

**ALUMAR**



**WELCOME**

**TO**

**SÃO LUIS!**

# Disclaimer

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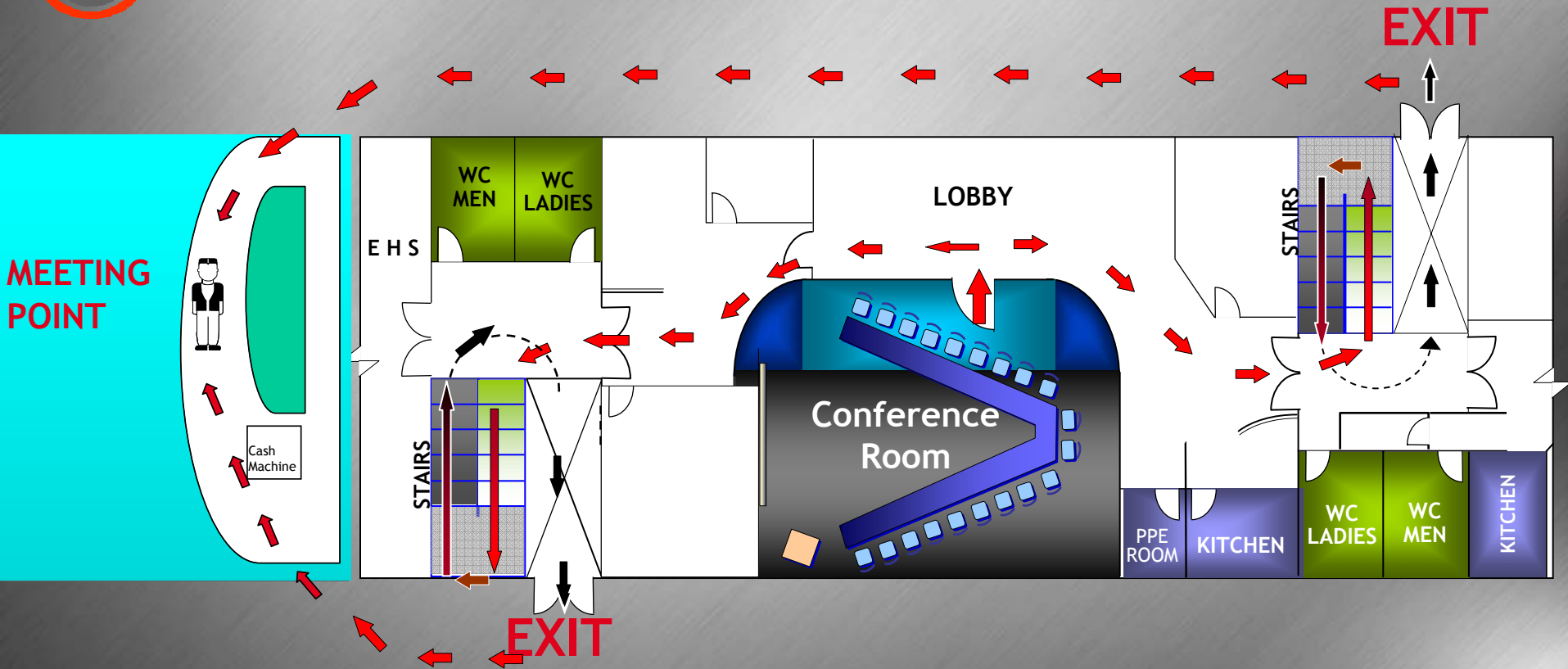
Nothing in this release should be construed as either an offer to sell or a solicitation of an offer to buy or sell shares in any jurisdiction.

# SAFETY

## EMERGENCY EXIT INSTRUCTIONS



Non smoking areas: Buildings and offices



Users of : **Pacemaker and contact lenses**  
Let us know

## March 23rd

- 08:15am Alumar presentation
- 10:15am Site visit – Casthouse and Smelter
- 11:45am Lunch
- 1:00pm Site Visit – Port and Refinery including Expansion
- 3:00pm Depart for Airport





**SÃO LUIS – ALUMAR**  
 Population: 937,588



**BRAZIL**  
 Total Area: 3,281,850 sq. miles  
 Population: 188.0 Million



**MARANHÃO**  
 Total Area: 115,830 sq. miles  
 Population: 6.0 Million





4,900,000 tpy



1,500,000 tpy



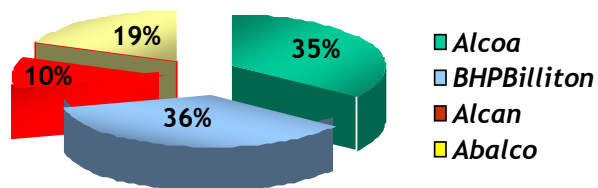
440,000 tpy



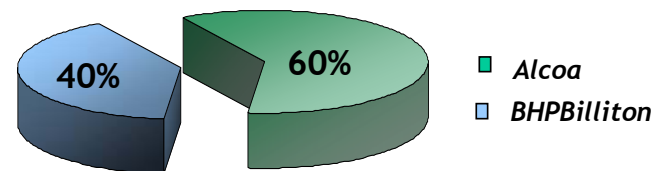
Current capacity and shareholder equity

	Start-Up	Current Capacity (TPY)	Const. cost. (US\$)
<b>Total Port</b>	<b>Sep.83</b>	<b>4,900,000</b>	<b>274M</b>
Refinery	Mai.84	500,000	560M
	Jan.05	1,000,000	62,3M
	Future	2,000,000*	1,800M
<b>Total Refinery</b>		<b>3,500,000*</b>	<b>2,422,3M*</b>
Smelter-L.I	Jul.84	127,082	372 M
Smelter-L.II	Feb.86	155,738	213 M
Smelter-L.III	Sep.90	97,180	308 M
Expansion-L.III	Apr.06	60,000	185 M
<b>Total Smelter</b>		<b>440,000</b>	<b>1,078 M</b>
<b>Total Plant</b>		<b>*Including Refinery Expansion</b>	<b><u>3,774,3 M*</u></b>

