

IN CONFIDENCE

HEALTH AND SAFETY EXECUTIVE  
FIELD OPERATIONS DIVISION

REPORT ON THE SPECIAL PROJECT NATIONAL: FACILITIES AND EQUIPMENT USED  
FOR SHEEP DIPPING.

---

Summary

The project looked at the sheep dipping facilities and practices on a nationwide sample of sheep farms. Objectives included assessing the impact of the Control of Substances Hazardous to Health Regulations 1988 (COSHH) on dipping facility design and working procedures, establishing the type and quality of personal protective clothing (ppe) worn, and determining the level of under-reporting of illness associated with dipping. Nearly 700 surveys were completed. The results show that many sheep farmers need to be further encouraged to use less hazardous products, that most could make more use of engineering controls, and that there were a number of incidents where those involved had associated sheep dipping with ill-health.

---

Introduction

1. The project was devised in 1991, when there was a growing belief that sheep dipping might affect the health of those engaged in it. Allegations of ill health centred on the use of organo-phosphorus (OP) based dips, although there was little or no confirmed medical evidence to support such allegations. The project was carried out in 1992 by Agricultural Inspectors and sponsored by HSE's Livestock National Interest Group.
2. In September 1991 HSE issued leaflet AS 29 'Sheep dipping -protect your health'. MAFF had also recently issued guidance on the safe handling and disposal of sheep dips, and sheep farmers were becoming more aware of the need to report cases of ill-health associated with their use of veterinary medicines generally.
3. The objectives of the project were:
  - i) to identify the types of dipping facilities and disposal arrangements used;
  - ii) to assess and increase the impact of COSHH on the design of dipping facilities, the working procedures, and to identify novel developments;
  - iii) to establish the type and quality of ppe available and worn;
  - iv) to determine the influence on exposure of factors such as siting of baths, environmental conditions and ventilation;
  - v) to quantify and increase awareness of published HSE and MAFF guidance;

- vi) to determine the level of under-reporting of illness due to dipping and to encourage reporting of all incidents;
- vii) to provide information to assist the sponsors determine inspection policy and identify areas where further research is required.

#### Method and contacts

4. HSEs' 16 areas with an agricultural inspection group were asked to complete survey forms between May 1 and October 31 1992. The planned 750 surveys were apportioned between groups to reflect the national distribution of sheep from figures supplied by the Meat and Livestock Commission (see appendix 1).

5. Inspectors were instructed to complete a survey form during routine or investigatory visits to farms, and if at all possible whenever dipping was taking place. They were asked to contact a significant proportion of contractors and to ensure that surveys were spread as randomly as possible through their areas and through the dipping season.

6. Space was available on the questionnaire for comments, sketches etc. Inspectors were asked, if reported cases of ill-health were investigated, to send copies of the investigation report to the sponsors. No such reports were received.

#### Results

7. Although 696 forms were returned to the sponsors completed correctly, it was not always possible to answer all questions fully. In some cases more than one response was given to a question, for example where a farm had more than one dip, or a range of engineering controls.

8. Appendix 2 is the survey form Inspectors were asked to complete, with the total responses given in the appropriate box, except for questions 7 (sheep dip products used) and 8 (personal protective equipment), 4(2) and (3), 14 and 15. Paragraphs 10 to 15 below give a narrative account of the surveys findings in some of those cases. Figures in paras 9 to 16 below relate to both farmers and contractors.

9. For question 7, it was possible to identify the active ingredients in the dipping products used in 730 cases out of the 839 products reported. Of these:

- 58% were propetamphos
- 33% were diazinon
- 3% were chlorfenvinphos
- 1% were chlorfenvinphos + diazinon
- 5% were flumethrin

ie 95% were organo-phosphorus compounds.

10. For question 8, due to the complexity of the question and the table for responses, it was not always possible to come to a reliable conclusion as to what sort of ppe was worn in what circumstances. The

quality of information provided by farmers about the material (eg nitrile, pvc etc) or type (eg faceshield, goggles etc) was not reliable, and is not given here. Reliable information about the clothing available during various operations follows. The first figure in each line of the table is the percentage of cases in which the ppe was available; figures in brackets indicate the percentage of the clothing available that was in good condition ie providing effective protection.

a) Preparing the dip:

gloves:	75% of cases	(69%)
face shield	37% of cases	(37%)
water resistant clothing	91% of cases	(75%)

b) Immersing the sheep:

gloves	93% of cases	(71%)
face shield	20% of cases	(77%)
water resistant clothing	95% of cases	(75%)

c) Handling or other contact with dipped sheep:

gloves	52% of cases	(68%)
water resistant clothing	91% of cases	(66%)

Note that none of these figures should be taken to mean that the ppe was actually worn during each or any of the operations.

