Arson Prevention Bureau

Fire Investigation in Scotland

www.arsonpreventionbureau.org.uk

An Arson Prevention Bureau publication by the **Association of British Insurers**

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Fire Investigation in Scotland
An independent report by Dr Allan Jamieson, The Forensic Institute

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ISSN 1354-0734

EXECUTIVE SUMMARY

This independent study was undertaken by the Forensic Institute on behalf of the Arson Prevention Bureau to look into current fire investigation arrangements in Scotland and make recommendations for improvements in the future. It draws on the findings of a number of previously published studies and consultations as well as interviews with a wide range of stakeholders, in particular the Scottish Fire Service, criminal justice system and fire policy makers. It analyses the strengths and weaknesses of the current system and proposes a model for the organization, management and delivery of fire investigation in Scotland. The current debate on delivery of fire investigation in England and Wales should be informed by these conclusions.

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The key findings of the report are:

- There should be a single agency responsible for fire investigation in Scotland, which should be within the Fire Service;
- This should embrace both fire investigation and analysis of data, using standardised methods based on scientific rather than legal criteria;
- Local first tier specialists could be integrated into this structure to provide career progression;
- Recognised professional standards should be developed which meet the progressive specialisms of each tier of fire investigation, with the national Fire Investigation Team assisting in the delivery of training to Fire and Police Service personnel;
- Fire investigation should be underpinned by a significant research programme which should form part of a wider UK and international research function;
- Community fire safety and Integrated Risk Management activities should be informed by the fire investigation analyses and research programme;
- This specialist resource should support the prosecution of the criminal investigations of the Police and Procurator Fiscal, in a manner similar to the role of the pathologist.

FULL LIST OF RECOMMENDATIONS

Organisation

- One agency should have responsibility, and the resources, for the identification of the cause of fire whether accidental or criminal. (That agency should be the Fire and Rescue Service)
- Having allocated responsibility for the investigation of fires to an agency, the agency must have a Fire Investigation Team with the required range and depth of expertise.
- The most effective use of fire related data will follow the creation of a national unit specifically to analyse fire-related data.
- This unit should be part of the agency responsible for investigation (i.e. Fire Service).
- The relatively small number of complex fires and the associated difficulty of developing and maintaining operational expertise in the investigation of such fires necessitates the creation of a national Fire Investigation Team within the Agency.
- The strategic management of the Team should include representatives from Crown Office, the Procurator Fiscal Service, fire scientists, insurers, HSE, and the Scottish Executive.
- For the immediate future, the Fire Investigation Forum in Scotland should be expanded to include a wider range of expertise and considered as a management or advisory board with the function of developing these proposals, monitoring the performance, and setting the operational and training standards for the national Fire Investigation Team.
- Solid links, including data sharing, should be established between the Team and the Arson Control Forum in England and Wales.

Purpose

- A clear, comprehensive, unambiguous statement of purpose for the collection of fire-related data is created to inform the design of forms and the statistical analysis of the data.
- The remit of the Fire Investigation Team could use aspects of that already in use for the Arson Control Forum of England and Wales.

Policy

- The Police and Crown Office commit, at senior level, to full engagement with all aspects of fire investigation and in particular with those aspects related, or potentially related, to criminality.
- A Total Quality Management approach should be adopted for the entire implementation of the national strategy.
- A benchmark costing model should be adopted and implemented locally and nationally to assess trends in fire-related costs and the effectiveness of prevention strategies.
- Active steps are taken to analyse and derive value from the collected data from fire investigations.
- The number of incidents attended, type of investigator (FIO, scientist etc), and level of expertise deployed, in addition to the potential demand for such expertise, should be assessed with some urgency to inform the strategic decision on funding fire investigation.
- A scientific definition of fires, that is distinct and unaffected by the legal definitions, is used as the primary recording and statistical tool to record and analyse trends in fire-related incidents.
- Better systems are necessary to translate the lessons learned from fire investigation and fire-related data analysis into operational improvements.
- A fire science research strategy should be developed and funded to ensure that what resources are available for research are efficiently and effectively used.
- Research opportunities should be identified, and if necessary pursued, by the agency in conjunction with other organisations.

Resources

- The agency tasked with investigating fires will require adequate resources and authority.
- The outsourcing of all or any of these functions should be considered on a Best Value basis.
- A costed and assessed publicity campaign should be devoted to fire prevention, particularly deliberate fire-raising, which must be considered preventable.
- Data on the detailed cause, or most likely cause, of fire and any likely prevention measures should be collected.

- Key Performance Indicators should be developed and applied at each level of service delivery, from overall organisational aims to individual performance.
- The Team should be directly resourced to provide funding for research specifically targeted at the aims of the Team.

People

- The current practices of unassessed training and simple personal endorsement of people as expert Fire Investigators should be replaced by a minimum qualification standard and evidence of Continuing Professional Competence (CPC).
- A continuous proficiency testing scheme for Fire Investigators should be developed and implemented.
- The Fire Service should engage with the main bodies involved with the development of forensic scientific standards in fire investigation.
- The national investigation team should promote, deliver, or contribute to fire investigation training provided by others such as the Scottish Police College or the Scottish Fire Services College.

STAKEHOLDER SURVEY

The current major stakeholders in this process include; Procurators Fiscal, Police, Fire Service, Health & Safety Executive, insurers, and Local Authorities. Another, and the largest, stakeholder are the public. For all of these stakeholders, an unplanned fire almost always represents a drain on resources.

Procurators Fiscal have, inter alia, a statutory interest in fires where life has been endangered, serious injury or death has resulted, and fires where some person is suspected of deliberately initiating it. The Police have a duty to investigate deliberately started fires. The Fire Service have a duty to extinguish and prevent re-ignition of fires. However there is no statutory duty on the Service to establish the cause of a fire.

For every fire incident, there are a potentially large number of interested parties outside government and the public services, who may consider that they have a reasonable requirement for data from the individual occurrence to form larger datasets. These include:

- insurers
- environmental groups
- farmers
- motor industry
- domestic white goods industry.

It is unlikely that all of these constituencies' demands can be met for practical reasons in recording the details of fires.

However, the low profile accorded fire investigation and its potentially beneficial effects have prevented the public, including business sectors, as the largest stakeholder beneficiary from developing sufficient awareness to move the political process or see fire prevention as a priority in their own lives.

This study proposes that the purposes of fire investigation are:

1. Identifying public safety issues;
2. Identifying criminal activity.

And, the benefits of fire investigation are;

1. Improved public safety (including protection from willful fire-raising);
2. Improved prosecutions;
3. Reduced social, economic and environmental losses.

Most fires, especially those termed secondary (grass, rubbish, unoccupied premises), receive little attention from expert investigators. The connection between these ostensibly trivial incidents and more serious problems is evidenced in two ways.

Firstly, deliberate fires are directly related to other criminal activity in that one study found that 13% of deliberate fires were created to cover another crime, the third most common motivation for deliberate fire-raising.[i] This figure rose to 41% in the 16-20 year-old age range. Secondly, there is growing evidence that those responsible for deliberate fire-raising develop their activities from 'easy', low-cost targets to higher cost targets. Most criminal activity thrives when the chance of detection is low.

Overall, fire affects a large number of people and organisations directly and indirectly.

The main project examining fires and fire investigation in Scotland in recent years has been the Joint Thematic Inspection of the Police Service and Fire Service[iv]. Although making reference to public safety issues, the report on the Thematic Inspection focused primarily on deliberate fires. Within that report, it is estimated that up to 35% of fires are started deliberately. However, the full value of fire prevention, of which investigation is a major component, can only be realised if all fires are considered.

Detailed discussions with and surveys of Fire Service and Police stakeholders in the present study suggest that fire investigation is beginning to be taken more seriously within the Fire Service, but is accorded a low priority by the other principal agencies involved in the investigation of criminal instances of fires. **It is therefore recommended that the Police and Crown Office commit, at senior level, to full engagement with all aspects of fire investigation and in particular with those aspects related, or potentially related, to criminality**.