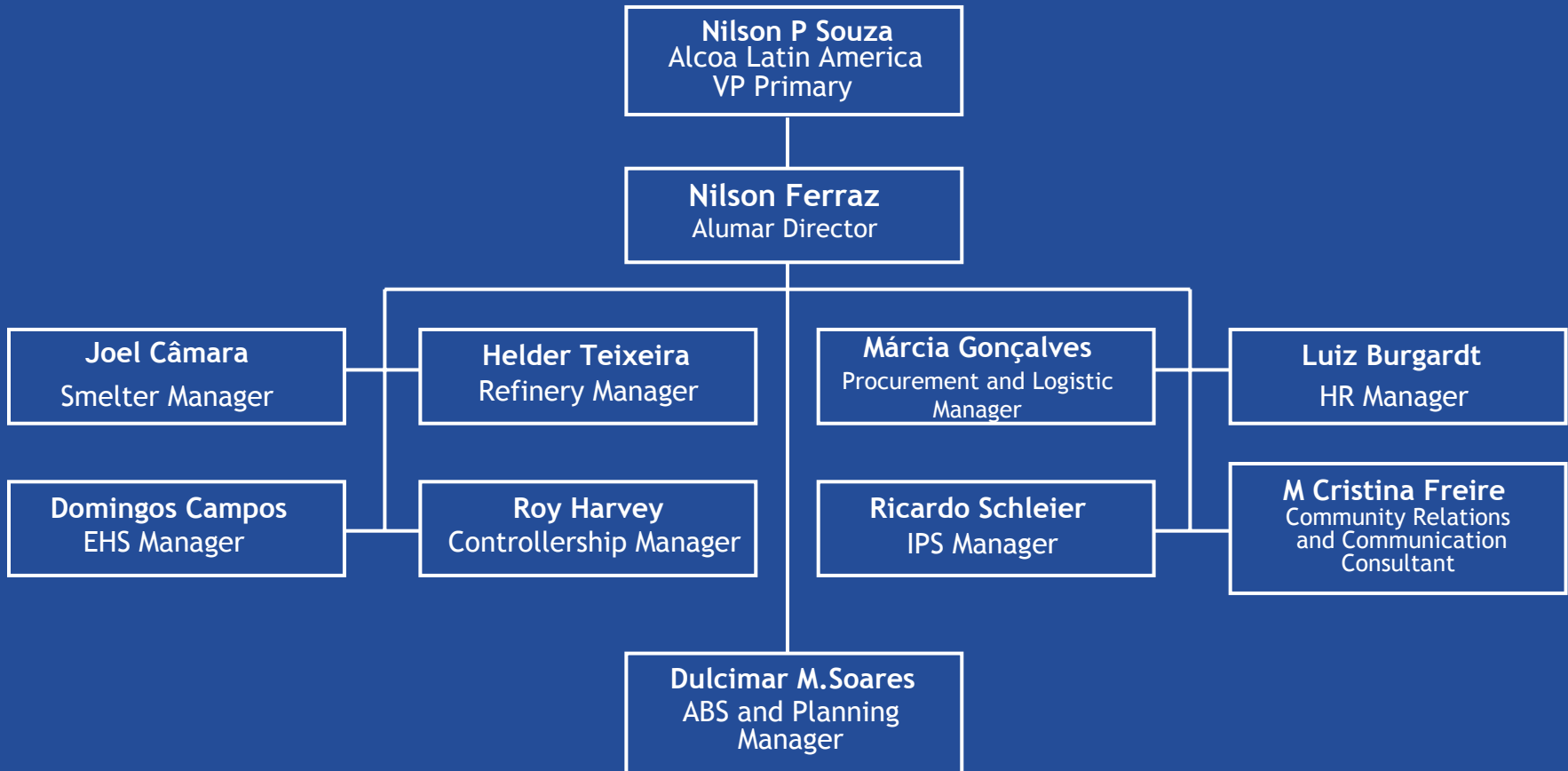
**REFINERY**



**SMELTER**

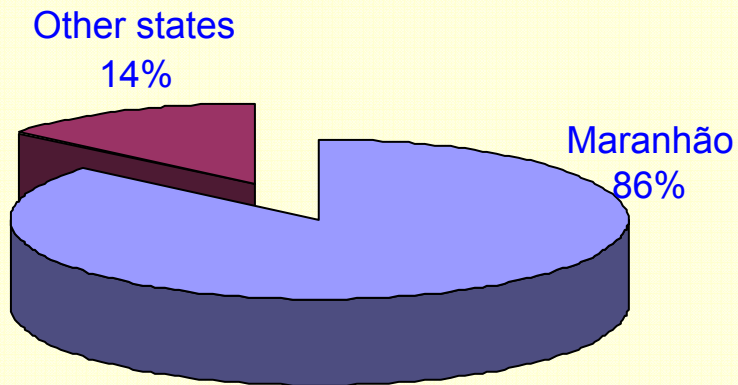


## Organization Chart

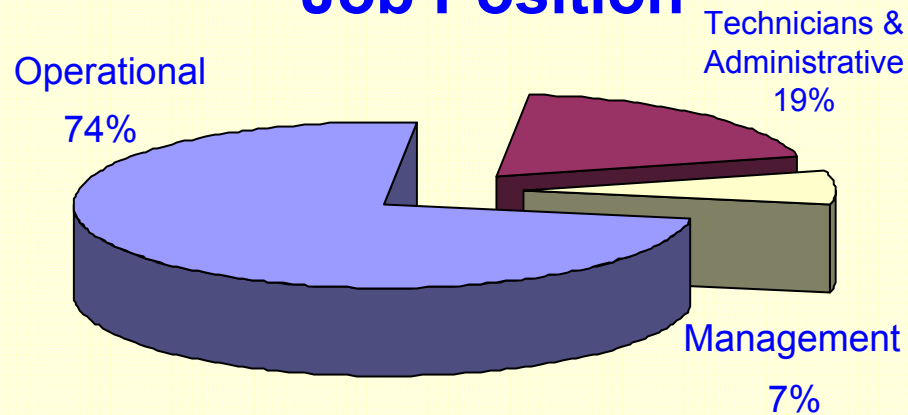


Population

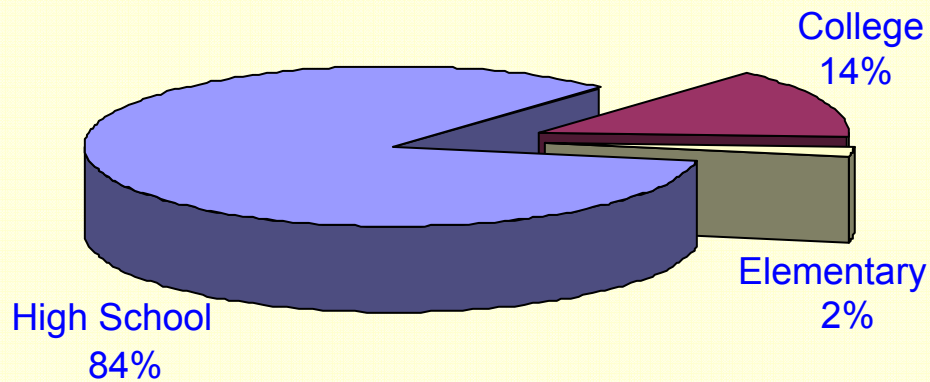
Origin



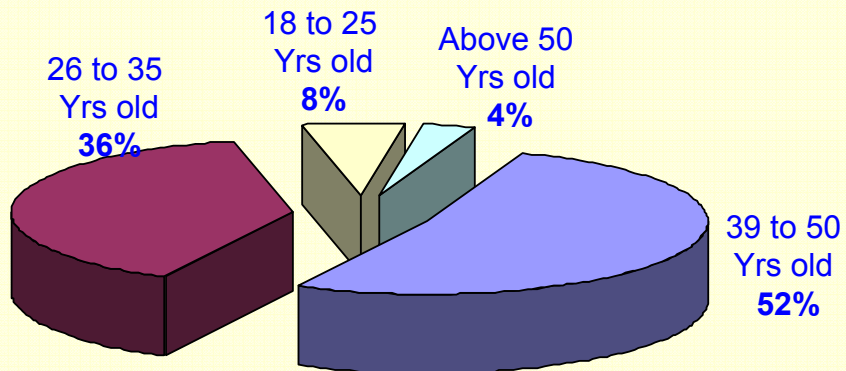
Job Position



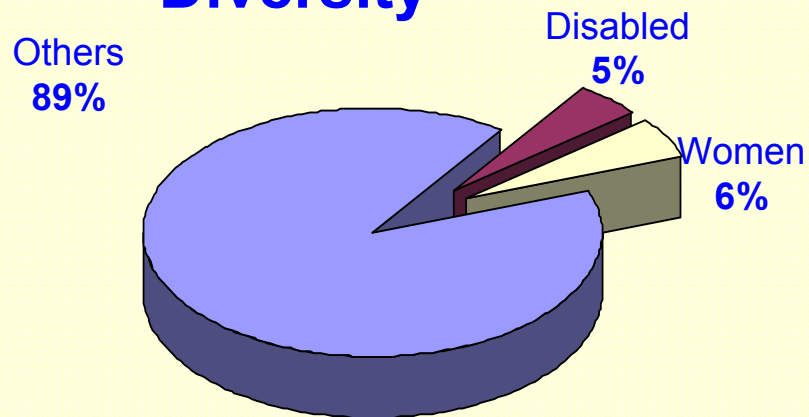
Formal Education



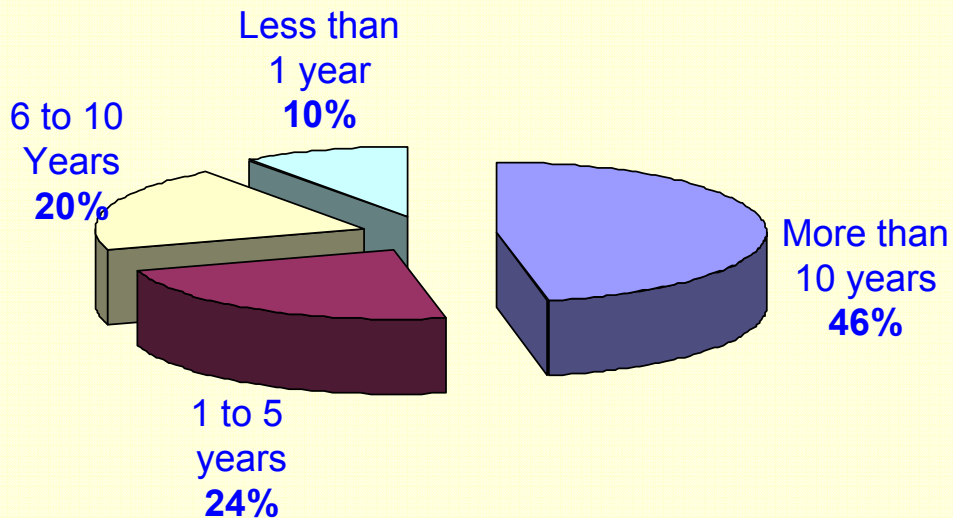
### Age



### Diversity



### Tenure



# History

**2006 Refinery Expansion Construction**

**2006 Line III Expansion start-up**

**2004 SA8000 certification – Social Accountability**

**2002 OHSAS 18001 Certification – Occupational Health and Safety**

**2000 ISO 14001 Certification – Environmental Management System**

**1997 ABS Implementation**

**1996 Environmental Park Implementation**

**1996 ISO9001 Certification – Quality Management System**

**1990 Line III start-up (phase I)**

**1986 Line II start-up**

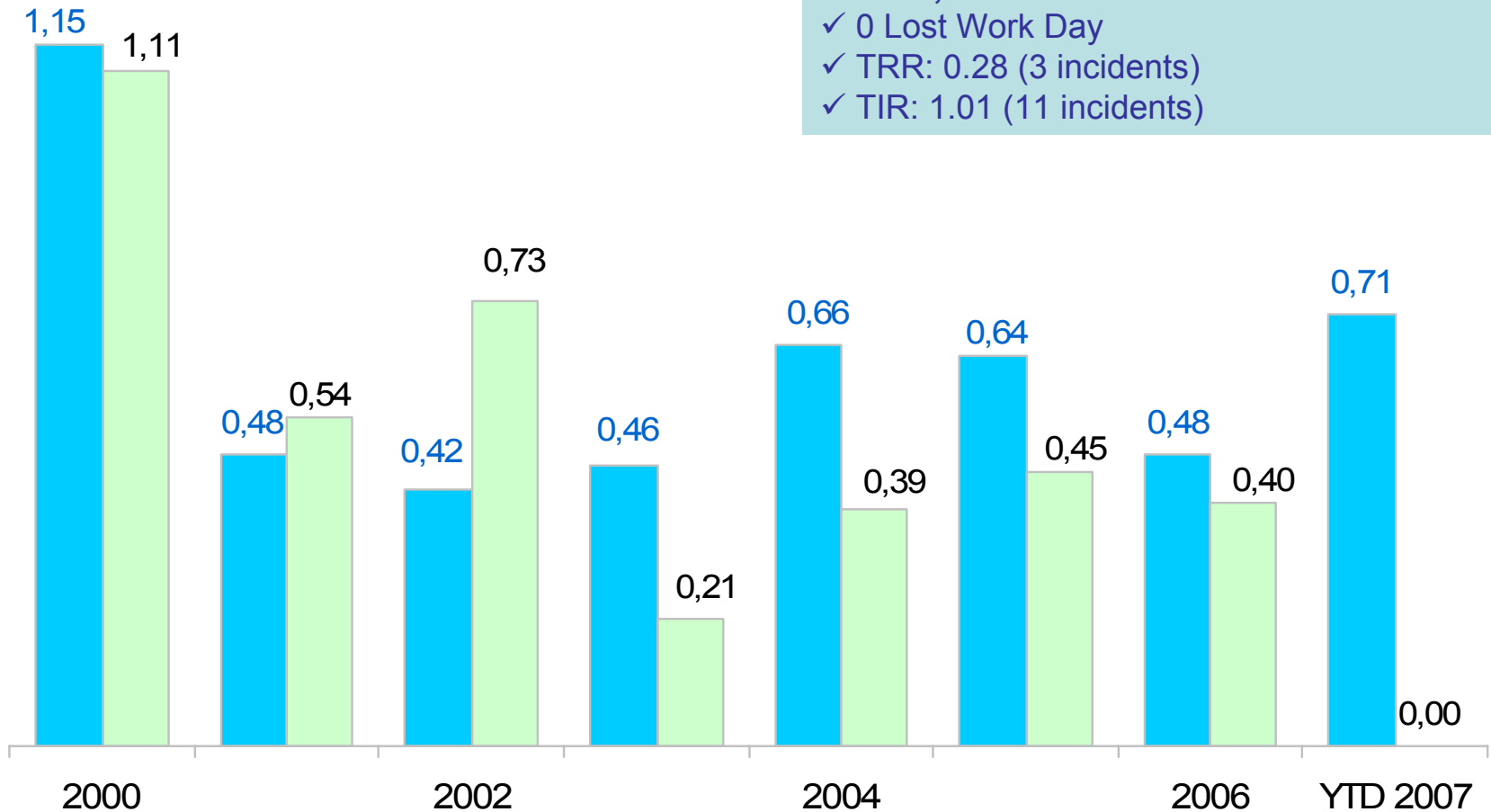
**1984 Plant Operations start-up**

**1983 Port Operations start-up**

## Alumar Total Recordable Rate (\*)

**In 2006, Smelter had the best result ever!!!!**

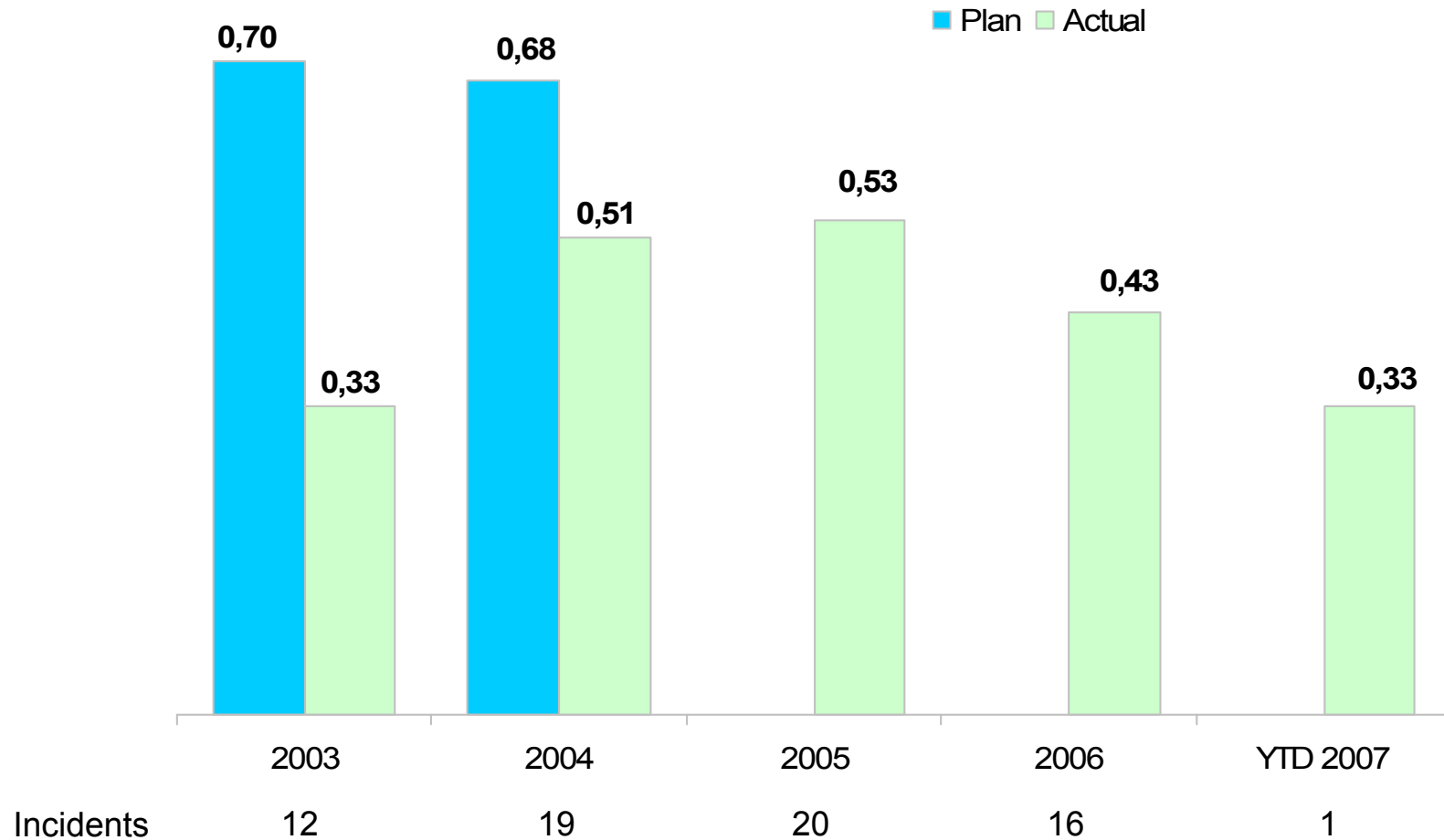
- ✓ 0 Lost Work Day
- ✓ TRR: 0.28 (3 incidents)
- ✓ TIR: 1.01 (11 incidents)



ALUMAR	20	9	8	8	11	10	8	1
Contractor	32	13	16	4	8	10	8	0
								16

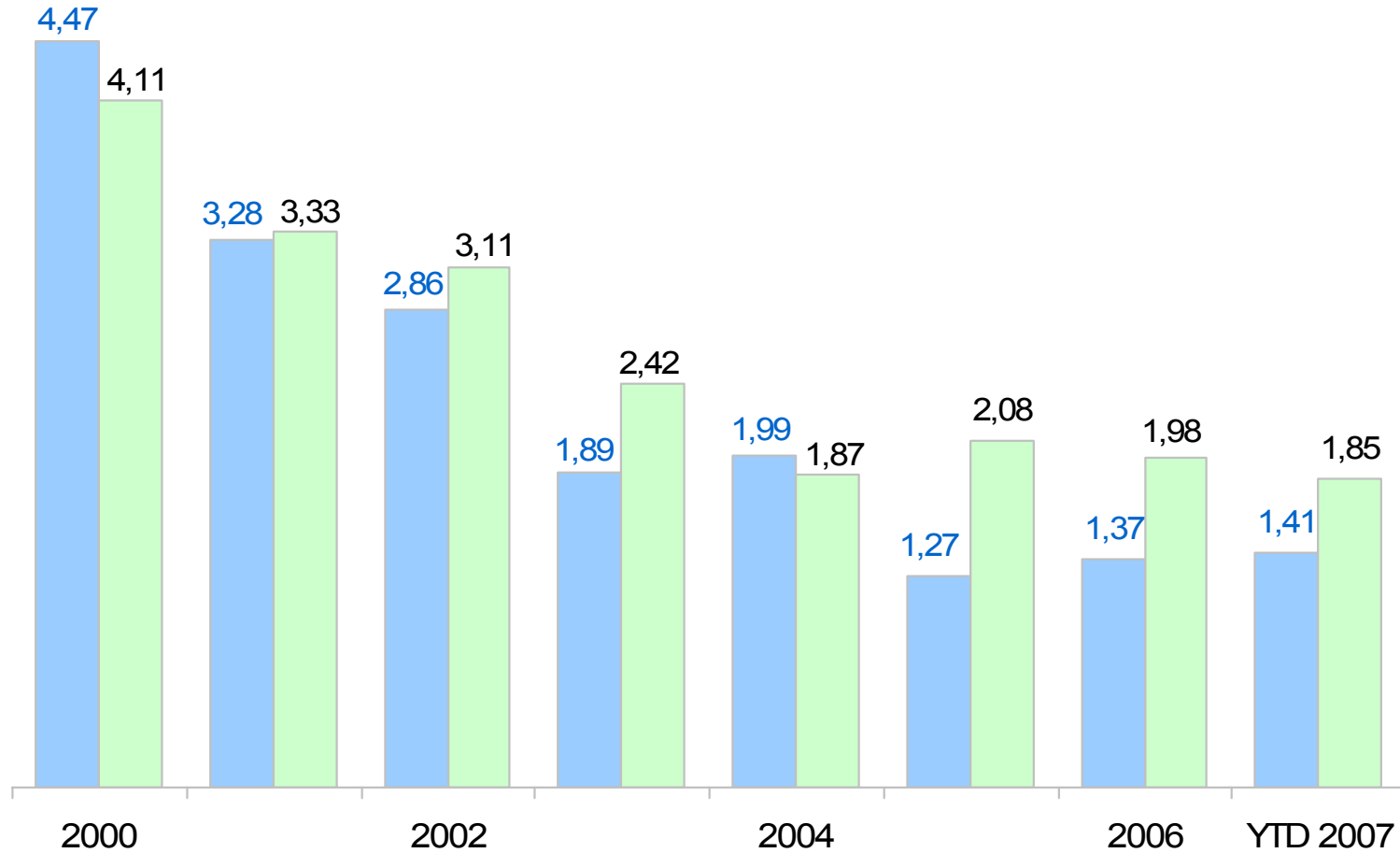
(\*) Number of incidents \* 200.000 / HHT

