CHAPTER 3
HMG'S RESPONSE: JULY 1995 – OCTOBER 1998

3.1 Introduction

3.1 To assess the response to the emergency by HMG and by other key bodies, it is important to understand the arrangements for administration and disaster response in place when the eruption began and how these developed and changed over the period since 1995. Annex 3 describes more fully the organisational arrangements in the UK, regionally and in Montserrat, and the shifts in delegations and responsibilities, particularly between 1995 and 1998.

3.2 The elected GoM was responsible for most normal areas of Government activity in Montserrat. The Governor had responsibility for external affairs, defence, law and order, the public service and, since the financial crisis of 1989, international financial regulation. Disaster preparedness was the responsibility of the Chief Minister. The Governor helped to fund the 1995 National Disaster Action Plan, which envisaged that the Governor would take the lead in an emergency in directing the National Emergency Organisation and supervising the Emergency Operations Centre.

3.3 The FCO had primary responsibility for the administration of the then Dependent, now Overseas Territories (OTs). The Governor of Montserrat was responsible to the West Indies and Atlantic Department (WIAD). Supervision and advice on external affairs, civil order and financial matters for the Caribbean Dependent Territories had been delegated to the Dependent Territories Regional Secretariat (DTRS), based in Barbados (see Figure 3).

3.4 The Overseas Development Administration (ODA) (since May 1997 the separate DFID) was in 1995 part of FCO but with its own budget and administrative structure. Within ODA the British Development Division for the Caribbean (BDDC) was responsible for the provision of development cooperation in the Caribbean. The heads of BDDC and DTRS had, in effect, dual key arrangements for commitment and approval of development aid.

3.5 ODA's Emergency Aid Department (EMAD) was responsible for approval and supervision of ODA's response to rapid onset disasters. EMAD assistance would normally be for a maximum of 6 months. Projects lasting beyond 6 months would be the responsibility of BDDC.

3.6 The complexity of this set of institutional arrangements implied some unclear areas of responsibility and a fragmentation of authority. There was no contingency planning on how the FCO and the then ODA would manage an emergency in an OT in circumstances which raise difficult issues of governance and risk management as well as all the detailed practicalities of emergency response. Ad hoc arrangements had to be put in place and this was done reactively as the eruption progressed. There were 4 closely related stages in HMG's response.

3.2 Initial crisis: July - September 1995

3.7 HMG's crisis response, as coordinated on-island by the Governor, in contingency planning by MOD personnel and in assistance by ODA, were prompt and appropriate to the highly uncertain situation (Annex 2, paras 2.3.5-16).

3.8 The Emergency Operations Centre (EOC) was quickly activated. Work focused on key areas of scientific assessment of risks, and planning for the evacuation and support of people moved from their homes. Within days the scientific monitoring and assessment capability on-island had been increased but opinion among scientists ranged widely from scepticism about the risk of a major eruption to concern that a full explosive eruption might happen within weeks. In these circumstances, officials planned for worst case scenarios requiring evacuation - at least temporarily - to the north and possibly off-island.

3.9 The Governor established a regular framework for consultation and decision-making, involving weekly consultations with the Chief Minister and visiting senior scientists. The Governor also initiated an immediate Evacuation Plan exercise, with the involvement of MOD personnel in the region following military exercises. Accommodation would be in public buildings and in tents. US tents and bedding were airlifted in and emergency rations stockpiled. Plans were made for emergency hospital facilities. Other requirements were identified by the military and arrangements for providing them set in train. EMAD in London played a key role in guaranteeing the funding. Over 6000 people were temporarily evacuated in July-August and returned to their homes in early September.

3.10 The crisis was successfully weathered, albeit with specific problems that reflected the lack of preparedness. Temporary evacuation – on and off island – had gone smoothly. Montserratians had themselves contributed considerably to easing the situation by their own voluntary movement off-island.

