WORKING PARTY ON CHEMICAL CONTAMINANTS IN FOOD

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DISCUSSION PAPER

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Agenda item 3

DIOXINS AND PCBs – RESEARCH, SURVEYS AND KEY ISSUES

Summary

1. This paper provides a summary of recently reported research and survey work relating to dioxins and PCBs in food and animal feeds, work in the process of completion and new work that is being commissioned. It refers to current issues being addressed at national or EU level and provides examples of dioxin/PCB-related incidents, hotspots and other particular areas of concern.

2. **Members of the Working Party are invited to comment on the approaches being taken to monitor and reduce dietary exposure to dioxins and PCBs and to provide an indication of the future direction that they believe this work should take.**

Background

3. Dioxins and PCBs are complex groups of highly stable organic contaminants with very similar chemical and toxicological properties. Dioxins are generated in small amounts during many combustion processes, both industrial and domestic, and may be formed as unwanted by-products in the manufacture of certain chemicals. Unlike dioxins, PCBs were manufactured for a wide variety of industrial applications from the early 1930s, but their manufacture ceased around 1970 and their only remaining use is in sealed electrical equipment.

4. Dioxins and PCBs are ubiquitous and persistent in the environment and, as a result, enter and build up in the food chain. They are present at very low concentrations in most foods, especially foods containing animal-derived fat such as milk, meat and fish because of their tendency to bioaccumulate. Food is the major source of human exposure to dioxins and PCBs, although dietary exposures to these chemicals are

falling. Dioxins and dioxin-like PCBs (so-called because they have a very similar toxicological profile to dioxins) have no immediate effect on human health. Potential risks arise from long term exposure to raised levels of these contaminants. Chronic effects include carcinogenicity, immunotoxicity, reproductive and developmental effects. The potential risks from non dioxin-like PCBs are still under assessment.

SURVEYS

5. With respect to dioxins and PCBs, surveys are carried out with a wide range of objectives. These include:

- the assessment of dietary exposure as a whole (Total Diet Surveys);
- assessment of dietary exposure of sensitive groups (e.g. babies and infants);
- measurement of typical levels in specific foodstuffs and animal feeding stuffs in order to determine their contribution to dietary exposure or to inform negotiations on limit-setting at EU level;
- measurement of levels in foods considered to be high contributors to overall dietary exposure (e.g. fish, eggs); and
- measurement of levels in foods targeted as a result of an incident.

Recent surveys

6. Recently published surveys include:

2001 Total Diet Study (FSIS 38/03)

A significant reduction was reported in dietary exposure to dioxins and PCBs (50% across all age groups) compared with 1997.

(www.food.gov.uk/science/surveillance/fsis-2003/fsis382003)

Dioxins and PCBs in fish oil dietary supplements (FSIS 26/02)

Some variation in dioxin and PCB levels was found in samples purchased between 2000 and 2002, although most levels were well below those found in the previous study (1994-6). (www.food.gov.uk/science/surveillance/fsis-2002/26diox)

Dioxins and PCBs in foods produced close to animal pyres (final report January 2002)

Despite concerns about the possibility of raised dioxin levels in the vicinity of pyres used for the disposal of animal carcasses during the 2001 foot and mouth disease outbreak, analysis of meat, dairy products and herbage did not indicate any cause for concern.

Current and future surveys

7. Current and forthcoming surveys for dioxins and PCBs cover:

The levels of dioxins and PCBs in Infant formulae

Results have been received from samples taken during 2003. This provides an update for products sampled in 1998 and 2001. The results are to be considered by the Committee on Toxicity (COT), and an Information Sheet is in preparation.

Investigation into the levels of PCB's and dioxins in animal feeds

75 samples have been analysed for dioxins and PCBs for the European Commission, to assess background levels in animal feeding stuffs within the EU. Confirmatory analyses are awaited on some samples;

Animal feeds

Approximately 750 samples of animal feeds, feed materials and other ingredients were taken by local authorities as part of an exceptional project of sampling and analysis funded by the Agency in 2002. Results are being reviewed and a report should be published shortly

Analysis of dioxins and PCBs in Baby foods

Analyses are being carried out and results will be reported to the Agency in November 2003

UK contribution to EU-wide representative food monitoring programme

Sampling is under way and will include additional samples of free-range eggs and game. Analytical results should be available in January 2004.

Farmed and wild fish and shellfish

Samples are being collected and analysis is under way to examine seasonal effects and to investigate the variation in contaminant levels during life stages of some fish. Samples will be collected over an extended period (August – May). Consequently, complete results will not be reported until September 2004.

UK contribution to EU-wide animal feeds survey

Sampling is to begin in October. This project is due for completion in mid-2004.

8. The Agency is also co-funding a UK-wide soil and herbage survey in collaboration with Defra, the Environment Agency and the devolved administrations. This work is expected to be complete by the end of 2003.

RESEARCH

Deposition of contaminated river sediment

9. A study has been carried out, and has recently been extended, into the deposition of river sediment containing elevated levels of dioxins and PCBs on pasture during flooding and its effect on levels in cows' milk. This project is now scheduled for completion in October 2004.

Transfer of dioxins and PCBs from feed to animals

10. Research is being carried out into the transfer and uptake of dioxins and PCBs into sheep and pig meat and poultry meat and eggs through feed. A final report is in preparation and is expected in November 2004. It is hoped that it will be possible for data from this research to be used to validate a new risk model. This model, 'Risk Modelling for Dioxin Releases', is being developed by Lancaster University on behalf of the Environment Agency, and includes steady-state food chain modelling.

REGULATORY CONSULTATION

11. The Agency is a Statutory Consultee under two items of environmental legislation that provide the opportunity to influence the control and emission of dioxins and PCBs from industrial processes and sites.

