Transfer of Jet-A1 following biodiesel at Charles De Gaulle and Orly airports (Paris – France) in MPPs

CONCAWE/COPEX
Implications of FAME in diesel for jet-fuel quality
March 2010 - Brussels

Patrick Viltart – TRAPIL

Le Havre Paris Pipeline

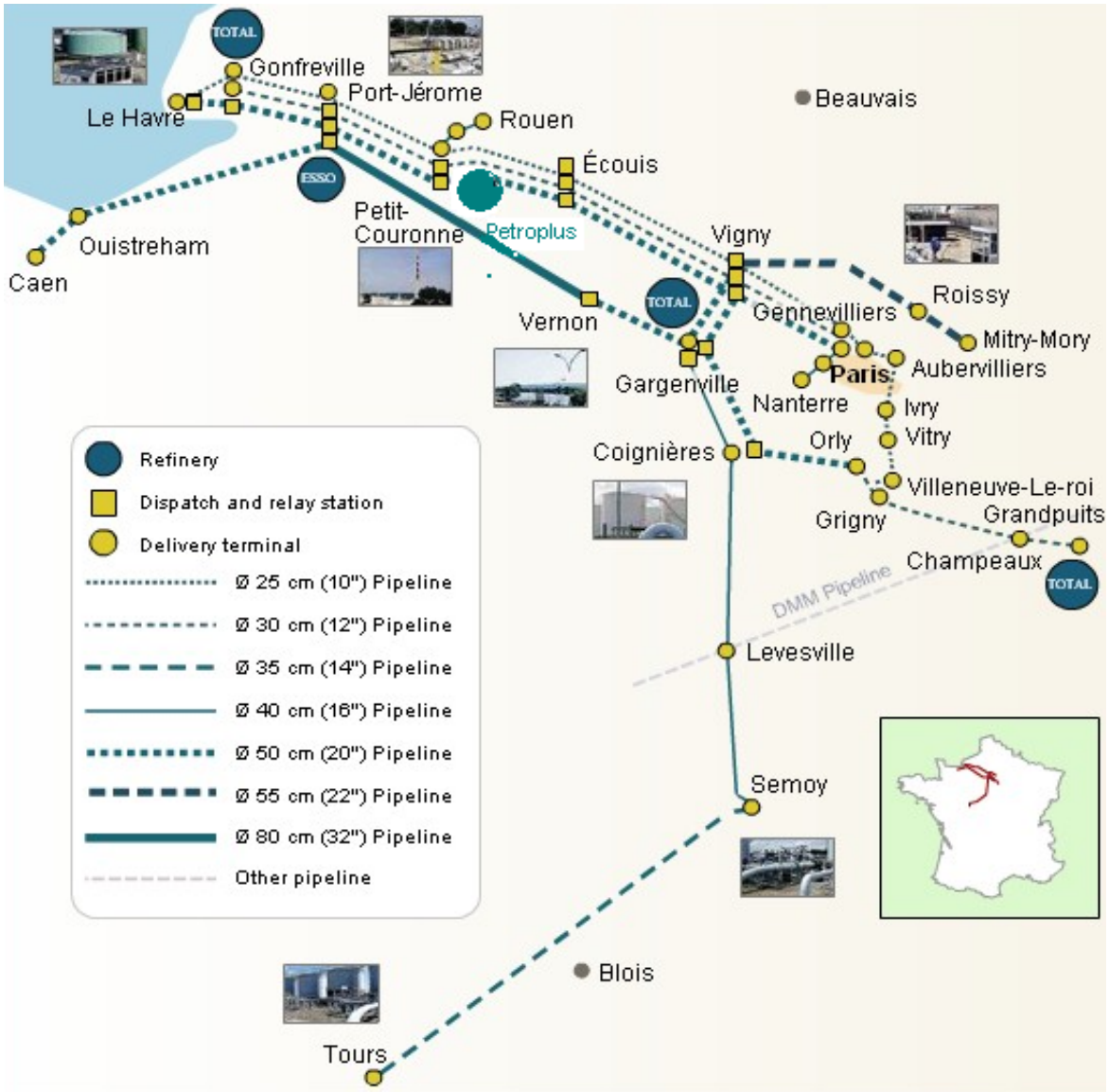
- Supply of depots and airports depots (SMCA consortium at Charles de Gaulle and Orly airports) in the Paris area from the port of Le Havre and refineries in Normandy, with automotive, heating products and jet-fuel
- 4 main lines: 10, 12, 20 and 32 inches diameter
- Length : 1375 km
- 29 pumping stations
- 27 delivery stations

