

PUBLIC INQUIRY

APPEAL REF: APP/M1900/W/24/3346607 by Brett Aggregates Ltd

Environment Agency Position

1. The Environment Agency considers the Appellant has provided sufficient information and monitoring data to demonstrate that the site lies outside of the bromate and bromide plume, and the risks to the water environment can be satisfactorily managed via planning conditions.

Round table discussion on 20th November 2024

2. I, Allison Thomas, have worked at the Environment Agency since 2006. In 2011 I took on the day-to-day management of the bromate and bromide pollution. Although not mentioned in the discussion, I would like to share my background here: I hold BSc(hons) Ocean Science from the University of Plymouth and MSc Environmental Science from the University of East Anglia. I am a Fellow of the Geological Society of London.
3. The notes I wrote during the discussion were on points that others made I wished to correct or provide additional context. As requested by the Inspector, I have written these up, arranged by topic from paragraph 5 below. These are not verbatim but the points I made during the discussion to the best of my recollection.
4. Throughout the discussion I referred to a 2007 Public Inquiry and Planning Inspector's report. This is the Report by The Planning Inspectorate to the Secretary of State for Environment, Food and Rural Affairs dated 23rd November 2007 following the Public Inquiry on Contaminated Land Remediation Notice served by the Environment Agency under Part 2a of the Environmental Protection Act 1990, Appeals by Redland Minerals Limited and Crest Nicholson Residential plc. St Leonard's Court, Sandridge, Hertfordshire (File References: APP/CL/05/01 and APP/CL/05/02).

Maps of the pollution

5. The map presented by Cllr Eames Petersen is not the most current. It was submitted within Report F1, as part of the work to fulfil the Remediation Notice (22nd July 2009). A more recent map is available from Report 4, submitted as part of the work to fulfil the voluntary Remediation Statement, signed in September 2020. I have emailed a copy of the more recent maps from Report 4 to the Inspector. Copies of the Remediation Notice and voluntary Remediation Statement are already in the Core Documents of this appeal.
6. The maps I provided show the plume further north than in the earlier maps. This is due to inclusion of additional monitoring and not necessarily an indication that the plume boundaries have moved.

Coincidence of bromate and bromide

7. Bromide occurs naturally, for example in seawater, and the background concentrations in this area of the Chalk were identified as 125 micrograms per litre (µg/l) by the Planning Inspector at the 2007 Public Inquiry. Other inputs of bromide to groundwater might include road grit salts.
8. Bromate is anthropogenic, it does not occur naturally. The presence of bromide is not an accurate indicator that bromate is or was also present.

9. The source of the bromate is a former chemicals factory in Sandridge, north of St Albans, where brominated compounds were produced between the 1950s-1980s, when the site was redeveloped as housing.

“Failed remediation”

10. It is not true to say that the remediation of the bromate and bromide pollution has failed or is not working. It is recognised that the scavenge pumping, or hydraulic containment, does not capture the entirety of the pollution, but that was not its purpose. The scavenge pumping at Hatfield is successful in what it was intended for, which is decreasing the concentrations of bromate and bromide at down-hydraulic gradient public water supply abstractions and springs that flow into the River Lee. It also continues to remove considerable mass of bromate and bromide from the Chalk aquifer.
11. The scavenge pumping was included as an Interim Remedial Treatment Action by the Planning Inspector in the Remediation Notice.
12. The long-term remediation method is yet to be determined. The parties responsible for the pollution, the Appropriate Persons, are in the process of working through the actions of the voluntary Remediation Statement, which includes a cost-benefit assessment of remedial options and considers the benefits to groundwater as well as the social and economic benefits of remediation.

Scavenge pumping

13. The scavenge pumping came about because pumping at the Hatfield public water supply abstraction stopped in 2000 when the groundwater pollution was discovered, which resulted in increasing concentrations at down-hydraulic gradient abstraction points; a portion of the plume of pollution was no longer being removed from the aquifer at Hatfield.
14. The affected water companies organised trials circa 2005 to resume pumping at Hatfield and it was demonstrated to be effective at decreasing concentrations down-hydraulic gradient. The scavenge pumping, or hydraulic containment, has been in operation since then and the Appropriate Persons are required to pay for it according to the Remediation Notice and subsequent voluntary Remediation Statement.
15. Hatfield is licenced to pump 9 Megalitres per day (ML/d). The typical pumping rates are 4 – 6 ML/d. The Water Companies have found that higher pumping rates result in lower concentrations of bromate and bromide.
16. In 2018, the water companies undertook a trial to improve the efficiency of the scavenge pumping at Hatfield, which included varying the dosing rates and pumping rates. This identified restrictions that mean it is not practicable to sustain 9 ML/d, including:
 - a. The pumped groundwater is dosed with ferrous chloride, to reduce the bromate to bromide, and discharged into a bespoke sewer that links to the main sewer network. A side-effect of the dosing is that a precipitate forms on the inside of the bespoke sewer and this restricts discharge rates, which necessarily restricts groundwater pumping rates.
 - b. During periods of heavy rainfall pumping must cease because the capacity of the main sewer that receives the pumped and treated groundwater is at risk of surcharging.
 - c. During periods of very low groundwater pumping must also cease to ensure the pump and adits remain sufficiently submerged. Adits are near-horizontal tunnels extending outwards from the main wells and were constructed to improve yield.
17. A question was asked what would happen if scavenge pumping at Hatfield stopped? The situation would be similar to what happened in 2000-2005; concentrations would increase

at the down hydraulic gradient groundwater abstractions and springs. The concentrations would not be as high as in 2000-2005 but I couldn't predict the degree of increase.