3.3 Waiting on the volcano: September 1995 - June 1997

3.11 During this period the volcanic situation deteriorated but the pattern was one of periods of intense volcanic activity followed by quieter phases. The perspectives of scientists, Montserrat politicians, officials and people were often inconsistent and changing. Right up to the catastrophe of June 1997 many Montserratians assumed or hoped for a rapid return to life centred on Plymouth. Up to the end of 1996, successive Chief Ministers and other elected Members of LegCo were concerned to avoid actions that might damage business expectations and so jeopardise the possibility of a rapid return to normality. British officials more quickly abandoned expectations of a return to normality. As early as September 1995, the Governor was the first to propose improving infrastructure in the north. From April 1996, when Plymouth and most of the south of the island was again evacuated, British officials did not expect reoccupation of the evacuated zone in the foreseeable future. The responsibility of HMG

officials in DTRS and London was to prepare for a worst-case scenario, which might involve evacuation from the whole island. But this role tended to make it seem less worthwhile to invest in anything other than the most immediate emergency facilities and to reinforce, some argued, the case for waiting and reacting to events.

3.12 Scientific monitoring and risk assessment capacity on the island was stepped up during this period, but this was done in an ad hoc way, with funding initially on a short-term basis.

3.13 The third evacuation of Plymouth and the south in April 1996 involved the relocation of 7,000 people. This highlighted the need for a programme to address immediate social needs and infrastructure improvement in the north of the island. Under a Voluntary Evacuation Scheme agreed in April, with the aim of relieving pressure on limited accommodation in the north, Montserratians who made their own way to the UK could stay for two years. A £25m aid package over 2 years was announced in August. By June 1997, very basic health, shelter and social assistance were provided to evacuees. HMG had also begun to fund, albeit slowly, infrastructure - jetty, roads, water, electricity, hospital - necessary to permit a substantial part of the population to live temporarily in the north. However, housing needs were not effectively addressed and no assistance was provided to those leaving the island. The strengthening of FCO and ODA's emergency management capacity on-island also proceeded slowly (see paras 8.2-8.4).

3.4 Volcanic crisis: June - September 1997

3.14 On 25 June, large pyroclastic flows led to the deaths of 19 people in exclusion zones and the zone of exclusion was extended (and its definition simplified), putting greater pressure on remaining facilities in the north. The airport and Plymouth port were closed. Emergency ferry and helicopter services were financed by DFID. Search and rescue helicopter operations were involved.

3.15 In London a special Task Force under DFID chairmanship was formed to co-ordinate responses to the crisis, with the Secretary of State for International Development taking the lead in reviewing the situation. HMG adopted the lower risk strategy of supporting those wishing to remain on-island and assisting temporary settlement in the UK and within the Caribbean region. A £6.5m emergency housing scheme was announced in July 1997 to provide homes for up to 1,000 people in the north.

3.16 Further intense volcanic activity in July and August destroyed part of Plymouth and caused a further extension of the Exclusion Zone. This, together with growing concern about the health situation in the buffer 'Central Zone', which included most of the remaining villa and potential office accommodation, brought the crisis to a head. DFID prepared a programme for assisted evacuation to the UK, consulting other UK government departments. It also offered assistance to evacuees elsewhere in the Caribbean. A full reassessment of the health situation, to be validated by the involvement of the Chief Medical Officer (England and Wales), was also agreed.

3.17 In August the three insurance companies announced the withdrawal or non-renewal of cover, the Montserrat Building Society suspended operations, and Barclays Bank ceased on-island operations. The continuing viability of an on-island population became in doubt because of direct pressures on accommodation, uncertainties over schooling, especially at secondary level, and the collapse of the private financial sector. For many, the choice was between assisted relocation to the UK or remaining in Montserrat but dependent on relief or facing very high living costs, indebtedness for destroyed or inaccessible assets, and no insurance or job security.

3.18 There was an unequivocal commitment on the part of HMG to sustain as long as was reasonably safe the option of people remaining on-island. In September 1997 a crisis programme of actions to support occupation in the north and for subsequent reconstruction was agreed between GoM and HMG, and included:

- Emergency investment and technical co-operation to ensure maintenance of essential facilities, including healthcare, education, utilities, and communications.
- Accelerated action on construction, including an immediate housing programme, upgrading the hospital at St John's and the construction of new temporary Government HQ.
- A soft mortgage scheme to be launched by December 1997 for those wishing to construct homes and for small-scale enterprise development.
- Re-establishing a fixed-wing air link.
- Joint preparation within 6 months of a Sustainable Development Plan (SDP) for infrastructure and community needs to be implemented jointly over 5 years.

3.19 These actions and the contractual arrangements for implementation have formed the basis of much subsequent HMG assistance. There were also significant improvements in management and the use of scientific advice.