FIRE AND FIRE-RELATED LOSSES IN SCOTLAND

The need for data

It is clear that there is confusion over the recording and analysis of fire-related data; this is acknowledged in the Thematic Inspection. Two relevant exercises are on-going within the Office of the Deputy Prime Minister (ODPM). One is a 'cost of fire' exercise and the other a review of the FDR1. (The FDR1 is the Fire Damage Report used by the Fire Service to record the details of every incident they attend).

The beginning of any process of data collection should consider the purpose for which the data is being collected. This does not seem to have been explicitly considered or discussed either in the Inspection or elsewhere. Improvement in public safety, in addition to loss reduction, is a benefit derived from knowing how fires start and develop. There is apparently no explicit agreement on the purpose for which fire statistics are recorded and we consider this a major defect in assessing the utility of any scheme to collect such data. **It is therefore recommended that a clear, comprehensive, unambiguous statement of purpose for the collection of fire-related data is created to inform the design of forms and the statistical analysis of the data**.

The cost of fire

> *"The cost of fire-raising to the Scottish economy is .....estimated to be as high as £188 million a year, of which more than £70 million is in Fire Service response costs alone."*[iv]

This figure is likely to be considerably different from the actual amount, given that it is based on extrapolations of unvalidated datasets subject to the same inaccuracies as detailed above. This was recognised by the authors. Previous estimates put the cost of fire in Scotland at up to £188m a year. However, this top line figure hides a number of possible inaccuracies and potentially misleading data. The choice of costs to include are a matter of considerable debate with, as yet, no agreed formula.

Most researchers calculate costs of fire using financial averages of various sorts (time in attendance, insurance cost) and multiply these by a volume number derived mostly from FDR1 data. Each of these input data is subject to wide variation and method of calculation. As an example, in a comparison of data for one year using different methods to calculate costs, one researcher calculated the total cost of fire as £970m by one method and £1,100m by another[ii]; a variation of about 13%. The same report also has a 64% difference in calculated values of losses sustained using different methods applied to domestic fires.

A 'Cost of Fire' project was recently completed by the ODPMii. A number of reports have attempted to assess these losses, but each concludes that further refinement is required. That report recommended the adoption of a system of categorising costs into three groups; anticipation, response, and consequence. Costs in anticipation are those associated with fire protection and prevention measures such as fire doors and sprinkler systems, and insurance administration. Costs in response are mainly those associated with the Fire Service, although it could be argued that there are many other direct response costs associated with agencies such as the Police and Local Authorities. Costs as a consequence are the losses; property, life, injury, and business opportunity. Again, this is likely to err on the low side if it ignores investigative and emergency reparative costs.

Current data collection

Fire Service data is primarily collected on two forms, FDR1 (Primary Fires with identified economic loss) and FDR3 (which records details of so-called Secondary Fires such as wasteland, grass, rubbish). In an attempt to ensure consistency of reporting the forms are limited to a specific set of responses.

A review of the FDR1 is currently underway within the ODPM. This is in its early stages with, to date, the output being the production of a remit for a consultancy project on changes to the FDR1. However, this deals only with Fire Service data. The mismatch between the data recorded by the Fire Service and the Police Service is significant;

> *"In 2000/01 the Fire Service attended 39,000 fires they consider had been started deliberately. Over the same period the Police service recorded 2,403 crimes of fire-raising".*[iv]

The disparity between these figures is a major source of concern and difficulty when considering the extent of wilful fire-raising and the total cost of fire incidents. In fact, the situation worsens when analysing trends in activity.

> *"Over the last decade the Fire Service has experienced a net increase in deliberate fires whilst Police service statistics have shown no comparable trend".*[iv]

Far from it, Police statistics show a downward trend in criminal fire-raising, in direct contradiction of the Fire Service data. The different number of wilful fire-raising incidents recorded as crimes by these agencies, terminology notwithstanding, is surprising given the explicit recommendation from the Scottish Executive that,

> *"If the cause of the fire is suspected by either party to be of non-accidental origin, or where crime is alleged by any person the fire will be recorded by the Police as a crime in accordance with Scottish Executive Justice Department counting rules"*[iv]

Resolving discrepancies

a) Wilful fire numbers

The reasons for this apparent discrepancy may be found in the purposes for which the different agencies are collecting data. This supports the need for a clear statement of purpose for this data. For example, the Police are interested in criminal activity that may involve fire as a secondary event (e.g. burning of a stolen vehicle), the Fire Service specifically in fire incidents.

It is clear that the Police definitions of fire-related incidents will change as the legal definitions and crimes change. This has already resulted in an abrupt change in recording practice in 2001 that makes pre-change statistics almost impossible to compare with those post-change statistics. Although improved cooperation and agreement between Police and Fire Service on counting conventions was identified as a need by the Thematic Inspection there appear to be only sporadic efforts at local level to develop such schemes (e.g. Fife).

Whilst the economic cost of fire and fire-related losses may have inherent and expected difficulties, the number of instances of fires may appear less prone to interpretation. The reality is that there remain ambiguities in the recorded instances of fire. For this reason **it is recommended that a scientific definition of fires, that is distinct and unaffected by the legal definitions, is used as the primary recording and statistical tool to record and analyse trends in fire-related incidents**.

b) Losses

The two major difficulties estimating fire losses, as distinct from numbers, are the lack of a consistent recording method among agencies such as the Police and Fire Service, and the absence of an appropriate costing method. Attempts have been made previously to devise a method for calculating the cost of losses (e.g. [ii],[iii]). There is no doubt that there is a very large range of possible values between the most pessimistic and optimistic assumptions used in these analyses. These difficulties were also identified in the Joint Thematic Inspection[iv].

Despite that report recommending that, "ACPOS and CACFOA make formal arrangements for the sharing of data and intelligence", little apparent progress has been made on this. The need for consistent and reliable data has been recognised and requested elsewhere,

> *"If the inter-agency approach is to be successful in the UK, one of the challenges for those carrying out the thematic reviews and the respondents must be to encourage and properly equip those carrying out investigations to compile accurate and meaningful information. This will further both community fire safety and arson prevention strategies".*[x]

A satisfactory refined economic model remains elusive. However, a pragmatic solution would at least deliver comparative information that can be useful in policy setting. Arguably, in assessing fire-related losses it is at least as important to assess the trends in losses. Determining whether they are increasing or decreasing will inform whether prevention strategies are effective. For this purpose, any costing using a model that even broadly measures fire-related cost could be performed against which future costs could be measured. This costing would be useful as an index rather than an absolute value and would adopt a costing model that is as objective as possible to allow valid comparisons to be made period-on-period. However it should be noted that this approach would still have shortcomings in comparing costs and potential benefits from interventions with other policy options facing government in unrelated and competing areas for funding, such as regeneration, transport, education, health etc. There should therefore be some assessment of the likely under-estimate such an approach would result in.

The benchmark should be based on locally collected data and this allows inter-locality (e.g. district and region) and inter-period (e.g. quarterly and annually) comparisons to be made. **A benchmark costing model should be adopted and implemented locally and nationally to assess trends in fire-related costs and the effectiveness of prevention strategies**.

c) Fatalities

One set of fire-related data is less subject to inaccuracies; in Scotland in 2001 84 people were killed or fatally injured by fire (all but 2 in domestic premises), and over 1,800 people sustained fire-related injuries. For comparison for every 7 people killed on the roads, 1 person was killed by fire. Each death is reckoned to cost £1.14m; for fires, this amounts to just under £96m per year for death alone. In contrast to the increasing number of deliberate fires, the number of road deaths, although high, was the lowest since 1954 and showing a continuing downward trend. This is arguably a consequence of the priority afforded by government in advertising, researching, legislating, investigating, and enforcing improved road safety. **A costed and assessed education and information programme should be devoted to fire prevention, particularly deliberate fire-raising, which must be considered preventable**.

This programme could build on existing work led by the Scottish Fire Investigation Forum to pool data from FDR5 forms (recording Fire fatality) centrally. It is unclear how the data, once pooled, is currently used. **It is recommended that active steps are taken to analyse and derive value from the collected data from fire investigations**.

d) Causes

Knowing the number of fatalities and value of fire losses is only part of the answer to the general question of what action should be taken to reduce them. Losses will generally be either preventable or not, although it is arguable whether there are any totally unavoidable fires. In any event, knowing the degree to which prior preventative action could reduce the risk of fire is an important factor in the cost-benefit analysis proposed in the Inspection and could make a potentially large contribution to public safety. But to expend resources on controlling the losses most resistant to prevention measures is neither efficient nor effective. The factors contributing to the ignition and the spread of fire should therefore be analysed with a view to determining future prevention strategies.

