

Aluminerie de Deschambault – Fluoride Reduction... Continuous Improvement



TMS Presentation – *February 2009*

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Alcoa Canada Primary Metals

More than **1 million** metric tons per year

3,300 employees

4 plants





Alcoa Canada Primary Metals



Aluminerie de Baie-Comeau (smelter)

Aluminerie de Deschambault (smelter)



Aluminerie de Bécancour (smelter)

Montreal Head office



Usine de Tige de Bécancour (rod plant)



Aluminerie de Deschambault

- Production start-up: February 1992
- Construction cost : 1 billion \$ CA
- 264 AP-30 pots
- Annual Production:
 - Initial design: 215,000 MT at 300 kA
 - Actual design: 260,000 MT at 365 kA
- Jobs :
 - 530 permanents
 - ~100 temporaries





Fluoride priority at Deschambault?



Why !

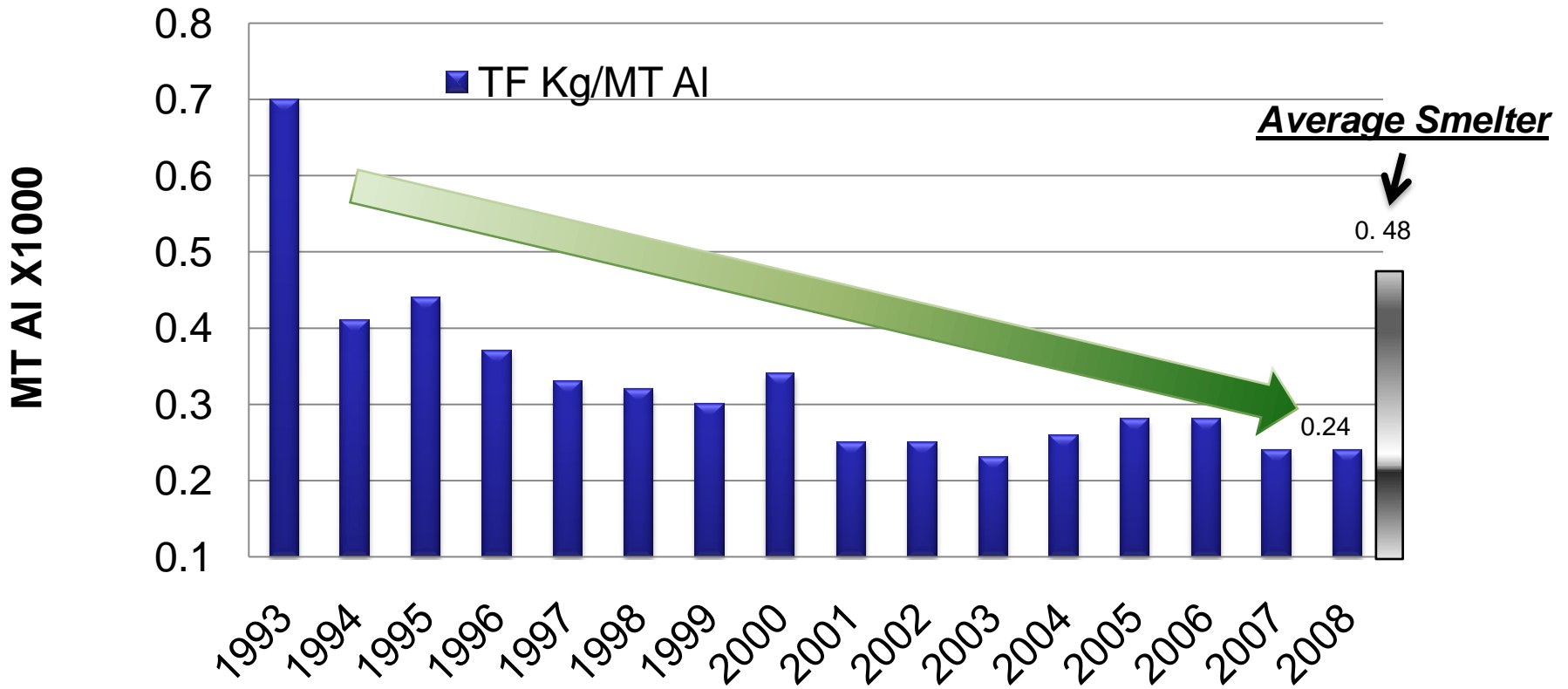
*Smelter in the park...
very sensitive vegetation near-by...
agricultural zone...*

