SF_6 and the Environment:
BC Hydro SF_6 Tracking and Reduction Program

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San Diego November 21, 2002

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BC hydro

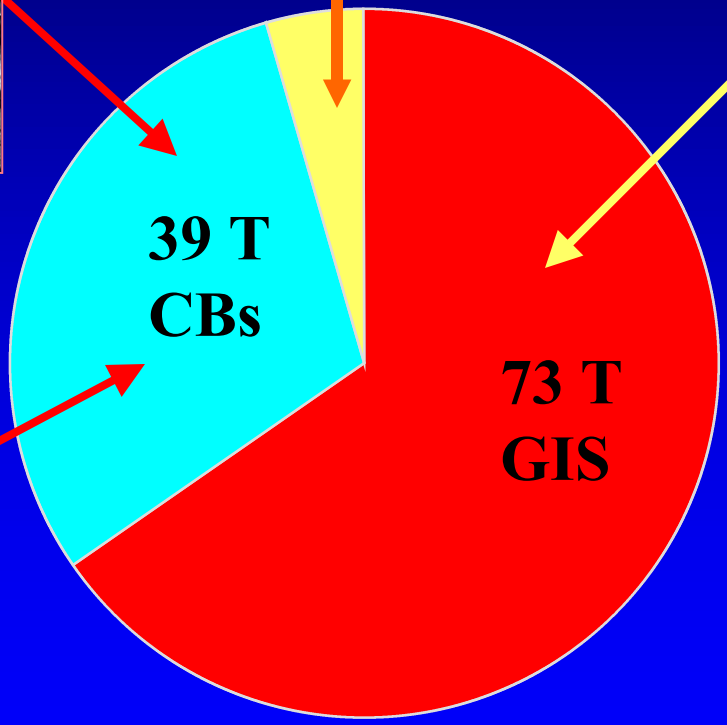
Our Business

- Generation, Transmission, Distribution
- 1.5 million customers
- 11.5 GW generating capacity
- 87% hydroelectric
- 72,000 km D and T lines

Our SF_6 Inventory

- In use since the early 1960s
  - pure SF_6 and mixtures (with N_2 or CF_4)
- SF_6 in over 1600 pieces of equipment plus 8 GIS stations
- more than 150 geographic locations
- range from 12 kV to 500 kV

SF_6 quantities in-service



112 tonnes in service

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SF_6 Reduction Program Components

- Establish amounts in service (1997)
- Design/Implement tracking system (1999)
- Train staff (99 and on-going)
- Establish SF_6 reduction targets (2001)
- Implement reduction strategy (2000)