Data on the detailed cause, or most likely cause, of fire and any likely prevention measures should be collected. The FDR1 Form uses percentage to express the degree to which assessments were certain or contributors to the cause, which implies a level of accuracy that is simply not there. This particular section was referred in the Scottish Fire Services Circular.

"Services are advised not to indicate a percentage likelihood of cause where a supposed cause is 'deliberate', and to base any information given under 5.1.c. solely on factual evidence."

This recommendation was most likely made to avoid harmful cross-examination of officers in court. **The assessments would yield better and more defensible data using a five-point scale e.g. unlikely, possibly, 50:50, likely, almost certainly**.

Improving use of data

The organisational distribution of statistical collection and the inability of Police and Fire Service to benefit from the timely reporting and analysis of incident data could mitigate speedy recognition and resolution of criminal and/or public safety problems. Therefore data that informs the degree to which the fire would have been avoidable, and the means of avoidance or risk minimisation, is necessary. There is no explicit provision for this in the current FDR1 or FDR2 forms (the latter only enables the data in the former to be amended) used by the Fire Service to record fire data. The advantages of identifying prevention measures is obvious in terms of public safety in addition to the reduction of economic loss. This requirement to improve the data extracted from individual incidents has implications for the training of personnel assessing the cause of fire. Additionally, timely statistical information on fire trends must be made available to relevant agencies and incorporated into Integrated Risk Management plans. As in many other areas of fire investigation practice, the needs have already been identified. Even with regard to so-called secondary fires, the Scottish Executive have said,

"It is important that the Police and Fire Services have standing arrangements to locally share information about these incidents, that emerging trends and patterns are identified and, where appropriate, positive steps are taken to reduce the number of such incidents. In the absence of such standing arrangements the procedures set out for primary fires should be followed".

Better systems are necessary to translate the lessons learned from fire investigation and fire-related data analysis into operational improvements, such as better targeting of resources, and improved training of investigators and firefighters.

Advancing science

This need is only part of a wider requirement to improve knowledge in the field called fire science. Despite the large financial and human losses attributable to fires, there is a dearth of funding for research into the cause and prevention of fires relative to most other academic disciplines. This is evidenced by the fact that, in Scotland, there is only one academic department devoted to fire science. This is at the University of Edinburgh. Any scientific discipline can only thrive with an underpinning of properly controlled and executed research. In fire science, there is the added value that such research provides in providing valid, scientifically supportable evidence to the court.

"Research into deliberate fire offending has not advanced to parallel the increasing problem, largely due to low arson detection rates".[i]

A fire science research strategy should be developed and funded to ensure that resources available for research are efficiently and effectively used.

CURRENT PRACTICES AT FIRE SCENES

In general, the procedures to be followed at fire scenes involve attending Fire Service personnel assessing whether there are any suspicious features of the scene. The general approach was outlined in Scottish Fire Service Circular 7/2001.[v] If criminal activity is suspected, or if there is a fatality, the Police are informed. Once the Fire Service have fulfilled their statutory responsibility to 'save life, extinguish and mitigate the effects of fire' under the control of the senior Fire Service officer, they may then initiate their own investigation.

The Thematic Inspection[iv] recommended the development of Memoranda of Understanding (MOU) to clarify the roles of the various personnel at fire scenes and improve inter-agency cooperation. Although most regions have developed these, many remain unsigned documents. There is no national model for an MOU and local arrangements can still be created under some of these regional agreements.

Sequence of management and investigation

Initial control of the fire scene is by the Fire Service, although the Police may be peripherally involved in creating a wider 'safety' cordon to protect the public rather than the scene. This function is performed by uniformed rather than Criminal Investigations Department officers. However in the event of suspicious circumstances or fatality, control of the entire scene is transferred to the Police once the fire is extinguished.

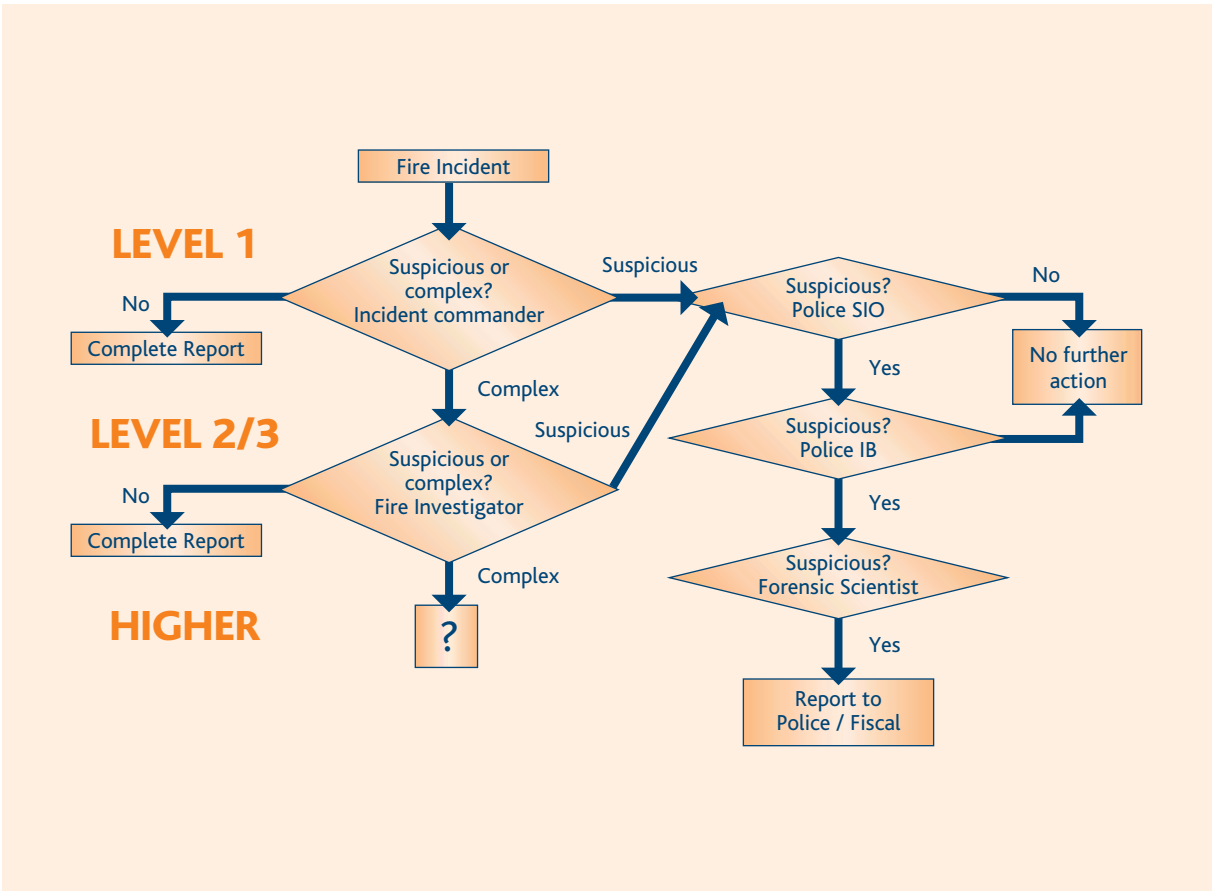
The attending CID officer will then make a further assessment and may call out Police Identification Bureau staff to conduct an examination of the scene. A decision is then made regarding the necessity to call a forensic scientist to the scene. Only four of Scotland's eight Police Forces have forensic science laboratories. Although formal arrangements exist between Forces providing forensic laboratory services to those who do not, there are also some ad-hoc requests that depart from these. For example, Lothian & Borders' scientists have attended scenes for Dumfries & Galloway, and Fife constabularies. These ad-hoc arrangements are generally applied during normal working hours and do not apply to emergency out of hours callout.

There are thus two principal routes that fire investigation could follow:

- If there are suspicious findings or a fatality (or potential fatality) the Police assume the investigative role insofar as the suspicions are confirmed;
- Otherwise the Fire Service assume the investigative role.