Environment is a priority for this plant



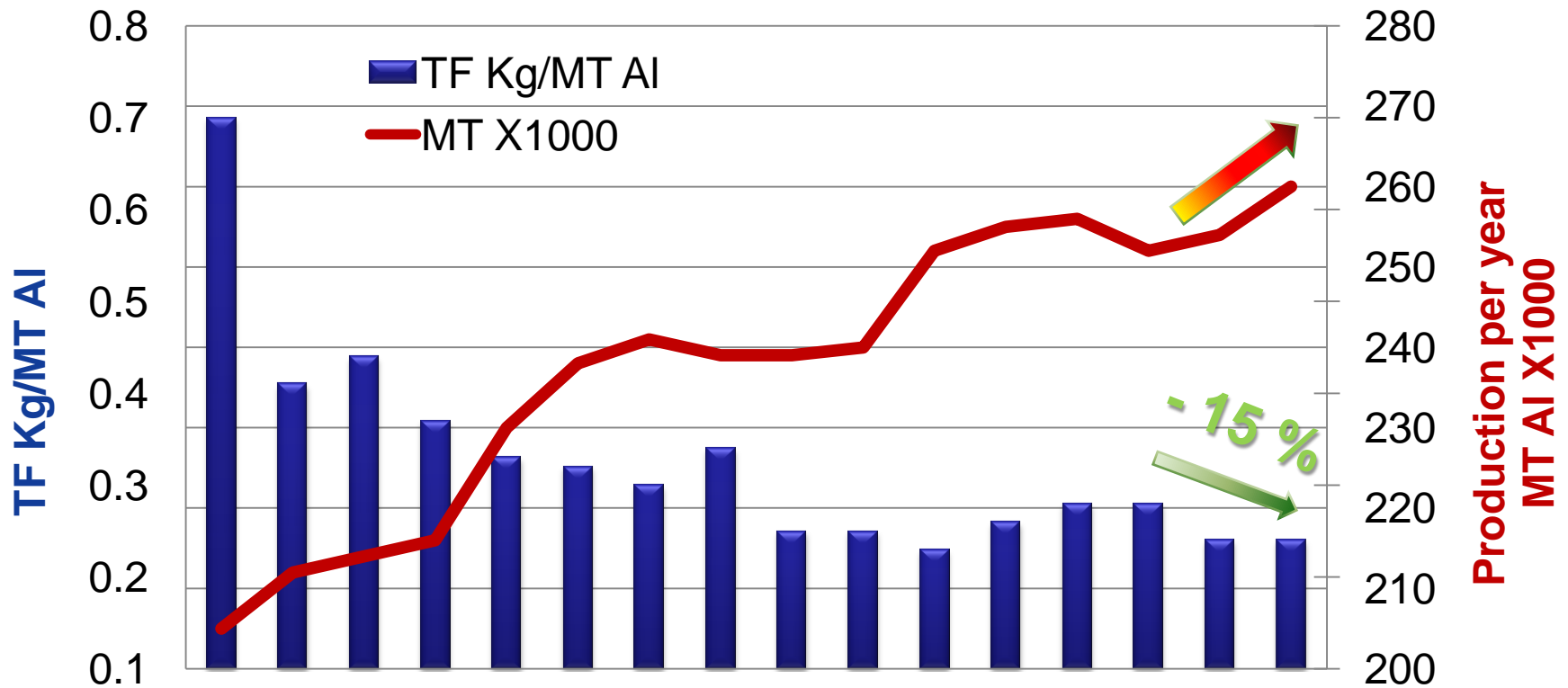
Deschambault - Worldwide Benchmark Fluoride Emissions

Fluoride Emissions at Deschambault





Production Up ! Emissions Down !

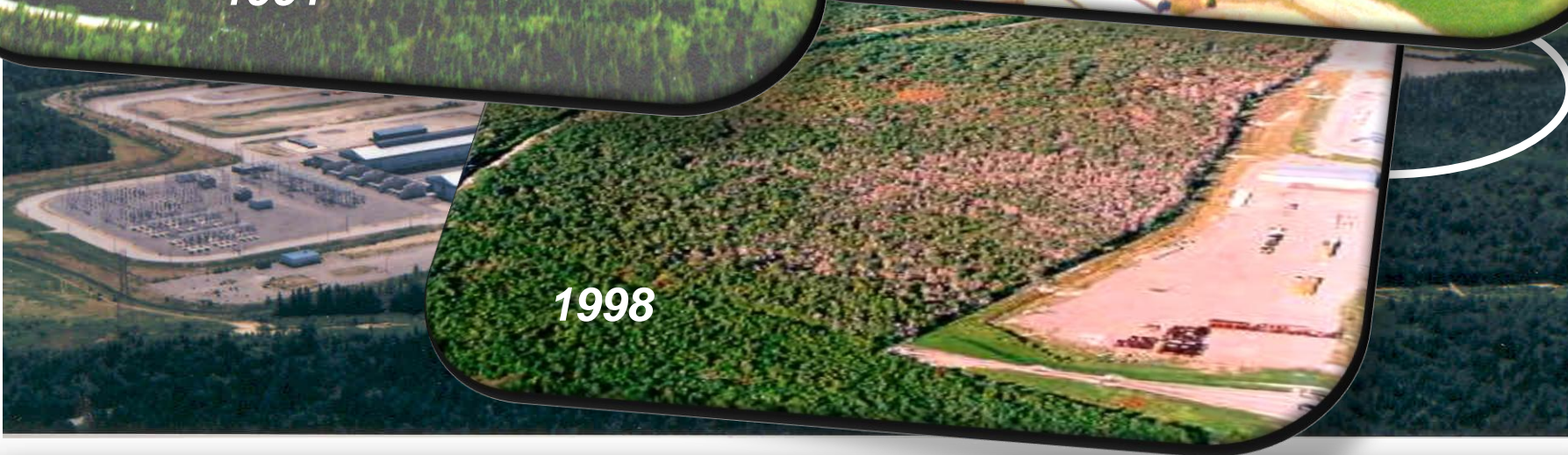
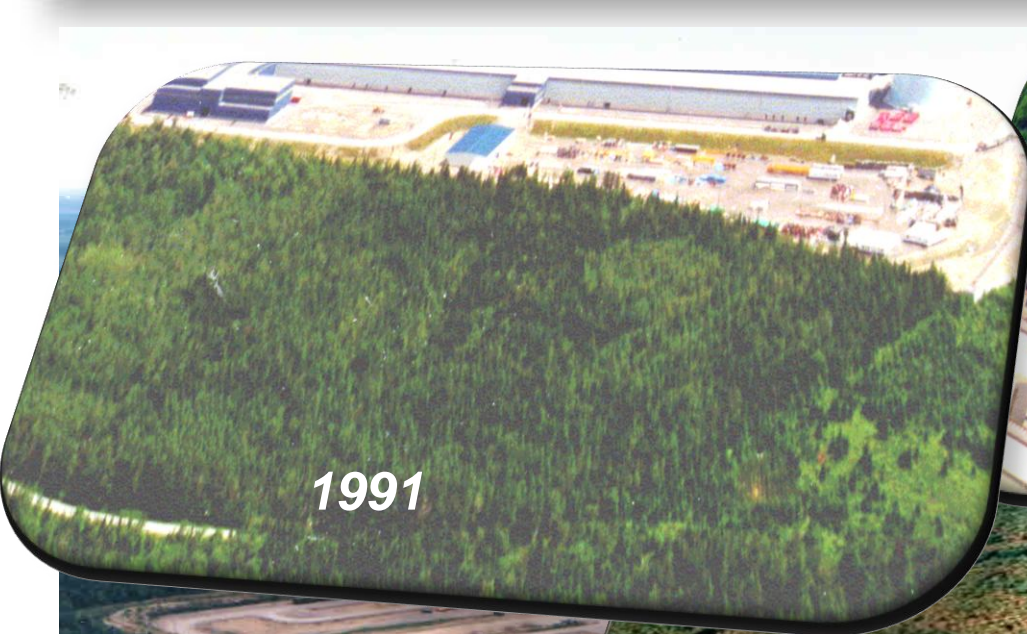




The Story of this Accomplishment ...



