Office of Utilities Regulation

Review of Jamaica Public Service Company Limited's Billing System for Electricity Consumption

February 2007

PRICEWATERHOUSECOOPERS

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Appendices

1 Executive Summary

PricewaterhouseCoopers was retained by the Office of Utilities Regulation ("OUR") to undertake a review of the billing system of Jamaica Public Service Company Limited ("JPS") for electricity consumption. The key objectives of this review were:

1) To conduct an examination of the various components of JPS' billing system with a view to determining the extent to which the existing system consistently provide reliable and accurate bills detailing customer consumption; and

2) To perform an assessment of the extent to which JPS is in compliance with the regulatory Directives and prescribed standards pursuant to the All-Island Licence 2001 under which the Company operates.

In accordance with the OUR's instructions as set out in the Consultancy Agreement dated 22 March 2006 ("the Contract") and directed through 18 separate terms of reference ("TORs"), we summarise the work done, scope limitations and key findings for each of the TORs.

TOR	Description	Summary of work done	Scope Limitations	Key Findings
1	Review relevant documentation.	All relevant documentation was reviewed and referenced to in the applicable TORs.	None	None
2	Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques.	Selected a sample of 50 customer complaints and assessed the legitimacy of these complaints on the basis of whether JPS was in breach of the Guaranteed Standards.	PwC's sample selection from the OUR's complaints database was restricted to 52% of the complaints logged in the database as no account numbers were available for the remaining complaints.	A general review of the OUR's complaints database confirmed that high consumption formed the majority of the complaints which were concentrated in the period during and following hurricane Ivan. Of the 50 sample complaints tested only 10 were deemed legitimate by PwC. We also observed that JPS was in breach of the Guaranteed Standards in 7 instances. However, in 5 instances we understand that no claims were submitted by the customers for compensation.

1. Executive Summary (Continued)

TOR	Description	Summary of work done	Scope Limitations	Key Findings
3	From an historical and current perspective, assess the accuracy and integrity of the meter reading process.	- Reviewed meter reading policies and procedures. - Interviewed key personnel involved in meter reading. - Observed, examined and re-performed key meter reading control procedures. Re-performance and reconciliation of meter reading data transferred between meter reading systems in November of 2006.	Historical data required to validate the working of meter reading controls were not available. There was no documentary evidence to support key controls represented by management as having been performed.	- Policies and procedures were in place to guide meter reading activities - Control activities aimed at validating complete and accurate data transfer were not evidenced. Re-performance of a sample of data transfers between meter reading systems and reconciliation of the results yielded no errors of differences.
4	Ascertain the proportion of meters per rate class being read monthly.	The scope of our work was designed to ascertain JPS' level of compliance with EOS 6 which was set at 99% effective 1 June 2004. While the TOR required an assessment from an historical and current perspective, the scope of our work and assessment was limited to a sample basis in light of the scope limitation. Alternately, PwC reperformed the aging of estimated billings for 5 months selected randomly.	PwC was provided with a compilation of meters read (by parish) for the period November 2004 to March 2006. However, in validating the source of the Percentage Meter Reads report it was concluded that the information was not accurate.	Currently, JPS does not report to the OUR in relation to performance of EOS 6. While JPS used to report internally, the process involved data being extracted from CIS Banner and compiled in Microsoft excel. We observed that the data had to be manipulated and in some instances monthly totals (meters to be read and meters read) derived were unusually high or low. Based on the re-performance of the aging of estimated billings we observed that bills in breach (more than 3 months consecutive estimated readings) were less than 2% for the months tested.

1. Executive Summary (Continued)

TOR	Description	Summary of work done	Scope Limitations	Key Findings
5	Assess the level of accuracy in reading of meters through field verification.	- Accompanied Meter Readers on the routes and read 120 meters. - Compared the PwC meter readings with those recorded by the JPS and traced the meter reads straight through to billing. - Chose a sample of 45 meters and independently read those meters one week after they were read by JPS Meter Readers. Assessed the reasonableness of the initial reading by the JPS Meter Readers by estimating a current reading based on the Average Daily Consumption (ADC) for the past three months and comparing that with the actual reading taken one week later. -	None	- Readings for all 120 meters corresponded to the JPS meter reads and were traced straight through to billings - Of the 45 meters that were independently read, 38 readings yielded consumption levels deemed to be reasonable. 1 reading indicated a negative consumption between the time of last meter reading and the meter reading taken one week later and another indicated a consumption of 16 times the ADC. 5 meters were not functional at the time of the subsequent meter read.

1. Executive Summary (Continued)

TOR	Description	Summary of work done	Scope Limitations	Key Findings
6	Assess the accuracy and reliability of the handheld devices used by meter readers to capture readings.	- Review of procedures to identify and resolve issues with handheld devices which are reported. - Research on the respective handheld machines to identify any known faults or defects. - Reviewed the results of work done from TOR 3 with respect to the transfer of 120 meter reads through the meter reading systems through to billing - Review of fault logs to identify common issues with the handheld devices	JPS' inability to provide a listing of the FW 200 handheld devices. JPS has indicated that such a list is available, but it has not been provided to us.	- Procedures are in place to identify and resolve issues with devices. These include a maintenance arrangement with the supplier who repairs defective devices - The FW 200 handheld machine which forms part of JPS' inventory of handhelds, is no longer being manufactured. - The manufacturer has indicated that support has ceased but JPS continues to receive support. JPS also uses the FW 300 handheld which is still being manufactured and which is still supported. Incident logs reviewed revealed such incidents as no screen display, device cannot be turned on, keys have malfunctioned, low battery life, meter read data not loading when placed in the cradle, device working slowly and freezing up and handheld device crashes.

1. Executive Summary (Continued)

TOR	Description	Summary of work done	Scope Limitations	Key Findings
7	Assess the reliability and accuracy of the computerised system use to upload, store and download meter readings in the process of transferring data from the field to the office.	Reviewed the following: - Controls over application security. - Controls over operating system security. - Controls over access to critical files and folders that support meter read transfers. - Controls of changes to programs which are used in the upload and download of meter readings. Incorporated results of the work in TOR 3 which dealt with data transfers across the files.	Information regarding an upgrade of UMS was not available for review.	- The computerised system (UMS) used to upload, store and download meter readings does not require a password. - The password policies for access to the operating system which manages the application are generally consistent with recommended practice. - UMS does not have the functionality to facilitate logging and monitoring of user activity. - Logging and monitoring of security events has however been enabled at the operating system level - With the exception of "Log on Locally", which allows direct access to the console, powerful user rights have generally been assigned consistent with recommended practice. - Further access restrictions were required for files and folders that support meter read transfers. Work done on TOR 3 re data transfers between systems yielded no errors or differences.

1. Executive Summary (Continued)

TOR	Description	Summary of work done	Scope Limitations	Key Findings
8	From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing).	For 40 days randomly selected, attempts were made to: - Observe, examine and/or re-perform control procedures to ensure operating effectiveness based on JPS' policies. - Review key reports, documents and records used to monitor and control the billing operations. These included billing exception reports and supporting working papers for any adjustments made. - Evaluate reports or documents that would allow us to determine the completeness and accuracy of bills generated. Key general computer controls associated with bill processing were also reviewed.	Documents, reports etc. required to perform the tests listed in the adjacent column were available for only 4 of the 40 days requested.	- Of the 4 items reviewed, we were only able to assess the treatment of 3 items as the 4th did not indicate reasons for the adjustment made. The 3 items appeared to be appropriately dealt with and were mathematically accurate. - Access to the billing database appeared to be reasonable and consistent with assigned roles and responsibilities, Auditing has not been enabled for key database activities.

1. Executive Summary (Continued)

TOR	Description	Summary of work done	Scope Limitations	Key Findings
9	From an historical and current perspective, assess the extent to which the design of the quality control measures (including meter reading and exceptions processing) reliably and consistently identifies and treats with legitimate/genuine billing anomalies.	Assessment of billing policies and procedures before and immediately after hurricane Ivan	No scope limitations	Procedures as identified should identify and treat with billing anomalies with the exception that supervisory level reviews of billing anomalies which have been corrected, are done on a sample basis.
10	From an historical and current perspective, verify the accuracy of the computation of the Fuel charges and assess the veracity of the inputs which include the heat rate, system losses, and fuel prices as shown in Schedule C of the monthly JPS Fuel and IPP reports.	PwC replicated the computation of the fuel and IPP charge for 10 months during the period July 2004 to July 2006 with the key objectives being: 1. verifying the mathematical accuracy of the computations; and 2. assessing the veracity of the inputs.	None	Instances where we observed deviations from the normal calculations, information and explanations justifying JPS' actions were provided. Corrective actions taken in subsequent months, where applicable, were reflected in the fuel and IPP calculations. These calculations are required to be submitted to OUR in the normal course of obtaining approval for the monthly fuel and IPP charges.

1. Executive Summary (Continued)

TOR	Description	Summary of work done	Scope Limitations	Key Findings
11	From an historical and current perspective, verify the accuracy of the computation of the IPP charges as per the IPP Power Purchase agreements as well as any other relevant billing input.	The IPP Power Purchase Agreements (PPA) were reviewed for all IPPs with the key objectives being: 1. obtaining an understanding of the basis of computation for the fuel and non-fuel charges of all IPPs; 2. confirming that the computations were performed in accordance with the IPPs' PPA; and 3. verifying accuracy of the computation of the IPP charges as well as any other relevant billing input. Step 3 above was conducted in conjunction with the months selected in TOR 10.	None	Generally, we observed that during the period June 2004 to October 2006, IPP charges were computed in accordance with definitions outlined in the 2004-2009 Tariff Review and respective Power Purchase Agreements. These IPP charges were also adjusted in accordance with the Determination Notices issued annually over the period. Where we encountered discrepancies which were outlined in TOR 10, these discrepancies were communicated to OUR. Corrective actions taken in subsequent months were reflected in the fuel and IPP calculations. These calculations are required to be submitted to OUR in the normal course of obtaining approval for the monthly fuel and IPP charges.

1. Executive Summary (Continued)

TOR	Description	Summary of work done	Scope Limitations	Key Findings
12	Assess whether the algorithm used by the JPS Customer Information System (Banner CIS) reliably and accurately computes the customer monthly invoices (bills).	- Re-performance of bill charges for 250 customers using actual readings. - Re-performance of estimated consumption for 250 customers. Re-performance of bill charges for the aforementioned 250 customers with the estimated consumptions.	None	There were no differences noted with any of the calculations done.
13	Assess the timeliness of the dispatch of validated bills/invoices within the interval specified by company policy.	For 40 days chosen, we attempted to do the following - Examine and/or re-perform of control procedures to ensure operating effectiveness based on JPS' policies; and - Review of documents and records used to monitor and control timeliness of bill dispatch.	- Documentation was available for only 5 of the forty days selected. No information is retained regarding the bill dispatch date. The bill print date therefore had to be used as a benchmark for the bill dispatch date.	- The document received for the 5 days only contained information relating to what was received for printing and had no comparison with what was sent for printing. From the documentation available for 5 days, it was noted that the bills were generally dispatched within 4 days, with the number of days being determined as the difference between the meter read date and the bill print date

1. Executive Summary (Continued)

TOR	Description	Summary of work done	Scope Limitations	Key Findings
14	Determine the extent to which the company is compliant with the following Overall and Guaranteed Standards *(EOS 6 - Frequency of meter reading, EOS 8 – Billing Punctuality, EGS 7 – Frequency of Meter Reading, EGS 8 – Estimation of Consumption, EGS 10 – Billing Adjustments*).	Comments made accordingly based on work performed in other TORs.	None	Key findings noted accordingly in the relevant TORs.
15	Assess the company's compliance with the Office's Directive of 24 February 2005 (amended 22 March 2005).	PwC conducted follow up procedures to determine the extent of JPS' compliance with the various Directives. The scope of our work involved verifying representations.	None	Of the 20 directives which were decided upon, only ten (10) have been fully implemented, while four (4) have been partially implemented and the remainder have yet to be resolved. Therefore, overall, JPS has been inconsistent in its compliance with the Office's Directive of 24 February 2005 (amended 22 March 2005).
16	Identify any areas of weakness within the systems mentioned above and determine the adequacy of the levels of safeguards to protect against data corruption and manipulation.	Reviewed findings in TOR 2 – 15	See TOR 2 - 15	Weaknesses have been identified as key findings under TOR 2 – 15.

1. Executive Summary (Continued)

TOR	Description	Summary of work done	Scope Limitations	Key Findings
17	Identify the causes of these weaknesses identified in TOR 16 above.	Reviewed possible causes of weaknesses noted in TOR 16.	None	System weaknesses were caused by: - An omission to adhere to instituted policies and procedures in those instances where weaknesses would have been mitigated by present policies; - Inadequate training of members of staff; and - Inadequate mechanisms for monitoring of compliance with policies and procedures.

1. Executive Summary (Continued)

TOR	Description	Summary of work done	Scope Limitations	Key Findings
18	Recommend how the system mentioned above could be improved with due regard for international best practices.	Recommendations made accordingly based on work performed in other TORs.	None	PwC recommends the following: **Billing Adjustments** - PwC recommends that bill adjustments arising from corrections of estimates in previous months be based on rates prevailing at the time that consumption was made rather than at current period rates. This will ensure that customers are ultimately in the same position that they would have been had the actual consumption been applied. **Frequency of estimates** – While we recognise that JPS is moving towards 100% meter reading on a monthly basis, we recommend that a longer observation period be applied as the basis of estimating consumption. In addition, the consumption pattern for the comparative period in the previous year could also be taken into consideration. **Performance audits** - Ongoing monitoring and reporting against the Guaranteed & Operating standards to the public should be implemented as a practice.

1. Executive Summary (Continued)

We wish to caution readers that the report should be read in its entirety as selecting portions of its contents, without considering all factors and analysis, could result in misinterpretation of comments and analysis determined herein. We further wish to point out that, the scope of our work has been limited to those areas detailed within the TORs as outlined in the contract with the OUR. Accordingly, the OUR is responsible for determining whether the scope of our work as specified in the TORs is sufficient for its purposes.

Our work did not constitute an audit conducted in accordance with generally accepted auditing standards, an examination of internal controls or other attestation or review services in accordance with standards established by the International Federation of Accountants. Accordingly, we do not express an opinion or any other form of assurance with respect to the JPS billing system. Our work was based primarily on internal management information and has been carried out on the assumption that information provided to us by the management of the Company is reliable and, in all material respects, accurate and complete. We have not subjected the information contained in our reports and letters to checking or verification procedures except to the extent expressly stated. This is normal practice when carrying out limited scope procedures, but contrasts significantly with, for example, an audit. Even audit work provides no guarantee that fraud will be detected. The OUR will therefore understand that the services are not designed to and are not likely to reveal fraud or misrepresentation by the management of the Company. Accordingly, we cannot accept responsibility for detecting fraud (whether by management or by external parties) or misrepresentation by the management of the Company.

It must be appreciated that the matters dealt with in this report came to our attention during the completion of tasks undertaken as part of the review agreed and undertaken as part of the terms and conditions agreed with the OUR and JPS management. Whilst we have carried out a high level review of the key processes and controls we would expect to see in the process cycles reviewed as required for each TOR, our work has not included a full end to end controls review and therefore our comments cannot be expected to include all possible issues that may exist or improvements in processes and controls that a more wide-ranging and detailed review might identify. Furthermore, this report has been prepared solely for the OUR's use and should not be quoted in whole or in part without our prior written consent. However, as mutually agreed with the OUR and JPS, a copy of our report was made available to the Company. To the extent that we consider appropriate, we have incorporated JPS' comments in our report.

No responsibility to any third party is accepted as the report has not been prepared for, and is not intended for, any other purpose. We will not accept any liability or duty of care (whether in contract, tort (including negligence) or otherwise) to any other person to whom this report is shown or into whose hands it may come save where expressly agreed by PwC's prior consent in writing.

2 Introduction and background

2.1 Introduction

PricewaterhouseCoopers ("PwC") has been retained by the Office of Utilities Regulation ("OUR") to undertake a review of JPS' billing system for electricity consumption. We understand that, in recent years, there has been a significant increase in the number of billing complaints to JPS and the OUR. While in recent months the number of complaints has fallen again, there is a clear need to understand what the driver behind the complaints was and whether JPS' systems and processes are able to support accurate and reliable billings going forward.

The key objectives of this review were:

1) To conduct an examination of the various components of JPS' billing system with a view to determining the extent to which the existing system consistently provide reliable and accurate detailing customer consumption; and

2) To perform an assessment of the extent to which JPS is in compliance with the regulatory directives and prescribed standards pursuant to the All-Island Licence 2001 under which the Company operates.

This report includes our key findings with a suggested priority for implementation of recommendations. We have discussed these findings with relevant members of JPS and their comments are included within our recommendations.

2.2 Structure of the report

The structure of the report is outlined in the section summaries below:

- Section 3 – Scope of work – This section outlines the services provided and the scope of work performed.

- Section 4 - Procedures and findings – This section details for each TOR the:

    - Key procedures
    - Key findings
    - Key assumptions and limitations

- Appendices – The appendices include certain aspects and findings of the review that support the main sections.

2.3 Background information

2.3.1 Tariff structures

Customer charges, demand charges and energy charges are fixed rates determined based on class and agreed with the OUR. These are published in the JPS Annual Rate Schedule. Fuel charge, IPP charge and foreign exchange adjustments are calculated monthly and charged on rate per kWh for all classes of customers. The table below summarises the charges applicable to each class of customer.

Charges	Basis	10	20	40	50	60
Customer charge	Fixed monthly charge	✓	✓	✓	✓	✓
Demand charge	Fixed rate driven by capacity (standard charge)			✓	✓	
Energy charge	Fixed rate driven by consumption	✓	✓	✓	✓	✓
IPP charge	Fixed $ rate calculated monthly and charged by consumption					
Fuel charge						
FX adjustment	Fixed % rate calculated monthly and charged by consumption					

Source: Review of 2004 – 2006 Rate Schedules

Generally, all customers are charged a fixed rate for kWh consumed and a fixed monthly customer charge; see **Appendix 1 - Customer Classes** for description of the various classes of customers. The table summarises the rates for the period 2004 to 2006.

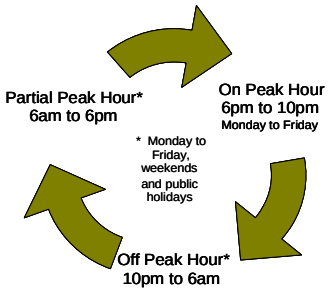
			Base Rate (J$ to US$1)	Effective Date	Year
			61.00	62.00	65.00
			01-Jun-04	01-Aug-05	01-Jun-06
Rate	Category	Charge	2004	2005	2006
10	Residential - First 100 kWh	Customer Charge ($ per month)	68.000	72.000	78.000
		Energy Charge ($ per kWh)	4.549	4.809	5.083
	Residential - Over 100 kWh	Customer Charge ($ per month)	68.000	72.000	78.000
		Energy Charge ($ per kWh)	8.008	8.466	8.932
20	General	Customer Charge ($ per month)	150.000	165.000	179.000
		Energy Charge ($ per kWh)	6.770	7.428	7.843
40ALV	Power Low Voltage	Customer Charge ($ per month)	2,100.000	2,287.000	2,486.000
		Energy Charge ($ per kWh)	4.250	4.628	4.894
		Standard	276.000	301.000	317.000
40LV	Power Low Voltage	Customer Charge ($ per month)	2,100.000	2,287.000	2,486.000
		Energy Charge ($ per kWh)	1.728	1.882	2.002
		Off-Peak	29.000	32.000	33.000
		On-Peak	394.000	429.000	452.000
		Partial Peak	308.000	335.000	353.000
		Standard	707.000	770.000	811.000
50MV	Power Medium Voltage	Customer Charge ($ per month)	2,100.000	2,287.000	2,486.000
		Energy Charge ($ per kWh)	1.556	1.694	1.804
		Off-Peak	26.000	28.000	30.000
		On-Peak	355.000	387.000	407.000
		Partial Peak	277.000	302.000	318.000
		Standard	636.000	693.000	729.000
60	Street Lights	Customer Charge ($ per month)	550.000	599.000	651.000
		Energy Charge ($ per kWh)	8.161	8.887	9.379
	Traffic Signals	Customer Charge ($ per month)	550.000	599.000	651.000
		Energy Charge ($ per kWh)	5.494	5.983	6.321

Source: Review of 2004 – 2006 Rate Schedules

2.3 Background information (Continued)

2.31 Tariff structures (Continued)

However, customers in class 40 (excluding 40ALV) and 50 have the option to be charged on a time-of-use basis. The diagram below illustrates a 24-hr consumption cycle for time-of-use basis.



2.3.2 Billing Cycles

Each account is assigned to a billing cycle. A billing cycle is the period (one month) between billing for consumption. In addition, meters are read based on billing cycles. The table below summarises the frequency of meter reading.

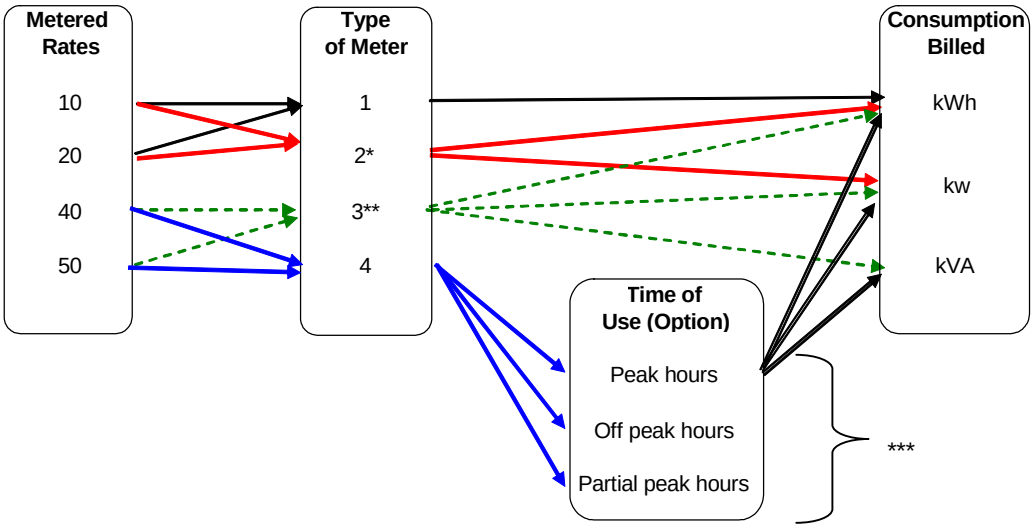
	Billing	Frequency of meter reading	
Rate	Cycles	Prior to May 05	Post May 05
10 and 20	01 – 42	01 – 21 read on odd months 22 – 42 read on even months	Read monthly
40	51 -54	Read monthly	
50	99	Read monthly	

Effective 1 May 2006, billing cycles for rates 10 and 20 were compressed into 21 cycles (from 42).

2.3 Background information (Continued)

2.3.3 Types of Meters (Registers)

There are four types of meters for meter reading and billing purposes within billing cycles 01 – 21, 51 – 54 and 99. The diagram below illustrates the various types of meters based on rates.



Notes:

* Physical meter has two registers: kWh and kW. However, the kW is read but not actually used as consumption is billed based on kWh.

** Physical meter has three registers: kWh, kW and kVA. However, the kW is read but not actually used as consumption is billed based on kWh and kVA.

*** Time of use is an optional for industrial customers. While the customer can choose which time band to operate, the meter has 9 registers. That is kWh, kW and kVA for peak, off peak and partial peak.

3 Scope of work

3.1 Services provided

To address each of the TORs our overall approach has involved the following activities:

- Planning and scoping our work with OUR and JPS;
- Agreement of number of working assumptions for this work with OUR and JPS;
- Preparation of an Inception report and an interim report for the OUR;
- Holding interviews with key management within the business in order to gather the necessary data and information;
- Understanding and assessing the process fitness relevant for each TOR;
- Understanding and assessing the system, access and monitoring and general computer controls relevant for each of the TOR;
- Understanding and assessing compliance with required standards, policies and procedures;
- Comparing processes and procedures with good /best practice and identifying potential areas for improvement;
- Re-performance of billing calculations as appropriate to the TOR;
- Observing live processes via walkthroughs with key staff; and
- Controls testing.

3.2 Scope of work performed

In order to complete both the data and system aspects of the review and to ensure the clarity of our findings we have divided our work into two separate, but interrelated, workstreams:

- The systems review workstream; and
- The data analysis workstream.

The systems review workstream

The systems review workstream addresses the robustness of the billing production process and meter reading and recording process. It included a review of the robustness of the data transfer and the extent of control mechanisms in place.

The process workstream were predominantly driven through qualitative analysis, relying heavily on process mapping and the interrogation of that process through interviews and first hand experience from site visits. It was envisaged that the process mapping will follow a relatively straightforward five step process:

1. Systems – Identify the systems (and their interactions) that are used in data capture, data transfer, data storage, bill production, performance and regulatory reporting, finance function.

3 Scope of work

3.2 Scope of work performed (Continued)

2. Description of process – Review and record the current bill production process flow, i.e. the method(s) followed for customer billing from the point of meter read to the point of bill dispatch. For example is the tariff selection process automated or based on manual input.

3. Controls, accountability, rectification – Processes, methods and guidelines in place to ensure the accurate and robust production of bills in a timely manner. For example, is there an audit trail and is there restricted (user defined) access to the various systems.

4. Error trapping – Processes and protocols in place to identify and resolve errors (e.g. invalid meter reads) and avoid inaccurate bills or other.

5. Reporting and monitoring – The method used and frequency of production for reporting and monitoring the production of bills and adherence to regulatory requirements imposed by the OUR.

The data analysis workstream

The data review workstream addresses the issues regarding type, frequency, significance and distribution of complaints and reasons for complaints. The key reasoning for the data review workstream is that it will provide numerical tests of the findings of the process review work stream. The data review included:

- Analysis of complaints to identify consistent areas of complaint;
- Analysis to target site visits;
- Check the effectiveness of meter reading;
- Check the effectiveness of data transfer between JPS systems;
- Cross check billing calculations;
- Assess the information used for monitoring the guaranteed standards;
- The findings of this analysis will be used to focus and refine the interviews and site visits.

4 Procedures and findings

4.1 TOR 2 - Legitimacy of complaints

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

4.1.1 Procedures

In order to assess the legitimacy of the complaints received by the OUR, PwC defined a legitimate complaint as:

An event or issue recognised by the customer that has occurred as a result of an error on the part of JPS, that is, JPS is at fault and such an error deemed valid based on the performance measures required by the service guarantees as defined by the Guaranteed Standards.

The database of complaints representing complaints against JPS received by the OUR for the period January 2003 to April 2006 was used as the basis to conduct this procedure. The scope of work included:

a) an initial review of the database; and
b) a more detailed review that looked at a sample of complaints.

In addition to the above, PwC extended the scope of work to determine from a current perspective what measures JPS has implemented to address, monitor and resolve complaints.

Initial review

The initial review involved an analysis of the scale of issue, understanding the magnitude of the complaints and the trend and concentration of occurrences. These factors were taken into consideration to determine the scope of work for the detailed review.

Detailed review

The detailed review involved a look at a sample of complaints intended to identify particular issues, JPS' performance against the guaranteed standards and determining JPS compliance to procedures, where applicable, based on our understanding documented from the process review.

Overview of detailed review

The method employed to address the scope of work involved taking a sample of 40 complaints from the OUR's database. The sample size of 40 was chosen based on PwC's internal controls testing methodology which recommends a sample size of 40 items when reviewing activities or controls which are manual in nature and exercised on a daily basis. The sample was generated by using Audit Command Language, a data interrogation tool and was stratified as follows:

4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

- 5 complaints before September 2004
- 25 during the period September to December 2004 (when most of the complaints were received)
- 10 after December 2004

To review the rate classes 40 and 50 complaints, PwC selected a sample of 10 complaints from August 2004 and July 2005 which represented the two months that had the most complaints.

Details of the sample have been included in **Appendix 3 – Customer complaints sampled**. To verify the legitimacy of the various complaints, we evaluated the extent that information gathered for each complaint collaborated with the nature of the respective complaints filed by the customers. In addition, where guaranteed standards are applicable, we investigated to determine the extent to which JPS complied with those standards (effective date 1 June 2004, per Final Determination Notice). To the extent that JPS was in breach we followed up to determine what compensation was provided to the customer. The table below summarises the nature of complaints selected in our samples and the scope of work applied:

	Verification Procedures				Compliance
Complaint category	Review consumption history (a)	Recalculate estimated consumption (b)	Recalculate bill (c)	Verify JPS' action (d)	Ascertain compliance to GS/OUR Directive (e)
High Consumption	√	√	√	√	√
Security Deposit	n/a	n/a	n/a	√	√
Meter related issues	√	√	√	n/a	√
Customer service issues	√	n/a	√	n/a	√
Estimate	√	√	√	√	√
Disputed	√	√	√	√	√
Unscheduled Interruption	n/a	n/a	n/a	√	√

(a) Review consumption history

This involved investigating the historical consumption pattern for the customer based on kilowatt hours charged monthly as provided from CIS Banner. The period usually covers 24 – 36 months spanning the period before the date of complaints and up to May 2006. In cases where there are disputes with the kilowatt hours charged, PwC performed the following actions:

4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

- Examined historical consumption pattern by identifying deviations from the consumption trend and assessed the reasons for deviation by reviewing frequencies of estimated billing versus actual billing. Further evaluated the effectiveness of monitoring controls to detect unusual consumption patterns (exceptions).

- Examined consumption immediately following the period of complaint to identify whether consumption fell back in line with the normal trend.

(b) Recalculate estimated consumption

Manually reperformed the calculations of kilowatt hours, for selected bills, to verify the accuracy of estimated consumption calculated by CIS Banner.

$$\text{Estimated consumption} = \text{Days of service} \times \text{Average daily consumption}$$

where,

$$\text{Average daily consumption} = \frac{\text{Kilowatt hours usage between the last two actual readings}}{\text{Number of days between last two actual reading dates}}$$

(c) Recalculate bills

This involved selecting a sample of bills issued to the customer up to the complaint date and verifying that these bills were accurate. For this procedure we verified the various rates to the applicable Rate Schedules and monthly Fuel and IPP calculations. The scope of work for this TOR did not involve recalculation of the Fuel and IPP charges. However, reliance was placed on these source documents on the basis that work performed in TOR 10 (Calculation of Fuel and IPP charges) did not result in material differences.

(d) Verifying JPS' action

This involved verifying the effectiveness of the various monitoring controls in place to detect errors and exceptions. In addition, CIS Banner was interrogated to ascertain the extent of documentation of supporting action in response to customers' complaints.

4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

(e) *Ascertaining compliance to the Guaranteed Standards/OUR Directive*

Reference to the guaranteed standards, effective 1 June 2004, was used to establish the extent of JPS' compliance in relation to complaints logged subsequent to June 2004. In addition, the performance measurements are publicly available in the JPS' Service Guarantees booklet[1].

To the extent that JPS was in breach, further work was conducted to ascertain whether or not the customer was satisfactorily compensated. A claim for compensation can be submitted via a completed claim form within 30 days after the occurrence of the breach where a customer believes JPS has breached a standard. Compensation, effective June 2004, for non-compliance with each standard are calculated as follows[2]:

- Residential and small commercial customers (rates 10 and 20) - $1,000
- Large commercial and industrial customers (rates 40 and 50) - $8,400
- Streetlights - $300/per lamp/per month

Compensation accumulates by the same amount for each period that the breach continues to a maximum of 4 periods.

4.1.2 Findings

General overview of OUR's database

It is our understanding that complaints logged in the OUR's database significantly comprise complaints filed as a last resort available to customers, having exhausted all other means with JPS, or as a mean of redress whereby a customer believes that a matter was not satisfactory addressed by JPS and now seeks the intervention of the regulator.

For our purposes, complaints were classified into three main categories: Billing Issues, Customer Service Issues and Metering Issues. The table below summarises the source of complaints logged in the database.

[1] Information summarised and presented in **Appendix 4 – Summary of Service Guarantees**
[2] Obtained from the Service Guarantees booklet and confirmed with the Tariff Review 2004-2009

4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

Analysis Complaints by Type

			Source of complaints			
Main Issues	**% of total**	**Total**	**Complaint Forms**	**Other written methods[1]**	**Direct contact with OUR[2]**	**Initiated by OUR**
Billing	13%	1,208	14	174	1,020	0
Customer service	34%	3,272	39	533	2,697	3
Meter reading	53%	5,049	98	944	4,006	1
Total	100%	9,529	151	1,651	7,723	4

Source: OUR's database of complaints – January 2003 to April 2006

1 Consists of e-mails, fax, letters

2 Consists of telephone contacts, meetings or personal visits with the OUR

The above summary shows that over the period 53% of the complaints were meter related issues while the balance related to customer service and billing issues, 34% and 13%, respectively. The following tables provide detailed analysis of the various types of complaints with each category.

The OUR's database did not contain sufficient information to determine the rate class for each complaint. However, our preliminary analysis revealed that the majority of complaints were filed from customers in St. Catherine, Kingston and St. Andrew.

	Number of complaints, broadly classified					Composition of complaints		
Parishes	**Billing**	**Customer Service**	**Metering**	**Total**	**Percentage of Total**	**Billing**	**Customer Service**	**Metering**
Clarendon	35	123	155	313	3%	11%	39%	50%
Hanover	11	56	40	107	1%	10%	52%	37%
Kingston	197	321	751	1269	13%	16%	25%	59%
Manchester	45	133	181	359	4%	13%	37%	50%
Portland	19	86	75	180	2%	11%	48%	42%
St. Andrew	386	982	1732	3100	33%	12%	32%	56%
St. Ann	47	175	206	428	4%	11%	41%	48%
St. Catherine	281	904	1188	2373	25%	12%	38%	50%
St. Elizabeth	26	100	111	237	2%	11%	42%	47%
St. James	49	120	206	375	4%	13%	32%	55%
St. Mary	36	85	121	242	3%	15%	35%	50%
St. Thomas	30	45	91	166	2%	18%	27%	55%
Trelawny	15	55	71	141	1%	11%	39%	50%
Westmoreland	30	79	119	228	2%	13%	35%	52%
N/A	1	8	2	11	0%	9%	73%	18%
	1,208	3,272	5,049	9,529				

Source: OUR's database of complaints – January 2003 to April 2006

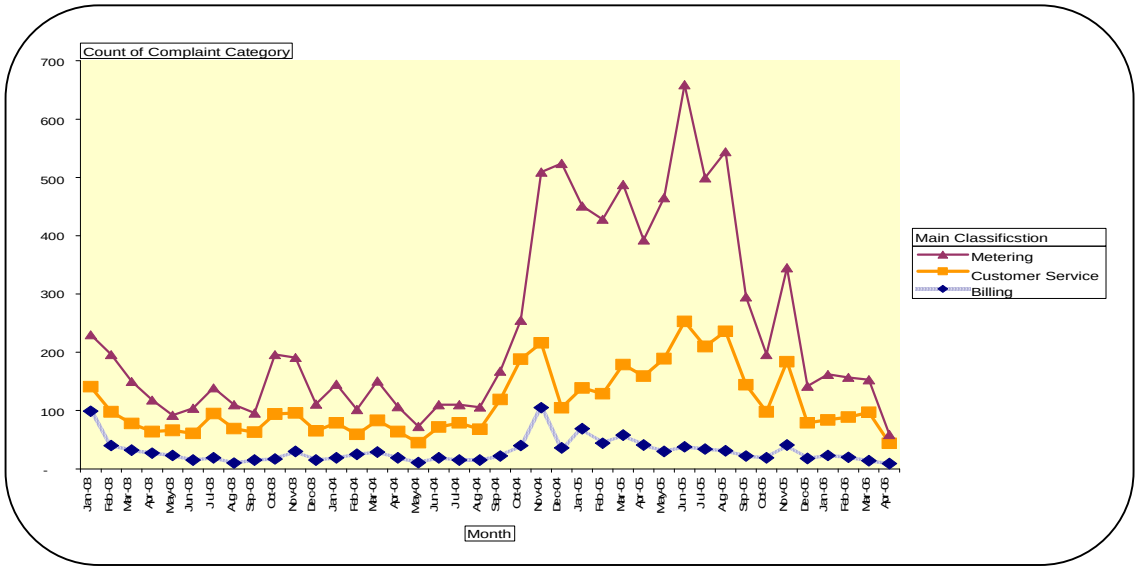
N/A – parish not identified in database

4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

The number of complaints went up two fold in 2005 from those made in 2003 and 2004, the vast majority of these complaints were in the last quarter of 2004 and the first two quarters of 2005 - this is consistent with the Oar's concerns about the rise in complaints following hurricane Ivan in September 2004. Further, looking at the figures up to April 2006 the level of complaints since Q3 2005 appears to be back down to levels pre hurricane Ivan. The relationship can be seen in the graph below.

