

**Veterinary Services (VS) mission to the UK**  
**Classical swine fever outbreak review**  
**September 19-21, 2000**

**EXECUTIVE SUMMARY**

A VS team visited the United Kingdom (UK) September 19-21 to meet with officials of the Ministry of Agriculture, Fisheries, and Food (MAFF) and to review the status of the outbreak of classical swine fever. The purpose of the visit was to obtain information on the effectiveness of MAFF's control program and to gain information from their experience that would be useful if the US were faced with an outbreak.

The team met with MAFF officials at headquarters in London and observed the control center at this location. On September 20, the team visited the field control center located in Bury St. Edmunds, Suffolk. Throughout the visit, MAFF personnel were very open and hospitable to the team. The team was impressed by the level of commitment from all levels of MAFF personnel to the control efforts.

At the time of the visit, 13 premises had been confirmed as affected with CSF. Subsequent to the visit, 2 additional premises have been identified, giving a total of 15 affected premises to date. All of these premises are located within the region of East Anglia - the counties of Norfolk, Suffolk, and Essex. The outbreak appears to be controlled adequately and has not spread outside this region.

Various hypotheses about the source of infection have been investigated, and the most likely source of infection is thought to be an illegally imported infected pork product. Pigs in breeding units in this region are housed in outdoor paddocks, with relatively easy access from nearby public footpaths. The virus has been identified as genotype 2.1, and is similar to viruses circulating in Asia. It does not appear to be similar to viruses circulating in continental Europe.

Epidemiological investigations have demonstrated spread of the disease through animal movements, lateral spread from affected premises, and personnel movements or contacts. Links have been established for most of the affected premises, with epidemiological investigations continuing in the more recently identified cases.

Control measures have been applied as specified in both EU and UK legislation. These include various levels of movement restrictions imposed around both infected premises and suspect premises, slaughter of pigs on affected premises and precautionary slaughter of pigs on premises considered dangerous contacts.

MAFF has identified several issues which we would also face if we had an outbreak in the US. Although there are differences both in industry practices and political pressures in the two countries, some lessons would apply equally in the US in a similar situation. These include the following: (1) The amount of time which must be spent on issues other than disease control (i.e.,

media, public reaction, industry relations, etc.) should not be underestimated; (2) Legislation should be reviewed and response plans revised as necessary; (3) Management levels and administrative procedures established in field operations are critical; (4) GIS systems and technology are extremely useful in an outbreak situation.

On September 20, 2000, APHIS published an interim rule excluding East Anglia from the list of regions it considers CSF-free. The team concluded that the conditions specified in the interim rule were appropriate to the current circumstances. Several possibilities for future actions, including reducing these restrictions, were discussed with MAFF, but these options are dependent on any future developments in the outbreak. The team also volunteered to provide assistance - either veterinarians or technicians - if requested by MAFF.

## **Trip Report:**

Veterinary Services (VS) mission to the UK to evaluate the status of the Classical Swine Fever (CSF) outbreak which was confirmed in East Anglia in August, 2000.

### ***Purpose and logistics of the visit:***

On September 19 through 21, a VS team visited the UK to meet with officials of the Ministry of Agriculture, Fisheries, and Food (MAFF) and to review the status of the UK CSF outbreak. The team reviewed the situation in the context of the September 20 interim rule that removed East Anglia from VS's official list of CSF-free regions. The team intended to gather information on the effectiveness of MAFF's control program and to gain information from MAFF's experience that would be useful if the US were faced with an outbreak.

Four individuals from VS comprised the team. Lisa Ferguson, Regional Coordinator, Sanitary Issues Management Team, served as team leader. Keith Hand from Emergency Programs, Ken Forsythe from the Centers for Epidemiology and Animal Health, and Anne Goodman from the Regionalization Evaluation Services Team, also participated. MAFF hosts are listed in Annex I.

Team members met with MAFF officials at their London headquarters on September 19 and 21. On September 20, MAFF hosted the VS team in its field control center located in Bury St. Edmunds, Suffolk.

### ***Information provided by MAFF:***

MAFF officials described the atypical characteristics of the CSF virus, pig production systems in East Anglia, the history of the outbreaks, tactical problems they encountered, diagnostic tests, applicable legislation and control mechanisms, use of Geographic Information Systems (GIS) technology, lessons learned from the outbreaks and future considerations for policy changes. The VS team noted the commitment of MAFF personnel and described future actions which VS might take.

For reference, affected premises were identified in this report as SF 2000/01 through SF 2000/13. Premises SF 2000/14 and SF 2000/15 were identified after the team's visit. The numbers refer to individual premises on which CSF was confirmed in chronological order of confirmation.

### **Atypical characteristics of CSF in the UK.**

The virus recovered from the first five cases has been identified as genotype 2.1. The clinical picture and sequence data of the envelope glycoprotein gene (E2) suggest that the virus is distinct from 2.1 isolates previously seen in the EU. Rather, it is similar to strains isolated in the Far East. In fact, UK and Laotian officials have been discussing similarities between isolates identified in their respective countries. At the time of this report, the isolates were indistinguishable.

In contrast to previously characterized CSF isolates, the UK variant of CSF appears to spread relatively slowly, either within a given premises or between premises. It can jump paddocks. MAFF officials also stated that it appeared to spread more efficiently between than within farms.

Antibody responses were delayed in comparison to MAFF expectations for CSF. In the UK outbreak, initial MAFF surveillance protocols reflected the expectation that antibodies could be detected two weeks after infection. However, antibodies were not detectable until 14-24 days after initial infection. MAFF subsequently altered its blood testing regimen to a 30-day period in response to this time frame. Clinical infection might not be seen for up to 3-4 incubation periods.

This delayed seroconversion has caused problems with CSF detection. Premises within the surveillance zone were visited and samples obtained 15 days after the last case was identified. Because of this, serum was collected from some infected premises before antibodies were detectable. In at least one instance, a premises on which CSF was incubating was initially characterized as uninfected. This premises was later identified as infected.