Le Havre Paris Pipeline

Nearly 20 millions of metric tons of products transferred in 2009:

- **Diesel fuel : 41%**
- **Jet-A1 : 26,5% (Charles de Gaulle: 21% - Orly : 5,5%)**
- Heating fuel : 15%
- Gazoline : 12.5%
- Naphta : 5%

Le Havre – Paris pipelines

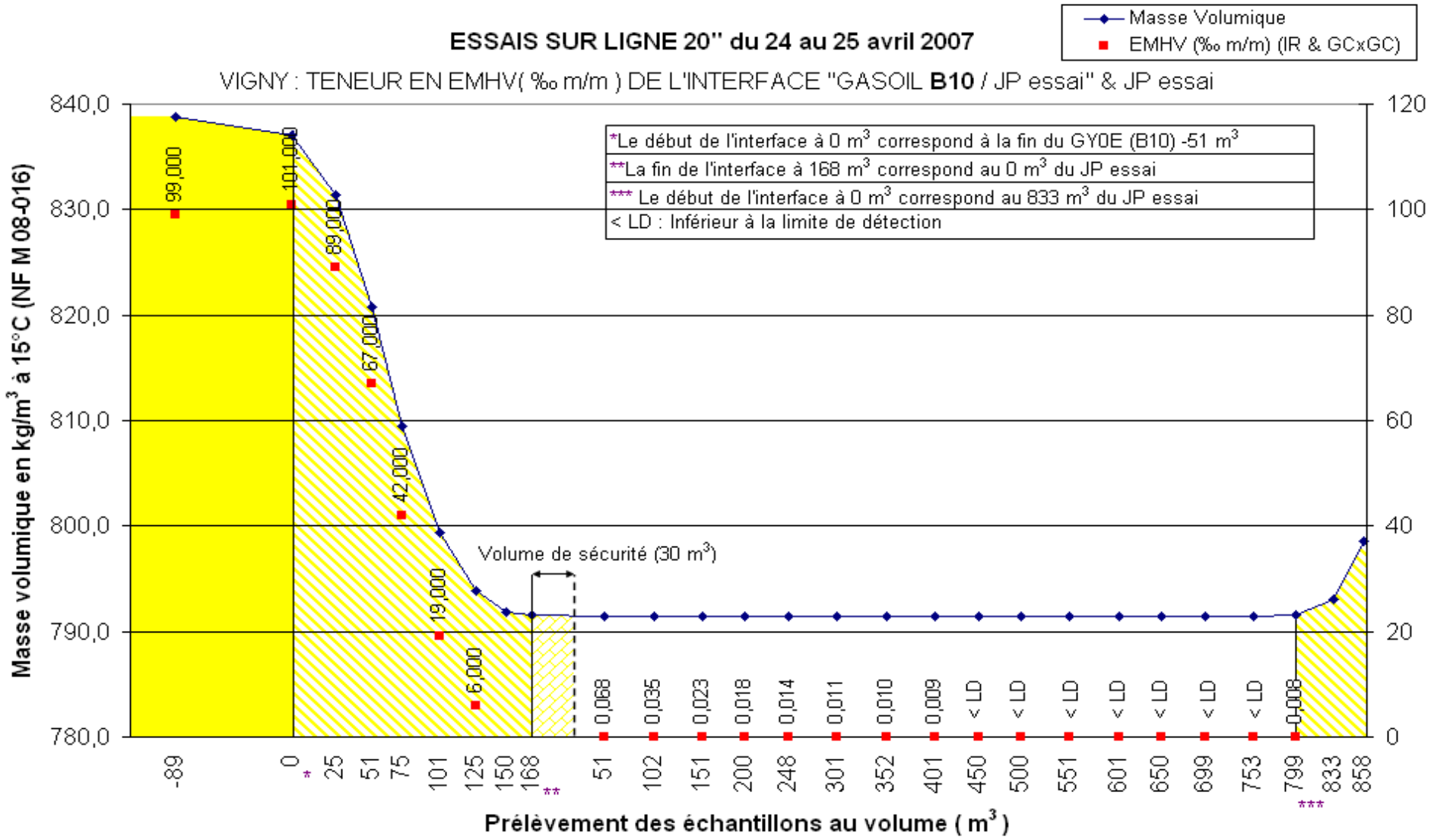


Jet-fuel and biodiesel

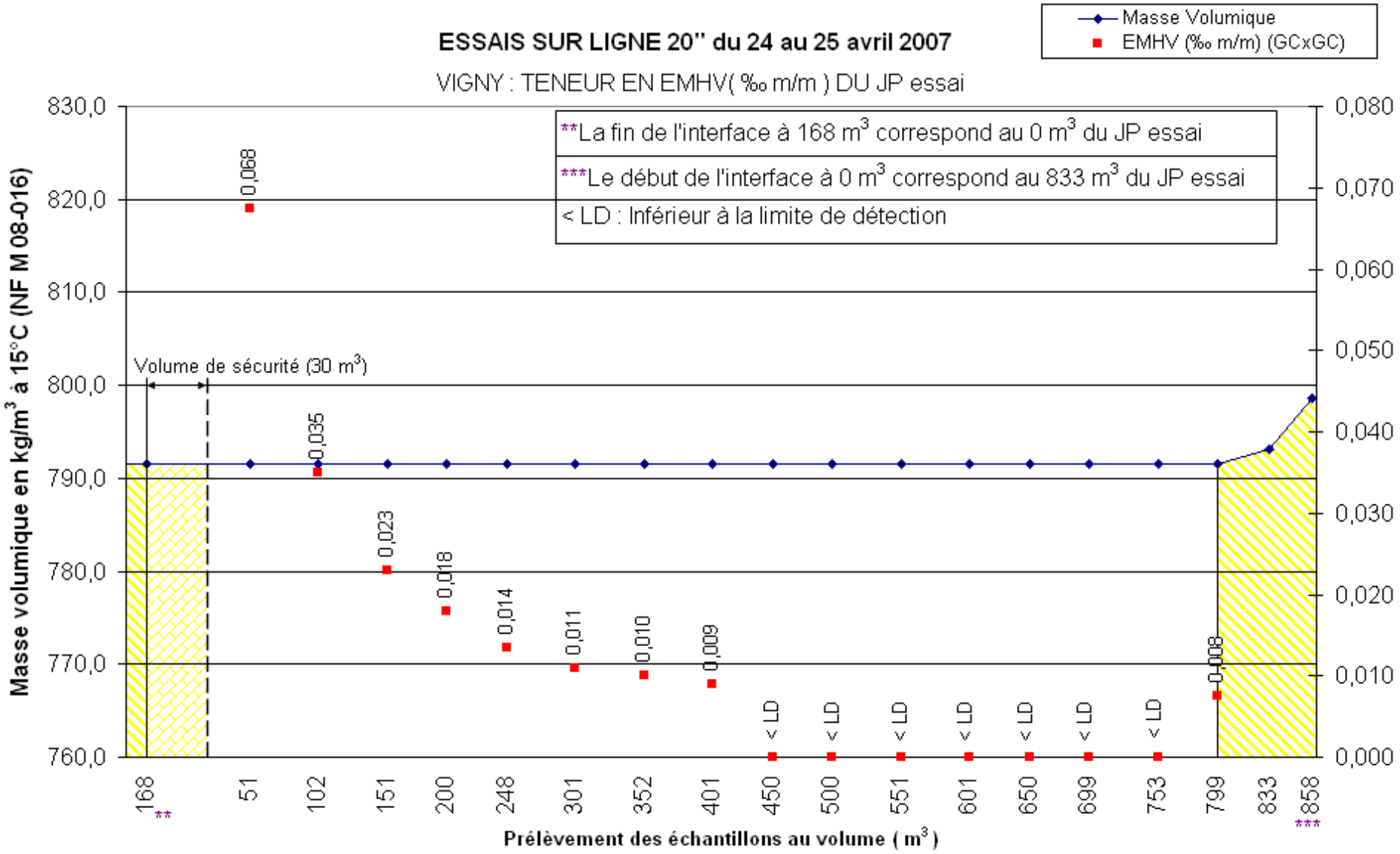
- In France, legislation dictates a level of 7% of FAME in diesel fuel, resulting in biodiesel B7
- TRAPIL could not use non-FAME containing buffers, modify periodicity and sequence of transfers, without a dramatic reduction of capacity of transportation and a shortage of jet fuel or diesel fuel in Paris area
- TRAPIL conducted a pipeline trial in April 2007, to identify and quantify the traces level of FAME in a jet-fuel batch following a B10 batch in the worst case operating scenario

