

Clean and Safe Drinking Water Workshop



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Leak Detection.....Today and the Future



Introduction



HETEK
SOLUTIONS INC.

- Founded in 1956
- Wholly owned Canadian corporation
- 50 employees
- Offices across Canada
- Products & Services provider
- Use and sell the best products available
- Projects completed in Canada, USA, UK, Morocco, Trinidad, Barbados, Brazil

Leak Detection.....Today and the Future



Why Leak Detection?



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- Limited Water Resources
- Increasing population / demand
- Expense of establishing new resource
- Health issues
- Economics - Water is expensive
- Leakage worldwide 10% - 70%

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What Have We Done So Far



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- Passive leak detection ... when we see water, we'll dig.
- All leaks come to the surface ... don't they?
- Listening on hydrants and valves.
- Increased flows to the treatment plant.
- Some leak noise correlation.
- Leak noise recorders.
- DMA (District Metering Areas).

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Localization of Leakage



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- Sonic detection – sounding
- Step testing
- Noise logging
- Correlation
- Permalog advanced leak detection

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Sonic Detection – Sounding



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For listening directly at pipes and fittings, for simple localization.

- Simple operation
- Low cost
- Lightweight
- Robust, compact design for field use



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Step Testing



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Step testing is the process of localizing leakage into a particular sector of the distribution system for subsequent pinpointing and repair

- System divided into “tight zones”
- Water supplied through one meter
- Working from the farthest valve, any leakage isolated in that sector is shown on the meter as a drop in consumption

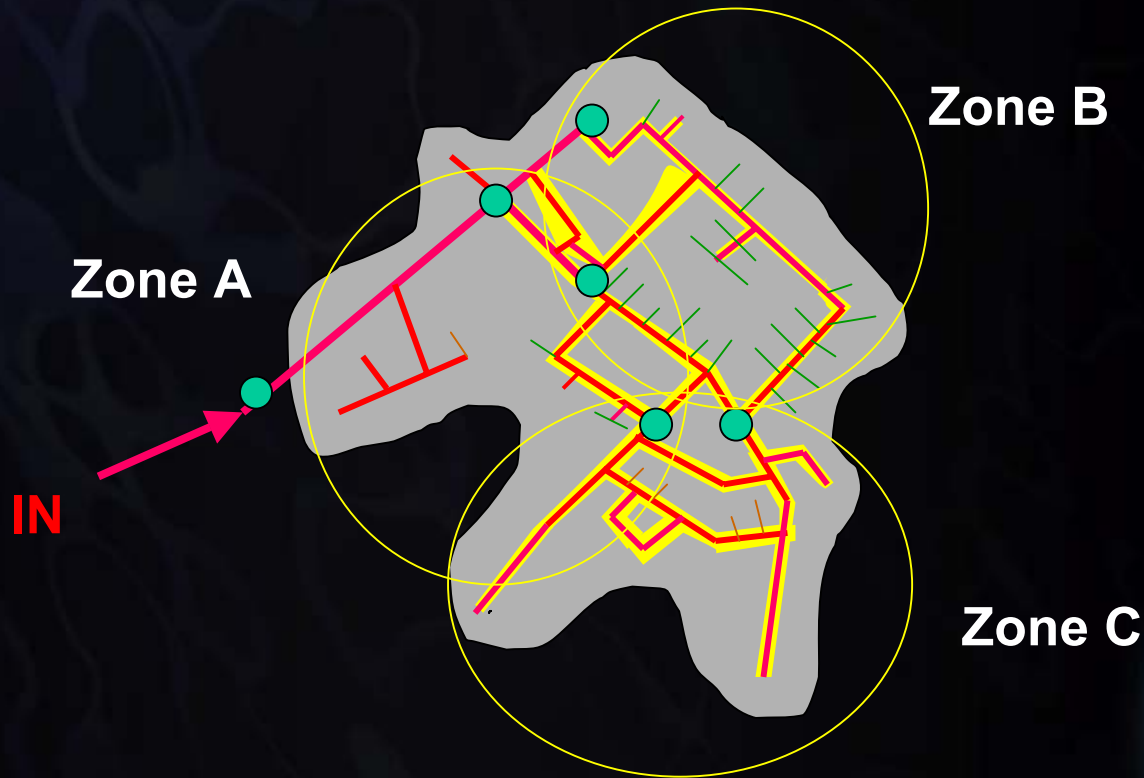
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Zoning an Area