3.5 Moving from emergency to reconstruction and sustainable development

3.20 Since the crisis action plan was agreed in September 1997 there has been a gradual shift from emergency measures to a more systematic plan of reconstruction focused on a safer northern zone.

3.21 The precise point at which the balance of HMG's efforts shifted from crisis management to rehabilitation is difficult to pinpoint. The December 1997 scientific assessment only indicated that it was sufficiently safe to continue to occupy the north. In July 1998 the scientific assessment confirming that magmatic eruption had halted and DFID's commitment of £75m funding over 3 years, in June, indicate that this threshold had been crossed by then. DFID and then FCO established simpler direct administrative arrangements for Montserrat and subsequently for the other Overseas Territories. EMAD phased out its involvement in Montserrat by early 1998. However, DFID continued in a crisis management mode effectively for the whole of 1998 through the centralisation of funding decisions in

London with ministerial approval of levels of spending that had previously been delegated to its Montserrat office. The Sustainable Development Plan (SDP) was broadly completed by July 1998 and jointly accepted in November. A Country Policy Plan (CPP) for 1998-2001 was formally signed in January 1999. Measures to support the settlement of Montserratians in the UK became normalised and the interdepartmental Montserrat Action Group, established in August 1997 and chaired at Ministerial level from November 1997, stopped meeting in November 1998. The start of reconstruction is too recent to be evaluated except as a process.

3.6 Resources

3.22 Up to March 1998, DFID had spent £59m in emergency-related aid, of which around £53m was additional expenditure, allowing for previous aid projections. In July 1998 DFID committed an additional £75m up to 2001. (Annex 9 provides a detailed breakdown of DFID spending on Montserrat.) Projected HMG expenditure will be at least £160m over six years, taking into account additional expenditure in the UK on relocating Montserratians. That is equivalent to £2600 per person a year, based on a pre-eruption population of 10,000 or over 80% of the 1994 GDP per capita. For a comparison with these considerable sums, the loss of GDP by 1997 was over 40% and the likely total capital loss, including real estate, is estimated as up to £1bn, most of it only partially recoverable or uninsured.

3.23 There was a considerable increase in HMG expenditure as the crisis escalated: some £30m. was spent in the first 23 months up to June 1997 and a further £40 m. in the following 16 months with subsequent planned expenditure of c£25m. a year. In 1997/98, Montserrat was the sixth largest recipient of DFID bilateral assistance. Such a substantial cost was to be expected because of HMG's responsibility in light of a small OT being unable to insure or make provision against such an extreme loss and the associated social assistance. Because of Montserrat's OT status, non-British external assistance has also been extremely low relative to the scale of the crisis. The pattern of expenditure has also changed through the crisis from largely emergency aid (two-thirds in 1995/6 but less than 10% in 1998/9) to budgetary assistance and, especially since 1997/8, development project aid to replace infrastructure and fund reconstruction.

3.7 The components of HMG's response

3.24 Since 1995 HMG's response has concerned almost every aspect of Montserrat's social and economic life and administration. As well as FCO, DFID as the primary source of financial assistance has been particularly closely involved. The Ministry of Defence and most other government departments have also contributed to aspects of the response, on and off-island. The evaluation has looked particularly at the effectiveness and efficiency of certain key aspects of the response as follows:

- Disaster-preparedness for the volcanic emergency prior to the eruption and scientific monitoring and risk assessment (Chapter 4).

- Actions to protect lives and safeguard pubic health (Chapter 4).
- The provision of accommodation, food vouchers and education (Chapter 5).
- Selected emergency engineering and investment projects (Chapter 6).
- Measures to sustain and revive the private sector and address problems of financial regulation (Chapter 7).

CHAPTER 4
RISK MANAGEMENT: SCIENTIFIC MONITORING AND PROTECTING LIVES AND HEALTH

4.1 A reactive strategy

4.1 From July 1995 when the eruption began, the strategy adopted on Montserrat was to react to changing risk levels as they were identified. This is in contrast to immediate withdrawal to areas likely to be safe except in the case of an extreme cataclysmic event (the strategy adopted on Guadeloupe in 1976). Only when full-scale evacuation to the north became unavoidable from July 1997 onward did complete withdrawal happen. HMG's policy was that people would be supported in continuing to occupy the island as long as there was a viable safe area. This accorded with the determination of most of the population to remain on-island and of their political representatives to continue their pre-emergency lives as normally as possible.