## Total Recordable Rate – Alumar + Contractors



(\*) Number of incidents \* 200.000 / HHT

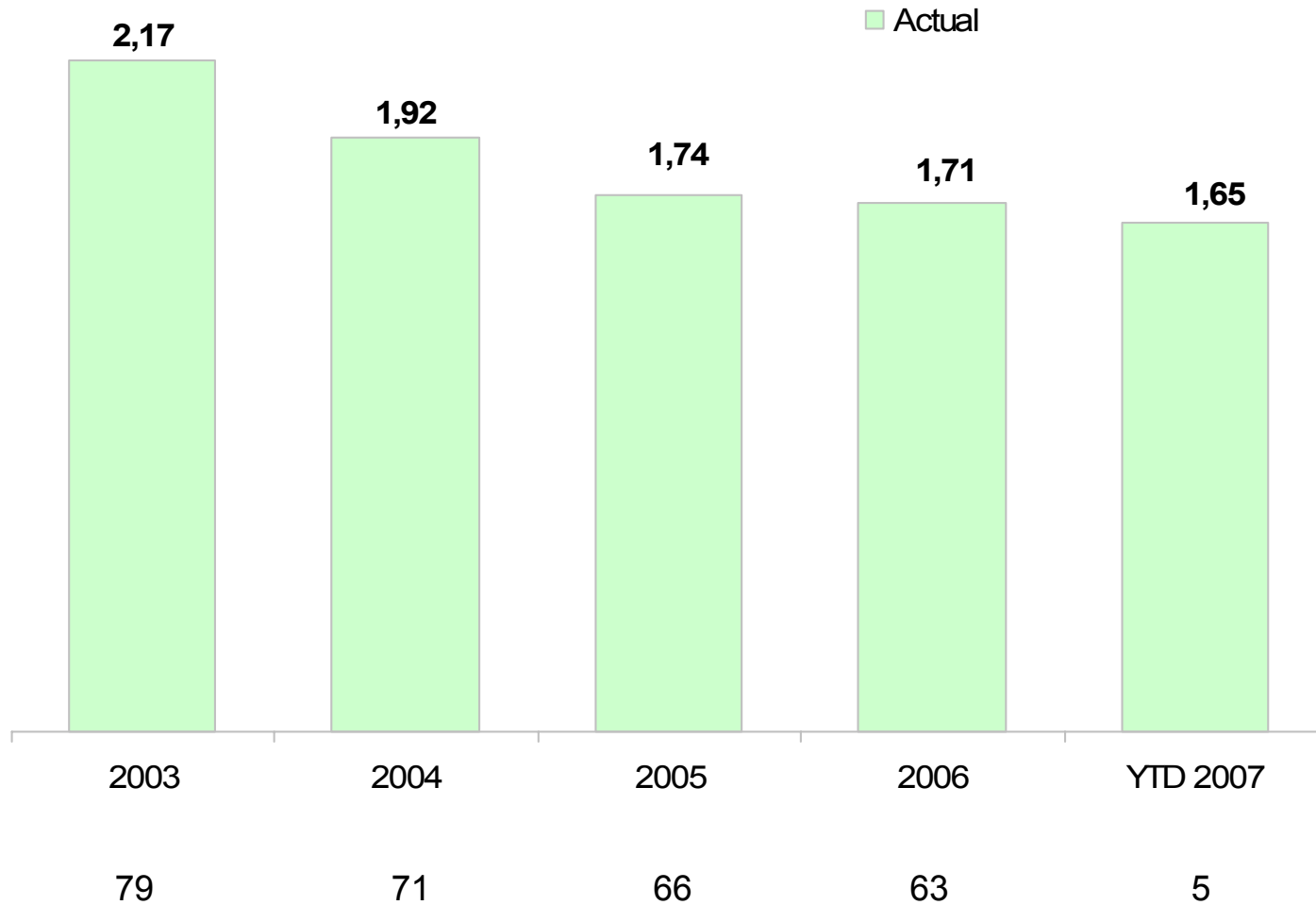
## Alumar Total Injury Rate



ALUMAR	78	61	54	33	33	20	23	2
Contractors	118	90	68	46	38	46	40	3

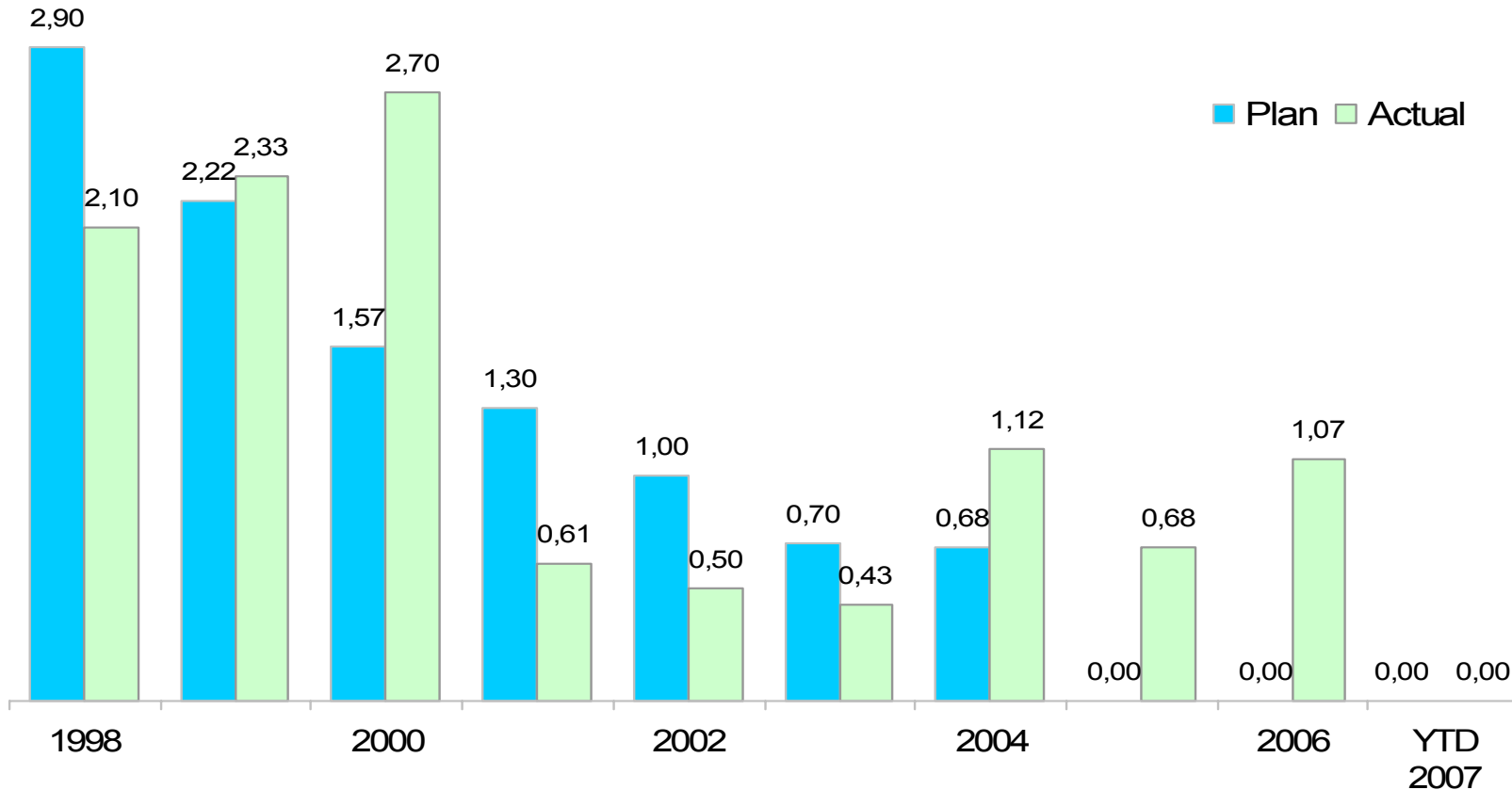
(\*) Number of incidents \* 200.000 / HHT