  Repair, **R**ecover, **R**e-use,
  Replace, **R**ecycle,
- Monitor and report

SF_6 Tracking System

Weigh cylinders before and after use

Record by location, equipment ID and usage type

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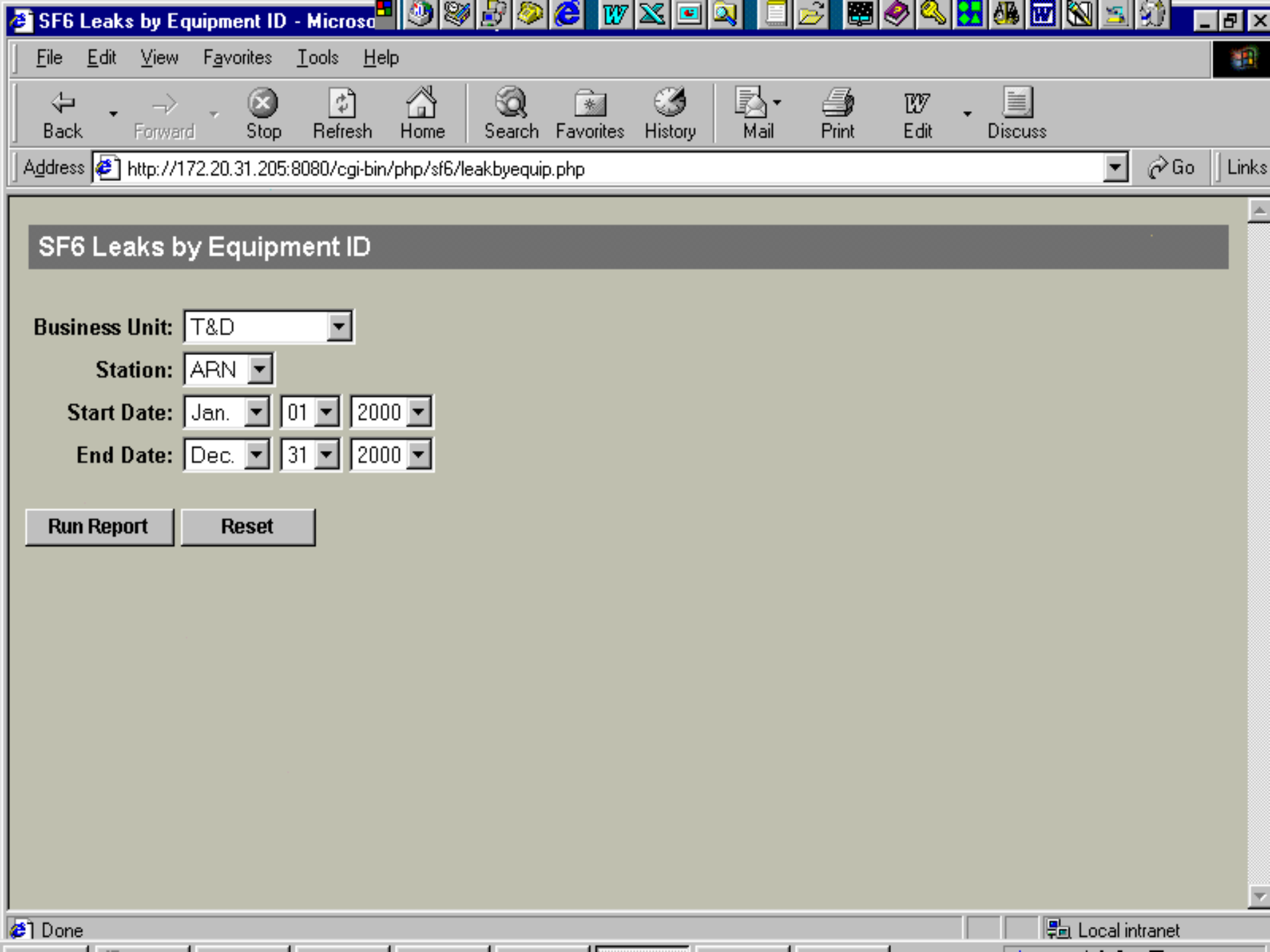
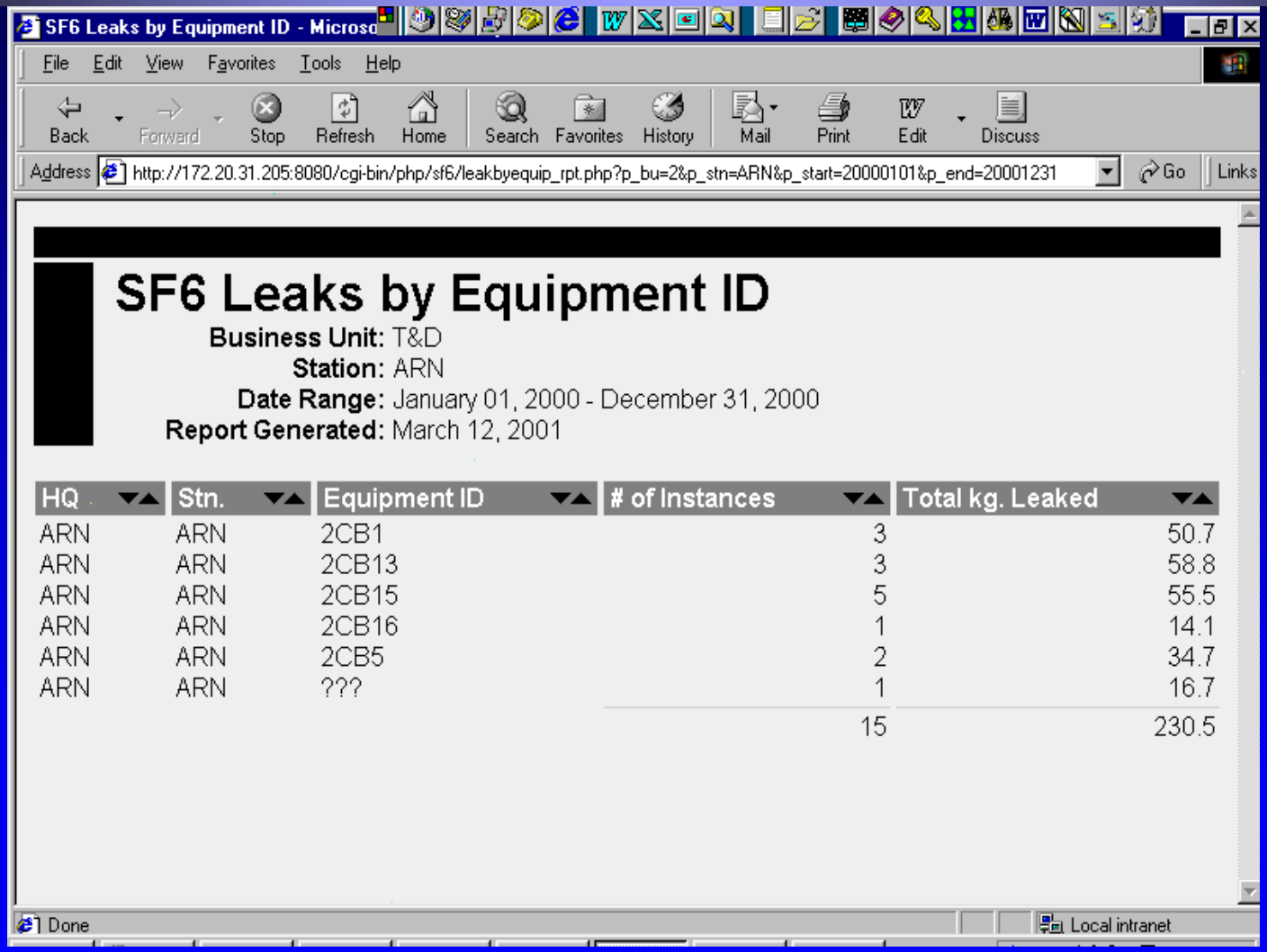
Usage codes

