

Department of Public Health Medicine

**Cornwall and Isles of Scilly
Health Authority**

THE HEALTH OF THE POPULATION

1988

CHAPTER 3

REPORT 1

THE LOWERMOOR WATER INCIDENT

In July 1988 there occurred an accident affecting the water supply to **an** area in North Cornwall supplied by the Lowermoor treatment works which caused great concern about its potential effects on the health of the local population. There were serious *répercussions* for the Health Authority because initial responses were perceived by the public **as** being slow and inadequate, and later escalating anxiety about putative longer term effects on health brought with it demands for greater efforts **by** the Health Authority to investigate and treat them. **This** loss of public confidence in the Health Authority stemmed from a failure by the Water Authority firstly to recognise and **secondly** to communicate the full Scale of what had happened. Later speculation by some scientists about possible long term effects, which **was** given wide publicity, led to unrealistic expectations about further action which might be taken by the Health Authority.

On July 7th 1988, the environmental department of the Health Authority received a telephone message from an officer of the South West Water Authority (SWWA), who explained that owing to a lime pump failure at the Lowermoor treatment works in North Cornwall there had been **an** excess of aluminium sulphate in the water supply, as a result of which the pH of the water had fallen to 4.2. This **was** a temporary problem which would be overcome by the reinstatement of the pump. It was anticipated that the aluminium sulphate would be dispersed by dilution and no particular action was thought to be necessary.

On July 12th a further message was received indicating that there had been a short term rise of the aluminium level to 40 mgm per litre, but that the incident was now over. There had also been some rises in copper and zinc levels associated with the low pH of the water. Following this, no additional information about the Occurrence was received **from** the water authority until early August.

In fact, what had happened was quite different, and very much more serious. On the afternoon of July 6th, a relief tanker driver, unsupervised, had called at the Lowermoor treatment works, and had delivered into **the** chlorine contact tank, which is the tank immediately before the holding reservoir for water awaiting distribution through the mains, 20 tonnes of 8% aluminium sulphate solution. This should have been delivered into a storage tank at another point in the works. Later studies by officers of the Water Authority demonstrated that this could have led to levels of aluminium up to 1,200 mgm per litre entering the distribution system at Lowermoor. Levels were, however, considerably reduced by a massive flushing exercise undertaken by the Water Authority overnight on July 6th/7th because the pH of the water remained unacceptably **low** in the early stages of the incident.

Tests carried out by the Water Authority on July 7th and 8th indicated aluminium levels at supply outlets of up to 50 **mgm** per litre. Thereafter, levels began to fall **as** the mains were flushed through by **use** and by the 11th of July aluminium levels were beginning **to** fall below 1mgm per litre. Table 18 lists the highest **readings** of aluminium recorded daily by the Water Authority during the first four **weeks** of the incident. There were concomitant increases in other metals such **as** copper and zinc due to the acidity of the water, which dissolved them from plumbing systems.

TABLE 18

Highest levels of Aluminium recorded daily by South West Water (cold water supply)
First four weeks of incident.

Date taken	Result mgm/L	Location of sample
07/7	50.00	Slaughterbridge
08/7	34.50	Michaelstowe
09/7 & 10/7	11.97	Marshgate
11/7	0.69	Port Isaac
14/7	2.00	Marshgate
18/7	1.00	Boscastle
19/7	0.68	Marshgate
20/7	0.73	Boscastle
21/7	2.20	Delabole
23/7	1.00	Camelford
23/7 & 24/7	0.70	Otterham
26/7	0.72	Delabole
27/7	0.61	Delabole
27/7 & 28/7	0.86	Tintagel
29/7	1.40	St Teath
01/8	0.36	Port Isaac
02/8	0.55	Delabole
03/8	0.34	Port Isaac

Note: Samples were not taken on every day, and in some cases the results for two days are listed together. Sampling was widespread; only the highest result for each day is shown.

Advice given to the public by the water authority in the initial stages of the incident was that the water was **safe to drink**. There was a great deal of minor gastro-intestinal illness in the affected community and aggravation of skin rashes, much probably due to drinking the polluted water. Aggravation of arthritis was also reported. Few people were ill enough to consult their family doctors but local pharmacists noticed an increase in attendances for remedies.

The full story of what had happened was published on August 15th as the result of an official enquiry carried out by Dr. J. Lawrence, Director of ICI Brixham Laboratory, a member of the Board of the **SWWA**. Hints of what had happened reached the environmental department of the Health Authority in mid-July, when rumours began to circulate. By the end of July, information was being received from Local residents and one of the GP's, hinting that a serious level of pollution and associated illness might have occurred. By this time it was too late to undertake meaningful measurements of metallic levels in the population, but preliminary consideration was given to the possibility of carrying out a population survey to discover the extent of the symptoms which were being reported. It was not until August 8th that actual confirmation of what had occurred was received in a telephone conversation between Dr. Grainger, the then Medical Officer for Environmental Health, and Dr. Lawrence.

