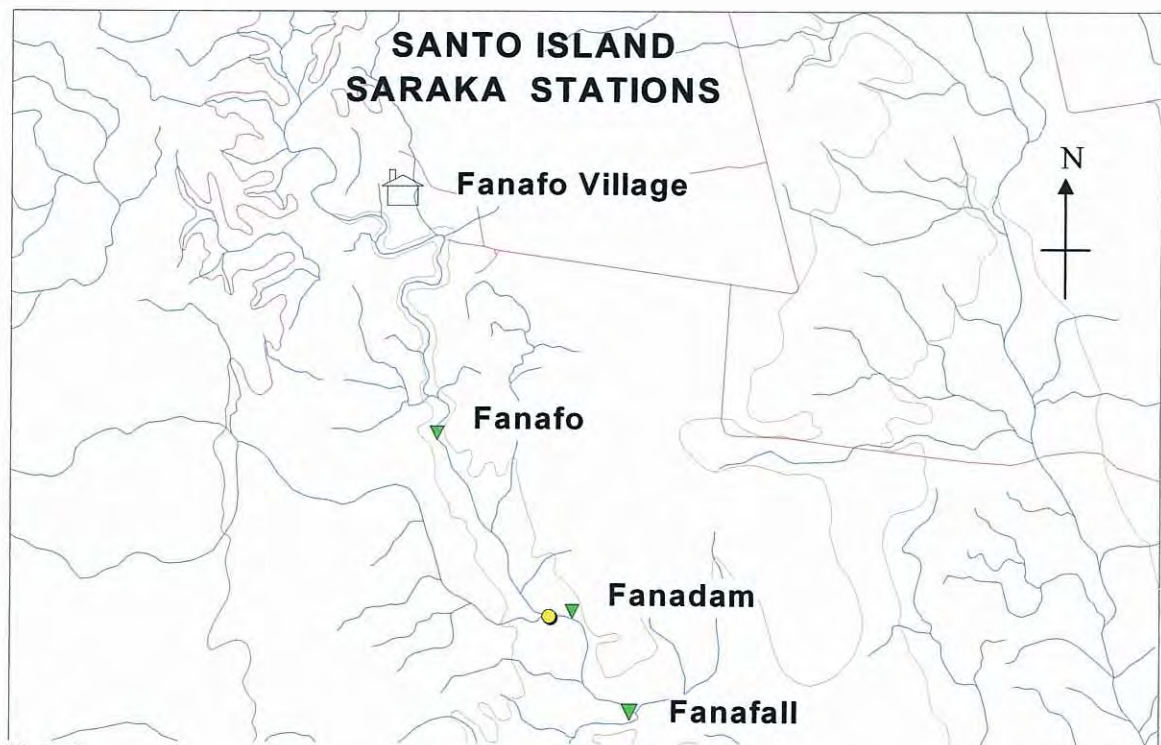
## 1.0 Introduction

In July 2005 representatives of the Vanuatu Department of Geology, Mines and Water Resources (DGMWR) completed a Field Trip to the Island of Santo as part of the 3<sup>rd</sup> Phase Hydropower Project Studies. The following sections of this report provide a background summary of the field activities completed prior to the July 2005 field trip, a summary of the field activities conducted during the subject field trip, presentation of the hydrological and water quality results, and discussion regarding future field activities and project needs. Figures are presented following the text. Gauging Calculations Sheets are provided in Appendix.

## 2.0 Field Activities

The purpose of July 2005 field trip was to inspect the three gauging stations, downloading of water level data, replacement of batteries and reading of totalizer at Fanafo station and to conduct water quality test at each stations. The location of each of the recording stations is shown on Figure 1. The following sections summarize the field activities conducted at each of the project sites.

*Figure 1*



### **2.1 Fanafall Station, Sarakata River**

Personnel from the DGMWR arrived at Fanafall Station (Site No 2230103) on the 16<sup>th</sup> of July 2005 at 12H43 pm. Staff found that the water level recording equipment, installed in March 2005 was in excellent condition. Data from the recording station was successfully downloaded. The recorder's reading was 220mm at 12.43 hours and the Staff gauge reading was 270 mm at 12H50 hours. The staff also perform stream gauging and water quality test where results are presented .

### **2.2 Fanadam Station, Sarakata River**

Personnel from the DGMWR arrived at Fanadam Station (Site No 2230104) on the 16<sup>th</sup> of July 2005 at 14h04. The staff gauge reading was 0.65m at 14H04. Staff also performed a water quality test where results are presented in section 3.2.

### **2.3 Fanafo Station, Sarakata River**

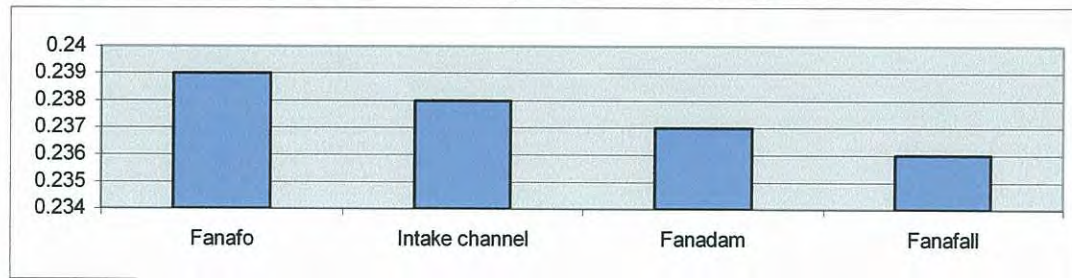
Personnel from the DGMWR arrived at Fanafo Station (Site No 2230102) on the 16<sup>th</sup> of July at 15H10. Staff found that the water level recording equipment, installed in February 2005 was found to being disturb during the recent flood at the height of H 65333mm and the logger have been resset at that time to 1360mm equal to 360mm and the time was 15h35. The automated Tipping Bucket Rain gauge that was also installed in February 2005 was found to be in excellent condition. Data from the recording station was successfully downloaded The stream gauging was conducted and the stage height was 0.36m at 15h10pm. Staff also performed a water quality test where results are presented in section 3.1.

### 3.0 Results

#### 3.1 Water quality test Results

The Water Quality test was done using the palintest kid and the Quanta probe.

	Fanafo	Fanadam	Fanafall
Temperature (°C)	23.27	23.48	23.58
Conductivity (ms/cm)	0.277	0.259	0.261
Dissolved Ox. (mg/L)	7.00	7.70	6.40
PH	7.58	7.79	8.01
Salinity (PSS)	0.13	0.12	0.13
%Dissolved Oxygen	78.6	76.6	75.4
ORP (mV)	220	213	219
% Clarity			
Depth (m)	0.2	0.6	0.5
Alkalinity	140	140	140
Hardness	140	180	180



#### 4.0 Conclusion

The field activities carried out during the July 2005 field trip included the inspection of the three Stations. The Fanafo and Fanafall stations were found to be in excellent condition, the datas were successfully downloaded and entered into the Department's Water Resources Database. The Fanadam Station will only need a staff gauge to read the water level and flow gauging to be conducted, automated water level recorder is not really necessary (TOR).