11. In only a very small minority of cases (13) was any form of respiratory protective equipment (rpe) available.

12. Although the responses to questions 8(3) and (4) are not reliable, they appear to show that most respondents clean their ppe after use and store it separately.

13. The subjects of the Improvement Notices served (see question 14) were as follows:

- 17 required an assessment under COSHH
- 12 required adequate ppe to be provided
- 5 required dip baths to be covered
- 1 required adequate controls when emptying
- 1 required a redesign or rebuild to remove the need for hand plunging
- 4 concerned other miscellaneous matters

14. One of the most common uses responses to question 15 was to give brief details of the range of ill-health symptoms claimed. It is important to note that in most cases these symptoms were not corroborated by medical diagnosis, but that the connection between work and ill-health had been made by the sufferers without prompting by HSE. The symptoms described ranged from headaches, nausea and aching limbs to longer term problems with joints, loss of memory and difficulty in concentrating.

### Statistical observations on the results

15. The survey form and results were submitted to HSE's Epidemiological and Medical Statistics Unit (EMSU) for comment. Their main comments, together with the sponsors responses, which have been discussed with EMSU, were:

a) that it would be difficult to say whether the study population is representative of the whole population of sheep dippers. The study design assumes that the geographical distribution of sheep reflects that of sheep farms which in turn reflects that of sheep dippers. Since sheep farming is not a very homogeneous activity neither of these assumptions is necessarily true (eg in hill country the numbers of sheep per farm may be different to that elsewhere).

However, the sponsors felt that the distribution of surveys between HSE areas was the best that could be achieved within the limits of available data.

b) that it will be important to ensure that rates derived from the study use the correct denominators, eg the number of premises for which a reply was given, the number of people engaged in a particular task, or the total number of people involved in dipping.

The sponsors have made every effort to ensure that rates have been calculated correctly, and that the meaning of the rates is adequately defined.

c) that particular caution needs to be exercised in converting the facts relating to the health effect measured by the survey to incidence rate. Although HSE have made no attempt to do this, some commentators have claimed that, for example, "nearly 10% of the 1800 people involved in sheep dipping believe they had suffered from ill health."

Such claims are not true, and the sponsors response to them, supported by EMSU, has been that a crude incidence rate could be said to be one of 8.9 self reported illness episodes per 1000 dippers per annum -which is very different. Even this 'incidence rate' is subject to several qualifications. The sponsors believe, however, that the facts do represent a snap shot of sheep dippers views at the time of the survey, and they have value because of that.

### Narrative account of significant results

16. For ease of reference the significant results are given below. Some of these results, with minor amplification, were presented with the HSE News Release E119:93 'HSE survey confirms poor working practices during sheep dipping' released at the Royal Welsh Show on 20 July 1993 (see appendix 3). All percentages relate to the numbers of

answers to the particular question, not to the overall response, and cannot be cross referenced to other points.

- a) Non OP products were used in only 5% of cases where adequate information was available (sample size 579)
- b) 91% of dipping baths were static (sample size 660), 48% being the short swim type (sample size 700), and 85% were sited outside (sample size 693). 15% were covered or in a building (sample size 693).
- c) 72% of dip facilities incorporated engineering controls; most common being splash boards alongside the dipping bath followed by remotely operated gates and chemical transfer systems (removing the need to handle concentrated dip). A number of facilities had used a combination of engineering controls. The sample size was 696.
- d) In 51% of cases Inspectors and farmers were of the opinion that droplets from dipped sheep in the drainage area could contaminate people during dipping. It was practicable to introduce measures which would reduce contamination in 30% of cases. The sample size was 696.
- e) On 65% of farms sheep were manually assisted into the bath (sample size 706). On 59% a wooden handled dipper was used to immerse the sheep, 6% used their foot or hand but only 35% used a metal handled dipper, gates or barriers in accordance with HSE advice (sample size 771).
- f) Although most people (over 90% of a sample of 562) had waterproof clothing available for use for some operations during or after dipping, less than 40% of a sample of 562 possessed a face shield. Around 75% of a sample of 562 had gloves available for dip preparation but only 50% of a sample of 622 claimed that they were available for use when immersing sheep.
- g) Personal hygiene facilities were generally good. 59% of people always washed splashes of dip off (sample size 615).
- h) 5% of the sample of 696 farmers carried out some form of health surveillance, which should be adopted where employees are considered to be at a significant risk of ill-health and is recommended in AS29.
- i) 160 occasions in the last 10 years were described when some form of ill-health after dipping occurred. Only two of these had previously been reported to HSE and three to MAFF/VMD.
- j) 51% of the sample of 696 farmers had carried out a COSHH assessment, and 58% had provided some control measures.
- k) In 6% (40) of the surveyed cases some form of formal enforcement action was carried out - ranging from requiring personal protective equipment to be provided to requiring the redesign of dipping facilities to remove the need for hand plunging.