The Medical Officer for Environmental Health immediately started to **seek a way** of carrying out a retrospective survey of the occurrence of illness in the population, and by mid-August had secured the cooperation of the Bristol Department of Community Medicine, linked with the University Department, where statistical expertise in designing and carrying out a survey was available. He also made contact with the Department of Health's Division of Toxicology

and Environmental Pollution seeking expert advice about the implications for health of the levels of pollution which had been revealed. As a direct result of this approach a medical toxicologist in the Division, furnished with as much background information about levels of pollution as was then available, investigated the likely effects by reference to the extensive literature that documented previous experience, and produced a detailed description of the health effects which were to be expected as a result of the occurrence. This information was widely circulated to local doctors and residents during the last week in August.

There was immense public anger in that part of North Cornwall supplied by the Lowermoor works when it was realised that the truth of what had happened had been suppressed for several weeks. In parallel with this there was associated anger that the Health Authority had not carried out a clinical survey of the population, and there was widespread disbelief of the contents of the document which had been circulated to provide information about what had happened and what was to be expected in relation to health. Some local general practitioners complained of lack of advice on how to investigate and treat their patients.

The organisation of the retrospective survey of symptoms, which was a controlled study based on a random sample of 500 households in the Lowermoor supply area, and of 500 households in a control area to the east with a different supply, took 10 weeks, and the questionnaires were eventually despatched early in November. During the rest of that month and December, efforts were made to obtain a reasonable response by means of broadcasts on local radio, and by means of a reminder letter which gave respondents the opportunity to say if they did not wish to participate and to give their reasons. However the response proved to be low, with less than 50 per cent of those sent questionnaires replying from both the study and the control areas.

The public outcry about what had happened continued during the autumn of 1988, and was fuelled by the appearance on local television of a scientist and a consultant obstetrician, both of whom predicted dire consequences for the long term health of the population which had been affected. They also made similar statements on radio and to the press. These statements were in direct contradiction of those made in the original advice provided by the Department of Health's Toxicology and Environmental Pollution Division, and the conflicting scientific advice caused great confusion and anxiety. Members of the public who had become ill at the time of the occurrence were complaining that their symptoms were persisting; others had developed symptoms similar to those being predicted by the broadcasts. There were increasing allegations that there were indeed long term effects of the incident, and that the advice given by the Division of Toxicology of the Department of Health was untrue.

Early in December reports emerged of privately collected samples of mains water which demonstrated that on July 6th and 7th, levels of aluminium sulphate greatly in excess of those measured by the SWWA on July 7th and subsequently, had occurred. One sample taken privately near St Teath in the early hours of July 7th demonstrated an Aluminium level of 620 mgm per litre, while a second taken in Camelford on July 6th recorded 190 mgm per litre. A subsequent review by an officer of the water authority into the distribution pattern of the water supply and actions taken by water authority staff overnight on July 6th/7th to flush out the mains indicated that these levels could have been achieved in some parts of the distribution system. In the light of these new revelations, and of the challenges which had been made about the veracity of the original advice from the Division of Toxicology and Environmental Pollution, Dr Rowland - the present Medical Officer for Environmental Health - wrote in mid December to the Chief Medical Officer of the Department of Health, with the full agreement of the Chairman of the Health Authority. The letter requested that arrangements should be made for the advice originally given to be reviewed by a panel of nationally recognised experts in the light of the new evidence which had accumulated, and the views of the scientists and others who had made public statements. The letter asked that the

panel should advise again on the likelihood of long term health effects, and also on any additional investigations which the Health Authority should carry out, and for advice on any treatment which should be given to any persons suffering from any long term effects.

An independent panel of experts was appointed by the Minister for Health early in 1989 and comprised Professor Dame Barbara Clayton, Professor J. A. Edwardson, Professor **R.** F. Packham, and Professor G. A. **Rose**.

Arrangements were also made during the autumn of 1988 to follow up all pregnancies which might have been affected by the pollution. **A** protocol for the study was drafted, and contact was made with the Department of Child Health in Bristol, where statistical and computing expertise was available.

In view of the ongoing allegations of persisting effects, despite the advice which had been received and circulated, preliminary consideration was also given to the creation of special consultant sessions to ~~carry~~ out a detailed investigation of those people who were continuing to complain of illness which they attributed to the pollution. It was felt that these clinics would benefit ~~from~~ the advice to be given by the expert panel, and so plans were formulated to start them at about the time that the panel would be expected to report in 1989.