The choice of whether to escalate the investigation to one requiring a higher level of expertise is made on the judgement of the most senior investigator at the scene at the time. Figure 1 illustrates the decision hierarchy and the complexity at each level of the investigation of an incident. Skills within Police Identification Bureaux vary.

Figure 1: Flow diagram of current investigative choices and complexity



Investigation procedures

Some Services (e.g. Lothian & Borders) have published procedures for their personnel investigating fires that do not involve the Police. These tend to focus on the administrative processes involved in compiling and filing of reports of incidents and are based on local experience and expertise rather than conforming to any model of best practice. Overall, there is a recognition of the need to have better practices in place to ensure that fire investigation is conducted in an efficient and effective manner. Despite this, there have been few concrete developments, and there remain issues around decision processes and statutory responsibilities. In particular, authority in terms of expertise for decisions relating to suspicious findings and the need to escalate an inquiry, and the access to expertise when the incident is not suspicious but may have a public safety interest. Associated with any issue of expertise is the topic of training, qualifications, and continuing competence of the experts. This is unresolved.

Deployment of specialist investigators

The investigator in the first instance is usually the most senior Fire Service officer (the incident commander). There are no defined qualifications or training requirements specific to fire investigation that any of the likely first-attenders at a fire are required to have.

Some Fire Services have defined the circumstances under which their Fire Investigation Officers (FIOs) are called to incidents. Some of these are objective, for example "Fires at which Fatalities Occur"[vi], whereas others require a degree of judgement, "Fires at which attendance is requested by the Police" (the judgement being whether to call the Police).

There are no data available on the numbers or proportion of fires that fall within the categories that require a FIO. The categories described in Figure 1, or any similar complexity categorisation, are not used by either Services or Forces as descriptors. Historically, fires have been termed as either primary or secondary. Neither of these terms necessarily describes the complexity of the incident.

One document produced recently in Strathclyde provides a more detailed description of roles and responsibilities at fire scenes . Strathclyde Fire Service have the only full time specialised Fire Investigation Unit in Scotland and this protocol is therefore specific to Strathclyde. The document nevertheless is explicit about the role and responsibility distribution between the Police and Fire Services with regard to investigations;

> *"the Fire Service currently has neither a statutory duty to investigate the causes of fire, nor any prescriptive legal authority to do so. Fire officers carrying out investigations therefore operate under the umbrella of Police powers. This mechanism permits their specialist knowledge to be made accessible to Police and Procurators Fiscal, and to add value to fire-related enquiries."*

In this regard, the comments contained in the recent White Paper[viii] are relevant;

> *"3.33 Linked to this, the powers of inspection under the Fire Precautions Act 1971 and the Fire Precautions (Workplace) Regulations 1997 will be re-enacted but they will be augmented with* ***new powers for fire officers to investigate the cause of a fire in premises****.*
>
> *"3.34 It is envisaged that this will be a simple power of entry to premises, including domestic premises. This power will be subject to conditions and controls to ensure that it is carried out sensibly. Our general policy aim is that the powers of inspectors should match, as closely as possible, the powers of Health and Safety Executive inspectors under section 20 of the Health and Safety at Work Act 1974. Fire officers should be able to take samples, equipment or articles and carry out any tests necessary for the purposes of investigation. This will require fire officers to be able to enter premises as quickly as possible after a serious fire so that a detailed investigation can be carried out".*

The access of the Fire Service to facilities to 'carry out any tests necessary for the purposes of investigation' are limited and mentioned elsewhere in this report. This is an issue of resources that has been identified previously. The White Paper is not clear on the method to be followed when a fire scene investigation becomes a

criminal investigation. The duty to decide on and perform analyses would clearly conflict with the same duties placed on the Police when seeking evidence for a criminal investigation.

Defining complex fires

The competence of individuals to assess and make decisions that may involve considerably complex considerations involving matters of public safety, operational requirements, and legal requirements will require attention. This is compounded by managerial considerations of how many officers with what level of skill will be required to service the need.

> *"Few Brigades appear to have taken up the 1988 recommendation to appoint at least one full time fire investigation officer. Nor has the report recommendation that the investigation and prosecution of arson be given high priority in the allocation of Police resources produced an adequate response. Resources have not matched the rise in deliberate fires".*[x]

The lack of data on the complexity of fires, rather than their size as determined by number of pumps attending, and the expertise deployed to investigate the fires, has made an estimate of the number and qualities of the Scottish requirement for fire investigators impossible. **A scientific definition of fires, that is distinct and unaffected by the legal definitions, should be used as the primary recording and statistical tool to record and analyse trends in fire-related incidents**.

Qualifications and training needs

Some FIOs have a defined training requirement (e.g. "attended and successfully completed a 2 week Fire Investigation Course at the Fire Service College, Moreton on Marsh"[vi]). Police officers attending scenes, and who assume the role of Senior Investigating Officer, have no qualification or training requirements with regard to fire investigation. Although the Thematic Inspection acknowledged the necessity for appropriate training of Fire Service personnel there was no mention of the specific training or qualification requirements for Police officers investigating fires. There was a strong suggestion that such issues were dealt with locally although no examples of such training or the outputs were given.

> *"Along with the courses delivered at the Scottish Police College, Forces often train their own staff commensurate with local needs and procedures. This training along with that provided at the college often involves working with other agencies such as the Fire Service and forensic scientists to improve investigative techniques."*

> *"... there is a question mark over the training and expertise of fire officers expected to make operational decisions and conclusions on the "cause of fire". HMIC and HMFSI feel Services and Forces must ensure that they can deliver a level of expertise in fire investigation commensurate with the demands placed upon them."*

In this regard, the role of the scientist and their role as experts in fire investigation was recognised by HMCIC and HMCIFS.

> *"The role of the forensic scientist in the investigation of fire-related offences is of great importance".*[iv]

This apparently crucial role of the forensic scientist in complex investigations has two associated issues; firstly, there is no defined training or qualification requirement placed upon the scientist at present. Secondly, availability of a scientist is at the discretion of the Police. This uncertainty is highlighted in Figure 1 as a query.

MEASURES OF EFFECTIVENESS AND EFFICIENCY

In this report effectiveness is defined as a measure of the degree to which a desired action is achieved, and efficiency the ratio of output to input. The purposes of fire investigation were identified at the outset to be;

1. Identifying public safety issues.
2. Identifying criminal activity.

Measures should monitor activity and trends, and be meaningful to practitioners and stakeholders alike in actually measuring key performance indicators (KPIs) directly related to achieving the purposes. **KPIs should be developed and applied at each level of service**

delivery, from overall organisational aims to individual performance. Caution should be exercised in resorting to ratios rather than absolute numbers.

Examples of relevant performance statistics are the number of;

a. Fire investigations performed at each complexity level.
b. Safety improvements identified.
c. Fires and fire losses (financial and human).
d. Wilful fire-raising events identified.
e. Charges brought against offenders.
f. Convictions secured (and numbers of these involving fire investigation personnel).

In undertaking this study it was notable that there is a lack of available relevant data to inform policy and strategy. Many of these are strategic data that the fire investigation, however successful, will only affect indirectly. Nevertheless they inform policy decisions in terms of the costs and benefits to society and government on the deployment of improved fire investigation resources.

By way of illustration, it is not clear how many investigations are performed at each complexity level or the costs associated with these. In 2001, the latest year for which numbers are available, less than 0.4% of wilful fires as recorded by the Fire Service, and less than 5% of criminal fire raising as recorded by the Police, resulted in a successful conviction (Table 1). It should be noted that 2001 showed a marked improvement in these figures against the trend of previous years. More data will be required to assess whether this is a real improvement, normal variation, or a recording idiosyncrasy.

