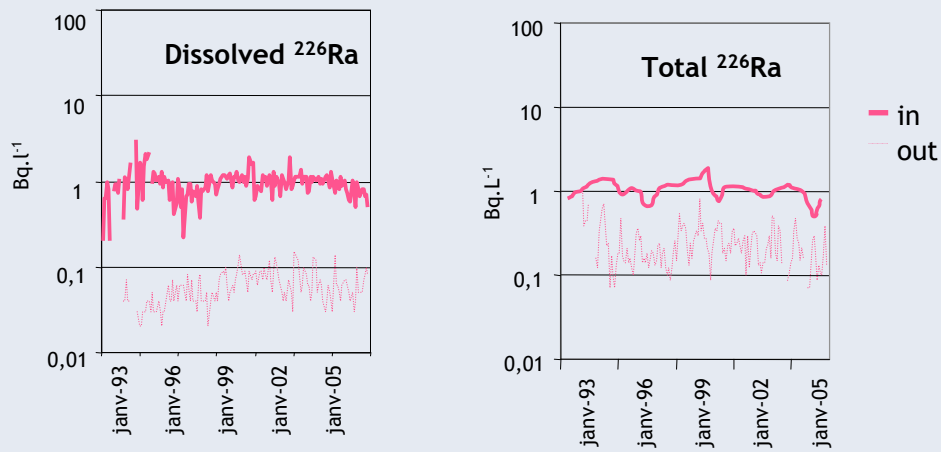




## Improving the water treatment efficiency: the starting point

Treatment = chemical precipitation and particles settling

Water treatment effectiveness for  $^{226}\text{Ra}$

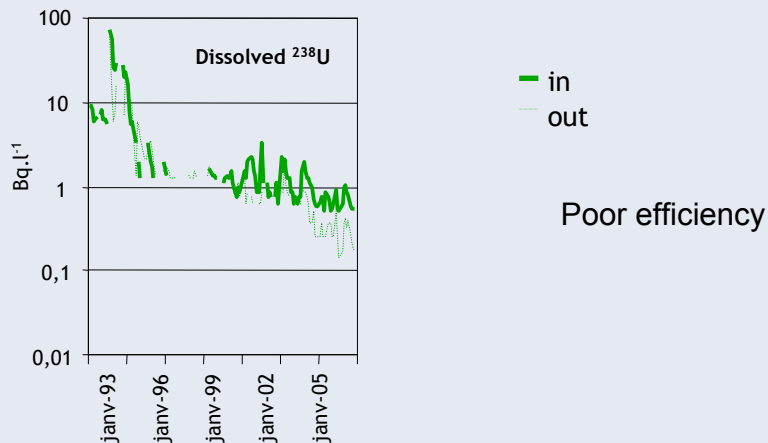


A part of particles created by precipitation does not settle and escapes the station. They potentially are the precursor of sediments in the Saint Pardoux lake.