4.2 This reactive strategy places enormous importance on scientific monitoring and risk assessment and it imposes special problems in emergency planning, preparedness for evacuation and other associated measures that would be necessary in cases of more extreme eruptions or with complete withdrawal. This chapter considers HMG's response in terms of disaster preparedness, risk assessment, emergency planning operations and public health. Annex 4 provides more detail on scientific monitoring, advice and input into risk assessment and policy. It also describes the main scientific bodies involved: the Seismic Research Unit (SRU), the Montserrat Volcano Observatory (MVO) and the British Geological Survey (International) (BGS(I)).

4.2 Disaster preparedness

4.3 The procedures in place in 1995 were not adequate to ensure that any increasing volcanic risk would be sufficiently well anticipated and then effectively monitored.

- Until the first eruptions in 1995, the SRU's monitoring was limited in scope and follow-up analysis. SRU was insufficiently proactive in advising the Government of possible, and then likely, increased volcanic risk between 1989 and 1995.
- The Wadge and Isaacs Report, commissioned by the Pan Caribbean Disaster Preparedness and Prevention Project (CDPPP), which highlighted the risks to Plymouth, made no impact on authorities responsible for disaster preparedness or scientific monitoring for Montserrat.[5]
- The Disaster Action Plan prepared with FCO funding following Hurricane Hugo, had virtually no scientific input and effectively ignored volcanic hazard.

[5] Wadge, G. and Isaacs, M.C. 1987. *Volcanic Hazards from the Soufrière Hills Volcano, Montserrat West Indies.* A Report to the Government of Montserrat and the Pan Caribbean Disaster Preparedness and Prevention Project. Reading: Department of Geography, University of Reading.

4.4 There is no simple explanation for this lack of preparedness. Hurricanes were a frequent and more immediate threat in the region. Seismic monitoring and volcanic preparedness appear to have had a relatively low priority. Prior to the eruption, disaster preparedness was largely an activity within the Chief Minister's Office. The effects of a volcanic eruption were potentially so serious economically and socially that those in elected public office on Montserrat were prepared to ignore some of the implications until it became impossible to do so. The failure of FCO and ODA and their regional divisions in volcanic preparedness had three sources:

- lack of channels for ensuring relevant scientific information (such as the Wadge and Isaacs study) would be taken into account;
- no-one had substantial separate responsibility for all aspects of disaster preparedness;
- the culture of the regional divisions of FCO and ODA (BDDC and DTRS) was to be responsive to proposals from regional bodies; but regional bodies were giving inadequate funding priority to volcanic hazard preparedness. Millenium

4.3 Scientific monitoring and risk assessment

4.5 The slow build-up of volcanic activity exacerbated the position over time. Risk situations evolved which would have been unacceptable had they developed at the outset; the slow build-up led some people to expect more in the way of precise timing predictions than was possible and long periods of slowly escalating, or apparently minor, activity led some Montserratians to ignore advice/instructions (leading in one instance to the tragic deaths of 25 June 1997).

4.6 The SRU had a mandate to maintain a volcano surveillance and early warning system for Eastern Caribbean islands. It reacted immediately to the initial eruption in July and, within its limited human and technical resources, engaged in intensified monitoring and risk assessment. Senior SRU scientists continued to play an important role in directing and staffing the Montserrat Volcano Observatory (MVO) but, from early on, SRU became progressively displaced as the main effective monitoring and assessment body, first by the United States Geological Survey (USGS), and then by UK agencies which became increasingly involved.

4.7 The MVO has played a key role in the emergency, evolving from a loose association of scientists and volcanologists in July 1995 to an organisation with a management structure and formalised procedures by autumn 1996, and in 1999 into as a statutory body of GoM. The BGS(I) has managed DFID - funded monitoring during the emergency, initially under a range of small contracts and later under a two-year contract. The involvement of scientists from British universities was crucial for supplementing the expertise provided by SRU and BGS(I). With leading scientists from many other countries, UK scientists evolved and enhanced capability at MVO to anticipate developments of the volcano and so to mitigate risks and protect life.

