

PCBs at Maendy: scare or disaster?

NWS

Press reports of pollution seeping into farmland from a South Wales tip suggest an alarming degree of contamination. How reliable are the data, and how effectively has the Welsh Office reacted to the problem?

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Maendy Quarry lies in the hills above the Taff Vale, 10 miles north west of Cardiff in an area dominated by coal mines, sheep and Plead Cymru. One hot evening last week I drove into the yard of Maendy Farm and asked Bill Maidment, who rents the land from the Glamorgan County Council, if I could look at the quarry. He was in the middle of milking, but he yelled for his 10-year old son, Philip. "This gentleman has come from London to see our Pollution. . . . Take him up the quarry, and show him."

We walked up the road and stepped over a strand of barbed wire, past a tired notice-board surrounded by decomposing mattresses, rusty paintcans, skeletal umbrellas, and non-biodegradable washing-up bowls. "Lantrisant RDC-Tipping of Refuse Prohibited," the sign said ineffectively. Further up the road was another, more sinister notice, handlettered onto the back of a cardboard box. "Danger. Contaminated Area. Keep Out. Issued by Plead Cymru."

Contaminated Areas often look fairly innocuous to the naked eye. This one does not. The sandstone quarry at Maendy belongs to the BP Pension Trust, which leases it to the waste disposal firm of Purle Bros, now part of the Redland Group headed by Lord Beeching. In 1966, Purle started to dump a wide variety of toxic wastes at Maendy: sludges, liquids, powders, drums, phials, and packets. They went on tipping until the quarry was full to the brim, and then they brought in some lorryloads of soil. But they failed to cover all Maendy's contents.

As I scrambled over its surface, I checked the names on some of the uncovered drums. Monsanto, ICI, Dow, BP, said four. But most of the containers are unlabelled, their contents spilling out: green powders, twisted copper wire, blue syrups, grey pastes, broken pipettes, black liquids, tortured hanks of just-solidified plastics. The Sunday Times, which has been splashing the Maendy story for the last three weeks, talks of stinking, bubbling pools of chemicals. "Some of the lads used to swim in there before they tipped the soil on," said Philip cheerfully.

During the 1960-70 period, Purle was collecting toxic wastes from half a dozen South Wales' chemical plants, including Monsanto at Newport and BP at Barry. In the absence of any but the most rudimentary records, no one is sure just what went into Maendy and the four or five other tips that Purle was using at the time. But it seems likely that down this capacious sandstone hole went such assorted items as acrylic acid, cumene hydroxide, phenolic resins, butylated hydroxytoluene, styrene, xylol, methylene chloride, lime slurry, lead and other petroleum additives, phosphorous pentasulphide, alkyl dithiophosphates, high-weight chlorinated

hydrocarbons, arsenic, cyanides, aryl silicates, and polychlorinated biphenyls. Among other things.

The key names on this list are polychlorinated biphenyls (PCBs) from Monsanto, and organic solvents like xylol, butanol, and methylene chloride from BP. Like their close relative, DDT, PCBs seem to be persistent and to accumulate in living tissue. The one property undoubtedly to their credit is an extremely low solubility in water, which severely limits their mobility.

To abandon such persistent compounds at all was the first Maendy error. However, the hazards of PCBs were not appreciated much before 1971; and since then, Monsanto has very properly used high temperature incineration to destroy all PCB wastes. The second Maendy error was to dump these insoluble compounds alongside a variety of organic solvents. The third was to choose as a tip a quarry on the summit of a hill with a spring underneath it.

The result, at Maendy was predictable, although at the time nobody knew enough of the facts to predict it. Monsanto is not sure how much PCB was dumped in the Maendy quarry, but it does know that between 1966 and 1970 it gave Purle about 30 000 tons of toxic materials. Of that, no more than 600 tons came from their PCB plant at Newport, and most of this went to Maendy. My own estimate would be that something of the order of 50 tons of PCB lies buried at Maendy Quarry.

As the steel drums rust through, the PCB and the organic solvents are being leached out by rain and spring water. From the edges of the tip rivulets of glistening brown liquids trickle over the fields, smelling like a randy tomcat having a bath in rancid coconut oil.

Maendy is not the only site at which Purle tipped Monsanto and BP wastes: there is another four miles south at Brofskin, and a third at Penrhos just west of Caerphilly. There may be several more. But at these three, local farmers have retained a London-based agricultural waste consultant called Douglas Gowan. Gowan was trained as an accountant, and at one time worked on pollution problems for the National Farmers' Union. According to his figures, the water in the Maendy streams has a COD (chemical oxygen demand—a measure of organic-chemical pollution) varying from 1750 to 4860 mg/l, and contains at least 28 named pollutants, including up to 40 parts per million (ppm) of phenol, 1 ppm of copper 1-3 ppm of methyl mercury, 2 ppm of lead and 20 ppm of PCB.