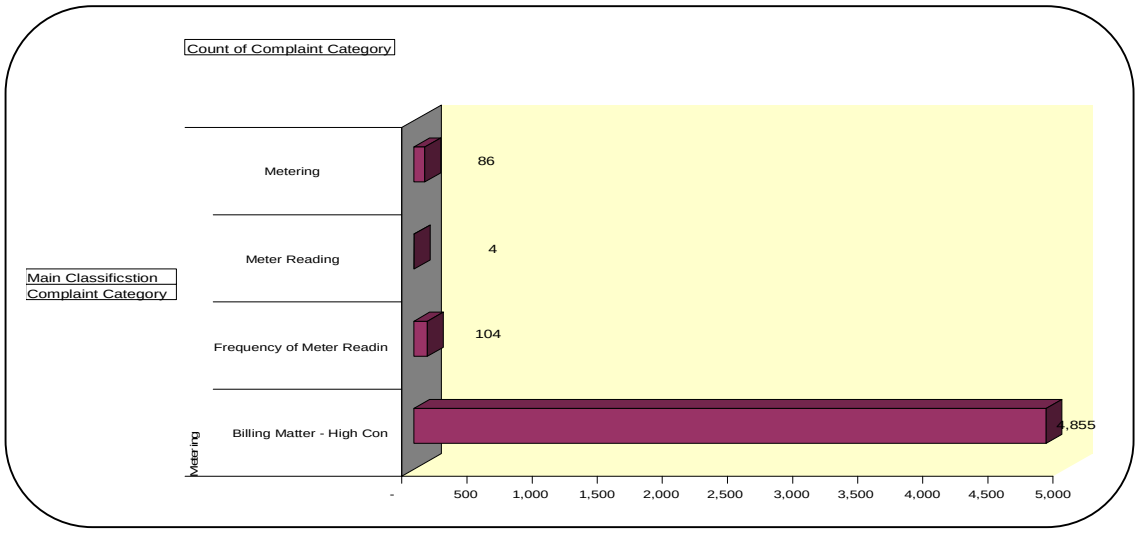
Analysis of Complaints by main issues, January 2003 to April 2006



4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

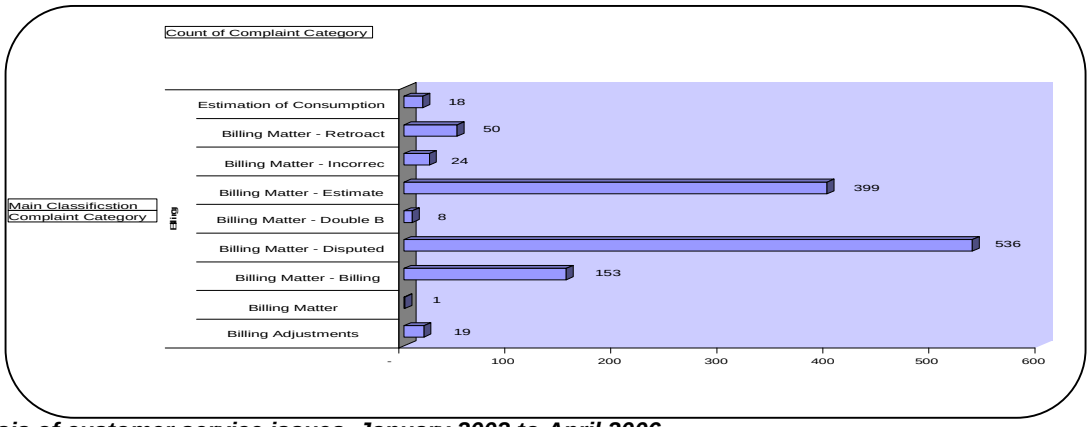
Analysis of meter related issues, January 2003 to April 2006
(53% of total complaints filed with OUR)



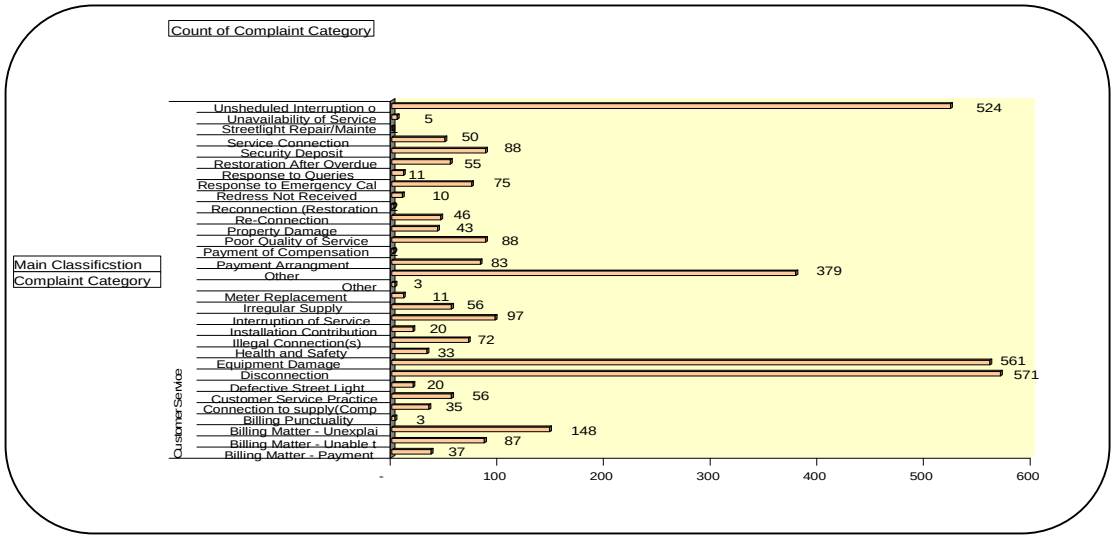
4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

Analysis of billing issues, January 2003 to April 2006
(13% of total complaints filed with OUR)



Analysis of customer service issues, January 2003 to April 2006
(34% of total complaints filed with OUR)



4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

The key conclusions that can be draw from the three graphs above are:

- Graph 1 – Clearly shows that the large majority of meter related issues/complaints were due to perceived "high consumption".
- Graph 2 – The majority of complaints classified as billing issues relate to estimation and general bill disputes.
- Graph 3 – Customer service complaints generally arose due to unscheduled interruption, equipment damage and disconnection.

Detailed review of samples

General

Overall, PwC concluded that of the 50 samples reviewed, 40 from the OUR's complaints database and 10 from JPS, only 10 were deemed legitimate. See **Appendix 5 – Summary of complaints reviewed** for further information.

The following general observations were made as follows:

Consumption

a) Following hurricane Ivan, a 25% reduction was applied on estimated consumption for September billing to compensate for day outages. However, this reduction was not applied to billing cycle 1-6 and part of 7 as readings were taken for these cycles prior to the hurricane.

Frequency of estimates

b) We observed that the basis of calculating estimated consumption was changed from the last 2 actual reads to the last 3 in May 2005 despite the implementation date of 1 June 2004 set in the Determination Notice via EGS 8. Based on discussions with JPS it is our understanding that the implementation delay was due to time required to effect system changes. We have requested correspondence to support our understanding, however, JPS is unable to locate any documentation.

4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

It is our further understanding that the OUR became aware, after Hurricane Ivan, that the Directive given to JPS for calculating estimated consumption using the last 3 actual readings was not adhered to. As a result, the OUR in the Determination Notice dated 22 February 2005, issued a further Directive with an effective date of 30 June 2005. Since then, as far as the OUR is aware, 3 months are being used for these calculations. This is confirmed by follow-up work done in TOR 15.

Specific

This section highlights the key findings while conducting the verification procedures outlined in the "Detailed review" section of this procedure.

Review consumption history

The consumption history was reviewed for unusual consumption patterns in connection with billing matters complaints (high consumption, disputes and estimates). The table below summarises the outcome relating to the verification of consumption.

4.1 TOR 2 - Legitimacy of complaints

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques (Continued)

Basis	Summary of outcome (unusual consumption history)	Sample No	Customer Class	Nature of complaint (per OUR)
1	Service was disconnected but JPS discovered at the time of reconnection that the meter was registering consumption subsequent to disconnection.	13	10	Disputed
2	During period of meter investigation JPS used estimated readings rather than the actuals resulting in an adjustment for overestimation.	25	10	Billing Estimated
3	Meter investigation initiated by JPS, however, nothing unusal noted.	4	10	High Consumption
		7	20	High Consumption
		8	10	High Consumption
		14	10	High Consumption
		37	20	High Consumption
		41	44	Meter Related
		47	40	High Consumption
4	Meter investigation initiated by JPS and previous readings found to be erroneous.	17	10	High Consumption
		21	10	High Consumption
		30	10	High Consumption
		32	10	High Consumption
		39	10	High Consumption
		40	20	High Consumption
5	No unusual consumption with the exception of the Ivan period when the period of estimated billings were extended.	2	10	High Consumption
		16	10	High Consumption
		22	10	High Consumption
		23	10	High Consumption
		24	10	High Consumption
		26	10	High Consumption
		28	10	High Consumption
		34	10	High Consumption
		31	10	High Consumption
		33	10	High Consumption
		35	10	High Consumption
		36	10	Disputed
6	No unusual consumption, frequency of meter reading in compliance with GS.	1	10	Billing Estimated
		3	10	High Consumption
		10	10	High Consumption
		11	20	High Consumption
		15	10	High Consumption
		18	10	High Consumption
		19	10	High Consumption
		20	20	High Consumption
		27	10	Billing Estimated
		29	10	High Consumption
		42	48	High Consumption
		43	40	High Consumption
		44	40	High Consumption
		46	40	High Consumption
		48	40	High Consumption
		49	40	High Consumption
		50	40	High Consumption
7	Unusual number of consecutive estimated readings. Unable to ascertain reason why meter not accessible	9	10	Billing Estimated
8	Complaint related to customer service, consumption not an issue.	6	10	Disputed
		45	48	Customer Service

4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

a) PwC observed that a number of complaints surrounding high consumption were concentrated during and immediately following hurricane Ivan, see basis 5 above. In some rates 10 and 20 billing cycles three consecutive estimated billings were generated in August 2004 was based on estimated readings in accordance with JPS meter reading schedules. However, as a result of the hurricane such meters were inaccessible in September and October when the meters were due for reading. This problem was compounded by the 25% reduction in estimating the consumption for September 2004 and the adjustment as a result of actual reading immediately following.

b) PwC also observed that for a number of complaints surrounding electricity consumption the frequency of meter readings were in accordance with the Guaranteed Standard 7 – Frequency of Meter Reading. While this indicates that consumption charged closely reflected actual consumption PwC is not sure how frequently meters in service are tested. This matter is evident in cases we have observed, included in basis 4 above, where billing adjustments were made retrospectively as a result of the discovery of a faulty meter.

c) PwC understands that the exception reports for 2004 are no longer retained. As such, high consumption readings could not be verified for authorisation for sample items 17 and 29 from **Appendix 3 – Customer complaints sampled** in August 2004 and July 2004, respectively.

Recalculate estimated consumption

a) An analysis of the meter reading history for high consumption complaints was performed and PwC observed that of the 30 complaints relating to high consumption only 10 had billings during the period of review with more than 3 consecutive estimated readings (see **Appendix 6 – Meter reading history – high consumption samples reviewed**). However, only 1 account had unusual period of estimated readings post Ivan.

b) Of all the recalculations performed on estimated consumption only one discrepancy occurred resulting in a difference in the kWh computed. This related to sample item 9 in **Appendix 3 – Customer complaints sampled** whereby PwC computed 157 kWhs for November 2004 versus 155 kWhs which was recorded in CIS Banner. It is our understanding that the estimated consumption was manually entered in CIS Banner to reflect a manual calculation done by a billing clerk based on a review of the customer's historical consumption trend.

Verifying JPS' action and assessing compliance to the guaranteed standards

Appendix 4 summarises the guaranteed standards applicable to the various classification of complaints reviewed. However, the table below summarises instances observed where JPS was in breach of the guaranteed standards.

4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

Sample No	Particulars	Guaranteed Standard	Performance measurement	Actual performance	Actions/ Compensation
5	Untimely inter-account transfer of deposit as requested by customer	GS 5(b) Investigation	Complete investigation within 30 days	Took 7 months to resolve	No compensation seen for breach[1].
9	Frequency of estimated readings	GS 7 Frequency of meter reading	Should not be more than 3 consecutive estimated bills, 2 subsequent 1 September 2006	3 separate instances where more than 3 consecutive estimated bills were generated	JPS purport meter inaccessible supporting documentation outstanding
25	Customer received 7 consecutive estimated bills	GS 7 Frequency of meter reading	Should not be more than 3 consecutive estimated bills, 2 subsequent 1 September 2006	7 consecutive estimate bills issued	JPS was conducting investigation of meter and while actual readings were done, estimates were made until the investigation was completed
32	Untimely adjustment to customer's account	GS 10 Billing adjustments	Within 1 month of identification of error	4 months	Customer was duly compensated
44	Rate Class Change	GS 5 Response to Customer Queries	Prompt response and 4 days where query is written, respond within 24 working days	41 business days	Issued written response to customer, however no compensation seen for breach[1].
48	Broken Glass	GS 9 Meter Replacement	Replace meter within 20 days of the discovery of the fault	7 months before change	Meter change effected, however no compensation seen for breach[1].

It is our understanding from JPS that in these cases of breach, no claims were submitted by the customers for compensation

4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

Current measures implemented

It is our understanding that prior to January 2006 written complaints were not logged centrally. Rather, each parish office would maintain their respective correspondences. Effective 1 January 2006, a Resolution Team was established at Head Office to maintain a complaints database log. This log is prepared in Microsoft excel and represents a centralised source of all written complaints received at Head Office and primarily relating to rates 10 and 20 customers.

A copy of the database was requested and received covering complaints logged from February 2006 to October 2006. A review of the database revealed that over the period 613 complaints were logged with an increase occurring over the period July 2006 to September 2006. We observed that the main complaints contributing to this increase related to billing queries, see **Appendix 7 – Summary of JPS' complaints database**. It may appear that these complaints may have been associated with bill calculations as we observed that during the months of June 2006 to August 2006, the fuel and IPP charges increased to J$10/kWh compared to a range of J$8-9/kWh previously, see **Appendix 13 – Recalculation of Billed Fuel and IPP Rates**.

Parish	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Grand Total
Kingston & St. Andrew		22	25	31	38	35	60	84	67	34	396
St. Catherine		7	2	3	4	4	6	16	11	2	55
St. Ann		2	2		7		7	6	5	2	31
Abroad		4	5	4	5	4	2	5	9		38
Trelawny		1	1		2						4
St. James			3	1		1	1	3	5	2	16
St. Mary		2	2			1	3	3	2		13
Manchester	1		2	1	1	2	1	3	1	2	14
Westmoreland			1	1	1		2		5	1	11
St. Elizabeth			1		2	3	1	2	3	3	15
Clarendon				1		2	1	1		1	6
Portland					2			1	2		5
St. Thomas							3	1	2		6
Lucea							1		1	1	3
Grand Total	1	38	44	42	62	52	88	125	113	48	613
Number of pending items	0	5	3	4	4	12	14	10	64	29	145
Percentage of total	0%	13%	7%	10%	6%	23%	16%	8%	57%	60%	24%

Source: Compiled from the complaints database maintained by the Resolution Team

4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

In addition to the above, JPS separately tracks and monitors the issues of key accounts. This also commenced in January 2006, whereby database files are maintained in Microsoft excel. It is our understanding that 160 key customer groups have been identified and assigned to 4 key account managers who in turn report to 2 key account managers. PwC understands that these files are mainly used as a facilitation tool to manage customer relationships. A review of one of the files revealed that at the end of the month issues are summarised by types of issue as well as the number of issued addressed, see **Appendix 8 – Typical KAM Report**. These results of these reports are communicated monthly to the SVP – Commercial Services. Effective May 2006, JPS implemented ACT by SAGE, a customer management solution software, to integrate the process. However, the implementation is still in progress but the objective is to migrate the data maintained in the separate excel files and have one file maintained on a common drive.

Assessment

A review of the OUR's complaints database confirmed that high consumption formed the majority of the complaints which were concentrated in the period during and following hurricane Ivan. Detailed review of these complaints revealed that, in most instances, the frequency of estimated billing around that period coupled with the 25% general reduction in estimated consumption in September 2004 for certain billing cycles resulted in significant adjustments following actual reads.

Of the 50 sample complaints tested, we observed that JPS was in breach of the guaranteed standards in 7 instances. However, in one case the customer was duly compensated and in another case the breach was justified as JPS issued several consecutive estimated bills during the period an investigation was being conducted on the customer's meter. In the case of the remaining 5 instances we understand that no claims were submitted by the customers for compensation regarding the breach.

We have observed that JPS has currently implemented measures to track and monitor written complaints received at Head Office as well as issues relating to key accounts. However, we understand that JPS does not maintain a central database of all complaints written to the Company. While there is no direct requirement to report this information under the guaranteed standards to the OUR, we believe this information could provide indications of potential operational and quality of service issues.

4.1 TOR 2 - Legitimacy of complaints (Continued)

Assess the legitimacy of the complaints against JPS received by the OUR by using appropriate sampling techniques

4.1.3 Limitations

PwC's sample selection from the OUR's complaints database was restricted to a population of 4,998 complaints or 52% of the database total as no account numbers were available for the remaining complaints. The account number is required to perform follow up work with JPS. In referring the matter to the OUR, the limitation was acknowledged and it was agreed that PwC should base its sampling on the 4,998 complaints.

In addition, the database did not classify the complaints by rate class. The sample selected was predominately residential and light commercial customers (rates 10 and 20). In referring the matter to the OUR, it was communicated that coverage should include all rate classes. On that basis a sample of written complaints logged in CIS Banner for rates 40 and 50 customers was selected from a list of complaints logged for the period 1 January 2004 to 30 October 2006. **See Appendix 9 – SQL statements for CIS Banner data files** for details.

4.2 TOR 3 – Accuracy and integrity of meter reading process

From an historical and current perspective, assess the accuracy and integrity of the meter reading process

4.2.1 Procedures

Scope of work

Meter reading policies, procedures and practices in existence immediately prior to and in the months immediately proceeding Hurricane Ivan were reviewed and evaluated. Our evaluation focused on those areas of processing risk which may potentially impact the completeness, accuracy and integrity of the meter read data that determines the final bill amount for customers.

Discussions were also held with the following persons who are integrally involved in the meter reading process:

- Field Services Supervisor, Kingston and St. Andrew (KSA) South;
- Customer Services Manager;
- Acting Field Services Supervisor, KSA North;
- Meter Reader, KSA South;
- Meter Reader, St. Ann's Bay; and
- Meter Reader, St. Catherine.

The discussions were conducted with a view to determining the following:

- The responsibilities of the Parish Offices and how personnel have been organised to carry out these responsibilities efficiently and effectively;
- If documented policies and procedures as it pertains to meter reading are being adhered to at the various Parish Offices;
- If policies and procedures in existence immediately prior to Hurricane Ivan differed from what currently exists;
- The key controls and risks related to the meter reading process that could impact the accuracy and integrity of the meter reading process; and
- The reconciliations that are carried out at each key point where data is transferred.

Our reviews of the policies and procedures, as well as the results of the discussions, informed the design of the tests documented below. These tests included:

- Observation, examination and/or re-performance of control procedures aimed at ensuring operating effectiveness based on JPS' policies, best practice standards & OUR rules;
- Reviews of key reports, documents and records used to monitor and control the meter reading operations; and
- Evaluation of reports or documents that would allow us to determine the accuracy and completeness of meter reads.

4.2 TOR 3 – Accuracy and integrity of meter reading process (Continued)

From an historical and current perspective, assess the accuracy and integrity of the meter reading process

Brief description of meter reading activities

Based on discussions with personnel from the various Parish Offices, and our review of policy and procedures documents, we obtained the following understanding of the management and execution of meter reading activities.

Readings are done by Meter Readers (also referred to as Field Services Technicians) at each Parish Office. Each day, a file which details the meters to be read is generated by the Computer Operations Department. The data in these files is downloaded to an application called Utility Management System (UMS) which is resident at the various Parish Offices. Using the application, routes for the meters to be read are assigned to Meter Readers by the Field Services Supervisors. Details supporting the meters to be read are then uploaded from the downloaded file to handheld devices used by the Meter Readers to record the meter readings. The upload of the data is done according to routes and the assigned Meter Readers.

The meter readings obtained are manually input into the handheld devices and, at the end of the day, the readings on the handheld machines are uploaded to UMS. The Field Services Supervisor then reviews a report known as the Unread Meters Report to determine which meters have not been read. Meters that have not been read are reassigned to Meter Readers to be read the following day.

If handheld devices are not functioning during meter reading exercise, then readings are recorded on a meter reading sheet by the Meter Readers and submitted to the Field Services Supervisor for input to UMS or the Customer Services Manager for input into Banner CIS.

The readings from each Parish Office are then uploaded from UMS to a main server called JPS hp 80 where the data is prepared for and used in the bill calculation process. Management then confirms with members of the Computer Operations department, via telephone, that the files have been submitted to the main server.

Sampling Techniques for Testing

Our test procedures as documented below focused on testing the controls over 40 days of meter reading activity. The 40 days selected are listed in **Appendix 12 – Samples for Systems Test**. Three random samples from stratified populations were chosen using a data interrogation tool, Audit Command Language (ACL). The stratification, as documented below, was done with a view to examining controls and activities before Hurricane Ivan, the months immediately following Hurricane Ivan and the months subsequent to December 2004. As is noted below, there was a heavy bias towards the days in the months immediately after Hurricane Ivan.

4.2 TOR 3 – Accuracy and integrity of meter reading process (Continued)

From an historical and current perspective, assess the accuracy and integrity of the meter reading process

- Stratum 1 – Five (5) dates before September 2004;
- Stratum 2 – Twenty five (25) dates during the period September 2004 and December 2004); and
- Stratum 3 – Ten (10) dates after December 2004.

The start and end dates from which the samples were chosen were January 2004 and June 2006.

The activities for those 40 days were examined with respect to the Ruthven Road office.

Test Procedures

For all time periods, our test procedures focused on the following areas which were thought to be critical to the accuracy and integrity of the meter reading process:

- The existence and adequacy of policies and procedures used to manage and execute meter reading activities;
- The completeness and accuracy of the receipt of the cycles to be read by the Parish Offices – This could impact the number and frequency of meter reads in instances where not all meters due to be read are downloaded to the Parish Offices;
- The completeness and accuracy of assignment of routes and handheld devices – This could also impact the number and frequency of meter reads as, even in instances where all the meters and cycles to be read are received, if the routes are not completely assigned to Meter Readers, meters may be unread;
- The completeness and accuracy of the download from the handheld devices and the verification of meter reads – This could impact the complete and accurate transfer of meter reads and their use in the billing process; and
- The completeness and accuracy of the upload of meter reads to the main server for the processing of bills – Incomplete uploads could result in estimated consumptions and inaccurate uploads may result in incorrect billings.

The specific test procedures for each of the aforementioned areas were as follows:

4.2 TOR 3 – Accuracy and integrity of meter reading process (Continued)

From an historical and current perspective, assess the accuracy and integrity of the meter reading process

Policies and Procedures

A review of manuals and flowcharts related to the meter reading process to determine the following:

- If formal policies and procedures exist and are being adhered to;
- If formal policies and procedures are appropriately designed to minimise the likelihood of meter reading errors; and
- If company policy has been appropriately communicated to all relevant staff.

Receipt of cycles to be read (Testing done for the 40 days selected)

- A comparison of meters to be read as per the main JPS Server which is used to deploy meters to be read to each Parish Office, to the data actually received by the Parish Office (on UMS), to ascertain whether data is being transferred completely and accurately; and
- An examination of reconciliations of meters to be read as per the main JPS Server, to the data actually received by the Parish Offices to ensure that management identifies incomplete data transfers, resolves any such anomalies in a timely manner and reviews the reconciliations.

Assignment of routes and Handheld machines (Testing done for the 40 days selected)

- A comparison of the meters to be read as per the UMS application and the meters to be read as per the handheld machine, to determine if the transfer of data from UMS to the handheld device is complete and accurate; and

- An examination of reconciliations of meters to be read as per the UMS application and the meters to be read that were actually downloaded to the handheld machine to ensure that management identifies incomplete and inaccurate data transfers, resolves these anomalies in a timely manner and reviews reconciliations.

4.2 TOR 3 – Accuracy and integrity of meter reading process (Continued)

From an historical and current perspective, assess the accuracy and integrity of the meter reading process

Download from handheld machine & verification of meters read (Testing done for the 40 days selected)

- A comparison of the meter readings, for a sample chosen randomly, as per the handheld device to what was uploaded to UMS for the days chosen for review;
- A review of the unread meter reports for the dates chosen for review to determine if they are being reviewed by management and if unread meters for routes are reassigned for reading the following day and reasonable attempts were made to read all such meters before an estimate is done; and
- A review of the found meters reports for the sample chosen for review to determine if all meters within the routes which have not been found are investigated and if they are being reviewed by management.

Upload to main server for the processing of bills

- A comparison the readings as per the UMS application and the main server to determine if all readings that were transferred to the main server were complete and accurate.
- A review of reconciliations, if any, between readings as per the UMS application and the main server to determine if management identifies incomplete and inaccurate data transfers, resolves these anomalies in a timely manner and reviews reconciliations; and
- An observation of the upload process to detect any deviations from company policies and best practice.

4.2.2 Findings

Test Results (Historical and Current Perspectives)

Policies and Procedures:

Policies and procedures documents, meter reading manuals and flow charts were in existence for the meter reading process. We noted that, in general, formal procedures are being adhered to. We noted, however, that meter reading sheets are not always used for manual readings. Instead, meter readings are recorded on a blank piece of paper which is discarded after the readings have been keyed to UMS or Banner CIS. The manual we reviewed indicated that manual readings should be recorded on a meter reading sheet.

4.2 TOR 3 – Accuracy and integrity of meter reading process (Continued)

From an historical and current perspective, assess the accuracy and integrity of the meter reading process

Based on discussions with management we noted that meter reading policies and procedures have been disseminated to the respective heads of departments (Parish Managers, Customer Service Supervisors and Field Services Supervisors). The heads of department communicate policy pronouncements to their subordinates verbally or through e-mail. These documents are maintained in folders accessible by these personnel.

Our review identified the following omissions from the policy documents, which, in some instances, represent established practice within the meter reading cycle:

- Keying of manual meter reads directly to UMS by the Field Services Supervisor; and
- Keying of manual meter reads directly to Banner CIS by the Customer Services Manager.

Other policy and procedures and processing manual omissions noted include:

- The absence of any formally documented training requirements for new meter reading staff. There is, however, standard training in the use of handheld devices, as new releases of handheld devices are followed by training in the use of these devices. Training is, however, made available to a select group of Meter Readers, who in turn train the remaining Meter Readers; and
- The absence of formal procedures for safekeeping and storage of the handheld devices; and
- The absence of documented procedures surrounding the processing of meter reads on the handheld devices.

Receipt of cycles to be read

- Data relating to submission and receipt of cycles to be read is not maintained on UMS or Banner CIS. For both the current and historical perspectives (using the sample of 40 days selected for testing), we were unable to execute any comparisons between meters to be read per Banner CIS and meters downloaded to UMS.
- There is no documentary evidence of formal reconciliations being done of cycles and routes to be read and cycles and routes received by UMS. Management does have a control in place in that data relating to meters to be read is submitted to the Parish Offices based on a monthly schedule. The schedule details the cycles and routes to be read daily. Field Services Supervisors compare the cycles and routes received to the cycles and routes per the monthly schedule, and, if any aberrations are noted, these are communicated via telephone to the Computer Operations department who would re-submit the correct schedule. There are deficiencies, however, in that there is no documentary evidence of these checks being done and, even in instances where the check is done and found to be reasonable, there is no check to determine the completeness of the meters listed in the cycles and routes to be read.

4.2 TOR 3 – Accuracy and integrity of meter reading process (Continued)

From an historical and current perspective, assess the accuracy and integrity of the meter reading process

Assignment of routes and handheld devices

- As above, there is no retention of data relating to cycle downloads and uploads from Banner CIS and to UMS, respectively. We were therefore unable to execute any comparisons between data downloaded to UMS and data uploaded to the handheld devices.
- No reconciliations are performed at the Parish Offices to determine the completeness and accuracy of the data transfers at the foregoing point.

Download from handheld device and verification of meters read and meter reads

- Data relating to meters read and meter reads per the handheld devices and the data transferred to UMS was not retained and, therefore, there could be no execution of procedures to compare the data sets. There was also no reconciliation done by management which would assist in the identification of any incomplete or inaccurate data transfers.

- Unread Meters reports and Found Meters reports are generally not printed. The reports required for the sample of 40 days were therefore not available. Management does however represent that these reports are reviewed on line and the necessary actions, for example, re-assignment of meters to be read, are taken. Consequent on the omission to print these reports, there is no documentary evidence of these reviews being done.

Upload to the main server for the processing of bills

- Historical data required for the execution of comparisons of meter reads on UMS to meter reads on Banner CIS was not available.
- There were no documented reconciliations of data transferred from UMS to Banner CIS. This represents a control weakness.

Additional procedures performed and the results

Consequent on the unavailability of historical data required to perform the tests intended, we extended our procedures to contemplate meter reading activities which were underway during the time of the audit. Our procedures and results were as follows:

4.2 TOR 3 – Accuracy and integrity of meter reading process (Continued)

From an historical and current perspective, assess the accuracy and integrity of the meter reading process

Alternative procedure 1 and result

For the meter reading cycles and routes for 14 and 15 November 2006, we compared the file of meters to be read (generated by the Computer Operations Department) with the 14 individual meter reading files sent to the respective Parish Offices. Using ACL, we compared the number of records in the main file (generated by computer operations) with the sum of the number of records in the 14 Parish Office files. For the dates in question, the record counts were 29,484 and 30,169 respectively and these were reconciled on both dates. Critical individual records in the files, such as customer number, meter number and premises number were compared. These records all reconciled.

Alternative procedure 2 and result

We carried out field visits for three Parish Offices (Ruthven Road, St. Ann's Bay and St. Catherine) and randomly selected, 40 meters per Parish Office being read at the time of our visit. These field visits were done on 1 September and 8 September 2006. We observed and recorded the data input into the handhelds for the 120 meters selected (40 per parish office) and compared the meter reads recorded to meter reads ultimately used in Banner CIS to bill the customers. The 120 meters read are detailed in Appendix I, item 3.

We found that all of the 120 readings agreed to the readings recorded on Banner CIS.

Alternative procedure 3 and result

One week old back-up tapes are maintained for all meter reads received from Parish Offices and meter reads uploaded to Banner CIS. We retrieved data from back-up tapes for data uploaded from the Montego Bay, Savanna-la-mar, Port Antonio and Spanish Town offices and found that the data elements were uploaded completely and accurately to Banner CIS. The data elements mentioned above were:

- Meter Number;
- Premises Number; and
- Current Reading.

Assessment

We were unable to assess the accuracy and integrity of the meter reading process as a result of the unavailability of meter read data for the 40 days selected for testing as well as management's omission to evidence reconciliations performed in the upload and download process.

4.2 TOR 3 – Accuracy and integrity of meter reading process (Continued)

From an historical and current perspective, assess the accuracy and integrity of the meter reading process

The alternative procedures performed gave indications that aspects of data transfers were functioning satisfactorily. Alternative procedure 2 gives some comfort regarding the integrity of the data transfer to Banner CIS. While the results of alternative procedure 3 indicate complete and accurate data transfers, these results are limited by the fact that the completeness of the data set being transferred from UMS to Banner CIS could not be determined as the files downloaded to UMS for the meter reads for those days were not available for comparison.

The accuracy and integrity of the meter reading process may be enhanced by the automation and review of data transfer reconciliations. These reconciliations should be developed with the assistance of the application vendors and should be reviewed at the various data transfer points. Documentary evidence of such reviews should be maintained, and the success/failure of data transfers should be reported on a monthly basis.

4.2.3 Limitations

The aforementioned scope and the related tests and procedures have been limited by the following factors:

- Historical data used for the meter reading process was not available; and
- Some key controls relating to data reconciliation, represented by management to be consistently performed, were not evidenced.

4.3 TOR 4 – Proportion of meters being read

Ascertain the proportion of meters per rate class being read monthly

4.3.1 Procedures

The scope of our work was designed to ascertain the level of compliance with EOS 6 (Frequency of meter reading) which became effective 1 June 2004 ("effective date"). Previously, this standard was EOS 7 under the 2001 All-Island Electricity Licence. The standard's target is 99% based on percentage of meter reads with time specified in the licensee's (JPS) billing cycle. The standard does not prescribe the frequency of meter readings. However, the current basis at the effective date continues to be applied i.e. monthly reading for non-domestic customers and bi-monthly for domestic customers.

4.3.2 Findings

At our initial request we were provided with a compilation of meters read (by parish) reports for the period November 2004 to March 2006. However, following our review it was deemed that the data did not provide an accurate performance measurement against the standard. The details are included in the Limitation section below. As such, we cannot comment whether or not JPS has achieved the target set in the standard over a period that reflects a historical and current perspective. However, PwC applied two alternate procedures:

1) recomputed the meters to be read and meters read by rate class on a sample basis; and
2) recomputed the aging of monthly estimated billings on a sample basis.

Alternate procedures

Test of Percentage Meters Read

The Service History files and the Exception Data files were extracted from CIS Banner for six months chosen randomly, **see Appendix 9 – SQL statements for CIS Banner's data files**. The Service History files contained a list of all meters by rate class for the respective month and whether the last reading was actual or estimated.

The Exception Data files contained a list of meters that estimated readings were used for the respective month to generate a bill.

The objective of our test was to determine the percentage of meters read by deducing the true number of unread meters. That is, the Service History files contain meters for which actual readings were done but due to exceptions (such as negative, low or high consumption) estimates were used. By matching those meters to the Exception Data files, then the remaining meters with "Estimates" would represent an approximation of unread meters.

4.3 TOR 4 – Proportion of meters being read (Continued)

Ascertain the proportion of meters per rate class being read monthly

Based on the results of the test, a high percentage of meters have been read on a monthly basis, see results of PwC test below.

Months Tested	Meters Billed	Actual Meters Read	Unread Meters	% Read	% Unread
Aug-05	575,407	547,586	27,821	95.2%	4.8%
Sep-05	576,094	552,505	23,589	95.9%	4.1%
Feb-06	582,217	557,663	24,554	95.8%	4.2%
Mar-06	583,030	558,490	24,540	95.8%	4.2%
Jun-06	586,312	560,940	25,372	95.7%	4.3%
Nov-06	577,143	540,840	36,303	93.7%	6.3%

Source: Compiled from work done by PwC, see **Appendix 10 - Summary of Meter Reads Samples Tested by PwC**

Notwithstanding the above, PwC observed a number of anomalies in the data. However, these were discussed with JPS and the following documented.

a) Duplicated records in the Exception file

   This is because of the exceptions on the different register readings on a meter. When the table was created, it did not differentiate between the different register. Therefore it returned kWh irrespective of the register. The rationale is because exceptions are generated by the systems for kWh. The only other reason an exception would be generated for the other type is if the reading were missing or idle. Idle represent meters for which service has been discontinued, but is still generating usage. Therefore the customer is stealing electricity.

b) Duplicated kWh records in the Service History file, some with the same read date and other with different read dates.

   Ideally a meter should have one reading per month. This situation occurs when the meters are being taken out of service. When this occurs they are required to take a reading before removing the meter. However, in these cases the customer number is blank or zero.

Recomputing the Aging of Estimated Billing

The objective of this exercise was to test the aging of total estimated bills generated monthly. Bills which had more than three consecutive estimated readings were defined as in breach of EGS 7 – Frequency of Meter Reading. As such, five (5) months were randomly selected and the following data files obtained to perform this test:

4.3 TOR 4 – Proportion of meters being read (Continued)

Ascertain the proportion of meters per rate class being read monthly

- **zrnrdg** (Active Accounts without Readings Report) – this shows the last actual read date for all accounts in breach, by parish office. This was used to determine the number of days that have passed since the customer received an actual reading.

- **uarmrst** (Monthly Revenue and Statistics Report) – This shows the revenue and statistical information. Of particular concern is the customer account statistics, which show the total invoices billed by parish office.

Test Procedure

See **Appendix 9** for detailed test procedure.

Based on the results of the work performed we observed that the occurrences of breach (bills with more that 3 consecutive estimated readings) were not significant, see **Appendix 11 - Summary of Estimated Billed Tested by PwC** for details.