Convictions and penalties

Table 1: Wilful and criminal fires, proceedings, and convictions, 2001

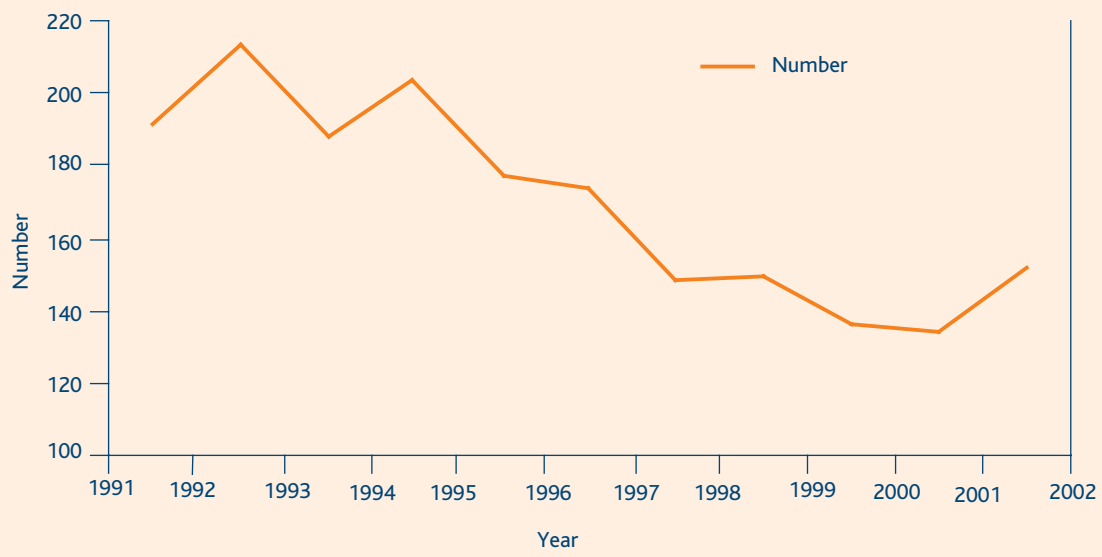
	Number of cases	Wilful fires % of total (39,000)	Recorded crime % of total (2,403)
Cleared up*	390	1.0	16.23
Proceedings	152	0.4	6.33
Convictions	119	0.3	4.95

* Using Strathclyde Police clear-up rate of 16.2% for 2000/1 (1,714, or over 70% of the total Scottish recorded crimes) extrapolated to the Scottish data. Percentages of wilful fires are rounded to the nearest 0.1.

It is noted that the clear-up rate for wilful fire-raising, using Strathclyde as an example, at between 16 and 20% is substantially below that for other group 1-5 crimes at 44-45%, offences against the person (assault, sexual assault, murder etc.) at 48-98%, and drugs at 98-99%. Whilst this may be a reflection of the difficulties of investigating fires, the effect on Police motivation to classify a fire as criminal when solve rates are a key performance indicator for Police should not be ignored.

Analysis of the penalties imposed for criminal fire raising in 2001 show that, of the 119 convictions 1 in 4 were placed on probation, 1 in 5 fined, 1 in 5 received custodial sentences, and 1 in 7 received community service orders. Five people were admonished or cautioned. There is a trend of decreasing convictions for fire raising between 1991 and 2001, although 2001 has an individual reverse of 13% on the previous year (Figure 2). This may reflect different recording practices.

Figure 2: Number of convictions for fire-raising in Scotland between 1991 and 2000



"the definitions attributed to different fires and their causes can be confusing and lead to inaccurate recording practices."[iv]

BEST PRACTICE AND BEST VALUE METHODS

The Local Government in Scotland Act 2003 places a duty on the Fire Service to deliver Best Value services. This is recognised in the Scottish White Paper[viii] which reiterates an earlier policy paper in stating, "an expectation of clear performance improvements aligned to achieving safer communities and efficiencies linked to the Best Value agenda".

Although Best Value is a Government initiative intended to assess service cost and delivery throughout public service, there has been no work done in Scotland on this topic in the area of fire investigation. The anecdotal reason offered for this was the small size and perceived peripheral nature of fire investigation. However, the Best Value initiative explicitly recognises some features that could bear on the measurement of the usefulness of good fire investigation.

For example, it was propsosed in the Implementing Best Value consultation that Best Value should;

- **"take a sufficiently long-term perspective**. Reviews will be unlikely to set targets that reflect best value unless they look far enough ahead to anticipate prospective changes in the demand for services and the means by which such services might be delivered." The impact of introducing better fire investigation and crime investigation as a consequence of these will only become apparent after the introduction of appropriate measures and continued data analysis.
- **"involve elected members**. Both executive and non-executive members have a key role in ensuring that Reviews reflect the strategic objectives and corporate priorities of the authority and focus on the perspective of actual and potential service users". No elected members are involved in any of the few fire investigation initiatives that exist in Scotland.
- **"seek advice from outside the authority**. Authorities with a track record of working with partners in the public, voluntary or private sectors recognise the benefits of involving them in the review process as an additional source of advice or as a sounding board for new ideas. Other external advice can be tapped by setting up expert panels or forums[sic]". Despite a large body of forensic and fire science expertise outside of Police and Fire Services, there is no fire investigation forum in Scotland that involves these.

The development of Best Practice has a direct bearing on the improving the effectiveness of fire investigations. It also has the potential to affect prosecutions and legal proceedings in general if practitioners are failing to adhere to best practice guidelines.

> *"While Her Majesty's inspectors will undoubtedly build on examples of good practice, it is equally important that local, regional and national structures are put in place to identify bad practice and failures. It is vital that lessons learnt are passed on".*[x]

These Best Value requirements are met within the model proposed in the final chapter of this report for the development of the Fire Investigation Service.

QUALITY MANAGEMENT TECHNIQUES

A widespread definition of quality is 'fitness for purpose'. As identified in this report, there has been a lack of strategic clarity on the purpose of fire investigation. This will inevitably hamper efforts to assess the quality of fire investigations at national level.

The situation is not improved as we look at operational investigations. The purpose of investigating a specific fire is usually clear, to establish the cause of the fire. However, there are no methods or procedures in place to assess the investigation of any specific fire or to sample a selection of incidents and assess the output. As part of any quality assessment, the definition of the purpose of the operation should be defined. Until this is done then there can be no assessment of 'fitness for purpose'. The lack of such a definition has already been alluded to above.

The Total Quality Management (TQM) philosophy is recommended in its basic form of;

1. Decide what is required;
2. Create systems to deliver the requirements;
3. Assess system performance; and
4. Improve the system.

This deceptively simple system has to a great extent been hijacked and overcomplicated, as demonstrated by the plethora of accreditation and standards systems emanating from TQM specialists. It nevertheless can, and should, be adopted as a model approach to creating, implementing, and measuring the desired improvements in fire investigation in Scotland. The scope of this exercise is beyond the current study. However, experience suggests that management of TQM initiatives should be tightly controlled to ensure that they do not become ends in themselves and that staff involved do not become disenfranchised either through an overwhelming number of quality initiatives (with accompanying acronyms and alienating language), or through an overwhelming amount of, essentially redundant, paperwork. The Forensic Institute has experience in developing appropriate systems. **It is recommended that a TQM approach is adopted for the entire implementation of the national strategy identified here**.

Components of this approach should include:

- A strategic Vision for Fire Investigation in Scotland.
- Policy setting out how the Vision will be achieved.
- Objectives conforming to the SMART model (specific, measurable, achievable, relevant, and timely)

Underlying this strategy, a TQM philosophy must include a proficiency testing scheme for investigators. However, proficiency testing is a priority that need not await the full implementation of the other recommendations in this report. **A continuous proficiency testing scheme for fire investigators should be developed and implemented**. This should probably be done in conjunction with other bodies outside of the Fire or Police Services.

SKILLS AND TRAINING

Fire investigation is a complex topic that has several levels of expertise applied. These levels have been defined as Screening, followed by four tiers of increasing complexity:

- Screening; initial identification of fire as suspicious and subsequent scene protection;
- Stage 1; basic investigation of simple fire;
- Stage 2; more complex investigation requiring additional knowledge;
- Stage 3; more complex, possibly multi-agency, investigation;
- Higher; complex investigation requiring scientific involvement.

These categories recognise the current personnel training and roles, and also the pragmatic fact that expensive, highly-trained staff cannot be sent to every incident. The investigative procedure must take account of this necessity whilst balancing this against the risk of missing a wilful fire-raising incident and any other crime associated with it, or of establishing patterns of accidental incidents. Sufficient knowledge should be possessed by each stratum of the investigating hierarchy to recognise when the scene requires more advanced skills. There are fewer complex fires than simple fires. There is a need to maintain the skills of fire investigators, particularly at the Stage 3 and Higher levels, to maintain and improve their effectiveness.