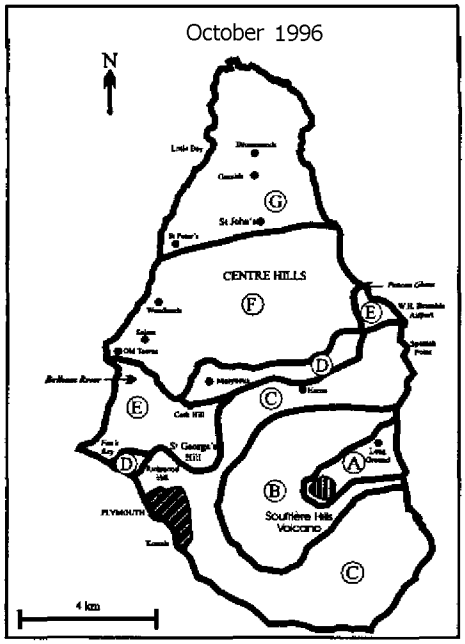
4.8 It is a common misconception that the job of scientists at the MVO was to predict the timing of volcanic events. The central process was to use scientific monitoring and understanding to anticipate activity and areas of potential impact, and then, using risk assessment techniques, to make recommendations to mitigate risks. The monitoring team developed new procedures for deriving the best scientific judgements and then translating these into communicable risk assessments, alert levels and risk zone maps. Monitoring included visual observation involving daily helicopter flights. Occasionally satellite data was available and provided valuable supplementary information.

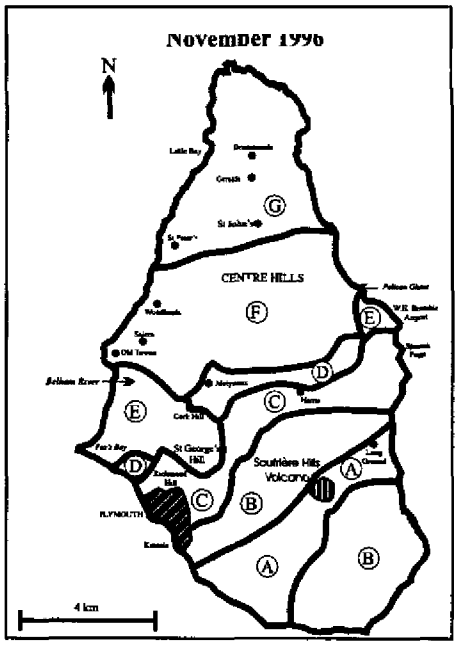
4.9 A micro-zonation system (Figure 4-page 28) was developed and proved successful in late 1996 and early 1997 in keeping risk zones as narrow and precisely located as possible. The zoning maps, which involved trade-offs between risk and short term socio-economic advantages, were changed frequently in response to changing circumstances. After the fatalities of June 1997, the escalation in volcanic activity threatened a wider area. The zone maps, which were relatively difficult to communicate and enforce, were therefore replaced by a simple tripartite division of the island into an Exclusion Zone, a safe zone, and an intervening Central "buffer" Zone.

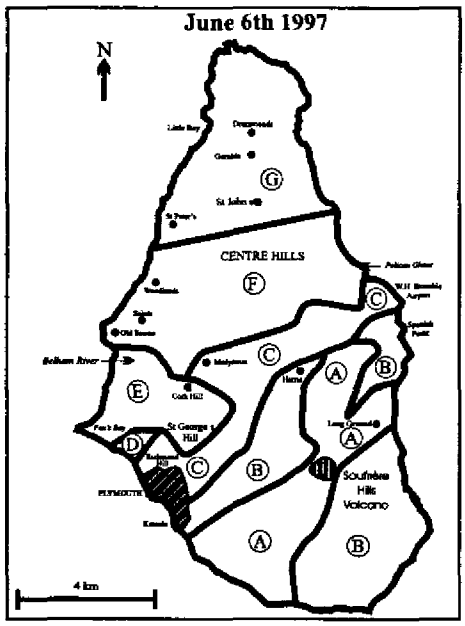
4.10 In July-August 1997 MVO scientists organised the first informal wider elicitation process which resulted in the assessment on 14 August which indicated the risks of continuing to occupy Salem. Meanwhile between July – December 1997, HMG was also re-examining the ways in which scientific advice was provided. In December 1997 the first of a series of formal jointly prepared six-monthly scientific assessments was produced. These would in future be a major input to policy decisions.