1997 ... Trees affected on the outskirts of the plant



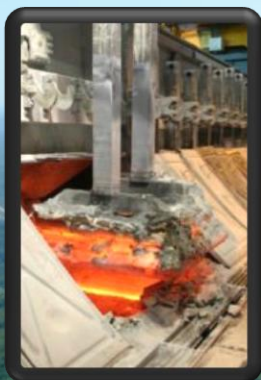
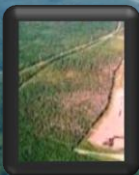
1998 : Anode setting leveling

How :

- ✓ Spreading-out of anode change cycle, 4 changes/hour

Why:

- ✓ To reduce occurrence of fluoride emission peaks detrimental to vegetation close to the plant (chemical attack)
- ✓ To increase equipment availability (Important with dual draft project)
- ✓ To increase work quality rather than speed



1997

1999

2002

2004

2004

2006

2007

2009

Results of anode setting leveling

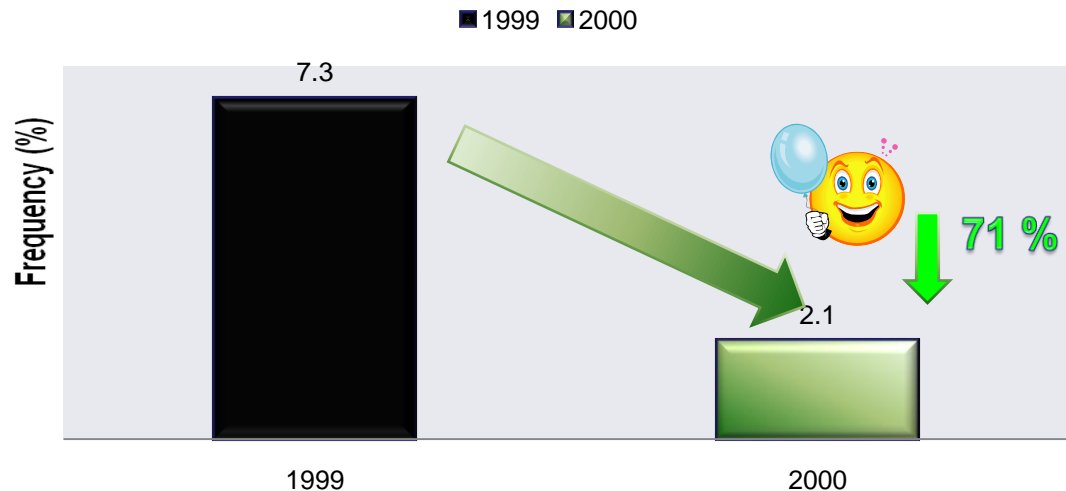
✓ *Rigorous follow-up:*

- Since 1998 , follow-up shift by shift., per team, per operator and in real time
- To make sure that all respect the rule of not more than 4 anode settings per hour.

✓ *Results:*

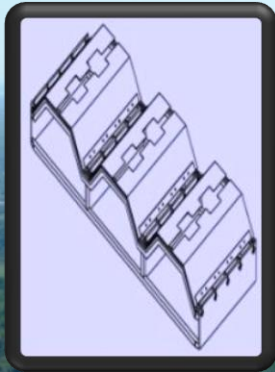
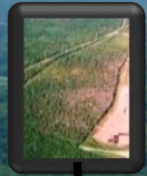


Peak HF concentration >15ppb (ambient station in trees decline area)





Summer 1999 : Development of bin cover and anode tray



1997

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2001

2002

2004

2006

2007

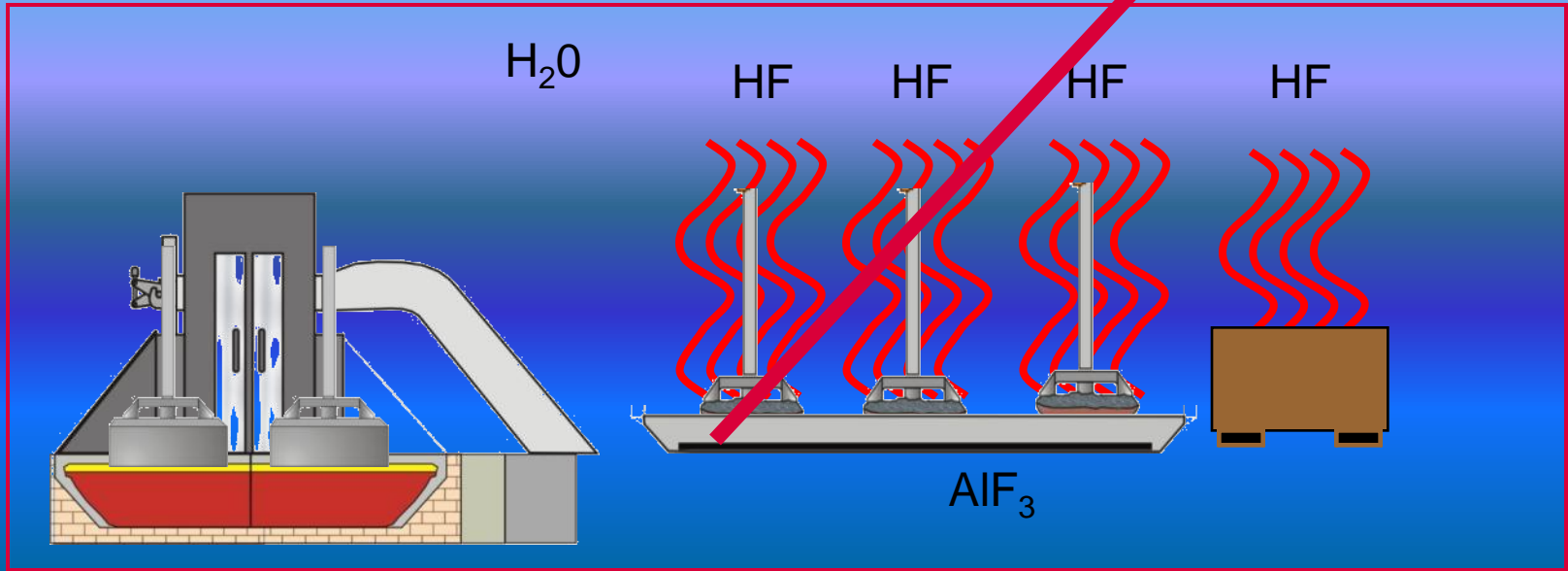
2009



Anode tray project...



