Groupe d'Expertise Pluraliste

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Uranium Mining and Hydrogeology V

Impact of uranium mines water treatment on the uranium and radium behaviour. The case of St Pardoux lake , Limoges, France

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Context

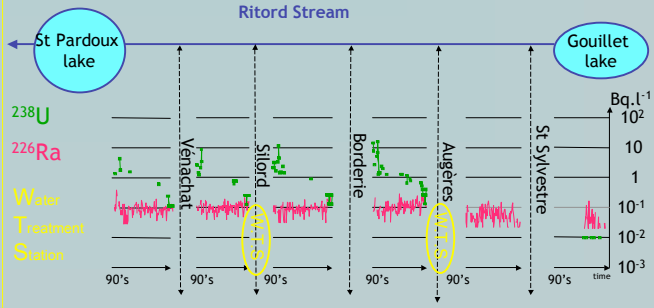
1- French uranium mines are closed;
2- Rehabilitation work was conducted during the nineties;
3- Waters flowing out of the mines are controlled and if necessary treated before being released into the environment.

Objectiv

1- Determine the level of contamination downstream the mine's water releases;
2- Evaluate the effectiveness of the water treatment.

Method

1- work on the Ritord stream collecting 5 water releases;
2- Focus on the main water treatment station (Augères);
3- Measurements of U and Ra (particulate and dissolved) all along the treatment and in sediments of the Saint Pardoux lake located downstream the release point.



Activity in the sediment Bq.kg^{-1}	^{238}U	^{226}Ra
Upstream (Gouillet lake)	~ 800	~ 600
Downstream st Pardoux lake	~5 000	~ 1 000

Activities in water up and downstream releases since 1990

Background $^{238}U = 10^{-2}$ Bq.l^{-1} ; $^{226}Ra = 4.10^{-2}$ Bq.l^{-1}

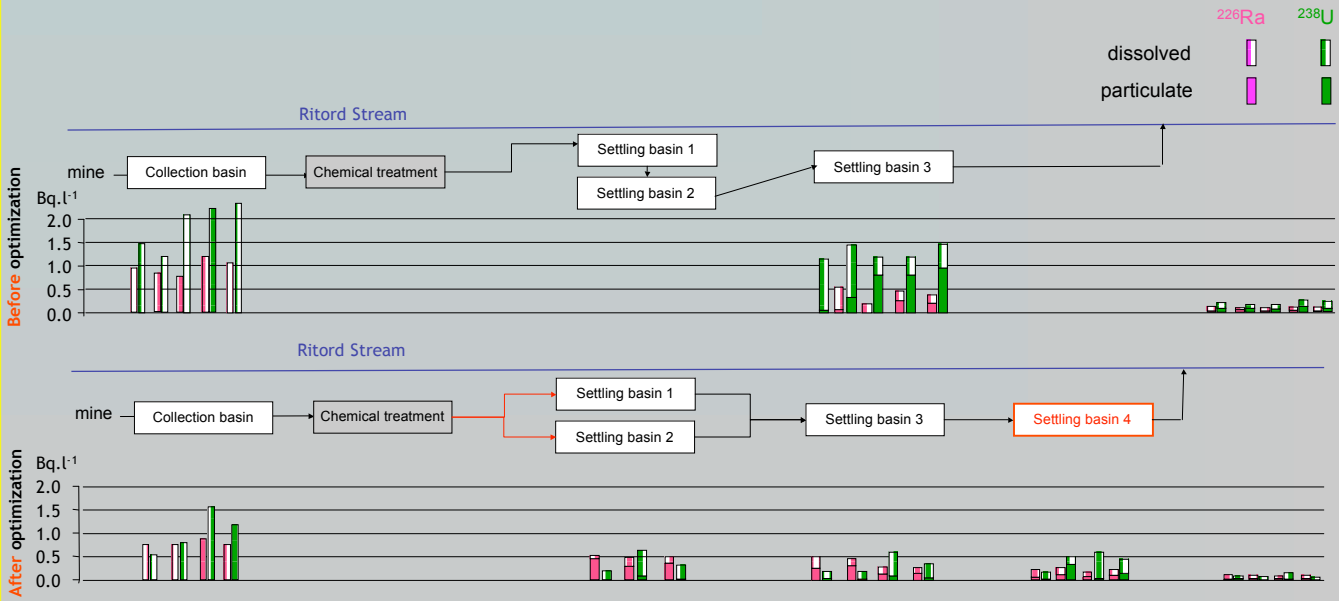
Highest activities in 1994 corresponding to the flooding of the mines

Present level : ^{238}U ~ ^{226}Ra ~ 10^{-1} Bq.l^{-1}

Mean activities in sediments up and downstream releases

Sediments are contaminated downstream the releases points. It may be considered as a potential radiological hazard for population or the environment.

The French local authority ordered that the operator:
1- clean up the Saint Pardoux lake → Removal of sediments
2- improve the water treatment → Optimization of water treatment station



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

^{226}Ra activity level remains slightly the same in Ritord
Particulate ^{226}Ra released decreases.

In sediments of the Saint Pardoux lake, no recent improvement of the quality was observed and the ^{238}U activity remains over the limit value locally fixed by the regulation : 3 700 Bq.kg^{-1}.

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

Water treatment is more efficient on ^{226}Ra than on ^{238}U

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