Trial results

FAME Values (‰ m/m) in interface B10/test Jet A-1 and in test Jet A-1



FAME Values (‰ m/m) in test Jet A-1



Summary results and consequences of the Test

- FAME is identified at ppm levels in the first 400 m^3 of the jet-fuel batch following the B10 batch.
- Update procedures must be applied not to exceed 5 ppm of FAME in delivery tanks, in accordance with the JIG bulletin n°15.

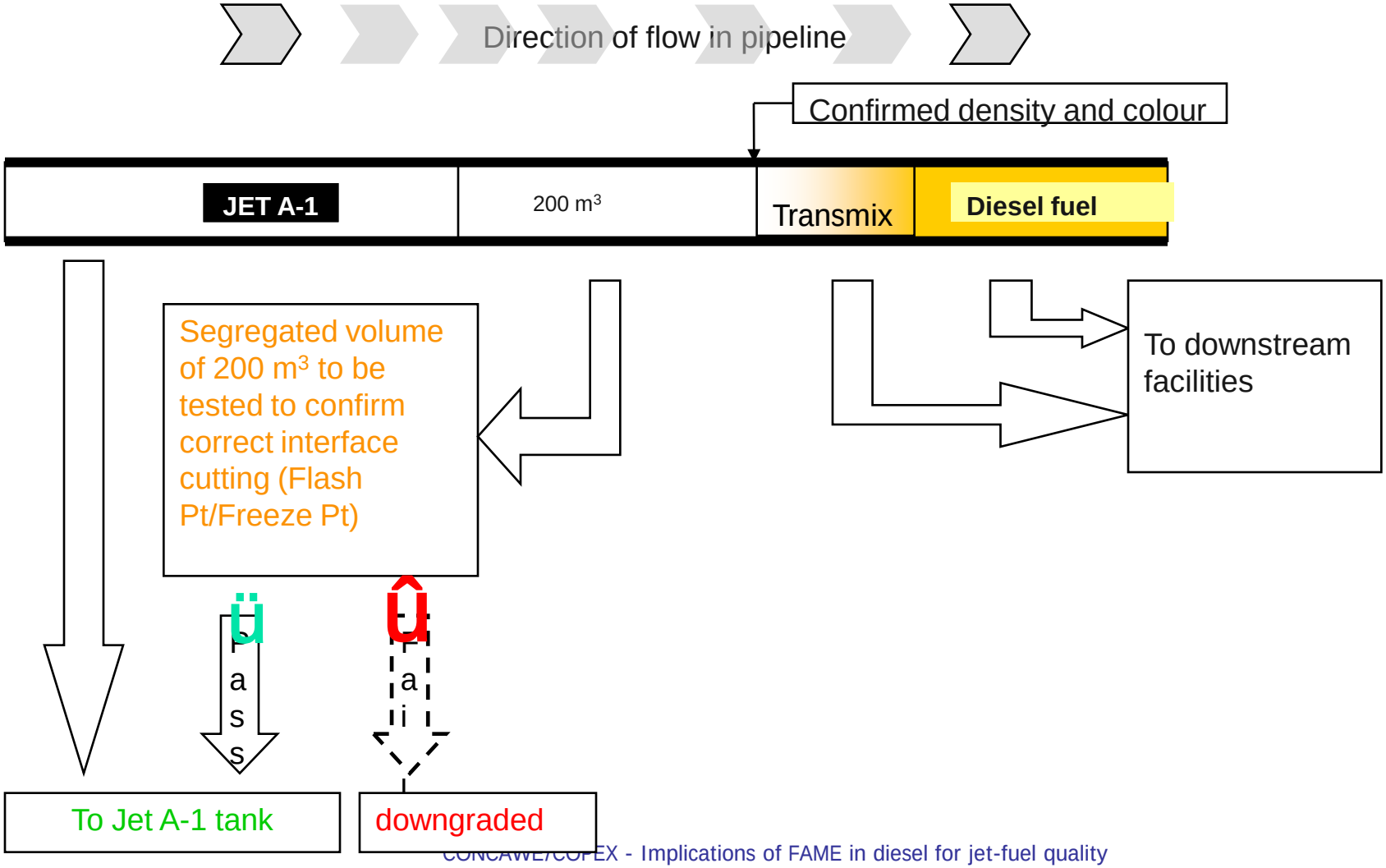
Update procedures

Mitigation procedures

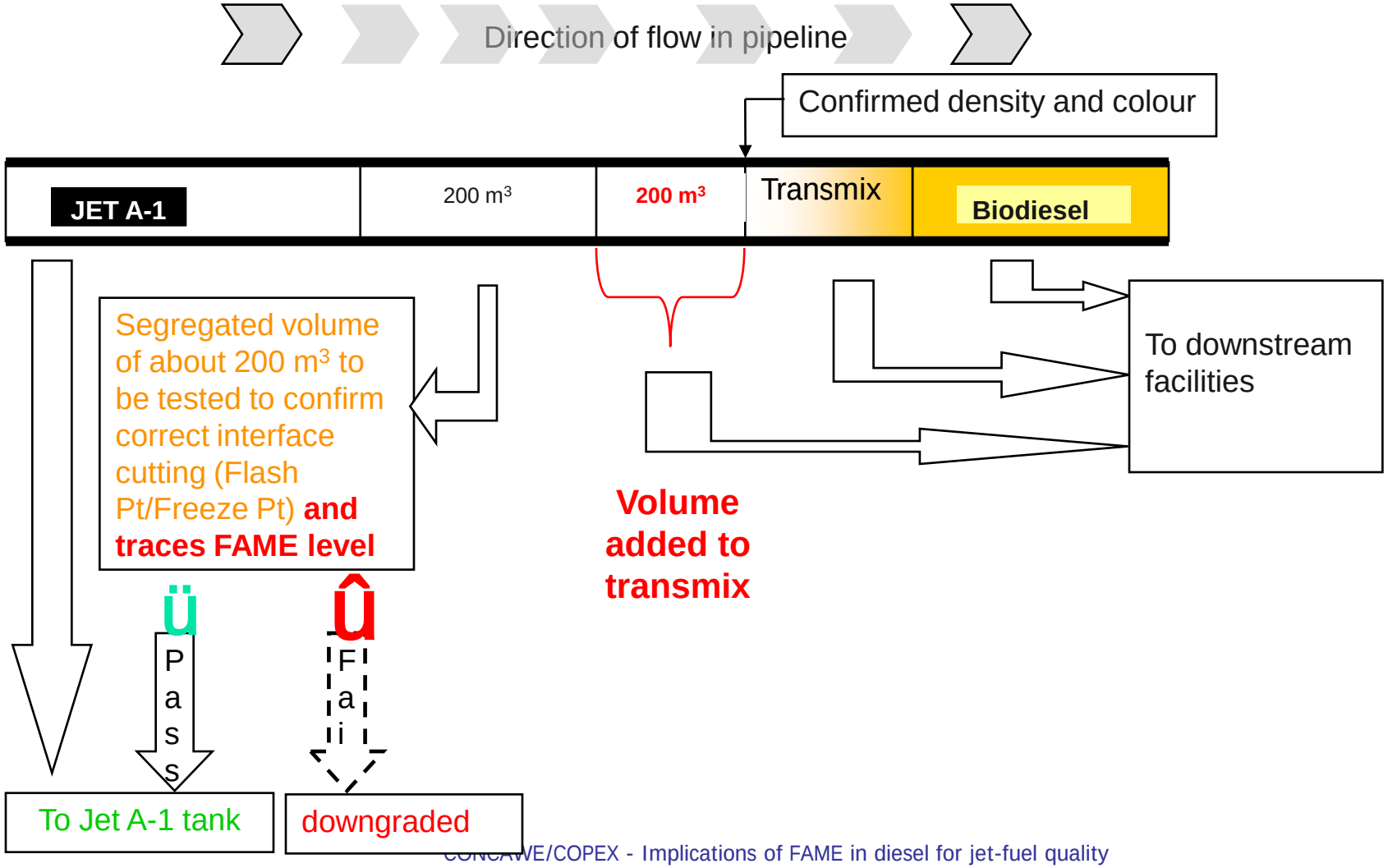
- Minimum jet-fuel batch following a B7 batch :
  - 12 000 m^3 at Orly airport,
  - 20 000 m^3 at Charles De Gaulle airport

- Transmix cutting must be modified by adding the first 200 m^3 of the jet-fuel batch with the highest level of FAME, to the transmix

Trapil previous operating procedure at airport



Trapil update operating procedure at airport



Additionnal procedures