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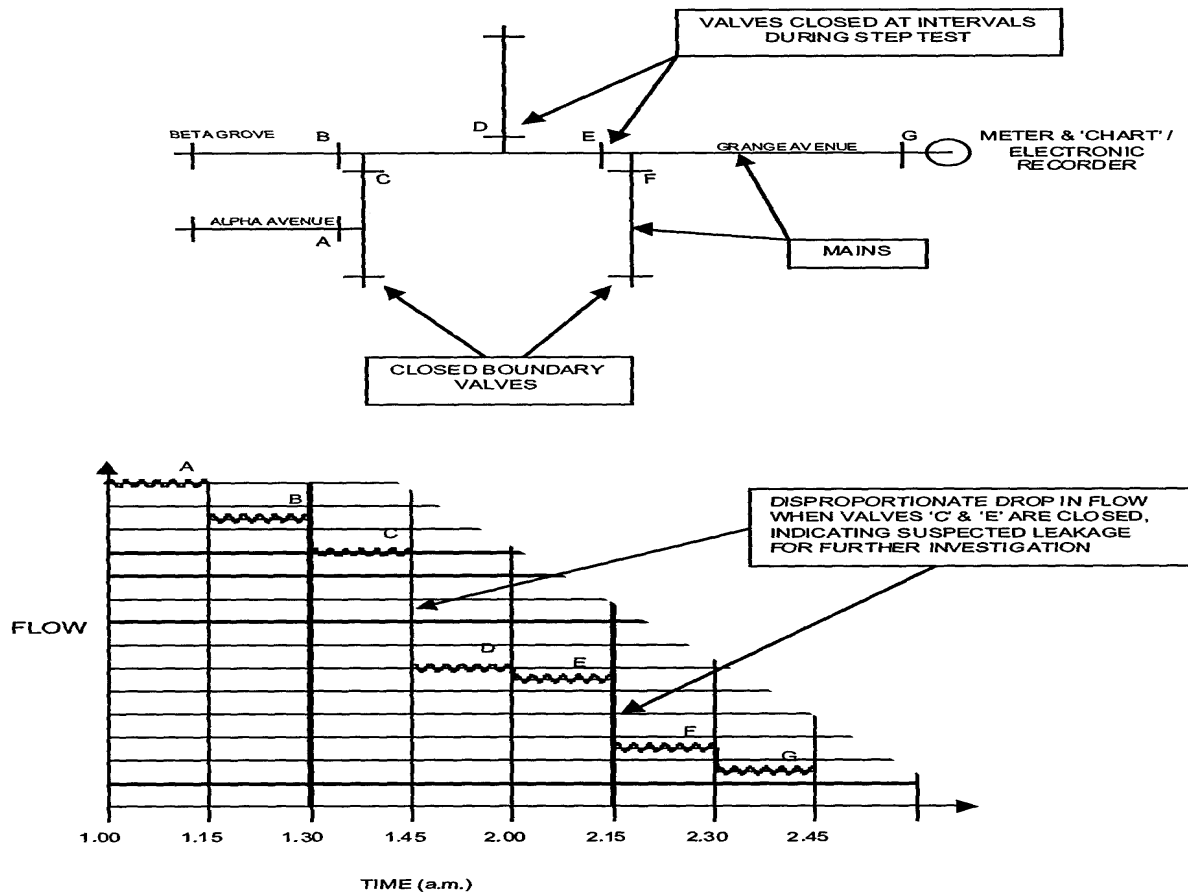
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Step Testing



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Figure 8.3 Diagram to Illustrate the Principle of 'Step Testing' for Leakage Control



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Step Testing



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Problems with Step Testing

- Requires detailed planning
- Area must be “tight” before the step test can begin
- Is normally carried out at night
- Can also be labour intensive

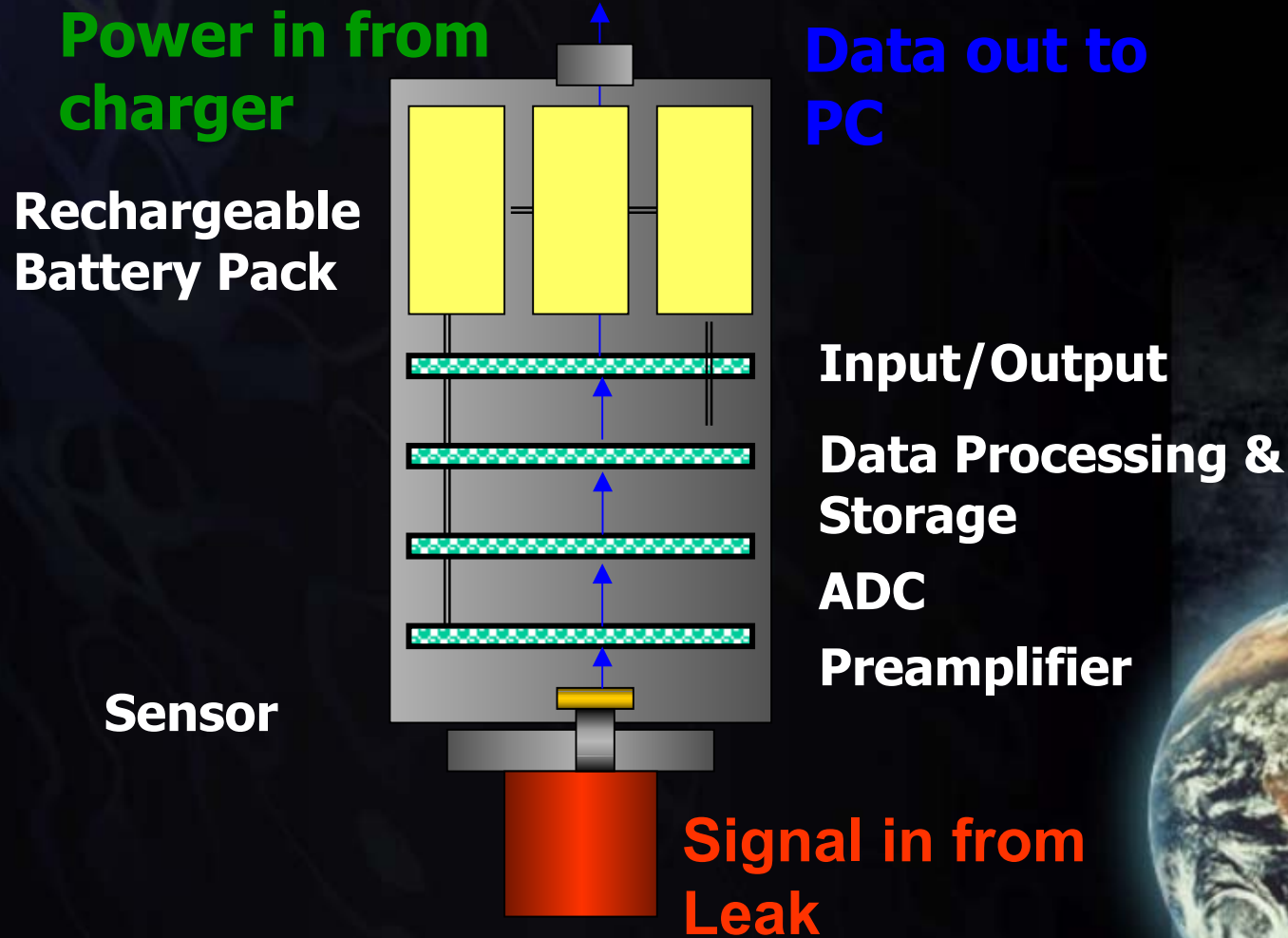
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Noise Logging