17. In view of the potential significance of sheep dipping contractors the 17 surveys relating to them were looked at separately. Although this sample is too small to be statistically significant it gives some indication of whether contractors are more likely to control risks than farmers in general. Selected responses follow; figures in brackets are those given earlier for the whole sample.

a) Engineering controls were provided in 82% of cases (72%), with metal handled dippers, gates or barriers provided to control immersion in 53% of cases (35%). A wooden handled dipper was used in 47% of cases (59%).

b) 35% of contractors always washed splashes off immediately (59%), but 59% of contractors had carried out a COSHH assessment (51%). 76% had provided some control measures (58%), but only 6% used a non-OP dip.

c) Protective clothing was available, and in good condition, as shown below. Figures in brackets are for the whole sample (as in para 11).

i) Preparing the dip:

	available	good condition
gloves:	76% (75%)	69% (69%)
face shield	29% (37%)	100% (37%)
water resistant clothing	94% (91%)	69% (75%)

ii) Immersing the sheep:

	available	good condition
gloves	70% (53%)	67% (71%)
face shield	12% (20%)	100% (77%)
water resistant clothing	94% (95%)	69% (75%)

iii) Handling or other contact with dipped sheep:

	available	good condition
gloves	41% (52%)	43% (68%)
water resistant clothing	65% (91%)	29% (66%)

Note that none of these figures should be taken to mean that the ppe was actually worn during each or any of the operations.

d) 9 of the 17 contractors stated that they had suffered a total of 17 ill health incidents within the last 10 years. Although contractors made up only 2.4% of the total sample, these incidents amount to 10.6% of the total.

### Conclusions

18. The main conclusions to be drawn from the survey are that:

a) the full requirements of COSHH are still to be implemented by many sheep farmers.

b) sheep farmers should be encouraged further to consider whether they need to dip their sheep or whether they could use other methods of treatment.

c) they need to reconsider their use of a hazardous product (containing OP compounds), and replace where reasonably practicable with a less hazardous product (containing non-OP compounds).

d) there is still further scope for increased use of engineering controls to reduce the chances of contamination, such as changing a wooden handled dipper to a metal handled dipper or using pumps rather than buckets to empty the bath.

e) although there is a reasonable awareness of HSE leaflet AS29 "Sheep dipping - protect your health" the reasonably practicable precautions suggested in that leaflet, while implemented on a few holdings, are being taken up only slowly.

f) sheep farmers need further encouragement to report incidents of apparent ill-health so that such incidents can be properly and promptly investigated. RIDDOR requires poisoning by OP compounds to be reported.

g) the potential for ill-health effects from some of the practices adopted by sheep farmers does not seem to be appreciated, despite the publicity given to that potential in recent years.

h) there is potential for personal contamination from droplets of dip released by sheep in the drainage areas.

i) the provision and use of ppe by many farmers can be improved. The survey was carried out before the latest manufacturer recommendations on ppe were made, and sheep farmers now have access to better information on the types of ppe that are required.

j) Overall the occupational health precautions adopted by contractors are less good than those adopted by others, in particular in providing and maintaining ppe, and in personal hygiene. However slightly more contractors had prepared a COSHH assessment and used some form of engineering control.