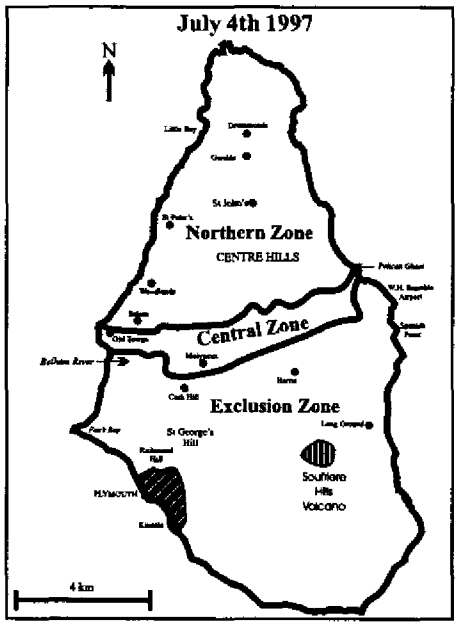
4.11 The Chief Medical Officer (England and Wales) and HMG's Chief Scientific Adviser (CSA) were also involved in reviewing advice. Both CSA and CMO endorsed advice that the level of volcanic risk was low enough to allow continued occupation of the north, but because of the health risk from ash they recommended in the strongest terms that everyone, especially children and asthmatics, should leave the Central Zone (Figure 4). The authorities' approach was to tell people what the risks were and leave them to make their own decisions about whether to leave the central zone. All residents were made aware of the volcanic hazard and health risks and provided with advice on minimising health risks on a day-to-day basis. The choice between using emergency regulations to exclude people or giving them advice on safety and health risks was closely linked to the slow pace in making adequate and timely provision of housing and other facilities in the north.

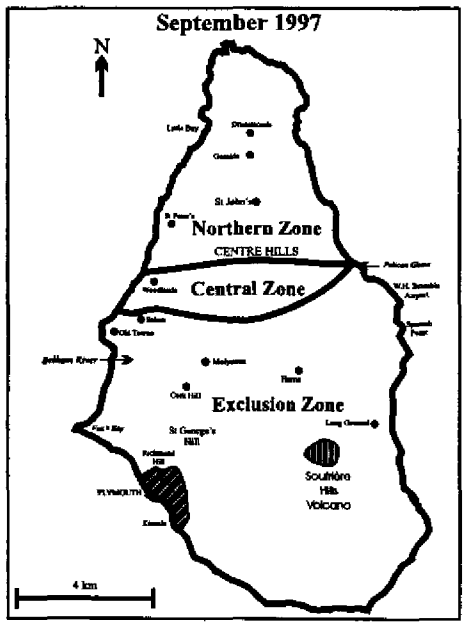
4.12 Several MVO Chief scientists have commented that they repeatedly signalled to HMG agencies the need to strengthen monitoring and assessment capability but without result. Procrastination by HMG agencies was perceived but, in terms of senior scientific personnel, there were real problems of people simply not being available. It is surprising that DFID on Montserrat was not actively engaged in monitoring the Observatory and its needs. The long delay in processing the BGS(I) two-year contract was also unhelpful, but mitigated by good day-to-day relationships. DFID did meet the costs of the Observatory (about £2.6m.) and the costs of the helicopter (£1.2m.). Monitoring was not constrained by the setting of financial limits but short term contracting in the initial stages presented problems of management for BGS(I). MVO did and is doing a commendable job for Montserrat and HMG in informing its analyses of risk.

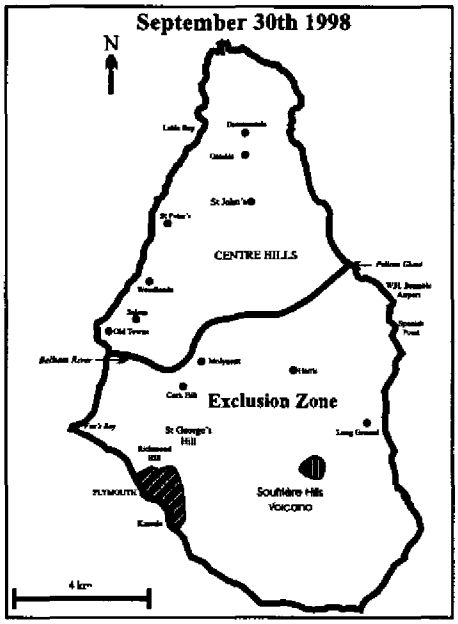












Risk decreases from A to G (earlier maps) and advice related to each area changes according to contemporary Alert Stage.