An individual animal does not necessarily display the complete gross pathology characteristic of classical CSF. Each animal usually displays a limited spectrum of pathological signs. To account for this, MAFF slaughters at least four animals and combine the gross pathologies to obtain the complete pathological picture of CSF.

#### **General epidemiological observations:**

The initial infection is assumed to have occurred from ingestion of illegally imported infected meat. Spread has been attributed to various pathways, including animal-to-animal contact, animal transport, wildlife (e.g., red foxes), and people (e.g., lorry drivers). Examples of each pathway will be discussed subsequently for individual premises.

Porcine dermatitis nephropathy syndrome (PDNS) has complicated diagnosis of CSF in the UK. Clinical signs of CSF are similar to those of PDNS. Suspect CSF cases must be reported to MAFF for investigation. However, PDNS is not a reportable disease. Early cases of CSF were initially thought to be PDNS. On certain premises, CSF progressed for some time because PDNS was suspected initially.

In 1999, CSF was reported as suspect and investigated 30 times. Most of these cases were attributed to PDNS; none to CSF. In contrast, the seventh investigation of the year 2000 was the first confirmed case of CSF.

Morbidity and mortality from CSF usually exceeds that from PDNS. Both diseases cause skin lesions, and, although animals infected with PDNS may have more than and slightly distinct skin lesions from CSF-infected animals, it is difficult to distinguish the diseases grossly. CSF can be diagnosed specifically through laboratory testing. However, there is no confirmatory test for PDNS, as the cause has not been definitively identified.

Because of the overlapping clinical picture, current practice in the UK is to sample all pens with sick pigs on a premises with PDNS. Approximately 60% of the pigs reported have had PDNS, which seems to be infecting animals concurrently.

PDNS is not distributed throughout the UK. There are two major pig-producing areas in the UK, one of which is East Anglia. PDNS is located primarily in East Anglia.

In these outbreaks, only breeding units and nursery units have been affected so far. No fattening units have been infected to date. Although the index animal was an adult sow, the disease appears to spread faster in nursery units. Young animals have a high virus load and probably shed heavily.

#### **Pig production systems in East Anglia:**

MAFF described pig production practices in East Anglia that were relevant to the spread of CSF. Many of these pig production methods reflect UK public concerns for animal welfare. For example, most of the breeding operations in this area of the country are located in fenced outdoor paddocks. Sows are not confined to farrowing crates or tethered. In some instances, these paddocks are located next to roads and footpaths, with relatively easy public access to the animals. At times, young animals which probably escaped from a nearby paddock have been observed wandering down the road. However, feral swine do not appear to be a significant problem, nor are there local populations of wild boars.

The outdoor system works fairly well in East Anglia because the area is relatively dry, and the soil is sandy. The paddocks are often leased, and the pigs are rotated onto these fields for a couple of years after crop rotations. Afterbirths are not removed from the paddocks. MAFF officials stated that production in the outdoor system could be almost as good as it was in other systems, as long as the producer was also a good manager.

Artificial insemination is not practiced routinely in East Anglia. Boars are put with sow groups for a specified period of time in the breeding unit. The boar moves from one group of sows to another, based on the boar's production statistics.

Three days before farrowing, pregnant sows are moved to open fenced paddocks and housed in metal structures called "arks." Arks are set on bare ground and lined with straw. "Fenders," which are metal obstructions low enough for the sow to get over and move freely in the paddock but high enough to keep the piglets in place, are placed at ark openings to keep piglets from wandering. Piglets are weaned at 4 weeks or when they weigh 7 kilograms (15 lbs) and moved to nursery rearing operations.

Nursery and finishing/fattening units are generally housed inside. Piglets from various breeding operations may be mixed in nursery units. Further mixing may occur when nursery groups are sent to fattening units. Both nursery units and fattening floors are usually operated on an all-in, all-out basis. Animals are held in nursery units for 10-12 weeks or until they weigh 32 kilograms. They then move to fattening operations until they weigh 110 kilograms.

Most pig production units are organized within pyramids. A pyramid (which appears to be equivalent to a singly-owned company in the US) consists of three separate units: breeding, nursery and fattening units. As of the end of September, 2000, only two pyramids were involved in the outbreak. The first is identified in this report as PYRAMID A; the second as PYRAMID B.

The initial phases of the outbreak occurred within several premises (SF 2000/01 - SF 2000/11) which were either part of PYRAMID A or could be linked by pathways like common lorry drivers (e.g., SF 2000/06). The pyramid contains herds that are owned by the company as well as contracted herds. Of the breeders in PYRAMID A, 70% are owned by the company, and 30% are maintained by contractors. PYRAMID A operated 43 breeding herds for production.

MAFF indicated that PYRAMID A's management practices and decisions were fairly

well-controlled. PYRAMID A produces its own feed and has some of its own processing and production facilities. Generally, its cleansing procedures appear to be adequate. It keeps extensive records of animal movement within individual premises.

However, MAFF has identified some questionable practices on individual premises. One unit (SF 2000/07) decided to restock its breeders because some of them were getting old. This decision was made after the premises became infected but before disease was detected. Rather than depopulating all of the animals, only the older breeding animals were depopulated. Young infected gilts were sent to another unit (SF 2000/11) that was later confirmed as infected. In addition, weaned pigs from this premises were also the source of infection for SF 2000/10.

Lorry drivers were also implicated in some questionable practices. Lorry drivers for PYRAMID A were generally associated with a single producer. However, MAFF discovered that one lorry driver was also essentially an owner. In this instance, the driver's wife actually owned the pigs on SF2000/06. PYRAMID A may not have known of this relationship, and the practice may have been contrary to company policy. In any event, the driver apparently left his lorry to help shorthanded personnel on several premises he visited. MAFF's evidence implicated the driver as the source of infection in those farms.