Meetings with academic fire investigators have identified the apparent lack of specialist training, in range and depth, within the Police and Fire Services. The Forensic Science Society are currently developing new qualifications with Fire Investigation being one of three disciplines piloting their new model. Centrex, the Fire Service College, the new version of the Sector Skills Council (which is developing the National Occupational Standard in Fire Investigation), and some universities, will be involved in developing these.

It has become clear during the project that there is a major cultural hurdle to be overcome in the Police and Fire Services on the importance of fire investigation.

> *"Senior fire officers involved in fire investigation normally attend a course at the Fire Service College in Gloucestershire. The course was revised in 2001 and has been extended from one week to two weeks. The content includes lessons on technical and practical aspects of fire-raising including sources of ignition, fire development and evidence gathering.*
>
> *Recent additions to the course include live fire incidents which students then have to investigate, and practical court sessions involving the presentation of evidence. Alternatively, external training contractors who deliver validated courses on fire investigation can also train officers to a similar standard.*
>
> *At a less senior level, firefighters and junior officers receive instruction on scene preservation and fire behaviour. Apart from this basic training on fire investigation there are no national training courses specifically aimed at increasing their fire investigation skills. Courses are provided by external agencies but Services generally only send more senior staff to them.*
>
> *Grampian Fire Service has just run an internal fire investigation course for all full and part-time operational personnel. However, HMIC and HMFSI found that this is the only course of its kind to be delivered recently, and many Services have not provided internal courses for some time. These Services acknowledged that a "skills-gap" was beginning to appear."*

There has been no evidence that this situation has changed in the last few years.

Even where training or qualifications are delivered there are no agreed standards of competence. The Institute of Fire Engineers offers a Diploma qualification. However, they recognise the difficulties in designing and delivering an appropriate training and qualifications system to fire investigators;

> *"Owing to our diversity, lack of commonality in working practices , procedures, and geographical spread, training standards and facilities are varied."*

The Forensic Science Society has provided Diplomas in Fire Investigation for some time. However, again recognising the wide range of skills required in fire investigation, these have been described as,

> *" set at a substantially higher level than would perhaps be considered necessary for the majority of fire investigations, but the qualification has a great merit for those investigators regularly undertaking the most complex and serious cases".*[x]

The Society are currently revising their standards and qualifications structure in a way that will recognise the range and depth of fire investigation skills and also attempt to integrate their qualifications with the National Qualifications Framework.

The search for agreement on the National Occupational Standards in Fire Investigation developed in conjunction with the Arson Control Forum have experience difficulty related to the scope of these. Nevertheless, the variations in training of Fire Service and other personnel involved in fire investigation has been recognised for a considerable time without apparent resolution.

> *" Training in fire investigation and the level of such training varies throughout the British Fire Service . Unfortunately the standards of such training varies from almost no input at all, to a comprehensive fire investigation department with training throughout the ranks".*[xiii]

In that paper, research discovered that most training in fire investigation for Fire Service personnel lasted about 2-3 hours. Only a few Services had staff whose training in this area exceeded one day. It also revealed that training was extremely limited, or non-existent, for Police and Scenes Of Crime Officers investigating fires.

The Council for the Registration of Forensic Practitioners (CRFP) has accepted fire investigators onto its register. However, the wide range and depth of expertise required in this area has already led to discussions about different levels of expertise for registrants. There are no published standards of professional practice for CRFP assessors to measure applicants against, and registration is therefore effectively by peer review. This is no different from most other forensic scientific specialties on the register, but must be seen as a current weakness in this system.

The Fire Service are hopeful that fire investigation will form a greater part of fire officer training and that specialist roles will receive improved forensic and fire science training using the improved qualifications framework.

Overall, there are a number of qualifications available for fire investigators. No single organisation has achieved a qualification structure that can match the identified categories of expertise required at fire scenes with their qualifications. The development of standards and the qualifications framework(s) that will follow from those are outwith the scope of any of the emergency services but rather fall within the scientific specialties. In order to deliver the strategy recommended within this document, which aims to create a professional, and continuous, career structure for fire investigators that is linked to other professional scientific activities. Therefore, rather than develop their own standards in fire investigation, **the Fire Service should engage with the main bodies involved with the development of forensic scientific standards**.

A NATIONAL STRATEGY

Many of the conclusions of this research on desired outcomes have been reached by other studies. However, few proposals exist for the integrated approach to the resolution of the identified problems. In drawing up a model for improved effectiveness and efficiency in fire investigation these identified needs have been regarded as central to the task. However, the solutions to some will only emerge with the implementation of the model.

There are two tightly linked components that comprise the principles behind the proposed model; assessment and improvement. Measurable improvement will only follow adequate measurement and assessment.

A single agency as a centre of excellence

The recent Scottish White Paper[viii] includes discussion of the creation of a Common Fire Services Agency. This study endorses that approach. **One agency should have responsibility, and the resources, for the identification of the cause of fire whether accidental or criminal**. Expertise in this area is distributed unevenly, and sometimes duplicated, across a number of agencies with lack of clarity in the boundaries between the responsibilities of each. Given that the Fire Service attend all fires, including those eventually shown to be criminally initiated, they are the logical agency to take this responsibility.

This would in no way compromise the Police responsibility for criminal investigation. It is important to understand that the introduction of a statutory duty on the Fire Service to establish, where possible, the cause of ALL fires, deliberate or not, does not compromise Police responsibilities. Police responsibilities have been summarised as;

"The Police service is responsible for the prevention and detection of crime and for reporting to the Procurator Fiscal any death that results from a fire. The Police are solely responsible for the direction and control of any criminal investigation into the cause of any non-accidental fire."

In fire-related incidents, the fire investigator will take a role similar to the pathologist or other expert supplying expert services to the Police. These experts act under the auspices of the Police, in the example of the pathologist, regarding the mechanics of the cause of death, but not who caused it. Similarly, the fire investigator will establish the cause of the fire, for all fires, within a similar statutory framework as the medic in establishing the cause of death, but not who caused it. The issue of criminality and the perpetrator remains a Police responsibility.

Although it is estimated that up to 95% of secondary fires are started deliberately, and are therefore most likely to be criminal acts, it would appear that less than 10% of these appear to attract the attention of the Police[iv]. If the Police were to investigate even a minority of these, it would place a significant new demand on their resources. Given that only four of the eight Forces have access to their own forensic analytical facilities, these new investigations would also impinge on the use and resources of the forensic science laboratories. They would also represent a significant cost to the customer Forces.

An issue to date in investigating all types of fire has also been the availability and ownership of expertise. Scientific and analytical resources are vested in the Police and are not routinely available to the Fire Service for non-criminal investigations. This proposal places that expertise wholly within the Fire Service and therefore also available to the Police in criminal investigations as experts in the same manner as other experts advising the Police in a range of areas.

Having allocated responsibility for the investigation of fires to an Agency, the Agency must have a Fire Investigation Team with the required range and depth of expertise. The logic of a Fire Service-based investigative team has been agreed by the Arson Control Forum in England and Wales.