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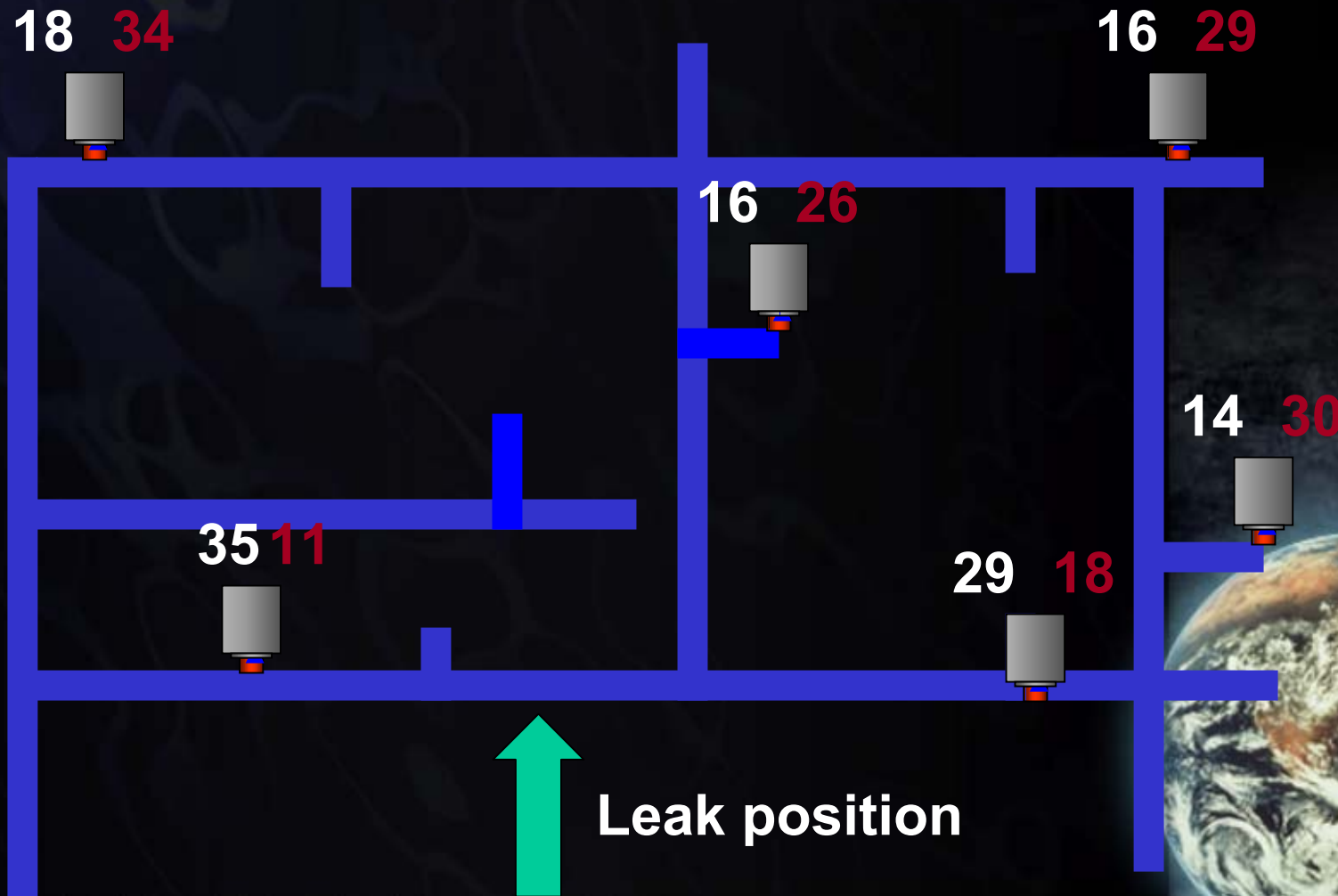