**HF emitted in the Potrooms .
The importance of the anode tray is:
80% emissions occur in first 20 minutes**

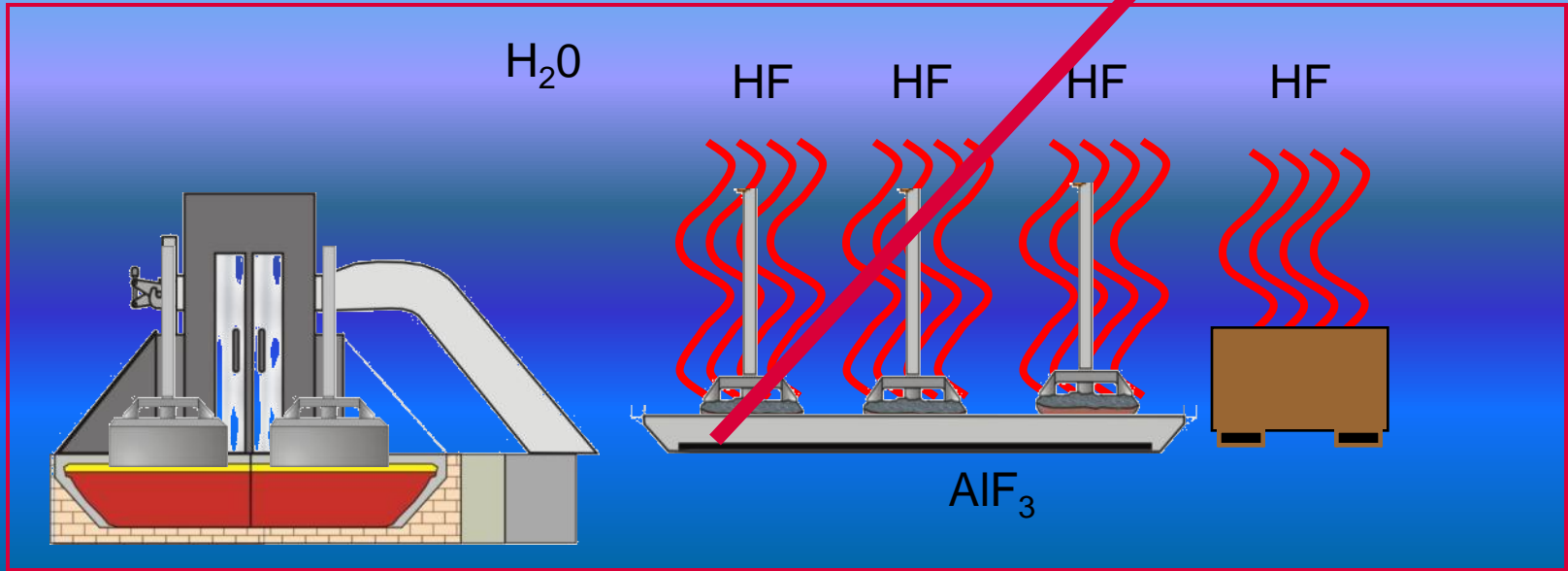




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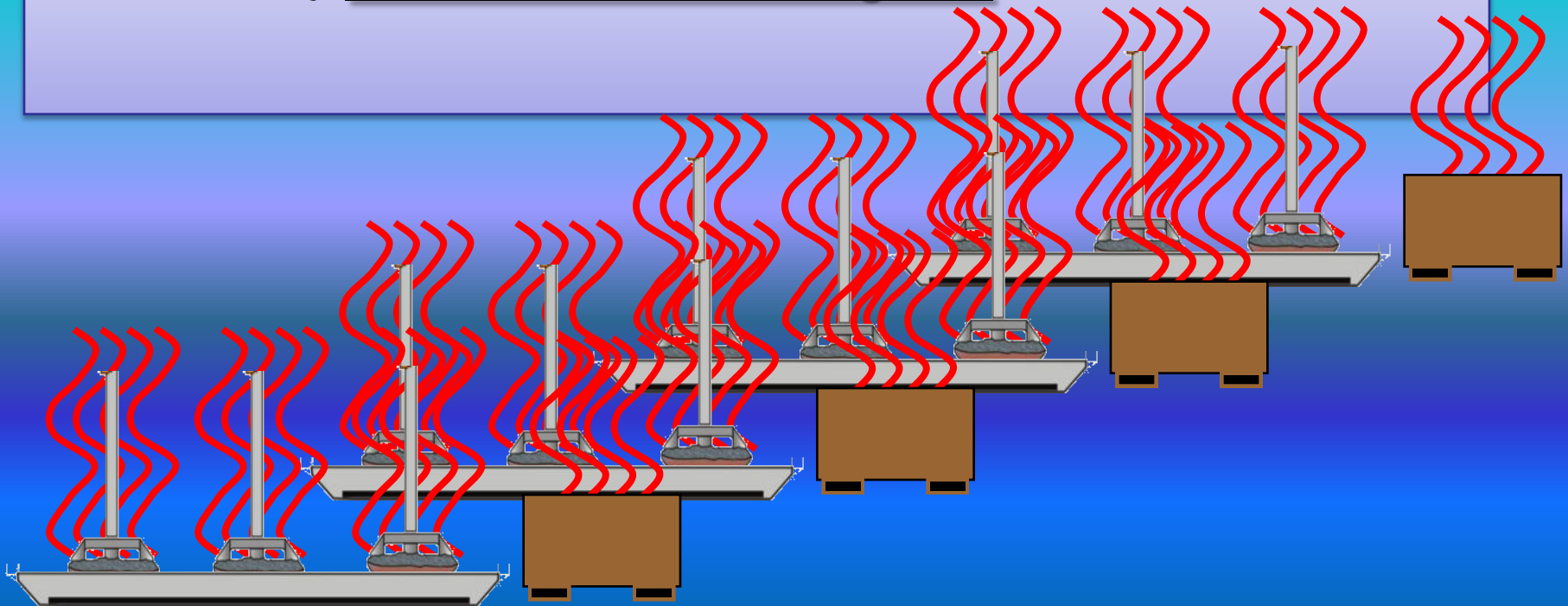




Butt cooling area... Major cause of tree damage

We had no choice...