18. It is important to note that 1 ML/d is 1 million litres per day, to appreciate the magnitude of the scavenge pumping operation at Hatfield compared to the site we discuss today.

Nature of groundwater flow

19. A sponge is a good analogy for the Chalk where the plume is between Sandridge and Hatfield. Very high concentrations have soaked into the Chalk matrix in that first approximate 5 km of the plume. Travel times are estimated as 50 metres per day.
20. The groundwater flow between Hatfield and the River Lee is more karstic. The conceptual understanding is that the pollution flows that eastern 15 km within a small number of larger fractures and fast. Travel times are the order of 3 days, based on tracer tests undertaken since 1930s, including the two Engineering Doctorates from UCL mentioned by others.
21. The Hatfield boreholes contain high concentrations of bromate and bromide and are around 100 metres deep, but they are on a hill so the pollution is unlikely to be 100 metres below ground level elsewhere.
22. The depth of the pollution is likely to be limited by horizontal flow zones; the pollutants will have migrated downwards and then been transported with faster groundwater flow rather than continue to sink.
23. The site discussed today has 3 levels of groundwater monitoring: in the upper and lower mineral horizons and in the Chalk.
24. The mass of pollution within the Chalk is deeper and to the north of the site we discuss today.

The longevity of the pollution

25. Concentrations at the source have decreased since 2000 but still represent serious pollution, which is why it is being regulated under Part 2a of the Environmental Protection Act 1990.
26. The bulk of the bromate and bromide pollution is absorbed into the Chalk matrix in the areas where very high concentrations have historically flowed in groundwater between Sandridge and Hatfield. This mass is now slowly diffusing back into the groundwater.
27. Due to the slow rate of back-diffusion, the concentrations in groundwater are declining exponentially and will continue to do so for potentially a hundred years or more.

Independent samples

28. The Environment Agency have not taken independent bromate and bromide samples from within the proposed quarry site. It is the developer's responsibility to demonstrate proposals do not pose an unacceptable risk to the water environment.
29. For context, the Environment Agency undertook extensive sampling and installation of new boreholes soon after the pollution was discovered circa 2000, to identify the source of pollution and plume boundaries.
30. Bromide sampling of groundwater was undertaken at the time of the redevelopment of St Leonard's Court, Sandridge, but bromate was not.
31. Bromate is accepted to have been present in the groundwater at the time of the redevelopment, many years before sampling for it began in 2000 and it was identified at the Hatfield abstraction.
32. The number of monitoring locations has since been reduced and the scope refined down to the current quarterly monitoring undertaken by the Appropriate Persons, which is for the purpose of monitoring the whole plume, some 20 kilometres in length.

Precautionary principles

33. In 2012, the EA was approached by SLR and Brett to discuss their proposals at a pre-planning and pre-permit stage. The initial site was much larger and extended north of the current proposals, which is over the bromate and bromide pollution. My response was that I would object.
34. Since then, the applicants have undertaken significant site investigation, have moved the site boundary and changed the site operations so that I am satisfied the site does not lie over the bromate and bromide plume.
35. The draft planning conditions pertaining to the Groundwater and Water Management Plan allow for additional investigation on each phase.
36. The conditions regarding no digging of the Lower Mineral Horizon within 100m of BH104, and no pumping of the Lower Mineral Horizon, I describe as belt and braces to further reduce any small, residual risk.

CEMEX excavation depths

37. The older CEMEX excavations, adjacent and up-hydraulic gradient to this site under discussion, do extend into the Lower Mineral Horizon in places. The works pre-date Control of Pollution Act 1974. The depth is demonstrated at the lagoon at the entrance to the CEMEX site, which is in hydraulic continuity with groundwater of the Lower Mineral Horizon and the Chalk.
38. The bromate concentrations of 2 µg/l and 5 µg/l used in the draft planning conditions as triggering action and response plans are consistent with what is required on the CEMEX site.

Sand and gravel

39. A question was asked whether the pollution could soak into the sand and gravel as it had done into the Chalk. The structure of the Chalk is that it has very tiny pores that soak up the polluted groundwater. The grains of sand and gravel do not have the same pores and so the pollution cannot enter into the grains.
40. The void created by the removal of sand and gravel would be replaced with that volume of groundwater, but the flow is temporary and in phases, it is many orders of magnitude smaller than the scavenge pumping.

Summary

41. It is the groundwater that is the sensitive receptor according to the St Leonard's Court Contaminated Land Special Site determination and designation. The Environment Agency aims to return the groundwater back to potable use, meeting the Drinking Water Standards.
42. In considering the scale of the bromate and bromide groundwater pollution and the scavenge pumping operation, this proposed development is not significant.



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