



Front end Transport Challenges to 2020



Perrine Russias

Sales Manager

***Front end & Research
Reactors Business line***

AREVA - TN International



Trend of growth

- ▶ **New projects and new plants erected in the fuel cycle, as well as new reactor build**
- ▶ **Transport industry has to anticipate those changes, in phase with the nuclear industry**
- ▶ **This paper shows example of transport challenges in the field of Mining, Enrichment, New reactors deliveries, as well as evolution in tails management**

New sites, new routes, new packages
And allways the the highest level of safety

Mining : new sites

- ▶ Uranium primary production is increasing from 52 000 MtU to 80 MtU during the next 10 years
- ▶ New mines are under development, and the logistics plays a major role regarding
 - ◆ cost and delivery time
 - ◆ Environmental footprint of the mine
 - ◆ Sustainability of the deliveries : local conditions (routes, port) may be not sufficient for the new UOC traffic



*Trekopje and
Imouraren
sites
Areva data
base*

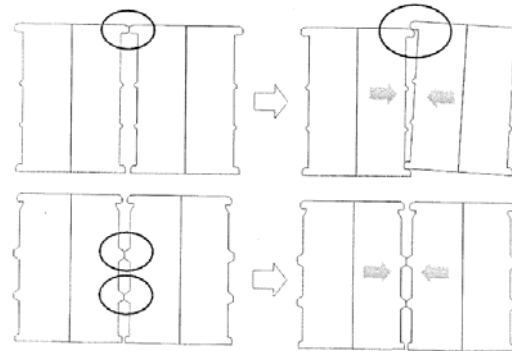


**The logistics has to be anticipated
for the new mines projects**

Mining : existing sites

- ▶ Since the transported quantity of UOC is increasing, it is maybe the time to think about optimization of the packaging
- ▶ Good old drums and 20" containers could certainly be improved
- ▶ Alternative packages also investigated (ex WNTI)