- N New - added to new equipment
- M Maintenance - repairs, overhauls,
- L Leakage - slow leaks
- F Fault - equipment failure
- T Transfer - to cylinder or cart
- C Contaminated gas
- D Decommissioned


SF6 Leaks by Equipment ID - Microso
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discuss
Address http://172.20.31.205:8080/cgi-bin/php/sf6/leakbyequip.php
Go Links
SF6 Leaks by Equipment ID
Business Unit: T&D
Station: ARN
Start Date: Jan. 01 2000
End Date: Dec. 31 2000
Run Report
Reset
Done
Local intranet

Report example



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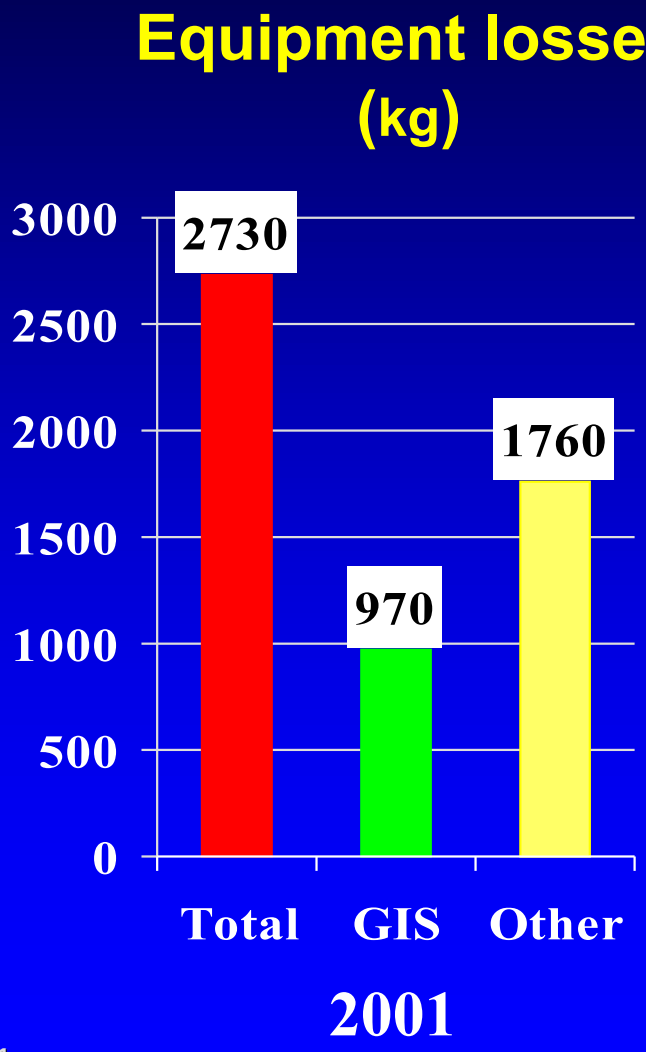
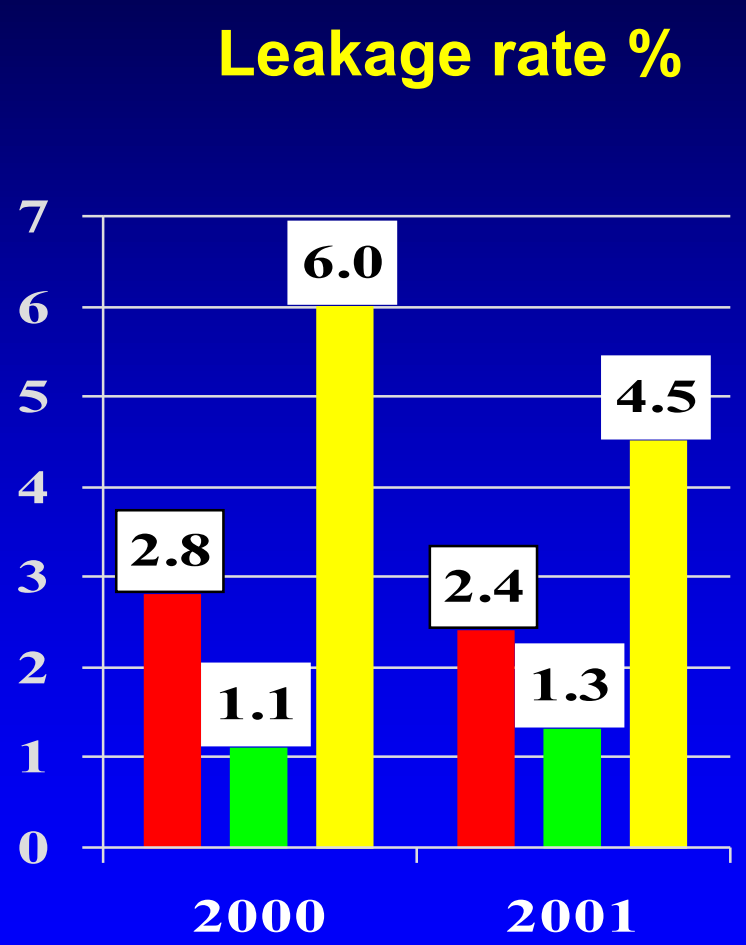
Equipment losses versus leakage rate