## Improving the water treatment efficiency: the starting point

Treatment : flocculation

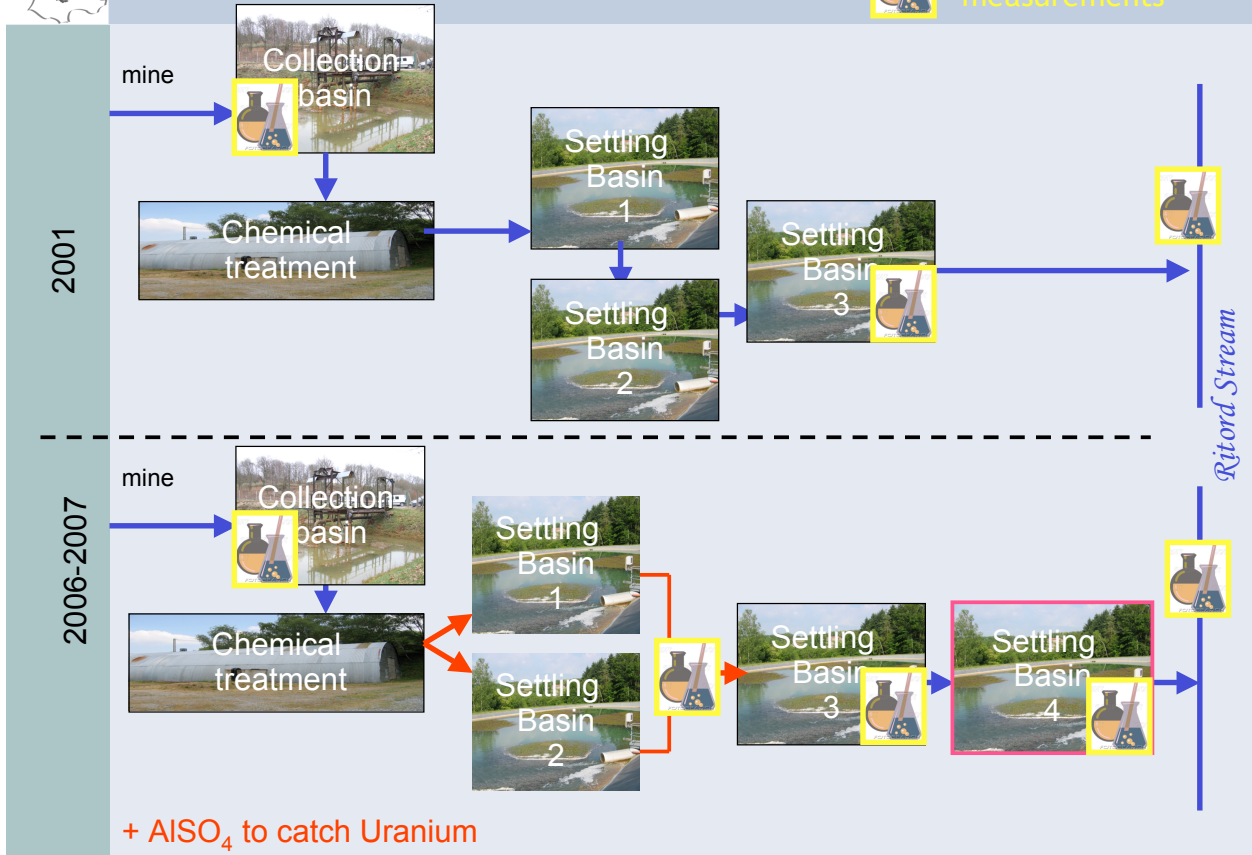




# Water treatment station improvement