4.13 Scientists also played a crucial, if initially reluctant, role in public information. In the phase July – September 1995, there was criticism of the lack of information on the eruption and its implications, which increased uncertainty and made it more difficult for people to plan how to respond. From October 1995, scientists were encouraged to be directly involved in public information and to encourage relocation they began to provide reports on radio and TV and to speak at public meetings and meetings with groups of people living in dangerous areas . This public information activity has probably contributed directly to saving lives and creating a calm social situation, despite the emergency.

4.4 Building science into emergency policy

4.14 The Office of Science and Technology guidelines on the use of scientific advice in policy suggest that:

'Once a potentially sensitive issue has been identified, departments should consider how to access the best available scientific advice. They should ensure that they draw on a sufficiently wide range of the best expert sources within and outside government.' (OST, 1998:p11 – see footnote 3)

4.15 Prior to the eruption the head of SRU advised only GoM's Chief Minister, with HMG indirectly involved. This was inappropriate. Once the potentially extreme risk was recognised, HMG progressively availed itself of the best scientific advice from within and outside government, and supported the development of the MVO to provide adequate monitoring and as a centre for complementary research. However, arrangements were *ad hoc* and short-term until BSG(I) was given a 2-year contract in September 1997. HMG has also brought together a sufficiently wide range of expert advice including the CMO and the CSA and has organised this through periodic formal elicitation meetings to provide a clearer and consistent basis for policy making.

4.5 Protecting lives: emergency planning and operations

4.16 The Emergency Department (ED), formerly the Emergency Operations Centre (EOC) has been the key institution in Montserrat managing the response to the volcanic eruption, with a key role in relief coordination – managing evacuation, supplies and the requisitioning of buildings, the administration of shelters and the distribution of emergency supplies. EMAD funded emergency supplies and equipment and provided technical support – largely successfully, though there were, inevitably in a crisis of this kind, some poor decisions. By August/September 1997, ED had 57 staff although only 4 of them were key professionals. The police and the Montserrat Defence Force (MDF) also had crucial roles in emergency operations. The police were involved in warning of and assisting in organising evacuations, and in manning check posts around the exclusion zone. The MDF supported the police operations, and helped in the construction of wooden buildings as shelters and temporary schools.

4.17 Vulnerability analysis, looking at which areas and buildings were at risk, and identifying which people were at risk and ought to go into shelters, has been difficult. MVO provided spatial vulnerability information that was initially too complex for the administration to use to best effect. And there were issues about whether politicians and groups would accept the implications of the advice being offered about risks. On the whole the interface between MVO and GoM was reasonably successful. However, with the benefit of hindsight, some decisions were over-optimistic with regard to the possibilities of continuing safe occupation of Plymouth and important facilities including the airport, and health risks in the Central Zone.

4.18 The first emergency plan was prepared within 11 days of the emergency, with the help of British military personnel in the area. This plan provided the basis for the programme of supplies and site preparation that made possible the first successful evacuation and identified the emergency investments that would be required in the event of further relocations. Further plans both for on-island and off-island evacuation were prepared involving other Caribbean islands. Emergency planning was strengthened by contracting the Emergency Logistics Management Team (ELMT) in 1996 to provide continued support.

4.19 Scientists believe they should have had a more substantial and formal input to contingency planning in the period up to June 1997 than was the case, a view endorsed by this evaluation. In the case of the airport in May-June 1997, for example, MVO scientists had warned that there was a serious risk involved in maintaining airport facilities. In the worst case scenario, the time available between onset of a catastrophic event and likely impact on the airport could have been as little as 90 seconds. When the authorities decided to keep it open, scientists and airport staff felt bound to assist. MVO personnel were stationed at the airport to provide confirmation of immediate safety. On 25 June 1997, the pyroclastic flow reached within 100 metres of the airport and everyone was evacuated safely (Figure 2-page vi). But it was only a late minor physical change at the summit of the volcano, which, perhaps fortuitously, caused the flow to follow a longer and less direct route.