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Noise Logging



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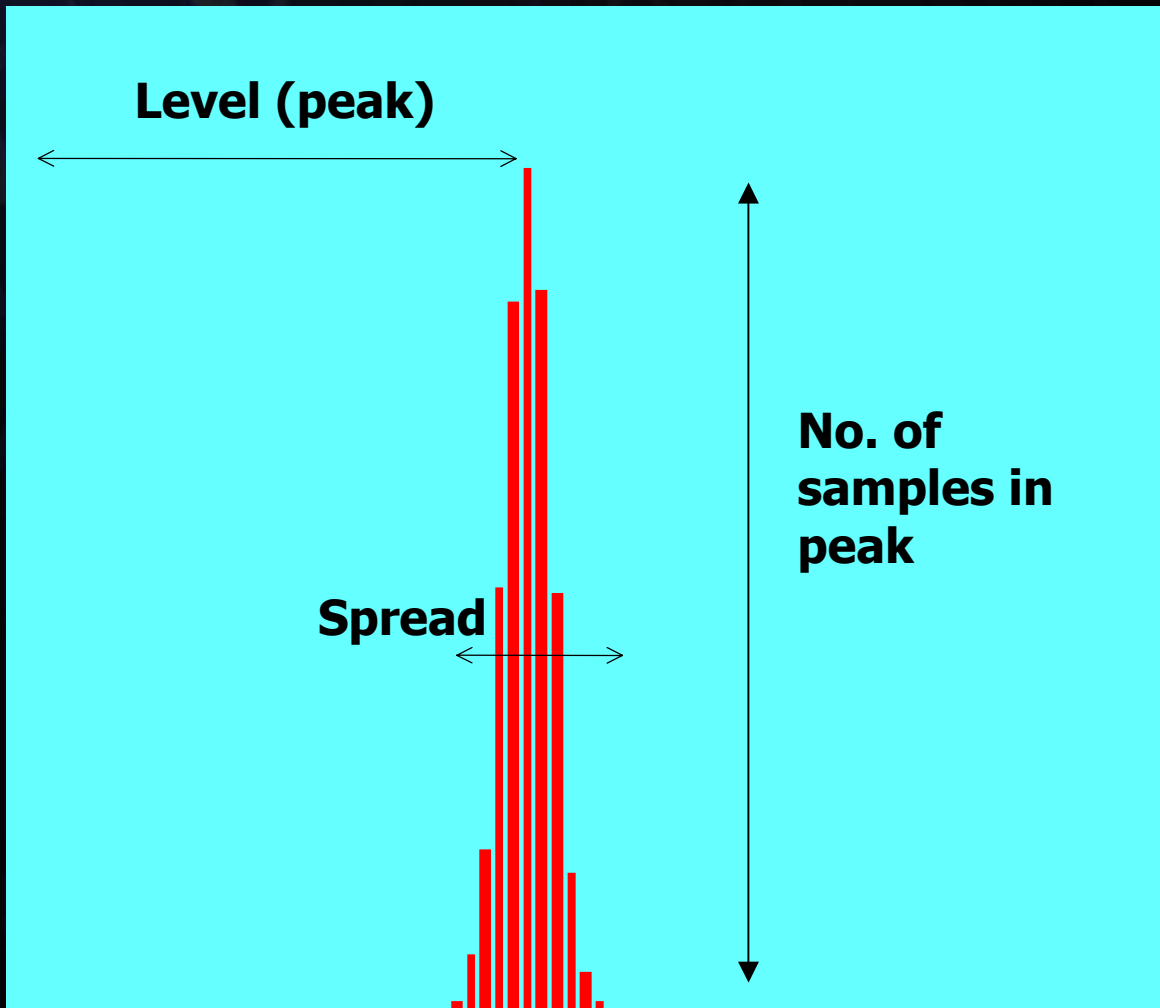
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Noise Logging



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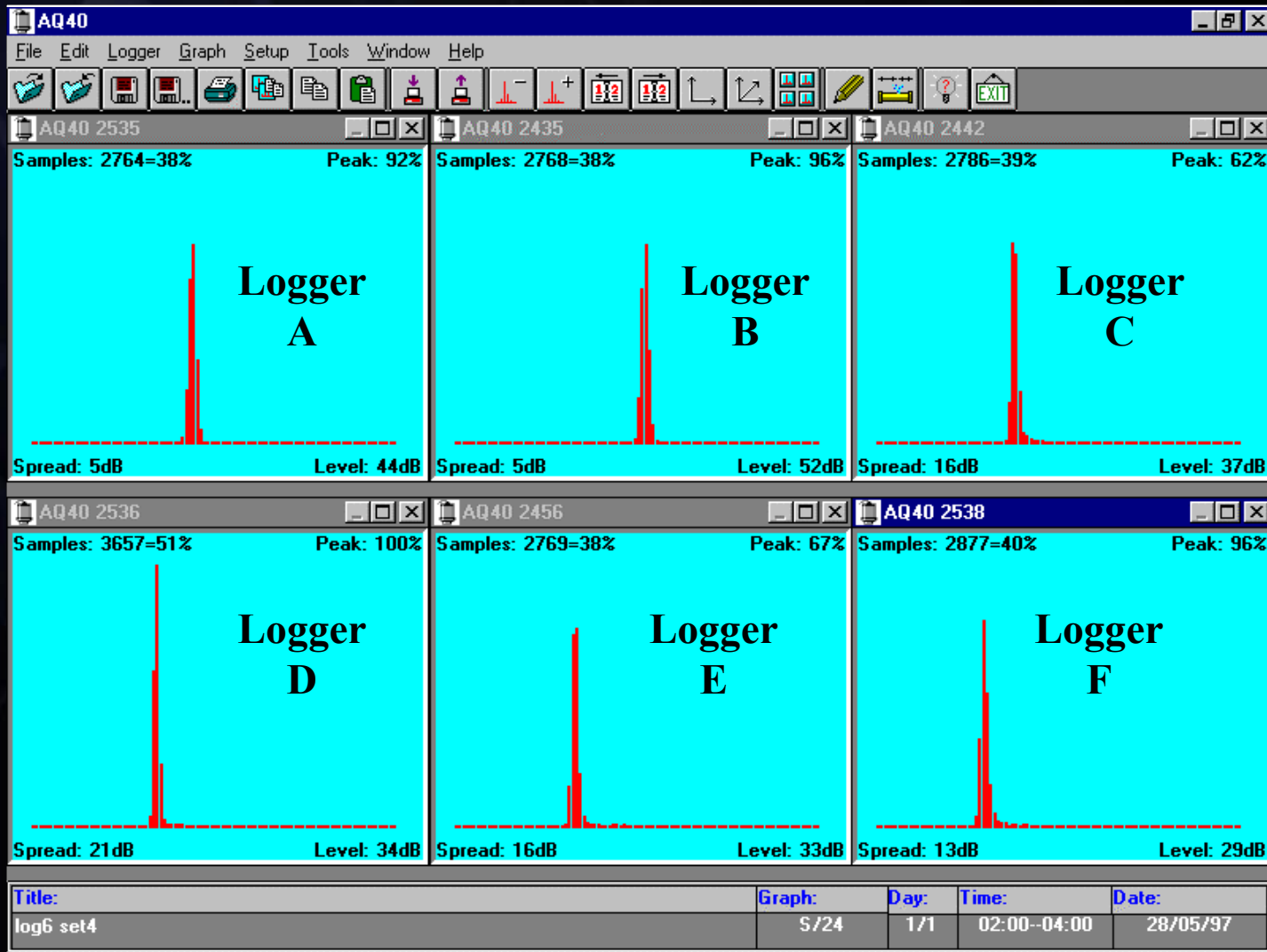
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Graph Interpretation