## Total Injury Rate – Alumar + Contractors



(\*) Number of incidents \* 200.000 / HHT

## Total Recordable Rate - REFINERY

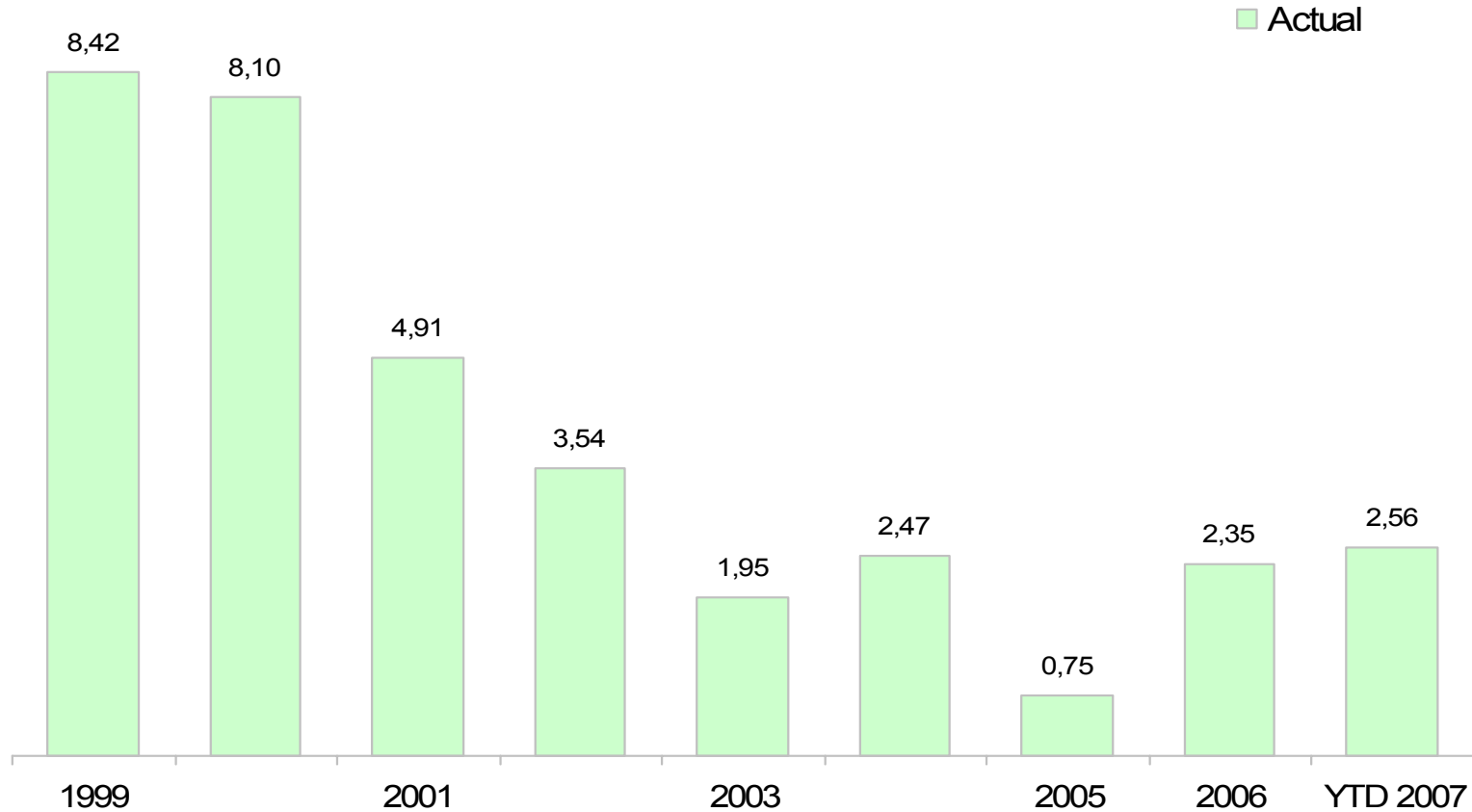


Incidents

9      7      10      3      3      2      5      3      5      0

(\*) Number of incidents \* 200.000 / HHT

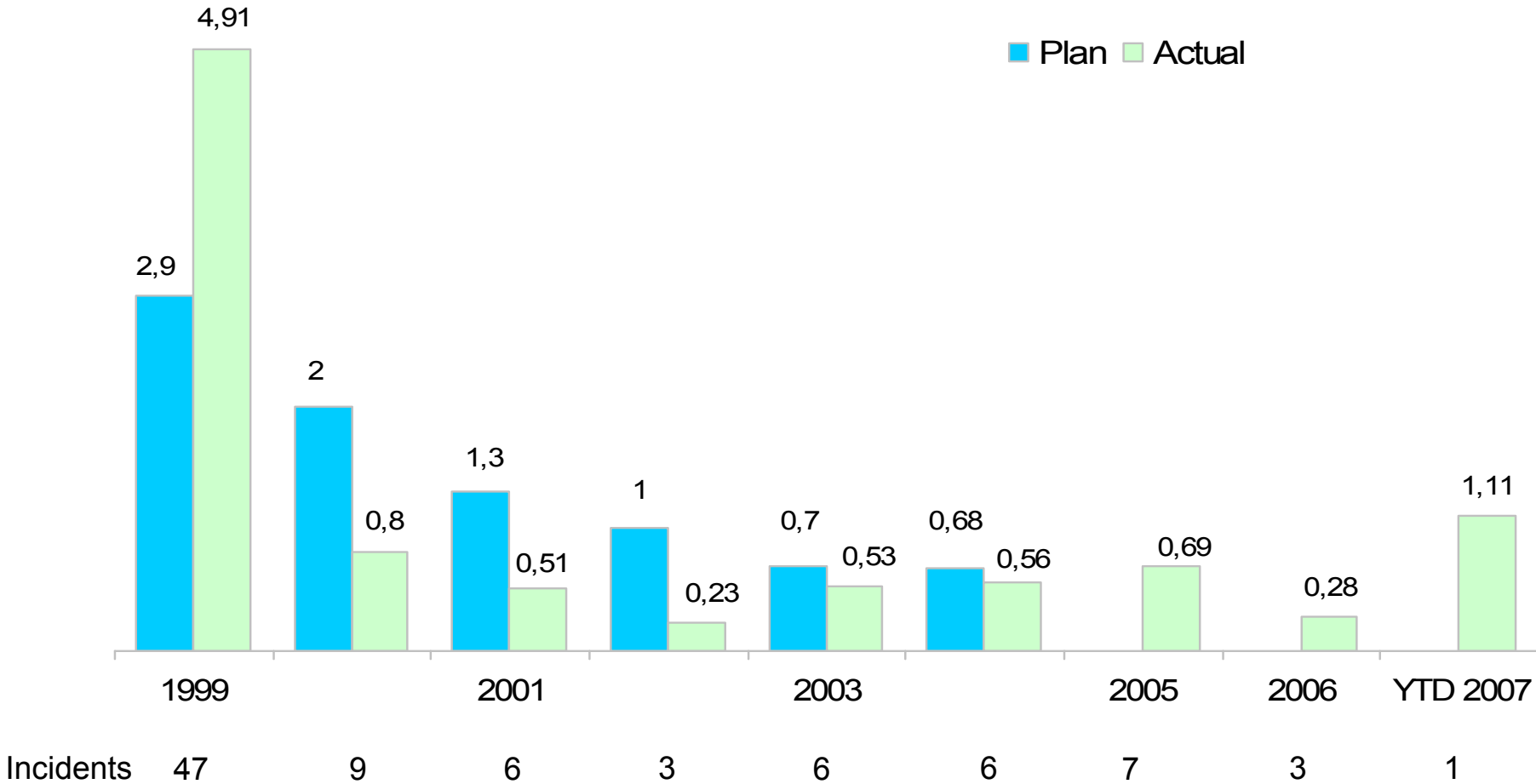
## Total Injury Rate - REFINERY



Year	Incidents
1999	31
2000	30
2001	24
2002	20
2003	9
2004	11
2005	5
2006	11
YTD 2007	1

(\*) Number of incidents \* 200.000 / HHT

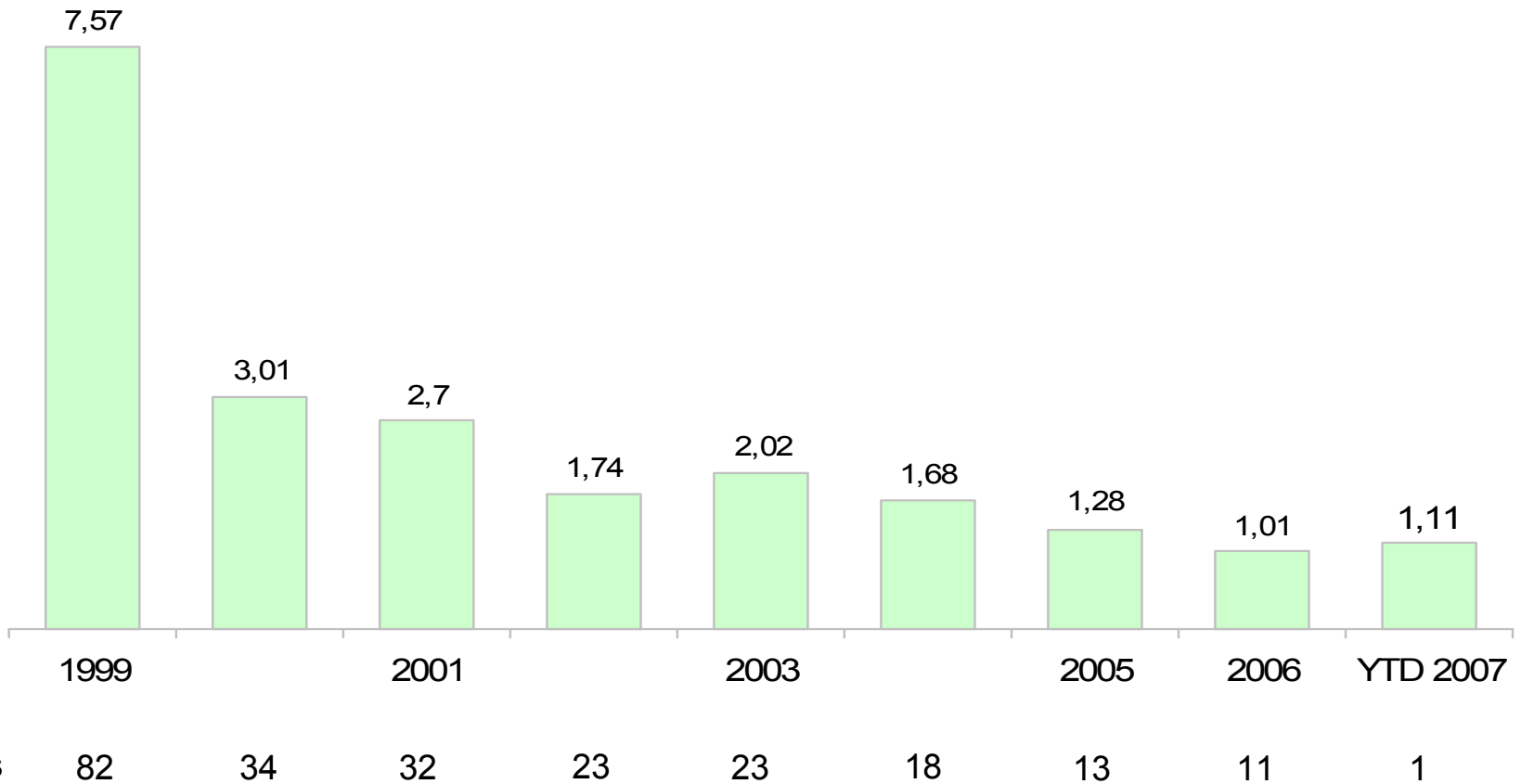
## Total Recordable Rate - SMELTER



(\*) Number of incidents \* 200.000 / HHT

## Total Injury Rate - SMELTER

Actual



(\*) Number of incidents \* 200.000 / HHT

## Fluoride Emissions – kg/tAl

### Root Causes

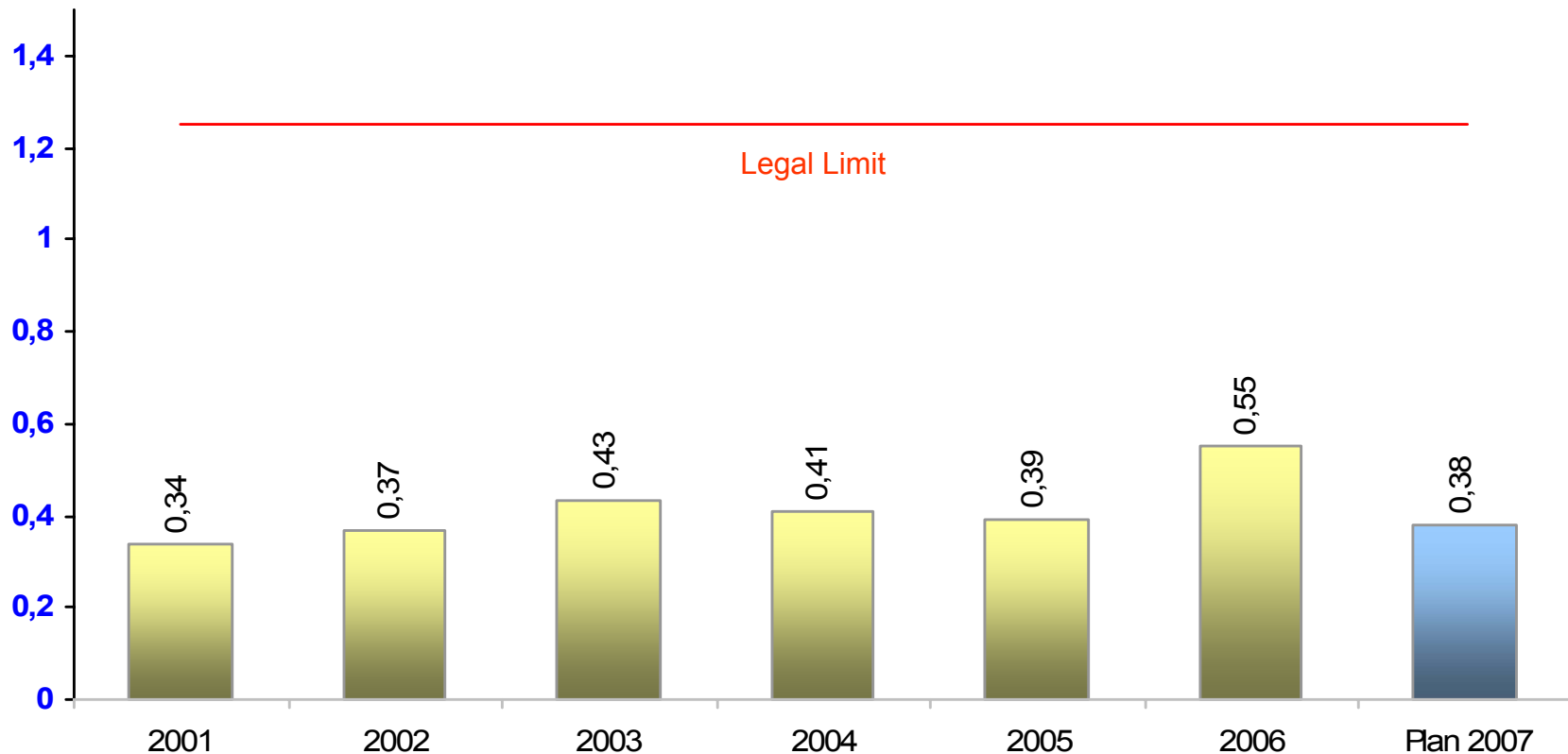
- Load Creep
- Setting Cycle (28 to 26 days)
- Pot Dressing frequency Reduction
- High Anode Effect
- Higher Burn Off
- Line 3 Completion Start Up

### Countermeasures

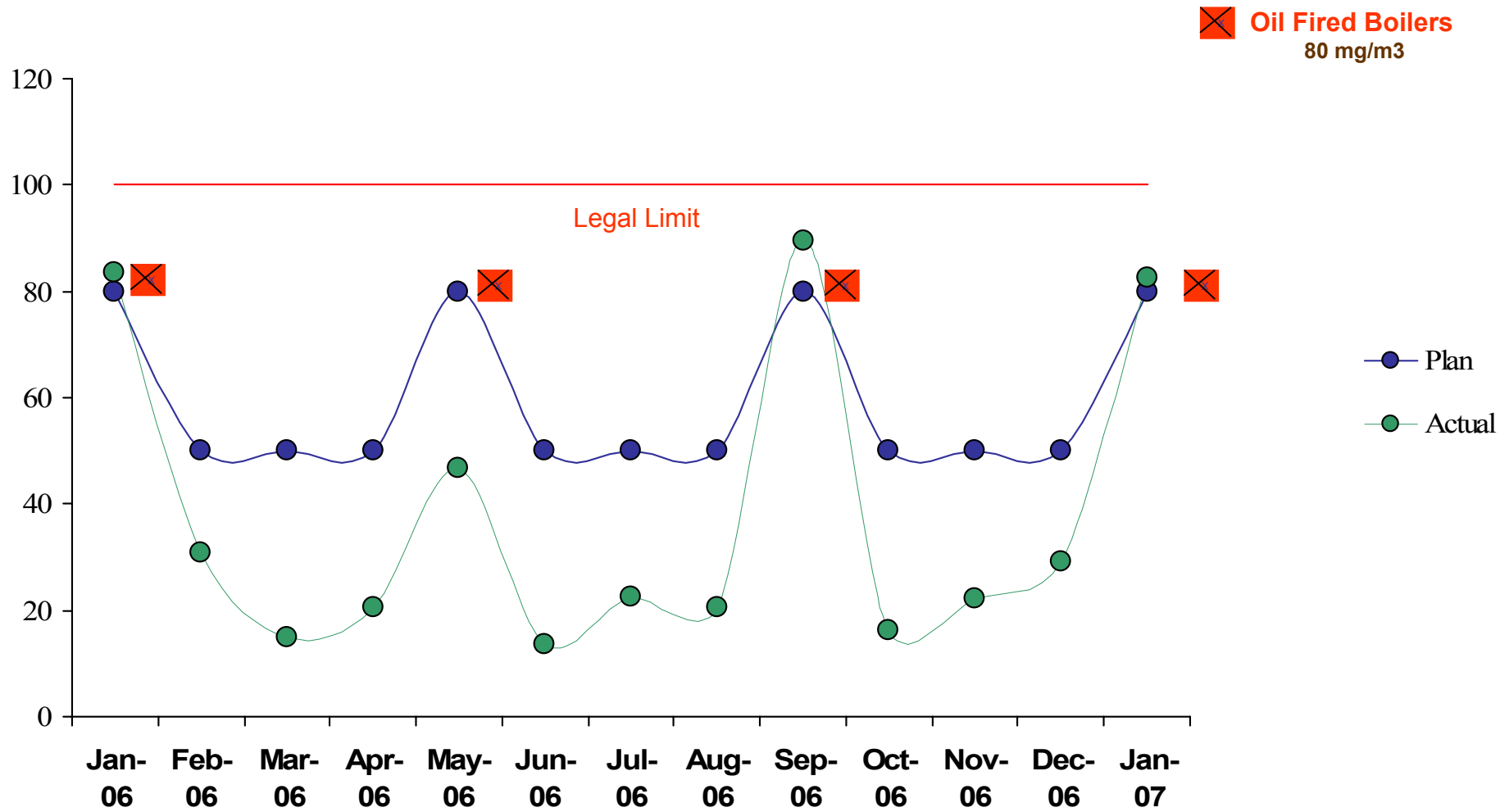
- Double draft conclusion
- Extra pot dressing between settings
- Anode effect further reduction (resolve alumina issue)
- Kaizen Event (pot dressing, air blasting and exhaustion piping cleaning)