	Total Bills	Bills in Compliance	Bills in Breach	% Breach
September 2004	535,266	524,872	10,394	1.9%
June 2005	545,176	537,088	8,088	1.5%
October 2005	553,049	544,453	8,596	1.6%
March 2006	554,559	546,152	8,407	1.5%
May 2006	560,570	553,760	6,810	1.2%

Source: Compiled by PwC from CIS Banner representing all bills generated for all rate classes
Note: Bills in breach is defined as bills with more than 3 months consecutive estimated readings

Assessment

Currently, JPS does not report to the OUR in relation to performance of EOS 6. While JPS used to report internally, the process involved data being extracted from CIS Banner and compiled in Microsoft excel. We observed that the data had to be manipulated and in some instances monthly totals (meters to be read and meters read) derived were unusually high or low. Based on the re-performance conducted on the aging of estimated billings we observed that bills in breach (more than 3 months consecutive estimated readings) were less than 2% for the months tested.

4.3 TOR 4 – Proportion of meters being read (Continued)

4.3.3 Limitations

In validating the source of the Percentage Meter Reads report we observed that this information is manually compiled monthly. That is, text files are sent to the Performance Management Department from Computer Operations. These files contain the weekly list of meters to be read and meters read by billing cycle. The Performance Management Department uses a spreadsheet to sort and eliminate duplicated transaction records in preparing the report. A cursory glance of the file records revealed that in some cases the files received was greater than the file sent. It is our understanding that such anomalies are not adjusted for.

It is our understanding that this information is not a standard reporting requirement to the OUR. PwC was not able to validate the text files. Based on discussions with the Computer Operations Supervisor, this information is only forwarded to the Performance Management Department (no reviews are done) as these text files do not form a part of the standard reporting process. In addition, no documentation exists to understand the report definitions and why transactions would be duplicated.

However, as part of the billing controls, a report USRMTRV has to run before a billing cycle is initiated. In other words, the billing generation process cannot commence until this report is run to ensure that the thresholds are met, at least 95% of accounts must have a meter reading for billing cycles 51-54 and at least 80% for all other billing cycles. However, these reports are not retained for filing.

4.4 TOR 5 – Accuracy in meter reading

Assess the level of accuracy in reading of meters through field verification[3]

4.4.1 Procedures

Scope of work

Our work on this TOR involved accompanying meter readers in the field and performing meter reads and verifying these meters reads to information used to perform customer billing. The very nature of this test limited our assessment to what currently obtains, and therefore excluded any work on meter readings done in the past. Cognizant of the inherent weaknesses in the approach, occasioned by possible heightened awareness and increased levels of caution on the part of the meter readers, we also performed follow-up meter reads on selected meters read one week before to determine if, based on an average daily consumption (ADC), computed based on the last three actual consumptions, the meter read taken one week before appeared reasonable.

We also examined the handheld devices used to record the meter reads to determine the extent to which these devices had in-built control mechanisms to identify and bring attention to unusual meter reads, prevent data manipulation, etc.

Test Procedures

The following were the procedures executed:

- We accompanied Meter Readers from the Ruthven Road Office, St Ann's Bay and St. Catherine Parish Offices on meter reads on 1 and 8 September 2006. We read 120 meters (40 per Parish Office haphazardly chosen) and documented all the meters that were read by the Meter Reader. We then attempted to compare this reading along with the customer details with what was keyed to the handheld machine to determine if meters are being read accurately.

- For the handheld devices, we:

    - Determined, through observation, if Meter Readers can choose not to read meters on the route without a prompt from the handheld device;
    - Determined, through observation, if the handheld devices would prompt the meter reader when a reading has been keyed that is above or below the threshold (high / low reading threshold). This was done by asking Meter Readers to key a reading 100% greater than the reading noted on the meter;
    - Determined whether meter readers can access data relating to previous readings;
    - Determined through observation if meter readers can enter readings twice; and
    - Determined through observation if the correct reading is assigned to the correct meter number.

[3] This verification process will be data driven rather than an inspection of the meters by those with appropriate engineering qualifications.

4.4 TOR 5 – Accuracy in meter reading (Continued)

Assess the level of accuracy in reading of meters through field verification

- For the meter readings carried out on 1 September 2006 and 8 September 2006, we performed the following tests:

  - Traced the meter reads that were documented by us to the actual bills generated through Banner CIS to ensure that the meter readings are the same and have been assigned to the correct meter and customer; and

  - Chose a sample of 45 meter reads (the 45 meters are listed in Appendix I, item 4) obtained during our field visits and read the same meters one week later. Using the ADC based on readings for the three months prior to the reading carried out during our field visits, we made an assessment of the reasonableness of the reading one week ago by comparing a derived estimated reading to the actual reading taken. A reading was deemed to be reasonable if the actual reading was within +/- 30% of the PwC estimated meter reads.

4.4.2 Findings

- The 120 readings which were taken were seen to be accurately input into the handheld devices. See **Appendix I2 – Samples for System Test** for the meters read.

- Our observation of the handheld devices indicates that there are prompts to Meter Readers when:
  - Meter Readers have skipped meters that fall within the sequence of meters to be read within routes;
  - A reading has been keyed that is above or below the threshold (high / low reading threshold); and
  - Meter Readers enter readings twice.

  Even though the foregoing prompts are given, the handheld device will not prevent acceptance of the initial meter read and it also will not prevent failure to read a meter. It was also noted that if readings are entered twice, the last reading is overwritten with the new reading.

  Our observations also indicated that Meter Readers cannot access data from the previous readings and that Meter Readers have to authenticate on the handheld device by using their unique employee number before readings can be keyed.

- For the 120 meter reads taken, we were able to trace all 120 to bills generated by Banner CIS.

4.4 TOR 5 – Accuracy in meter reading (Continued)

Assess the level of accuracy in reading of meters through field verification

Our reasonableness assessment of meter reads revealed two exceptions of the 45 meters read as documented in the table below.

Meter Number	PwC Reading – Done 1 week after actual meter read	Last meter read – Done one week before	Expected Reading based on ADC	Difference between PwC reading and expected readings
683118	41806	40849	40907	***899 KWH***
1045393	2398	2438	2501	***(103) KWH***

In the case of meter 683118, the subsequent reading taken results in a consumption which is 16 times that which is expected based on the ADC for that customer and in the case of meter 1045393 the subsequent reading indicates a negative consumption of electricity. For both meters in question, there were no pending service orders indicating that there were any faults or errors with the meters.

There were also 5 meters which were not operational during our review. These meters were meter numbers 755680, 1034752, 771350, 765072 and 568090. No assessment was done on these as a consequence.

Assessment

The work done on the items selected and tested indicates that a reasonable level of accuracy of meter reading. 120 readings which were taken in the field were seen to be accurately processed through the handheld devices through the system inclusive of billing.

The negative consumption indicated by the reasonableness assessment of the reading done on meter number 1045393 does, however, cast some doubt on the accuracy of meter reads. This is, however, a single observation from a sample of 45 items tested. A conclusive assessment of the other inconsistent meter read cannot be done, as this may have resulted from a meter fault which had not been reported to the JPS.

4.4.3 Limitations

There were no major scope limitations.

4.5 TOR 6 – Accuracy and reliability of handheld devices

Assess the accuracy and reliability of the handheld devices used by meter readers to capture readings

4.5.1 Procedures

Scope of work

Work on this TOR involved an examination of procedures used by management to ensure that:

- Any issues or faults with the handheld devices are identified, reported to management and remedied;
- The handheld devices are properly maintained or serviced on a routine basis; and
- Proper arrangements exist for the maintenance of the handheld devices.

The work also involved attempting to determine whether there were any known technical issues with the makes and models of handhelds used by the JPS and whether the makes and models being used by the JPS were still being supported by the manufacturers. We also attempted to review fault logs to identify any recurring issues with the handhelds being used.

Brief description of handheld devices and their maintenance

There were two types of handheld devices in use at the time of our review. These were the FW 200 and the FW300 and both are supplied by Radix Corporation which is based in the United Kingdom and the United States of America. Radix provides maintenance for these devices. Issues arising with the handheld devices are reported to the help desk by the Field Services Supervisor. The help desk in turn reports the issue to the Asset Administrator (equipment technician) who logs the problems identified in an incident log. The incident log captures such data as:

- Location;
- Serial number;
- Return material authorisation number;
- Problem reported;
- Date the device was sent to Radix; and
- Date and location the repaired handheld was sent to.

Following the logging of the problem by the help desk personnel, the issue noted is automatically routed to the Asset Administrator via the Heat Call Log System. Radix is then contacted to report the fault and the device submitted to them for repairs. When the devices have been repaired they are sent back to the Asset Administrator who initializes and keeps them in a pool of handsets available for deployment in the field. *No testing is done before the device is submitted to the Parish Offices.*

4.5 TOR 6 – Accuracy and reliability of handheld devices (Continued)

Assess the accuracy and reliability of the handheld devices used by meter readers to capture readings

All devices owned by the company are logged and tracked using an application called Heat Asset Tracker, Tracking Manager. The following data is stored in the application:

- An Asset Tag;
- Location of the device;
- Status of the device (assigned, spare, repaired); and
- Customer ID (Parish number).

This application can be accessed by the Asset Administrator, the IS Manager and Supervisor. Data within the application can only be changed by them.

Test Procedures

- Enquired of and attempted to review contracts between JPS and Radix (if any) to determine if maintenance contracts are in place and if there is routine maintenance of the handheld devices;
- Tested authentication process for the handheld devices;
- Researched the make and model of the handhelds used by the JPS. This research included performing searches from publicly available information sources to determine manufacturer's recommendations for maintenance and useful life etc, any publicly known faults or defects and any best practice calibrations or configurations for these devices;
- Enquired of and attempted to review management reports (if any) from the JPS Parish Offices to the Regional Office and reports from Regional Offices to Head Office to determine whether there were any and the extent of reported incidents of product faults;
- Enquired of and attempted to review correspondence between the JPS and Radix to identify any reported product faults; and
- Carried out field visits for three Parish Offices (Ruthven Road, St. Ann's Bay and St. Catherine) and selected randomly, 40 meters per parish being read at the time of our visit. These field visits were done on 1 September and 8 September 2006. We therefore observed and recorded the data input into the handhelds for the 120 meters read and compared the meter reads recorded to meter reads ultimately used in Banner to bill the customers. The 120 meters read are detailed in **Appendix 12 – Samples for System Test.**

4.5 TOR 6 – Accuracy and reliability of handheld devices (Continued)

Assess the accuracy and reliability of the handheld devices used by meter readers to capture readings

4.5.2 Findings

- Maintenance contracts existed between JPS and Radix. The contract stated that Radix will provide maintenance services as required but did not specify a maintenance routine or schedule.

- From our research done of the FW200 AND FW300 handheld devices being used by JPS we noted that the FW200 unit was phased out in 2003 and support of this unit by the vendor ceased in 2005. Based on discussions with the Asset Administrator, Radix still provides support for FW200 devices used by JPS and this was validated through examination of documentation indicating returns of items submitted for repair on 19/1/06, 21/8/06, 4/1/05, 9/3/05, 11/5/05, 27/5/05 and 7/6/05.

  As the FW200's are no longer being manufactured, parts have been difficult to source and the manufacturer consequently obtains parts from FW200 units that have been retired and are no longer being used by its customers. Based on this we attempted to determine the number of FW200's presently in use. We were unable to obtain this information as no FW200 stock listing was available for our review.

  Our research showed that, on the FW200 units, the areas prone to fail first are the display screens and the batteries. The display screens stop showing certain items and the batteries no longer hold a charge or charge fully. This was also confirmed through discussions with the Asset Administrator.

  We were unable to determine, based on our research, manufacturer's recommendations for maintenance, useful life, etc as well as best practice configuration/calibration of these devices.

- Based on our examination of incident logs, we noted that the following incidents were being reported for the handheld devices:
  - No screen display;
  - Device cannot be turned on;
  - Keys have malfunctioned;
  - Low battery life;
  - Meter read data not loading when placed in the cradle;
  - Device working slowly and freezing up; and
  - Handheld device crashes.

4.5 TOR 6 – Accuracy and reliability of handheld devices (Continued)

Assess the accuracy and reliability of the handheld devices used by meter readers to capture readings

Based on our review of the incidence log, the main problems reported related to the functioning of the keypads, defective screen displays and low battery life.

- Our reviews and discussions also revealed that:

    - Handheld devices that have been repaired by the vendor are not tested by JPS before they are used to carry out meter reads;
    - There is no independent review of the incident logs to ensure that issues reported to the Asset Manager are being actioned in the fastest time possible;
    - Requests for servicing by JPS to Radix which should show details on the reason why devices require repair are not documented. The requests are made via telephone and the devices submitted afterwards;
    - There are no periodic tests carried out on handheld devices that ensure that they are functioning properly; and
    - Incidents reported to the Asset Manager by the Parish Office are not recorded by Parish Managers and monitored to ensure the timeliness of the repair and return of handheld devices to them.

- We also noted that through observation that the devices needed to be authenticated by the Meter Reader before it can be used; and
- Please see test results in TOR 3 for the results of our field visits where 120 meters were read and compared to readings per readings ultimately used in Banner to bill the customers.

Assessment

- Based on work done for TOR3, we saw where 120 meter reads entered into the handheld devices were accurately transferred to Banner CIS and used in final bill calculations.
- The process for management and maintenance somewhat facilitates identification and resolution of issues with the devices. However, the absence of a regular maintenance schedule and the use of a model that is no longer being manufactured (FW 200) and for which spares are also no longer available brings into question the continued reliability and usability of that model. The extent to which that model of handheld was used or formed part of the pool of handheld devices could not be determined as asset listings were not available.

4.5.3 Limitations

The aforementioned scope has been limited by JPS' inability to provide a listing of all FW 200's (brand of handheld devices no longer being supported) in stock. JPS indicated that such a listing was available, but up to the time of finalization, the listing was not was not provided to us.

4.6 TOR 7 – Reliability and accuracy of computerised system

Assess the reliability and accuracy of the computerised system use to upload, store and download meter readings in the process of transferring data from the field to the office

4.6.1 Procedures

Scope of work

Based on the Terms of Reference noted above, the following areas were deemed necessary to provide comfort on the reliability and accuracy of the computerised system used to upload, store and download meter readings in the process of transferring data from the field to the office:

- Controls over application security;
- Controls over operating system security;
- Controls over access to critical files and folders that support meter read transfers; and
- Controls of changes to programs which are used in the upload and download of meter readings.

Specific data transfer reconciliations, noted in TOR 3 (Alternative procedures 1 and 3) were also performed with a view to assisting with the assessment.

Background information

The application used to upload, store and download meter readings is known as UMS and this application is managed in a Windows 2000 environment. The network service FTP is used to transfer data from UMS to Head Office.

The UMS application performs the following functions:

- Acts as a repository for data relating to meters to be read per day;
- Allows for the assignment of meters to be read to Meter Readers (please note that each Parish Office receives meter read data in cycles and routes; assignment is done by route);
- Facilitates transfer of meters to be read to handheld devices through the use of an external port;
- Facilitates the transfer of meter reading completed from handheld devices to UMS;
- Allows management to monitor the various aspects of procedures through the generation of reports. Examples of reports are as follows,

    I. Found meters report – Lists meter found by the Meter Reader while reading the route;
    II. Unread meters report – Details all meters that were not read for a period;
    III. Comment codes report – Details all accounts in which the Meter Reader entered a specific comment code; and
    IV. Unfound meters report – Details meters that could not be located, etc.

- Facilitates the transfer of meter read data to the server at Head Office;
- Allows route purging which removes all records related to a particular route from the route database; and
- Allows the backup and restoration of meter read data.

4.6 TOR 7 – Reliability and accuracy of computerised system (Continued)

Assess the reliability and accuracy of the computerised system used to upload, store and download meter readings in the process of transferring data from the field to the office

At the beginning of each day meters to be read are downloaded to files accessible by the individual Parish Offices. To access the data within the files, UMS is launched and the UMS file transfer function is engaged. The file is then downloaded into the application which allows the Field Services Supervisor to assign routes to Meter Readers and upload the meter read data to handheld devices. After readings have been carried out by Meter Readers, the handheld devices are docked to loaders and chargers which allow transfer of data to UMS. After the Field Services Supervisor carries out various reviews of reports generated by UMS, an export function is engaged which creates an export file. The UMS file transfer menu is then accessed and the file uploaded to the JPSH80server (Main server) at Head Office.

Test Procedures

The procedures performed during our review were designed primarily to assess the adequacy of the controls surrounding the IT environment. For each of the areas reviewed we performed the tests documented below:

Application Security Review - Logical security of UMS

We reviewed the logical access controls that govern direct access to the UMS application. The following areas were considered:

- Patch management;
- End - user account management;

Application Security Review - Logical security of UMS

- Local security policies;
- Password policies;
- Account policies; and
- Audit policies.

Operating System Review - Logical security of the UMS operating system

We reviewed the logical access controls that govern direct access to the server that hosts UMS. The following areas were considered:

- Patch management i.e. the extent to which routines exist for the upload of security patches which address security vulnerabilities within the technologies being used.
- End-user account management

4.6 TOR 7 – Reliability and accuracy of computerised system (Continued)

Assess the reliability and accuracy of the computerised system used to upload, store and download meter readings in the process of transferring data from the field to the office

I. Procedures for management of user access for example, adding/deleting users, changing levels of access, etc. ;
II. Access to privileged accounts; and
III. Account and group assignment on the server.

- Local security policies

I. Password policies;
II. Account policies;
III. Audit policies;
IV. User right assignment; and
V. Security options.

- Access to sensitive application data folders;
- Time out after inactive use;
- Virus management controls and settings; and
- Authentication requirements to gain access to the server locally and remotely.

Controls over physical access to the operating system that manages the UMS application

We observed the physical controls in place at the Ruthven Road and St. Ann's Bay Parish Offices. We reviewed controls that governed:

Controls over physical access to the machine that houses operating system that manages the UMS application

- Access to the building; and
- Access to the room in which the machine is held.

Logical security of the UMS File transfer application which is used to initiate the file transfers

We reviewed the access controls over the UMS File transfer application as well as those controls over the configuration of the connections.

Logical security over handheld devices which is used to record meter readings

We reviewed the access controls over the handheld devices inclusive of access to modify data.

4.6 TOR 7 – Reliability and accuracy of computerised system (Continued)

Assess the reliability and accuracy of the computerised system used to upload, store and download meter readings in the process of transferring data from the field to the office

Logical security over critical files and folders where the downloaded and uploaded files are maintained

- UPD.files – these files include meter read data transferred from the Parish Offices; and
- Mtr'date'.files – these files include merged meter read data from the various Parish Offices.

Controls over changes to programs

We reviewed procedures and controls over changes made to UMS.

Policies and procedures

Reviewed formal policies and procedures to determine adequacy of pronouncements and whether they are being adhered to.

4.6.2 Findings

Application Security Review - Logical security of UMS

Patch Management

JPS is currently using the UMS version 5.040. We could not determine the most current version of the application as that detail was not available for review.

User Account Management

There are no formal user administration procedures in place for the removal and modification of users' access to the application. The foregoing is as a result of UMS being installed on designated computers at each Parish Office as a stand alone application. The installation of UMS on computers is carried out by IS Specialists who are also responsible for configuration of password, account lockout and audit policy settings. Users are given access to the application by merely installing it on computers assigned to them. There is no central database which details computers on which UMS is installed.

4.6 TOR 7 – Reliability and accuracy of computerised system (Continued)

Assess the reliability and accuracy of the computerised system used to upload, store and download meter readings in the process of transferring data from the field to the office

Application Security Review - Logical security of UMS

User Account Management

- Based on our review, we also noted that production users have access to carry out all functions on the application except for configuration of password and account lockout policies which are password protected. These functions include:

  I. Download meter read data from the main server;
  II. Assignment of routes;
  III. Loading routes to handheld devices;
  IV. Unloading meter read data to UMS from handheld devices;
  V. Generation of reports; and
  VI. Upload of meter read data to the main server.

  To make changes to security settings, IS Specialists use unique passwords. There is, however, there is no formal user administration procedure in place for the addition and removal of these administrative users.

Local security policies

- Users do not require a password to access the system as password and account lockout policies have not been configured.
- We also noted the system does not have the functionality to generate audit logs.
- The system will not log out after a defined period of inactivity.

The foregoing could result in unauthorised access.

Operating System Review - Logical security of the UMS operating system

Patch management

Routines exist for patch management. Patch management for the operating system is managed by the System Administrators.

The server is running a Microsoft Windows 2000 Professional (OS), patched with Service Pack 4, the latest Service Pack released by Microsoft. Mainstream patch support for Microsoft Windows 2000 OS ended on 30 June 2005.

4.6 TOR 7 – Reliability and accuracy of computerised system (Continued)

Assess the reliability and accuracy of the computerised system used to upload, store and download meter readings in the process of transferring data from the field to the office

End - user account management

- Formal documented procedures exist to guide the management of user access; and
- Field Services Supervisors have administrative access to the server. Field Services Supervisors have been given this access through membership to the administrator group. The administrator privilege is the most powerful privilege defined on the system and has access to all areas of the system. Based on discussions with the IS Specialist, this access is necessary for the execution of functions on UMS.

Operating System Review - Logical security of the operating system that manages the UMS application

End - user account management

- The administrator and guest user accounts have not been re-named. The guest account has however been disabled.

Local Security Policies on the operating system that manages the UMS application

The following are the settings noted for the respective security parameters:

- Password policies: The following system configurations were noted during our review of password policies

Local Security Policies on the operating system that manages the UMS application

I. Enforce password history - 24 passwords remembered – consistent with recommended practice;
II. Maximum password age - 60 days - consistent with recommended practice;
III. Minimum password age - 14 days - consistent with recommended practice;
IV. Minimum password length - 6 characters - consistent with recommended practice;
V. Passwords must meet complexity requirements – Enabled - consistent with recommended practice; and
VI. Store password using reversible encryption for all users in the domain – Enabled – not consistent with recommended practice. With this setting, passwords can be unencrypted and seen in clear text.

4.6 TOR 7 – Reliability and accuracy of computerised system (Continued)

Assess the reliability and accuracy of the computerised system used to upload, store and download meter readings in the process of transferring data from the field to the office

- Account lockout settings: The following system configurations were noted during our review of password policies,

  I. Account lockout duration – 0 – not consistent with recommended practice;
  II. Account lockout threshold - 5 invalid logon attempts – consistent with recommended practice but nullified by the account lockout duration setting; and
  III. Reset account lockout counter after 360 minutes.

  Policy settings not consistent with recommended practice could result in unauthorised access.

- Audit policies: No security events have been configured to be logged. Based on review of security logs we noted however that logging was carried out up to 11 August 2005.
- User rights assignments noted were as follows:

  I. Powerful user rights were assigned in most instances to only the administrators, who have access to all areas of the system;
  II. Power Users, Users, Administrators, Everyone, and Backup Operators access the server from the network; and
  III. For the critical setting, "Log on locally", which defines who can log on directly to the console, we found the groups and users Backup Operators, Power Users, Users, Administrators and KSANUMS1\Guest assigned. The group Users, contains members of staff to whom access has been granted. Not all of these users require rights enabling them to log on directly to the console.

- Critical local security options were defined. For example, the system is configured to log off users after 15 minutes of idle time.

Access to and logging of activity within application folders

The system file **C:/UMSS** was reviewed. The folder contains the application program and data files that JPS uses to manage and execute meter read data storage, assignment of routes and the upload and download of meter read data. Full control access, which allows all access, was allowed to only the administrator. Note, however, that the Field Services Supervisors have been given administrative access to the server. While access has been restricted to administrative users, the Field Services supervisors, who are administrative users may not need this level of access. Access should therefore be further restricted.

4.6 TOR 7 – Reliability and accuracy of computerised system (Continued)

Assess the reliability and accuracy of the computerised system used to upload, store and download meter readings in the process of transferring data from the field to the office

Operating System Review - Logical security of the UMS operating system

Virus Management

Symantec Antivirus Corporate Edition is in use presently. The virus definition settings in place on the system as at 19 September 2006 were as follows:

- Version: 19/9/2006 v 19
- Program: 8.1.0.825
- Scan engine: 4.2.0.7

The foregoing virus definitions represent the latest version released at the time of the review.

Controls over physical access to the machine on which the operating system that manages UMS resides

During our review of the physical security of the UMS machine at the Ruthven Road and St. Ann's Bay Parish Offices, we noted that all members of staff could access the UMS machine, as they were located within the Field Services Supervisors' office, which was not locked if vacant. We noted however that the computers were locked if the Field Services Supervisor was not present.

Logical security of the UMS File transfer application which is used to initiate the file transfers

Access to the UMS File transfer application is restricted to administrative users and Field Services Supervisors.

Logical security over handheld devices which is used to record meter readings

We noted the following:

Logical security over handheld devices which is used to record meter readings

- Field Services Technicians are required to enter their employee number before data on the handheld devices can be accessed;
- Data relating to prior meter reads cannot be accessed; and
- Standing data such as customer name, premises number and meter number cannot be edited on the handheld devices.

4.6 TOR 7 – Reliability and accuracy of computerised system (Continued)

Assess the reliability and accuracy of the computerised system used to upload, store and download meter readings in the process of transferring data from the field to the office

Logical Security over critical files and folders where the downloaded and uploaded files are maintained.

Based on our review of the UPD.files, which include meter read data transferred from the Parish Offices, access rights are had by only personnel from the Parish Office, the CIS team and Computer Operations staff. The mtr'date' files, which include merged meter read data from the various Parish Offices, can be accessed only by the Computer Operators and members of the CIS Team. The CIS team has access privileges which will allow them to edit the mtr'date' files.

Controls over changes to programs

There are formal procedures in place that govern how changes are made to UMS. These procedures are generally sufficient to ensure that only authorised changes are made. However, we could not test upgrades of UMS, as the documents relating to the most recent change could not be located.

Policies and Procedures

Based on our review of formal policies and procedures related to computerised systems used to upload, store and download meter readings in the process of transferring data from the field to the office, we noted that they included the following:

- Procedures and controls over changes to programs;
- Controls over the servers; and
- Details relating to the use of the UMS application.

We noted, however, that the documentation did not include details of who should be able to access critical files and folders, namely the'UPD.files' and mtr'date'.files.

Data transfer reconciliations

Reconciliations of data transfers were performed satisfactorily per TOR 3 for alternative procedures 1, 2 and 3.

4.6 TOR 7 – Reliability and accuracy of computerised system (Continued)

Assess the reliability and accuracy of the computerised system used to upload, store and download meter readings in the process of transferring data from the field to the office

Assessment

There are formal procedures that govern the management and use of the various systems utilized to upload, store and download meter readings in the process of transferring data from the field to the office. Generally, there is compliance with these policies. There are, however, a number of internal control weaknesses that were identified, that could negatively impact the accuracy and reliability of the systems used. These weaknesses are referred to in TOR 16 under the section that deals with TOR 7.

We were unable review the management and execution of changes made to UMS the last time there was a major upgrade. We were therefore unable to determine if the changes were properly made and tested and if management and key users were of the view that the application continued to meet the business' requirements after the change was made.

The tests performed on actual data transfers from the handheld devices to UMS and ultimately to CIS banner were done satisfactorily without exception.

4.6.3 Limitations

The scope of our work has been limited by our inability to obtain documentation relating to an upgrade to the UMS application. This information included correspondence with the vendor, problem logs, test documentation and formal approval for the implementation of the upgrade. We were also unable to determine the most recently available version of the UMS application.

4.7 TOR 8 – Billing practices compliant with quality control procedures

From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing)

4.7.1 Procedures

Scope of work

- The procedures carried out from an IS perspective to generate bills and the associated controls in place that seek to ensure the completeness and accuracy of bills;
- The procedures in place in the billing department for the identification and treatment of billing exceptions; and
- Roles and responsibilities pertaining to bill generation.

We then evaluated the appropriateness of policies, procedures and practices used in the management and execution of the billing process. Our evaluation focused on those areas of processing risk which may potentially impact completeness, accuracy and integrity of inputs into the billing calculations and ultimately the bills generated.

Where the design of the policies, procedures, etc in, our opinion, appeared to be able to provide management with reasonable assurance over the strength of billing practices, we designed tests and conducted reviews, to validate adherence to and the effectiveness of the related controls. These tests included:

- Observation, examination and/or re-performance of control procedures to ensure operating effectiveness based on JPS' policies;
- A review of key reports, documents and records used to monitor and control the billing operations;
- Evaluation of reports or documents that would allow us to determine the completeness and accuracy of bills generated; and
- Review of key General Computer Controls associated with bill processing.

Brief summary of billing procedures

The procedures documented below were obtained through discussions with key billing personnel and reviews of policy and procedures documentation.

Readings carried out each day by meter readers are downloaded to the main server where all the files received from the various Parish Offices are merged and a main file created. Processes are run to generate an exception report named 'URRMTRX' which identifies high and low consumption readings and negative readings. Readings are deemed to be high or low based on a consumption which has an ADC which is which is more or less that +/-30% of the previous ADC. The report includes the following data:

4.7 TOR 8 – Billing practices compliant with quality control procedures (Continued)

From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing)

Brief summary of billing procedures (Continued)

- Route;
- Premises number;
- Customer number;
- Address;
- Service Type;
- Meter Number;
- Current Consumption;
- Current Reading;
- Read Date; and
- Exception Trbl – Exception type

No bill is generated for the accounts which are on this exception report. These exceptions are printed by personnel from the Billing department and a decision is made as to whether to estimate the reading, send through the reading as is or create a service order so that the meter can be investigated. The decision to estimate the reading, send through the reading as is or create a service order is based on examination of consumption trends for a 12 month period for customers with stable consumption patterns and a 24 month period for other customers. After the decision has been made and a bill amount computed, this amount is posted to Banner CIS and the bill generated and printed. The Billing Supervisor then reviews the exception reports to ensure that the exceptions were treated appropriately.

A process known as the charge calculation process is then executed. This process applies charges to the readings and a bill print file is generated. This file is then saved to a server (JPS Dep server1) which gives the Mail Services Supervisor access to the bill print file. The bill print file is then copied and pasted to a file accessible by the bill print application. The Mail Services Supervisor reconciles the files saved to a server called JPS Dep server1 to what they have pulled into the bill printing application. The bills are then printed for mailing to the customers. Based on company policy this process should be carried out within four working days.

4.7 TOR 8 – Billing practices compliant with quality control procedures Continued)

From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing)

Error Reports are also generated through use of an application called Audit Command Language (ACL). This application is used by the Billing Department to identify the following exceptions,

- New Charges – Any account where there is a variance between the charges ACL calculates, and the total current charges on the bill. This will occur in the following instances
  - Where JPS creates a new (temporary) charge – e.g. "Regulatory Penalty"
  - For accounts appearing in the category of 'consumption error.'
  - Accounts where rate class and metered service do not correspond (e.g. RT 10 - MT20).
  - Any miscellaneous charges other than those recognized by the ACL program. These charges include, for example, returned cheque fees, duplicated payments, applied deposits etc.
- Consumption Error – ACL uses the difference between current and previous readings on the bill and compares this against the actual consumption being billed. If there is any difference between the two figures it will be identified as an exception;
- Days exceeding 45 days – ACL flags all accounts billed for a period exceeding 45 days at the current month's rate. Billing periods often span several months, yet accounts maybe billed at the current month's fuel and foreign exchange rate;
- High first bill: CIS does not create an exception for high first bills (no consumption history to make comparison). ACL highlights accounts with the following criteria:
  I. Rate 10: Previous usage = 0; Current consumption ≥ 1,000 kWh
  II. Rate 20: Previous usage = 0; Current usage ≥ 20,000 kWh
- Negative deposit;
- Number of Days – Highlights all active accounts where the days of service on bill is not equal to days of service calculated by the ACL using the current date less the previous date; and
- Zero New Charges – if current charges are zero for active accounts; and
- Inactive Accounts – CIS bills for any active service. Incorrect service order closure will lead to inactive accounts with active services and hence a bill produced. ACL looks at the status of the bill to flag inactive accounts that are billed.).

4.7 TOR 8 – Billing practices compliant with quality control procedures (Continued)

From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing)

These error reports are generated through ACL by billing clerks. Error Reports are examined and bills that fall within the respective exception groupings are pulled by mailing clerks so that they are not mailed before the errors are reviewed and resolved. Based on discussions with the billing clerk, the bill may be mailed as is, the bill may be cancelled and the customer may be re-billed or an adjustment may be done to the bill. Adjusted bills are done using adjustment forms and are then printed and mailed to the customers.

Sampling Techniques

Our sample selection routines were arrived at consistent with the approach used for TOR 3. 40 days were selected for review to determine the extent to which the procedures were consistently applied for the 40 days. The 40 days selected are detailed in Appendix I, item 1.

Test Procedures

1. Company procedures were compared to what obtains in practice. The following key areas were examined:

    - Generation and upload of meters to be read by the computer operations department;
    - Meter reading;
    - Bill generation;
    - Exception processing; and
    - Computer operations:

2. Examined Run Sheets for dates chosen randomly and seen in TOR3 to determine if:

    - All processes relating to the generation of meters to be read per Parish Office and all bill generation processes were included;
    - The Run sheets were reviewed by the Data Control Officer and the Computer Operations manager to facilitate identification and remediation of any issues or errors;
    - Errors and omissions identified during processing were appropriately resolved; and
    - Examined issues noted on run sheet to determine if any major issues were identified and ascertain whether these issues were resolved in a timely manner.

3. Tested access to the folder in which run sheets are held to determine if personnel other than computer operations staff can access and modify details within run sheets.

4.7 TOR 8 – Billing practices compliant with quality control procedures (Continued)

From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing)

4. Tested access to the functionalities that allow for the scheduling of processes related to generation of meters to be read and bill generation.

5. Tested access controls to the JPSHP80 server. This server is accessed by the computer operations department to transfer meters to be read and receive meters read and also accessed by Parish Offices to receive meters to be read and to upload meters read daily. For the JPSHP80 server, which is a Unix server, the controls over the following were tested:

   - Password management;
   - User management;
   - Auditing, logging and monitoring;
   - Group management; and
   - File system access and management;

6. For the sample of 40 dates chosen randomly, we attempted to test exception processing to determine if:

   - They were reviewed by Billing Clerks and the Billing Supervisor to ensure that all exceptions have been checked;
   - The treatment of exceptions was reasonable;
   - The exceptions were reviewed and bills sent out in a timely manner;
   - Adjustment forms were prepared and reconciled to information supporting the adjustments being made;
   - The adjustments were made accurately and the customers' accounts updated accordingly; and
   - Exceptions re-billed are submitted to the customers on a timely basis.

7. An application security review was carried out for Audit Command Language (ACL) which is used to generate exceptions noted in the summary of procedures. The application security review included the following:

   - General access controls;
   - Access to the formulae and scripts used to generate the exceptions.

8. We examined Error reports generated from ACL for the days chosen randomly to determine if the action taken was appropriate and within company policy. Where a bill was cancelled and a new bill generated through an adjustment we tested the accuracy of the computations.

4.7 TOR 8 – Billing practices compliant with quality control procedures (Continued)

From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing)

9. An Oracle database review was carried out which included the following:

   - Auditing, Logging and Monitoring;
   - Change management;
   - General Controls; and
   - Access to critical tables (these tables are listed in the results section)

4.7.2 Findings

1. Based on our examination of policies and procedures documentation relating to the billing process, we noted that billing procedures generally corresponded to actual procedures. These were validated through management representation and on-site observation, as documentary evidence of control activities is often times not maintained. Procedures that have been documented include the following:

   - Processes necessary for the generation of meters to be read and the upload to the main server;
   - Download of meters to be read to UMS;
   - Assignment of routes;
   - Upload of meters to be read to handheld devices;
   - Download of meters read to UMS;
   - Review of key reports (unread meter report and found meter reports) before upload to the main server;
   - Processes performed by the Computer Operations department to generate billing exceptions and bill print files;
   - Treatment of exceptions;
   - Performance of bill adjustments, re-billing and posting of new bills to Banner CIS; and
   - Bill printing and dispatch.

   We noted, however, that procedures documentation did not include requirements for:

   - The reconciliation of meter read data uploaded to the JPSHP80Server and the files actually received by the server;
   - The reconciliation carried out by the Mail Services Supervisor to determine if all bill print files necessary for the printing of bills have been transferred to the bill printing application successfully;

4.7 TOR 8 – Billing practices compliant with quality control procedures (Continued)

From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing)

- Periodic reviews carried out by the Mail Services Supervisor that ensures that bills have been submitted to customers. The Mail Services Supervisor periodically calls customers to ensure that they have received their bills; and
- The keying of manual readings to Banner CIS by the Parish Office Customer Services Manager.

2. Based on our examination of run sheets for the dates under review, we noted that they were not printed and signed by the Computer Operations Supervisor and the Data Control Officer as evidence of review. Run sheets are maintained electronically in a folder on a server and the names of the Computer Operator who monitored the each process and the Supervisor and the Data Control Officer who reviewed the document are electronically recorded on the sheets. The fields on the run sheet can be updated by any member of the Computer Operations department.