Another questionable practices followed on a PYRAMID A premises (SF 2000/02) included location of a casualty pen adjacent to pens containing healthy gilts. The significance of each of these practices in the outbreak is discussed.

PYRAMID B was implicated later in the outbreak (premises SF 2000/12 and SF 2000/13) MAFF felt that management controls in this pyramid were not as tight as they were for PYRAMID A.

#### **History of the outbreak:**

MAFF traced pig movement among premises with the record-keeping system, Pigs (Records Identification and Movements) Order 1995 - PRIMO. This is required by UK legislation. In addition, MAFF was able to document movement within premises through the management records maintained by the company. MAFF traced movement of people and vehicles through interviews with personnel involved. It evaluated implications of wildlife by inspection of facilities and interviews with personnel.

CSF was introduced into the first premises confirmed with disease (SF 2000/01), a nursery/rearing unit, by movement of undetected infected pigs from undetected premises SF 2000/02. The PYRAMID A veterinarian reported suspicious cases to MAFF on August 4. MAFF confirmed CSF on August 8. Pigs on this premises had been treated for PDNS, but the clinical picture was not completely consistent with PDNS so the disease was reported as suspicious for CSF.

MAFF initially designated a relatively large area as infected, and extended the scope of its investigation to an increased number of adjacent premises. The radius of this infected area was larger than the 10 kms required by European Commission legislation, with a protection zone of 3 km defined around the infected premises. Adjacent premises were confirmed subsequently as infected. These zones were delineated by existing barriers including roads.

The premises that was the point source of the outbreak was identified subsequently - on August 9 - as SF 2000/02. This was a breeding unit which had sent nursery pigs to several facilities. MAFF's working hypothesis is that a person walking on a public footpath adjacent to

an open breeding paddock either discarded illegally imported infected meat which a sow ingested or fed the infected meat to a sow. Animal movement records among and within premises were sufficient for MAFF to trace the origin of the outbreak to a single sow (designated 847Y).

A map of the SF 2000/02 is attached as Annex 2 (entitled "SF 2000/02, Diagram of outdoor unit"). For reference, the circular area to the right identifies service and dry sow paddocks. The arrows indicate the direction in which sows were moved to the farrowing paddocks. The lines of vertical boxes to the left designate farrowing paddocks (F1 to F6), each of which contains several arks. The index sow was located in a section of farrowing paddock F1 and labeled "TA" for "target animal."

A public footpath follows a 10 foot hedge (see top of the map) along the perimeter of the area. MAFF believes that the infected meat was probably discarded by someone using this footpath. The way in which the infected meat reached the target animal, designated 847Y and located in a center paddock, and excluded animals nearer the footpath was not known, although several hypotheses were proposed.

Subsequent spread through the breeding unit was relatively slow. The infection rate in various paddocks on this premises ranged from 0-90%. The paddock where the original infected sow was located had an infection rate of approximately 90%. This paddock was directly adjacent to paddocks which had an infection rate of 60%. The paddocks farthest away were not affected.

CSF was transmitted to the piglets, some of which were mixed with other litters, and the mixed group was shipped to several farms. One of the farms receiving infected piglets, designated SF 2000/01, was the premises on which CSF was identified first.

Ultimately the sick sow was placed in a casualty pen (see Annex 3, entitled "SF 2000/02 - Diagram of Farm Buildings") which was adjacent to a pen containing healthy gilts. For reference, this unit is labeled "GE" on the diagram and located in the upper left-hand corner immediately below the fattening pig area. The disease then spread to gilts in the pens contiguous to the casualty pen.

The private veterinarian had not visited premises SF 2000/02 for approximately 6 weeks. The owner was aware that he had sick pigs, but he attributed disease to PDNS. CSF was diagnosed after a PYRAMID A veterinarian noticed clinical signs that were not entirely compatible with a diagnosis of PDNS.

Premises SF 2000/02 and 2000/03 were confirmed on August 9. The epidemiological investigation indicated that disease on SF 2000/02 was probably introduced around June 1. The date was suggested from an analysis of CSF positive and negative premises which had received pigs from this premises between May 2 and August 1. CSF was not detected on premises receiving piglets before June 20; disease was confirmed on premises which received shipments after June 27 (See Annex 4, entitled "Pig movements associated with SF 2000/02"). After accounting for an incubation period of 20 days, June 1 was identified as the date of introduction.

The following disease history was established for the index case (847Y):

On February 20, she was served.

.... June 13, she farrowed 12 healthy piglets.

.... June 21, she became ill.

.... June 26 and 27, 6 piglets became ill.

.... July 1-10, 8 piglets died.

.... July 11, 4 piglets which lived were weaned. At least 3 were shipped to

the premises designated SF 2000/01 on which CSF was first confirmed. Here, they were mixed with other shipments to form a group of 236 piglets. These were shipped to premises SF 2000/01, SF 2000/03, SF 2000/04, and SF 2000/05.

- .... July 11, the sick sow was sent to the casualty pen.
- .... July 18, the sow died.
- .... July 19, the gilts contiguous to the casualty pen became ill.
- .... July 23, piglets in the casualty pen began to die.
- .... Aug. 9, CSF was confirmed.

Disease was then confirmed on premises SF 2000/04 and SF 2000/05. The movement of infected piglets from premises SF 2000/02 was the cause of disease on premises SF 2000/01, SF 2000/03, SF 2000/04 and SF 2000/05.

Infection of premises SF 2000/06 appeared to originate from the lorry driver previously discussed. He was husband to the owner of SF 2000/06. The gentleman traveled among premises SF 0000/04, SF 2000/05, and SF 2000/06.

Disease spread laterally to premises SF 2000/07, and the disease was confirmed on this premises on September 8. The estimated date of introduction of disease onto this premises was July 11. This was a breeding unit located adjacent to premises SF 2000/01. MAFF believes that red foxes transmitted disease from SF 2000/01 to SF 2000/07.

