Statement of key conclusions and recommendations

1 Following the outbreak of foot and mouth disease (FMD) in Surrey on 3 August, the government asked the Health and Safety Executive (HSE) to lead an investigation into biosecurity issues at the Pirbright facility – a site occupied by the Institute of Animal Health (IAH) and also by two private companies called Merial Animal Health Ltd (Merial) and Stabilitech Ltd (Stabilitech). The Department of the Environment, Food and Rural Affairs (DEFRA) had established that the virus strain causing FMD in the first infected herd of cattle at a farm in Normandy, Surrey was O1 BFS67 (also known as 01 BFS1860 and hereafter referred to as O1 BFS). This is a laboratory strain not naturally found in the environment and was one upon which work was being carried out by all three occupants of the Pirbright site ahead of the first outbreak. HSE's job was to lead a team to investigate:

- potential breaches of biosecurity at the Pirbright site;
- whether such breaches may have led to a release of any specified animal pathogen;
- whether any such breaches had been rectified to prevent future incidents.

2 The period covered by our investigation was 7–26 July following advice from DEFRA epidemiologists.

3 The team started work at the site on 5 August. Within two days, we established and prioritised our main inquiry lines and set these down in an initial report submitted on 7 August. Within a month of the first outbreak, the team has completed the investigation and our conclusions and recommendations are summarised below, according to the questions we were asked to address in our commission from the government. Our report in full follows.

O1 BFS virus strain

4 We conclude first that this virus strain, found in the first infected animal herd in Normandy, is highly likely to have originated from the Pirbright site. We conclude this from the results of nucleotide sequencing tests of the virus strain in question, which we commissioned as part of the investigation. However, due to very small differences in the strains used at all three organisations at Pirbright, it has not been possible to pinpoint precisely through sequencing the exact origin of virus found in the infected animals at Normandy.

Breaches of biosecurity at Pirbright

5 We looked at biosecurity controls in four areas where we judged it possible for the virus to escape containment arrangements at Pirbright, namely solid waste disposal, airborne routes through the fabric of site buildings or faults in filtration systems, liquid waste disposal, and human movements.

Solid waste

6 We found no evidence of any breakdown in the containment systems for solid waste disposal at the Pirbright site overall.

Airborne release

7 We found no evidence of a biosecurity failure that could have led to the virus being released from the site into the atmosphere. The appropriate bio control systems were functioning properly at Merial. The same was true at IAH and Stabilitech, although we did find some weaknesses in the physical integrity of their premises and in their filter testing regimes.

Liquid waste disposal

8 IAH and Stabilitech work on experiments with only small amounts of live FMD virus. Waste from those experiments can include the live virus that passes through a chemical effluent inactivation process before entering the Pirbright site drainage system. That process does not achieve complete inactivation; a final effluent treatment process on the site is designed to achieve that before the waste passes into the public sewer. Waste water from human showers, which could also contain some live virus, enters the site drainage system direct. It was therefore possible for small quantities of live virus from IAH and Stabilitech to have entered the site drainage system at this point in the system. However, because this was in accordance with DEFRA's requirements, we conclude there was no breach of biosecurity in this respect.

9 We take the same view in relation to Merial. During the period covered by our investigation, Merial were engaged in large-scale FMD vaccine production and we established that the resulting waste containing the live FMD virus O1 BFS was flushed into the company's effluent sump and then passed into the site drainage system. The quantities involved were much larger than those for IAH and Stabilitech. However, this act of discharge was permitted by DEFRA, hence we conclude there was no breach of biosecurity at this juncture by Merial.

10 However, such was the condition in which we found the site drainage system that we conclude that the requirements for Containment Level 4 were not met, thus constituting a breach of biosecurity for the Pirbright site as a whole. Our conclusion is supported by the evidence we found of long-term damage and leakage, including cracked pipes, unsealed manholes and tree root ingress. We have investigated ownership of the drainage system, which rests with IAH. However, we are aware of a difference of opinion between IAH and Merial over responsibility for maintenance of a key section of pipe relevant to this investigation.

