

THE PROBLEM OF PHOSPHOGYPSUM WASTES IN THE TINTO RIVER MARSHES HUELVA, SPAIN

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The problem

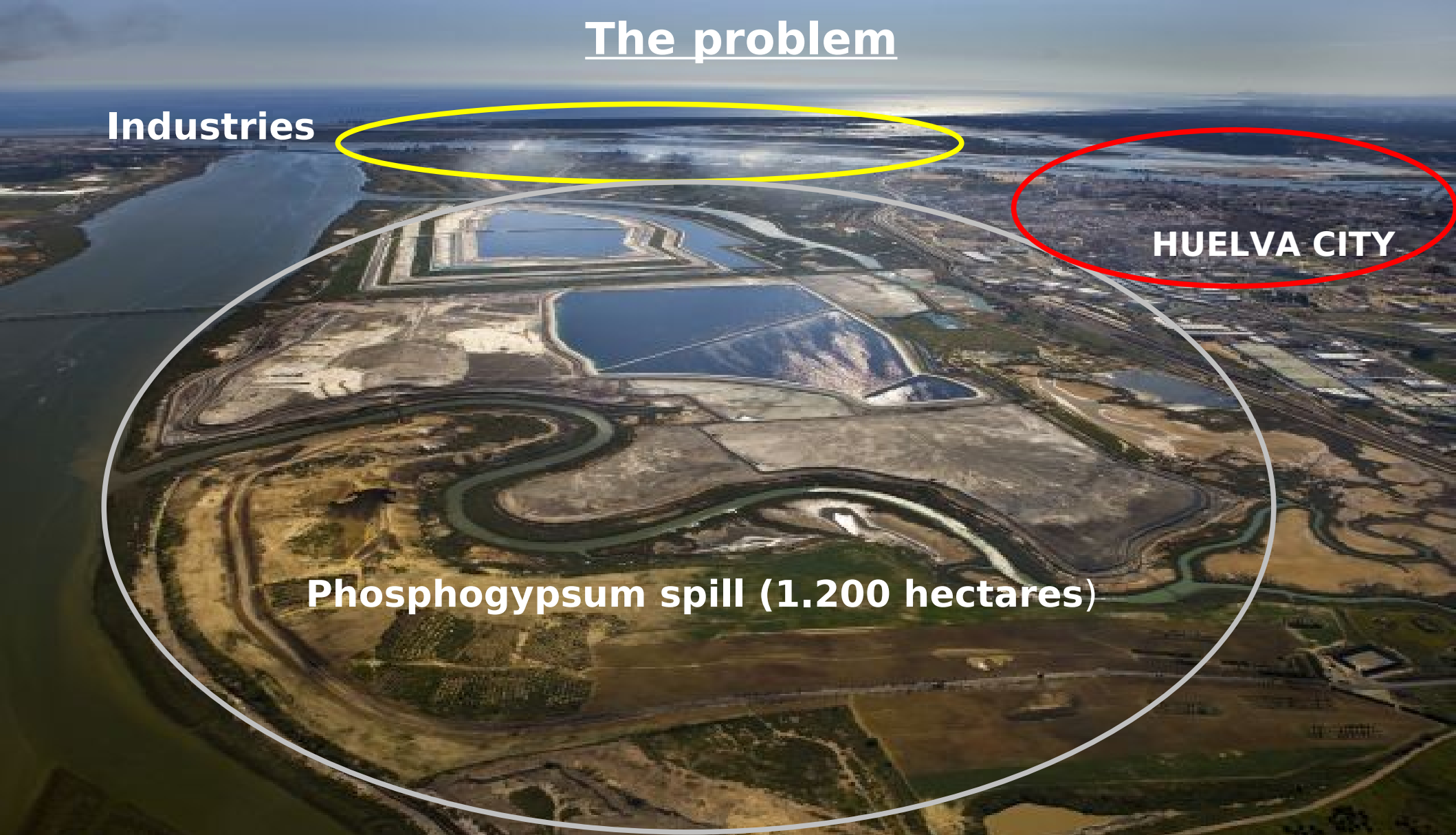
Industries

HUELVA CITY

Phosphogypsum spill (1.200 hectares)

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What is the phosphogypsum?

It is a waste from the manufacture of chemical fertilizers.

It contains radioactive isotopes such as uranium 238, unstable element that decays into other radiotoxic elements (Th230, Ra226, Po210).

Huelva's industry has dumped illegally in the phosphogypsum other toxic wastes (weak acid) with high content of heavy metals such as arsenic, cadmium, lead and zinc (the same acids that were dumped illegally in Aznalcollar and the Rio Tinto mines).