To make a step change reduction for fluoride emitted by roof fans at butt cooling area

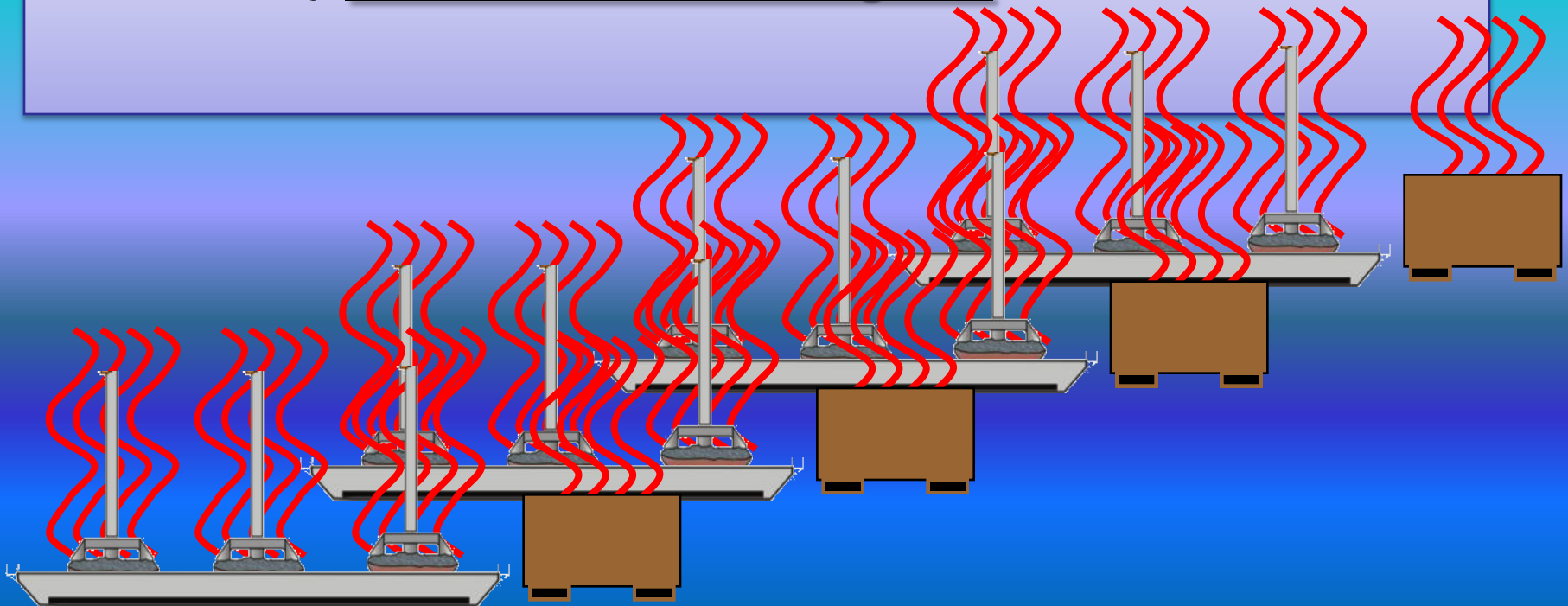


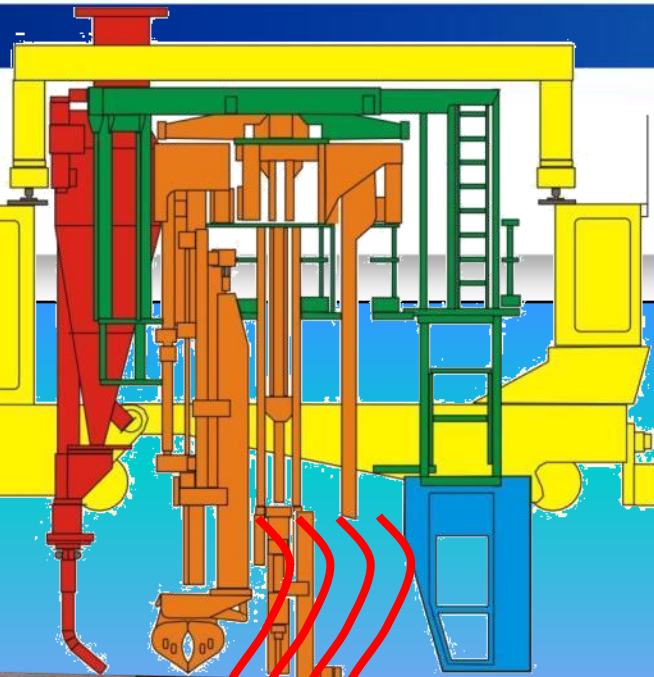


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Results at cooling area... 80% reduction HF at roof fan



Bath Processing (cooling process)

Passé / Before

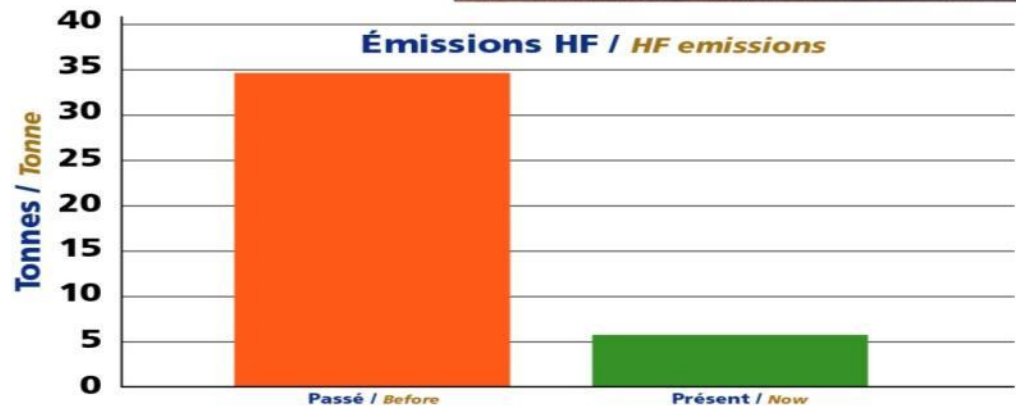


Présent / Now



...résultat / result!