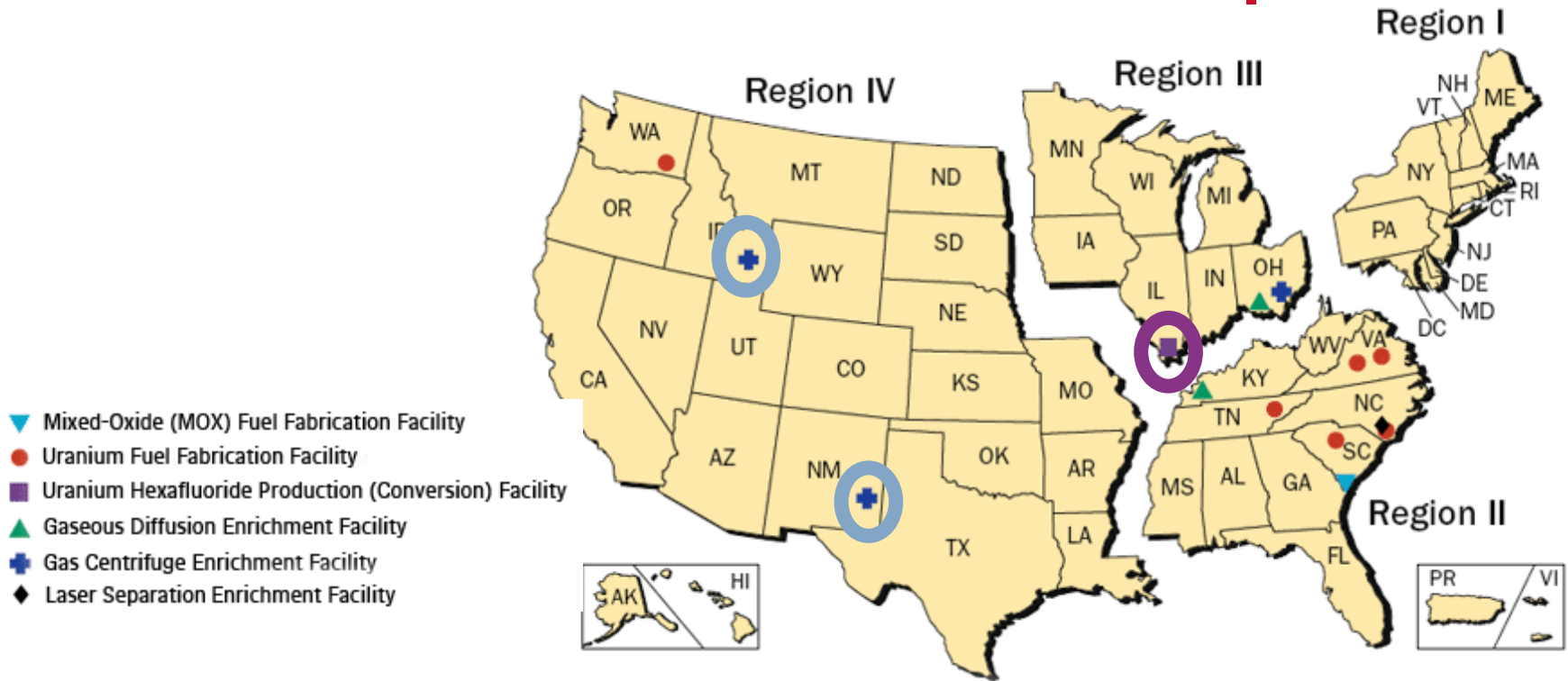
UOC drums - WNTI data base



UOC drums optimisation - AREVA

LOGISTICS

Feeding the new enrichment plants



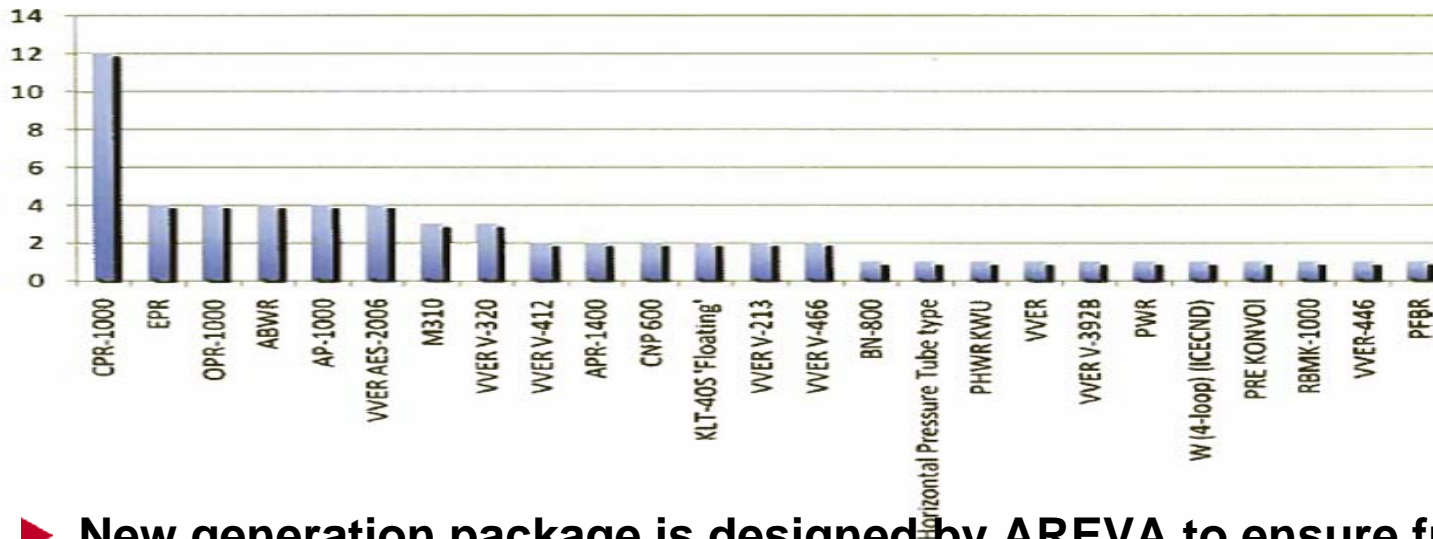
Long distances leads to CO2 emission & Cylinder fleet management challenges

LOGISTICS

New reactors fuel deliveries

- ▶ 150 new reactors are planned, 340 are proposed
- ▶ Various designs of reactors leads to various designs of fuel

Number of Reactors Under Construction (by Model)



Source IAEA PRIS data base -

WNA 2010

- ▶ New generation package is designed by AREVA to ensure future deliveries in the next decade

Standardization of fuel packages and optimized first core deliveries leads to cost optimization

LOGISTICS

Evolution in Tails management

- ▶ **“De conversion” plants are build to convert depleted UF6 into depleted Uranium Oxyde**
 - ◆ Pierrelatte (France) since 1984
 - ◆ Zhelenogorsk (Russia) since 2009
 - ◆ US : Ohio starting 2010, one more plant planned near Urenco LES facility
 - ◆ UK : one project planned near Urenco Capenhurst facility
- ▶ **Similar logistics than a conversion plant :**
 - ◆ 48Y cylinders for the UF6, heels, cylinder washing
 - ◆ oxyde packages and transport/storage
- ▶ **DV70 packages used in France for storage**
 - transported since many years by train



DV 70 storage – Areva data base

Environmental evolution

- ▶ Increase of class 7 volumes and new flows need to be explain for better public acceptance
- ▶ Real time communication leads to real time tracking
- ▶ Evolution in applicable regulation for transport activities, included physical protection measures

April 2010 – Greenpeace web site

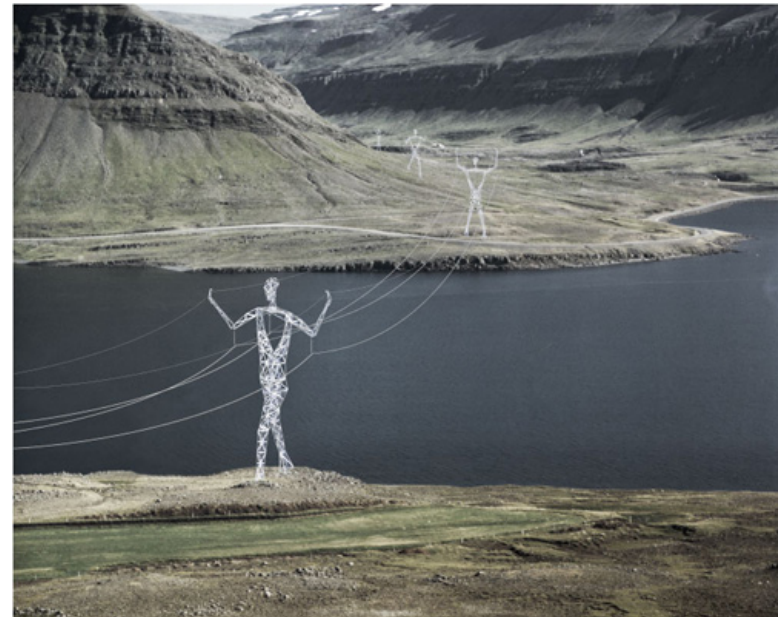


LOGISTICS

Conclusion

Keeping the routes open, open new routes,
Design and manufacture new packages,

Take advantage of this period of growth to innovate



Innovation contest in Island – electricity transportation pylons– innovation website

LOGISTICS