- Examination of facilities all along the supply route to remedy any source of low level cross contamination (in accordance with the JIG bulletin n°16)
- Purchase of a GCxGC and then GC/MS chromatographs, training and qualification of the laboratory technicians on these methods
- Review of the sampling procedures, training and qualification of the field operators to take samples of jet-fuel representative of FAME traces
- At shipping (refineries ...), check of no traces of FAME on unit samples taken at 200 m^3 from the head of the jet fuel batch
- At airport, measurement of the FAME traces level in the first 200 m^3 (segregated volume) following the B7 batch and in the composit automatic samples

Cost of update procedures

1 million of euros a year including

- Reprocessing of jet-fuel volumes added to transmix at refinery (impossibility of reinjection in ground products because of high rate of sulfur in jet fuel, not enough heating fuel batches transferred)
- Operations for specific sampling
- Measurement of FAME traces at laboratory

Drawbacks

- Update operating procedures are complex
- Update operating procedures are costly
- Highly skilled technicians for sampling and laboratory are needed
- Greenhouse gas emitted by truck transfers and by reprocessing of jet fuel volumes added to transmix

Conclusion

- In a short time, need of tests providing confidence that FAME traces in jet-fuel up to 100 ppm are acceptable (work in progress : JIP/EI).
- Reliable operating procedures could be applied again
  - to prevent airports from a disruption of fuelling
  - to reduce the extra-cost of operations for the benefit of the air transportation industry
  - in accordance with the objective of Europe and other countries, to reduce the greenhouse gas emission

Thanks for your attention