80 %



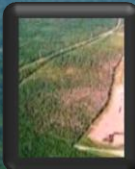
2002 : Ventilation Upgrade Project...



Two objectives:

- Increase by 15% the flow of each pot
- Have dual draft at 4.4 Nm³/sec when we work on pots

18.9 M\$ US CAPEX for this project



1997

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2009



Increase ventilation at each pot... A new network ducting with new CTG



Pot Ventilation Increase

Passé / Before



Ventilation flow 2.1 Nm³/sec

Présent / Now

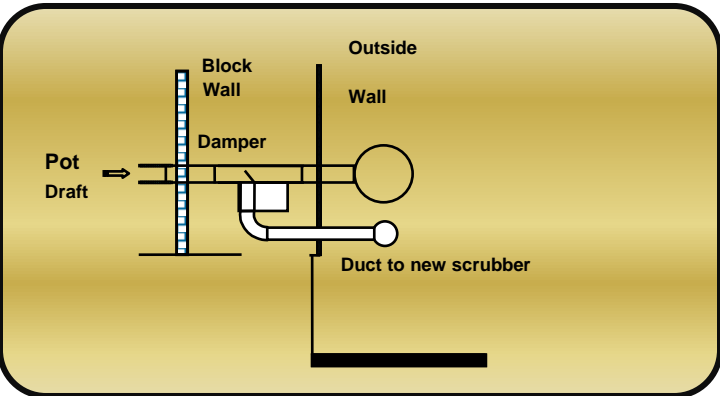


Ventilation flow 2.4 Nm³/sec





High draft mode.... Installation diverter valve for each pot



High Draft Ventilation Mode

During pot maintenance activities : 4.4 Nm³/sec.

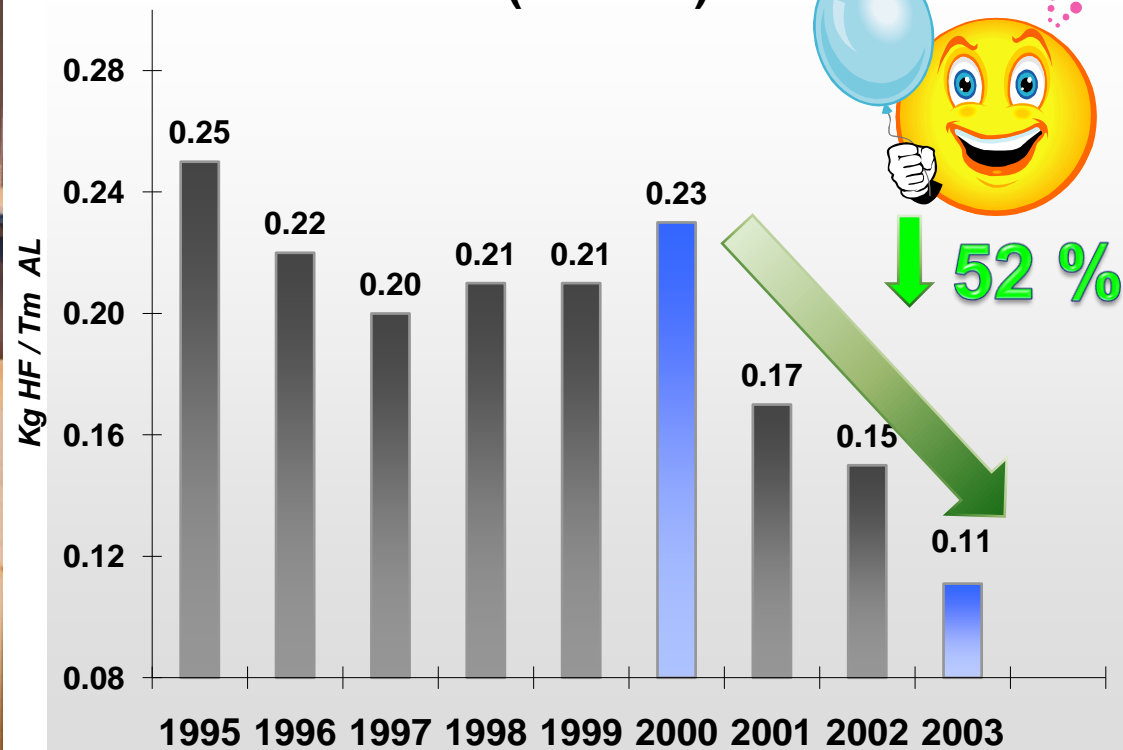


Results : Upgrade Ventilation Project...

52 % HF reduction



HF at roof vents (Potline)





2003 : New visual board For best efficiency at pot-line scrubber



Board in use since September 2003:

- ✓ Rapid problem identification
- ✓ Leveling of actions
- ✓ Establish action plan for yellow and red zones
- ✓ Ensure and clarify “Job to do “
- ✓ Easy monitoring
- ✓ Development of new tools directly in the field

