

The Great Red Mud Experiment That Went Radioactive

By Gerard Ryle, Sydney Morning Herald, May 7, 2002.

Sick animals ... Mr Treasure with some red mud. Photo: Tony Ashby

Quentin Treasure was a member of a local land-care group when he was approached to take part in an unusual experiment by the West Australian Agricultural Department.

The department wanted to spread a reddish substance over his farmland to see if it would stop unwanted phosphorus from entering waterways.

The bonus, Mr Treasure was assured, was not just environmental. He could look forward to vastly increased crop yields using a soil-improving agent that would cost him just 50¢ a tonne.

But this was no ordinary product. It was industrial waste.

The trucks dumping tonne after tonne of the ochre-like material were coming straight from settling ponds at the nearby Alcoa aluminium refinery, which was co-funding the project.

"We never talked a lot about whether it was safe or not," Mr Treasure said. "We were just told it was dirt from the hills that came from Alcoa. And being a little bit naive at the time, that is all we assumed it was."

The experiment, now being used to justify an extraordinary proposal for large-scale use of industrial waste on West Australian farms, remains a bitter memory for a small group of farmers that originally took part.

What Mr Treasure did not fully understand when he agreed to the proposal was that, apart from having fertilising potential, the red mud was also laced with dangerous materials.

Sprinkled over each hectare were up to 30 kilograms of radioactive thorium, six kilograms of chromium, more than two kilograms of barium and up to one kilogram of uranium.

On top of that there were 24 kilograms of fluoride, more than half a kilogram each of the toxic heavy metals arsenic, copper, zinc, and cobalt, as well as smaller amounts of lead, cadmium and beryllium.

And this was at the lowest application rate of 20 tonnes a hectare.

In one instance - when the red mud was applied at 200 tonnes a hectare - the doses could be multiplied ten-fold, according to a West Australian Environmental Protection Authority document.

Between 1991 and 1994 more than 7,600 tonnes of Alcoa red mud was poured directly onto Mr Treasure's farmland at Yarloop, about an hour's drive south of Perth. About 23,000 more tonnes were poured onto the lands of 12 neighbouring farmers.

"The thing that started to alert us that something might be wrong was that we started to get sick animals," Mr Treasure said. "We started getting very unusual sicknesses in the cows and some of them began to die."

"But it seemed to us that all the department was worried about was reducing the phosphorous running off into the estuary.

"There was nothing in their protocol to go and check animals. And at the end of the day we are producing animals for people to eat. They had already decided the stuff was safe and that they didn't need to do that."

Concern turned to alarm when the farmers were given heavy metal measurements of water running off their lands. They showed elevated levels of toxic mercury, selenium, copper and lead.

"I rang the department up to question the figures and they sent me a fax saying that someone had probably thrown a [car] battery in the water and that is why there were excess levels in the water," Mr Treasure said. "So my hackles began to rise. I said, 'Don't take us for fools'."

Graeme Moore, who also took part in the experiment, said the department then tried to claim that the high readings were a result of run-off from a quiet country road,

"They said, 'Oh you are only dumb farmers, you don't know what that means'. "But we said, 'It is there in black and white that these levels exceed what is supposed to be going down there'. That is when we started to get angry about the whole thing."

Meanwhile, the department was hailing the experiment as a success. It is a view it still vehemently holds. Early indications showed that the primary purpose of the trial - to try to prevent algae blooms in the Peel-Harvey estuary by reducing phosphorous run-off - appeared to be working.

And Alcoa was happy.

Storing the material was costing a lot of money. It had been seeking uses for it since the early 1980s and was more than happy to see it being given away.

From the beginning both the department and Alcoa acknowledged the potential pollutants in the waste.

But each maintained - and still maintains - that the increased levels of heavy metals would remain tightly bound up in the soil and that the radioactive materials would barely be noticed.