### Improvement Actions

- Double draft expansion (~\$20 MM)
- Intelligent crust breaker (~\$20 MM)
- Butts pallet cover (~\$3.5 MM)



## Boiler Emissions – mg/m<sup>3</sup>

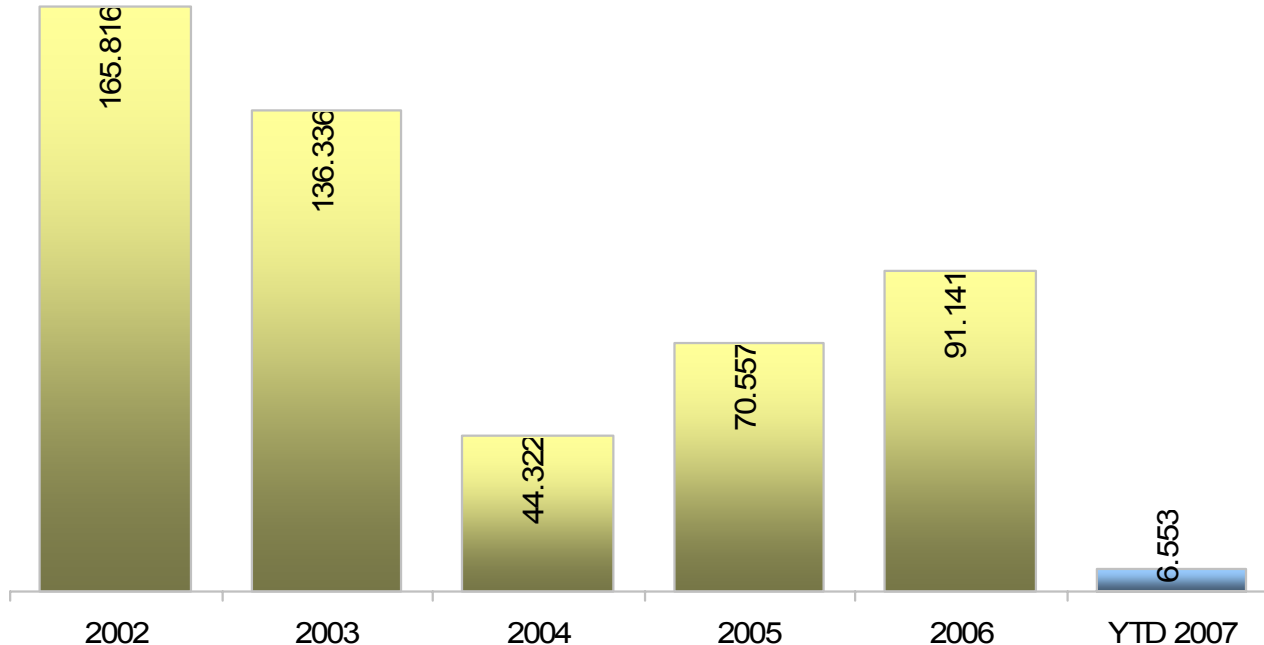


## GHG Emissions – PFC (Per Fluor Carbon)

### Initiatives:

- Implementation of slotted anode reducing Anode Effect (AE) frequency by 50% (Jan 2003).
- Revision of AE termination logic (April 2004).

• AE rate affected by start-up of new pots in Line #3 (Dec 05 – Apr 06)



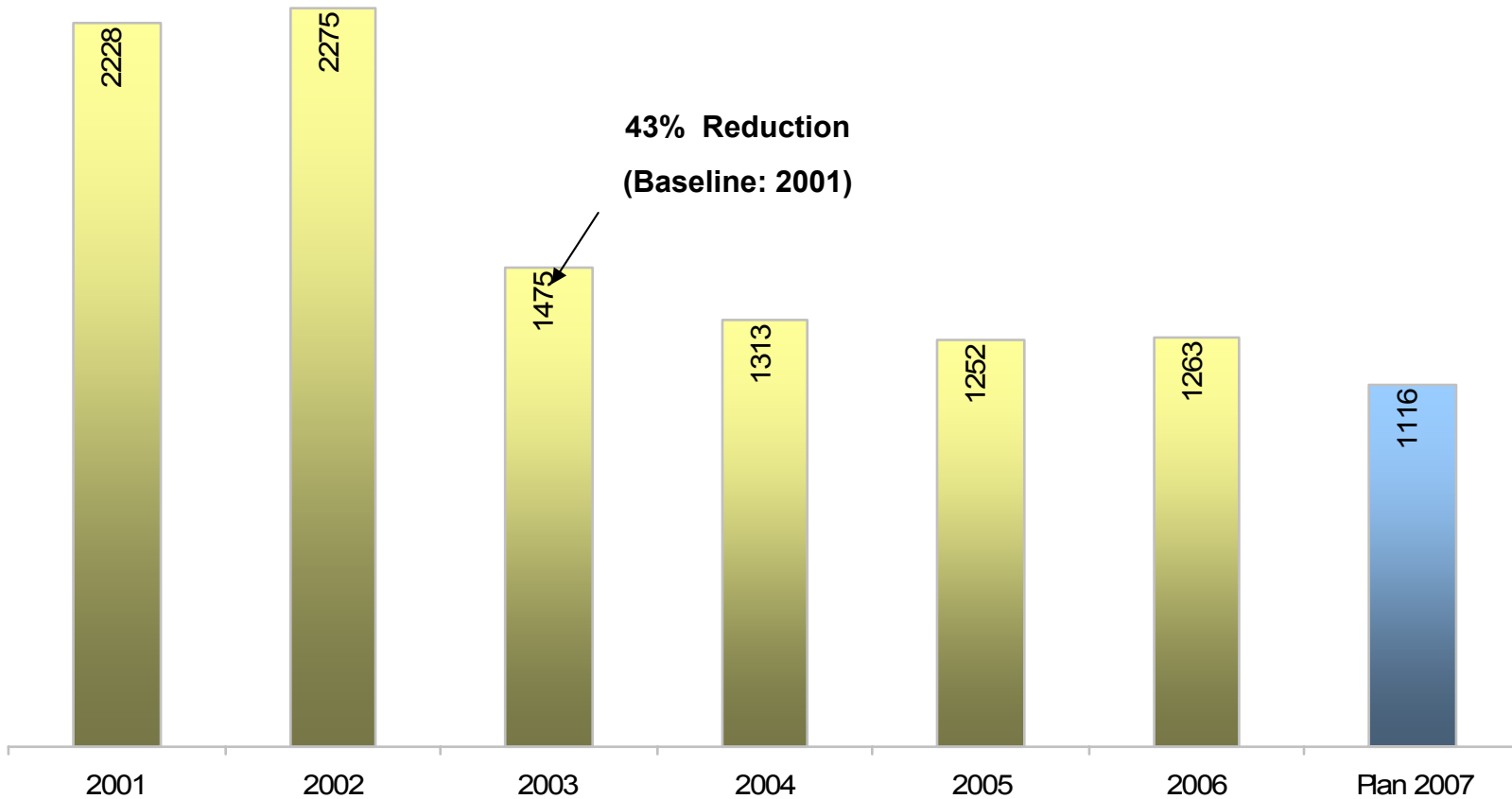
## Baking Furnace Opacity – %



# Water Consumption (ML)

**Water reduction projects:**

- Use of storm water in pot and anode cooling
- Use of compressed air in baking furnaces
- Use of treated wastewater in landscaping



## Solid Waste Management

### Root Causes

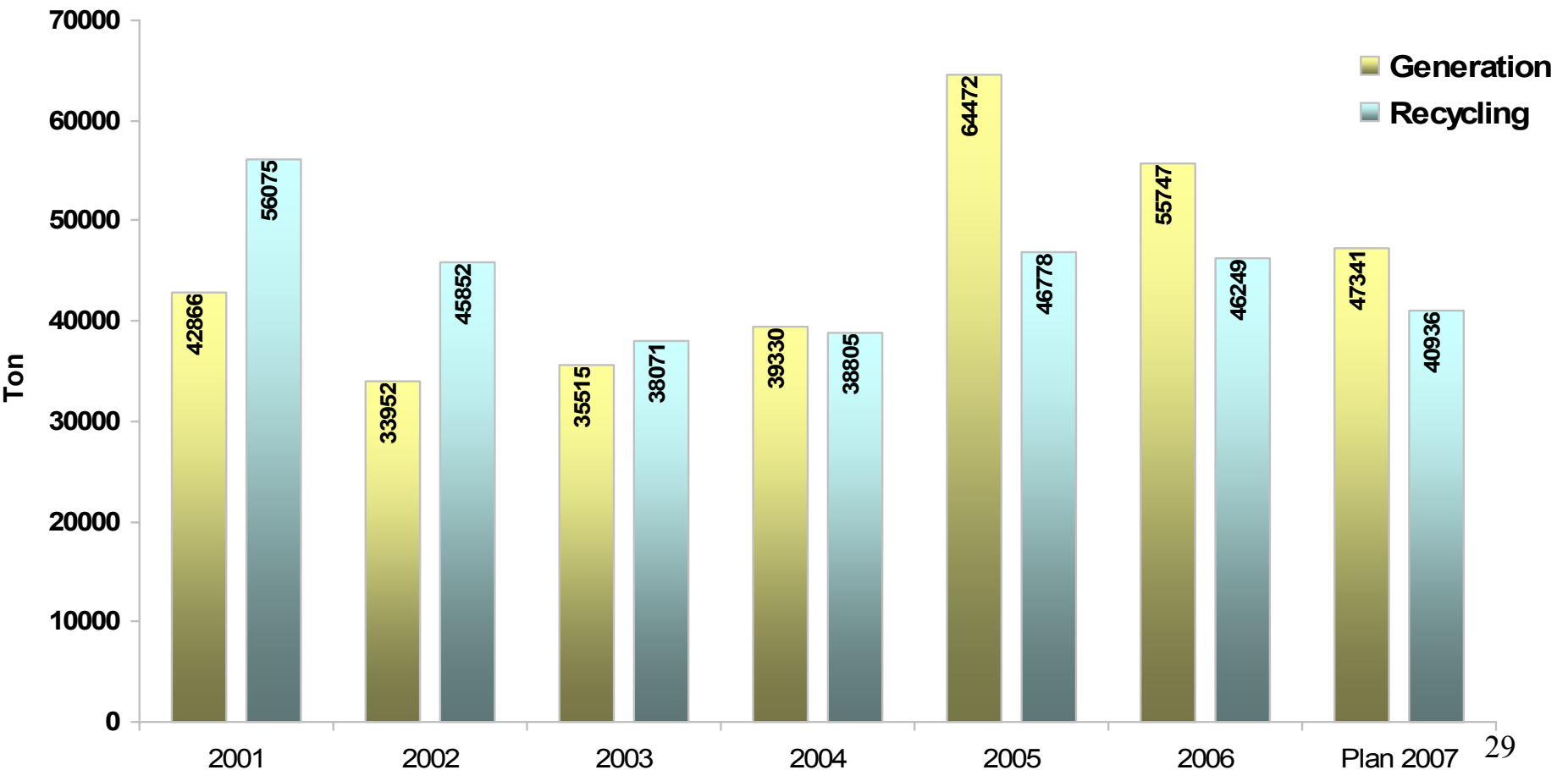
- ESP Dust Generation;
- Waste Generation from Expansion Projects – Smelter and Refinery.

### Countermeasures

- Develop alternatives for ESP Dust Recycling;
- Implement wastes minimization initiatives in Expansion Projects.

### Improvement Actions

- Develop new SPL Co-processor;



- Outstanding result on recordkeeping audit performed by Bill Taylor (CTJS-OSHAS) consultant
- All plant leadership was trained in Human Performance by Rob Fischer, Alcoa consultant
- 53 fatality risks eliminated
- No new environmental non compliance
- Replacement of fossil fuels by Biodiesel (2%) in baking furnaces and industrial vehicles
- Groundwater consumption reduced by 44% from 2001 basis



# EHS Performance

## 2007 Challenges



- Continue to eliminate fatality risks, implement Fatality Prevention Protocol
- Full integration of the current safety Continuous Evaluation Process (PAC) with Alcoa Self Assessment Tool (ASAT) testing activities
- Human performance training deployment for Alumar and its Contractors employees
- Reduce fluoride emissions to benchmark levels
- Establish a Water Strategy aiming to avoid process water discharges, reuse of waste waters and potable water consumption
- Improve biofuels utilization, including biomass, in our processes.

- ✓ Alumar is the largest private employer in Sao Luis
- ✓ Among employees and contractors, more than 5,000 families depend direct or indirectly on Alumar businesses
- ✓ Excluding Raw Materials and Power, Alumar purchases in Sao Luis and/or Maranhão state about 54% of its needs, in a total of more than US\$ 214 MM/year

## Community Actions

Developed by Alumar Employees with the partnership of Alumar contracted companies



## Cultural projects developed with the community

CD's, theater plays, plastic arts exhibition, books etc.