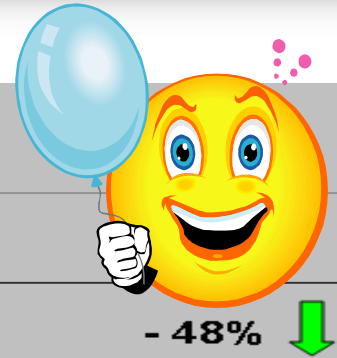
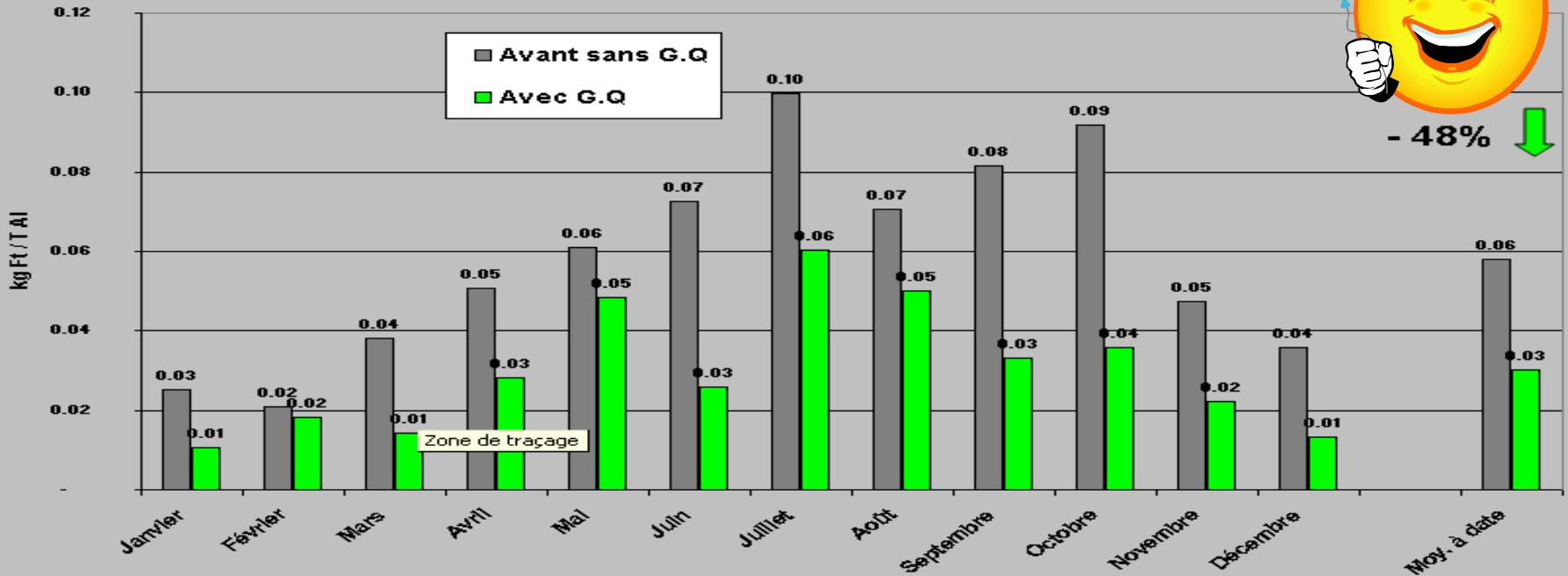


Impressive efficiency at scrubbers

Average: 0.02 kg FT / MT Al outlet stack



Émissions de FT depuis 2003 des CTG 330
et comparaison depuis l'établissement de G.Q. en septembre 2005

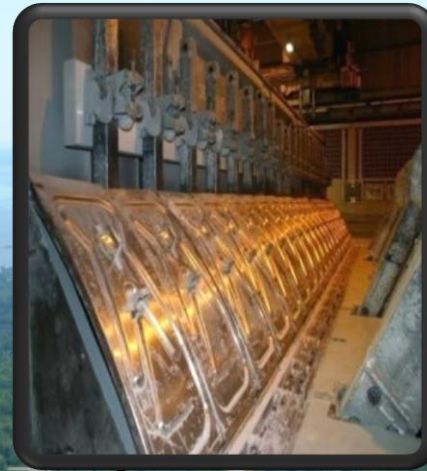
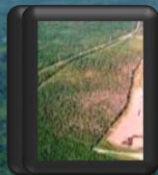


With No investment required, only the board...



2004 : Hood, anode seal, and pot triangle ...