3. Run sheets can be accessed only by members of the Computer Operations Department.

4. Banner CIS allows for scheduling of tasks necessary for bill and report generation. Scheduling as it pertains to the generation of bills and billing exceptions is carried out by the Computer Operations Supervisor. Please note that all members of the Computer Operations department can access this functionality that schedules job processing and make changes to schedules.

5. The following was noted during our review of the Unix Server:

   Password Management

   Based on our review of critical files, we noted that all users on the system require unique passwords. We also noted that these passwords have been encrypted.

   User Management

   Based on our review of critical files we noted the following:

   - Only authorised users have accounts on the server;
   - Only users who require domain wide access are included in the password file which allows such access;
   - Each user has a unique User ID; and
   - Only authorised users have access to the root account, which is the most powerful account defined on the system.

4.7 TOR 8 – Billing practices compliant with quality control procedures Continued)

From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing)

Group Management

During our review of critical files we noted that each group had a unique GID and only authorised and approved accounts were members of privileged groups.

File System Access and Management

We noted that:

- Permissions and ownership for command-line access were fairly strong on critical directories; and
- Permissions on the critical systems directories and all files and directories contained within were configured so that they are only writeable by root, bin, or sys which is consistent with best practice recommendations.

6. We were only able to review exception reports for four dates out of the 40 chosen for review, as these reports could not be located by the JPS. For the four reviewed we noted the exception reports were signed by the Billing Supervisor as evidence that they were reviewed. The Billing Supervisor assigns exception reports to Billing Clerks and ensures that she receives and reviews all that were assigned. Of the 4 exception reports, we noted that the treatment of exceptions was reasonable for 3 as it was noted that in one instance (customer number 647770 and exception report dated 26/7/2006) that the reading was estimated but no indication as to why this was done was given. Estimations were also carried out for the other 3 exceptions but explanations were offered for these estimations.

   These estimations were computed within company policy and were accurate.

   We could not determine if bills were mailed or the exception process was carried out in a timely manner as there was no documented evidence that would aid us to make this determination. The name of the Billing Clerk who reviewed the exceptions was not recorded on the exception report however this detail was noted on the system (Banner CIS).

4.7 TOR 8 – Billing practices compliant with quality control procedures (Continued)

From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing)

7. During our review of the logical security controls over ACL we noted the following:

   Patch management

   The version of ACL presently in use is v8, which is the latest version of ACL

   End - user account management

   We noted that only members of the billing department with responsibility for reviewing error reports, Internal Audit department and system administrators can access ACL. We also noted that the foregoing personnel could edit scripts used to generate exceptions.

   Users are added based on requests made by the head of the department via email. All users seen on the system were bona-fide users. All users can access all functions within ACL.

   Password and account lockout security functionalities are not available with ACL.

8. We examined error reports generated from ACL for the days chosen randomly and noted that there was no evidence that they were being reviewed by the Billing Clerks. We also noted that the Billing Supervisor does not review all of the error reports that have been reviewed by Billing Clerks. The foregoing indicates that in case there are any errors or omissions on the part of the Billing Clerks in treating with these exceptions, these errors and omissions could go undetected for a protracted period of time.

   We also reviewed the action taken and noted that they were within company policy. Based on our re-computations, where a customer was re-billed or an estimate was done, JPS' calculations were accurate.

9. We noted the following during our review of logical security over the Oracle Database used to store and transmit billing data:

   Auditing, Logging and Monitoring

   We noted that auditing has not been enabled to capture the following:

   - Changes made to tables by users who access the Sys account;
   - Changes made to tables by DBA users; and
   - The use of sensitive objects and SQL statements;

4.7 TOR 8 – Billing practices compliant with quality control procedures (Continued)

From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing)

Access to critical tables and change management;

Based on our review of the database settings, we deemed access to the tables hosting the following critical data to be appropriate and consistent with the roles and responsibilities of persons to whom such access was granted:

- Customer number;
- Premises number;
- Meter number;
- Service type;
- Previous date;
- Actual read;
- Cycle code;
- Previous meter reading;
- Previous meter read date;
- Current meter reading;
- Current meter read date;
- Multiplier;
- Actual consumption;
- Days of service (cycle days);
- Current read type (E – Estimate, A – Actual);
- Previous read type (E – Estimate, A – Actual);
- Estimation source;
- Rate class; and
- All customer charges - for instance
  I. 1C or 2C charge
  II. 1F or 2F charge
  III. FEX
  IV. RT10 or RT20 charge

Access to the databases in most instances is given indirectly through access to the application, Banner CIS. In light of the foregoing, standing data such as customer name and address may be changed through accessing Banner CIS. These changes are however not reviewed by management after they have been made. Additionally, there is no log maintained of changes made to tables seen above unless the changes are deemed to be major.

4.7 TOR 8 – Billing practices compliant with quality control procedures (Continued)

From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing)

These changes are recorded on system request forms which have to be approved by the manager of the requesting department. These were reviewed and no anomalies were noted. We noted however that changes made by DBAs and members of the IS team requested via email by department heads can be made without the knowledge of IT management. Additionally, changes requested via email are not reviewed by personnel independent of the DBA or IS Personnel who made the change. There are also no snap checks of data on a sample basis to ensure that unauthorised changes have not been made to tables.

Assessment

We were unable to fully assess the extent to which billing practices are in line with existing quality control procedures as we were unable to validate exception processing as it relates to reviews of high, low or negative consumption. This was as a result of the exception reports used for exception processing on the 40 days selected for testing being available for only 4 of the days.

Our review of error reports generated through ACL indicates that those procedures seem to be in line with existing quality control procedures. There were, however, a number of control weaknesses that may impact the identification and resolution of all errors identified by ACL. Procedures performed to test General Computer Controls that impact the generation of bills and billing exception identification revealed a number of control weaknesses (for example an omission to log and monitor database changes) which vary from quality control procedures.

4.7.3 Limitations

There were no major scope limitations.

4.8 TOR 9 – Design of quality control measures

From an historical and current perspective, assess the extent to which the design of the quality control measures (including meter reading and exceptions processing) reliably and consistently identifies and treat with legitimate/genuine billing anomalies

4.8.1 Procedures

Scope of work

Billing policies and procedures which were used to manage and execute the processing of billing exceptions, and, which were in existence immediately prior to and in the months immediately following Hurricane Ivan, were reviewed. Discussions were also held with a Billing Clerk, the Billing Manager and the Computer Operations Supervisor.

We then evaluated the appropriateness of policies, procedures and practices used to manage the billing function. Our evaluation focused on those areas of processing risk which may potentially impact completeness, accuracy and integrity of the meter read data that determines the final bill amount for customers.

Test Procedures

We reviewed policies and procedures relating to meter reading and exception processing quality controls to identify possible control design weaknesses which may negatively impact the reliability of the processes intended to identify billing anomalies. Policies and procedures related to the following activities were reviewed:

- The generation by the Computer Operations department of files identifying possible meter reading and electricity consumption errors;
- Examination of exceptions by the billing department (Performance of bill adjustments, re-billing and posting of new bills to Banner CIS); and
- The generation of error reports from ACL and review of these reports by the Billing Clerks.

4.8 TOR 9 – Design of quality control measures (Continued)

From an historical and current perspective, assess the extent to which the design of the quality control measures (including meter reading and exceptions processing) reliably and consistently identifies and treat with legitimate/genuine billing anomalies

4.8.2 Findings

From our review of policies and procedures relating to quality control measures (including meter reading and exceptions processing) we noted that the following controls surrounding the identification and treatment of genuine billing anomalies were in place:

Processes performed by the computer operations department to generate billing exceptions and bill print files (refer to TOR 3 for more details on procedures surrounding this area)

- The generation of exceptions is scheduled by the Computer Operations Supervisor through Banner CIS;
- The scheduled task is reviewed by the Data Control Officer and monitored by the Computer Operators;
- Run sheets, which detail the jobs scheduled for each day, which includes the generation of exceptions, are reviewed by the Computer Operations Supervisor daily; and
- Any incidents that impact the scheduled tasks for each day are recorded on the run sheets;

Examination of exceptions (Performance of bill adjustments, re-billing and posting of new bills to Banner CIS)

- Exception reports are assigned to Billing Clerks by the Billing Supervisor;
- Exception reports are reviewed by Billing Clerks daily;
- Exception reports which are reviewed by the Billing Clerks are again reviewed by the Billing Supervisor daily to ensure that the action taken to resolve the exceptions was appropriate and that adjustments made to bills or manual estimates are accurate;
- The Billing Supervisor ensures that all exception reports generated for a particular day are reviewed by Billing Clerks. The foregoing is carried out by reviewing the unbilled report which is generated by the Computer Operations department. The unbilled report shows all exceptions that have not been actioned; and
- New bills posted to Banner CIS are reviewed by management on a sample basis. The sample selection is intended to be random, without any specified criterion or bias.

4.8 TOR 9 – Design of quality control measures (Continued)

From an historical and current perspective, assess the extent to which the design of the quality control measures (including meter reading and exceptions processing) reliably and consistently identifies and treat with legitimate/genuine billing anomalies

The generation of error reports from ACL and review of these reports by the Billing Clerks

- ACL is used to identify "errors" in all billing computations which are generated on an Error report. These errors are specified in the summary of procedures for TOR 8 above;
- Bill print files cannot be edited before it is transferred to ACL;
- ACL scripts have been preset to generate errors. No manual adjustments to scripts have to be made by billing clerks;
- Error reports are reviewed by Billing Clerks daily; and
- All errors resulting in rebilling are reviewed by the Billing Supervisor.

Assessment

Generally, the quality control procedures, as designed, should result in the consistent identification and treatment of legitimate billing anomalies. Weaknesses inherent in the design of the quality control procedures, such as management reviews of billing corrections resulting from billing exception reports on a sample basis, may however negatively affect the efficacy of these reviews.

4.8.3 Limitations

There were no major scope limitations.

4.9 TOR 10 – Accuracy of the computation of fuel charges and veracity of inputs

From an historical and current perspective, verify the accuracy of the computation of the Fuel charges and assess the veracity of the inputs which include the heat rate, system losses, and fuel prices as shown in Schedule C of the monthly JPS Fuel and IPP reports

4.9.1 Procedures

The scope of our work mainly involved ascertaining that the fuel charge as computed by JPS, via monthly Schedule A, was accurate and the various inputs valid and bonafide. While this TOR specifically requires PwC to assess the fuel charge computation it should be noted that the charge as computed by JPS also includes IPP costs. As such, for the purposes of recalculating the monthly charges, PwC also reperformed the calculations on a similar basis (fuel and IPP charge). To achieve the objective of this procedure we divided the scope of work into two distinct workstreams:

1. Verifying the mathematical accuracy of the fuel and IPP charge computations; and
2. Assessing the veracity of the inputs.

Verifying the accuracy of the fuel charge computations

The scope of work involved in verifying the mathematical accuracy of the fuel and IPP charges included:

1. Understanding the calculations of the fuel and IPP charges as performed by JPS based on interviews conducted with JPS' personnel as well as references to documentation;
2. Preparing a calculation table mapping each calculation and the various inputs required;
3. Where a component of a calculation was an input, PwC tested mathematical accuracy of schedules where applicable; and
4. Where a component of a calculation was based on a previous calculation, PwC reperformed the calculations to verify mathematical accuracy. This was performed at two levels: a global basis, covering the period June 2004 to October 2006 and a sample basis, randomly selecting a number of months. Where discrepancies were noted, explanations were sought from JPS.

<u>Understanding the calculations</u>

PwC referred to the following documents for guidance:

- All-Island Electricity Licence, 2001, Schedule 3 (Price Controls); and
- The Jamaica Public Service Company Limited Tariff Review for period 2004-2009 (Determination Notice) prepared by the OUR, June 2004.

4.9 TOR 10 – Accuracy of the computation of fuel charges and veracity of inputs (Continued)

From an historical and current perspective, verify the accuracy of the computation of the Fuel charges and assess the veracity of the inputs which include the heat rate, system losses, and fuel prices as shown in Schedule C of the monthly JPS Fuel and IPP reports

Specifically, we were guided by the definition[4] outlined in the Licence, as follows:

"***F_m*** *= Total applicable energy cost for period*

The total applicable energy cost for the period is:

a) *The cost of fuel adjusted for the determined heat rate and system losses and which fuel is consumed in the Licensee's generating units or burned in generating units on behalf of the Licensee for the calendar month which ended one month prior to the first day of the billing period plus:*

b) *The fuel portion of the cost of purchased power (including IPPs), adjusted for the determined system losses, for the calendar month which ended one month prior to the first day of the billing period; and*

c) *An amount to correct for the over-recovery or under-recovery of total reasonable and prudent fuel costs such amount shall be determined as the difference between fuel costs billed, using estimated fuel costs, and actual reasonable and prudent fuel costs incurred during the month which ended one month prior to the first day of the billing period*

S_m *= the kWh sales in the Billing Period.*

The kWh sales in the Billing Period is the actual kWh sales occurring in the billing period which ended one month prior to the first day of the applicable billing period."

[4] Exhibit 2, Page 302Y All-Island Electricity Licence, 2001

4.9 TOR 10 – Accuracy of the computation of fuel charges and veracity of inputs (Continued)

From an historical and current perspective, verify the accuracy of the computation of the Fuel charges and assess the veracity of the inputs which include the heat rate, system losses, and fuel prices as shown in Schedule C of the monthly JPS Fuel and IPP reports

In the mathematical equation, we interpreted the formula (which was confirmed with the OUR) as follows:

	Fuel cost of JPS = JPS' fuel cost x heat efficiency[5] x system efficiency
Add	Fuel cost of IPPs = IPPs' contract costs x system efficiency
Equals	Total fuel cost
Add/Less	Under/Over recovery of fuel cost
Equals	Total adjusted fuel cost **(F_m)**
Divided by	Total kWh sales in the billing period **(S_m)**
Equals	**Fuel charge per kWh**

In addition, interviews were conducted with a number of JPS' employees to understand the inputs and the supporting documentation used in the computation of the fuel charge as performed by JPS via Schedule C. The following employees were interviewed:

Methodology and source of inputs

- Vice President & Corporate Controller
- Analyst

Heat efficiency and generation

- General Manager, Business Support and Administration
- Budget and Performance Reporting Coordinator

Oil Prices

- Assistant Accountant

[5] Heat efficiency is calculated as the weighted average heat efficiency across all JPS and IPP generating stations.

4.9 TOR 10 – Accuracy of the computation of fuel charges and veracity of inputs (Continued)

From an historical and current perspective, verify the accuracy of the computation of the Fuel charges and assess the veracity of the inputs which include the heat rate, system losses, and fuel prices as shown in Schedule C of the monthly JPS Fuel and IPP reports

Performing detailed review

A sample of ten months was selected between the period July 2004 to July 2006, stratified as follows:

- 1 month pre-Ivan period, (July 2004);
- 1 month Ivan period, (September 2004):
- 2 months immediately post-Ivan period, (October 2004 and December 2004); and
- 6 months current perspective, (February 2005, September 2005, December 2005, February 2006, March 2006 and July 2006.

While we randomly selected the months we applied some level of bias by selecting the same months over the period. This approach was applied to assess the extent of unusual fluctuations that may have occurred between comparative months.

Assessing the veracity of the inputs

The scope of work involved in assessing the veracity of the inputs was conducted in two ways for months selected for review:

1. where a component of a calculation was an input, PwC traced to supporting documentation and where necessary, appropriate authorisation verified; and
2. investigating one-off/unusual adjustments by seeking explanation from JPS as well as verifying supporting documentation and assessing the legitimacy of such items.

In addition to the above, the mechanics of certain formulae were reviewed to evaluate the objectivity of the calculations. The formulae specifically reviewed were the heat rate efficiency, system losses and volumetric adjustments.

4.9 TOR 10 – Accuracy of the computation of fuel charges and veracity of inputs (Continued)

From an historical and current perspective, verify the accuracy of the computation of the Fuel charges and assess the veracity of the inputs which include the heat rate, system losses, and fuel prices as shown in Schedule C of the monthly JPS Fuel and IPP report

4.9.2 Findings

Verifying the accuracy of the fuel charge computation

Overview

Based on our review of the fuel and IPP charge per kWh over the period June 2004 to June 2006[6], we observed that the rate increased from 8.4 US cents to 16 US cents, an absolute increase of 89.9% or 2.7% compounded per month. We further observed that the cost of fuel was the main variable contributing to the significant increase (see table below).

	June 2004	June 2006	Absolute change	CAGR[7]
System net generation (MWh)	331,662	341,099	2.8%	0.1%
Electricity sales (MWh)	267,427	262,479	(1.9%)	(0.1%)
Fuel costs (JPS & IPPs) net of adjustments[8] – J$'000)	1,250,776	2,402,092	92.0%	2.8%
System losses	19.37%	23.05%	(2.4%)	(0.1%)
Heat rate	10,282	10,037	7.9%	0.3%
Exchange rate (J$:US$1)	61.22	66.03	19.0%	0.7%
USc/kWh	8.43	16.00	89.9%	2.7%

Source: Compiled from the monthly Fuel & IPP Computation Sheets

Based on a high level calculation, it appears that, as would be expected, the fuel and IPP charge per kWh is highly sensitive to a change in oil prices. The calculation set out below illustrates that fuel costs have increased as a result of a change in oil prices and exchange rates.

[6] Represents the month during the observation period when the computed charge was highest
[7] Compounded annual growth rate (24 months)
[8] Includes IPP surcharge for June 2004 which was excluded from fuel costs after efficiency ratios

4.9 TOR 10 – Accuracy of the computation of fuel charges and veracity of inputs (Continued)

From an historical and current perspective, verify the accuracy of the computation of the Fuel charges and assess the veracity of the inputs which include the heat rate, system losses, and fuel prices as shown in Schedule C of the monthly JPS Fuel and IPP reports

	June 2004	June 2006
Fuel costs – J$'000	1,250,776	2,402,092
Prevailing exchange rate	61.22	66.03
US$'000 equivalent	20,431	36,379
Prevailing average price per barrel	27.9729	51.1767
Estimated barrels of oils consumed	730,380	710,847

It should be noted that the heat rate target of 11,200 kJ/kWh and system losses target of 15.8% of net generation is fixed for the five year price cap period for June 2004 to June 2009. Since these parameters are constant, variations in the fuel rates are directly attributable to variations in oil prices i.e., customers are not charged for JPS' failure to meet these efficiency targets. Conversely, customers do not benefit from JPS' exceeding these efficiency targets.

Detailed reviewed

PwC developed a spreadsheet model to replicate the calculations as represented by JPS and OUR. The following exceptions were noted in the calculations over the period June 2004 to October 2006.

Month	Exception	Explanation from JPS
September 2004	Electricity sales of 249,686 MWh was used to determine the fuel and IPP rate instead of the actual sales of 185,001 MWh.	Due to the low sales level for September 2004, as a result of hurricane Ivan the sales for September 2003, of 249,686 MWh, was used as the divisor to derive the fuel and IPP rate. This was done to prevent the significant increase in the fuel and IPP rate that would have resulted had the unusually low sales level for September 2004 been used in its derivation. This basis was applied to prevent what would have otherwise been a significant over recovery of fuel costs from customers in the following month, when sales level returned to normal levels. This deviation from the norm resulted in a volumetric adjustment of US$ 703,000. If the actual sales for the month had been used to derive the fuel and IPP rate, the volumetric adjustment in the following month (given the actual sales level observed in October 2004) would have been US$7M, representing an over-recovery of the September fuel costs.

4.9 TOR 10 – Accuracy of the computation of fuel charges and veracity of inputs (Continued)

From an historical and current perspective, verify the accuracy of the computation of the Fuel charges and assess the veracity of the inputs which include the heat rate, system losses, and fuel prices as shown in Schedule C of the monthly JPS Fuel and IPP reports

Month	Exception	Explanation from JPS
October 2004	System losses and the heat rate efficiency ratio were excluded from adjusting fuel costs.	Permission was granted by OUR to exclude both ratios from adjusting fuel cost only for September 2004 and October 2004 to recognise the inefficiencies as a result of Hurricane Ivan. However, billings for September 2004 were already done so the OUR approved JPS to add back J$465M to fuel costs in October 2004 representing undercharged fuel costs in September 2004.
November 2004	System losses and the heat rate efficiency ratio were excluded from adjusting fuel costs.	JPS incorrectly excluded system losses and the heat rate efficiency ratio from adjusting fuel costs. It is our understanding that JPS planned a meeting with OUR to discuss outstanding issues in the aftermath of hurricane Ivan, most notably of which was the unavailability of ST14, and its request to extend the waiver of the guaranteed standards for two further months (November and December). JPS moved ahead with the November 2004 calculation under the assumption that the waiver would be extended but meeting with OUR in mid November 2004, the request was denied. JPS explained the error in the November 2004 rate calculation. The error, approximating to J$51M, was corrected in December 2004.
February 2006	Electricity sales of 269,193 MWh was used to determine the fuel and IPP rate for the month instead of the actual sales of 229,506 MWh.	Electricity sales in February 2006 of 229,506 MWh were used to compute the system losses for that month. However, similarly to September 2004, due to the low sales level for February 2006, the sales for January 2006, 269,193 MWh, was used as the divisor to derive the fuel and IPP rate. This was also done to prevent the significant increase in fuel and IPP rate that would have resulted had the unusually low sales level for February 2006 been used in its derivation. This basis was also applied to prevent what would have otherwise been a significant over recovery of fuel costs from customers in the following month, when the sales level returned to normal levels. This deviation from the norm resulted in a volumetric adjustment of US$2.8M, representing an under recovery of fuel costs. If the actual sales for the month had been used to derive the fuel and IPP rate, the volumetric adjustment in the following month (given the actual sales level observed in March 2006) would have been US$2.2M, representing an over-recovery of fuel costs.

4.9 TOR 10 – Accuracy of the computation of fuel charges and veracity of inputs (Continued)

From an historical and current perspective, verify the accuracy of the computation of the Fuel charges and assess the veracity of the inputs which include the heat rate, system losses, and fuel prices as shown in Schedule C of the monthly JPS Fuel and IPP reports

Month	Exception	Explanation from JPS
July 2006	Reversal of SCT waiver.	JPS has always passed on to customers the invoiced cost of fuel subject to the agreed efficiency adjustments. This invoiced cost includes the invoiced value of fuel net of credit notes issued by Petroleum Corporation of Jamaica ("Petrojam") to reflect the SCT waiver on the Bogue station units 12 & 13. In May 2006 Petrojam informed JPS that it was going to discontinue sending credit notes and that JPS would have to seek a refund of this waiver directly from the Government of Jamaica ("GOJ"). JPS disagreed and continued calculating the value of the credit notes and also paying Petrojam net of such credit notes. In July 2006, under threat by Petrojam, JPS paid Petrojam for all legally outstanding amounts, since it had not in fact received any credit notes from Petrojam and it was legally bound to pay for the invoiced value of fuel deliveries. As a result of the above, JPS began charging customers for the full cost of fuel which excluded the usual credit notes for the SCT waiver since these were in fact not forthcoming. From an accounting perspective JPS could not reduce the cost of fuel for the SCT waiver which was now being sought from the GOJ since the amount and timing of such recovery were not known with certainty. JPS recommenced receiving the SCT waiver in October 2006 by way of the original method (i.e. credit note from Petrojam) and thus reverted to the original methodology for recovering its fuel costs.

4.9 TOR 10 – Accuracy of the computation of fuel charges and veracity of inputs (Continued)

From an historical and current perspective, verify the accuracy of the computation of the Fuel charges and assess the veracity of the inputs which include the heat rate, system losses, and fuel prices as shown in Schedule C of the monthly JPS Fuel and IPP reports

Assessing the veracity of the inputs

One-off/Unusual Items

In addition to providing further explanations for certain of the exceptions as discussed above, specific discrepancies were observed in the a number of months where calculations were reperformed by PwC. Further details include:

Discrepancies/Unusual items	Note	Jun 04	Jul 04	Aug 04	Sept 04	Oct 04	Nov 04	Dec 04
Adjustments to special consumption taxes (SCT) and IPP fuel costs not adjusted for efficiencies in heat rate and system losses	1	√	√	√	√			
JPPC's variable operating and maintenance costs duplicated	2	√	√	√				
Exclusion of IPP surcharge for calculation of billed fuel and IPP charge	3				√	√		

1. The adjustments relating to under/(over) estimations of SCT waived and IPP fuel cost were not adjusted for efficiencies in heat rate and system losses. The SCT adjustments represent a waiver of taxes on fuel purchased for Bogue stations 12 & 13. This forms an incentive to JPS. The IPP fuel cost estimates represent under/(over) estimation of IPP fuel cost for the previous month. In both cases, both adjustments were not netted against the fuel cost before applying the efficiencies for heat rate and system losses. In other words, JPS did not pass on the benefit of the efficiencies to customers in relation to the prior month adjustments to SCT waived and IPP fuel costs under/(over) estimated.

   Explanation

   PwC understands that JPS misinterpreted how both adjustments should be included in the computation of the billed fuel and IPP rate. The adjustments for prior month were not adjusted for efficiencies; the error was realised and corrected in November 2004. That is, the method of adjusting the fuel costs for under/(over) estimations was changed in November 2004. However, no adjustment was incorporated in the calculations to take into account the effect of the error. A review of the calculations done subsequent to November 2004 confirmed that the adjustments were properly classified in calculating fuel cost.

4.9 TOR 10 – Accuracy of the computation of fuel charges and veracity of inputs (Continued)

From an historical and current perspective, verify the accuracy of the computation of the Fuel charges and assess the veracity of the inputs which include the heat rate, system losses, and fuel prices as shown in Schedule C of the monthly JPS Fuel and IPP reports

2. The fuel cost for JPPC was inadvertently included as part of the variable operating and maintenance portion of the IPP surcharge (Schedule D) between June 2004 and August 2004. This resulted in the IPP surcharge being overstated.

   Explanation

   Based on our discussions with JPS, PwC understood that all fuel costs and any (over)/under recovery of IPP non-fuel costs from the non-fuel tariffs should be passed through to the customers. It was however misunderstood that the energy payment due on the JPPC bill also included fuel costs and not only variable operating and maintenance costs. Thus fuel costs were not deducted from the energy payment before inputting these in the fuel and IPP rate computation as variable operating and maintenance cost. This therefore led to IPP surcharge being overstated. This error was completely corrected as at December 2004.

3. The IPP surcharge for September 2004, which amounted to US$1.090M, appeared to be excluded from the calculation of the fuel and IPP rate for month.

   Explanation

   In connection with the double charging of JPPC fuel costs for the months of July 2004 - August 2004 as well as the (over)/under recovery of estimates for SCT discounts, JPS actually modified the IPP surcharge used to derive the fuel and IPP rate to correct for previous error noted. The balance of the over recovery was also spread over October 2004 – December 2004, see table below for details.

   Computation:

Month	Correct IPP Surcharge US$'000	Actual Surcharge US$'000	Under/(Over) Recovery US$'000	Cumulative Recovery US$'000
Jun-04	1,087	1,756	669	669
Jul-04	834	2,069	1,235	1,904
Aug-04	727	2,660	1,933	3,837
Sep-04	1,089	0	(1,089)	2,748
Oct-04	794	0	(794)	1,954
Nov-04	666	(311)	(977)	977
Dec-04	2,454	1,478	(977)	0

4.9 TOR 10 – Accuracy of the computation of fuel charges and veracity of inputs (Continued)

From an historical and current perspective, verify the accuracy of the computation of the Fuel charges and assess the veracity of the inputs which include the heat rate, system losses, and fuel prices as shown in Schedule C of the monthly JPS Fuel and IPP reports

Heat rate efficiencies

We observed that fuel costs (JPS and IPPs) were adjusted monthly by the composite average heat efficiency rates in determining total fuel costs net of efficiencies. This practice was inconsistent with the definition for fuel cost of IPPs outlined in the 2001 All-Island Electricity Licence. However, based on supporting documentation provided by the OUR, the targeted heat rate was changed to include IPPs in the system heat rate effective 1 April 2002. That is, the target heat rate, currently set at 11,200 kJ/kWh, took into account IPPs and hydro energy thereby providing JPS with incentives to achieve and surpass the heat rate target on a sustained basis.

System losses

We observed that system losses computation is a rolling 12 month calculation. That is, the cumulative twelve month average of current billed MWh expressed as a percentage of net MWh generated. The system loss is applied in the calculation of billed fuel and IPP charge in two ways:

1. determining the current electricity sales (MWh); and
2. determining the system efficiency factor.

Determining the current electricity sales (MWh)

Electricity sales (MWh) is used as the denominator in calculating the monthly billed fuel and IPP charge. The mathematical expression in calculating the electricity sales is Net Generation (MWh) x (1 – system losses).

Determining the system efficiency factor

The system loss is used to calculate the actual system efficiency. That is, 1 less system loss percentage, expressed as a mathematical equation. The actual system efficiency is then expressed as a percentage of the maximum system efficiency to determine the system efficiency factor. In other words, fuel cost is reduced to the extent that JPS' system loss is above the threshold of 15.8% as set in the 2004-2009 Tariff Review Final Determination Notice.

4.9 TOR 10 – Accuracy of the computation of fuel charges and veracity of inputs (Continued)

From an historical and current perspective, verify the accuracy of the computation of the Fuel charges and assess the veracity of the inputs which include the heat rate, system losses, and fuel prices as shown in Schedule C of the monthly JPS Fuel and IPP reports

Volumetric adjustments

The volumetric adjustment acts as a mechanism that adjusts in the current month, the (over)/under recovery of total fuel and IPP costs incurred, net of efficiencies, as a result of the (over)/under estimation of electricity sales. The mathematical equation, expressed in a simplified form, is as follows:

Current month volumetric adjustment = Difference in MWh sales[1] x Previous month's fuel and IPP rate

[1] defined as previous month normalised electricity sales (current billed + current unbilled – previous unbilled) – current month actual electricity sales (current billed)

Assessment

Based on our understanding, we were able to replicate the calculation of the fuel and IPP charges for the months tested in our samples selected during the period June 2004 to October 2006. Instances where we observed deviations from the normal calculations, information and explanations justifying JPS' actions were provided. Corrective actions taken in subsequent months, where applicable, were reflected in the fuel and IPP calculations. These calculations are required to be submitted to OUR in the normal course of obtaining approval for the monthly fuel and IPP charges.

PwC reperformed the calculation of the billed fuel and IPP charges for the months of June 2004 to December 2004 based on the discrepancies noted while conducting the test for mathematical accuracy as well as assessing the veracity of inputs. Our revised computation resulted in an over recovery of J$9.9 million over the period, see **Appendix 13 – Recalculation of billed fuel and IPP charges**.

4.9.3 Limitations

There were no major scope limitations.

4.10 TOR 11 – Accuracy of the computation of IPP charges

From an historical and current perspective, verify the accuracy of the computation of the IPP charges as per the IPP Power Purchase agreements as well as any other relevant billing input

4.10.1 Procedures

In verifying the accuracy of the computation of the IPP charges as per the IPP Power Purchase agreements, the scope of work was undertaken in two distinct workstreams:

1. obtaining an understanding of the basis of computation for the fuel and non-fuel charges of all IPPs;
2. confirming that the computations of the fuel and non-fuel charges were performed in accordance with the IPPs' Purchase Power Agreements (PPA); and
3. verifying accuracy of the computation of the IPP charges as well as any other relevant billing input.

Understanding basis of computation

In conducting this procedure we referred to Schedule 6 of each PPA for guidance in understanding the basis of computations. At the review date, the following IPPs had PPAs in effect:

- Jamaica Private Power Company
- Jamaica Energy Partners
- Jamalco
- Jamaica Broilers
- Wigton Farms

In addition, an annual adjustment is made to the base tariffs. This adjustment is approved by the OUR and is applied in the surcharge to recover non-fuel costs. The following documents were referred to in obtaining the relevant annual adjustments applicable over the period:

1. The Jamaica Public Service Company Limited Annual Tariff Adjustment 2006 (Determination Notice) prepared by the OUR, June 2006.

2. The Jamaica Public Service Company Limited Annual Tariff Adjustment 2005 (Determination Notice) prepared by the OUR, August 2005.

3. The Jamaica Public Service Company Limited Tariff Review for period 2004-2009 (Determination Not

4.10 TOR 11 – Accuracy of the computation of IPP charges (Continued)

From an historical and current perspective, verify the accuracy of the computation of the IPP charges as per the IPP Power Purchase agreements as well as any other relevant billing input

Confirming accuracy of computations

In determining the accuracy of the computation of the IPP charges we were also guided by the decision in the Tariff Review for the period 2004-2009[9]:

"The actual Independent Power Producers (IPPs) costs shall be recovered as a pass through on customers' bills by using the following methodology:

- *Estimated base Non-Fuel IPP costs shall be embedded in the non-fuel charges. JPS shall submit its methodology for allocating IPP cost to the Office for approval.*
- *A computation shall be done on a monthly basis to determine whether the actual costs deviate from the estimated base costs.*
- *A surplus or deficit shall be returned or recovered over the kWhs billed. This surplus or deficit shall be included in the Fuel and IPP charge line item on the bill."*

The scope of our work for this procedure was based on sample testing.

Verifying accuracy of the computation of the IPP charges

The scope of work in this procedure mainly involved ascertaining the mathematical accuracy of the computations reviewed. The months selected for reviewed were based on those same months selected in TOR 10.

[9] Exhibit 3, Page 14 Jamaica Public Service Company Limited Tariff Review for 2004-2009

4.10 Accuracy of the computation of IPP charges (Continued)

From an historical and current perspective, verify the accuracy of the computation of the IPP charges as per the IPP Power Purchase agreements as well as any other relevant billing input

4.10.2 Findings

Obtaining an understanding of the basis of the computation

IPP costs comprise fuel and non fuel costs. The non fuel costs have two components: capacity payments and variable operating and maintenance costs. The table below depicts the breakdown of the costs associated with each IPP as set out in the respective PPAs.

	Non Fuel Charges		
Independent Purchase Power Provider	**Capacity Payments**	**Variable Operating and Maintenance Costs**	**Fuel Charges**
Wigton Farms	Not applicable	√	Not applicable
JEP	√	√	√
JPPC	√	√	√
Jamalco	√	√	√
Jamaica Broilers	Not applicable	Not applicable	√

The fuel portion of the cost is recovered directly from the customer as a pass through in the monthly billed fuel and IPP rate while the non-fuel portion is recovered through the tariff. However, Wigton is currently the only IPP whose total energy charges are fully recovered through the variable operating and maintenance component of the IPP surcharge.

The non fuel cost is recovered from customers through the tariff. However, (over)/under estimated costs are adjusted monthly through a line item called “Adjustment for IPP Surcharge”. The (over)/under estimation of IPP non fuel costs is calculated as the difference between estimated total non fuel costs and electricity sales (MWh) times IPP surcharge.

The IPP surcharge represents a base surcharge adjusted annually for escalation. In reviewing the determination notices for 2004 to 2006 we observed that the IPP surcharge was computed annually was follows:

4.10 TOR 11 – Accuracy of the computation of IPP charges (Continued)

From an historical and current perspective, verify the accuracy of the computation of the IPP charges as per the IPP Power Purchase agreements as well as any other relevant billing input

Years	2004	2005	2006
Base Surcharge (Cost/Revenue)*	.996		
Escalation Factor (%)		7.72	6.58
Revised Surcharge (Base surcharge x (1+ escalation factor)		1.073	

* The 2004 Base Surcharge was set based on anticipated costs of J$3.00 billion and anticipated revenue of J$3.01 billion. The anticipated costs of J$3.00 billion was verified via Tariff Review for the period 2004-2009. In addition, information provided by OUR indicated that the Base Surcharge was calculated as follows:

Years	Budgeted IPP Costs
Revenue requirement in new tariff (J$'000)	3,002,542
Projected sales for 2004 (MWh)	3,013,591
Average IPP Charge (J$/kWh)	**.996**

Confirmation and verifying accuracy of computation of the fuel and non fuel charge

Schedule 6 of the relevant PPA's was reviewed to verify that the IPP costs were correctly allocated to fuel and non-fuel charges and charges were in accordance with the PPA. In conjunction with TOR 10, PwC replicated the computation of the fuel and the non fuel charge for the IPP's which revealed the following exceptions:

- Between June and August 2004 the fuel cost for JPPC was included in the variable operating and maintenance costs which resulted in the customer being over charged. This error was corrected in November 2004.
- In July 2005 JPS made a one off payment to JEP for J$9.9 million for an outstanding payment due to the change in tax law.