19. This survey has confirmed the relevance of HSE's aims for sheep dipping, which are:

i) to reduce the extent of use of OP dips, in view of their hazardous nature, to that consistent with necessary and non-avoidable veterinary purposes; and

ii) to bring the worst performing dippers up to the standards regarded as reasonably practicable, but at present adopted by only a minority.

iii) identify further research needs following publication of existing HSE sponsored research.

## SUMMARY OF RESULTS OF STUDY

HSE's Field Operations Division carried out the study between May and October 1992. The objectives of the study are set out below.

Although 696 farms were visited dipping was taking place at only 26 visits, thus many of the answers are subjective opinions formed by the Inspector and the farm occupier. The percentage numbers relate only to the point in which they are made and should not be cross referenced to other points.

### Objectives

- i) identifying the types of dipping facilities;
- ii) assessing the impact of COSHH on dip design and working procedures;
- iii) establishing the types of personal protective equipment available and worn;
- iv) determining the level of under reporting of illness due to dipping.

A total of 696 farms, distributed across the country to reflect the geographical distribution of sheep, were visited. A wide range of facilities, conditions and working practices were found, the most important points of which are:

- a) The most widely used product contained propetamphos (58%) followed by diazinon (33%) - both organophosphorus compounds (OP). Non-organophosphorus compounds were used in only 5% of cases.
- b) 91% of dipping baths were static, the majority being the short swim type, and 85% were sited outside. Only 15% were covered or in a building.
- c) 72% of dip facilities incorporated engineering controls; the most common being splash boards, followed by remotely operated gates and chemical transfer systems (removing the need to handle concentrated dip).
- d) In 51% of cases Inspectors and farmers were of the opinion that droplets from dipped sheep in the drainage area could contaminate people during dipping, although it was practicable to reduce contamination in many cases.
- e) On 65% of farms sheep were manually assisted into the bath. On 59% a wooden handled dipper was used to immerse the sheep, 6% used their foot or hand but only 35% used a metal handled dipper, gates or barriers in accordance with HSE advice.
- f) Although most people (over 90%) had waterproof clothing available for use, less than 40% possessed a face shield, which it is essential to wear when handling the dip concentrate. Around 75% of people had gloves available but only 50% wore them when immersing sheep in the dip.

- g) Personal hygiene facilities were generally good but less than 69% of people always washed splashes of dip off.
- h) 160 occasions were described when some form of ill-health after dipping occurred. Only two of these had previously been reported to HSE and three to MAFF/VMD.
- i) 51% of farmers had carried out an adequate COSHH assessment, and 58% had provided adequate control measures in the opinion of the Inspector carrying out the survey.
- j) In 6% (40) of the surveyed cases some form of enforcement action was carried out - ranging from requiring personal protective equipment to be provided to requiring the redesign of dipping facilities to remove the need for hand plunging.

#### SUMMARY OF CONCLUSIONS

- a) The full requirements of COSEH are still to be implemented by sheep farmers.
- b) The reasonably practicable precautions suggested in HSE leaflet AS29 "Sheep dipping - protect your health" while implemented on a few holdings, are being taken up only slowly.
- c) Farmers need to be encouraged further to substitute a hazardous product (containing organophosphorus compound) with a less hazardous product (non-organophosphorus compounds). Some farmers claimed that health problems after dipping disappeared when the dipping product was changed from OP to non-OP.
- d) There is great scope for increased engineering controls; simple steps such as changing a wooden handled dipper to a metal handled dipper should reduce the chances of contamination.
- e) The latest advice from manufacturers on the personal protective equipment required during dipping goes several steps beyond what the majority of sheep dippers provide and wear.

APPENDIX 1

ALLOCATION OF SURVEYS, AND COMPLETION RATE

HSE area number and area office location	Number of surveys targetted	Number completed (percent of target in brackets)
01 Bristol	110	107 (97%)
02 Basingstoke	30	22 (73%)
03 East Grinstead	35	34 (97%)
07 Chelmsford	10	6 (60%)
08 Luton	10	10 (100%)
09 Northampton	30	15 (50%)
11 Cardiff	160	159 (99%)
12 Newcastle under Lyme	40	39 (97%)
13 Nottingham	20	16 (80%)
14 Sheffield	20	11 (55%)
15 Leeds	40	30 (75%)
17 Bootle	25	24 (96%)
18 Preston	50	63 (126%)
19 Newcastle upon Tyne	15	16 (106%)
20 Edinburgh	100	103 (103%)
21 Glasgow	55	41 (74%)