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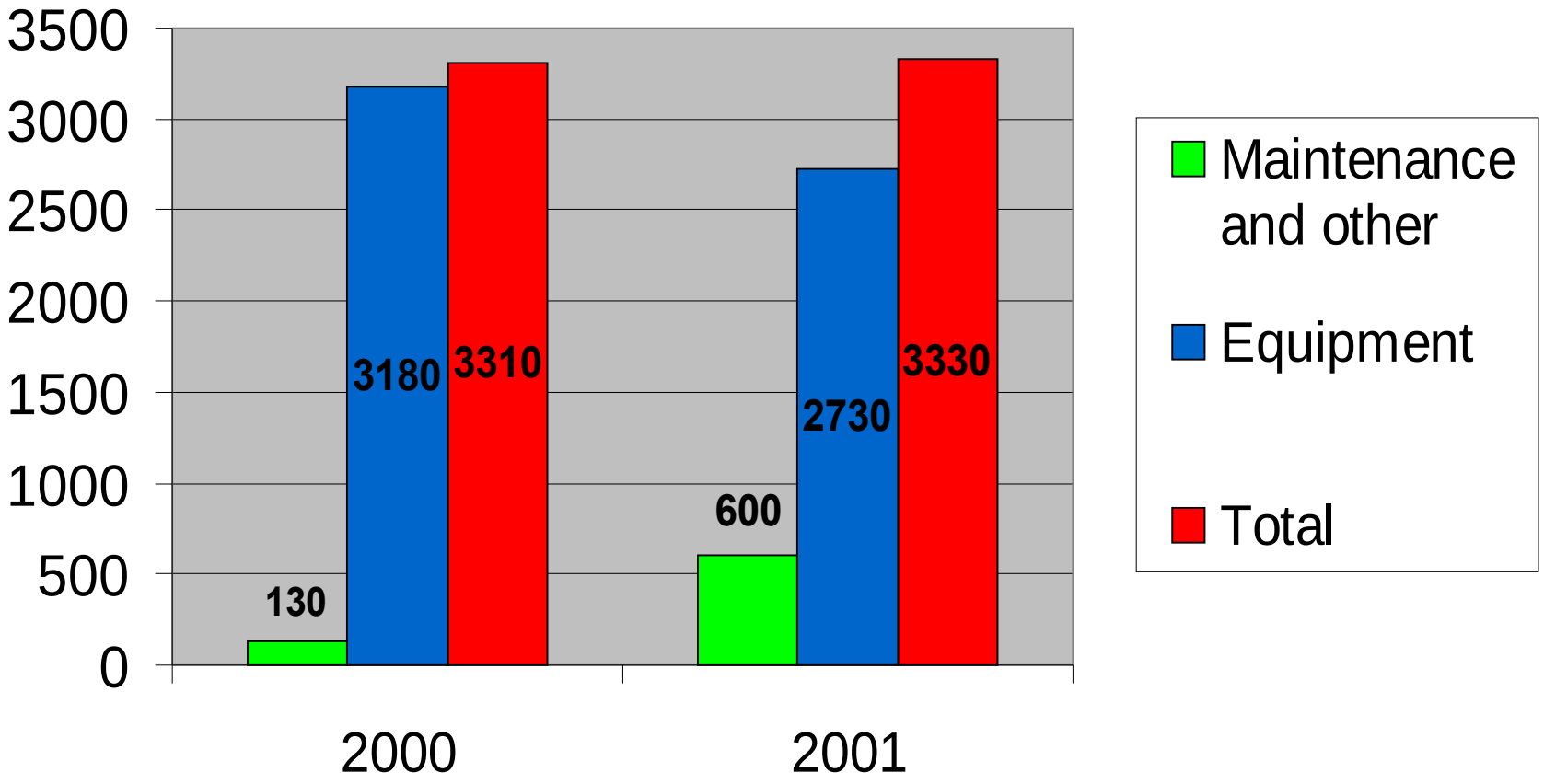
BC Hydro Overall SF_6 Losses (kg)