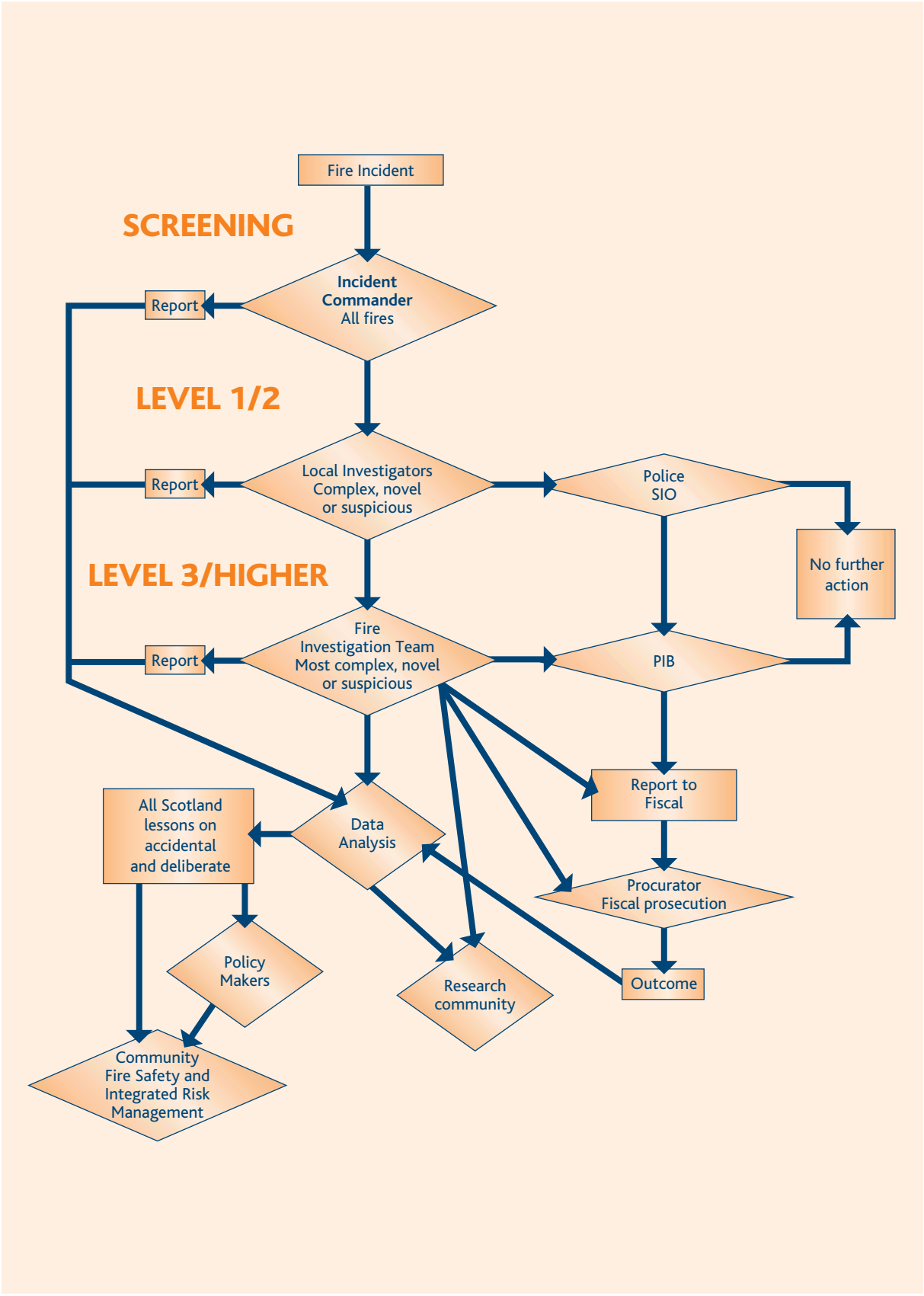
"The [Arson Control Forum] task group sees a need for a specialist fire investigation capability in the Fire Service".[xi]

A team with overall responsibility for fire investigation, similar to the Air Accident Investigation Branch (AAIB) of the Civil Aviation Authority and the Marine Accident Investigation Branch (MAIB) of the DfT, could operate within the Fire Service structure and have the same authority at fire scenes as the AAIB and reporting to the Procurator Fiscal. The purpose of the AAIB and the MAIB is "to determine the circumstances and causes of the accident with a view to the preservation of life and the avoidance of accidents in the future". Regardless of the agency investigating fires, it is easy to see how this purpose can be adapted for these investigations; "to determine the circumstances and causes of the fire with a view to the preservation of life and property, and the avoidance of fires in the future".

The relatively small number of complex fires and the associated difficulty of developing and maintaining operational expertise in the investigation of such fires necessitates the creation of a national fire investigation team within the Agency. The team would investigate all complex fires and could support local investigators in the investigation of other fires. Local investigators may be part of the national team or part of the local agency. The former allows career development opportunities for fire investigators.

"The processes and management of fire cause determination will need to be strategically planned to ensure quality outcomes from the use of efficient and effective inputs. [...] Our view is that utilising a team approach based on the one outcome will define the cause and behaviour of the fire and be the only accurate way of providing these answers".[xiv]

Figure 4: Flow diagram of the new model for fire investigations



Defining the agency's scope

The remit of the Team could use aspects of that already in use for the Arson Control Forum, begun in April 2001 as a government-led national body seeking to reduce arson-related deaths, injuries and damage. The Agency approach suggested here will allow integration of the Fire Investigation Team with other fire and community safety initiatives already happening within the Fire Service locally and nationally.

Major stakeholders are included in the Arson Control Forum such as the Fire Service, the Police Service, insurance industry, government departments, local authorities and Forensic Science Service. To date, there has been limited practical official Scottish involvement in this valuable forum.

Its aims are to:

- Raise public awareness of arson prevention and investigation issues;
- Reduce the number of deliberate fires and related deaths, injuries and damage;
- Maintain a strategic overview of all general arson prevention and investigation matters;
- Develop, monitor and support initiatives which improve arson prevention & detection;
- Promote partnership and co-ordinate efforts amongst stakeholders in order to develop better policy on arson prevention & investigation;
- Monitor and contribute to improvements in the recording and detection of arson in the UK; and
- Monitor and contribute to arson prevention & investigation work conducted by European & International bodies.

Data analysis and interpretation

The most effective use of fire related data will follow the creation of a national unit specifically to analyse fire-related data.

> *"Ideally, the lessons learnt from each investigation should be pooled and the data immediately channeled into community safety and arson prevention strategies."*[iv]

The unit should have a clear focus on;

a) Extracting information useful to drive public safety, policy and practice,
b) Monitoring the number of willful fire-raising incidents, and the charging and conviction rates,
c) Identifying ways of improving both the form and content of such data,
d) Improving fire investigation techniques.

It is envisaged that this unit should be part of the national fire investigation team to unite the statistical and operational expertise required for maximum effectiveness.

> *"Common threads exist but are often missed or misconstrued due to lack of research and specialist Fire Service and Police investigators".*[i]

> *" The experience gained over many years of attending fires adds an important dimension to scientific analysis and criminal investigation".*[xiii]

This unit should be part of the Agency responsible for investigation (i.e. Fire Service).

Training and research

The current practices of unassessed training and simple personal endorsement of people as expert fire investigators should be replaced by a minimum qualification standard and evidence of Continuing Professional Competence (CPC). It is increasingly important that investigators, especially those appearing in court, will have to demonstrate competence by reference to assessments by third parties.

It is envisaged that the National Team will comprise mostly people with skills at Stage 3 and Higher and that they will have access to sufficient technical resources (IT and Laboratory) to fulfill their remit. It is not envisaged that they necessarily be firefighters, although it would be desirable that the Fire or Police services see career opportunities within the team for operational officers.

The national investigation team should promote, deliver, or contribute to fire investigation training provided by others such as the Scottish Police College or the Scottish Fire Services College. Fire investigation should be given a higher priority at all levels of training of operational and managerial officers.

Research opportunities should be identified, and if necessary pursued, by the agency in conjunction with other organisations. There are a range of research questions beyond the purely statistical analysis of data, although many research questions could also arise from this data, which if answered could improve public safety. The Fire Investigation Team, via the Agency would be the logical driver of these research questions and the impact of the outcome of such research.

The Team should be directly resourced to provide funding for research specifically targeted at the aims of the Team. This funding should be subject to the same assessment and monitoring process as the other components of the Agency to ensure the delivery of Best Value. Alternatively, another body should consider submissions for research funding from the Team.

Management

Strategic and Policy management of the Team management should have representation from Police and Fire Services because of their roles at fire scenes and any potential criminal investigation; Crown Office, the Health & Safety Executive, and the NHS because of the public health issues; Local Authorities and the Scottish Executive as the major clients and representing the electorate, and the forensic science community because of the specialist investigations involved. It is recognised that some of these agencies will have several interests in the prevention of fires. Other interested parties include the Procurator Fiscal Service, fire scientists and insurers.

There should be a clear remit to monitor and improve the investigation of fires with the objectives of improved public safety and improved detection and prosecution of criminal fires.