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Acoustic Loggers



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Potential areas for improvement

- Still require manpower (deployment and downloading)
- Need to re - deploy periodically to ensure leakage has not risen again



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Leak Noise Correlation



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MicroCorr (3/Super)



MicroCorr 4



MicroCorr 5



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Leak Noise Correlation

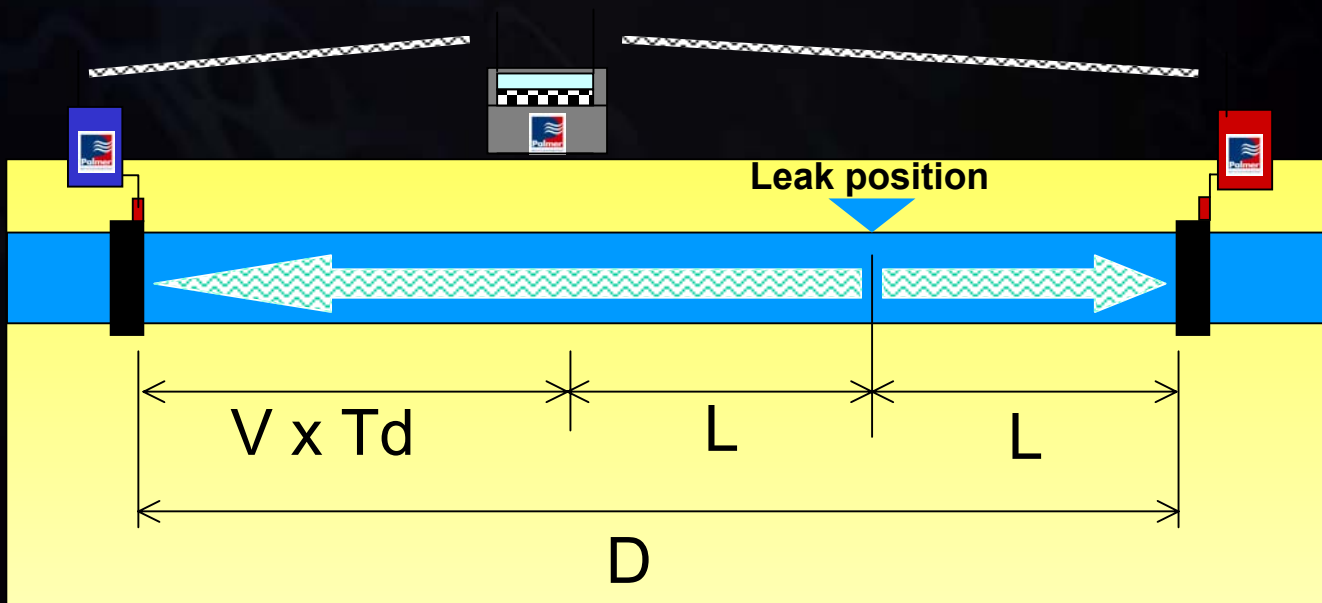


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The Process

The correlation formula

$$L = \frac{D - (V \times T_d)}{2}$$



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Leak Noise Correlation



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Information required to do a correlation

- Length of pipe between sensors
- Type of pipe – Cast Iron, Plastic
- Diameter of the pipe
- Any changes of materiel, pipe type

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Leak Noise Correlation



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Factors producing good quality leak noise

- High water pressure
- Hard backfill
- Small rupture
- Clean pipes
- Metallic pipes
- Small diameter pipes



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Leak Noise Correlation



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Factors producing poor quality leak noise

- Low water pressure
- Soft backfill
- Split mains
- Encrusted pipes
- Soft/Lined pipes
- Large diameter pipes

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Criteria for a Permanent System



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- Procedure for rapid leak localization
- No specialist labour required
- Low cost to enable widespread deployment
- Long operating lifetime
- Intelligent leak identification