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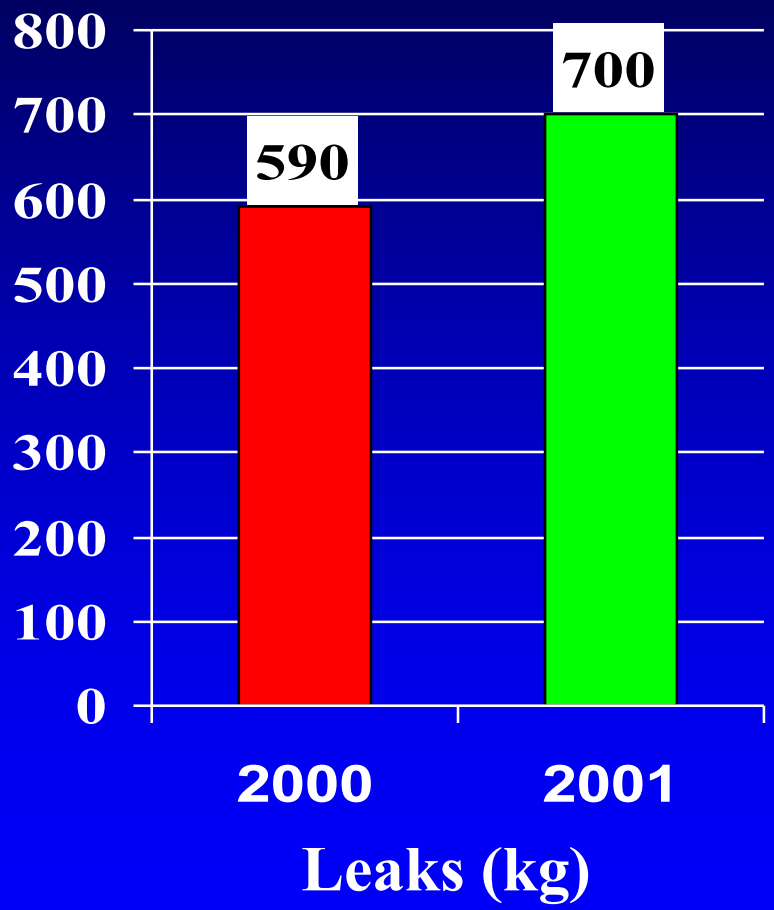
The Culprit Equipment

- 85% of BC Hydro 2001 losses

- 40 CBs + 1 GIS

- repairs done on 25 units in 2000-2001

ITE 230 kV Dual pressure breakers



- **21 leakers (from 15 in 2000)**
- **avg. leak rate 7.2%**

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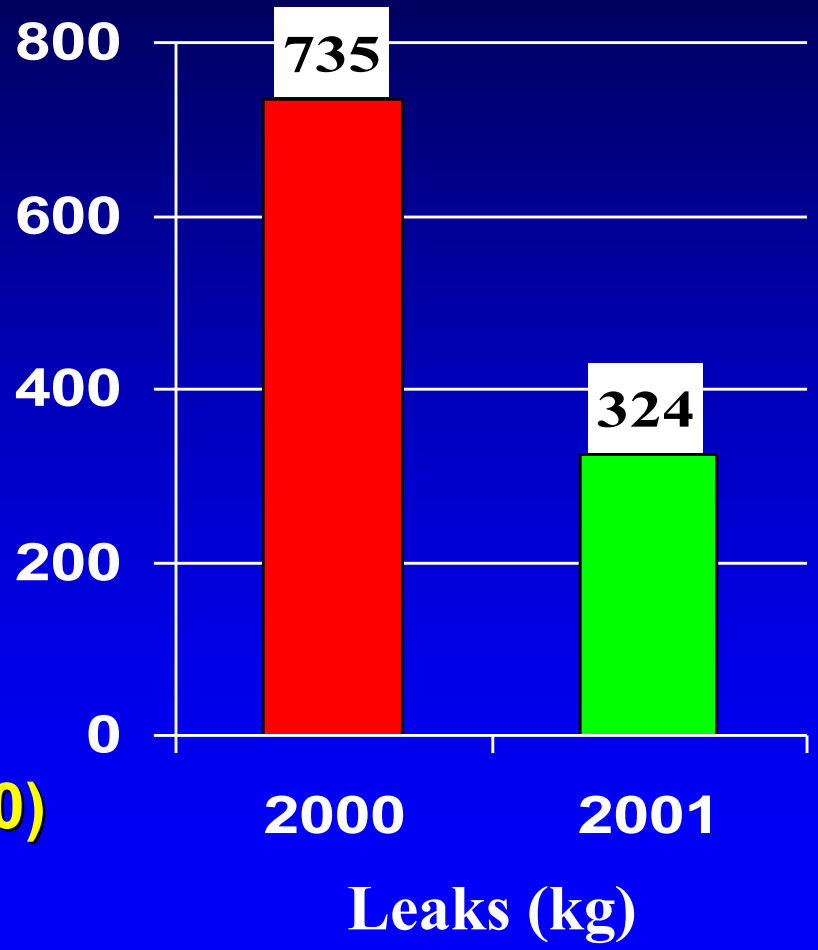
Westinghouse 230 kV Dual pressure breakers