4.10 TOR 11 – Accuracy of the computation of IPP charges (Continued)

From an historical and current perspective, verify the accuracy of the computation of the IPP charges as per the IPP Power Purchase agreements as well as any other relevant billing input

Assessment

Generally, we observed that during the period June 2004 to October 2006, IPP charges were computed in accordance with definitions outlined in the 2004-2009 Tariff Review and respective Power Purchase Agreements as well as adjusted in accordance with the Determination Notices issued annually over the period. However, where we observed discrepancies, as outlined in TOR 10, such discrepancies were previously communicated to OUR. Corrective actions taken in subsequent months were reflected in the fuel and IPP calculations. These calculations are required to be submitted to OUR in the normal course of obtaining approval for the monthly fuel and IPP charges.

4.10.3 Limitations

There were no major scope limitations.

4.11 TOR 12 – Reliability and accuracy of the algorithm

Assess whether the algorithm used by the JPS Customer Information System (Banner CIS) reliably and accurately computes the customer monthly invoices (bills)

4.11.1 Procedures

Estimation and Charge Calculations

Work on this TOR focused on Banner CIS' ability to derive consumption estimates in line with the business rules and calculate electricity charges based on actual consumption as determined by meter reads. From bills generated for the months of October 2004, November 2004, December 2004, January 2005 and April 2006, we randomly selected 230 customer accounts per month for testing. Of these 230 accounts for each of the months, 180 were billed based on actual readings and 50 were based on estimates. Our total accounts tested were 1,150, of which 900 were actual readings and 250 were estimates.

Based on regulations, estimated consumption should be based on a customer's last three (3) actual meter reads. Note however, that prior to May 2005, only the last two (2) actual reads where required.

Consumption determination – Estimates and Actual

Actual Consumption – For the 900 sampled customer accounts we computed the actual consumption based on the difference between the current and previous meter read and compared it to the consumption generated by the system (CIS Banner).

Estimated consumption – For the 250 sample accounts, we computed the estimated consumption, taking into consideration the following and finding the product of the Average Daily Consumption (ADC) and the days of service for the current month:

- For the months before May 2005, the last two (2) actual meter reads;
- For the months after May 2005, the last three (3) actual meter reads;
- When the meter rollover limits are reached;
- The days of service between the last actual meter reads (last 2 meter reads for periods before May 2005 and last 3 meter reads for periods after May 2005);
- The average daily consumption (ADC) between the last actual meter reads (same as above); and
- The days of service of the current month.

4.11 TOR 12 – Reliability and accuracy of the algorithm (Continued)

Assess whether the algorithm used by the JPS Customer Information System (Banner CIS) reliably and accurately computes the customer monthly invoices (bills)

Bill Charge Routine – Actual and Estimated Bills

Using the tariff rate sheets which detail the agreed rates for 2004, 2005, and 2006, for customer rates, F/X base rates, energy rates, fuel and IPP rates, we recalculated the charges for the sampled accounts and compared them to the charges as computed by Banner CIS.

Charge Calculation

Rates used were based on the rates applicable for the months sampled. The different charges applied were determined based on the following rules:

- Energy charges - determined from the energy rate tariff, and are applied differently depending on the rate class as follows:
    - For Rate 10 customers, tiered rates are applied based on the consumption;
    - For Rate 20 customers, the charges are applied to the entire consumption;
    - For Rates 40, 48 and 50, these are applied based on the time of consumption
- Customer charges - determined from the customer rate tariff, and are fixed charges based on rate class.
- Foreign Exchange adjustment - determined based on 76% of the marginal difference between the billing exchange rate and the base exchange rate.
- Fuel and IPP charges are obtained from the tariff and are applied to the consumption for the month

4.11 TOR 12 – Reliability and accuracy of the algorithm (Continued)

Assess whether the algorithm used by the JPS Customer Information System (Banner CIS) reliably and accurately computes the customer monthly invoices (bills)

4.11.2 Findings

Consumption Routines – Estimates and Actual

Of the 250 accounts which were tested, we found no differences. The table below highlights a summary of the test results.

Months	Estimate Consumption per CIS Banner	Estimate Consumption per PwC	Estimated Consumption Difference	Count	Num of Records with Differences	% Record with Differences
Oct 04	17,975	17,975	-	50	-	0.00%
Nov 04	10,551	10,551	-	50	-	0.00%
Dec 04	13,893	13,893	-	50	-	0.00%
Jan 05	30,474	30,474	-	50	-	0.00%
Apr 06	19,941	19,941	-	50	-	0.00%

Bill Charge Routine – Actual and Estimated Bills

Actual Bill Charges

Calculations were done for energy charges, fuel charges, customer charges and foreign exchange charges. The comparisons of the amounts calculated by PwC and the amounts seen on Banner CIS were done and are as noted as follows:

Energy Charges

Month	Banner CIS Energy	PwC Energy	Energy Diff
Oct 04	582,811.80	582,811.80	-
Nov 04	396,066.03	396,066.03	-
Dec 04	385,775.29	385,775.29	-
Jan 05	700,705.01	700,705.01	-
Apr 06	410,230.92	410,230.92	-

4.11 TOR 12 – Reliability and accuracy of the algorithm (Continued)

Assess whether the algorithm used by the JPS Customer Information System (Banner CIS) reliably and accurately computes the customer monthly invoices (bills)

Fuel Charge

Month	Banner CIS Fuel	PwC Fuel	Fuel Diff
Oct 04	508,536.37	508,536.37	-
Nov 04	387,873.62	387,873.62	-
Dec 04	379,187.72	379,187.72	-
Jan 05	519,780.16	519,780.16	-
Apr 06	547,817.59	547,817.59	-

Customer Charge

Month	Banner CIS Customer Charge	PwC Customer Charge	Customer Charge Diff
Oct 04	14,700.00	14,700.00	-
Nov 04	14,700.00	14,700.00	-
Dec 04	14,700.00	14,700.00	-
Jan 05	14,700.00	14,700.00	-
Apr 06	15,750.00	15,750.00	-

Foreign Exchange

Month	Banner CIS Foreign Exchange	PwC FX	FX Diff
Oct 04	6,626.42	6,626.42	-
Nov 04	4,501.94	4,501.94	-
Dec 04	4,889.91	4,889.91	-
Jan 05	5,615.98	5,615.98	-
Apr 06	18,274.59	18,274.59	-

4.11 TOR 12 – Reliability and accuracy of the algorithm (Continued)

Assess whether the algorithm used by the JPS Customer Information System (Banner CIS) reliably and accurately computes the customer monthly invoices (bills)

Estimated Bill Charges

Energy Charge

Date	Energy	PwC Energy	Energy Diff
Oct 04	122,790.24	122,790.24	-
Nov 04	126,903.01	126,903.01	-
Dec 04	89,991.20	89,991.20	-
Jan 05	89,697.29	89,697.29	-
Apr 06	145,255.40	145,255.40	-

Fuel Charge

Date	Fuel	PwC Fuel	Fuel Diff
Oct 04	105,198.25	105,198.25	-
Nov 04	125,104.53	125,104.53	-
Dec 04	89,901.61	89,901.61	-
Jan 05	71,004.50	71,004.50	-
Apr 06	189,776.59	189,776.59	-

Customer Charge

Date	Customer Charge	PwC Cust Charge	Cust Charge Diff
Oct 04	4,548.00	4,548.00	-
Nov 04	5,536.00	5,536.00	-
Dec 04	4,466.00	4,466.00	-
Jan 05	4,548.00	4,548.00	-
Apr 06	4,881.00	4,881.00	-

4.11 TOR 12 – Reliability and accuracy of the algorithm (Continued)

Assess whether the algorithm used by the JPS Customer Information System (Banner CIS) reliably and accurately computes the customer monthly invoices (bills)

Foreign Exchange

Date	Foreign Exchange	PwC FX	FX Diff
Oct 04	1,412.20	1,412.20	-
Nov 04	1,451.54	1,451.54	-
Dec 04	1,153.33	1,153.33	-
Jan 05	1,021.64	1,021.64	-
Apr 06	6,440.82	6,440.82	-

Assessment

The work done has identified no instances of error in the computation of estimated consumption as well as actual invoice amounts. The algorithm therefore seems to reliably and accurately compute monthly invoices.

4.11.3 Limitation

There were no major scope limitations.

4.12 TOR 13 – Timeliness of bill dispatch

Assess the timeliness of the dispatch of validated bills/invoices within the interval specified by company policy

4.12.1 Procedures

Scope of work

Discussions were held with the Bill Production Supervisor to determine:

- The procedures carried out to dispatch validated bills; and

- The controls in place that ensure that bills are dispatched in a timely manner and according to the dictates of company policies.

We then evaluated the appropriateness of policies, procedures and practices used in the management and processing of the billing function. Our evaluation focused on those areas of processing risk which may potentially impact the timeliness of bill dispatch.

Where the design of the policies, procedures, etc in, our opinion, appeared to be able to provide management with reasonable assurance over the strength of meter reading procedures, we designed tests and conducted reviews, to validate adherence to and the effectiveness of the related controls. These tests included:

- Observation, examination and/or re-performance of control procedures to ensure operating effectiveness based on JPS' policies; and
- Review of documents and records used to monitor and control timeliness of bill dispatch.

Summary of procedures relating to this TOR

Please see summary of procedures in TOR 8 for summary of procedures.

Sampling Techniques

Please see sampling techniques in TOR 3 for further details.

4.12 TOR 13 – Timeliness of bill dispatch (Continued)

Assess the timeliness of the dispatch of validated bills/invoices within the interval specified by company policy

4.12.2 Findings

Test Procedures

1. For the sample chosen above, we attempted to review reconciliations of bill print files generated by Computer Operators and those uploaded to the bill print application for printing of bills to determine if all bills have been transferred to the bill printing application; and

2. From a sample of reconciliations determine whether bills were dispatched on timely basis.

Test Results

1. Only 5 reconciliations (9/30/2005, 10/18/2005, 3/2/2006, 3/13/2006 & 5/2/2006) of the 40 requested could be located. Based on review of the 5 reconciliations submitted to us we noted that they only included the file number and size copied to the bill printing application. They did not include the file number and size as per the bill print file before it is copied to the bill printing application. We also noted that they were not signed by personnel who prepared the reconciliation and there was no independent review of the reconciliation.

2. Based on our examination of bill print dates and the dates meters were read we noted that bills were dispatched within 4 days. The bill print date was examined as there are no other records that would help us to determine when bills were dispatched. Based on discussions with the Bill Production Supervisor bills are usually mailed on the dates bills are printed.

Assessment

Based on the unavailability of the reconciliations requested, we are unable to assess the timeliness of the dispatch of validated invoices.

4.12.3 Limitations

Reconciliations were not received for the dates requested. Please see **Appendix 12 Samples for Systems Test** for details of items not submitted to us.

4.13 TOR 14 – Compliance with Overall and Guaranteed Standards

Determine the extent to which the company is compliant with the following Overall and Guaranteed Standards *(EOS 6 - Frequency of meter reading, EOS 8 – Billing Punctuality, EGS 7 – Frequency of Meter Reading, EGS 8 – Estimation of Consumption, EGS 10 – Billing Adjustments*)

4.13.1 Procedures

The main objective in this procedure was to determine the extent that JPS has complied with the specific overall and guaranteed standards. As such, the scope of work was mainly based on the result of work conducted in other TORs. Our comments were made in reference to the targets/performance measures as follows:

Standard	Description	Units	Targets June 2004 – May 2009 (inclusive)
EOS 6	Frequency of meter reading	Percentage of meters read within time specified in the licensee's billing cycle (currently monthly for non-domestic customers and bi-monthly for domestic customers)	99%
EOS 8	Billing punctuality	98% of all bills to be mailed within specified time after meter is read	5 working days

Standard	Focus	Description	Performance Measure
EGS 7	Estimated bills	Frequency of meter reading	Should not be three (3) or more consecutive estimated bills (where company has access to meter). This changes to two (2) on September 1, 2006
EGS 8	Estimation of consumption	Method of estimating consumption	An estimated bill should be based on the average of the last three (3) actual readings (first 6 bills of new accounts excepted)
EGS 10	Billing adjustments	Timeliness of adjustments to customer's account	Where necessary, customer must be billed for adjustment within one (1) billing period of identification of error

4.13 TOR 14 – Compliance with Overall and Guaranteed Standards (Continued)

Determine the extent to which the company is compliant with the following Overall and Guaranteed Standards *(EOS 6 - Frequency of meter reading, EOS 8 – Billing Punctuality, EGS 7 – Frequency of Meter Reading, EGS 8 – Estimation of Consumption, EGS 10 – Billing Adjustments*)

4.13.2 Findings

EOS 6 – Frequency of meter reading

Due to the limitations encountered in TOR 4 our comment with respect to JPS' compliance to this standard is based on the results observed from the samples tested. For the months that the meter reads performance were reperformed from CIS Banner we observed that JPS achieved a rate of 93% to 95% of total meters. We also observed that effective 1 May 2006, billing cycles for rates 10 and 20 were compressed into 21 cycles (from 42).

EOS 8 – Billing Punctuality

In reviewing the punctuality of the bill dispatch we traced the 120 meters selected randomly, to the actual bill dispatch reconciliation specified in TOR 13. Based on these reconciliations, bills were mailed within 4 days of the readings and before the end of the billing cycle. Additionally, we compared the date bills were printed and mailed to the bill date per the reconciliation for the 9/30/2005, 10/18/2005, 3/2/2006, 3/13/2006 & 5/2/2006 and noted that all bills were mailed before the close of the Billing cycle and within 4 days of the meter reading.

EGS 7 – Frequency of Meter Reading

In reviewing the legitimacy of high consumption complaints we also reviewed the meter reading history for these accounts. Our review revealed that of the 30 complaints with high consumption readings only one had more than three consecutive estimated readings post Ivan. However, the other nine observed occurred due to general inaccessibility of meters as a result of hurricane Ivan. See **Appendix 6 - Meter Reading History - High Consumption Samples Reviewed** for details.

In addition, we randomly tested the aging of bills generated and observed that for the months tested bills with more than three consecutive estimated readings were less than 2%.

4.13 TOR 14 – Compliance with Overall and Guaranteed Standards (Continued)

Determine the extent to which the company is compliant with the following Overall and Guaranteed Standards *(EOS 6 - Frequency of meter reading, EOS 8 – Billing Punctuality, EGS 7 – Frequency of Meter Reading, EGS 8 – Estimation of Consumption, EGS 10 – Billing Adjustments*)

EGS 8 – Estimation of Consumption

In reviewing the legitimacy of complaints we reperformed the calculation of estimated consumption for samples relating to high consumption, disputes and estimated billing complaints. We observed that the basis of calculating estimated consumption was changed from the last 2 actual reads to the last 3 in May 2005 despite the implementation date of 1 June 2004 set in the 2004-2009 Tariff Review Determination Notice. Based on discussions with JPS it is our understanding that the implementation delay was due to time required to effect system changes. This was communicated to OUR. We have requested correspondence to support our understanding, however, JPS is unable to locate any documentation.

It is our further understanding that the OUR became aware, after hurricane Ivan, that the Directive given to JPS for calculating estimated consumption using the last three actual readings was not adhered to. As a result, the OUR in the Determination Notice dated 22 February 2005, issued a further Directive with an effective date of 30 June 2005. Since then, as far as the OUR is aware, three months are being used for these calculation. This is consistent with our findings from follow-up work done in TOR 15.

EGS 10 – Billing Adjustments

Based on our observation of the general treatment of billing exceptions and tests carried out in TOR 8 on error reports and exception reports, we noted that billing adjustments were carried out the same day the exception or error was reviewed, which is generally a day after the meters are read. These adjustments are keyed to Banner CIS on identification of the exception / error and the new bill reprinted and mailed to the customers within one billing period. We noted however that those exceptions requiring adjustments may go undetected as Billing Supervisors who are responsible for the review of exceptions investigated by Billing Clerks only review only a sample of exceptions. Please note that there is no methodology in selecting the foregoing sample as the sample is chosen based on the discretion of the Billing Supervisor. We also noted that Adjustments can be made to bill amounts without the knowledge of the Billing Supervisor as there are no automated controls that would assist in such.

4.13.3 Limitations

There were no major scope limitations.

4.14 TOR 15 – Compliance with Offices Directive of February 24, 2005

Assess the company's compliance with the Office's Directive of February 24, 2005 (amended March 22, 2005)

4.14.1 Procedures

The scope of our work was designed to ascertain the level of compliance with the OUR directives dated 24 February 2005 as amended 22 March 22 2005. These directives require that the JPS in accordance with section 4 (2) of the Office of Utilities regulation Act as amended, to secure compliance with the Decisions set out herein with the view to, inter alia, ensuring that:

a) The needs of the consumers of the services provided by JPS are met;

b) The JPS operates efficiently and in a manner designed to affording it's consumers' economical and reliable service such as accurate and reliable electricity bills.

A list of decisions was issued and in order to ascertain the level of compliance a status of the response to each decision was requested.

4.14.2 Findings

The table below summarises JPS' responses to each of the Directives as contained in its Terminal Report – December 2005 as well as PwC's assessment of implementation based on follow up work conducted.

OUR Directive decision	JPS' responses to implementation[1]	Implemented[2]	Other comments
1. Meter Reading			
a. Re-training of all meter readers	26 new meter readers were hired in 2005 to support the monthly meter reading effort. All have been fully trained and existing meter readers re-trained in regards to the new control procedures.	Yes	
b. Implementation of effective mechanism to facilitate performance monitoring of meter readers regarding quality of their readings. Mechanism must hold meter readers accountable for accurate readings	It is our understanding that JPS is currently finalizing a report that will allow some assessment of meter reading accuracy. This is based on the number of high, low, missed or negative reads by meter reader. When finalized it can be used to evaluate meter reader accuracy	No	

4.14 TOR 15 – Compliance with Offices Directive of February 24, 2005 (Continued)

Assess the company's compliance with the Office's Directive of February 24, 2005 (amended March 22, 2005)

OUR Directive decision	JPS' responses to implementation[1]	Implemented[2]	Other comments
c. Accountability standard prescribed by JPS for meter readers must be communicated to OUR (30 June 2005)	Has not been done.	No	No further action taken by JPS subsequent to December 2005.
d. Routine inspection and maintenance of hand-held devices	It is our understanding that JPS is currently finalising a procedural document regarding the maintenance of the handhelds.	No	No programme in place to routinely inspect hand-held devices. Maintenance continues to be performed on a break-down basis.
e. Notification of customers whose consumption is outside the high/low variance criterion	Measure has been in place since January 2005.	No	PwC unable to confirm implementation of Directive as it is our understanding that, with the exception of November 2004 billing, customers are not usually notified.
f. Manual re-entry of readings flagged by hand-held device as exceptions	Implemented in March 2005.	Yes	Unable to substantiate formal procedure however, observations from meter reading field visit confirmed procedure in place.
g. Removal of access to previous readings by meter readers in the field	Implemented in March 2005.	Yes	Unable to substantiate formal procedure however, observations from meter reading field visit confirmed procedure in place.

4.14 TOR 15 – Compliance with Offices Directive of February 24, 2005 (Continued)

Assess the company's compliance with the Office's Directive of February 24, 2005 (amended March 22, 2005)

OUR Directive decision	JPS' responses to implementation[1]	Implemented[2]	Other comments
h. Assessment of technology options and feasibility to introduce Automatic Meter Reading and Pre-paid Meters by the system (September 2005)	A consultants' report titled The implications of AMI for JPS was tabled and discussed with the OUR on 13 December 2005. No similar assessment was done for Pre-paid metering.	Partial	No further development to date.
ii) JPS to submit monthly progress reports in relation to system overhaul		Covered under items a) through h) above	
iii) JPS to put in place within 3 months of this Directive a customer education programme about meter reading procedures designed to restore confidence in the integrity of the billing system	JPS has been running an education campaign since November 2005 to teach customers how to read their meters and to encourage them to conduct routine readings on a given frequency as a counter-check for the Company's reading accuracy.	Ongoing	
iv) Wider and more frequent rotation of the assigned areas to meter readers	Meter readers are routinely rotated. However, there are limitations to the effectiveness of such rotation especially in smaller parishes.	Yes	Unable to substantiate formal procedure however, observations from meter reading field visit confirmed procedure in place.

4.14 TOR 15 – Compliance with Offices Directive of February 24, 2005 (Continued)

Assess the company's compliance with the Office's Directive of February 24, 2005 (amended March 22, 2005)

OUR Directive decision	JPS' responses to implementation[1]	Implemented[2]	Other comments
2. High/Low criterion rejection			
i) Rejection criterion to be lowered to +/-30% for rate 10 customers by 31 July 2005. Commencing with March 2005 billing and until further notice, JPS shall be required to submit reports detailing exceptions generated by the high/low criteria	The tolerance band for residential customers was reduced from +/-80% in two stages: +/-50% in September 2005 and +/- 30% effective November 2005. The gradualism permitted the observation of the change in workload precipitated by the tightening of the criterion as well as the impact of 100% monthly reading.	Yes	
ii) High/low criterion for commercial accounts to be lowered to +/-60% by 31 July 2005	The tolerance band for commercial accounts was already lowered to +/-40% at the time of the Directive.	Yes	
3. Estimation Routines			
i) a. Effectively immediately, estimate of consumption should be based on the last 3 actual readings (new accounts excepted)	Billing estimates (kWh) have been based on last 3 actual meter readings as of May 2005's billing.	Yes	
b. Effective immediately, there should be no difference in the algorithm used for the Mass and Base Estimators.	Consolidated estimation routines based on OUR's mandate.	Yes	

4.14 TOR 15 – Compliance with Offices Directive of February 24, 2005 (Continued)

Assess the company's compliance with the Office's Directive of February 24, 2005 (amended March 22, 2005)

OUR Directive decision	JPS' responses to implementation[1]	Implemented[2]	Other comments
c. Effective immediately, adjust monthly consumption estimates used by the Manual Estimator to better reflect the class average consumption	Manual estimations are still based on 100 kWh per 30 days for residential accounts and 200 kWh per 30 days for non-residential accounts. The OUR's Directive required that the estimators be changed to the respective class averages (200 kWh – residential and 1,000 kWh – non-residential). JPS proposed to the OUR that there should be no changes as the change would replace one set of customer issues with another. Unless subsequently instructed to the contrary JPS would continue the current manual estimation rules.	No	It is our understanding from JPS that no subsequent instruction was received from the OUR.
ii) JPS to assess the merit of using even longer periods and advise OUR by 30 June 2005	JPS is of the view that there is no need to extend the length of history contained in the estimation routine, given by their nature estimators are imperfect and the Company is moving towards 100% monthly meter readings.	No	It is our understanding from JPS that no subsequent instruction was received from the OUR.
4. November 2004 Billing			
i) JPS to present proposal to OUR by 28 February 2005 for adjusting 21,000 accounts	OUR approved the Company's proposal on the decision. Payment is to be effected in the course of billing of accounts in January 2006.	Yes	
ii) The 21,000 accounts only to be disconnected for non-payment of current billing		Yes	Random sample conducted, see below.

4.14 TOR 15 – Compliance with Offices Directive of February 24, 2005 (Continued)

Assess the company's compliance with the Office's Directive of February 24, 2005 (amended March 22, 2005)

OUR Directive decision	JPS' responses to implementation[1]	Implemented[2]	Other comments
5. Meter Maintenance & Testing			
Develop a meter testing programme that will enhance credibility of JPS' metering programme	Is being undertaken by various entities, however the Licensee has documented their progress on the related issue.	Ongoing	

1 Extracted from JPS' Terminal Report – December 2005

2 PwC's assessment of implementation based on response in Terminal Report and where necessary, verification from a current perspective

Random testing re November 2004 billing Directive ii

To verify JPS' compliance with the Directive, ten accounts were randomly selected from the list of accounts to be adjusted. Payment and disconnection histories requested for the period 1 December 2004 to 31 March 2005, see **Appendix 12 – SQL Statements for CIS Banner's Data Files** for source code. Where we observed that a disconnection was performed we verified what period the disconnection related to i.e. disconnections should only have been made for balances in arrears and relating to amounts invoiced subsequent to December 2004. The table below provides details of our work.

Sample	Service Order No	Disconnection Request Date	Status	Findings
1	26476186	25-02- 2005	Cancelled	Service was not disconnected.
2	26694353	15-04-2005	Service disconnected on 20-04-05	Service was disconnected for outstanding payment for March 2005.
3	26417698	12-02-2005	Service disconnected on 21-2-2005	Service was disconnected for outstanding balances prior to August 2004, and non payment for services between December 2004 and February 2005.

4.14 TOR 15 – Compliance with Offices Directive of February 24, 2005 (Continued)

Assess the company's compliance with the Office's Directive of February 24, 2005 (amended March 22, 2005)

Sample	Service Order No	Disconnection Request Date	Status	Findings
4	26602037	25-03-2005	Closed	Unable to validate if service was disconnected as there were no reconnection order created in the system and there was no reconnection fee paid.
5	26621100	26-3-2005	Service disconnected on 31-03-05	Service was disconnected for current portion of the bill i.e. non payment of February 2005 bill.
6	No service order created during the period of review			
7	No service order created during the period of review			
8	No service order created during the period of review			
9	No service order created during the period of review			
10	No service order created during the period of review			

Assessment

Of the 20 directives which were decided upon, only ten (10) have been fully implemented, while four (4) have been partially implemented and the remainder have yet to be resolved. Therefore, overall, JPS has been inconsistent in its compliance with the Office's Directive of February 24, 2005 (amended March 22, 2005).

4.14.3 Limitations

There were no major scope limitations.

4.15 TOR 16 – System weaknesses and adequacy of safeguards

Identify any areas of weakness within the systems mentioned above and determine the adequacy of the levels of safeguards to protect against data corruption and manipulation

TOR 3 – From an historical and current perspective, assess the accuracy and integrity of the meter reading process

	Findings	Implications	Recommendations
1.	Based on discussions with the Field Services Supervisor and Customer Services Manager for the KSAN Parish Office, manual readings carried out by Meter Readers are keyed directly to the Utility Management System (UMS) or Banner CIS by the foregoing personnel. We noted however that the readings that are keyed to Banner CIS or UMS are not reviewed by personnel independent from those who key the data.	In the event that the incorrect reading is keyed to the mentioned systems, customers may receive inaccurate bills.	We recommend that all readings that are keyed to UMS or CIS Banner directly, be reviewed by independent personnel. This review should be evidenced by the reviewer's signature on the Meter Reading Sheet.
2.	Based on discussions with the Field Services Supervisor for the KSAN Parish Office we noted that manual readings are not always recorded on Meter Reading Sheets but are recorded on pieces of paper which are discarded after the readings have been keyed to the system.	In the event that management has to refer to past manual readings due to customer complaints, the actual readings recorded on the pieces of paper would not be available for review. This may lead to a lack of accountability if complaints are due to inaccurate keying to UMS on the part of the Field Services Supervisor, from the piece of paper.	All Manual Readings carried out Meter Readers should be documented on Meter Reading Sheets and reviewed by the Field Services Supervisor before the readings are keyed to UMS.

4.15 TOR 16 – System weaknesses and adequacy of safeguards (Continued)

Identify any areas of weakness within the systems mentioned above and determine the adequacy of the levels of safeguards to protect against data corruption and manipulation

TOR 3 – From an historical and current perspective, assess the accuracy and integrity of the meter reading process

	Findings	Implications	Recommendations
3.	During our review of the meter reading process, we noted that the following data transfers are carried out: - Transfer of meters to be read data for each Parish Office from the main server to a folder where the all Parish data is merged; - Transfer from the merged data file located on the main server to UMS by the Field Services Supervisor at each Parish Office; - Transfer of meter read data to Handheld devices; - Transfer of readings from the handheld devices to UMS; and - Transfer of readings from UMS to the main server There is no reconciliation of data transferred from source to destination for the transfers seen above except for the transfer of readings from UMS to the main server. We also noted that the reconciliation performed for transfer of readings from UMS to the main server is not documented and retained.	In the event that incorrect data sets are transferred at any of the mentioned points, there is an increased risk that: - Meters within a cycle are not read; and - Readings are not completely transferred to the main server.	Management should implement reconciliation procedures that would reconcile data from source to destination for the transfers mentioned across. These reconciliations should be documented and evidenced. Reconciliations should also be reviewed by personnel independent of the preparer and filed for future reference.

4.15 TOR 16 – System weaknesses and adequacy of safeguards (Continued)

Identify any areas of weakness within the systems mentioned above and determine the adequacy of the levels of safeguards to protect against data corruption and manipulation

TOR 3 – From an historical and current perspective, assess the accuracy and integrity of the meter reading process

	Findings	Implications	Recommendations
4.	During our review of Meter Reading procedures we noted that Unread Meter Reports and Found Meter Reports are not generally printed and signed by Field Services Supervisors as evidence that they were reviewed.	There would be a lack of accountability as it relates to the review of the mentioned reports.	Key reports reviewed by the Field Services Supervisor should be printed and signed by them as evidence that they were reviewed.
5.	Based on our review of the Meter Reading policies and procedures documentation we noted that the keying of manual meter reads to UMS and Banner CIS by the Field Services Supervisor and the Customer Services Manager respectively has been omitted.	In the event of the departure of key personnel, then there is the increased risk of omission of key procedures.	Policies and procedures documentation requires enhancement. The policy and procedure documentation should be updated to include policy pronouncements on keying of manual meter reads to UMS and Banner CIS.
6.	Based on review of documentation relating to training of Meter Readers we noted that there were no formal procedures concerning formal and ongoing training in the proper use and safekeeping of handheld devices. Further discussion with the Field Services Supervisor from the KSAN Parish Office revealed that there is no ongoing training in the areas noted above.	Lack of regular training in the proper use and safekeeping of handheld devices may lead to inappropriate safekeeping practices. This increases the risk of handheld devices being damaged.	There should be formal and ongoing training for Meter Readers in the proper use and safekeeping of handheld devices. This training should be included as a part of the approved training schedule.

4.15 TOR 16 – System weaknesses and adequacy of safeguards (Continued)

Identify any areas of weakness within the systems mentioned above and determine the adequacy of the levels of safeguards to protect against data corruption and manipulation

TOR 3 – From an historical and current perspective, assess the accuracy and integrity of the meter reading process

	Findings	Implications	Recommendations
7.	During our assessment of the reliability of handheld devices, we noted that detailed instructions for the use of handheld devices have not been circulated to the Meter Readers.	In the event that Meter Readers are newly employed, there is an increased risk that the new user may enter readings incorrectly, which may impact the accuracy of readings transferred to UMS and ultimately lead to incorrect customer bills.	Even though new Meter Readers are trained by personnel experienced in the use of handheld devices, detailed instructions pertaining to their use should be circulated to all Meter Readers.
8.	During our review of control procedures surrounding meter reading, we noted that there are no procedures in place for regular snap checks of meter reading techniques and readings taken by Meter Readers in the field.	The lack of snap checks may result in meter reading practices which are not in line with company policy.	Snap checks of meter reading practices performed by Meter Readers should be carried out by management to ensure that meter readers are reading meters accurately and within company policy.
9.	Based on discussions with the Asset Administrator, we noted that handheld devices which have been repaired by the vendor are not tested by personnel at JPS before they are submitted to the Parish Office and used in recording meter readings.	In the event that the handheld devices have not been repaired based on specifications, then there is an increased risk that: - Readings taken in the field may be lost; and - Readings may be incomplete and/or inaccurate.	Handheld devices that have been repaired by the vendor should be tested by JPS before they are used to read meters. Test plans should be developed for these tests and results documented and reviewed by management before the handheld devices are released for use at the Parish Office. Ideally, review by management should be followed by formal approval to release the tested handheld device.

4.15 TOR 16 – System weaknesses and adequacy of safeguards (Continued)

Identify any areas of weakness within the systems mentioned above and determine the adequacy of the levels of safeguards to protect against data corruption and manipulation

TOR 3 – From an historical and current perspective, assess the accuracy and integrity of the meter reading process.

	Findings	Implications	Recommendations
10.	Incident logs are prepared by the Asset Administrator. Incident logs detail faults with handheld devices reported by personnel at each Parish Office. Based on discussions with the Asset Administrator, Incident logs are not reviewed by personnel independent of the preparer to ensure that incidents are resolved in a timely manner.	The lack of independent review of incidents logs may lead to untimely resolution of incidents reported.	Handheld device incident logs should be reviewed by personnel independent of the Asset Administrator. This review should focus on ensuring the timeliness of the resolution of incidents reported and recorded. Also each Parish Office should record incidents that they have reported and monitor the resolution of the incident.

TOR 7 - Assess the reliability and accuracy of the computerised system used to upload, store and download meter readings in the process of transferring data from the field to the office

	Findings	Implications	Recommendations
11.	During our review of access controls surrounding the UMS Application, we noted that a username and password is not required to access UMS.	The lack of a password requirement increases the risk the application may be accessed by unauthorised users.	Password policies for the UMS application require enhancement. Each user should be required to enter a unique username and password before access to the application is allowed.

4.15 TOR 16 – System weaknesses and adequacy of safeguards (Continued)

Identify any areas of weakness within the systems mentioned above and determine the adequacy of the levels of safeguards to protect against data corruption and manipulation

TOR 3 – From an historical and current perspective, assess the accuracy and integrity of the meter reading process.

	Findings	Implications	Recommendations
12.	We noted that the UMS application does not have the functionalities required to generate audit logs, specifically, those related to security events and general application usage.	Audit logs collect information about system usage. Each event that is audited in an audit log is written to a security event log, which can be viewed and monitored. In the event that there are system problems or events that affect critical functionalities, the foregoing may not be identified easily.	Management should consider implementing system functionalities within UMS that support the generation of audit logs. This is especially useful if passwords are required to enter the application as security related events can be logged and monitored.
13.	Based on our review of the Windows 2000 operating system on which the UMS Application resides, we noted that the Field Services Supervisors are members of the administrator group.	The administrator account is the most powerful account on the server. Production users with these privileges can make unauthorised changes to general configurations and data within the operating system.	Ideally, Field Services Supervisors should be removed from the administrator group for the UMS Windows 2000 operating system.
14.	We noted that the administrator and guest accounts have not been renamed for the Windows 2000 operating system on which UMS resides. The guest account has however been disabled.	These built-in accounts are known to exist on the Windows Operating system 2000 operating system. They may be among the first accounts that an intruder will attack.	The 'Administrator' and 'Guest' user accounts for the UMS Windows 2000 operating system should be renamed. The foregoing accounts should be renamed to a unique, obscure name.

4.15 TOR 16 – System weaknesses and adequacy of safeguards (Continued)

Identify any areas of weakness within the systems mentioned above and determine the adequacy of the levels of safeguards to protect against data corruption and manipulation

TOR 8 – From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing).

	Findings	Implications	Recommendations
15.	Run sheets are prepared by Computer Operators. They detail the processes run within the Computer Operations department in the generation of exceptions and bill calculations. Based on our review of run sheets we noted that they are not signed by the Computer Operators who monitored the processes, the Data Control Officer and the Computer Operations Supervisor who reviews it. The names of the foregoing personnel are simply recorded on the run sheet.	There may be a lack of accountability in the monitoring and review of run sheets with the lack of a signed verification that the tasks have been completed.	Summary reports concerning processes run specified on run sheets should be implemented, printed, reviewed and signed by the Computer operations Supervisor daily.
16.	Jobs are scheduled using Banner CIS. These jobs include the generation of exception reports and processes responsible for the calculation of bills. These schedules are set by the Computer Operations Supervisor. We noted that the Computer Operators do not require the approval of senior personnel to make changes to the scheduled job runs.	In the event that unauthorised changes to the schedule are made, there may be an omission of processes critical for the generation of bills and billing exceptions	Computer Operators should be restricted from changing processes without authorization. We recommend that changes are made only through authorization by senior personnel. Additionally, management should consider implementing automated controls which restrict Computer Operators from making changes to processes without approval from senior personnel.

4.15 TOR 16 – System weaknesses and adequacy of safeguards (Continued)

Identify any areas of weakness within the systems mentioned above and determine the adequacy of the levels of safeguards to protect against data corruption and manipulation

TOR 8 – From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing).

	Findings	Implications	Recommendations
17.	During our review of Billing exceptions on the 7/26/2005 we noted that there was one instance (customer number 647770 and exception report dated 26/7/2006) that the reading was estimated but no indication as to why this was done was given.	Management would not be able to determine if exceptions were treated within policy pronouncements.	There should be an indication of reasons why estimations are carried out for exceptions by Billing Clerks which should be documented on the exception report.
18.	During our review of ACL Error reports, we noted that they were not signed by the Billing Supervisor as evidence that they were reviewed.	Errors identified by ACL may not be investigated and resolved.	Audit Command Language (ACL) Error report should be signed by the Billing Supervisor and the Billing Clerk after they have reviewed it.
19.	During our review of the procedures taken to generate Error reports through ACL, we noted that ACL scripts used to identify errors can be edited by the Billing Clerks without the knowledge of management.	ACL may not be able to identify all errors which may lead to billing anomalies not being identified and ultimately, incorrect bill amounts.	Access to scripts used by ACL to generate error reports should be more restrictive. Management should consider password protecting ACL scripts.
20.	We noted that Billing Clerks are not required to access ACL through a unique username and password. It is noteworthy however that the application does not provide features for password controls.	Unauthorised users may access the application and perpetrate actions outside of company policy. These actions may lead to errors not being identified in a timely manner.	Even though ACL does not provide for password controls, users should be required to enter a unique username and password to access ACL. Management should contact the vendors for the application and enquire about a possible upgrade that would include access through unique usernames and passwords.