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Intelligent noise logger designed for permanent deployment or tactical deployment to survey large areas of network quickly and effectively



- Fully automatic intelligent logger
- Adaptable to all network situations
- Compact size
- Low unit cost
- Long operating life
- Patent protected

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Permalog an alternative approach



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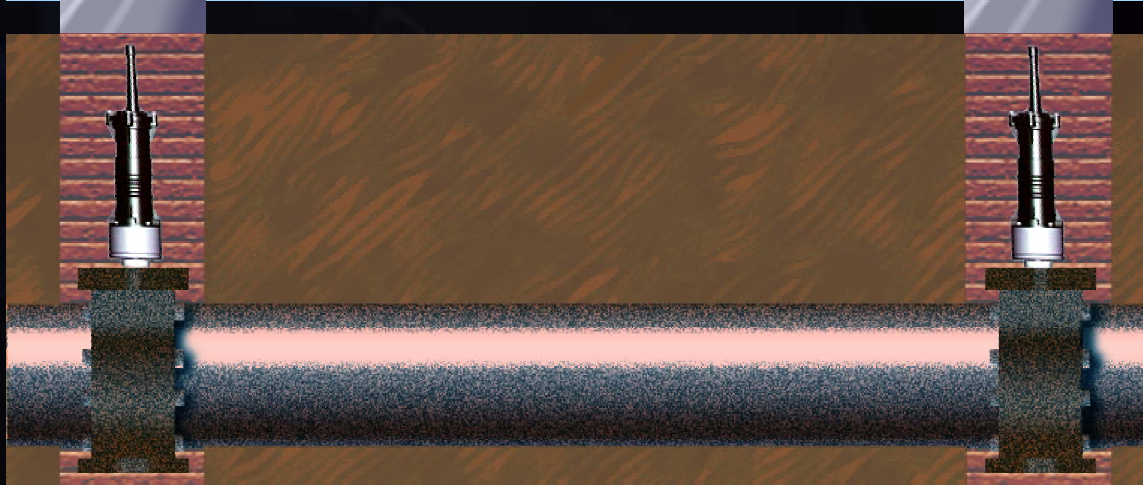


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Permalog[®] Patroller



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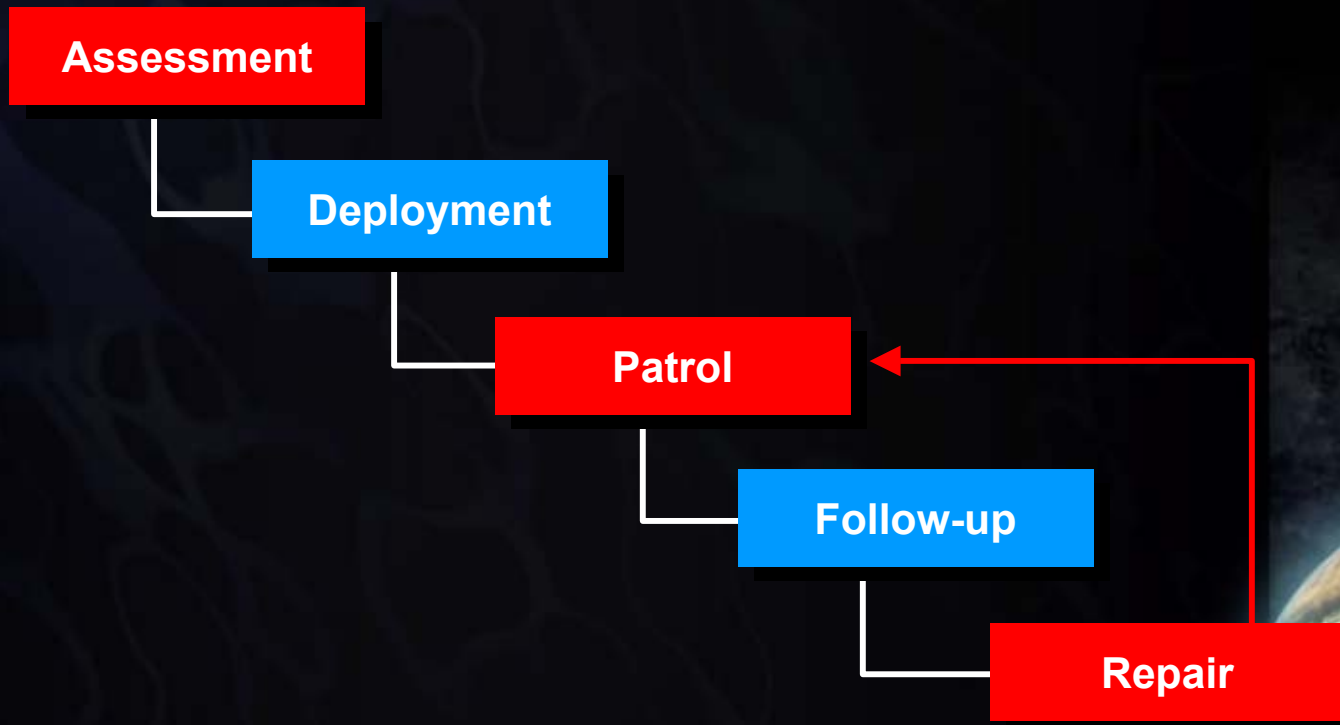