Premises SF 2000/01 had pigs dying in such numbers that the carcasses overflowed the storage containers available for disposal. Although the practice was illegal, dead pigs were placed on a concrete apron of the disposal area. A census of pig carcasses suggested that at least 30 bodies were missing. Red foxes, which were endemic in the area, could have removed carcasses from the site. Foxes could have contributed not only to the spread of disease to premises SF 2000/07, but also SF 2000/08 and SF 2000/09.

Other factors in this area might also have facilitated disease transmission, particularly in view of the open nature of pig production. In this regard, escaped pigs were observed wandering down the road. People come to the area for picnics. Children sometimes climbed the fence to feed the animals. Caravans are located in the area.

Premises SF 2000/07 was the premises referred to earlier which had planned to depopulate its breeding herd. However, gilts were sent to a premises subsequently identified as infected (SF 2000/11), and weaned pigs were sent to another premises also subsequently confirmed as infected (SF 2000/10).

Epidemiological investigations linked premises SF 2000/01 through SF 2000/11 to PYRAMID A. However, the outbreaks in SF 2000/12 and SF 2000/13 were associated with a different production pyramid, PYRAMID B. This caused some concern because of the potential for spread within a new pyramid for which movement within the pyramid had not been evaluated. MAFF indicated that the amount of data that must be analyzed for PYRAMID B is massive. Also, MAFF did not consider the management practices in this pyramid to be as tightly controlled as they were in the initial pyramid. The epidemiological picture in the premises associated with PYRAMID B was not entirely clear at the time the APHIS team visited the UK, although some tentative links with PYRAMID A had been identified (Annex 6).

Premises SF 2000/12 was confirmed on September 12/13. The disease source was not identified with confidence at the time of the APHIS site visit (September 21), although several hypotheses were being investigated. Sick pigs were first reported approximately September 8. The premises was 500 m from SF 2000/04. Both were indoor units and although they are close

to one another, no direct link was established at that time. The owner was also a lorry driver, an observation that was being investigated. Disease was probably introduced approximately August 14.

Of interest is that the fact that pigs from this premises had been sent to a slaughterhouse that is approved to export pork to the US. Meat from these pigs could have been included in some shipments of meat which were sent to the US prior to August 4. However, VS has taken no action on this since there was no indication that there was undetected infection on this premises at the time of shipment.

Premises SF 2000/13 was confirmed September 17. Again, origin of disease was not identified at the time of the site visit, although at least one loose link with PYRAMID A had been identified. The unit was located in open country, 1.5 km from SF 2000/04. SF 2000/13 was an independent contractor which received animals from the same breeding unit that sent animals to PYRAMID A.

Consideration has been given to the potential for spread by wildlife other than red foxes. In addition, because some feral pigs seen in the area around SF 2000/01 and SF 2000/10 were considered to constitute a risk, they were being hunted and shot by a marksman using a gun with laser lights.

#### **Tactical problems:**

Cleaning and disinfection (C&D) of positive premises is often difficult. Afterbirths are not routinely removed. C&D of the arks are not so difficult because arks are moved to concrete bases for the purposes.

Although MAFF stated that the strain hasn't lived more than 42 days under the environmental conditions existing in East Anglia, restocking is not allowed until 30 days after C&D were completed satisfactorily. Restocking may only be carried out under license and is carefully controlled and monitored by the State Veterinary Service.

Because the breeding operations are outside, sampling of animals can be a problem. Because of that and because of the confusion caused by PDNS, MAFF samples every pig on premises with PDNS.

Tonsils are not routinely sampled because of difficulties getting samples from animals housed outside.

#### **CSF diagnosis:**

Samples are tested at the Central Veterinary Laboratory in Weybridge. Specimens are usually cryostat sections of standard tissues and EDTA (unclotted) blood. Tissues are tested by fluorescent antibody (FA) for virus antigen, and serum is tested for antibodies. Although a positive FA test provides a cause for concern, it is not considered conclusive. Culture of the virus from tissue and detection by ELISA using a monoclonal antibody at 24, 48, and 72 hours is considered conclusive. The laboratory may perform the reverse transcriptase (RT) test on blood; however, this test is considered confirmatory to tissue culture since inadvertent laboratory contamination with a single virus particle could result in a positive RT test.

#### **Relevant legislation and control activities:**

MAFF control activities for the outbreaks are directed by coordination from two locations. One is MAFF headquarters in London. This unit coordinates the eradication effort and sets policy. The second is the local control center in Bury St. Edmunds. This unit handles field operations.

The MAFF control center collects data which it sends the staff at headquarters for processing by its Geographic Information Systems unit (which will be described later in this report). The local MAFF unit also interacts with local authorities for local knowledge of laws, people, and animal populations and movement. Local authorities can prosecute, if necessary.

The policies developed by headquarters and the operations directed in the field must be consistent with the requirements in EU Council Directive 80/217/EEC. This legislation requires that protection (3 km radius) and surveillance (10 km radius) zones be established around infected areas and that pig movement be restricted within these zones. A census of all holdings within the zones must be conducted shortly after the zones are defined. Restrictions required by Article 19 of Directive 80/217/EEC were placed on all premises within a 3 km radius of a confirmed infected premises, i.e., the protection zone. Special restrictions apply to animals within the protection zone because pigs are at greater risk of contracting disease from neighborhood contacts. However, movement of animals on and off premises is restricted in both zones in the UK. Moreover, movement of all species within the protection zone must be licensed.

In many instances, the zones around infected premises that were located in close proximity to one another overlapped. To address this, individual zones were combined into 5 major zones (see larger zones defined by jagged lines indicating natural barriers illustrated in Annex 7, entitled, "Locations associated with Swine Fever in East Anglia.") As of September 19, two hundred farms had been included in the 10 km zones.

Data collected under the legislation establishing PRIMO, which requires pig farmers to maintain records on animal movement, has been invaluable. This legislation prohibits movement of live pigs off a premises for 21 days after the introduction of other pigs on to the premises (although elite production herds can move under specialized circumstances). MAFF indicated that this 21 day holding period effectively slowed disease transmission.