4.15 TOR 16 – System weaknesses and adequacy of safeguards (Continued)

Identify any areas of weakness within the systems mentioned above and determine the adequacy of the levels of safeguards to protect against data corruption and manipulation

TOR 8 – From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing).

	Findings	Implications	Recommendations
21.	We noted that audit logs cannot be generated by ACL.	System events may occur that may not be identified. These system events may negatively impact the generation of errors and ultimately the billing of customers.	Consideration should be given to enhancing the application to allow for auditing of security related events.
22.	We noted that major changes made to the Oracle Database tables, where billing data critical to the computation of billing amounts, are recorded on Change Request Forms and approved by management before changes are made. We noted however that minor changes are made by the Database administrators without approval from management which is not in line with best practice controls.	The foregoing may lead to unauthorised changes to tables within the database which are critical for the computation of bills. These unauthorised changes may lead to incorrect billing amounts. Database Managers may also be able to perpetrate fraud with the lack of strong controls related to change of data within tables.	All changes made to tables within the Oracle Database by Database administrators and members of the IS Team should always be reviewed by management. As a result, minor changes should be recorded and approved by management before changes can be made to data. If possible, changes should require online approval before the changes are released.

4.15 TOR 16 – System weaknesses and adequacy of safeguards (Continued)

Identify any areas of weakness within the systems mentioned above and determine the adequacy of the levels of safeguards to protect against data corruption and manipulation

TOR 8 – From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing).

	Findings	Implications	Recommendations
23.	Based on our review of the Oracle database we noted audit logs are not generated and monitored for the following areas: - Changes made to tables by users who access the Sys account; - Changes made to tables by DBA users; and - Sensitive objects and SQL statements;	In the absence of auditing for the foregoing areas there is an increased risk that data may be changed without the knowledge of management.	Auditing should be defined on the Oracle database for the following areas: - Changes made to tables by users who access the Sys account; - Changes made to tables by DBA users; and - Sensitive objects and SQL statements These logs should be reviewed periodically by management.
24.	Based on our review of program change controls, we noted that snap checks are not carried out for changes made to source codes for the Oracle Database.	This could result in unauthorised changes to source codes, not being promptly detected.	We recommend that regular snap checks be carried out by an independent unit to test the integrity of source codes by recompiling the latest source and comparing it to the corresponding production objects. The source codes would be selected randomly and include core programs. The snap checks should be carried out at least quarterly.

4.15 TOR 16 – System weaknesses and adequacy of safeguards (Continued)

Identify any areas of weakness within the systems mentioned above and determine the adequacy of the levels of safeguards to protect against data corruption and manipulation

TOR 8 – From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing).

	Findings	Implications	Recommendations
25.	During our review of program change controls, we noted that changes are not monitored by management for timeliness.	Critical changes may not be made in a timely manner.	The timeliness of program change should be monitored.
26.	We noted that priority is assigned to program system requests by the IS Department, we noted however that this priority is not documented.	Personnel responsible for developing changes may not be aware of the priority given to the change and as such, there may be delays in the development and implementation of these changes.	Priority given to program change by management should be documented. This priority can be recorded on the System request forms.
27.	There is no central database for the recording changes made to applications and the database.	Management may not be able to refer to past changes made to source if a central data base is not maintained.	Changes made to applications should be logged to a central database.
28.	Based on our review of System Request Forms (SRF's) we noted the following: - The date the request was made was not recorded on the following SRF's, b03, b04, b05, b10, b20, b21, b22 & b11; and The following SRF's were not signed by the IS Manager, 59358, 51331, 54593, 54679, 56198, 59557, b03, b04, b09, b10, b12, 53615 & b11	- It would be difficult to monitor the progress of system requests in the absence of request date; and - Unauthorised changes may be made to programs.	- All the relevant data should be recorded on the System request forms (SRF's).

4.15 TOR 16 – System weaknesses and adequacy of safeguards (Continued)

Identify any areas of weakness within the systems mentioned above and determine the adequacy of the levels of safeguards to protect against data corruption and manipulation

TOR 8 – From an historical and current perspective, assess the extent to which the billing practices are in compliance with the existing quality control procedures (including meter reading and exceptions processing).

	Findings	Implications	Recommendations
29.	Based on our review of access rights over the bill print file which has been transferred from the main operating system on route to ACL, we noted that permissions on the file allows the Billing Clerk to edit the data within the file before it is transferred to ACL for the generation of error reports.	Users may make unauthorised changes to the bill print file which may disallow ACL from identifying all billing anomalies.	Billing Clerks responsible for reviewing error reports should be assigned more restrictive rights over the bill print file which is transferred to ACL to generate errors.

TOR 9 – Design of quality control measures

	Findings	Implications	Recommendations
30.	Reviews of corrections resulting from billing exception reports are done on a sample basis, without a defined sample selection criterion.	Errors or omissions relating to corrected bills may go undetected.	A sample selection criteria for reviewing billing exceptions should be determined. The criteria should sufficiently reduce the likelihood of material errors being undetected.

4.16 TOR 17 – Causes of system weaknesses (TOR 16)

Identify the causes of these weaknesses identified in TOR 16 above.

4.16.1 Procedures

The weaknesses noted above were reviewed and an examination of the possible causes for these weaknesses was done.

4.16.2 Findings

The possible causes for the weaknesses noted above include:

- An omission to adhere to instituted policies and procedures in those instances where weaknesses would have been mitigated by present policies;
- Inadequate training of members of staff; and
- Inadequate mechanisms for monitoring of compliance with policies and procedures.

4.16.3 Limitations

There were no limitations

4.17 TOR 18 – System improvement recommendations

Recommend how the systems mentioned above could be improved with due regard for international best practices.

Billing adjustments

1. We observed that under/(over) estimated consumption (embedded in the actual readings) are charged/adjusted at rates prevailing at the current month of billing. Specifically, variable charges (foreign exchange adjustments and fuel and IPP charges) are based at the rates prevailing for the current month. Conversely, we recognise that there are trade offs where in instances an overestimation was made (JPS has to refund at current rates).

   Recommendation

   We recommend that the bill adjustments arising from corrections of estimates in previous months be based on rates prevailing at the time that consumption was made rather than at current period rates. This will ensure that customers are ultimately in the same position that they would have been had the actual consumption been applied.

Frequency of estimates

2. We observed that the basis of using the last 3 months actual reads (2 months prior to May 2005) may not form a sufficient observation period to estimate consumption due to the impact of unusual fluctuations that may occur in actual consumption.

   Recommendation

   We recommend a longer period that would take into consideration the impact of unusual fluctuations. Therefore, a basis at least 6 months actual reads would be a more reasonable observation period. In addition, the consumption pattern for the comparative period in the previous year could also be taken into consideration.

Performance Audit

3. Ongoing monitoring and reporting against the Guaranteed & Operating ("G&O") standards to the public should be implemented as a practice.

   Recommendation

   For example, in a similar approach as to the UK, G&O performance monitoring could require the company's auditors or similarly qualified independent party to sign off on the reports accuracy in the future. This could enhance performance management as well as the internal reporting requirements to management. At frequent intervals these standards and definitions could appear on customers' statements as well as JPS' performance against those standards.

4.17 TOR 18 – System improvement recommendations (Continued)

Recommend how the systems mentioned above could be improved with due regard for international best practices.

Fuel cost calculation - heat rate efficiency

4. It appears under the existing basis of applying a composite average heat efficiency ratio, JPS is still commercially incentivised to call its own energy production, rather than a cheaper IPP's, where its plant has outturn heat rate efficiency factors better than the Target figure.

   Recommendation

   To address this issue, we would further recommend considering potential options to mitigate the current risk of inefficient merit order dispatch, for example:

   - Investigation of the benefits of divesting all generation capacity by JPS:
   - Introduction of an Independent System Operator (ISO) responsible for the planning [such as for outages], scheduling [month ahead visibility of generation availability and system requirements] and dispatch [e.g. day ahead and real time] of generating plant according to cost, system requirements and system constraints; and
   - Additional licence requirement or pricing mechanism that incentivises JPS to minimise overall energy cost and not solely heat rate efficiency. However, the concern over difficulty in monitoring and enforcement in practice must be taken into consideration.

   While we understand that the first two of these options are not short term solutions, we would nevertheless recommend their consideration given that they are consistent with the unbundling of energy network activities as seen in the UK and as now being endorsed and implemented across Europe. The intention of this is to promote effective competition and non-discriminatory behaviour as well as to create a transparent sector structure.

Monitoring customer complaints

5. We have observed that JPS has currently implemented measures to track and monitor written complaints received at Head Office as well as issues relating to key accounts. However, we understand that JPS does not maintain a central database of all complaints written to the Company.

   Recommendation

   While there is no direct requirement to report this information under the Guaranteed Standards to the OUR, we believe this information could provide indications of potential operational and quality of service issues. We recommend that JPS implements a system that integrates all complaints. The Resolution Team, which was originally established in January 2006 to monitor Head Office complaints, could be assigned the role of monitoring the complaints and reporting the trends and issues monthly to management.

PRICEWATERHOUSECOOPERS

Appendix 1 – Classes of Customers

			CUSTOMER CHARACTERISTICS			BILLING AND METER READING						
						Minimum Charge						
Main Class	Rate[1]	Category	Type of Customer	Consumption Demand	Service Delivery (Meter)	Customer Charge	Demand Charge	Energy Charge	Fuel Charge	IPP Charge	FX Adjustment	Meter reading
10	10	Residential Service	Residential	Actual Usage	Single point	Monthly charge	None	Flat rate per kWh for first 100 kWh monthly plus flat rate for each kWh in excess of 100 Covers non-fuel costs that vary with consumption and additional fixed non-fuel costs not recovered through the customer charge. Energy charge does not include any portion of fuel costs.	Monthly amount per kWh	Monthly amount per kWh	Applies to all charges except Fuel and IPP	At least every month. If estimated, average of the three previous meter readings except accounts opened less than six months.
20	20	General Service	Commercial	less than 25 kVA	Single point	Monthly charge	None	Flat rate per kWh consumed monthly. Covers non-fuel costs that vary with consumption and additional fixed non-fuel costs not recovered through the customer charge. Energy charge does not include any portion of fuel cost.	Monthly amount per kWh	Monthly amount per kWh	Applies to all charges except Fuel and IPP	At least every month. If estimated, average of the three previous meter readings except accounts opened less than six months.
40	40ALV	Power Service[2]	Commercial and Industrial	25 kVA or more, whose average monthly consumption during 2000 was less than 30,000 kilowatt-hour.	Single point	Monthly charge	Flat Rate per kVA	Flat rate per kWh consumed monthly. Covers non-fuel charge that vary with consumption and additional fixed non-fuel costs not recovered through customer charge. Energy charge does not include any portion of the fuel cost.	Monthly amount per kWh	Monthly	Applies to all charges except Fuel and IPP	Higher of maximum demand for the month or 80% of the maximum demand during the five-month period preceeding the month of biling but not less than 25 kVA . Maximum demand shall be the registered integrated average in kVA measured in the 15-minute interval in which such average load in kVA is highest during the month.
40	40LV	Power Service Low Voltage	Commercial and Industrial	25 kVA or more	Single point	Monthly charge	Flat Rate per kVA	Flat rate per kWh consumed monthly. Covers non-fuel charge that vary with consumption and additional fixed non-fuel costs not recovered through customer charge. Energy charge does not include any portion of the fuel cost.	Monthly amount per kWh	Monthly amount per kWh	Applies to all charges except Fuel and IPP	**Standard:** Higher of maximum demand for the month or 80% of the maximum demand during the five-month period preceeding the month of biling but not less than 25 kVA. **Time-of-use option** :Charge dependent on time of day electricity is used.
50	50MV	Power Service Meduim Voltage	Commercial and Industrial	25 kVA or more	Single point	Monthly charge	Flat Rate per kVA	Flat rate per kWh consumed monthly. Covers non-fuel charge that vary with consumption and additional fixed non-fuel costs not recovered through customer charge. Energy charge does not include any portion of the fuel cost.	Monthly amount per kWh	Monthly amount per kWh	Applies to all charges except Fuel and IPP	**Standard:** Higher of maximum demand for the month or 80% of the maximum demand during the five-month period preceeding the month of biling but not less than 25 kVA. **Time-of-use option** :Charge dependent on time of day electricity is used.
60	60	Street Lighting	Non-residential	Dusk to dawn	Photocell	Monthly charge	None	Flat rate for all kWh consumed per lamp. Covers non-fuel charge that vary with consumption and additional fixed non-fuel costs not recovered through the customer charge. Energy charge does not include any portion of the fuel cost.	Monthly amount per kWh	Monthly amount per kWh	Applies to all charges except Fuel and IPP	Flat rate per lamp irrespective of level of consumption.
60	60	Traffic Signals	Non-residential	Dusk to dawn	Traffic control system	Monthly charge	None	Flat rate for all kWh consumed per unit. Covers non-fuel charge that vary with consumption and additional fixed non-fuel costs not recovered through the customer charge. Energy charge does not include any portion of the fuel cost.	Monthly amount per kWh	Monthly amount per kWh	Applies to all charges except Fuel and IPP	Flat rate per unit irrespective of level of consumption.

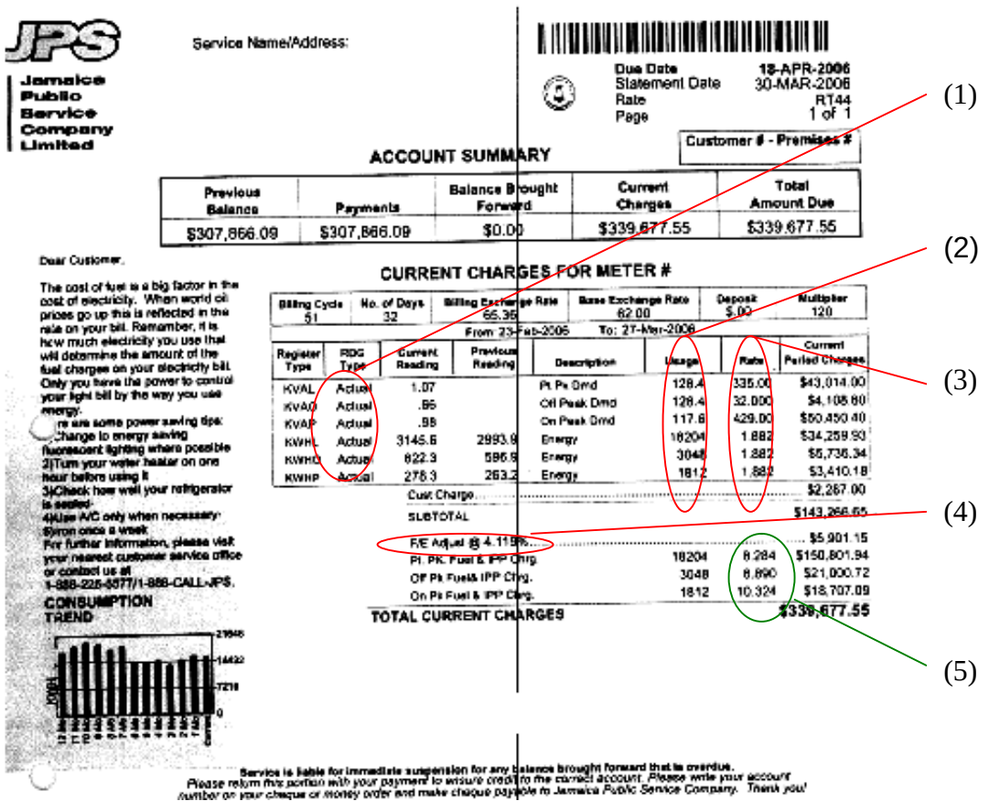
Source:

[1] Rate Schedules 2006, reviewed 2004 and 2005 no significant difference in description noted.

[2] This rate is being phased out and therefore new applicants will not be accepted for entry or re-entry into this category.

Appendix 2 - Overview of a typical bill

The diagram below illustrates the format of a typical bill issued by JPS monthly.



1. Instances where consumption is not based on actual reading, “Estimate” is indicated in the consumption row.

2. Represent energy consumption. Example is an industrial customer, hence various registers indicate time of use billing.

3. Rates agreed between OUR and JPS published via annual Rate Schedules.

4. Represent 76% of difference of change in foreign exchange rate (Billing versus Base). Base rate agreed between OUR and JPS (Rate Schedules).

5. Calculated monthly with rate for each category of time of use based on weights (confirm frequency of change for weights). **This is the objective of TORs 10 & 11**

PRICEWATERHOUSECOOPERS

Appendix 3 – Customer Complaints Sampled

							Test for accuracy of estimated consumption										
Sample No	Customer Class	Parish	Date of Complaint	Nature of complaint (per OUR's database)	OUR's Classification	Period reviewed	Days of Service[1]	Estimated Consumption[2]	Bill / Months selected[3]	Reconnection EGS 6 (a or b)	Freq. of meter reading EGS 7	Frequency of est. billing EGS 8[4]	Meter Replacement (timing) EGS 9	Billing Adjustment (timing) EGS 10	Compensation EGS 12	Conclusion	Legitimacy
1	10	Kingston	Apr-04	Customer complaining about number of estimated bills being received and a high c/f balance	Billing Matter Estimate	August 03 - Dec 04	√	√	√ March 04 Dec 04	Not applicable	√	√	Not applicable	Not applicable	Not applicable	A review of the customer's account from CIS Banner for 7 months prior to date of complaint indicated that the frequency of estimated consumption by JPS complied with EGS 7 (Frequency of meter reading) and where estimated bills were generated these were mathematically accurate. However, our review of the payment history revealed that monthly invoices were not fully settled by the customer hence an accumulation of outstanding balances.	No
2	10	Kingston	Nov-04	Customer received 2 bills which she does not understand. The last bill is much higher than her normal bills.	Billing Matter High Consumption	May - Dec 04	√	√	√ Aug 04 Dec 04	Not applicable	√	√	Not applicable	Not applicable	Not applicable	A review of the customer's account for 6 months prior to date of complaint indicated that the frequency of estimated consumption by JPS complied with EGS 7. However, monthly consumption for the 4 months prior to complaint had an usual fluctuation and which formed the basis of the customer's complaint. In July 2004, the customer received an estimated bill (308 kWh). However, the estimated consumption was lower than actual consumption for the previous month (June 2004) due to: 1) a reduction in actual consumption in June 2004 (329 kWh) versus May 2004 (391 kWh) and 2) less days of service in July 2004. In August 2004, actual consumption was 373 kWh. In September 2004, the general rebate of 25% was applied to the customers estimated consumption resulting in 235 kWh (313 kWh x 75%). However, following the actual read in October 2004, actual consumption charged was 363 kWh.	No
3	10	Kingston	Feb-05	Customer reactivated her account in July 04 for less than 30 days and was issued and estimated billed for 482kWhs.	Billing Matter High Consumption	July 04 - Feb 05	√	√	Not applicable	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The first reading was an estimate of 482 kWh based on the last 2 actual readings prior to disconnection of the customer's account in 1999. The number and frequency of estimated readings hereafter is consistent with EGS 7 and have been calculated accurately. JPS's policy at the time was that estimates were taken every other month. This account fell into a cycle which was estimated for this (first) month of reactivated service.	No
4	10	Kingston	Jun-05	Customer occupied premises on 13/3/05. 2 households are on the same meter. The bill received dated 14/3/05 for actual consumption 255kWh amounted to $3,231.34. The bill dated 15/4/05 was for estimated consumption 186kWh for $2,300. She is concerned about bill dated 20/5/05 for actual consumption of 579 kWh for $8,214.86. Each household has 1 fridge, tv, radio, fan, iron	Billing Matter High Consumption	May 04 - Oct 05	√	√	√ March 05 May 05	Not applicable	√	√	Not applicable	Not applicable	Not applicable	JPS recognised an exception and issued a service order type SRDG (a special reading to test meter accuracy) for the reading dated 19 May 2005. The order was completed on 24 May 2005 and no further service orders were issued other than the disconnection for non payment (DNP). No problems were therefore identified with the meter performance.	No
5	10	Portland	Dec-03	Customer requested transfer of a security deposit from her fathers account in May 2003. The deposit was to be given back to her father less what he owed. Interest on the deposit was also to be applied which she was told the Kingston office would carry out based on a request from him. She would then receive a cheque for the deposit + interest. Customer also signed a request for interest form. Customer was given the "run-around" for several months before she received the balance on account plus interest.	Security Deposit	May - Dec 03	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	See comment in conclusion	The customer has a valid complaint. Her request was poorly handled by JPS. It took 7 months for the balance and interest to be transferred to her account. She was not compensated for the delay and JPS explained that the customer would only be compensated if a case was put forward requesting compensation for the inconvenience.	Yes
6	10	St. Andrew	Oct-04	Customer meter was to be changed and JPS advised him that this would involve the changing of wires. He claims that JPS installed the previous meter and should be held responsible for any wires that needed to be changed.	Other	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	√	Not applicable	Not applicable	The customer is responsible for any wiring of the premises. In this case, the customer had an illegal connection and to accommodate JPS's meter he would need to put in new wiring. JPS's standard contract refers to this responsibility. An inspection of the meter was conducted on June 7, the meter and the reading were not consistent with what was previously installed by JPS The meter was changed on June 17 which is compliant with EGS 9 - Timeliness of meter replacement.	No

PRICEWATERHOUSECOOPERS

Appendix 3 – Customer Complaints Sampled (Continued)

							Test for accuracy of estimated consumption										
Sample No	**Customer Class**	**Parish**	**Date of Complaint**	**Nature of complaint (per OUR's database)**	**OUR's Classification**	**Period reviewed**	**Days of Service [1]**	**Estimated Consumption [2]**	**Bill / Months selected [3]**	**Reconnection EGS 6 (a or b)**	**Freq. of meter reading EGS 7**	**Frequency of est. billing EGS 8 [4]**	**Meter Replacement (timing) EGS 9**	**Billing Adjustment (timing) EGS 10**	**Compensation EGS 12**	**Conclusion**	**Legitimacy**
7	20	St. Andrew	Nov-04	Customer was alarmed by the significant increase in her bill. She was advised to make a deposit of $30,000 and this was done. However, the following months bill included the amount b/f from the previous bill. JPS informed her that the reading was correct and the bill should be paid. The bill in question increased by over 300% over 1 month and no purchases of any new equipment or changes were made to operations. Customer wants to know if this sort of fluctuation is normal, and wonders if the meter readers / meters may be defective.	Billing Matter High Consumption	May 04 - June 05	√	√	√ Sept 04 Oct 04	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The average consumption as at October 04 has been 4,000 kWh per month. Consumption for October 2004 was a high 6,043 KwH per month. JPS recognised an exception and a meter inspection was carried out in November 2004. The November and December readings are actual and in keeping with the average consumption between September and October [(1,967+6,043)/2=4,000 (approx)]. **Note:** In reviewing the history of readings we observed that the reading for October 2004 was less than September 2004. Further investigation revealed that the meter installed at the customer's premise is 5 digit and reset in September 2004.	No
8	10	St. Andrew	Nov-04	Customer reported that her present bill is very high $5,815.83 and her last bill was $3,304.65 and she has read the meter. Her reading was 26,450 which was lower than the JPS's reading of 28,192.	Billing Matter High Consumption	May - Dec 04	√	√	√ Oct 04 Nov 04	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The customer's reading for November of 26450 is less than the reading for the previous 4 bills which would only be likely if the readings prior to this reading were estimates or an error had been made continuously by JPS. A meter inspection was issued by JPS in November 04. The frequency of estimated readings for this account are in keeping with EGS 7 - Frequency of meter reads and have been calculated accurately.	No
9	10	St. Andrew	Dec-04	Customer reports that she has received 5 estimated bills consecutively and wonders if she should be receiving so many estimates, if her meter is accessible.	Billing Matter Estimate	May - Dec 04	√ - Exception see note (1)	√	Not applicable	Not applicable	√ - Exception see note (2)	√	Not applicable	Not applicable	Not applicable	Customer has received 5 consecutive estimates (Aug - Dec 04) which is not compliant with EGS 7 - Frequency of Meter Reading. Estimates had to be taken as a result of the inaccessibility of the premises. (1) The estimate for November 2004 was not accurately calculated and read 155kWhs rather than 164 kWhs (which is the correct estimate). After recalculation with JPS, it appears that the last 3 actual reads was used as the basis of calculation. (2) A review of the customer's account revealed that estimated readings were done for Aug04 to Dec04 (5 months), supporting complaint. However, further meter reading history also revealed that there was estimated readings exceeding 3 consecutive months for Feb05 - Apr05. Further work revealed that February and Aprial were months for estimation based on the billing cycle. However, no reason was documented in CIS Banner to support the reason why no reading was taken in March.	Yes
10	10	St. Andrew	Jan-05	Customer reported that her bills are ussually $2,000 - 2,500 per month. She received a bill for $3,800 for the December period although she has not added any new appliances or changed her consumption.	Billing Matter High Consumption	May 04 - April 06	√	√	√ Dec 04 Jan 04	Not applicable	√	√	Not applicable	Not applicable	Not applicable	A review of the consumption history revealed no unusual fluctuation of consumption. The bill issued in December 2004 was an estimate therefore in January 2005 (month of complaint) the underestimation of December's consumption was included. The frequency of estimates is in line with EGS 7 and the calculations of estimates are in line with EGS 8 - Method of estimating consumption.	No
11	20	St. Andrew	Aug-05	Customer operates an old age home and complains about an increase in her bills since March 2004. She finds bill consumption in the range of 1,600-2,200 KWh excessive and has complained to JPS but no investigation has been conducted. Her reported load is: 4 A/C units (2 added in Sept 04), 2 refrigerators, 1 freezer, 3 TV's, 1 washing machine and 1 dryer (hardly used).	Billing Matter High Consumption	Jan 04 - April 06	√	√	March 04 Sept 05	Not applicable	√	√	√	Not applicable	Not applicable	The frequency of and calculation of estimates are in line with the standards EGS 7 and 8. However, the number of estimates over the period has made it necessary for the actual readings to always compensate for over/underestimation and creating an unstable consumption pattern. The consumption pattern for the customer points to high consumption in the summer months, a gradual fall towards the end of the year and a gradual rise to its peak. The trend seems consistent for the 2 year period over which we were able to assess it. The August 04 reading was also a 34 day cycle which would make its consumption higher than normal. A meter inspection was conducted in November 2005 and the meter replaced in the same month, i.e. in compliance with EGS 9 - Meter Replacement.	No

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Appendix 3 – Customer Complaints Sampled (Continued)

							Test for accuracy of estimated consumption										
Sample No	**Customer Class**	**Parish**	**Date of Complaint**	**Nature of complaint (per OUR's database)**	**OUR's Classification**	**Period reviewed**	**Days of Service[1]**	**Estimated Consumption[2]**	**Bill / Months selected[3]**	**Reconnection EGS 6 (a or b)**	**Freq. of meter reading EGS 7**	**Frequency of est. billing EGS 8[4]**	**Meter Replacement (timing) EGS 9**	**Billing Adjustment (timing) EGS 10**	**Compensation EGS 12**	**Conclusion**	**Legitimacy**
12	10	St. Andrew	Sep-05	Customer complained that JPS disconnected her electricity supply although she had no outstanding balances. When she contacted JPS she was informed that a crew would be dispatched shortly to reconnect her but this did not happen.	Unscheduled Interruption	July - Sept 05	Not applicable	Not applicable	Not applicable	????	√	√	Not applicable	Not applicable	Not applicable	The customer paid her bill dated 14 August 2005 on 9 September 2005 which was late, however at the date of disconnection 22 September 2005 (according to her complaint) there was no balance outstanding. There is no evidence of a disconnection or reconnection at the residence as CIS Banner did not reflect any disconnection request or reconnection fees paid during the period of complaint. Our analysis is therefore inconclusive. Our review of the customer history shows that the account is still active. There is evidence based on the payment history that the customer may not be receiving her bills on time as she in some cases has made blanket payments based on previous bills. However, we are unable to identify the reason for the untimely receipt of the invoices.	No
13	10	St. Andrew	Mar-06	Customer complained that the bill for January 2006 for her rented property came to $436.46 after her last tenant vacated the premises. However the current bill for February 2006 is $27,514.05 which is inexplicable. She contacted JPS who told her this amount was outstanding from 03/04. She finds this explanation unacceptable and needs assistance to have the matter resolved.	Billing Matter Unexplained	n/a	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	√	Not applicable	JPS explained that the customer account was disconnected in 2002, however, electricity was being consumed subsequent to disconnect and to the date JPS reconnected service in December 04. This consumption during the period of disconnected service amounts to $27,000 and was applied in January 05. JPS only became aware of the usage (during the period of disconnection) on reconnection of the meter in December 2004 following an application of service. Supporting calculation for backbilling seen. Based on the information seen the billing adjustment was performed in accordance with EGS 10 - 'Timeliness of adjustments to customer accounts.'	No
14	10	St. Ann	Nov-04	Customer complained that her bills for the last 2 months were too high. Further, for the 4 month period 1/4/04 - 3/8/04 her bills range from 3,243.45 - 4,240.69. For the period 1/9/04 - 1/10/04 she received a bill amounting to $7,531.98. She also received and estimated bill amounting to $5,975.66 for the period 1/9/04 - 1/10/04 and during this period there was no electricity for 13 days because of Ivan.	Billing Matter High Consumption	May - Dec 04	√	√	√ Sept 04 Jan 06	Not applicable	Not applicable	√	Not applicable	Not applicable	Not applicable	JPS issued a service order to conduct a special meter reading in September 2004 which was carried out in October 2004. Our review of the consumption history revealed that JPS overestimated consumption for September 2004, driven by a high consumption in August 2004 and supported by actual consumption for October 2004 of 1 kWh. The invoice for October (dated 1 November 04) was recalculated and found to be accurate.	No
15	10	St. Catherine	Jul-05	Customer complained that her bill for May 2005 was $5,624 and the bill for June 2005 was $7,301. She has not added any equipment or changed her consumption history. JPS has informed her that her consumption is stable. She was advised that fuel prices could cause the spike in her bills. She is not satisfied.	Billing Matter High Consumption	May 04 - April 06	√	√	√ April 05 July 05	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The frequency and calculation of estimates is compliant with EGS 7 and 8. The bills for April and July 2005 have been recalculated and found to be in line with the bill amounts generated.	No
16	10	St. Thomas	Jul-05	Customer received a bill for $5,301.47 for June 05. He says this is the highest bill he has ever received and he has added no new appliances to his home, he currently has a fridge, TV, fan, radio and 3 lights. He visited JPS to complain and was not satisfied with the explanations.	Billing Matter High Consumption	May 04 - April 06	√	√	√ June 05	Not applicable	√	√	Not applicable	Not applicable	Not applicable	There were 2 estimated bills prior to the generation of the bill for June which was an actual reading. The average consumption level of the 3 readings (April, May and June) is about 200 kWh which is not out of line with the regular consumption pattern. The frequency of estimates is in line with 'EGS 7 - Frequency of Meter Readings' and the calculation of estimated consumption is in line with EGS 8 - 'Method of Estimating Consumption'.	No
17	10	Westmoreland	Dec-04	Customers previous bills have been no more than $5,000. However after Ivan she received a bill for $14,721.23 plus. She was told by JPS that they would investigate the matter. She then received a bill for $4,000, her electricity was disconnected but she paid the bill. The house has been unoccupied for 3 months.	Billing Matter High Consumption	May 04 - May 05	Not applicable	Not applicable	√ May 05	Not applicable	√	√	Not applicable	√	Not applicable	Consumption was minimal (i.e. near 0) and suddenly shot up to 1,143 kWh for August 2004. The September and October readings were estimates, therefore continuing to be erratic. JPS completed an investigation in November 2004 and discovered the August reading was an error which subsequently lead to the overestimation of the following two readings (September and October). The November reading was an actual reading but was reversed on 9 December 2004 and the adjustment reflected in the customer bill for November in line with 'EGS 10 - Timeliness of Adjustments' which states that customers must be billed for adjustment within 1 billing period of identification of the error. The November 2004 bill was recalculated to verify its accuracy.	Yes

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Appendix 3 – Customer Complaints Sampled (Continued)

							Test for accuracy of estimated consumption										
Sample No	**Customer Class**	**Parish**	**Date of Complaint**	**Nature of complaint (per OUR's database)**	**OUR's Classification**	**Period reviewed**	**Days of Service[1]**	**Estimated Consumption[2]**	**Bill / Months selected[3]**	**Reconnection EGS 6 (a or b)**	**Freq. of meter reading EGS 7**	**Frequency of est. billing EGS 8[4]**	**Meter Replacement (timing) EGS 9**	**Billing Adjustment (timing) EGS 10**	**Compensation EGS 12**	**Conclusion**	**Legitimacy**
18	10	Westmoreland	Jun-05	Customer has not been in occupancy since May. JPS has sent an actual bill for $6,936.89 for May - June 05.	Billing Matter High Consumption	May 04 - April 06	Not applicable	Not applicable	Not applicable	Not applicable	√	√	Not applicable	Not applicable	Not applicable	Our review of the customer's consumption history revealed that prior to June 05 bills were based on actual readings at least every other month and actual reads hereafter. The dispute in June 05 was mainly attributable to an underestimation in May 05.	No
19	10	St. Catherine	Feb-03	Customer reports that her bills are too high. Her house is occupied only by herself and daughter. She complained to JPS but the response was poor.	Billing Matter High Consumption	June 02 - April 04	Not applicable	Not applicable	Not applicable	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The customer's consumption pattern during the period in question (2002 to February 2003) is stable. The frequency of estimates and calculation of estimated consumption is in line with EGS 7 and 8. In reviewing the consumption history, high billing were based on consumption pattern which mainly reflected frequent actual readings.	No
20	20	St. Andrew	Mar-04	The company paid $157,000 on bill dated Jan 9 2004 reflecting actual consumption for the period 26 Nov 03 - 29 Dec 03. Customer asks for an investigation as there are significant changes in consumption. She points out that the connected load to the meter is lighting for Tropical Plaza's parking areas and walkways	Billing Matter High Consumption	June 03 - June 06	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Consumption peaks in December each year as is seen from the analysis done of the customer's consumption pattern which would be as a result of the plaza lighting and longer opening hours of the season. All bills for the review period were based on actual reads.	No
21	10	Trelawny	Apr-04	Customer reports an increase in her electricity bill. JPS told her that the meter was bad and she was previously being undercharged and she would have to pay. Customer was not satisfied with the response and did not pay.	Billing Matter High Consumption	Nov 03 - May 05	Not applicable	Not applicable	Not applicable	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The meter was reversing because of tampering. The meter was changed in April 2003. An adjustment was done to reflect the consumption that was not charged for 6 periods based on the average daily usage at the time the meter was changed, i,e May 2003. The adjustment was applied in April 2004, hence the complaint about high bills in April 2004. JPS was not compliant with 'EGS 10 - Timeliness of Adjustments to Customer's Account'. The adjustment should have been applied to the customers account within 1 billing period of the identification of the error. No compensation due for the breach of EGS 10 as the customer was at fault (tampered meter). **Note:** During this period JPS had quite a few service orders outstanding and were constantly dealing with backlog, hence this adjustment being pushed back.	No
22	10	Clarendon	Sep-04	Customer bill based on last reading was $4,200 and the reading before was $2,000. The estimated bill for this month is $5,703 which is too high and not in line with consumption history. Customer was advised that the bill month was 35 days and she should pay the bill to avoid disconnection.	Billing Matter High Consumption	May 04 - Dec 04	√	√	√ Aug 04	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The customer is debating the bill for $5,703 which is based on an estimated reading for August 2004. The calculation of the estimate is compliant with EGS 8 and is therefore accurate. The frequency of estimates is compliant with EGS 7.	No
23	10	St. Andrew	Oct-04	Customer bills are much higher than they used to be.	Billing Matter High Consumption	May - Dec 04	√	√	√ Sept 04	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The customer consumption pattern is stable and the frequency of and calculation of estimates is in line with EGS 7 and 8 respectively and are accurate.	No
24	10	St. Andrew	Oct-04	Customer enclosed 2 bills A: due September 10 2004 paid September 7 2004, B: due 27 October 2004 which is outstanding. Neither of the persons in the house can understand why bill B is so high and JPS could not give a rational explanation.	Billing Matter High Consumption	May - Dec 04	√	√	√ Oct 04	Not applicable	See note (1)	√	Not applicable	Not applicable	Not applicable	Estimated readings were generated for August, September and October 04 and were high as a result of the high readings for June and July 2004. The September estimated bill has been adjusted based on the 25% agreed adjustment to estimates. Consumption for October was also based on an estimate and would therefore also be high (based on June and July actual readings). The actual reading for November gives a low consumption (416kWhs) to reflect the overestimation over the period in question. (1) JPS issued 3 consecutive estimates because of the inaccessibility to read meters due to Hurricane Ivan.	Yes