## Alcoa Institute / Alcoa Foundation Projects

Developed by a philanthropic institution or the government, financially supported by the Alcoa Institute

### JUNIOR ACHIEVEMENT – MINI-ENTERPRISE: Developed with high school students

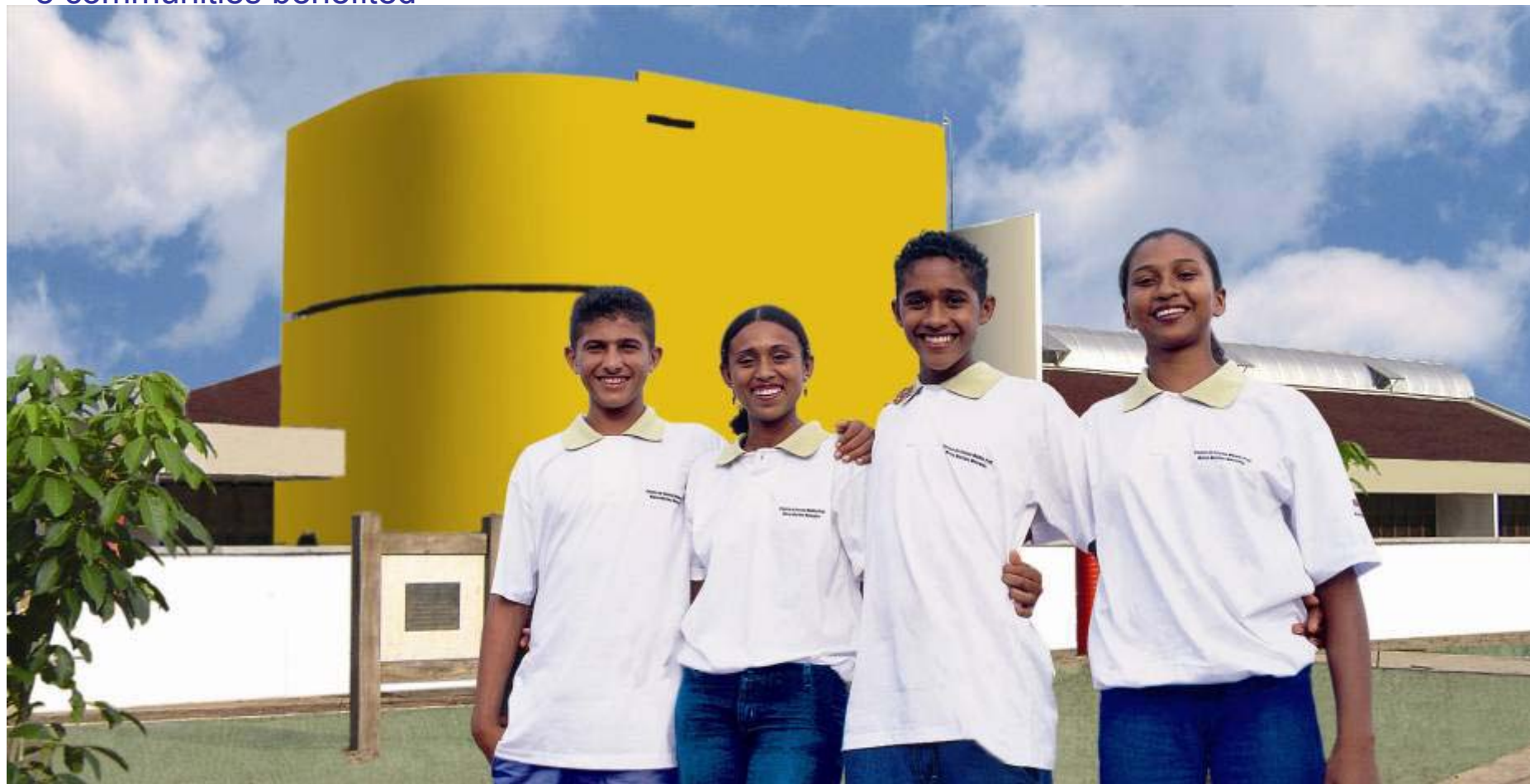


Developed with elementary school students

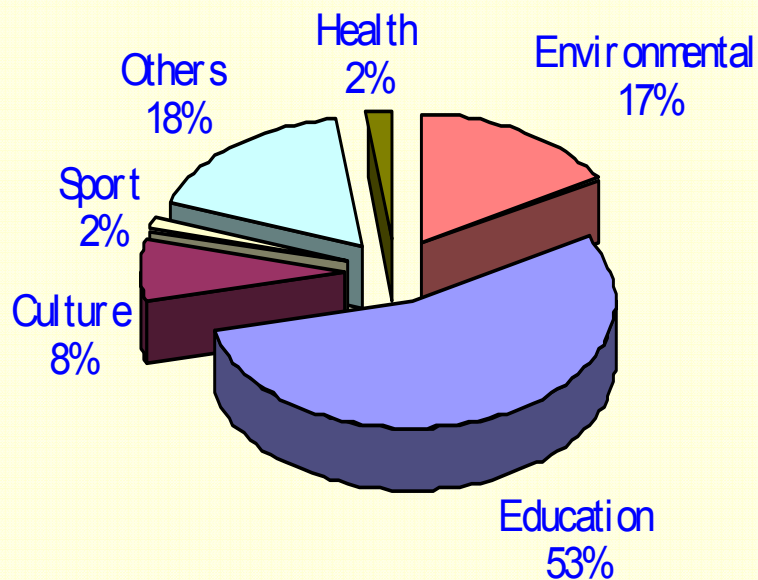
### High School: CEM Prof. Mário Martins Meireles

