Performance Audit
Water Loss Control Management
by the
Water Services Corporation
Water – a scarce resource in a small Mediterranean Island

- Water is a scarce resource and is under intense pressures from competing users.

- Immediate supply constraints have been addressed through significant investment in Reverse Osmosis plants – but environmental externalities result.

- Around 41 percent of water available for distribution remains unbilled (real losses - 23 percent, apparent losses - 18 percent).
Audit Objectives and Methodology

Audit Objectives
This audit focused on the WSC’s management regarding real and apparent losses. The main objectives of this exercise included the determination of:

- the adequacy of the WSC’s initiatives to detect, monitor and record water leakage; and
- the adequacy of the WSC’s management of leakage control.

Methodology
In order to attain the above objectives, the NAO:

- reviewed WSC documentation, namely, water leakage policies and plans;
- analysed the WSC’s databases relating to water leakage management, customer service and billing systems; and
- conducted interviews with key WSC personnel.
Real and Apparent Losses

Real Losses

- relate to the physical losses of water from the distribution system, including leakage and storage overflows.
- inflate the water utility’s production costs and stress water resources since they represent water that is produced, extracted and treated, which however never reaches beneficial use.
- cannot be completely eliminated. The lowest technically achievable annual volume of real losses for well-maintained and well-managed systems is known as Unavoidable Annual Real Losses (UARL).

Apparent Losses

- occur in the Corporation’s operations due to customer meter inaccuracies, billing system data errors and unauthorised consumption.
- cost utilities revenue and distort data on customer consumption patterns.
# Audit Focus - The Water Balance

## System Input Volume

<table>
<thead>
<tr>
<th>Authorised Consumption</th>
<th>Billed Authorised Consumption</th>
<th>Billed Metered Consumption (including water exported)</th>
<th>Revenue Water</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Billed Un-metered Consumption</td>
<td></td>
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<tr>
<td>Unbilled Authorised Consumption</td>
<td>Unbilled Metered Consumption</td>
<td>Unbilled Un-metered Consumption</td>
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</tbody>
</table>

## Water Losses

<table>
<thead>
<tr>
<th>Apparent Losses</th>
<th>Unauthorised Consumption</th>
<th>Non-Revenue Water (NRW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Metering Inaccuracies</td>
<td>Data Handling Errors</td>
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<table>
<thead>
<tr>
<th>Real Losses</th>
<th>Leakage on Transmission and Distribution Mains</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Leakage and Overflows at Utility’s Storage Tanks</td>
<td>Leakage on Service Connections up to point of Customer metering</td>
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</tbody>
</table>
Tackling Real Losses

Unavoidable Leakage Level

Present Leakage Level

Active Leakage Localization

Network Rationalization

Pressure Management

Dynamic Leakage Repair

Replacement of Critical Weak Pipe-work
Striving to attain Infrastructure Leakage Index targets

![Graph showing Infrastructure Leakage Index (ILI) and yearly average leakage (cubic metres per hour) from 2004 to 2008. The ILI shows a downward trend, indicating a decrease in leakage, while the yearly average leakage also decreases but at a slower rate.](image-url)
Significant Progress in minimising Real Losses

- The WSC is striving to attain its ILI targets within the zones by 2010.
- The WSC aims to attain an ILI of 2.0 by 2009 within zones.
- The WSC adopted the ‘five forces national strategy’ to substantially reduce real losses.
- Further reduction necessitates significant investment and the application of an economic leakage intervention model.
Dealing with Apparent Losses

- The WSC is increasingly focusing more initiatives to deal with Apparent Losses.

- Indirect Plumbing Systems are a significant contributor to meter under-registration.

- The use of technology has drastically reduced billing system data errors.
Dealing with Apparent Losses (cont…)

- Improvements in the estimation procedures of unread meters has decreased apparent losses.

- Over three percent of accounts have not been read for over 3.5 years.

- More could be done to tackle water theft.

- Illegal Extraction of ground water.
Conclusions

- WSC’s initiatives over the years have led to significant reductions in water losses.

- Despite progress registered, water losses still amount to 41 per cent of the system input volume.

- Further improvements regarding real losses through: maintaining up to date management information, fine tuning ILI calculations and introducing an economic leakage intervention model.

- The WSC needs to do significantly more to control apparent losses.

- With regards to apparent losses, the appropriate strategy needs to be in place, lines of responsibility clearly defined, increased cooperation between the various operational Units, a more proactive approach regarding water theft and fine tuning in the calculation of apparent losses.
Lessons Learnt by the Audit Team

- Scope of the audit was too broad.
- Limited work on the financial and environmental costs of minimising water losses.
- Limited data available to enable robust analysis on economic leakage intervention.
- Limited ‘Water’ expertise within the NAO.
The performance audit report
Water Loss Control Management
by the
Water Services Corporation
is available online at
www.nao.gov.mt

Thank You