Pollution Prevention and Control (PPC) Regulations

12. The PPC regulations, in force since 2000, require a wide range of industrial operators to obtain a permit to continue their processes. The operator must submit a

package of information including details of raw materials handled, actual activities, composition and disposal route for waste streams and emissions to air, water and land. Copies of the package are supplied by the Regulator to the Agency.

13. The Agency provides advice to the Regulator (Environment Agency or Local Authority) on possible impacts on the safety of the food chain from these processes, including those with the potential for dioxin emission such as steel, non-ferrous metal and cement works, coal power stations and incinerators. The Agency is able to request additional data and monitoring, if necessary, and to advise on the adequacy of abatement. This is in order to ensure that dioxin emissions not only are reduced using best available technology to minimise the effect on the overall environmental burden, but also have a negligible impact on local food production activities.

14. In reviewing the contents of waste streams from these operations and also because hazardous waste activities fall under PPC regulations, the Agency is also able to ensure that there are no significant releases of PCBs to the local food chain or to the wider environment.

15. Bonfires and fireworks remain significant sources of dioxin release to the environment and these are largely unregulated.

Contaminated Land Regulations

16. The Contaminated Land Regulations require all Local Authorities to have generated a strategy for identifying and remediating contaminated land within their areas. Again, the Agency is a statutory consultee and has already advised all Local Authorities on their overall strategy. The Agency will also provide advice on the contamination that is found, which may include dioxins and PCBs from previous activities. Further, because the PPC regulations require operators to produce a report of the site condition, the Agency may identify problems of existing contamination and draw these to the attention of the Regulator.

INVESTIGATION WORK

17. Incidents and events that prompt special investigations involving dioxins/PCBs can place a heavy demand on resource (staff resources and financial) at short notice, and some may last for a considerable time. They tend to occur when an atypical result is detected during routine monitoring or when a particular incident, such as a large fire,

causes concern about possible dioxin/PCB contamination of arable land or pasture. Whether or not significant amounts of actual testing are needed will vary from one incident to another. The following are some examples.

Belgian feed crisis

18. The Belgian feed crisis (1999) concerned used cooking oils, adventitiously contaminated with dioxins and PCBs, that went into animal feed. This was a very prominent issue in Belgium and other EU countries and led to the removal of poultry, pig meat and eggs from shops and elsewhere in the food chain.

Contamination of allotments in Byker

19. In 1999, Newcastle City Council reported that 2,000 tonnes of incinerator ash had been used for paths on allotments in Byker. Initial tests showed significantly raised levels of dioxins in both the soil and in eggs produced on the allotments. Subsequently, following remediation work, dioxin levels in eggs were found to have fallen. However, they were still above the level normally expected for free-range eggs and the levels of dioxins alone would exceed the limit of 3 ng/kg, the World Health Organisation Toxic Equivalent (WHO-TEQ), set for cage and barn-produced eggs. In August 2003, Newcastle City Council issued a letter containing advice to poultry keepers on how to minimise birds' exposure to contaminated soil and indicating that eggs now produced on the allotment (with the exception of bantam eggs) should be safe to eat as part of a normal, balanced diet.

Foot & Mouth disease outbreak

20. During the foot and mouth disease outbreak in 2001, there was concern that raised levels of dioxins might be generated by the very large pyres used for the burning of animal carcasses, some of which were several hundred metres in length and burned for a number of weeks. This led to an intensive programme of sampling and testing of meat, eggs and dairy products from farms in close proximity to the pyres in several UK regions. In the light of its policies on openness, the Agency took great care to ensure that the farmers concerned, together with the wider public, were kept informed of progress. Final results, which showed that there was no significant increase in risk, were published in the form of survey reports.

PCB Contamination on Anglesey

21. In the course of the investigations into the impact of pyres during the foot and mouth disease outbreak, atypically high results for PCBs (but not dioxins) were found in

hen eggs (but not duck eggs) on one farm in Anglesey. Precautionary advice was provided to the farmer concerned. Further investigation eliminated foot and mouth pyres as a possible cause and indicated localised land contamination. Responsibility for further action was transferred to the Environment Agency.

EU MATTERS

22. The Agency is participating in EU-wide surveys for dioxins and PCBs in foods and animal feed. The EU monitoring programme is expected to continue until 2006.

23. The limit for dioxins and dioxin-like PCBs in eggs is currently 3 ng/kg fat (Regulation 2375/2001). There is a derogation for free and semi-free-range eggs because of the tendency for the birds to ingest soil which may come from contaminated ground. This derogation will expire on 10 January 2004. In view of the paucity of UK data, additional samples of free range eggs are being taken and tested during the EU food survey.

24. Discussions have been held about the part of fish to which dioxin/PCB limits should apply. Consensus among Member States is that this should be the edible portion, although it is recognised that there may be some variation in what is eaten between countries. There is also an ongoing debate about the most appropriate composition of an aggregate sample, since fish vary greatly in size, although a minimum sample weight of 1kg has been agreed.

Non-dioxin like PCBs

25. Analysis for PCBs indicating results for specific congeners has routinely been included by the Agency (and previously MAFF) in almost all dioxin surveys. Data for non-dioxin like PCBs has not been included in Information Sheets but is available in research reports and has been made available to the Committee on Toxicity (COT) and various EU bodies on request.

26. Non-dioxin like PCBs have different toxicological profiles to dioxins and they are therefore not covered by existing limits for dioxins and dioxin-like PCBs. Some EU countries already regulate non-dioxin-like PCBs and would like to see interim EU-wide limits. However the UK, along with the majority, believe that it is preferable to await a full risk assessment. This is being carried out by European Food Safety Authority (EFSA) / WHO but is unlikely to be complete before the end of 2004.

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