Alcoa said there was "more zinc in oysters, more selenium in brazil nuts, more fluoride in toothpaste, more mercury in shark, more lead in typical soil and more cadmium in fertiliser" than in the red mud.

The department maintained that a number of the high heavy metal readings taken from the water run-off could be explained by other factors. "I mean bin Laden is not going to go stealing this stuff to make atomic bombs out of it," said an Agriculture Department research officer, Rob Summers.

"That is what soils are made of - things like fluoride, aluminium, iron and manganese. All those materials are of course extremely toxic but when they are built into the matrix of a soil they are very very hard to get out."

The Environmental Protection Authority (EPA) also went along with the experiment even though it had acknowledged as early as November 1993 that small amounts of highly poisonous arsenic, fluoride and aluminium were leaching from the soil.

"Bauxite residue [red mud] ... contains traces of some elements which if mobilised could pose environmental risks," one EPA report said. "There are a number of issues associated with this proposal which need to be addressed or considered by other agencies. These issues include health issues such as the accumulation of heavy metals/radioactivity in vegetables."

By 1995 the Agriculture Department was struggling to explain how samples of drain water showed concentrations of aluminium, copper, lead, mercury and selenium above the levels recommended for marine and fresh water. In August 1995 and in September 1996 it acknowledged that arsenic levels in waterways were being exceeded.

Although five years had passed since the material was first applied, large plumes of red dust were still hanging over the farmers' fields. This was not supposed to happen.

Pressed by the farmers, the department finally agreed in late 1996 to undertake a limited test on the health of some of the animals.

"You should have seen the land with 20 tonnes to the hectare," Mr Treasure said. "The poor old animals - if they wanted to eat grass they had to physically eat red mud. They had no choice. Because we knew there was heavy metals in it we wanted to know if it was going into their system. Being farmers, we didn't want to contaminate our overseas markets."

Although the department's investigation found "no obvious health problems", it did find high chromium, fluoride and cadmium levels in some cattle. The high chromium levels were linked to the dust and this prompted fears for the farmers' health.

"Our animals were walking through it and they were covered in the stuff," Mr Treasure said. "And we were doing the same. One day they asked me to drive my cattle up through the paddocks wearing a dust monitor. The monitor clogged up."

It took the department another year to repeat the dust tests, using independent experts. Again they concluded there was no threat, but the farmers were unconvinced.

"At the end of the day we are not qualified to say whether the red mud is injurious to our health or benign ... but we don't believe they do either," said Mr Moore. "I hope it is safe as hell and I hope it does the job they say it does. But I am still sitting on the fence because I am not happy."

Despite the fact that many of the original farmers raised concerns - including that they were not getting the promised higher crop yields - the department pressed ahead with the project.

Red mud was spread over 22 more properties and a fertiliser company was enlisted to help mix the mud with a commercial fertiliser to try to produce a slow-release phosphorus product.

In 1999 the department applied to the EPA to spread 360,000 tonnes of red mud on farmlands across the entire Swan coastal plain.

Then came an unexpected twist.

Alcoa refused to release any more mud unless it got indemnity from any environmental damage. It said this was simply to avoid the risk of any "irresponsible or inappropriate" use of the product. The department backed the request on the ground that it was not a commercial project.

"It costs us money to make the material available but we do that because we have been convinced by the science," said an Alcoa spokesman, Brian Doy. "We think that due diligence has been done to make sure this is a safe product to use."

Certainly when the then state Liberal government granted Alcoa the indemnity in September 1999 the move was unprecedented.

It cleared the way for hundreds of thousands of tonnes of red mud to be made available to farmers, this time at \$14 a tonne.

But Mr Treasure and his neighbours have their own theories about why Alcoa sought an indemnity. He points out, with some justification, that many of the independent studies used to rationalise the experiment were paid for by Alcoa.

Mr Summers dismisses the implications. "You might actually find that the people who work for Alcoa in Western Australia do consider that there are some environmental problems that they would actually love to help with."