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Operational Methodology



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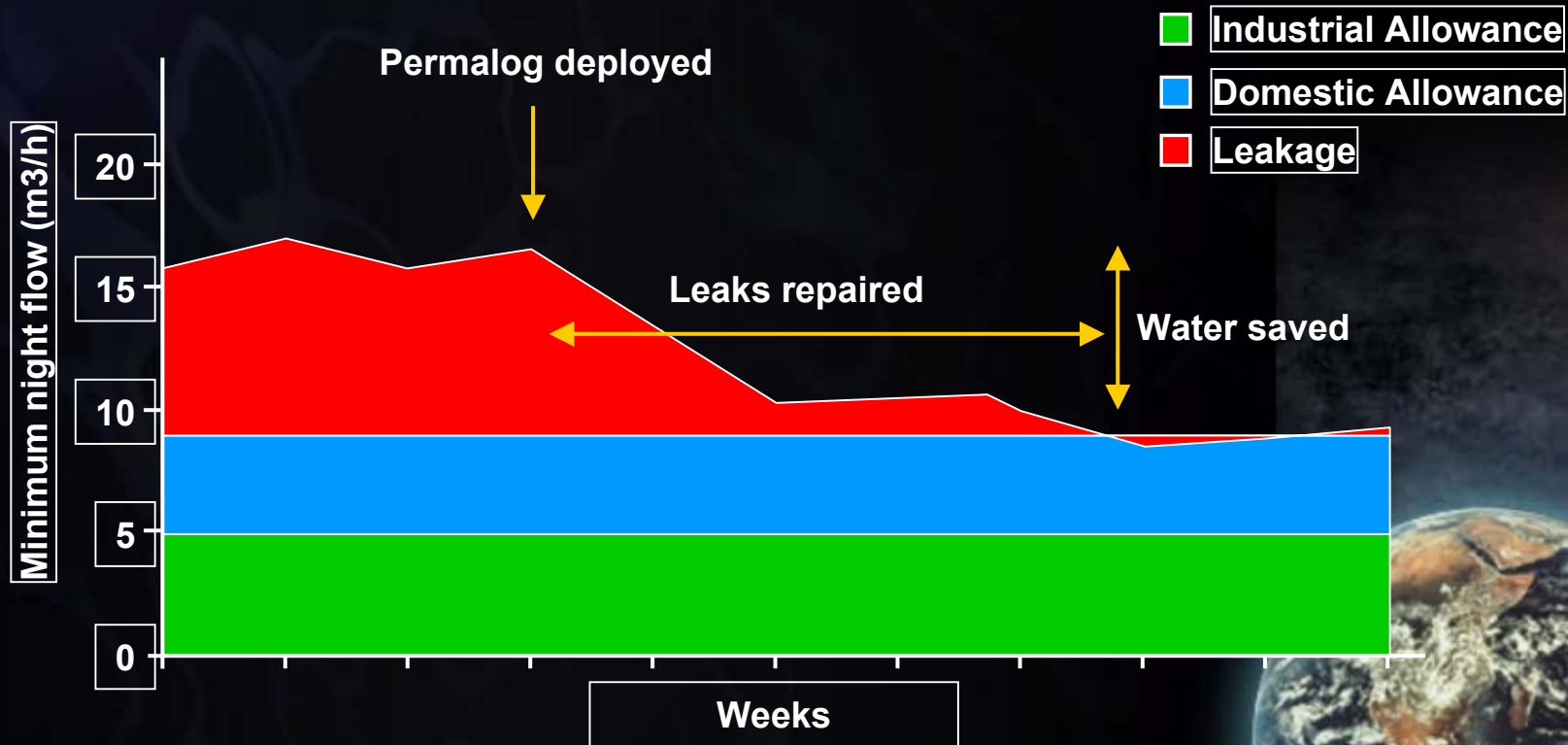
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Water Savings



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Benefits



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- 100% of distribution system monitored
- More leaks found, more quickly
- Faster response to mains bursts
- Automates and de-skills surveying
- Independent of metering/balancing
- No opening/closing of valves
- Improves overall detection efficiency and motivation
- Operates continuously over a 10 year period
- Potential to comprehensively cover a network without small flow zones
- Permanent monitoring of "sensitive" pipelines

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Pressure Management



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Why manage pressure?

- Simple and immediate method of reducing leakage
- Reduced volumetric flow into a zone
- Lower pressure-related consumption
- Fewer burst pipes
- More consistent service to the consumer

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Electronic Pressure Controllers