Producers apparently documented movement of sows on the farm in a very detailed manner. This facilitated epidemiological characterization of disease spread significantly.

MAFF imposes restrictions it designates as Form A restrictions on premises where pigs show symptoms of disease that cannot be distinguished from CSF. These restrictions allow no movements of animals on or off a premises. Form A implementation also restricts movement of people and vehicles. Form A requires suspect disease to be investigated by sending samples from affected pigs for laboratory tests. If CSF is confirmed, all pigs are valued, slaughtered, and the carcasses destroyed. Restrictions remain for at least 30 days after satisfactory cleaning and disinfection of the premises. Restocking is allowed only under license and is carefully monitored by the State Veterinary Service. MAFF was sufficiently confident that spread was controlled in certain areas that it has lifted restrictions in some areas (SF 2000/03).

For premises under Form A restrictions where disease is not confirmed, i.e., if the laboratory result shows that disease is not present, restrictions are lifted immediately.

Generally, Form B restrictions are placed on a premises as a result of tracing movements of live pigs, vehicles, persons, or other contacts that may have carried infection to or from a

confirmed infected premises. Form B restrictions are intended to prohibit the movement of animals from premises which might be expected to be incubating disease. Movements of pigs on or off the premises are not permitted, since movements of pigs and vehicles pose the greatest risk of spread.

For Form B restrictions where the contact is less than 20 days, a Veterinary Officer (VO) will inspect premises. If the VO suspects disease, Form A procedures are initiated. If no clinical disease is found, Form B restrictions remain and the VO will arrange for re-inspection and sampling 20 days after the contact. For Form B restrictions where contact is more than 20 days, a VO will inspect. If there is no evidence of disease, blood samples will be taken for testing. If pigs are healthy and the samples test negative, Form B restrictions may be lifted.

Form B premises are identified through epidemiological investigations and surveillance. Surveillance activities have addressed movements of people and vehicles in addition to those of pigs. Person and vehicle movements were more difficult to trace than shipments of pigs, since no records are required. Identification was based primarily on interviews with involved individuals and were probably affected by the accuracy of their memories and reports.

Additional movement controls were established early in September to supplement the policies establishing protection and surveillance zones. Concern was expressed at that time over additional spread of the disease and the possibility that pigs were being moved away from premises where the disease was suspected. Movement restriction zones with a radius of 10 km were then imposed immediately in areas where CSF was suspected to be present, prior to laboratory confirmation of disease. If test results were negative, the restrictions are lifted. If CSF were confirmed, then the appropriate protection and surveillance zones were defined as necessary.

Another control measure being taken by MAFF is the precautionary slaughter of dangerous contacts. Dangerous contacts have been defined on a case by case basis, based on an evaluation of factors such as known contact with an infected premises or location adjacent to an infected premises. As an example, all premises which received pigs from premises SF 2000/07 were defined as dangerous contacts and the animals were slaughtered. Two of these premises (SF 2000/10 and SF 2000/11) were subsequently confirmed as infected. CSF was not confirmed on other premises designated as dangerous contacts. For example, one premises in Darbyshire (a location outside of the three-county area under consideration) which had received pigs from SF 2000/07 was depopulated within days after receipt of pigs. CSF was not confirmed in any samples taken during depopulation. Because there has been no evidence of disease, restrictions have not been imposed in the area.

MAFF has also instituted a policy of precautionary slaughter of all pigs located within a 1 km zone of an infected premises. Pigs within the 3 km protection zone are restricted, but will not necessarily be slaughtered unless epidemiological evidence indicates it is necessary.

## **GIS technology and interactive web site:**

Data are collected by personnel from the disease control center in Bury St. Edmunds, then sent to headquarters and processed by the GIS unit. Although the GIS technology was in place prior to the outbreaks to trace diseases like tuberculosis in badgers in the West Country, this was the first time it had been used in an outbreak situation. MAFF updates its web site on a daily basis, as new information arrives. MAFF is developing an interactive component for its web site so that users in the field can request information on the status of specific locations of interest. This is specifically aimed at producers who can then use the interactive web site to determine whether their premises are located within a zone with movement restrictions.

Information on Form A and Form B premises is processed by the system and can be retrieved quickly. Care must be taken to identify errors. In one instance, different sources identified the location of a single premises in 2 disparate areas 5 miles apart. Investigation of the discrepancy revealed that one was the location of the house and the other was the location of the pigs.

## **Lessons learned:**

MAFF indicated that practices and policies which were in place at the time of the outbreak were not entirely appropriate. They had to be modified to address the lessons learned in the outbreak. Some of these lessons were technical; some were not.

For example, in contrast to past epidemics, disease itself is no longer the sole consideration which must be addressed. Current activities in the UK are directed approximately equally toward 3 targets: the press, the EU, and disease surveillance/control. Specifically, the UK has found it labor-intensive to meet EU legislation.

Public interest in the outbreak is intense and must be addressed. The Chief Veterinary Officer has been interviewed by the press as many as 10 times per day. Cooperation with other UK government agencies has been extremely helpful. In this regard, a public announcement from the UK agency responsible for human health assisted MAFF in convincing the public that there was no human risk.

The legislation in place when the outbreak started was out of date, in part since no disease had been observed since 1986. Although that legislation provided for a contingency plan, the plan didn't entirely work.

MAFF indicated that it considered open and public communication to be critical to success of the effort. To that end, it shares all information with the public (with the exception of owners names of the affected premises). Reports on disease status are revised daily on the Internet when there are changes. As previously mentioned, an interactive web site is under development. MAFF holds weekly meetings with stakeholder groups at which only technical issues may be discussed. Other avenues of communication are also under consideration because not all interested members of the public have access to computers or the Internet. Discussion of political issues like compensation, which has been an extremely high profile issue for pig producers, is not allowed at these meetings.