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Appendix 3 – Customer Complaints Sampled (Continued)

Sample No	Customer Class	Parish	Date of Complaint	Nature of complaint (per OUR's database)	OUR's Classification	Period reviewed	Test for accuracy of estimated consumption			Reconnection EGS 6 (a or b)	Freq. of meter reading EGS 7	Frequency of est. billing EGS 8[4]	Meter Replacement (timing) EGS 9	Billing Adjustment (timing) EGS 10	Compensation EGS 12	Conclusion	Legitimacy
							Days of Service[1]	Estimated Consumption[2]	Bill / Months selected[3]								
25	10	St. Andrew	Nov-04	Customer reported that he received seven consecutive estimated bills in a row and wants to know what to do.	Billing Matter Estimate	May - Dec 04	Not applicable	Not applicable	Not applicable	Not applicable	See note in conclusion	√	Not applicable	Not applicable	Not applicable	Customer did receive 8 consecutive estimates for the period May 2004 to December 2004 which is abnormal practice. Actual readings were taken but on investigation direct connection to electricity was identified and estimated readings were used instead. After several months investigation adjustments were made to the account in 2005 (activity date) based on overestimations during that period. This is not compliant with EGS 7 - Frequency of Estimates. However, this was a result of investigation of possible fraudulent meter activity which was found to be inaccurate.	No
26	10	St. Catherine	Nov-04	Customer is disputing her JPS bills. Her Sept - October bill was for $4,241 and included a 2 week period when she had no service because of hurricane Ivan. Her October - November bill was $3,711 and she does not feel that she could use that amount of energy.	Billing Matter High Consumption	May - Dec 04	√	√	√ Oct 04	Not applicable	√	√	Not applicable	Not applicable	Not applicable	Consumption peaked in September 2004. Unfortunately the following months consumption was based on an estimate because of Ivan, and the estimate was high because of the high consumption experienced in September (actual reading). The consumption reported for November 2004 is lower because it compensates for the overestimated October consumption (which was not reduced to reflect the impact of Ivan).	No
27	10	St. Thomas	Nov-04	Customer received an estimated during a period when she had no electricity. She did an actual reading and compared it with an estimated reading and found them to be the same.	Billing Matter Estimate	May - Nov 04	√	√	√	Not applicable	See note in conclusion	√	Not applicable	Not applicable	Not applicable	The customer has not identified the month in question, however if consumption is estimated in Month 1(when no electricity is consumed) the following months actual reading will compensate for the over/under estimation of the previous month(s). The estimates were recalculated in line with EGS 8 and found to be accurate and the frequency of estimates is in line with EGS 7 except during the Ivan period when meters were not accessible.	No
28	10	St. Mary	Nov-04	Customer reported that she received a bill for $2,100 including the 2 week period in September when she had no service after Ivan. Her bill for October $1,900 is normal, she has not seen a decrease to reflect the interruption of service.	Billing Matter High Consumption	May - Dec 04	√	√	√ Oct 04	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The estimate for September 2004 includes the 25% reduction in consumption to reflect the loss of service during the period, i.e the bill for $684. The bill for October seems high as it compensates for the underestimation in actual consumption in September. JPS is in line with the relevant standards for the frequency of and calculation of estimates.	No
29	10	St. Andrew	Dec-04	Customer spoke to CSR, Romeo McDonald and was told that after investigation her bill for $20,000 had not changed.	Billing Matter High Consumption	May - April 06	Not applicable	Not applicable	Not applicable	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The bill for July 2004 was based on an estimated consumption reading. The following bill therefore compensating for underestimation. The average of the estimated and actual bill is 12,500 which is in line with the customers consumption at points in his history. However at the point of the $20,000 bill he had not yet experienced this. Also important at this point is that it is a 34 day cycle which will make consumption higher than normal. The frequency of estimates and the method of and calculation of estimated consumption is in line with standards EGS 7 and 8.	No
30	10	Kingston	Dec-04	Customer bill for November 2004 is too high, $33,023.97. The previous bill was $1,919.38.	Billing Matter High Consumption	May - October 05	Not applicable	Not applicable	Not applicable	Not applicable	√	√	Not applicable	√	Not applicable	A service order to carry out a special meter reading (SRDG) was initiated in December 04. The error was recognised in January and adjusted in February which is complaint with 'EGS 10 - Timeliness of adjustments to customer accounts'. The "actual" meter reading for November 04 was inaccurate resulting in an inaccurate estimate for December. An adjustment was done in February 2005 to reverse the consumption for November, December and January to reflect the actual consumption for the 3-month period. The January reading is an actual reading which (as stated above) has been adjusted to correct the error for November and December.	Yes
31	10	St. Ann	Dec-04	JPS sent customer a bill for $7,381.55 although customer claims there is less electricity being consumed because her sister is no longer there.	Billing Matter High Consumption	May 04 - January 05	√	√	√ Dec 04	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The bill in question was for December 2004 which was an estimate and therefore would not reflect the actual consumption of the residence. The consumption and bill for January reflects the overestimation in December. The frequency of estimates and the method of and calculation of estimated consumption is in line with standards EGS 7 and 8.	No

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Appendix 3 – Customer Complaints Sampled (Continued)

						Test for accuracy of estimated consumption										
Sample No	**Customer Class**	**Parish**	**Date of Complaint**	**Nature of complaint (per OUR's database)**	**OUR's Classification**	**Period reviewed**	**Days of Service[1]**	**Estimated Consumption[2]**	**Bill / Months selected[3]**	**Reconnection EGS 6 (a or b)**	**Freq. of meter reading EGS 7**	**Frequency of est. billing EGS 8[4]**	**Meter Replacement (timing) EGS 9**	**Billing Adjustment (timing) EGS 10**	**Compensation EGS 12**	**Conclusion**	**Legitimacy**
32	10	St. Catherine	Dec-04	Customers states that her average electricity bill is $2,500 - $3,000 per month. However she was billed for $13,344 in November.	Billing Matter High Consumption	May 04 - Jan 05	Not applicable	Not applicable	Not applicable	Not applicable	√	√	√	See comments in conclusion	×	JPS recognised a meter reading error in January 2005 and issued a service order 3 January 2005 to inspect the meter. The meter was replaced on 5 January 2005 and the last 6 months adjusted based on the actual consumption for the 9 days (5 - 14 January 2005). The meter error was identified in January and the adjustment not effected before April. JPSCo was not compliant with 'EGS 10 - Timeliness of adjustments to customer accounts' which states that the adjustment should be applied within 1 billing period of recognition of the error. Customer received compensation "OUR penalty November 04 - $1,061.34", however we are not sure how the compensation was calculated. ***We are awaiting supporting documentation from JPS.***	Yes
33	10	St. Mary	Dec-04	Customer reported (December 2004) thet her bill has increased from approx $1,800 per month to $17,232 which is her current bill.	Billing Matter High Consumption	May 04 - Jan 05	Not applicable	Not applicable	Not applicable	Not applicable	See comments in conclusion	√	Not applicable	Not applicable	Not applicable	A bill for the amount stated ($17,232) was not found and consumption and bill patterns seem relatively normal. The frequency of estimates and calculation of estimates is in line with the relevant standards except during the Ivan period there were 3 consecutive estimates as a result of the inaccessibility of meters due to flooding.	No
34	10	St. Catherine	Dec-04	Customer wants explanation for increase in her bill dated 16 October 2004 for $2,188. Her bills have never exceeded $2,000 and she will not be paying the full amount of the bill in question until the matter has been resolved.	Billing Matter High Consumption	May 04 - Dec 04	√	√	√ Oct 04	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The 25% reduction of the estimate for the Ivan outages was applied to the September bill. The October bill is higher than normal to compensate for the underestimation in consumption on the September bill. Consumption for November and December are back in line with the customers consumption pattern. The frequency of estimates and calculation of estimates is in line with the relevant standards.	No
35	10	St. Catherine	Dec-04	Customer reports that bill for period 29 October - 30 November 2004 is high. His previous bill amounted to $1,383.76. He was told by JPS that the billed amount is what he has used and he should therefore pay the bill.	Billing Matter High Consumption	May 04 - Dec 04	√	√	√ Nov 04	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The bill for November 2004 is based on an actual reading and the frequency of estimates and calculation of estimates for the period reviewed is in line with the relevant standards.	No
36	10	St. Andrew	Jan-05	JPS issued a notice of intent to disconnect service. Customer claims there is ongoing dialogue between himself and JPS to rectify a number of issues including an audit of the meter and adjustments to submitted bills. Customer contends that JPS should not disconnect his supply.	Billing Matter Disputed	May 04 - June 06	√	√	Not applicable	Not applicable	√	√	Not applicable	Not applicable	Not applicable	No unusual activity has been identified on this account for the period reviewed, no complaints were recorded on CIS Banner and no service orders were issued). Estimated consumption and bills for the period were recalculated and found to be accurate; and JPS was compliant with the relevant standards for frequency of meter readings (except during the Ivan period when 3 consecutive estimates were given).	No
37	20	St. Thomas	May-05	Customer compaint received May 17 2005 - JPS has been sending customer high bills. he operates a service station in Yallas and business has fallen in the last few months. She has complained but the matter has not been resolved.	Billing Matter High Consumption	May 04 - April 06	√	√	√ Aug 04 Jan 05	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The customer has only received actual readings which based on our analysis seemed to have fallen between 2004 and 2005. JPS responded and a meter inspection was conducted in June 2005 and again in February 2006 prior to disconnection in both July 2005 and March 2006 respectively.	No
38	10	St. Catherine	Jul-05	Customer reported that last month his service was disconnected for non-payment and he had to pay an upgraded deposit to heve service restored. His service was again disconnected and he had to pay another upgraded deposit.	Security Deposit	n/a	Not applicable	Not applicable	Not applicable	Not applicable	√	√	Not applicable	Not applicable	Not applicable	The deposit should be the equivalent of 2 months (current) consumption. Therefore each time service is disconnected the consumption for the last 2 months will be assessed and the difference between that amount and the existing deposit will be required to upgrade the deposit. This was calculated and the additional deposit required to be paid by the customer was found to be accurate for the disconnection in April. The additional deposit in July of $2,000 will bring the total deposit higher than the required deposit based on this policy. This appears to be as a result of the frequency of disconnections.	No
39	10	Trelawny	Jul-05	Customer recently received a bill for $12,000 although his regular bills are approximately $700.	Billing Matter High Consumption	May 04 - April 06	Not applicable	Not applicable	Not applicable	Not applicable	√	√	Not applicable	√	Not applicable	The customer was billed for 872 kWh in June and his consumption does not normally exceed 80 kWh per month. The error was recognised and an meter inspection generated 22 Jun 05. Following the reading on 11 Jul 05 an adjustment of -796 kWhs was applied on 25 Jul 05 (which is compliant with EGS 10) to reflect actual consumption for the period of 76 kWhs for the month. This was an error on the part of JPS. Customer credited for the difference of $11,764.	Yes

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Appendix 3 – Customer Complaints Sampled (Continued)

							Test for accuracy of estimated consumption										
Sample No	Customer Class	Parish	Date of Complaint	Nature of complaint (per OUR's database)	OUR's Classification	Period reviewed	Days of Service[1]	Estimated Consumption[2]	Bill / Months selected[3]	Reconnection EGS 6 (a or b)	Freq. of meter reading EGS 7	Frequency of est. billing EGS 8[4]	Meter Replacement (timing) EGS 9	Billing Adjustment (timing) EGS 10	Compensation EGS 12	Conclusion	Legitimacy
40	20	Manchester	Dec-05	Customer complains about 2 recent bills received: 17,444.57 and 24,451.13. His normal bills are ussually between $5,000 and $9,000 monthly. He complained to JPS and technicians checked his meter and changed it.	Billing Matter High Consumption	April 04 - May 06	Not applicable	Not applicable	Not applicable	Not applicable	√	√	√	√	Not applicable	JPS did a meter investigation on 19 July 2005 and found that the meter was working on light load (the customer was being undercharged). The meter was changed 22 July 2005 and the readings were regularised, i.e his consumption and bills have escalated. The first reading was for 16 days on 4 August 2005. JPS is compliant with the relevant standards: EGS 8, 9 and 10 which refer to the frequency and accuracy of estimated readings and the timeliness of adjustments to customer accounts after recognition of an error. The meter was changed within the standard 20 working days of recognition of a problem. The customer account has been disconnected since November 2005 (and is still disconnected)	No
41	44	Kingston & St. Andrew	05-Aug-04	Checking meter reading for month of July 04	Metering		Not applicable	Not applicable	Not applicable	Not applicable	√	Not applicable	√	Not applicable	Not applicable	JPS responded to customer on 5 Aug 04. No breach found	No
42	48	St. Marv	09-Aug-04	Bill Query - Telephoned	Billing		√	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	JPS responded to customer 9 Aug 04. No breach found	No
43	40	St. James	10-Aug-04	Bill Query	Billing		√	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	JPS responded to customer 10 Aug 04. No breach found	No
44	40	St. James	16-Aug-04	Customer concerned about electricity bill.	High Bill		√	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Follow up reading done 21 October 2004 and meter replaced 26 November 2004. However, no compensation seen for breach of GS 5.	Yes
45	48	Kingston & St. Andrew	25-Aug-04	Statement request.	Customer service		Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	JPS completed requested on same day. No breach found	No
46	40	St. Ann	05-Jul-05	Bill query	Billing		√	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Problem resolved by phone same day. No breach found	No
47	40	Westmoreland	08-Jul-05	Customer requesting meter check	High Bill		Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	√	Not applicable	Not applicable	Meter reading ordered and conducted 27 July 2005. Meter found to be in good working order. No breach found	No
48	40	Kingston & St. Andrew	14-Jul-05	Broken meter glass, kindly replace.	Metering		Not applicable	Not applicable	Not applicable	Not applicable	√	Not applicable	√	Not applicable	x	Meter was eventually replaced in February 2006 resulting in a duration of over 200 days to rectify the matter. However, no compensation seen for the breach of GS 9.	Yes
49	40	Kingston & St. Andrew	19-Jul-05	Customer reported that meter & meter socket fell out electrician tape wire - meter now to the connected - Urgent	Metering		Not applicable	Not applicable	Not applicable	Not applicable	√	Not applicable	√	√	Not applicable	Delay in replacing meter was due to the time take by the customer to install new meter box. This was completed on 12 August 2005 and JPS installed new meter with a follow up meter investigation 6 October 2005.	Yes
50	40	St. Ann	26-Jul-05	Bill query	Billing		Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	JPS completed requested on same day. No breach found	No

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Appendix 3 – Customer Complaints Sampled (Continued)

General conclusion/observation:

1. Under/(over) estimated consumption (embedded in the actual readings) are charged/adjusted at rates prevailing at the current month of billing.

In September 2004, a 25% reduction was applied to estimated consumption. In cases where our data captured that period, the estimated consumption was recalculated and was found to be mathematically accurate.

Scope of work

[1] Represents the difference in days betrween the action dates of the month of last actual read and current month (estimated month). The action date of the last actual read is excluded in the calculation of the total number of days.

[2] Estimated consumption calculated as follows:

Days of service (DOS) x Average daily consumption (ADC) - rounded to the nearest whole number

where

$$ADC = \frac{\text{Difference in consumption between the last two actual reads}^*}{\text{Total number of DOS elapsed between last two actual reads}^*}$$

* Commencing May 2005, the basis was changed to last three actual reads. This was confirmed by recalculations conducted for estimates caputured in our data for months subsequent to May 05.

[3] Randomly selected two months and verified accuracy of bill by:

- verifying that applicable tariff rates agreed to the relevant customer rate class per tariff rate schedule.
- verifying that the correct FX adjustment, IPP and Fuel charges were applied. No recalculation of these charges were undertaken for this step. However, our samples were based on specific months selected in TOR 10 & 11 which involved us recomputing the

[4] Effective 1 June 2004, standard requires estimated consumption to be calculated based on last three (3) actual reads (first 6 bills of new accounts excepted). However, it is our understanding that this policy was not effected until May 2005 due to the changes that was required to CIS Banner. Instances where it is not possible to obtain readings for new meters installed for rate classes 10 and 20, consumption is estimated based on a minimum of 100 and 200 kWh, respectively, pro-rated on the days of service.

Appendix 4 - Summary of Service Guarantees

Standard		Performance measurements
GS 1 – Connection of supply (simple connection)	Simple connection (electricity supply and meter are already available at location)	If electricity supply and a meter are already available at location, JPS will connect **within 4 working days of signing a service contract**
	New installations (no previous supply and lines and meters within 30 metres of existing supply line)	Connection shall be completed **within 5 working days of signing a service contract**
GS 2 – Connection of supply (complex connection)	Connections between 30 and 100 meters of an existing distribution line	JPS will provide an **estimate of cost within 10 working days after receipt of service application** Line construction and electricity connection shall be completed **within 30 days after customer makes requisite payment**
	Connections between 101 and 250 meters of an existing distribution line	JPS will provide an **estimate of cost within 15 working days after receipt of service application** Line construction and electricity connection shall be completed **within 40 days after customer makes requisite payment**
GS 3 – Response to emergency and service calls		In the event of an emergency service call, electricity will be restored within **6 hours**. This takes into account geographically diverse area of the country and traffic congestion in urban areas but excludes factors beyond JPS' fault such as natural disasters, widespread riots or disruptions due to industrial unrest
GS 4 – Billing punctuality: Dispatch of first bill		JPS will produce and dispatch customer's first bill **within 45 working days after service connection**
GS 5 – Response to customer queries	No involvement of third parties	Written complaints will be handled within **4 working days. Where query requires follow-up investigation**, this will be completed and a **written response provided within 24 working days**
	Involvement of third parties	Investigation will be completed and a response provided **within 60 working days** after receipt of query
GS 6 –Reconnection after payment of overdue amounts	Urban areas	Electricity will be supplied **within 1 day after overdue amounts and reconnection fee are paid**
	Rural areas	Electricity will be supplied **within 2 days after overdue amounts and reconnection fee are paid**

Appendix 4 - Summary of Service Guarantees (Continued)

Standard		Performance measurements
GS 7 – Frequency of meter reading	Prior to 1 September 2006	No more than **3 consecutive estimated bills** where JPS has access to customer's meter
	As of 1 September 2006	No more than **2 consecutive estimated bills** where JPS has access to customer's meter
GS 9 – Meter replacement		JPS shall replace a faulty meter **within 20 working days of detection** of fault
GS 10 – Billing adjustment		JPS shall adjust customer's account **within one billing period after identification of error**
GS 11 – Streetlight maintenance		JPS shall repair defective streetlights reported by the responsible local authority in accordance with the Streetlight Protocol agreed with the Ministry of Local Government
GS 12 – Responding to claims for compensatory payment		Once breach of standard is confirmed customer is entitled to compensatory payment **within 45 working days**

Source: Summarised from the Services Guaranteed booklet, prepared by JPS

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Appendix 5 - Summary of Complaints Reviewed

Disputed

Sample No	Customer Class	Parish	Date of Complaint	Test for accuracy of estimated consumption: Days of Service	Test for accuracy of estimated consumption: Estimated Consumption	Test for compliance with Guaranteed Standards: Freq. of meter reading EGS 7	Test for compliance with Guaranteed Standards: Frequency of est. billing EGS 8	Test for compliance with Guaranteed Standards: Meter Replacement (timing) EGS 9	Test for compliance with Guaranteed Standards: Billing Adjustment (timing) EGS 10	Legitimacy
6	10	St. Andrew	10-Oct-04	Not applicable	Not applicable	Not applicable	Not applicable	√	Not applicable	No
13	10	St. Andrew	03-Mar-06	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	√	No
36	10	St. Andrew	28-Jan-05	√	√	√	√	Not applicable	Not applicable	No
								Sample tested		**3**
								Conclusion	**Not legitimate**	**3**

Metering

Sample No	Customer Class	Parish	Date of Complaint	Test for accuracy of estimated consumption: Days of Service	Test for accuracy of estimated consumption: Estimated Consumption	Test for compliance with Guaranteed Standards: Freq. of meter reading EGS 7	Test for compliance with Guaranteed Standards: Compensation EGS 12	Test for compliance with Guaranteed Standards: Meter Replacement (timing) EGS 9	Test for compliance with Guaranteed Standards: Billing Adjustment (timing) EGS 10	Legitimacy
41	44	Kingston	06-Aug-04	Not Applicable	Not Applicable	√	Not Applicable	√	Not Applicable	No
47	40	Sav-la-Mar	08-Jul-05	Not Applicable	Not Applicable	√	Not Applicable	√	Not Applicable	No
48	40	St. Andrew	14-Jul-05	Not Applicable	Not Applicable	√	x	√	Not Applicable	Yes
49	40	St. Andrew	19-Jul-05	Not Applicable	Not Applicable	√	Not Applicable	√	√	Yes
								Sample tested		**4**
								Conclusion	**Not legitimate**	**2**
									Legitimate	**2**

Customer Service

Sample No	Customer Class	Parish	Date of Complaint	Test for accuracy of estimated consumption: Days of Service	Test for accuracy of estimated consumption: Estimated Consumption	Test for compliance with Guaranteed Standards: Freq. of meter reading EGS 7	Test for compliance with Guaranteed Standards: Frequency of est. billing EGS 8	Legitimacy
45	48	Kingston	25-Aug-04	Not Applicable	Not Applicable	Not Applicable	Not Applicable	no
						Sample tested		**1**
						Conclusion	**Not legitimate**	**1**
							Legitimate	**0**

Billing Estimated

Sample No	Customer Class	Parish	Date of Complaint	Test for accuracy of estimated consumption: Days of Service	Test for accuracy of estimated consumption: Estimated Consumption	Test for compliance with Guaranteed Standards: Freq. of meter reading EGS 7	Test for compliance with Guaranteed Standards: Frequency of est. billing EGS 8	Legitimacy
1	10	Kingston	Apr-04	√	√	√	√	No
9	10	St. Andrew	Dec-04	x	√	x	√	Yes
25	10	St. Andrew	Nov-04	Not applicable	Not applicable	x	√	No
27	10	St. Thomas	Nov-04	√	√	x	√	No
						Sample tested		**4**
						Conclusion	**Not legitimate**	**3**
							Legitimate	**1**

Security Deposit

Sample No	Customer Class	Parish	Date of Complaint	Test for compliance with Guaranteed Standards: Freq. of meter reading EGS 7	Test for compliance with Guaranteed Standards: Frequency of est. billing EGS 8	Test for compliance with Guaranteed Standards: Compensation EGS 12	Legitimacy
5	10	Portland	Dec-03	Not applicable	Not applicable	x	Yes
38	10	St. Catherine	Jul-05	√	√	Not applicable	No
					Sample tested		**2**
					Conclusion	**Not legitimate**	**1**
						Legitimate	**1**

Sample No	Customer Class	Parish	Date of Complaint	Test for compliance with Guaranteed Standards: Reconnection EGS 6 (a or b)	Test for compliance with Guaranteed Standards: Freq. of meter reading EGS 7	Test for compliance with Guaranteed Standards: Frequency of est. billing EGS 8	Test for compliance with Guaranteed Standards: Compensation EGS 12	Legitimacy
12	10	St. Andrew	09-Sep-05	????	√	√	×	No
50	40	St. Ann	26-Jul-05		Not applicable	Not applicable	Not applicable	No
						Sample tested		**2**
						Conclusion	**Not legitimate**	**2**

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Appendix 5 - Summary of Complaints Reviewed (Continued)

High Consumption

				Test for accuracy of estimated consumption		Test for compliance with Guaranteed Standards				
Sample No	Customer Class	Parish	Date of Complaint	Days of Service	Estimated Consumption	Freq. of meter reading EGS 7	Frequency of est. billing EGS 8	Meter Replacement (timing) EGS 9	Billing Adjustment (timing) EGS 10	Legitimacy
2	10	Kingston	Nov-04	√	√	√	√	Not applicable	Not applicable	No
3	10	Kingston	Feb-05	√	√	√	√	Not applicable	Not applicable	No
4	10	Kingston	Jun-05	√	√	√	√	Not applicable	Not applicable	No
7	20	St. Andrew	Nov-04	√	√	√	√	Not applicable	Not applicable	No
8	10	St. Andrew	Nov-04	√	√	√	√	Not applicable	Not applicable	No
10	10	St. Andrew	Jan-05	√	√	√	√	Not applicable	Not applicable	No
11	20	St. Andrew	Aug-05	√	√	√	√	√	Not applicable	No
14	10	St. Ann	Nov-04	√	√	Not applicable	√	Not applicable	Not applicable	No
15	10	St. Catherine	Jul-05	√	√	√	√	Not applicable	Not applicable	No
16	10	St. Thomas	Jul-05	√	√	√	√	Not applicable	Not applicable	No
17	10	Westmorelan	Dec-04	Not applicable	Not applicable	√	√	Not applicable	√	Yes
18	10	Westmorelan	Jun-05	Not applicable	Not applicable	√	√	Not applicable	Not applicable	No
19	10	St. Catherine	Feb-03	Not applicable	Not applicable	√	√	Not applicable	Not applicable	No
20	20	St. Andrew	Mar-04	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	No
21	10	Trelawny	Apr-04	Not applicable	Not applicable	√	√	Not applicable	Not applicable	No
22	10	Clarendon	Sep-04	√	√	√	√	Not applicable	Not applicable	No
23	10	St. Andrew	Oct-04	√	√	√	√	Not applicable	Not applicable	No
24	10	St. Andrew	Oct-04	√	√	x	√	Not applicable	Not applicable	Yes
26	10	St. Catherine	Nov-04	√	√	√	√	Not applicable	Not applicable	No
28	10	St. Mary	Nov-04	√	√	√	√	Not applicable	Not applicable	No
29	10	St. Andrew	Dec-04	Not applicable	Not applicable	√	√	Not applicable	Not applicable	No
30	10	Kingston	Dec-04	Not applicable	Not applicable	√	√	Not applicable	√	Yes
31	10	St. Ann	Dec-04	√	√	√	√	Not applicable	Not applicable	No
32	10	St. Catherine	Dec-04	Not applicable	Not applicable	√	√	√	x	Yes
33	10	St. Mary	Dec-04	Not applicable	Not applicable	x	√	Not applicable	Not applicable	No
34	10	St. Catherine	Dec-04	√	√	√	√	Not applicable	Not applicable	No
35	10	St. Catherine	Dec-04	√	√	√	√	Not applicable	Not applicable	No
37	20	St. Thomas	May-05	√	√	√	√	Not applicable	Not applicable	No
39	10	Trelawny	Jul-05	Not applicable	Not applicable	√	√	Not applicable	√	Yes
40	20	Manchester	Dec-05	Not applicable	Not applicable	√	√	√	√	No
42	48	St. Mary	09-Aug-04	√	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	No
43	20	Montego Bay	10-Aug-04	√	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	No
44	20	Montego Bay	16-Aug-04	√	Not Applicable	Not Applicable	Not Applicable	√	Not Applicable	Yes
46	40	St. Ann	05-Jul-05	√	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	No

Sample tested		**33**
Conclusion	**Not legitimate**	**27**
	Legitimate	**6**

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Appendix 6 – Summary of Meter Reading History

High Consumption Samples Reviewed

	Rate Class	10	10	10	20	20	10	20	10	10	10
	Sample No	2	3	4	7	8	10	11	14	15	16
Period reviewed	Apr-04							Actual			
	May-04	Actual		Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Jun-04	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Jul-04	Estimate	Estimate	Actual	Estimate	Estimate	Actual	Estimate	Actual	Estimate	Actual
	Aug-04	Actual	Actual	Estimate	Actual	Actual	Estimate	Actual	Estimate	Actual	Estimate
	Sep-04	Estimate	Estimate	Estimate	Estimate	Estimate	Actual	Estimate	Actual	Estimate	Estimate
	Oct-04	Actual	Actual	Estimate	Actual	Actual	Estimate	Actual	Estimate	Actual	Estimate
	Nov-04	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Dec-04	Actual	Actual	Estimate	Actual	Actual	Estimate	Actual	Estimate	Actual	Estimate
	Jan-05	Estimate	Estimate	Actual	Estimate	Estimate	Actual	Estimate	Actual	Estimate	Actual
	Feb-05	Actual	Actual	Estimate	Actual	Actual	Estimate	Actual	Estimate	Actual	Estimate
	Mar-05	Estimate	Estimate	Actual	Estimate	Estimate	Actual	Estimate	Actual	Estimate	Actual
	Apr-05	Actual	Actual	Estimate	Actual	Actual	Estimate	Actual	Estimate	Actual	Estimate
	May-05	Estimate	Estimate	Actual	Estimate	Estimate	Actual	Estimate	Actual	Estimate	Estimate
	Jun-05	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Jul-05	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Aug-05	Actual	Estimate	Estimate	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Sep-05	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Estimate
	Oct-05	Estimate	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Nov-05	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Dec-05	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Jan-06	Actual	Actual	Actual	Actual	Estimate	Actual	Actual	Actual	Actual	Actual
	Feb-06	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Mar-06	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Apr-06	Actual	Actual	Actual	Actual	Actual	Estimate	Actual	Actual	Actual	Actual

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Appendix 6 – Summary of Meter Reading History (Continued)

High Consumption Samples Reviewed

	Rate Class	10	10	10	20	10	10	10	10	10	10
	Sample No	17	18	19	20	21	22	23	24	26	28
Period reviewed	Apr-04			Estimate	Actual	Estimate					
	May-04	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	
	Jun-04	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Jul-04	Estimate	Actual	Actual	Actual	Actual	Actual	Estimate	Actual	Actual	Estimate
	Aug-04	Actual	Estimate	Estimate	Actual	Estimate	Estimate	Actual	Estimate	Estimate	Actual
	Sep-04	Estimate	Actual	Actual	Actual	Estimate	Estimate	Estimate	Estimate	Actual	Estimate
	Oct-04	Estimate	Estimate	Estimate	Actual	Estimate	Estimate	Actual	Estimate	Estimate	Actual
	Nov-04	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Dec-04	Actual	Estimate	Estimate	Actual	Estimate	Estimate	Actual	Estimate	Estimate	Actual
	Jan-05	Estimate	Actual	Actual	Actual	Actual	Actual	Estimate	Actual	Actual	Estimate
	Feb-05	Actual	Estimate	Estimate	Actual	Estimate	Estimate	Actual	Estimate	Estimate	Actual
	Mar-05	Estimate	Actual	Actual	Actual	Actual	Actual	Estimate	Actual	Actual	Actual
	Apr-05	Actual	Estimate	Estimate	Actual	Estimate	Estimate	Actual	Estimate	Estimate	Actual
	May-05	Estimate	Actual	Actual	Actual	Actual	Actual	Estimate	Actual	Actual	Estimate
	Jun-05	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Estimate	Actual	Actual
	Jul-05	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Aug-05	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Sep-05	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Oct-05	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Nov-05	Actual	Actual	Estimate	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Dec-05	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Estimate	Actual	Actual
	Jan-06	Estimate	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Feb-06	Actual	Actual	Actual	Actual	Actual	Actual	Estimate	Estimate	Actual	Actual
	Mar-06	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Apr-06	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Estimate	Actual	Actual

PRICEWATERHOUSECOOPERS

Appendix 6 – Summary of Meter Reading History (Continued)

High Consumption Samples Reviewed

	Rate Class	10	10	10	10	10	10	10	20	10	20
	Sample No	29	30	31	32	33	34	35	37	39	40
Period reviewed	Apr-04										
	May-04	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Jun-04	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Jul-04	Estimate	Actual	Actual	Actual	Actual	Estimate	Actual	Actual	Estimate	Estimate
	Aug-04	Actual	Estimate	Estimate	Estimate	Estimate	Actual	Estimate	Actual	Actual	Actual
	Sep-04	Estimate	Actual	Estimate	Estimate	Estimate	Estimate	Actual	Actual	Estimate	Estimate
	Oct-04	Actual	Estimate	Estimate	Estimate	Estimate	Actual	Estimate	Actual	Estimate	Actual
	Nov-04	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Estimate	Actual
	Dec-04	Actual	Estimate	Estimate	Estimate	Estimate	Actual	Estimate	Actual	Estimate	Actual
	Jan-05	Estimate	Actual	Actual	Actual	Actual	Estimate	Actual	Actual	Actual	Estimate
	Feb-05	Actual	Estimate	Estimate	Estimate	Estimate	Actual	Estimate	Actual	Estimate	Actual
	Mar-05	Estimate	Actual	Actual	Actual	Actual	Estimate	Actual	Actual	Actual	Estimate
	Apr-05	Actual	Estimate	Estimate	Estimate	Estimate	Actual	Estimate	Actual	Estimate	Actual
	May-05	Estimate	Estimate	Actual	Actual	Actual	Estimate	Actual	Actual	Actual	Estimate
	Jun-05	Actual	Estimate	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Jul-05	Actual	Estimate	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Aug-05	Actual	Estimate	Actual	Actual	Actual	Estimate	Actual	Actual	Actual	Actual
	Sep-05	Actual	Estimate	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Oct-05	Actual	Estimate	Actual	Estimate	Actual	Actual	Estimate	Actual	Actual	Actual
	Nov-05	Estimate		Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Dec-05	Estimate		Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Jan-06	Actual		Actual	Actual	Actual	Actual	Estimate	Actual	Actual	Actual
	Feb-06	Actual		Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Mar-06	Actual		Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	Apr-06	Actual		Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual

PRICEWATERHOUSECOOPERS

Appendix 7 – Summary of JPS' Complaints Database

Parish	(All)

Count of Status	Month										
Main Classification of Complaint	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Grand Total
Account Name Change		1					2	2		1	6
Amnesty					1						1
Application Query					2						2
Authorization letter								4	3	2	9
Billing Query	1	14	27	17	27	25	37	56	62	30	296
Claims		1			2		3	6	3	1	16
Closureof Premises Advice (copy)										1	1
Complaint Settled										2	2
Connection Request				2	2		2	9	7	3	25
Customer Advising Absence							1				1
Defective S/W							1				1
Defective Streetlight			1		2	1	3	3			10
Defective Transformer								1			1
Deposit Refund		2									2
Disconnection in Error						1	2	1			4
Disconnection Issues							3				3
Disconnection Request		6	5	3	10	9	14	8	9	1	65
Easement						1	1				2
Electricity Issues			1	2			3	1	4		11
Emergency									1		1
Encroachment								1			1
Follow up to Letter										1	1
Gei Cert						1		1			2
Illegal Connection		1		1	3	1	1	3	1		11
JPS Premises Visit							1				1
Letter of Demand								1			1
Letter of Possession								1			1
Mailing Address Change		7	6	14	10	10	8	15	15	2	87
Meter Check		2				1	4	1	2	1	11
Payment Arrangement Advice (copy)										1	1
Rate Change			2	1	1				1		5
Reconnection								1			1
Refund Request								2			2
Rep Application						1	1				2
Request for date of Occupancy letter										1	1
Reva Adjustment						1					1
Thank you Letter										1	1
Transfer of Funds							1	3	1		5
Tree Trimming		1						2			3
Unclaimed mail									1		1
Unidentified		3	2		2			2	1		10
Wire Issues				2				1	2		5
Grand Total	1	38	44	42	62	52	88	125	113	48	613

PRICEWATERHOUSECOOPERS

Appendix 8 - Typical KAM report (Key Customers)

Month	YTD	January	February	March	April	May	June	July	August
# of contacts	545	51	53	57	62	65	77	21	62
# Satisfied	186	10	33	30	26	27	0	11	49
% Satisfied	34%	20%	62%	53%	42%	42%	0%	52%	79%
Types of issues									
Power Quality	20	1	1	2	6	4	0	2	4
Outage	50	8	6	3	8	9	1	1	14
Construction line Extnsn	98	12	20	23	17	17	0	2	7
Billing	79	8	8	13	10	16	3	4	17
Energy Management	23	6	2	3	4	3	0	0	5
Transformer Regularizn	0	0	0	0	0	0	0	0	0
Maintenance	52	2	15	5	11	8	0	2	9
Claims	15	0	0	0	3	3	5	1	3
Social Call	17	4	0	0	1	3	0	8	1
Others	7	0	0	5	1	0	0	1	0
Total	**361**	**41**	**52**	**54**	**61**	**63**	**9**	**21**	**60**
Method of contact									
Telephone	304	31	36	36	48	39	57	20	37
Visit	99	15	10	16	11	13	17	0	17
E-Mail	41	1	7	5	3	13	3	1	8
Training Seminar	0	0	0	0	0	0	0	0	0
Social Function	0	0	0	0	0	0	0	0	0
Total	444	**47**	**53**	**57**	**62**	**65**	**77**	**21**	**62**
Business type									
Agricultural/Manufacturing	283	31	49	49	48	52	1	3	50
Utility	16	5	0	3	3	5	0	0	0
Communications	1	1	0	0	0	0	0	0	0
Construction	0	0	0	0	0	0	0	0	0
Finance and Insurance	3	2	0	0	0	0	0	1	0
Hotel	2	0	1	0	0	0	0	0	1
Government	2	0	0	0	0	0	0	2	0
Restaurants	9	1	0	0	0	1	0	1	6
Wholesale and Retail	27	3	3	3	3	4	0	6	5
Others	5	0	0	0	0	0	0	5	0
Total	**348**	**43**	**53**	**55**	**54**	**62**	**1**	**18**	**62**

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Appendix 9 - SQL Statements for CIS Banner's Data Files and PwC Test Procedures

TOR 2

To generate a list of rates 40 and 50 complaints logged in CIS Banner for the period 1 January to 30 October 2006, the following SQL statement was used.

```
SELECT ucrserv_cust_code, ucrserv_prem_code, ucrserv_srat_code, ucrcmpl_opened_date,
ucrcmpl_complaint_text
from  ucrcmpl, ucrserv
where ucrserv_cust_code = ucrcmpl_cust_code_filing
and ucrserv_prem_code = ucrcmpl_prem_code_ref
and ucrserv_srat_code in('RT40','RT44','RT48','RT51','RT53','RT55','RT57')
and ucrcmpl_stus_code = 'C'
and ucrcmpl_opened_date >= ('01-JAN-2004')
```

TOR 4

To produce the files for the service history the following SQL statement was applied:

```
SELECT urrshis_cust_code customer, urrshis_prem_code premise, urrshis_scat_code reg,
urrshis_action_date readdate, urrshis_reading reading, urrshis_consumption USAGE, urrshis_dos dos,
urrshis_rtyp_code rtyp, urrshis_invn_code meter, urrshis_styp_code Rate
FROM urrshis
WHERE urrshis_action_date >= '01-MAR-2006'
AND urrshis_action_date < '01-APR-2006'
```

To produce the files for the data files the following SQL statement was applied:

```
select uzbmrex_cust_code Customer, uzbmrex_prem_code Premise, uzbmrex_invn_code
Meter,uzbmrex_reading Reading,uzbmrex_consumption Consumption,uzbmrex_mtrd_code
Excep,uzbmrex_action_date ReadDate, uzbmrex_scat_code KWH
from uzbmrex
where uzbmrex_action_date >= '01-MAR-2006'
AND uzbmrex_action_date < '01-APR-2006'
```

PwC Test Procedures for determination of percentage of meters read per rate class per month.