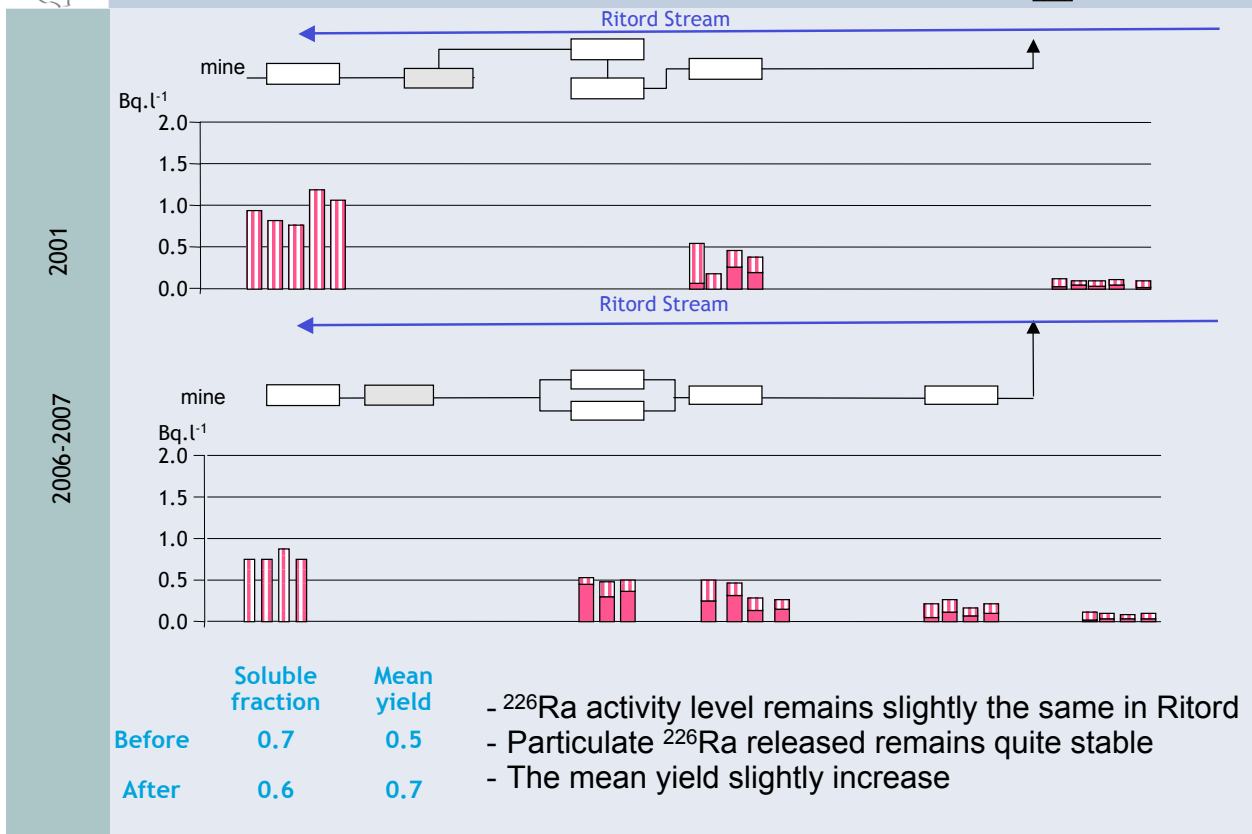
$^{238}\text{U}$  and  $^{226}\text{Ra}$  measurements



# Results on $^{226}\text{Ra}$

particles (solid pink bar)

dissolved (striped bar)