High PCB levels have also been found in soil and grass, and the sterility, abortion and death of a number of cattle, at Brofskin as well as Maendy, have been attributed to the

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polluted water and herbage in general, and to PCBs in particular. This theory is the more plausible at Maendy in that last week I saw abundant cow, sheep and horse footprints on the tip surface, and watched a cow and her calf ankle deep in a mud whose PCB content is said to be around 10 ppm. Finally, a fortnight ago Gowan announced the discovery of up to 50 ppm of tri-ortho-cresol phosphate (TOCP), a highly poisonous organophosphate substance.

Unfortunately, not everyone accepts Douglas Gowan's figures, which are based on analyses by ICI at Brixham. Monsanto says that the highest PCB level it has found in Maendy water is 0.09 ppm. The many public authorities involved—the Welsh Office, the Glamorgan River Authority, the Glamorgan Public Health Inspector, the Water Pollution Research Laboratory of the Department of the Environment, the Government Chemist, and various arms of the Ministry of Agriculture—have failed to find any PCB levels above 0.15 ppm. Douglas Gowan says that everyone else has a vested interest in finding low levels, and claims that PCB concentrations fluctuate markedly at Maendy and Brofskin, increasing in wet weather when high water flows wash more pollutants into the open. (His critics point out that high flows would be more expected to cause dilution.) Gowan's figures have been widely reprinted in the press—notably by the Sunday Times—and the suspicion that Gowan is right and everyone else is wrong has been strengthened by the behaviour of the Welsh Office.

Welsh Office complacency

Many people—the local MP, Brynmor John, included—feel that over the past two years the Welsh Office have been somewhat slow and complacent in reacting to the hazards at Maendy, Brofskin and elsewhere. For a start, the Welsh Office sees its responsibilities at Maendy in terms which are somewhat narrow. As a senior spokesman put it to me in Cardiff last week: "We are proceeding with the objective of ensuring that there is no hazard to health." Possible environmental contamination has hardly been considered, and no attempt has been made to measure PCB levels in wildlife around the contaminated tips.

A Welsh Office spokesman confirmed last week that it was consulting with the local authorities, BP and Puric about fencing the tip, to which children and livestock still have free access.

I asked a senior official whether or not the Welsh Office had made any examination of the tip surface, where half-exposed drums and containers still contain accessible chemicals in an undiluted form. "No," he replied, "because it's not our job to do so." And in reassuring the public—an operation which, so far, has not been notably cost-effective—one official explained that the Maendy stream "would undoubtedly reach WHO standards for purity for certain elements".

The aspect of Welsh Office policy which is raising most eyebrows among government scientists is its refusal to split samples with

Douglas Gowan and ICI. Interpreting agreed data on environmental pollution is hard enough; when major dispute exists about the facts, progress becomes impossible. While the figures of the four government laboratories and Monsanto all agree that PCB levels in Maendy water is at most 0.15 ppm the Gowan figures run up to 20 ppm. How can differences of two or three orders of magnitude be explained? Again, why does Gowan claim that ICI has found up to 50 ppm TOCP, a chemical which the government agencies have as yet been unable to detect?

In these circumstances, it is standard scientific procedure to take a series of joint samples, split them on the spot, and analyse them separately. This the Welsh Office steadfastly refuses to do. It will go so far as allowing Gowan to take parallel samples while government agencies take theirs, but it will not split a sample with him, nor will it accept suggestions from him as to when and where to sample.

Since the essence of Gowan's case is that high PCB levels only occur intermittently this attitude hardly helps to resolve the dispute. "We have our responsibilities," Welsh Office spokesman told me firmly, "and they clearly are very weighty responsibilities, but they do not extend to having to programme our researches laid down by someone else. If his reputation is at stake then so is ours." This attitude is bitter resented by many scientists in the Department of Environment, who in this instance are having to act under Welsh Office orders.

Split sampling, which the Welsh Office refuses to allow, would be the simplest way of resolving the conflicts of data. However, perhaps the discrepancies derive not from lack of comparable samples, but from differing analytical techniques? For example, might confusion exist on the definition of water? Perhaps ICI was including a heavy suspension of silt in its water samples. I put these points to Douglas Gowan last week and he agreed to provide me with full data on a small number of samples. There was one set of soil specimens which interested me particularly, since it had been split in two parts and analysed by both ICI at Brixham and Dr Nicholas Platonow, a toxicologist at Guelph University in Canada. Platonow confirmed to me last week that he, like ICI, had obtained a figure of 10 to 20 ppm on the two soils. These soils, Gowan told me, had come from Maendy on 1 and 2 May, 1973. They had been sampled by a senior chemist from ICI Brixham, and witnessed by Gowan and two of his associates. Unfortunately, the ICI chemist concerned, although he remembers the pair of samples clearly, told me last week that he had not himself taken the nor had he been in Wales on that day.

The only other sample whose provenance Gowan provided was a pair of water specimens in which on 7 June, 1973, Gowan announced ICI had found TOCP at a level to 50 ppm. This pair of samples, Douglas Gowan said, had been taken at Maendy 24 May by the same ICI chemist, in the presence of Professor George Clarke.

eminent veterinary toxicologist who has been advising Gowan. When I rang Professor Clarke, he was unable to confirm this. "I've only been up to Maendy once and that was last year," he said.