However, MAFF stated that public communication has been difficult. Both the press and industry are looking for MAFF to make mistakes. MAFF personnel suggested that training in media relations might have been useful.

Coordination of field operations in Bury St. Edmunds presented unexpected difficulties. MAFF had to recruit personnel from other locations, provide additional workspace, and arrange living accommodations. Accommodations in the affected regions were insufficient to contain the additional personnel comfortably. This has been a continuing problem.

Furthermore, office space in the field was insufficient to accommodate the additional personnel. MAFF leased modular prefabricated buildings and set them up in the parking lot.

MAFF stated that the type of administration established in the field was critical to success of the effort. Apparently, the initial level of management assigned to the field was inappropriate (either too technical or with insufficient authority). An effective control program required a manager at the intermediate level who had authority to make decisions and take action.

In addition, the personnel assigned to the field must provide continuity and stability to the effort. MAFF's original intent was to rotate all personnel at defined intervals. However, this meant that new personnel recruited into the effort had to be trained. Now assignment of personnel is scheduled to address this problem.

Finally, MAFF characterized paperwork as more important than anything else. However, it also felt that were appropriate operational procedures, training, and support services were important elements.

**Policy/legislative changes under consideration:**

MAFF is considering several options to address the problems identified. Areas under consideration included biosecurity issues such as (1) better controls on the potential for contact between the general public and animals, e.g., double fences around outdoor paddocks (2) the current situation in which owners can also work as lorry drivers, and (3) location of casualty units in the vicinity of healthy animals.

MAFF also recognized the need to update its contingency plan. Furthermore, it is considering formation of an emergency team to deal with future outbreaks of CSF and other diseases.

**Commitment of MAFF personnel:**

The team was impressed by the level of commitment from MAFF personnel to the effort. Two particular examples can be cited.

The first involved the response of the GIS unit to a flood of the original GIS facility. This occurred in the basement of the headquarters building about 4:00 pm on the Friday afternoon preceding the APHIS team's visit on Tuesday. The flood affected the area in which the computers and servers were located and incapacitated most of the building's elevators. Only one freight elevator remained operative. Personnel from the GIS facility moved the entire operation to the eighth floor of the building (9 floors). The facility was back in operation, albeit in relatively cramped quarters, by Saturday morning. Phones were inoperative for four hours on Friday, which was characterized as the most difficult issue with which to deal.

The second example involved the dedication of personnel in the field operations office. Most of them were recruited for outbreak duty from their homes in other parts of the country. Because accommodations around Bury St. Edmunds were not adequate, many of them have moved from hotel to hotel as unreserved rooms become available. In addition, they have worked long hours and often as much as seven days a week.

Despite these problems, MAFF personnel were open with and hospitable to the team.

**Possible APHIS actions in response to the outbreak:**

On September 20, 2000, APHIS published an interim rule excluding East Anglia from the list of regions it considers CSF-free. APHIS limited this restriction to East Anglia because the UK has been CSF-free for 14 years and the rest of the country has remained CSF-free. This long history of disease freedom has not been characteristic of other parts of the world under consideration by APHIS for CSF regionalization..

One reason APHIS requested the opportunity to visit the UK was to assess whether the conditions of its interim rule were appropriate and to evaluate potential long-term actions. The team believes that the conditions specified in its interim rule were appropriate to the current circumstances. Furthermore, the team believes that, although the outbreak in the UK may not be over, it is being controlled adequately and disease is being retained within the region of East Anglia.

While there is currently insufficient information for APHIS to evaluate the appropriate long-term actions to take, as the outbreak could continue to develop or spread, several possibilities are under consideration. Once the comment period for the interim rule is over, APHIS could (a) finalize the rule and continue to exclude East Anglia from its list of CSF-free regions; (b) revise the rule to reflect altered circumstances which might arise in the future, (c) reverse the rule if APHIS considers that East Anglia has reestablished a CSF-free status, (d) extend the comment period if APHIS felt that it needed more time to evaluate the situation.

In the meantime, APHIS has volunteered to provide assistance if requested by MAFF. Temporary assignment of animal health technicians, veterinarians, or provision of GIS expertise would be helpful to the UK and would allow APHIS employees to gain valuable experience in an outbreak situation.

ANNEX 1

APHIS Team

Lisa Ferguson, Regional Coordinator for Europe, Team Leader  
Keith Hand, EP  
Ken Forsythe, CEAH  
Anne Goodman, REST

Meetings held:

September 18, 2000, 4:30 pm

American Embassy

Tom Hamdy, Minister-Counselor, FAS  
Steve Knight, Agricultural Economist, FAS  
Lisa Ferguson  
Anne Goodman

September 19, 2000, 10:00 am - 4:30 pm

Ministry of Agriculture, Food, and Fisheries

1A Page Street, London

James Scudamore, Chief Veterinary Officer, MAFF  
Nigel Gibbens, Deputy Veterinary Head of Team, Veterinary Policy: International Trade  
Fred Landeg, Veterinary Head of Team, Veterinary Policy: Exotic Diseases  
Rob Paul, Departmental Emergency Control Center (DECC) Manager at Page Street (title applicable to epidemic - otherwise, Divisional Veterinary Manager [DVM], Preston Animal Health Divisional Office)  
Steve Knight  
APHIS Team

September 20, 2000, 10:30 am - 3:00 pm

Control Center, Bury St. Edmunds, East Anglia

Theresa Philips, Regional DECC Manager in Bury St. Edmunds (title applicable to role in epidemic - otherwise, DVM, Leicester Animal Health Divisional Office)

Control Center Staff

David Mouat, Deputy Head of Team, Veterinary Policy: Exotic Diseases (accompanied group from headquarters)