Capacity: 1,200 students

8 communities benefited

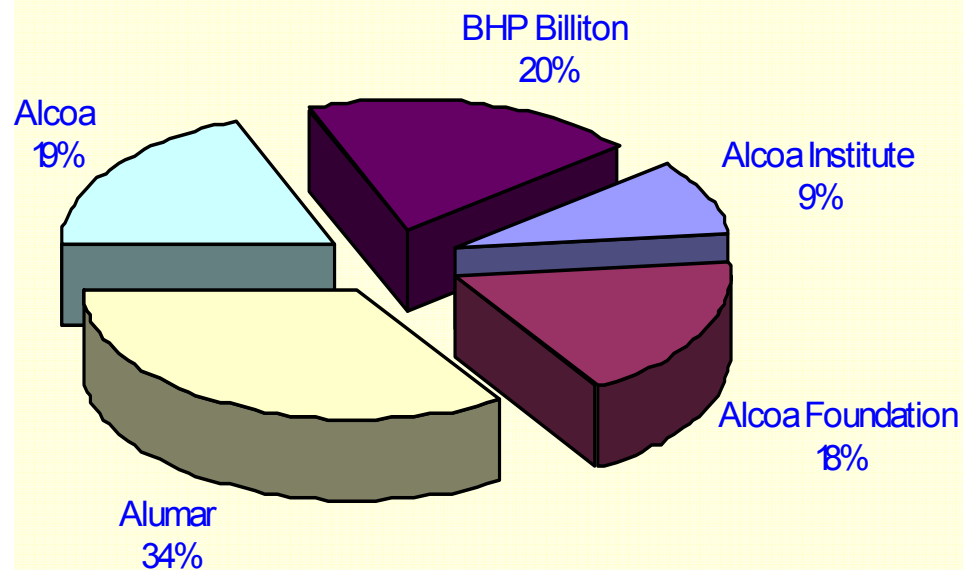


# Social Projects 2006



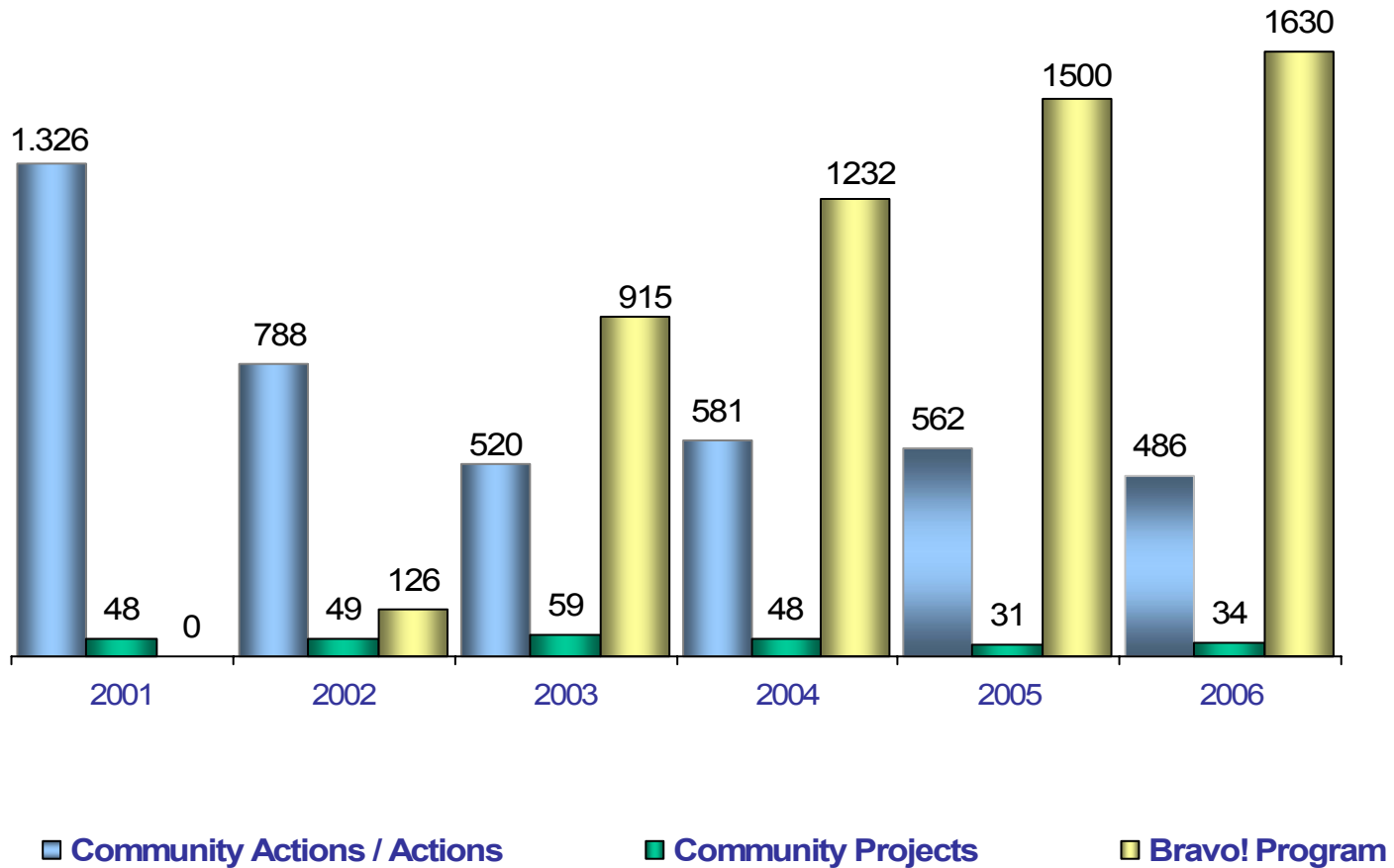
# Investments 2006

Total: US\$ 2,482,245



## BRAVO! - Voluntary Work

Number of employees





**REFINERY**

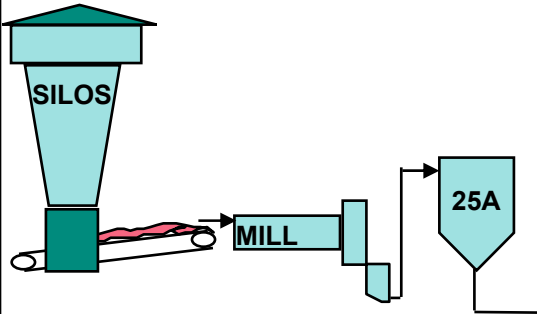
**ALUMAR**



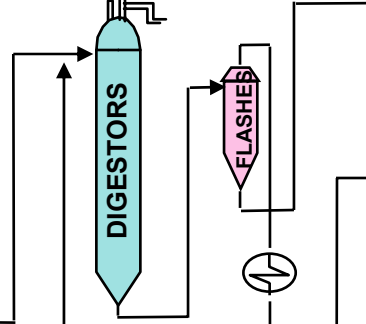
# REFINERY MACRO FLOW

## BAUXITE

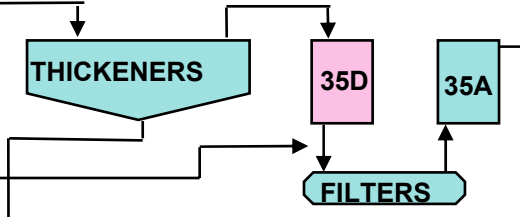
### 25: STORAGE & MILLING



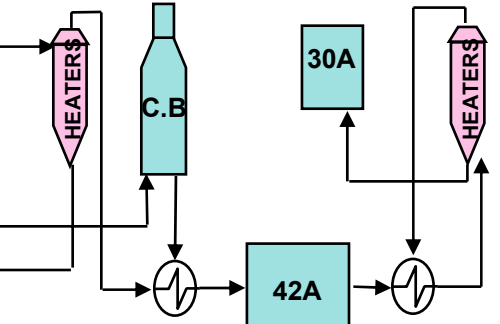
### 30: DIGESTION



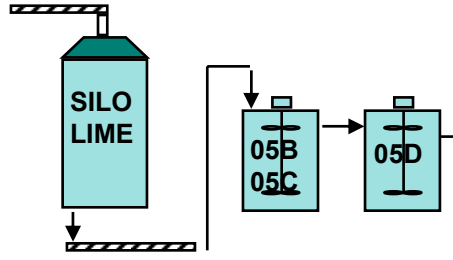
### 35: THICKENERS & FILTERS



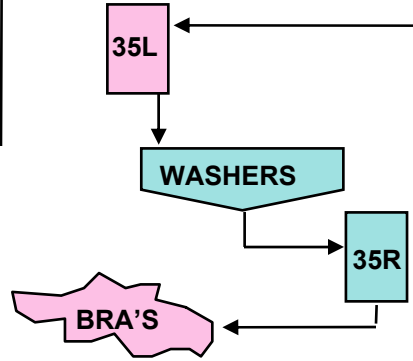
### 40/42: EVAPORATION & HEAT EX



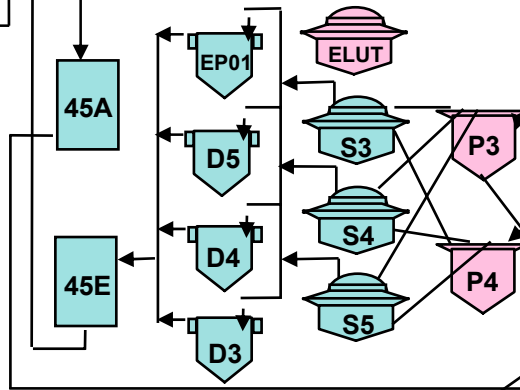
### 05: LIME & FILTER-AID



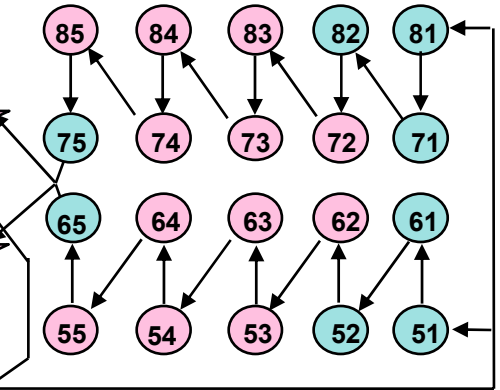
### 35: WASHERS



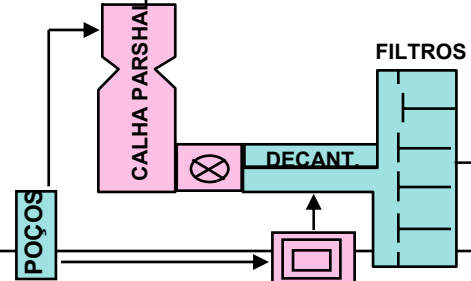
### 45: CLASSIFIERS & CILCLOES



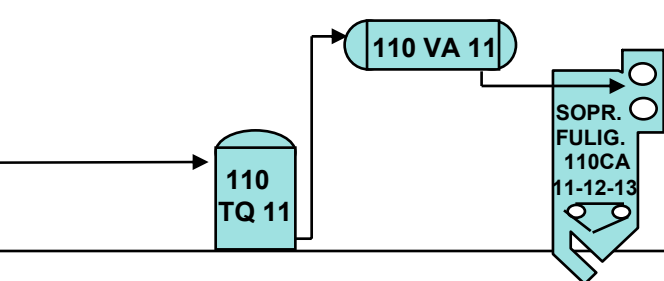
### 45: PRECIPITATORS



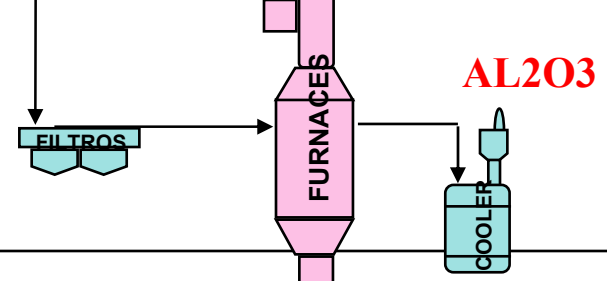
### Área 371: WATER



### Área 110: BOILERS

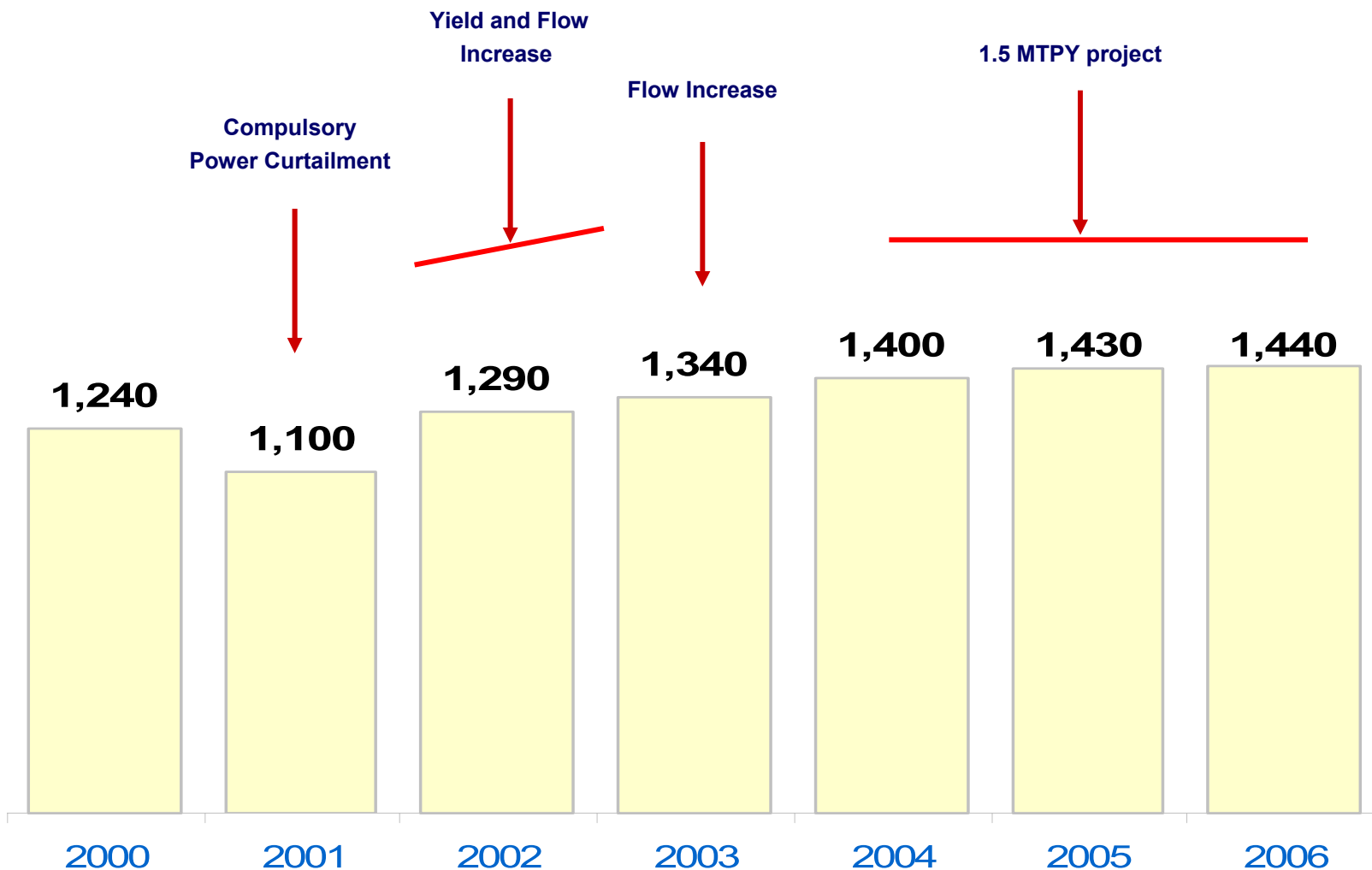


### Área 50: CALCINATION



## Smelter Grade Alumina (SGA) production (kton/y)

3.500 with Expansion

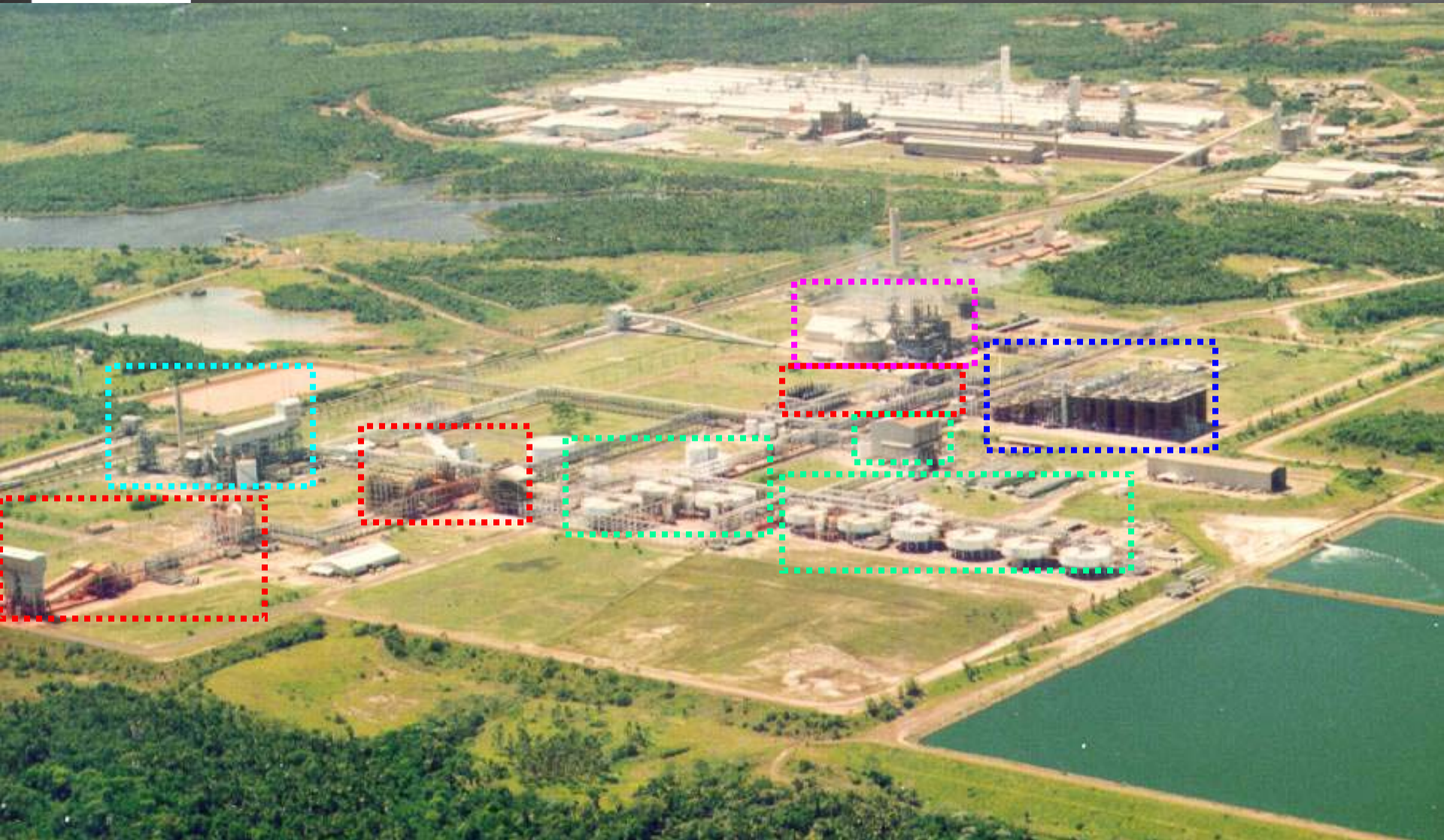


## **ACHIEVEMENTS**

- ✓ PRECIPITATION SIZE STABILITY
- ✓ SPENT LIQUOR SCALE INHIBITOR TEST
- ✓ EARLY EXPANSION GAINS
- ✓ KEEP SECOND RENTAL BOILER

## **CHALLENGES**

- ✓ PASTE WASHERS IMPLEMENTATION
- ✓ LONG TERM CONTRACT FOR CRITICAL MAINTENANCE ACTIVITIES
- ✓ EARLY EXPANSION GAINS
- ✓ NEW BAUXITE FREIGHT CONTRACT



 Mills, Digestion, Bldgs 40 & 42    Clarification    Precipitation    Calcination    Powerhouse

### Upgrade existing unit with new unit 2

New Capacity 3.5 mtpy

Production availability 96.0%

Recovery 96.5 %

Precipitation seed ratio 1000 grams per liter (gpl)

Precipitation yield 98 gpl (Gross) - Benchmark

### **ENERGY**

- Additional heater for washer flow heating at Digester Unit #1
- Installation of axial cyclones at the Digester units to improve flash vapor quality
- Heat recovery from excess condensate at 35E tanks
- Co-generation at Powerhouse

### **CAUSTIC SODA**

- Indirect slurry heating of bauxite slurry at Digestion Units #1 & #2
- Application of E-duct technology at Thickeners and Washers
- Installation of DIASTAR filters
- Additional evaporation unit

### **BAUXITE (Recovery)**

- Installation of cyclones at new bauxite mills
- Increase of Digestion temperature to 150° C

### **ENVIRONMENTAL**

- Lower sulfur oil in Calcination
- Reduction of potable water use by using condensate at Cooling Towers Bldg #45
- Avoid using cooling towers in Bldg 50

### **ABS PRINCIPLES (Operability improvements)**

- Flow path simplification at 42A / Bldg 42
- Unitized systems, 35D, Disc filters.

**ALUMAR**



**ABS – ALCOA  
BUSINESS  
SYSTEM**



# WHAT IS ABS ?

## Alcoa Business System

**It is a system based on the following principles:**

- **Understanding precisely our customers' requirements.**
- **Pre-specifying the activities, the pathways, and the connections**
- **Safeguarding what we have pre-specified with built-in tests to identify and prevent problems**
- **Enabling every employee to recognize and trace problems back to their root cause and eliminate them.**
- **This system provides the most efficient way for eliminating and preventing waste by enabling us to supply customers, on demand, with defect-free products at the lowest cost and with the highest degree of safety.**

# ABS

represents strong alignment of goals and methods.

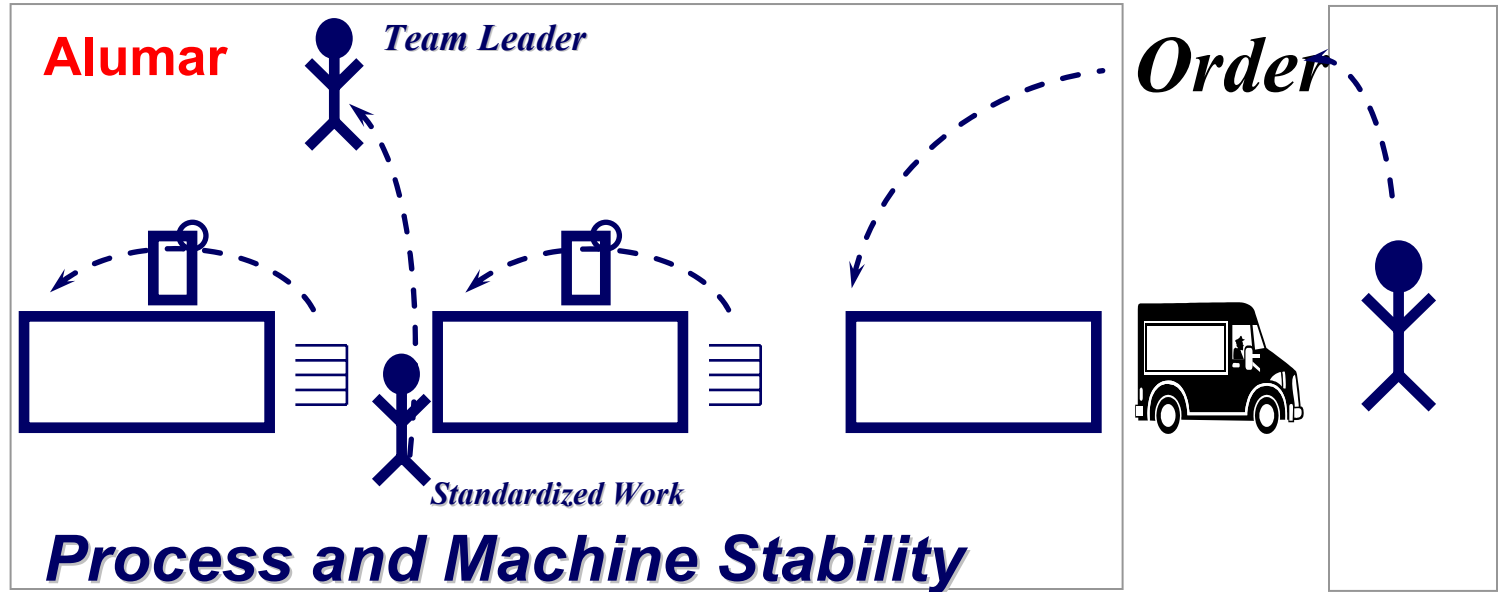
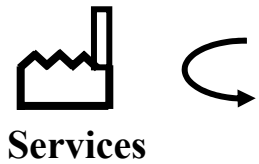
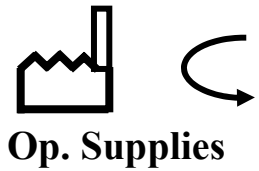
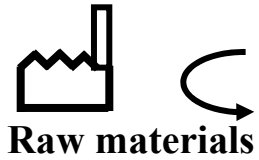
Everybody in the organization understands the goals and everybody uses the ABS methods and its countermeasures





# Redesign to ABS

## BY DESIGN rather than BY CHANCE



**Suppliers**

**Customers**

Redesigned to **Connect to the Customers**

Redesigned to **Stabilize work place**

- Flow path, connections & activities
- Built in tests

Redesigned People System to provide **help chain**

Redesigned to **Connect to Suppliers**

## Value to the Business\*

Inventory reduction	US\$ 17,142,000
Cash cost reduction:	US\$ 15,551,000
Output:	US\$ 46,449,000
Avoided Capital Expend:	US\$ 1,310,000
<b>Total :</b>	<b>US\$ 80,452,000</b>

Both Alumar Smelter and Refinery have been considered as ABS worldwide Benchmark Plants as per Alcoa Operational Excellence Audit Process throughout Global Primary Product Business Units.