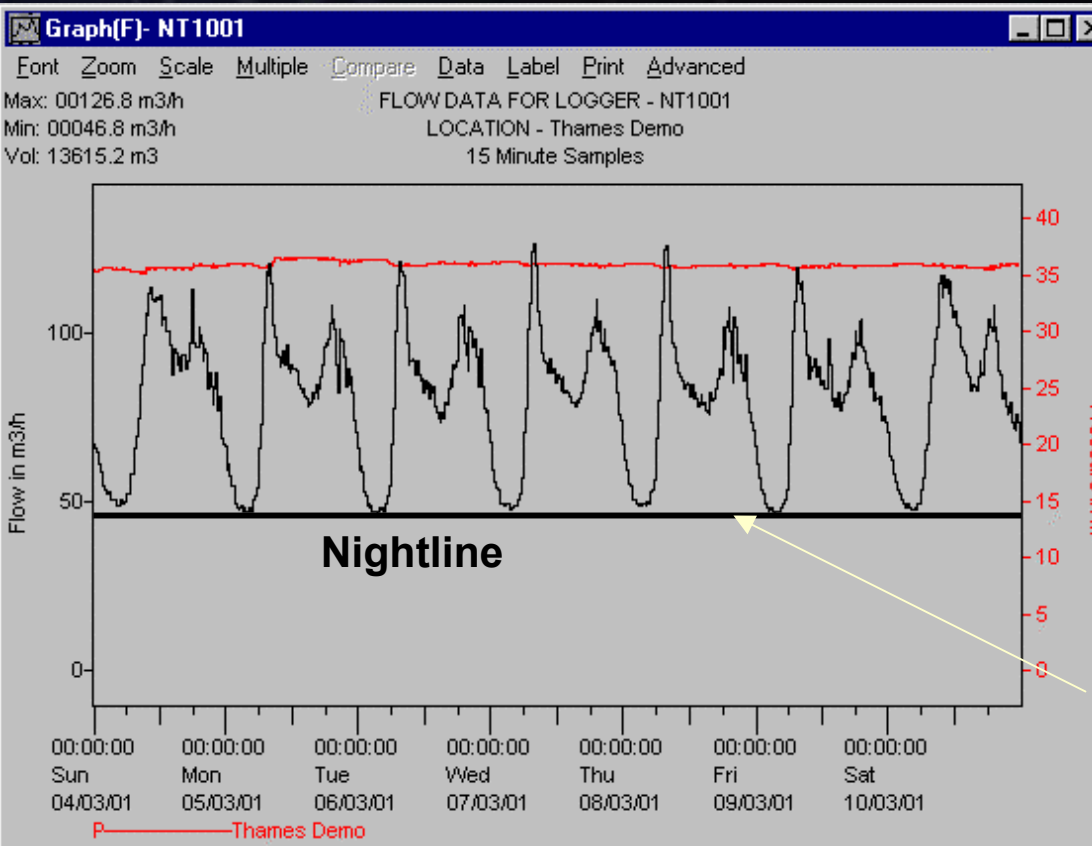
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- Regulate the operation of the PRV according to demand (flow rate) or time of day
- Optimize pressure in the network
- Get the most out of the investment in PRV
- Need to be reliable and safe



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Without PRV controller



- Fluctuating demand
- Constant pressure
- Total week's

Lowest demand. Pressure much too high

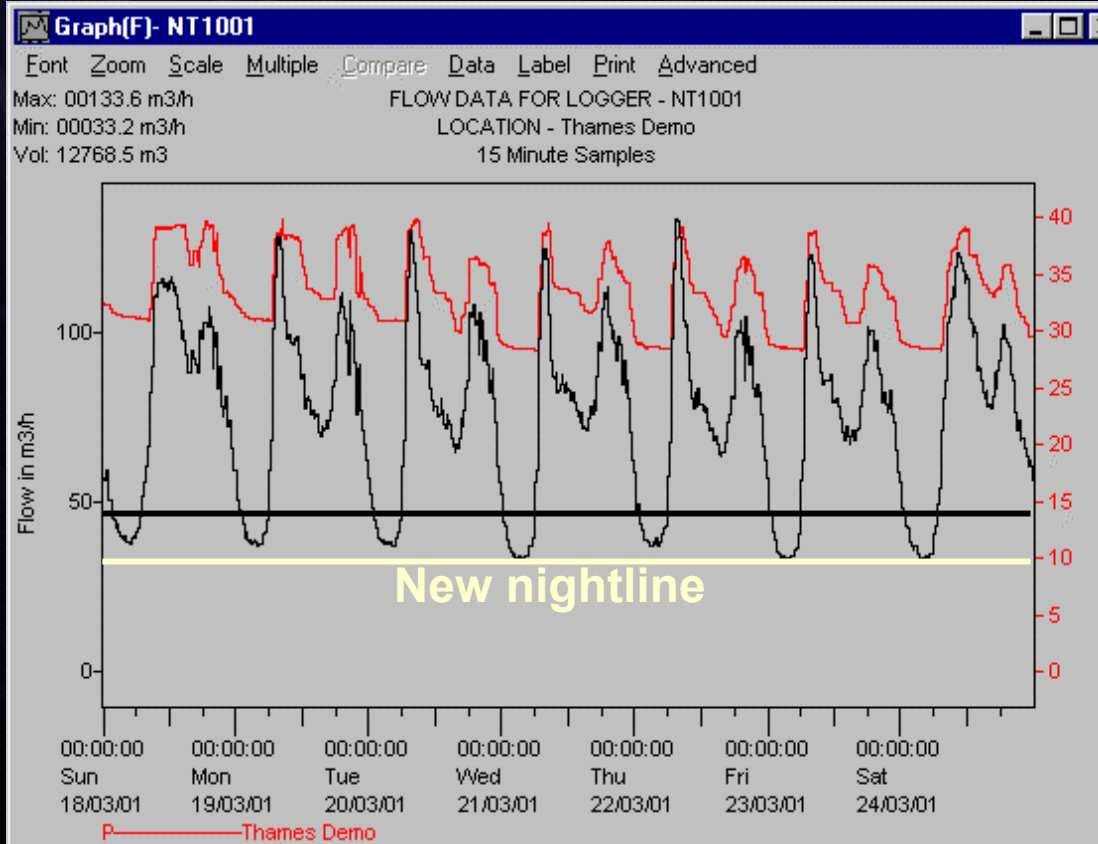


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With PRV Controller



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- Fluctuating demand
- Pressure adjusted accordingly
- 12.8ml in the week

Immediate water saving of 6%

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Conclusions



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- Sophisticated equipment is available for each aspect of leakage control.
- Performance /and reliability is key.
- Deployment of the correct techniques and technology can produce significant water saving, and effectively control the network.

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End Result Less ...



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Thank You for Your Time

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