Jorgen Westergaard, EC  
Steve Knight  
APHIS Team

September 21, 2000, 10:00 - 11:30 am

Ministry of Agriculture, Food, and Fisheries

1A Page Street, London

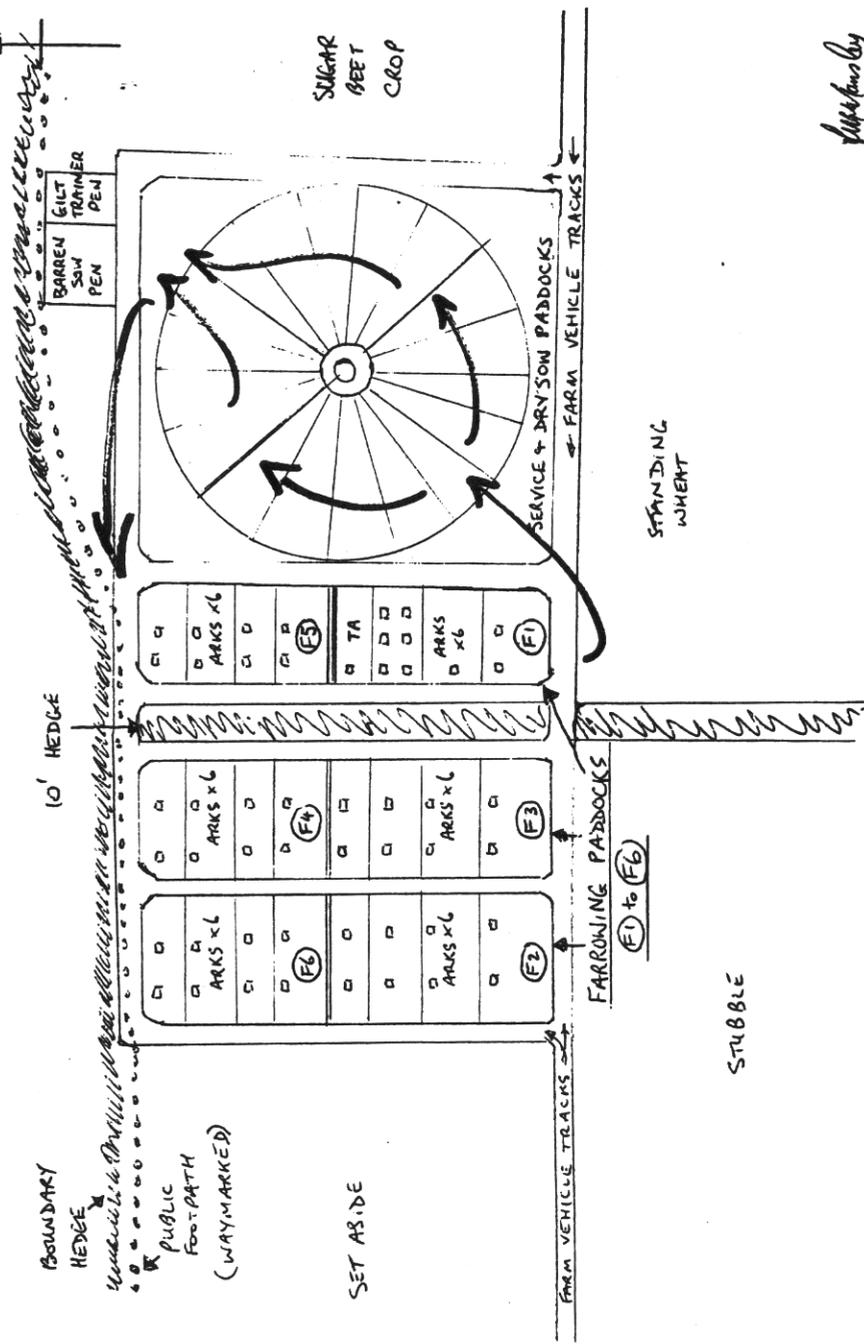
Martin Atkinson, Deputy Chief Veterinary Officer (Services)  
Robin Bell, Veterinary Head of Team, Veterinary Policy: International Trade

Nigel Gibbens  
Fred Landeg  
Jorgen Westergaard  
Tom Hamdy  
Steve Knight

Draft prepared by Anne Goodman  
September 29, 2000  
Revised October 4 and October 6, 2000

# ANNEX 2. ANNE

SF 2000/02 - DIAGRAM OF OUTDOOR UNIT



10/1/00

BOUNDARY HEDGE  
PUBLIC FOOTPATH (WAYMARKED)

SET ASIDE

STABLE

STANDING WHEAT

SERVICE & DRY SOW PADDOCKS

FARRROWING PADDOCKS (E1 to E6)