## Operational Aspects

Employees Engagement

Plant Stability

Predictive and Preventive Maintenance Improvement

Operational Excellence

Technology Sharing and Best Practices Transfer

## Main Goals

Production Output

Metal Purity

Energy Consumption

Productivity Improvement

EHS related Issues

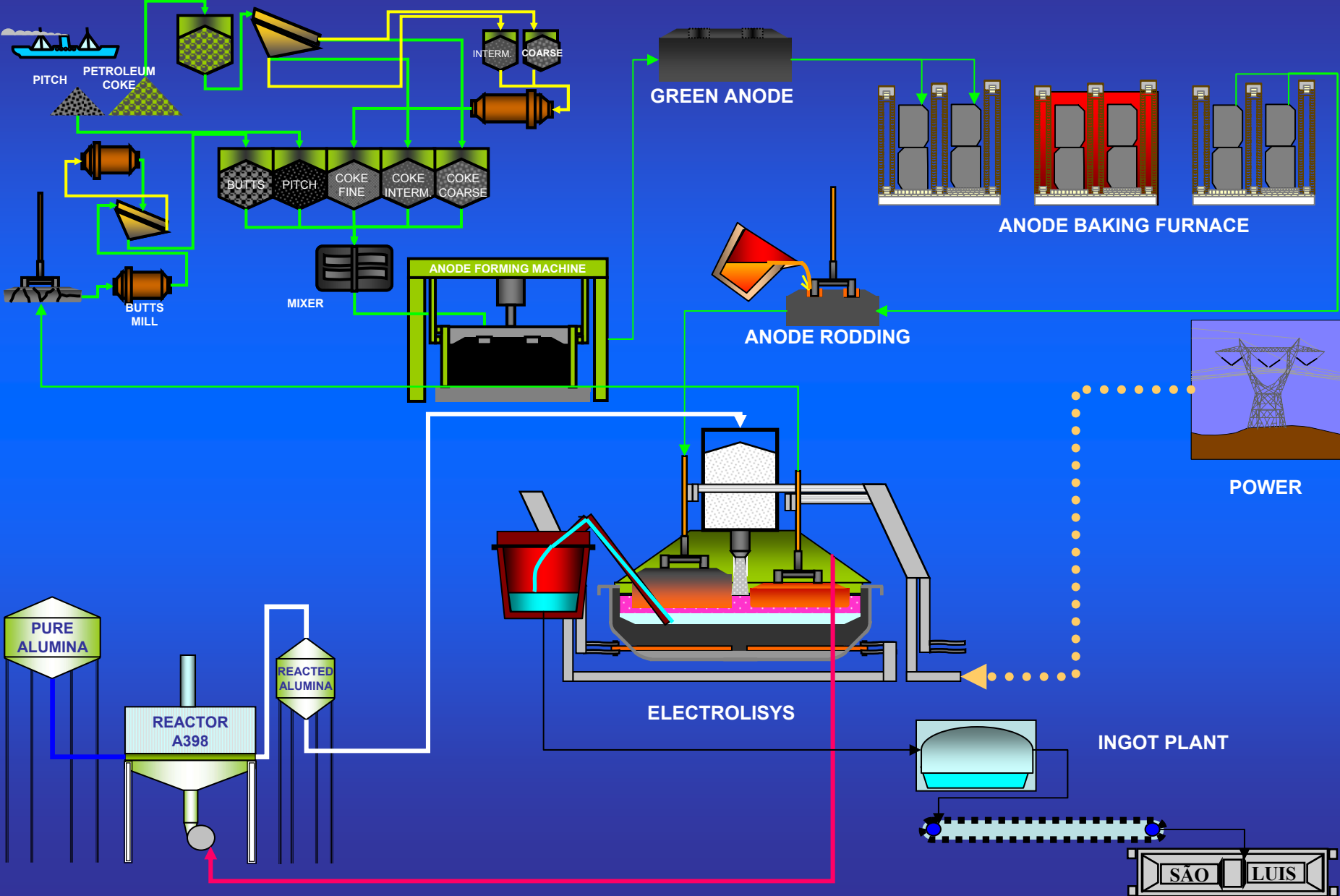


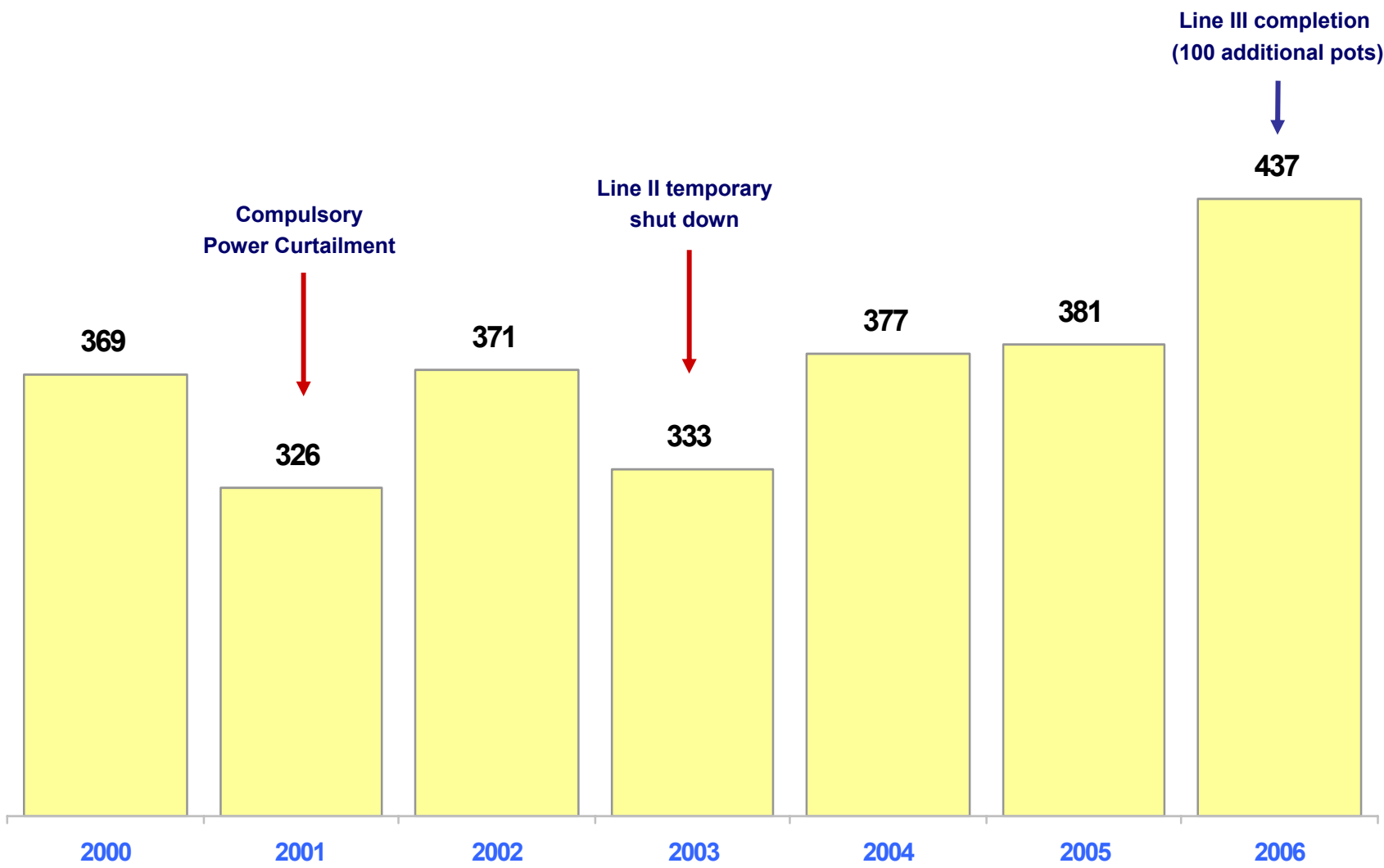
**SMELTER**

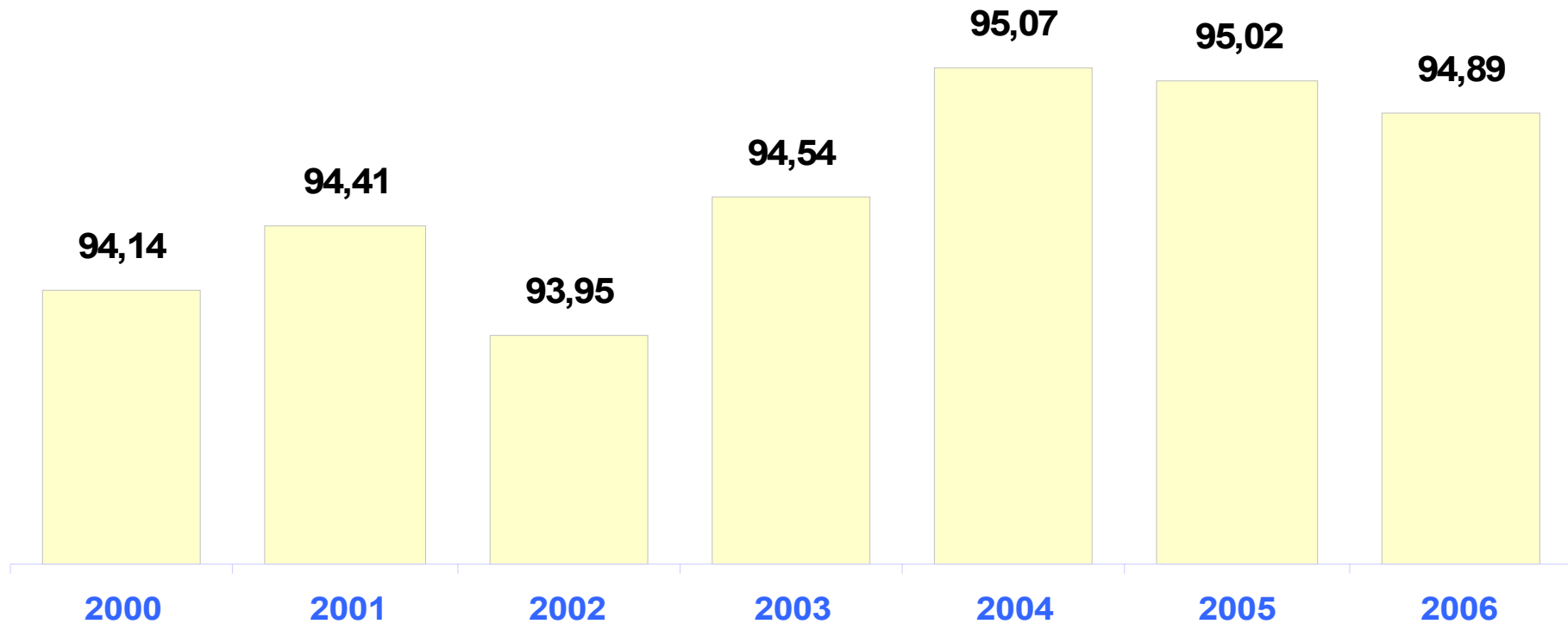
**ALUMAR**



# SMELTER MACRO FLOW







## **ACHIEVEMENTS**

- ✓ 52 POTS START-UP WITH NO INCIDENT
- ✓ BEST EVER SAFETY RESULT
- ✓ ANODE QUALITY
- ✓ ABS OpEx ASAT RESULT
- ✓ 95% PLANT STABILITY

## **CHALLENGES**

- ✓ CONSISTENT OPERATIONAL STABILITY
- ✓ IMPROVE PLANT RELIABILITY AND ASSET INTEGRITY APPLICATION
- ✓ SIGNIFICANT PRODUCTIVITY IMPROVEMENT
- ✓ PROACTIVE COST CONTROL
- ✓ CONSOLIDATION OF DMS/PPS/ABS-ASAT

- ✓ Focus on customer and company's business case, execution and follow-up
- ✓ Leadership (Beware, Believe and Behave)
- ✓ Strong focus on stability of processes, equipments and people
- ✓ People engaged in problem solving using scientific methodology
- ✓ KISS – Keep It Simple and Same
- ✓ Continuous improvement Culture
- ✓ People development (Expectation - Execution - Feedback)
- ✓ End-to-End organization engagement
- ✓ Learning-oriented organization: Learn by Doing and Teaching

# INSTITUTIONAL VIDEO

ALUMAR