4.20 The GoM and HMG were not at all prepared for the communications and public information roles that managing the emergency would necessitate. There is scope for learning from this experience, in other OTs and elsewhere in the region in both contingency planning and disaster response. Those responsible for managing the emergency were untrained and inexperienced in what was required in terms of types of communication and skills. The efforts made by EOC/ED to learn during the emergency are impressive. Through radio, community meetings, small informal discussions, simulation exercises and a monthly newsletter, all residents were informed of risks and almost all of them were persuaded to accept relocation as necessary despite the immediate high personal costs. The commitment, at an individual level, of ED/EOC, Police and MDF was also impressive.

4.21 Perhaps the most controversial aspect of the emergency has been the provision of accommodation for those evacuated. The scale and unpredictability of the emergency required the commandeering of churches, schools and other public facilities for emergency accommodation – with important

implications for education. Progress in enabling people to leave temporary shelters has been slow and raises questions about the effectiveness of the emergency housing programme.

4.6 Safeguarding public health

4.22 Health service management, prior to the crisis was essentially a GoM responsibility, with ODA providing limited technical support and substantial capital investment. People enjoyed a relatively high standard of health care and services. As HMG became progressively more involved because of the emergency, ODA advisers came to play a more important role, and the effective demarcation of responsibilities between them and GoM grew increasingly unclear. From early in the emergency HMG brought in specialist advice on volcanic health issues. Later, in September 1997, the CMO led a review on the health implications of the eruption. These specialists, interacting with DFID advisers, played an important role in shaping the response in terms of protecting lives and ensuring health. However, owing to the paucity of relevant data, there remains uncertainty regarding the long-term health effects of inhalation of fine ash.

4.23 Following early ash falls on Plymouth the hospital was transferred to temporary premises at St John's School. A continuing area of disagreement between GoM and HMG has been about the level of facilities to be provided at either an upgraded or new hospital. There were also differences of view within HMG on the latter issue and related problems of coordination. The PUSS (FCO) announced support for a new hospital in mid-June 1997, when DFID had already decided to support only upgrading.

4.24 Throughout 1996/97 conditions at the St John temporary hospital were very unsatisfactory. From August 1997, the conversion of St John's into a permanent facility began promptly. But the delay in its basic upgrading was unsatisfactory. With the benefit of hindsight it is obvious that a new hospital would have taken so long to complete that the initial priority should have continued to be the rapid upgrading of conditions at the St John's site. The success of protective and health safeguarding measures during the emergency can be attributed to the:

- timely evacuation of the population away from the immediate physical, and potentially lethal, volcanic hazard
- emigration and evacuation of a large proportion of the population off-island
- high level of social order shown by the shelter population
- comparatively good infrastructure established in the north of the island.
- dedication of health personnel.

4.25 The measures taken by HMG, the GoM and the Public Health Officer with respect to the health needs of the population were, in general, timely and appropriate and contributed to a good outcome. Communicable disease surveillance was promptly initiated. Accessible primary and secondary health services, including off-island evacuation, were maintained throughout the crisis, and steps were taken to investigate the possible hazard from ash, gas and volcanic emissions, and to protect the population from

their effects. Primary health care services were expanded and developed, in step with the changing needs of the displaced shelter population. The requirements of special needs cases were largely met through primary care and off-island evacuation. Coverage was generally good, with limited exceptions.

4.26 In technical terms, HMG's response was delayed or otherwise unsatisfactory in three areas:

- a delay of approximately 6 months in upgrading the temporary facilities at the St John's hospital which exposed patients and staff to very inadequate conditions. Although there was no incident leading to an adverse outcome, facilities fell below the people's reasonable expectations and contributed to difficulties in retaining health staff.
- limited delays in establishing a clear system for providing public advice and protection against the health risk from ash.
- a failure to make adequate provision for the health of psychiatric cases.

4.27 The continuing problem of exposure of the population to ash, in particular in Salem and other reoccupied areas, may need further action by DFID and the GoM in public education. Finally, there is the challenge of reorganising the health system to take account of the reduced population and the changed pattern of health needs.

4.28 The reasons for the delays and omissions are to be found in the complexities of HMG's management system and the system of GoM, as discussed in Chapter 8.