In an extensive field investigation programme, records can of course easily become confused. But it is a matter of regret that there should be doubt about two such key samples—the only two whose provenance was supplied to me. It is also unfortunate that, in the case of the latter sample, the ICI chemist whom Gowan quotes as having found up to 50 ppm of TOCP should have denied to me that this chemical was ever detected. This denial was repeated by Dr Bob Pearson, deputy director of ICI's Brixham lab: "I would be happier to say this was a phosphorus peak with characteristics that could be TOCP." I put this discrepancy to Douglas Gowan. He invited me to settle the matter by phoning Professor Clarke, since he had been down to Brixham to check the TOCP finding. "I was shown one experiment with a blue colour which might have been TOCP, but it was never positively identified," said Clarke.

ICI's tests queried

The Brixham lab's measurements of PCB levels have been based on chromatography only, and have not been confirmed by mass spectrometry. An independent expert to whom I showed a complete ICI analysis sheet reporting 10 ppm of PCB in Maendy sludge took a different view. The peaks could be those of a PCB, he commented, but without mass spectrometry or some other positive identification, they could not be distinguished with certainty from any other high boiling-point aromatic. Again, both Dr Pearson and the chemist concerned admitted to me last week that their laboratory no longer held reference samples for the controversial high PCB levels they had reported in water. Pearson, confirming that ICI had been aware the Maendy investigation was likely to end in litigation, called this loss "unfortunate".

Douglas Gowan's lapses of memory over details are not confined to scientific data. He alleges that in 1972 Purle offered an out-of-court settlement to one of his clients. The figure involved appears in a Gowan letter to the Welsh Office dated 10 May, 1973, as £80 000; it was retailed to me as £40 000; and it is said by the client to have been only £30 000. Purle emphatically denies making any such offer. According to Gowan, a Purle director said at that time that if this offer was not accepted, the operating subsidiary Redland-Purle might be allowed to go bankrupt, and no compensation would be forthcoming. Gowan has also suggested to me that Redland-Purle is currently transferring its assets to the parent Redland Group in case the cost of making Maendy and other tips safe becomes too great to bear. This claim, which also appears in a letter from Gowan to the Welsh Office dated 10 May, 1973, was described to me by Richard Hawkins, the Redland-Purle company secretary, as "a patent falsehood. Such a course has never even been contemplated."

Quite apart from possible deficiencies in the existing data, the Gowan case contains three extremely odd gaps. First, why has he never taken milk samples from the affected farms and sent them for PCB analysis? A PCB build-up in the tissues of cattle is always associated experimentally with high levels in the milk, although nobody can be sure that the presence of one of the many other pollutants might not inhibit this excretion. Second, why in Gowan's lengthy, wide-ranging and repetitive correspondence with the Welsh Office, which repeatedly passed on the result of analyses at Brixham, were photocopies of the actual ICI reports not enclosed? Gowan says this was done to save his clients expense. Third, why were MAFF veterinary officers first invited to participate in the postmortem examination of the bull calf which died at one of the tips earlier this year, and then prevented from doing so by the dispersion of the carcass to different laboratories in Britain, Canada and the United States?

While the Gowan-ICI data would seem to need some confirmation, some of them at least are relatively secure. For example the bull calf had (according to Gowan) 25 ppm of PCB in its liver, a level which must be indicative of serious local contamination; luckily, tissue samples of this calf are still extant at Brixham, and thus available for checking. And soil contamination at the 10 ppm level is obviously a matter of concern.

The unfortunate possibility is that the unyielding attitude of the Welsh Office on the one hand, and Douglas Gowan's somewhat cavalier treatment of scientific data on the other, will prevent consideration of the very real hazards present at Maendy. Some scientists will undoubtedly go along with Dr Alf Vodden of Monsanto, who considers that should Douglas Gowan's PCB data be proved entirely correct (and Vodden claims that even with the help of organic solvents a concentration of more than 0.09 ppm of PCB in water is "impossible") this still involves no risk to man or beast. Others no doubt will feel that even if environmental PCB levels are no higher than the Welsh Office believes, this still demonstrates a worrying degree of pollution.

The majority are perhaps likely to suspend judgement until undisputed figures are available. This can only be achieved by a speedy reversal of policy in Cardiff. As an interim measure, and until the present somewhat limited official analyses of milk have been extended to cover all cattle grazing near the tip, it would be prudent to accept the demands of the local Plaid Cymru branch that the tip be properly fenced and sales of milk and eggs from the affected farms be suspended. While the distaste of the Welsh Office for any close cooperation with Gowan is easy to understand, it is less easy to justify, and non-scientific public opinion is unlikely to be reassured unless split-sampling takes place. An honest reassessment should allow the counter-accusations of scare and cover-up to be replaced by an urgent attempt at remedy. And that is what the farmers would surely like to see.