All components that have an impact on fluoride emissions were improved



1997

1999

2002

2003

2004

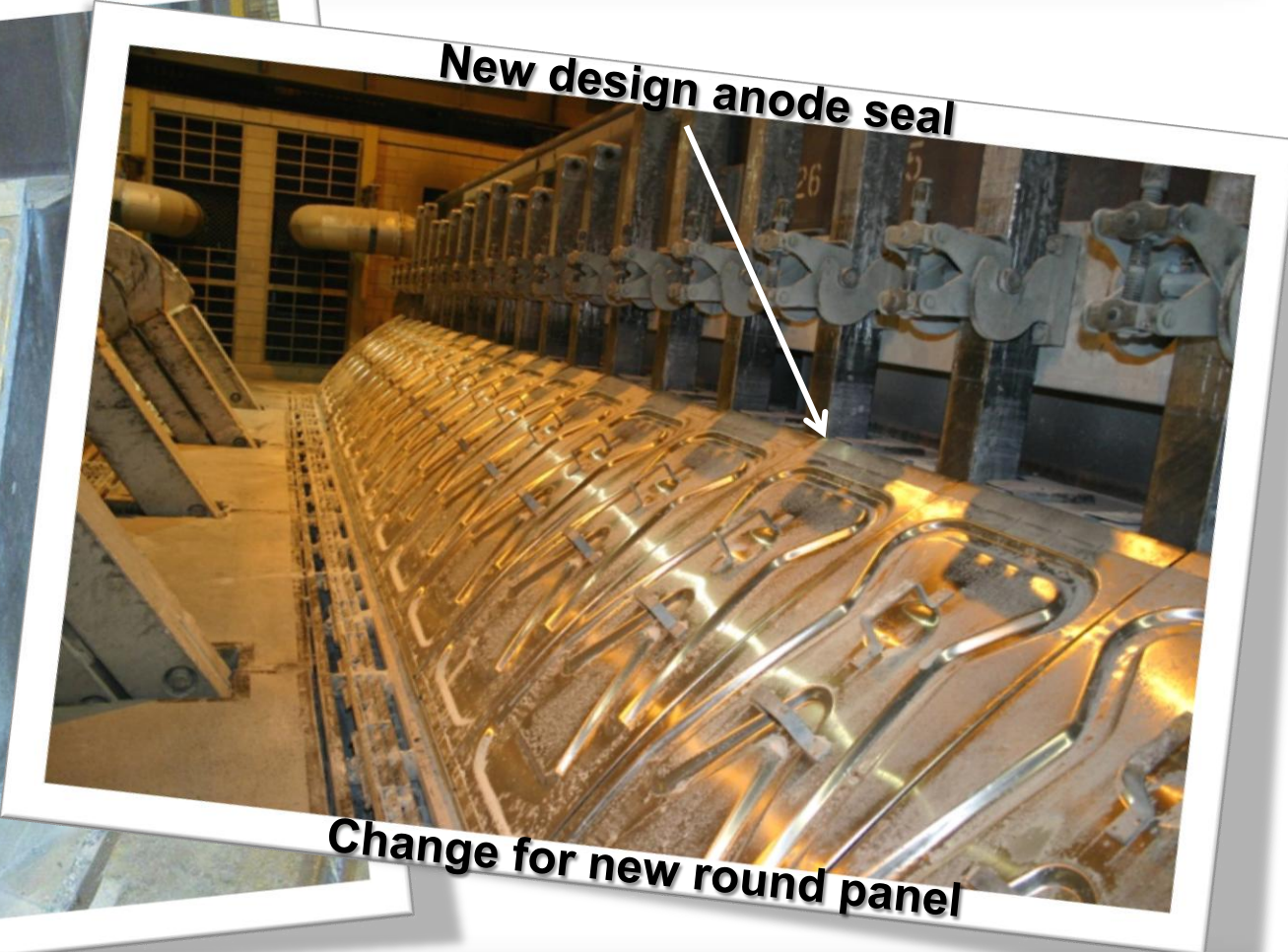
2006

2007

2009



New pot hood design improved the robustness





2006 : Follow-up, in order to consolidate our gains





Rigorous follow-up : A few exemples...

Clear rules – misplaced panels

Standard pour tournée capots

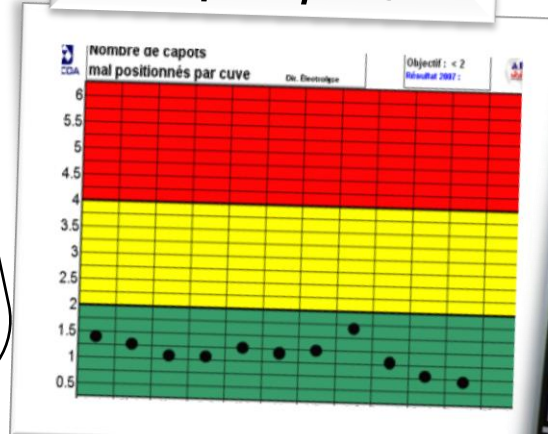
1 2 3 4 5

Un capot est considéré mal positionné si:

- La règle de mesure s'insère dans l'espace entre 2 capots pour plus de la moitié de la hauteur du capot (réf.: poignée horizontale). (photos 3 et 4)
- La règle de mesure s'insère dans l'espace entre la tablette et le capot pour plus de la moitié de la largeur du capot (réf.: poignée verticale). (photo 5)

Procedure Visuelle Simplifiée

Bimestriel audit
Misplaced panels



Each team, each operator's score is shown and reviewed continuously



Tasks audited each week



By supervisor with results

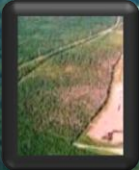
CHANGEMENT D'ANODES	COTE
10	10
15	15
15	15
10	10
15	15
15	15
AUDIT SS SUR CA	Total
100	100
VERIFICATION DES ANODES	COTE
30	30
20	20
20	20
AUDIT COLLETTE DE METAL	Total
100	100
10	10
20	20
20	20
20	20
10	10
20	20
Observation du jour :	Total
100	100

Display real time
Ensures 4 – Anode-setting is respected





2007 : New TPM on pots...



1997

1999

2002

2003

2004

2006

2007

2009



2007 : New TPM on pots...



Before



Now



2007 : New TPM on pots...



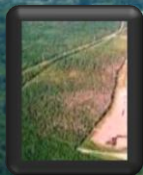
- Anode seal, pot triangle, tapping door ...all components that have an impact on fluoride emissions are recorded and repaired
- A new vision was implemented ...just-in-time principle on these components

When a pot seal component needs to be replaced it is written on the pot's visual board.





2009 : See you at the next TMS...



1997

1999

2002

2003

2004

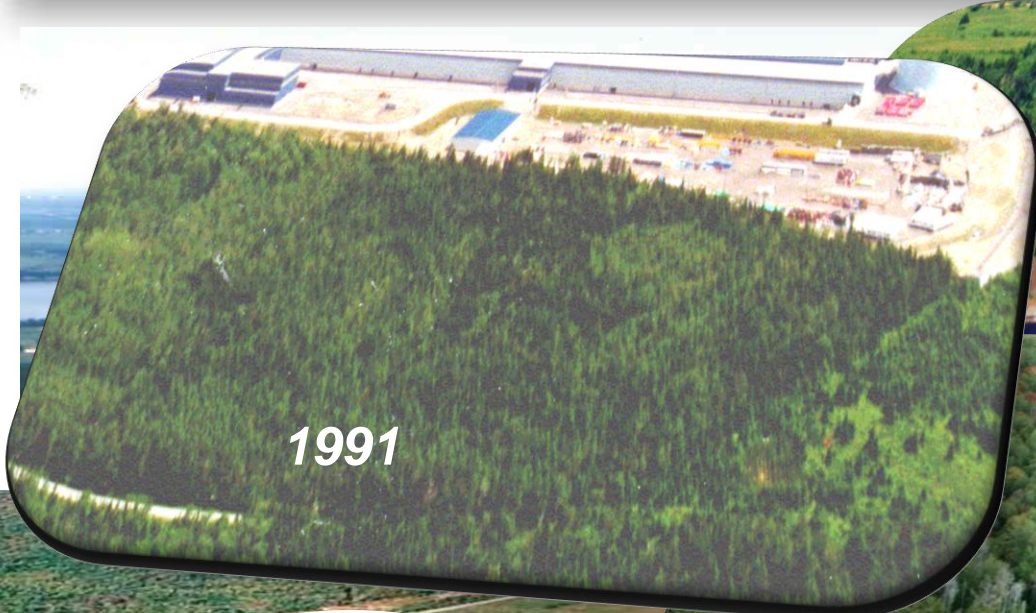
2006

2007

2009



About tree damage...



1998



Key to our success!



**People
involvement**

Innovation

Follow-up

*Fluoride committee in place
for 10 years...*

*Communication is alive
with our people about this value*

Very good team work



Our achievement...

Definition of new environmental standards for Alcoa





Questions ?