11 The arrangements for discharge from the Merial sump into manhole FM1 (see later) leaves the potential for overflowing of the manhole and release of material from the effluent sump. If this were to contain live pathogens, in our view this would constitute a breach in biosecurity. Moreover, we judge the practice employed by IAH of using bowsers and hoses in the intermediate site effluent drains to clear blockages without a standard operating procedure (SOP) to be a breach of biosecurity.

Human movements

12 We established that, in the period covered by our investigation, not all human and vehicle movements via the IAH gatehouse to the site were recorded, in particular traffic associated with construction work going on at the site at the time. We conclude these failures to keep complete records were not in line with accepted biosecurity practice and represent a breach in biosecurity at the IAH site.

13 We also found evidence of poor monitoring and control of access to restricted areas within IAH facilities. We conclude that this too constitutes a breach in biosecurity.

Whether such breaches may have led to a release of any specified animal pathogen

14 Given what we say above, it is our conclusion that the breaches we have identified in the biosecurity arrangements for handling liquid waste are likely to have occasioned a breach of containment and release of FMD strain O1 BFS onto the Pirbright site. We judge it likely that waste water containing the live virus strain, having entered the drainage pipework, then leaked out and contaminated the surrounding soil. We also believe that excessive rainfall may have exacerbated the potential release from the drain.

Transfer of the released O1 BFS virus strain beyond Pirbright

15 We have said that in the period covered by our investigation, human and vehicle movements at Pirbright were not adequately controlled. Indeed, in relation to the construction traffic, we conclude that the vehicles involved were likely to have had unrestricted access to the site. In our opinion, the construction activities on site above the vicinity of the intermediate section of the effluent drainage system are likely to have caused disturbance and movement of soil in a way that contaminated some of the vehicles with live FMDV O1 BFS. We conclude it likely that those vehicles, having driven over this part of the site, carried off out of the site materials containing the live virus in the form of mud on tyres and vehicle underbodies. This is likely to have been exacerbated by the very heavy rainfall at the time, resulting in significant amounts of mud and slurry at the site as well as drainage problems.

16 We have further established that some of the vehicles thus contaminated drove from the site and along Westwood Lane, Normandy as part of their journey to their destinations. Westwood Lane passes the first infected farm. It is our conclusion that this combination of events is the likely link between the release of the live virus from the Pirbright site and the first outbreak of FMD.

Whether any such breaches have been rectified

17 We have drawn our concerns about potential breaches of biosecurity, together with the recommendation listed below, to the attention of the Pirbright site regulator (DEFRA) so that they can be rectified.

Recommendations

18 We make the following key recommendations in the light of our investigation:

- We recommend that the required standards of containment for animal pathogens should be clearly documented to facilitate the regulatory process and that a review is completed to contrast the actual regulatory position for animal pathogens with human pathogens to make sure the position is justified.

- We recommend review of arrangements for setting and monitoring safe operating practices where work is subcontracted under a single licence operating under the Specified Animal Pathogens Order (SAPO) with responsibilities clearly defined between the licence holder and the subcontractor.

- We have concerns about the suitability of continued use of the upper south wing of the IAH laboratory, which is also used by Stabilitech for high containment work.

In our view, it does not meet the requirement for SAPO 4 and we recommend that remedial work be carried out at the facility.

- We have concerns about filter arrangements throughout the IAH/Stabilitech facility where banks of HEPA filters are tested as a single unit leading to possible undetected failures. We recommend consideration given be to changing the siting and testing arrangements.

- We recommend review of the appropriateness of chemical treatment for sterilising liquid waste containing SAPO Category 4 pathogens. It is our experience that chemical treatments, while reducing the amount of pathogen in the liquid, may not render the liquid completely pathogen-free.

- We recommend the effluent drainage system on the Pirbright site is improved to ensure high level SAPO requirements are met. In addition we also recommend better record keeping, maintenance and monitoring regimes in relation to the effluent drainage system.

- We recommend tighter controls of vehicle and human movement on the IAH site.