FARM VEHICLE TRACKS

FARM VEHICLE TRACKS

BARREN SOW PEN  
GILT TRAINER PEN

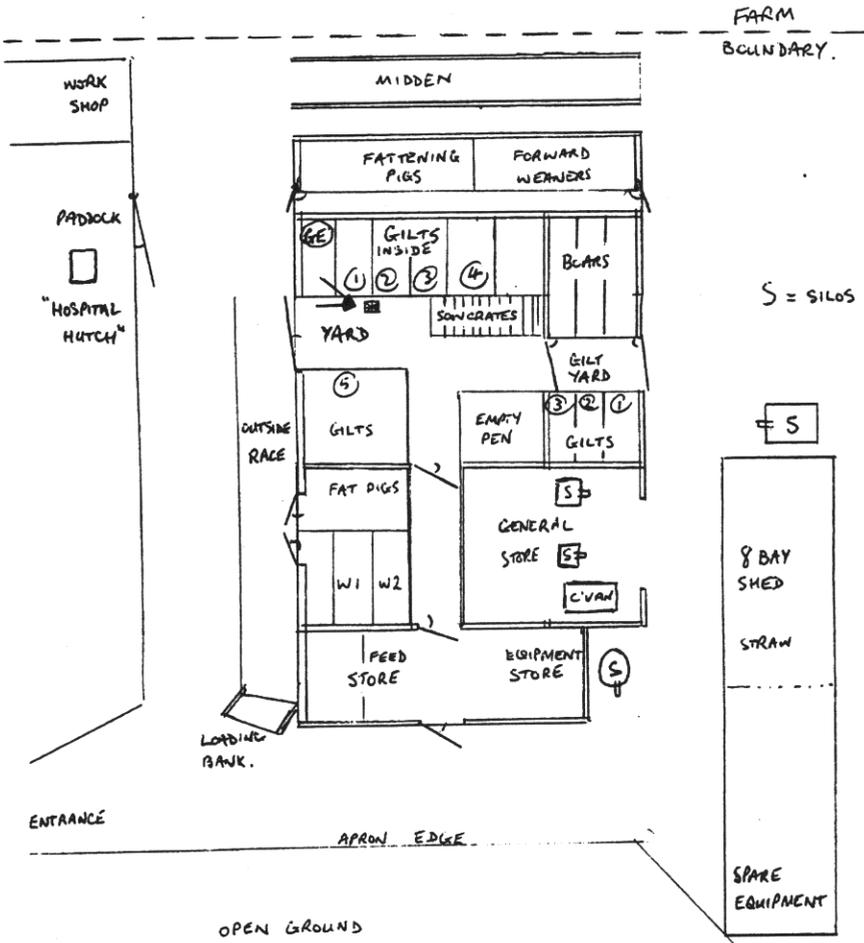
SUGAR BEET CROP

10' HEDGE

ARKS x6  
E6  
E5  
TA  
E4  
E3  
E2  
E1

SF 2000/02 - DIAGRAM OF FARM BUILDINGS

OLD BUCKENHAM.



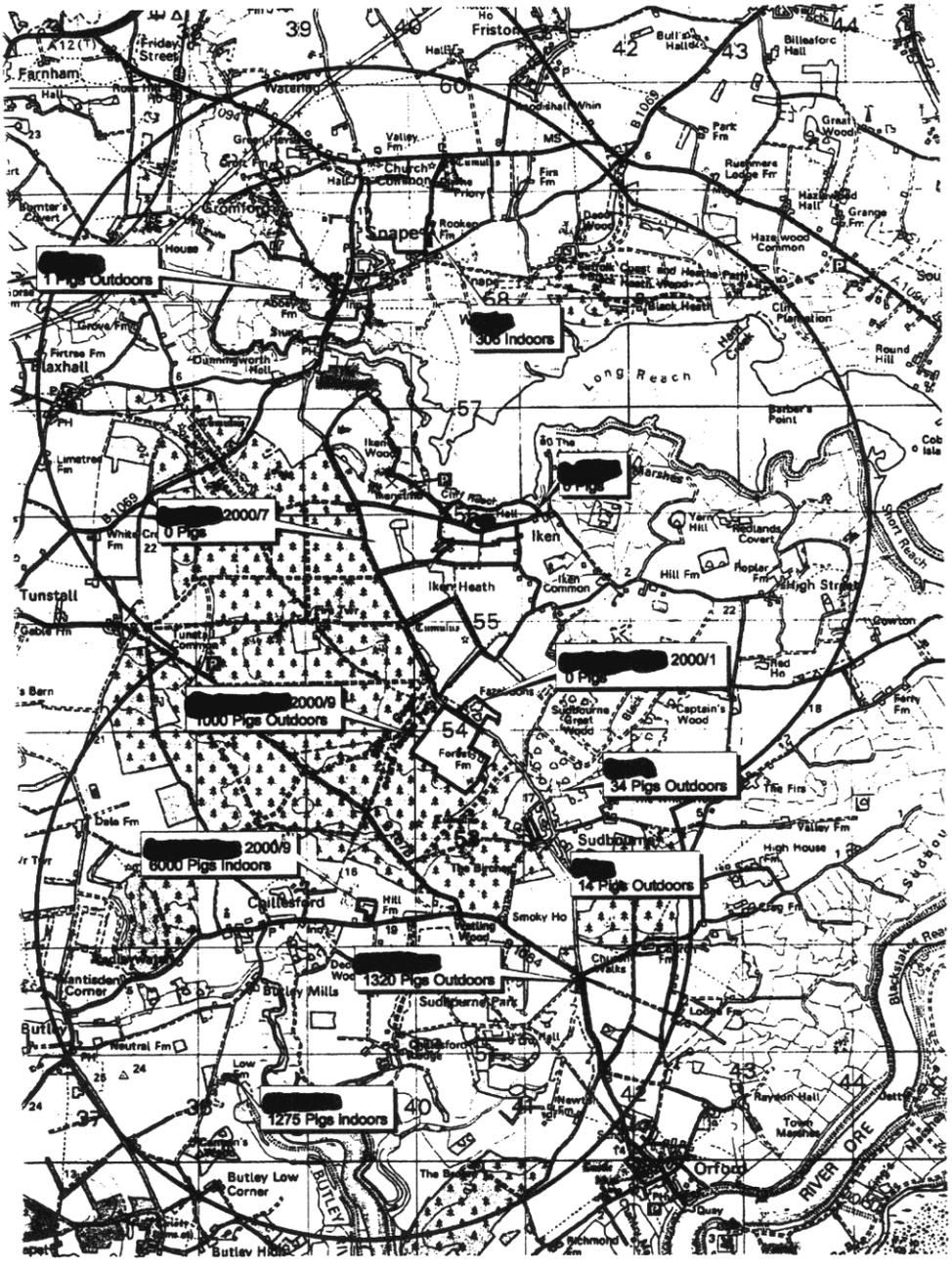
ANNEX 3.

*Handwritten signature*  
18/8/00



ANNEX 5

Holdings Found During Field Patrol Around Facons Bottom - 2000/1





# ANNEX 7

Locations associated with

Swine Fever in East Anglia

Publication Date: 20/09/2000  
Bury St Edmunds Swine Fever Emergency Centre  
GIS Team