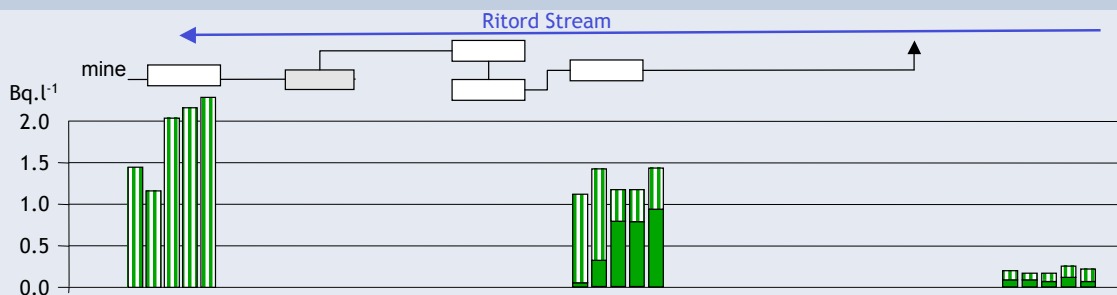




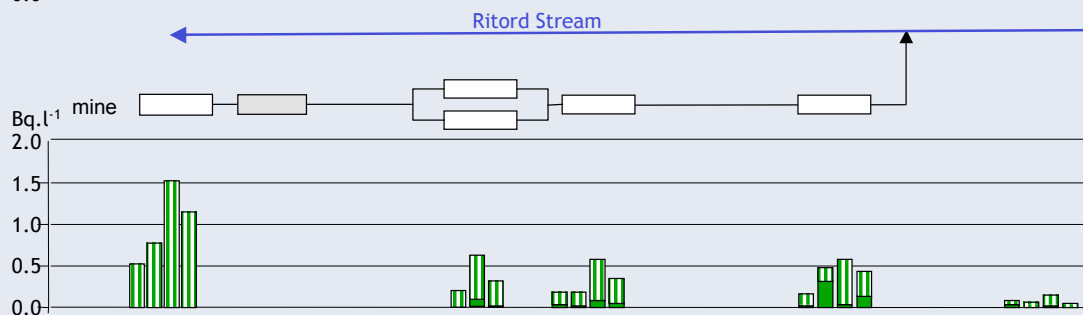
## Results on $^{238}\text{U}$

particles  
dissolved

2001



2006-2007



|        | Soluble fraction | Mean yield |
|--------|------------------|------------|
| Before | 0.5              | 0.2        |
| After  | 0.7              | 0.5        |

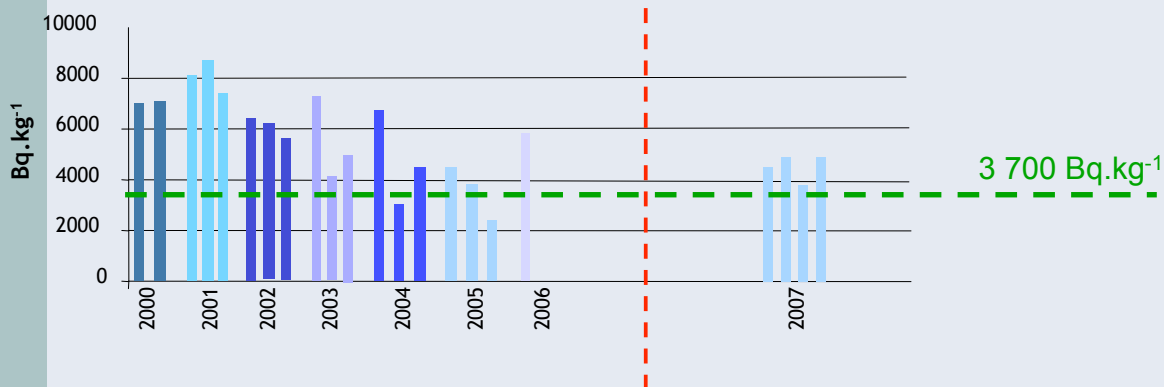
$^{238}\text{U}$  activity level decrease over time in Ritord  
- improvement of the mine's water quality  
- improvement of the treatment



## $^{238}\text{U}$ activity in the sediments of the Saint Pardoux lake

Before developments in the water treatment station

After developments in the water treatment station



No recent improvement of the sediment quality  
 $^{238}\text{U}$  activity is still over 3 700 Bq.kg<sup>-1</sup>



# Conclusion

## Water treatment

Percentage of  $^{226}\text{Ra}$  and  $^{238}\text{U}$  kept in the water treatment station.

|        | $^{226}\text{Ra}$ | $^{238}\text{U}$ |
|--------|-------------------|------------------|
| Before | 0.5               | 0.2              |
| After  | 0.7               | 0.5              |

Water treatment is more efficient for  $^{226}\text{Ra}$  than for  $^{238}\text{U}$

**BUT**

Improvement is better on  $^{238}\text{U}$  than on  $^{226}\text{Ra}$



# Conclusion

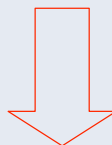
## Environmental impact evolution

### 1 The quality of the Ritord's water increases over time

$^{226}\text{Ra}$  and  $^{238}\text{U}$  activity levels in water flowing out of the mines decrease

Efficiency of water treatment improves

### 2 $^{238}\text{U}$ activity in sediments is still over 3 700 Bq.kg<sup>-1</sup>



Development of a treatment to reduce  $^{238}\text{U}$  content in released water is in progress



- **More information about GEP ?**

Lecture Hall GEL-0001  
13.00-13h20 Yves Maignac  
Post uranium mining: The activities of the  
"Groupe d'Expertise pluraliste in Limousin  
France"

[www. gep-nucleaire.org/gep](http://www.gep-nucleaire.org/gep)