For the immediate future, the Fire Investigation Forum in Scotland should be expanded to include a wider range of expertise and considered as a management or advisory board with the function of developing these proposals, monitoring the performance, and setting the operational and training standards for the national fire investigation team.

Resourcing

The agency tasked with investigating fires will require adequate resources and authority. These include material, expertise, and statutory legitimacy to conduct investigations. In discussions with senior Fire Service officers there was a consistent willingness to take on the responsibilities of fire investigation. However, there was a reticence that this increased responsibility would simply become another drain on resources already under heavy demand.

The outsourcing of all or any of these functions should be considered on a Best Value basis. It is a reasonable expectation in any public spending that the public receive a benefit for such spending. Best Value principles and the adoption of appropriate KPIs should ensure that the Agency delivers such value. Such data will also provide the background for strategic decisions regarding the appropriate rate of funding for the Agency.

The Team itself should be small, with expertise including Police, Fire Service, and scientific experts. Their remit should include;

- Co-coordinating fire investigation procedures nationally by developing local procedures and skills in conjunction with local Police and Fire Services to investigate smaller incidents;
- Having the skills and resources to investigate major incidents (whether fatal or not);
- Collect and analyse fire-related data, including costs, trends, and public safety issues;
- Initiate or perform fire-related research; and
- Work with Police and other agencies to support criminal and other investigations involving fire.

The organisational mechanism, or funding, of the Team is beyond the scope of this report.

Relationships with others

Solid links, including data sharing, should be established between the Team and the Arson Control Forum in England and Wales. The small number of people currently involved in fire investigation, the wide range of expertise that can be brought to bear on the problem, and the importance of communicating learning points within the community, are all reasons for supporting a UK-wide group rather than regional groups. The meetings of the

Scottish Fire Investigation Forum, including as they do practical work and discussions, are likely to be attractive to practitioners and management alike. A UK group will also underline the scientific, rather than legal, approach to the problem.

Summary

These proposals present potential solutions to problems identified here and elsewhere. The solutions echo and strengthen those proposed in other fora.

> *"Effective work on fire protection requires a strengthening of the powers of the Fire Service in the areas of fire investigation and seizure of goods".*[xvi]

> *"The inspectorate have recommended the establishment of a national forum, which can provide leadership and organisation to all parties concerned, to reduce the level of fire-raising in Scotland".*[xvi]

> *"HMIC and HMFSI recognise the benefits of such a team, although smaller Services and forces may find it difficult to create permanent units. However, in terms of overall fire investigation, the benefits of running a small highly skilled team, working closely with Police and forensic investigators, may prove to be cost-effective".*[iv]

CONCLUSION

Fire investigation should play an essential role in contributing to public safety by reducing the risk of loss to life and property, and by contributing to the reduction in crime.

Despite the potential value of fire investigation it does not receive the recognition or resources to enable full value to be gained from investigations. These resources include expertise and analysis of the data gleaned from individual events.The lack of reliable data on the number and type of incidents, and the losses from these incidents, hampers attempts to evaluate the true loss and the benefit improved fire investigation could bring.

It is nevertheless clear that fires cause significant loss to life and property. Improved fire investigation will reduce future losses by improving fire safety and/or contributing to the prosecution of wilful fire-raisers. The collection and proper analysis of data from fires would increase the value obtained from individual fire investigations and provide the basis for future learning points and training.

There are fewer complex fires than simple fires. High level expertise is therefore required at relatively few incidents. The development, maintenance and measurement of competence of fire investigators must be improved to ensure the reliability of findings. In criminal investigations the fire investigator should be an expert reporting to the Police and Procurator Fiscal in the same way as other experts, such as pathologists and scientists, already do.

All of these requirements can be met by the creation of a national Fire Investigation Team of high expertise regularly attending complex fires and working with local investigators who may be part of the national organisation. The Common Fire Services proposed in the current White Paper on Fire Services in Scotland offers a possible location for such a team. The national team should also encompass data analysts and should contribute to the training of others who may be involved in fire investigations, such as Police and operational fire fighters.

Overall, the creation of such a team should focus resources in a measurably efficient and effective manner, and improve the value obtained from the allocated resources, which at the moment are neither measured nor sufficient for the problem.

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ANNEX 1

FIRE INVESTIGATION IN SCOTLAND - REMIT

This report is the result of a project to examine the process of fire investigation in Scotland. It is the result of an approach made by The Forensic Institute to the Association of British Insurers and the Arson Prevention Bureau to assess the quality of fire investigation and the use to which the resultant data is put.

The remit of the project was:

1. Conduct a preliminary, limited survey of stakeholders to examine their needs and current level of satisfaction with current procedures.
2. Collate data on the value of fire and fire-related losses in Scotland and assess the possibilities for improvements in the collection and collation of this data.
3. Identify current practices at fire scenes in terms of;
   a) callout procedures
   b) scene management (including responsibilities)
   c) inter-agency procedures
   d) approximate costs
4. Propose measures of effectiveness and efficiency in fire investigation
5. Identify methods for the identification and implementation of Best Practice and Best Value methods.
6. Identify appropriate quality management techniques.
7. Identify relevant skill sets and training opportunities for fire investigators.
8. Propose a national strategy and identify specific actions necessary to assess and improve the use of fire investigation techniques.

The project involved consultation by meetings, e-mail, and telephone; web research; library research, and questionnaires sent to Procurators Fiscal, Police, and Fire Services supplemented by personal interviews.

ANNEX 2

ACKNOWLEDGEMENTS

Many people and organisations contributed to this work. I am sure that they would wish me to make clear that the finished article is entirely my own work and represents my view alone. This has been developed after impartially researching the issues surrounding fire investigation in Scotland.

Although the work was funded by the Arson Prevention Bureau I am indebted to them for allowing the project to develop without undue interference, but rather with constructive suggestions and comments – an opportunity also presented to the major stakeholders.

In no particular order, or reflecting contribution, I thank Mr John Gow (Fire Investigator, Strathclyde Fire Brigade), Mr Bob Arnott (Fife Fire & Rescue Service), Mr D Philp (Health & Safety Executive, Glasgow), Mr Brian Allaway (Firemaster, Lothian & Borders Fire Brigade), Mr Dell Simpson (Head of Fire Safety, Lothian & Borders Fire Brigade), Professor Douglas Drysdale (Edinburgh University), Dr Niamh nic Daeid (Strathclyde University), Mr Dennis Davis (Her Majesty's Chief Inspector of Fire Servicesin Scotland), Mr Scott Dennison (Office of the Deputy Prime Minister – ODPM), Ms Georgina Ford (ODPM), Mr Ian Snedden (Head of Fire & Emergency Planning Division, Scottish Executive Justice Department), Mr Keith MacGillivray (Asst. Firemaster, Strathclyde Fire Brigade), Mr Hugh Adey (Strathclyde Fire Brigade), Mr Bob Virtue (Director of Fire Service Training, Scottish Executive Justice Department), and Mr Pat Cox (Fire Service College).

Other people have helped directly or indirectly and I apologise for missing you individually but my thanks are due nevertheless.

Finally, I thank Karen Haestier, formerly of the Arson Prevention Bureau, and Jane Milne who were instrumental in setting the remit, and achieving the funding for the project. In the course of the work changes were made to the method and they provided valuable comments and support.

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The Forensic Institute.

GLOSSARY

ACPOS:	Association of Chief Police Officers (Scotland).
CACFOA:	Chief and Assistant Chief Fire Officers' Association.
CRFP:	Council for the Registration of Forensic Practitioners.
HMIFS, HMCIFS:	He Majesty's (Chief) Inspector of Fire Services.
HMIC, HMCIC:	Her Majesty's (Chief) Inspector of Constabularies.
HSE:	Health & Safety Executive.
FDR1:	Fire Damage Report for Primary Fires, i.e. those with an identifiable loss such as premises or cars.
FDR2:	A form to amend an FDR1 form.
FDR3:	Fire Damage Report for Secondary Fires, e.g. wasteland, rubbish, or grass.
FDR5:	Record of fire fatality.
FIO:	Fire Investigation Officer.
KPI:	Key Performance Indicator.
ODPM:	Office of the Deputy Prime Minister.
SOCO:	Scenes of Crime Officer.

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