Thus by the end of 1988 the following actions had been taken by the Health Authority:

- a) Toxicological advice on the effects of the incident had been obtained and circulated to local doctors and the affected population. The advice, especially that relating to the unlikelihood of long term effects, was rejected by many people. Local doctors continued to complain that they had received insufficient information.
- b) A retrospective survey into the acute effects of the incident had been carried out and the results forwarded to Bristol for analysis.
- c) A request had been made for the likelihood of long term effects to be reviewed in the light of additional information which had been becoming available during the preceding months. **An** independent expert panel was appointed early in 1989 **as** a result of this request.
- d) Plans had been prepared for the follow up of all pregnancies exposed to the polluted water and necessary consultations about the proposals were commencing.
- e) Consideration was being given to providing special consultant sessions to examine people with persisting symptoms.

As indicated above, the Lowermoor Incident Advisory Group (LIHAG), led by Professor Dame Barbara Clayton, was appointed by the Minister for Health early in 1989 and, at their request, arrangements were made for some members of the Group to visit Camelford on February 22nd. Here they spoke to a selection of people who had been ill following the pollution, and who were still complaining of being unwell, **and also** met the general practitioners covering the affected population in order **to learn of** their findings. During succeeding months, LIHAG met on **a** number of occasions **to consider all** the available information and to listen to the views of some scientists **who believed that** there had **been** significant absorption of pollutants and that the long term **health of** the population **was** threatened.

In Cornwall, commencing December **1988**, a register was created of all those persons known to their family doctors who continued to complain of persistent illness which they attributed to the water pollution. Consideration was given to ways of providing special consultant sessions at which these people could be investigated and offered appropriate treatment. It was felt that it would be wise to start the clinics when the LIHAG report was judged to be imminent so that any advice about investigation and treatment that the Advisory Group might give could be implemented. It was thus planned to start the clinics in May.

Detailed planning of the follow-up of pregnancies which could have been affected by the pollution also continued during the early part of **1989**. A protocol had been drafted and discussed with the local obstetricians during December. Contact had also been made with the Department of Child Health in the University of Bristol, who had expressed interest in collaborating. The protocol was developed further, and was then referred to the consultant obstetricians in Plymouth and North Devon for their agreement. The approval of the ethical committees in Plymouth and Cornwall also had to be obtained. A job description for a part time research assistant was drafted, and the assistant was appointed in April to carry out the work associated with this study and also to continue to assemble the register of people with persisting symptoms.

The special consultant sessions to review people with persisting symptoms commenced in May, based at the East Cornwall Hospital, Bodmin; the report of LIHAG was still awaited. At this stage, there were 280 names on the register, 19 of which were of people living outside Cornwall who had written in to report symptoms or seek advice. It was decided that only Cornwall residents would be invited to the local consultant sessions, but that any advice received from LIHAG would be sent to non-residents and their medical advisers. From May onwards invitations were sent out in a controlled manner to people on the register, offering them the opportunity to see the consultant, and those who accepted were placed on his waiting list. This task was completed during September. Additional sessions were planned for October and November in order to reduce the waiting time for those on the list.

By the beginning of March **1989** there were indications that a counselling service would be of help to those people still complaining of symptoms. It was felt that it would be particularly helpful to have such a service in place by the time that LIHAG reported. During March and April ways of setting up such a service were explored, and by April Cornwall Social Services Department had agreed to make a detailed assessment of the need. Following a report by a worker specially appointed for this task by Social Services, an approach was made to the Citizens Advice Bureaux, and as a result a counselling service commenced in the third week in July.

The results of the Health Authority's own survey, carried out in conjunction with the Bristol Department of Community Medicine and Bristol University, were reported to a meeting of the Health Authority on June 14th, **1989**. The survey confirmed that there had been excess illness in the Lowermoor supply area during July and August **1988** and, in particular, drew attention to a statistically significant increase in the occurrence of joint pains at that time. This was of particular interest because joint pains had been a prominent complaint of victims of the incident ever since. The report confirmed that otherwise the symptoms experienced were those which had been predicted in the advice originally circulated in August **1988**.

The start of the counselling service almost exactly coincided with the publication of LIHAG's report (the Clayton Report) on July 20th, when a press conference was held at the District Health Authority's Headquarters. The fundamental conclusion of the report was that, since only relatively small amounts of aluminium and other metals could have been ingested, and insignificant amounts of aluminium could have been absorbed during the short period of significantly raised levels, no long term effects should be expected. Those symptoms

attributed to the incident were due to other causes, had been mistakenly attributed to the water pollution, and were being exaggerated by **mass** anxiety promoted by alarmist and inaccurate media coverage.

Some people in North Cornwall expressed great disappointment with the report, claiming that it had been selective in the evidence that it had used and was too superficial. Some scientists were also critical - by and large those who had always been predicting long term harm. However, ~~from~~ the point of view of the Health Authority, the report confirmed the advice which it had already been given and passed on **to** the local population. Most importantly, it did not indicate any specific action additional to that already being taken in attempts to help the victims of the incident.

By September 1989, the consultant clinics and counselling service were fully operative, and the prospective study of pregnancy outcome was being actively pursued.

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