All this, on a permeable marsh with direct action of tides and direct leakage into the Tinto river and the ocean.

**Direct discharges to the
Tinto river from Fertiberia**

Tinto river

Odiel river

Atlantic sea

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Local discharges of polluted water from phosphogypsum spills to the Tinto river.

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Local discharges of polluted water from phosphogypsum spills to the Tinto river.



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Polluted water on the phosphogypsum spill.

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Atmospheric pollution and dust coming from the phosphogypsum spills.



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Health and mortality

Various health and epidemiological studies show that Huelva is the largest city in Spain with cancer mortality:

- **Universidad Pompeu Fabra**
- **Instituto de Salud Carlos III**
- **Centro Nacional de Epidemiología**

Other agencies already alert on health problems in the area:

- **Servicio Andaluz de Salud**
- **Consejo Superior de Investigaciones Científicas**

The rate of asthmatics is the largest of Spain (14.6%) according to data from the *Sociedad Española de Neumología y Cirugía Torácica*, more than double than in larger Spanish cities like Barcelona.

Health and mortality

- According to the studies of the Pompeu Fabra University



Mortality from cancer in Huelva is a 16% higher than in the rest of Andalusia and higher than in the rest of Spain.

The most polluted estuary in the world, according to an unpublished report of Junta de Andalucía (report 16/92-C-00)



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Results of CRIIRAD report (1/3):

- On top of phosphogypsum, the gamma level radiation is 3 to 38 times higher than the normal level.
- Less than 9 minutes a day/year in contact with phosphogypsum, the total dose accumulated exceeds 10 microSv (not insignificant health risk of suffering from cancer, according to the EURATOM 96/29 Directive).
- Covering phosphogypsum with a layer of soil for a further revegetation, is an insufficient measure, as it has been demonstrated in those treated areas.

Results of CRIIRAD report (2/3):

Radium 226 (Ra-226):

- Activity measured in the phosphogypsum is between 1,000 to 18,000 Bq/kg: this is 40 to 800 times higher than in control soil.
- It is a transmitter of alpha particles Period physical = 1,600 years. Its disintegration generates a radioactive gas: Radon 222 (globally it is estimated that Radon 222 is responsible for 10% of lung cancers).

Thorium 230 (Th-230):

- Some materials associated with phosphogypsum have high concentrations of Th-230. Very radiotoxic by inhalation (its radiotoxicity is comparable to that of plutonium 238).
- Measured level: 11,100 Bq/kg: 400 times more than the soil control.

Results of CRIIRAD report (3/3):

Lead 210 (Pb-210)

- The phosphogypsum have high concentrations of Pb-210. Active measures between 10,000 Bq/kg to 17,600 Bq/kg: this is 40 to 800 times more than in the control soil.
- Lead 210 (and polonium 210 are descendants) are very radiotoxic if swallowed. The radiotoxicity polonium 210 has a 14 times higher than that of plutonium 238 (for children ages 2 to 7 years)
- The water creeps into the lead 210 Rio Tinto (CRIIRAD measures = 30 Bq/l): this pollution produces significant health risks as lead and polonium can accumulate heavily on fish, molluscs and crustaceans.

Greenpeace discovery Cesium 137 spill to the Tinto river.



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Greenpeace discovery Cesium 137 spills to the Tinto river from the CRI-9:

- Between 5,800 to 7,000 tons of waste contaminated by cesium-137 from the accident ACERINOX (Algeciras, 1998) is buried in the IRC-9 instead of being brought to El Cabril, merely because the latter was more expensive. The burial failed Resolution of the Ministry of Industry and Nuclear Safety Council and have not served to isolate the environment.
- The cesium-137 is a radioactive artificial substance (emits beta and gamma). Its physical half-life period is 30 years.

The analysis of CRIIRAD in water and sediment samples show:

- Water pollution by cesium 137 (1,73 Bq/l in the insoluble fraction and 0,41 Bq/l soluble fraction)
- Pollution of sediments: 3,200 Bq/kg.

Many unanswered questions:

- The phosphogypsum contain radionuclides long period of physical half-life: 4,500 million years for uranium-238; 75,000 to thorium-230; 1,600 years for radium-226.
- What control and containment have? What consequences would flood or rising sea levels?
- The Cesium-137 isotope is a pond and is releasing uncontrolled into the environment from the CRI-9, before the action irresponsible and negligent of the Andalusian and Central Administration. Why these radioactive waste are not carried El Cabril?
- For when an independent epidemiological study in Huelva?

Thank you...



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