- **10 leakers (from 16 in 2000)**
- **avg. leak rate of 5.2%**

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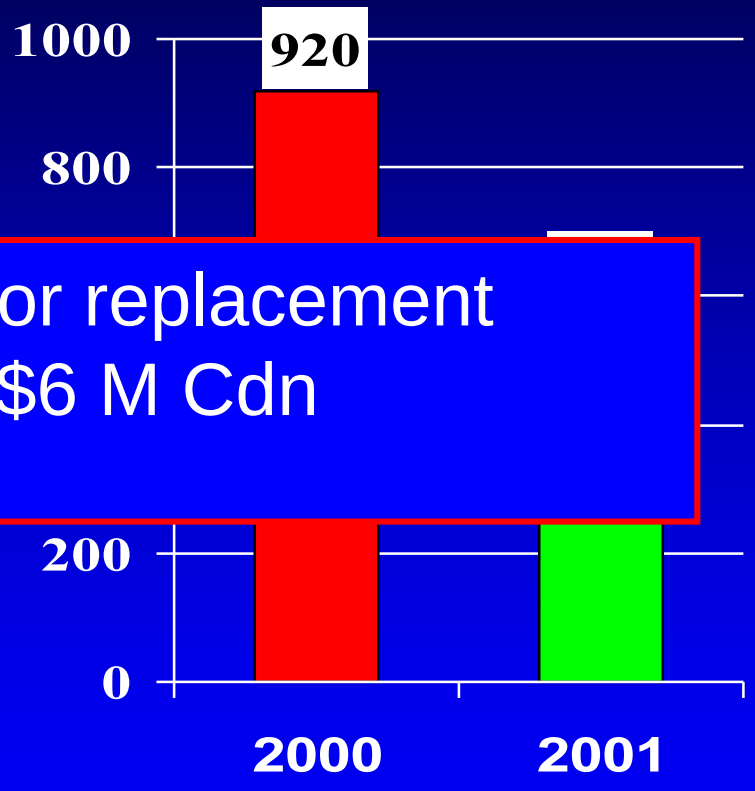
GE AT type air blast breakers 230 and 360 kV

- 9 units scheduled for replacement
- costs of over $6 M Cdn



- **9 leakers (2001)**
- **avg. rate 12.5%**

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MICA Generating Station - ITE GIS

- 776 kg lost (2001)
- leakage rate of 4%
- 80% of GIS losses
- leakage rate for other GIS = 0.4%

Tracking system deficiencies

- Overall mass balance possible but difficult
  - **more than 500 cylinders in system**
- gas stored in gas carts not always accounted for
- cylinders or cards go “missing”
- maintenance losses also include losses from leaks.

Program Benefits

- set priorities for repairs and replacement
- track if repairs successful
- data used in business cases for replacement
- increase staff awareness/competencies
- influence future regulatory requirements

SF_6: Significant contributor to BCH GHG

- 3 MMTCE overall emissions
- 2 MMTCE from Burrard Thermal
- SF_6 is 2.7% of BCH GHG emissions

Conclusions - Why are we doing it?

- Use of SF_6 technology is a significant component of our business.
- SF_6 can be managed in an effective and sustainable manner.
- SF_6 tracking and management results in a significant reduction of leaks.
- Leak reduction helps us deliver on our environmental policy, EMS and goal of becoming a sustainable energy company.

Contact for further information

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