The specific steps performed by PwC using ACL involved the following:

1. Created a computed field called 'Meter TRIM' in the service history and exception file that eliminated the spaces before and after the characters in the Meter field. Used All Trim function to do this.
2. Sorted the Service History file by Meter TRIM (Ascending) AND Read Type (Ascending). Created a new table called Service History <month> SORT.
3. In the Service History Sort file, summarised on Meter TRIM and return the Read Type, Rate Code.
4. In the Exceptions file, summarised on Meter TRIM.

Appendix 9 - SQL Statements for CIS Banner's Data Files and PwC Test Procedures (Continued)

5. Related the Exceptions summarised file (Child) to the Service History Sort summarised file (Parent) by Meter TRIM.
6. Executed the following filter to determine all actual reads – i.e. those classified as A (actual) and those with E (estimate), but showed up in the billing exceptions report, hence the meter was actually read.
   ((Invalid Meter) AND (RTYP <> "E")) OR (Service_Excep_Sep_05_SUMM.Meter_TRIM <> " ")
   Where Invalid Meter is (RTYP <> " "). That is Rate type is blank.

PwC's Test Procedures to recompute aging of estimated billing.

- Imported both reports, for each sampled months into ACL – as a print image report.

zrnrdg

- For each of the sampled months, CLASSIFY on Parish Office
- For each Parish Office, Age the records as follows (using the AGE function):
  - AGE on Last Actual Read Date
  - Cut-Off Date of (the month-end date for each sampled month, e.g. 30 September 2004)
  - Aging Periods – 0, 90, 150, 240 and 365 days
- Repeated for each Parish Office for each of the sample months

uarmrst

- Note, while there were several report types within this file, PwC was mainly concerned with the Customer Account statistics for each Parish Office for each sampled month.
- Once the file was imported, CLASSIFY on Classification Type. This showed the different reports and statistics that were imported.
- FILTER on Customer Accounts, and EXTRACT the records to another a new table
- Repeated this for each sampled month
- With the new files created for each sampled month, CLASSIFY on Parish Office. This showed the total bills by Parish Office.
- Repeated for each sampled month.

Appendix 9 - SQL Statements for CIS Banner's Data Files and PwC Test Procedures (Continued)

TOR 15

To produce the payment, service order and billed charged histories for the ten samples, the following SQL statements were used:

Payment history

```
select uabpymt_cust_code, uabpymt_prem_code, uabpymt_pymt_date,
uabpymt_amount
from uabpymt
where uabpymt_pymt_date>='01-DEC-2004'
and uabpymt_pymt_date<='31-MAR-2006'
and uabpymt_cust_code=& customer_code
and uabpymt_prem_code='&Premise_code'
```

Service Order History

```
select ucbsvco_cust_code, ucbsvco_prem_code, ucbsvco_code,
ucbsvco_sotp_code, ucbsvco_srce_code, ucbsvco_date_created,
ucbsvco_stus_code, ucrevnt_target_date, ucrevnt_compl_date
from ucbsvco, ucrevnt
where ucbsvco_code=ucrevnt_svco_code
and ucbsvco_date_created>='01-DEC-2004'
and ucbsvco_date_created<='31-MAR-2006'
and ucbsvco_cust_code=& customer_code
and ucbsvco_prem_code='&Premise_code'
```

Billed Charges History

```
select uabopen_cust_code, uabopen_prem_code, uabopen_srat_code,
uabopen_billed_chg, uabopen_charge_date from uabopen
where uabopen_cust_code=& customer_code
and uabopen_prem_code='&Premise_code'
and uabopen_charge_date>='01-DEC-2004'
and uabopen_charge_date<='31-MAR-2006'
```

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Appendix 10 - Summary of Meter Reads Samples Tested by PwC

Sample Month Tested Aug-05

Rate Class	Meters Billed Count	Actual Meter Reads Count	Unread Meters Count	% Read	% Unread
MT10	510,235	486,523	23,712	95.35%	4.65%
MT20	60,416	56,610	3,806	93.70%	6.30%
MT40	1,504	1,413	91	93.95%	6.05%
MT50	99	97	2	97.98%	2.02%
MT60	17	13	4	76.47%	23.53%
MTPS	24	24	0	100.00%	0.00%
MTRS	3,112	2,906	206	93.38%	6.62%
Totals	**575,407**	**547,586**	27,821	95.16%	4.84%

Sample Month Tested Sep-05

Rate Class	Meters Billed Count	Actual Meter Reads Count	Unread Meters Count	% Read	% Unread
MT10	510,741	490,837	19,904	96.10%	3.90%
MT20	60,595	57,171	3,424	94.35%	5.65%
MT40	1,496	1,416	80	94.65%	5.35%
MT50	101	100	1	99.01%	0.99%
MT60	16	9	7	56.25%	43.75%
MTPS	24	24	0	100.00%	0.00%
MTRS	3,121	2,948	173	94.46%	5.54%
Totals	**576,094**	**552,505**	23,589	95.91%	4.09%

Sample Month Tested Feb-06

Rate Class	Meters Billed Count	Actual Meter Reads Count	Unread Meters Count	% Read	% Unread
MT10	516,292	495,342	20,950	95.94%	4.06%
MT20	61,144	57,808	3,336	94.54%	5.46%
MT40	1,517	1,428	89	94.13%	5.87%
MT50	102	100	2	98.04%	1.96%
MT60	14	8	6	57.14%	42.86%
MTPS	25	24	1	96.00%	4.00%
MTRS	3,123	2,953	170	94.56%	5.44%
Totals	582,217	557,663	24,554	95.78%	4.22%

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Appendix 10 - Summary of Meter Reads Samples Tested by PwC (Continued)

Sample Month Tested Mar-06

Rate Class	Meters Billed Count	Actual Meter Reads Count	Unread Meters Count	% Read	% Unread
MT10	517,008	495,889	21,119	95.92%	4.08%
MT20	61,242	58,092	3,150	94.86%	5.14%
MT40	1,523	1,458	65	95.73%	4.27%
MT50	103	102	1	99.03%	0.97%
MT60	13	8	5	61.54%	38.46%
MTPS	24	24	0	100.00%	0.00%
MTRS	3,117	2,917	200	93.58%	6.42%
Totals	583,030	558,490	24,540	95.79%	4.21%

Sample Month Tested Jun-06

Rate Class	Meters Billed Count	Actual Meter Reads Count	Unread Meters Count	% Read	% Unread
MT10	519,845	497,963	21,882	95.79%	4.21%
MT20	61,701	58,496	3,205	94.81%	5.19%
MT40	1,531	1,463	68	95.56%	4.44%
MT50	103	99	4	96.12%	3.88%
MT60	13	8	5	61.54%	38.46%
MTPS	24	23	1	95.83%	4.17%
MTRS	3,095	2,888	207	93.31%	6.69%
Totals	586,312	560,940	25,372	95.67%	4.33%

Sample Month Tested Nov-06

Rate Class	Meters Billed Count	Actual Meter Reads Count	Unread Meters Count	% Read	% Unread
MT10	511,712	480,006	31,706	93.80%	6.20%
MT20	60,655	56,490	4,165	93.13%	6.87%
MT40	1,523	1,407	116	92.38%	7.62%
MT50	100	99	1	99.00%	1.00%
MT60	15	10	5	66.67%	33.33%
MTPS	24	24	0	100.00%	0.00%
MTRS	3,114	2,804	310	90.04%	9.96%
Totals	577,143	540,840	36,303	93.71%	6.29%

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Appendix 11 – Summary of Estimated Billing Tested by PwC

Total Billed

	Sep-04				Jun-05			
Parish_Office	Total Bills	Bills in Compliance	Bills in Breach	% Breach	Total Bills	Bills in Compliance	Bills in Breach	% Breach
Lucea	14,475	14,348	127	0.9%	14,906	14,759	147	1.0%
Falmouth	13,786	13,440	346	2.5%	14,312	14,215	97	0.7%
May Pen	42,161	39,830	2,331	5.5%	42,514	40,485	2,029	4.8%
KSA North	69,770	67,533	2,237	3.2%	69,379	67,099	2,280	3.3%
KSA South	51,654	51,521	133	0.3%	51,134	51,059	75	0.1%
Mandeville	36,537	35,461	1,076	2.9%	37,068	36,676	392	1.1%
Morant Bay	18,479	17,402	1,077	5.8%	18,971	18,581	390	2.1%
Port Maria	24,486	23,963	523	2.1%	25,271	24,999	272	1.1%
Sav-la-Mar	33,231	32,982	249	0.7%	34,359	33,986	373	1.1%
Black River	34,517	34,453	64	0.2%	35,687	35,660	27	0.1%
Montego Bay	43,812	43,705	107	0.2%	45,549	45,458	91	0.2%
Port Antonio	17,585	17,169	416	2.4%	18,067	17,612	455	2.5%
Spanish Town	99,068	97,617	1,451	1.5%	100,832	99,461	1,371	1.4%
St. Ann's Bay	35,705	35,448	257	0.7%	37,127	37,038	89	0.2%
Totals	535,266	524,872	10,394	1.9%	545,176	537,088	8,088	1.5%

Source: Compiled by PwC from CIS Banner

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Appendix 11 – Summary of Estimated Billing Tested by PwC (Continued)

Total Billed

	Oct-05				Mar-06				May-06			
Parish_Office	Total Bills	Bills in Compliance	Bills in Breach	% Breach	Total Bills	Bills in Compliance	Bills in Breach	% Breach	Total Bills	Bills in Compliance	Bills in Breach	% Breach
Lucea	15,196	15,077	119	0.8%	15,299	15,225	74	0.5%	15,433	15,366	67	0.4%
Falmouth	14,553	14,434	119	0.8%	14,570	14,493	77	0.5%	14,782	14,717	65	0.4%
May Pen	43,022	41,139	1,883	4.4%	42,787	40,873	1,914	4.5%	43,314	41,581	1,733	4.0%
KSA North	71,221	67,977	3,244	4.6%	72,168	69,280	2,888	4.0%	71,818	69,873	1,945	2.7%
KSA South	51,967	51,884	83	0.2%	51,586	51,460	126	0.2%	53,155	52,979	176	0.3%
Mandeville	37,418	37,124	294	0.8%	37,637	37,195	442	1.2%	38,230	37,995	235	0.6%
Morant Bay	19,362	19,052	310	1.6%	19,495	19,105	390	2.0%	19,654	19,318	336	1.7%
Port Maria	25,673	25,416	257	1.0%	25,620	25,499	121	0.5%	25,833	25,691	142	0.5%
Sav-la-Mar	35,175	34,889	286	0.8%	35,513	35,362	151	0.4%	36,254	36,108	146	0.4%
Black River	36,048	36,013	35	0.1%	36,259	36,202	57	0.2%	36,451	36,385	66	0.2%
Montego Bay	46,112	46,049	63	0.1%	45,667	45,634	33	0.1%	46,510	46,475	35	0.1%
Port Antonio	18,271	17,803	468	2.6%	18,406	17,977	429	2.3%	18,649	18,305	344	1.8%
Spanish Town	101,417	100,016	1,401	1.4%	101,555	99,889	1,666	1.6%	101,967	100,485	1,482	1.5%
St. Ann's Bay	37,614	37,580	34	0.1%	37,997	37,958	39	0.1%	38,520	38,482	38	0.1%
Totals	553,049	544,453	8,596	1.6%	554,559	546,152	8,407	1.5%	560,570	553,760	6,810	1.2%

Source: Compiled by PwC from CIS Banner

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Appendix 12 – Samples for Systems Test

TOR 5

1. The following dates were chosen randomly and used during our reviews to validate exception reports, reconciliations of key data transfers and Computer Operations run sheets:

   1/23/2004, 2/3/2004, 3/10/2004, 5/31/2004, 8/19/2004, 9/10/2004, 9/13/2004, 9/20/2004, 9/22/2004, 9/28/2004, 9/29/2004, 10/1/2004, 10/6/2004, 10/12/2004, 10/13/2004, 10/14/2004, 10/15/2004, 10/22/2004, 11/4/2004, 11/9/2004, 11/15/2004, 11/23/2004, 11/24/2004, 12/1/2004, 12/7/2004, 12/9/2004, 12/15/2004, 12/17/2004, 12/20/2004, 12/29/2004, 2/8/2005, 3/8/2005, 3/21/2005, 5/23/2005, 7/26/2005, 9/30/2005, 10/18/2005, 3/2/2006, 3/13/2006 & 5/2/2006

2. The following meters were read during our field visits,

   598634, 6018301, 516816, 564958, 813958, 557002, 526743, 358936, 274106, 532430, 565930, 394655, 838895, 331005, 621772, 278609, 782536, 87101, 84800, 5314681, 892902, 934769, 1014377, 760088, 202101, 747174, 593587, 599426, 79934, 646931, 328825, 42483, 999373, 46627, 1037137, 511786, 237700, 369596, 237689, 706886, 876697, 794594, 1078202, 920137, 797738, 762004, 383150, 874078, 842013, 848618, 1043788, 927773, 754231, 749588, 748735, 749564, 748752, 982096, 748036, 382815, 322123, 851386, 797559, 754814, 753340, 753702, 1058296, 869118, 790817, 1064169, 797536, 518565, 836653, 1055035, 790859, 210567, 709698, 790873, 790138, 955689, 73639, 864715, 644965, 637070, 226859, 997702, 602277, 973373, 835969, 229663, 231138, 858716, 38475, 660866, 657627, 34584, 268692, 659808, 82170, 841266, 1000238, 221270, 899906, 404134, 892133, 402849, 49180, 268860, 856790, 306209, 204002, 727277, 686071, 643242, 231345, 530230, 749866, 120278, 211707, 948573 & 984544.

3. The following meter readings for the following meter numbers were tested for reasonableness,

   598839, 711636, 616800, 1068463, 614210, 942220, 617656, 291071, 210718, 531989, 617119, 683118, 866159, 793427, 760383, 1001440, 269141, 606489, 1031089, 504482, 964095, 1016205, 927204, 1045393, 937422, 386321, 667041, 1070280, 773486, 755680, 530356, 921942, 251893, 771350, 805652, 580001, 1034752, 765072, 701555, 832942, 568090, 973441, 323213, 180066 & 1024196

Appendix 12 – Samples for Systems Test (Continued)

TOR 8 and 13

4. The following data has not been submitted to us:

   - Exception reports for the following dates,

     1/23/2004, 3/10/2004, 5/31/2004, 8/19/2004, 9/10/2004, 9/13/2004, 9/22/2004, 9/28/2004, 9/29/2004, 10/1/2004, 10/6/2004, 10/12/2004, 10/13/2004, 10/14/2004, 10/15/2004, 10/22/2004, 11/4/2004, 11/9/2004, 11/15/2004, 11/23/2004, 11/24/2004, 12/1/2004, 12/7/2004, 12/9/2004, 12/15/2004, 12/17/2004, 12/20/2004, 12/29/2004, 2/8/2005, 3/8/2005, 3/21/2005, 5/23/2005, 9/30/2005, 10/18/2005, 3/2/2006 & 5/2/2006

   - Reconciliations of bill print files generated by computer operators and those uploaded to the bill print application for printing of bills,

     1/23/2004, 2/3/2004, 3/10/2004, 5/31/2004, 8/19/2004, 9/10/2004, 9/13/2004, 9/20/2004, 9/22/2004, 9/28/2004, 9/29/2004, 10/1/2004, 10/6/2004, 10/12/2004, 10/13/2004, 10/14/2004, 10/15/2004, 10/22/2004, 11/4/2004, 11/9/2004, 11/15/2004, 11/23/2004, 11/24/2004, 12/1/2004, 12/7/2004, 12/9/2004, 12/15/2004, 12/17/2004, 12/20/2004, 12/29/2004, 2/8/2005, 3/8/2005, 3/21/2005, 5/23/2005 & 7/26/2005.

TOR 13

5. The following reconciliations of data transferred from the main server to the bill print application could not be located 1/23/2004, 2/3/2004, 3/10/2004, 5/31/2004, 8/19/2004, 9/10/2004, 9/13/2004, 9/20/2004, 9/22/2004, 9/28/2004, 9/29/2004, 10/1/2004, 10/6/2004, 10/12/2004, 10/13/2004, 10/14/2004, 10/15/2004, 10/22/2004, 11/4/2004, 11/9/2004, 11/15/2004, 11/23/2004, 11/24/2004, 12/1/2004, 12/7/2004, 12/9/2004, 12/15/2004, 12/17/2004, 12/20/2004, 12/29/2004, 2/8/2005, , 3/8/2005, 3/21/2005, 5/23/2005 & 7/26/2005

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Appendix 13 – Recalculation of billed fuel and IPP charges

	Line	Ref	Jun-04	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04	Total
Electricity sales (MWh)										
Current month	1		267,427	273,243	268,328	249,686	251,955	244,852	255,593	
Previous month	2			267,427	273,243	268,328	249,686	251,955	244,852	
Billed sales (MWh)	3			270,247	279,827	197,439	242,152	227,849	246,309	
Exchange rate	4		61.22	61.80	61.90	61.89	61.88	61.98	61.63	
JPSCo fuel cost	5		1,041,827	1,123,480	1,073,492	977,055	1,365,190	1,207,929	1,131,851	
Adjustments to SCT discounts [1]	6		(70,954)	(75,581)	(49,706)	(44,685)	(60,614)	(50,670)	(56,139)	
Total JPSCo fuel cost - J$'000	7	Line 5 + Line 6	970,873	1,047,899	1,023,786	932,370	1,304,576	1,157,259	1,075,712	
Total JPSCo fuel cost - US$'000 equivalent	8	Line 7 / Exchange rate	15,859	16,956	16,539	15,065	21,082	18,671	17,454	
Heat rate efficiency factor [2]	9		1.089	1.076	1.056	-	-	1.013	1.018	
System loss efficiency factor [2]	10		0.958	0.959	0.958	-	-	0.952	0.950	
	11	Line 8 x Line 9 x Line 10	16,543	17,498	16,725	15,065	21,082	18,006	16,889	
IPP fuel cost	12		207,181	188,374	216,517	169,579	252,647	285,016	219,782	
Adjustments to fuel cost estimates [1]	13		735	371	743	2,661	(3,197)	5,610	(7,190)	
Total IPP fuel cost - J$'000	14	Line 12 + Line 13	207,916	188,745	217,260	172,240	249,450	290,626	212,592	
Total IPP fuel cost - US$'000 equivalent	15	Line 14 / Exchange rate	3,396	3,054	3,510	2,783	4,031	4,689	3,449	
Heat rate efficiency factor [2]	16		1.089	1.076	1.056	-	-	1.013	1.018	
System loss efficiency factor [2]	17		0.958	0.959	0.958	-	-	0.952	0.950	
	18	Line 15 x Line 17	3,543	3,152	3,549	2,783	4,031	4,522	3,338	
Adjusted fuel costs before heat rate and system loss efficiencies	19	Line 11 + Line 18	**20,085**	**20,650**	**20,274**	**17,848**	**25,114**	**22,528**	**20,227**	
IPP surcharge [3]	20		1,087	834	727	1,089	794	666	2,454	
Volumetric adjustments [4]	21	See below	(510)	(218)	(512)	5,413	735	2,549	(153)	
Total adjusted fuel costs	22	Sum of Lines 19 to 21	**20,662**	**21,266**	**20,489**	**24,350**	**26,642**	**25,743**	**22,527**	
Billed fuel and IPP charge - USc/kWh										
Revised per PwC	23	Line 22 / Line 1	7.726	7.783	7.636	9.752	10.574	10.514	8.814	
Original per JPSCo	24		8.428	8.242	8.348	9.332	10.431	10.441	8.092	
Difference	25	Line 23 - Line 24	(0.702)	(0.459)	(0.712)	0.420	0.143	0.073	0.722	
J$ equivalent of difference	26	Line 25 x Line 4	(42.95)	(28.38)	(44.09)	26.01	8.86	4.52	44.48	
(Over)/under recovered fuel and IPP rate - J$'000	**27**	Line 1 x Line 26	**(11,487)**	**(7,756)**	**(11,831)**	**6,493**	**2,233**	**1,106**	**11,369**	**(9,873)**
Revised Volumetric Adjustments [5]										
Under/(Over) estimation of electricity sales	28	Line 2 - Line 3	(68.57)	(28.20)	(65.84)	708.89	75.34	241.06	(14.57)	
IPP and fuel rate for previous month	29	Line 24	7.438	7.726	7.783	7.636	9.752	10.574	10.514	
Revised Volumetric Adjustments	30	Line 28 x Line 29	(510.00)	(218)	(512)	5,413	735	2,549	(153)	

Notes re PwC's recalculation:

1 Amounts properly adjusted against fuel costs for the period June 2004 to September 2004. For this period JPS excluded these amounts in adjusting fuel costs for heat efficiency and system loss.

2 Efficiency ratios and system losses waived in accordance with authorisation from OUR (September and October 2004).

3 Correct IPP surcharge applied to calculation, therefore addressing the duplication of JPPC's variable operating and maintenance and the (over)/under estimation of IPP surcharge.

4 Revised volumetric adjustment based on recalculated fuel and billed IPP charge.

5 PwC recognises limitation in the revised the volumetric adjustments determined. Similar to JPS, in determining the revised volumetric adjustment we applied the previous fuel and IPP charge. It is our understanding that the existing basis of calculating the volumetric adjustment does not take into consideration the under/(over) recovery of fuel costs as a result of time of use rates relating to commercial customers.

PRICEWATERHOUSECOOPERS

Appendix 14 – February 2005 Directives and Follow up Work

(i) Meter Readings - JPS must undertake as a matter of priority, the complete overhaul of its meter reading regime to correct the deficiencies identified. This system overhaul should be completed by 30th June 2005 and must include provisions for;

Decisions		Action observed by PwC
(a)	The re-training of all meter readers	Two main training sessions were held during the period May 16 – June 30, 2005; one in Montego Bay and the other in Kingston, see **Appendix 15 – Example of Meter Reading Training (May 16 – June 30, 2005)** for training outline. A database of all meter readers trained was presented to PwC. It is our understanding that the 105 meter readers existing as at 30 June 2005 were included in the training.
(b)	The implementation of an effective mechanism to facilitate the performance monitoring of meter readers regarding the quality of their readings. This mechanism must hold meter readers accountable for accurate readings.	It is our understanding that JPS is currently finalising a procedural document regarding the maintenance of the handhelds.
(c)	The accountability standard prescribed by JPS for meter readers and which must be communicated to the Office by 30th June 2005	No further action taken since reported to OUR in the Terminal Report.
(d)	The routine inspection and maintenance of hand held devices	Based on documents submitted to PwC it was confirmed that the handheld meter reading devices were maintained on a breakdown basis. A paper trail was found tracking the process from the report of the fault, to delivery to manufacturers, to the handheld being returned to JPS.
(e)	The notification of customers whose consumption is outside the high/low variance criterion	The ongoing compliance of this directive could not be confirmed as there is no evidence that a person whose consumption falls outside of the threshold is notified upon occurrence. The only form of notification seen was for November 2005 when standard letters were enclosed with customer bills.

Appendix 14 – February 2005 Directives and Follow up Work (Continued)

(i) Meter Readings - JPS must undertake as a matter of priority, the complete overhaul of its meter reading regime to correct the deficiencies identified. This system overhaul should be completed by 30th June 2005 and must include provisions for;

(f)	The manual re-entry of readings that are flagged by the hand-held device as exceptions The flagged/excepted readings should be rejected and a new reading taken by the meter reader which should be manually re-entered and not simply overridden in the field.	PwC has not received any documented proof that this was actually enforced. However, based on observation made while shadowing a meter reader, it was observed that exception readings returned a beep and a request for re-entry.
(g)	The removal of access to previous readings by the meter readers in the field	This was confirmed by PwC personnel, based upon shadow observation of meter readers in the field. However, no documented proof as to when the actual implementation occurred.
(h)	An assessment of technology options and feasibility to introduce Automatic Reading and Pre-paid Meters into the system. This assessment is to be submitted to the Office by 30th September 2005.	No further action taken since reported to OUR in the Terminal Report.

Appendix 14 – February 2005 Directives and Follow up Work (Continued)

	Decisions	Action observed by PwC
ii)	Commencing as of March 2005 the Company is required to submit monthly progress reports on the status of the system overhaul to the Office until the activity is completed.	It is our understanding that the last communication to the OUR was done via the Terminal Report dated 24th February 2005.
iii)	The Office also requires that JPS put in place within three months of the this Directive a customer education programme about meter reading procedures designed to restore confidence in the integrity of the billing system.	The implementation of this Directive has been confirmed by PwC. The campaign was started within the time frame requested by the OUR. There are printed educational brochures as well as copies of public forums held.
iv)	The Office considers that wider and more frequent rotation of the assigned areas to meter readers is necessary.	We have not seen any evidence to provide support that a structured meter reading plan is in place. However, on our field visit to KSAN and St. Catherine we observed that rotations were done verbally by the Field Services Supervisor. We were not able to verify rotations historically as the information to do this is only maintained for one week in UMS server.
2. High/Low Rejection Criterion		
(i)	The rejection criterion is to be lowered to +/- 30% for Rate 10 customers by 31st July 2005. This should be confirmed in writing by the Company to the Office as having been implemented. Commencing with March 2005 billing and until further notice JPS shall be required to submit its management reports to the Office, such reports providing details of the exceptions generated by the high/low criteria.	Based upon documents and spreadsheet data submitted to PwC it was confirmed that the high/low criterion for rates 10 and 20 is the range as stated by the Directive. A paper trail of the program change and management sign off was seen along with the confirmation using ACL (CAAT testing) of the acceptance and rejection of billing data.
(ii)	The high/low rejection criterion for commercial accounts is to be lowered simultaneously to +/- 60%.	Based upon documents and spreadsheet submitted to PwC it was confirmed that the high/low criterion for commercial customers is the range as stated in the Directive. Confirmation gain from CAAT procedures of the acceptance and rejection of billing data.

Appendix 14 – February 2005 Directives and Follow up Work (Continued)

	Decisions	Action observed by PwC
3. Estimation Routines		
(i) JPS shall immediately		
(a)	Effect the necessary changes to its system to facilitate compliance with the guaranteed standards, that is all estimates of consumption should be based on the last three (3) actual readings (new accounts excepted)	Based upon documents and spreadsheet submitted to PwC it was confirmed that all estimations were done using the last 3 actual reads as stated in the Directive. A paper trail of the program change and management sign off was seen along with the confirmation using ACL (CAAT) testing of the acceptance and rejection of billing data.
(b)	Synchronize the Mass Estimator and the Base Estimator. There should be no difference in the algorithm used for the Mass and Base Estimators.	Based upon documents submitted to PwC it was confirmed Directive base and mass estimation routines have been consolidated into one so that all system-generated billing estimates are based on the OUR's mandate of using three actual meter readings.
(c)	Adjust the monthly consumption estimates used by the Manual Estimator to better reflect the class average consumption.	JPS has confirmed that manual estimations are still based on 100 kWh per 30 days for residential accounts and 200 kWh per 30 days for non-residential accounts. It is our understanding that the OUR has not re-instructed JPS to implement this measure.
(ii)	JPS is required to assess the merit of using even longer periods than the stipulated last 3 actual readings and shall advise the Office of its conclusions by 30th June 2005.	No further action taken since reported to OUR in the Terminal Report.
4. November 2004 Billing		
(i)	JPS shall presents its proposals to the Office by 28th February 2005 for adjusting the 21,000 accounts being mindful that the Office will not agree to any measures which seek to recover sums which would in effect penalize customers for the company's own inefficiencies.	It is our understanding that following disagreements of JPS' proposal and the OUR's counter proposal a final position was arrived at in January 2006. In a letter dated 17 January 2006 from OUR and addressed to JPS, the OUR outlined the amended methodology to be used to identify accounts that qualified for adjustment. Subsequently, JPS responded and via a letter dated 26 January 2006, the calculations supporting the adjustments were submitted to OUR.

Appendix 14 – February 2005 Directives and Follow up Work (Continued)

Decisions		Action observed by PwC
(ii)	In the meantime, these 21,000 accounts identified are to be flagged, customers required to make current payments only while their account is investigated and there are to be no disconnections of these accounts for the 'disputed" amounts. For the avoidance of doubt, these accounts should be disconnected only on the basis of arrears for current amounts going forward from January 2005 billing.	Sample of 10 accounts selected by PwC. Work documented in TOR 15.
5. Meter Maintenance and Testing		
	The Office's enquiry into the JPS billing system has identified that the major weaknesses in said system lie in the areas of meter reading and quality control. While there is no indication of massive meter malfunctions, the Office holds the view that customer confidence would be enhanced if JPS meter testing programme, as required pursuant to the All-Island Electricity License 2001, incorporated an 'independent' certification process. In this regard, the Office encourages the Company to work with the Jamaica Bureau of Standards (JBS) in order to develop a meter testing program that will enhance the credibility of the Company's metering programme. Conclusion of this exercise should go a long way towards improving customer confidence at least to the aspect of the accuracy of the metering devices. The Office is mindful of its duties under Section 4 of the OUR Act and will be moving immediately to conclude ongoing discussions between itself, JPS and the JBS with a view to bringing the matter to finality by 31st March 2005. It should be noted that prior to this enquiry, the Office has been engaged in dialogue with the Company and the JBS regarding meter testing.	Based on discussions with the General Manager of Engineering and Technology it is our understanding that JPS is in the process of implementing an Accreditation Lab. The lab is currently preparing a meters database. The typical information that each meter record will hold includes the meter #, manufacturer, model, type of meter and age. However, given the limited information in CIS Banner, the database is only about 60% complete. Once the database is completed it will be used as the basis for the OUR or Jamaica Bureau of Standard to select meters for testing. It is expected that the lab will be in full operation by March 2007

PRICEWATERHOUSECOOPERS

Appendix 15 – Example of Meter Reading Training Schedule

METER READER TRAINING
MAY 16 - JUNE 30, 2005
MONTEGO BAY

No.	Topic	General Objectives	Course Content	Specific Objectives	No. of P/pants	Duration	Period	Group	Trainer
1	Orientation				10	1 day	May 16,	1	J. Spalding
2	Metering Technology	To sensitize trainees to the characteristics, features and techniques of metering technology	Basic Electric Review -Ohms Law -AC Voltage Characteristics -Effects of Inductance & Capacitance -Power Factor -Power and Energy The Watthour Meter -Components -Electromechanical Operation -Power Demand Metering -Types1-3 Meters -Security of Meters	Explain the fundamentals of electric circuits Identify the components of a basic Watthour meter and explain their functions	10	3 days	May 17, 18, 19	1	D. Carson
3	Introduction to Meter Reading	To promote an understanding of the principles involved in meter reading	Reading all Meters -Reading electromechanical meters -Reading Digital Multifunction meters -Reading Time of Use Meters -The Importance of Resetting Registers -Misplaced Pointers -Effect of Power Outages on Meter Reading -Error Display on Electronic Meters -All Meter Reading Workshop	Identify all meter types and demonstrate competence in reading all various types of analog and digital registers	10	4 days	May 20, 24, 25, 26	1	D. Carson

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Appendix 15 – Example of Meter Reading Training Schedule (Continued)

METER READER TRAINING
MAY 16 - JUNE 30, 2005
MONTEGO BAY

No.	Topic	General Objectives	Course Content	Specific Objectives	No. of P/pants	Duration	Period	Group	Trainer
4	Meter Reading - Critical Business Process	To expose trainees to the foundation, concepts and principles involved in meter reading and preparation of bills	Meter Reading in the Field Service Context The Billing Process: *Cycles		10	1/2 day	May 27,	1	M. Jones
			Meter Reading as part of the Value Chain *Billing *Revenue Collection *Speed *Customer Satisfaction		10	1/2 day	May 27,	1	V. Allen
5	Meter Reader as JPS Representatives	To ensure that trainees positively represent the Company's image	Company Image Dress Conduct Communication		10	1/2 day	May 30,	1	W. Callum
	Meter Readers as Customer Service Representatives	To enable trainees to improve customer satisfaction by delivering excellent customer service			10	1/2 day	May 30,	1	S. Jones

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Appendix 15 – Example of Meter Reading Training Schedule (Continued)

METER READER TRAINING
MAY 16 - JUNE 30, 2005
MONTEGO BAY

No.	Topic	General Objectives	Course Content	Specific Objectives	No. of P/Pants	Duration	Period	Group	Trainer
6	The Meter Reader's Work Environment	To sensitize trainees to the challenges they will encounter while performing their duties	Access to premises/meter Safety Distractions Weather Conditions Hostile Customer Bad dogs		10	1 day	May 31,	1	Paulston Francis
7	Hand Held Device	To expose participants to key features of the meter reading device	How to input readings		10	1 day	June 1,	1	Paulston Francis
	Metering Technology					2 days	June 2 & 3		D. Carson
8	Defensive Driving	To promote an understanding and commitment to safe driving	What is it Making choices you can live with What you do is what you get The conditions that drive us What are you willing to do		10	1 day	June 6, 7,	1	External A. Grennell
9	Practice days	To ensure recall of new knowledge and skills at an acceptable level and to determine areas needing improvement			10	10 days	June 8 - 24		Existing Meter Readers

PRICEWATERHOUSECOOPERS

Appendix 16 – List of Key Personnel

Discussions and interviews were held various employees of JPS holding the following positions at date of our review:

Doreen Bailey	-	Analyst
Kevin Brooks	-	Meter Reader, St. Catherine
Steve Dixon	-	General Manager, Engineering and Technology
Steve Forest	-	Acting Field Services Supervisor, KSA North
Errol McDonald	-	Bill Production Supervisor
Evon Gordon	-	Customer Services Manager
Karlene Haye Williams	-	IS Specialist
Alego Lee	-	Budget and Performance Reporting Coordinator
Clava Mantock	-	General Manager, Business Support and Administration
Romeo McDonald	-	Field Services Supervisor, Kingston and St. Andrew (KSA) South
Kennedy Reid	-	Computer Operations Supervisor
Devon Smith	-	Meter Reader, KSA South
Dan Theoc	-	Vice President & Corporate Controller
Daniel Newby	-	Meter Reader, St. Ann's Bay
Suzette Weis-Williams	-	Assistant Accountant