Report on the Arson Information Management Systems Conference

Airlie, Virginia
May 3–5, 1979

Prepared for the U.S. Fire Administration
Federal Emergency Management Agency
Washington, D.C.

AMERICAN INSTITUTES FOR RESEARCH/1055 Thomas Jefferson Street, NW, Washington, DC 20007

TABLE OF CONTENTS

Acknowledgements

Preparation of this document was made possible through the assistance and cooperation of several people.

First and foremost we are indebted to Mary Saily, who was the primary author of this report. She excelled in culling the important issues and capturing the speakers' key points from the two-day long meeting.

Thanks are due to Gerald Murphy, Harry Bratt,David Icove, Cliff Karchmer, Doss Sauerteig, and David Scondras who reviewed synopses of their respective remarks and verified their accuracy.

The USFA staff, especially Richard Strother, Phineas Anderson, Laura Buchbinder, and their consultant John Sawyer, provided helpful suggestions for preparation of the report and editorial advise during its completion.

Special thanks are due to AIR production staff, Arlene Simon and Gary Kaminski who assisted in report preparation.

Finally, we acknowledge the contributions of others but assume responsibility for the information and views contained here-in.

Jane Siegel
Project Director
American Institutes for Research

Introduction

Arson is a serious and rapidly growing crime. The national direct loss to arson is estimated at $1.3 billion per year, a figure that is comparable to losses due to other major crimes such as larcency-theft ($1.1 billion) or burglary ($1.4 billion). Boston alone has estimated that $39 million in tax revenues were lost in seven years to arson. Equally important, arson is a killer. Each year about 700 lives are lost to arson--and this figure is growing. In New Jersey alone, 28 people were murdered by arson in a one-month period this year.

Arson is, furthermore, a crime of broad scope and complexity. The arsonist's motives range from revenge to arson-for-profit. Arson is committed to stop business losses, to remove low-income tenants, to create new real estate parcels for construction, or to collect insurance monies. Because arson is a crime that crosses organizational barriers, broadly based countermeasures are required. Coordination among fire, police, prosecutors, insurance agents, bankers, and municipal officials is critical to solving this problem at the federal, state, and local levels.

The Fire Prevention and Control Act of 1974 established the U.S. Fire Administration (USFA) and directed it to focus on the fire problem in the United States, including fires caused by arsonists. A 1978 amendment to this Act specifically mandated USFA to develop arson detection techniques and to assist Federal agencies, states, and local jurisdictions in improving arson prevention, detection, and control. As part of the new Federal Emergency Management Administration (FEMA) USFA has the leadership role in hazard mitigation, specifically in reducing incentives to arson.

Subsequently, the Office of Planning and Education, USFA has been developing methods of detecting and predicting arson, particularly arson-for-profit. This effort includes supporting the development of arson management information systems. These systems are designed to collect, analyze, and manage data that can assist in predicting and preventing arson. Such data include building code violations, market versus paper values of properties, sales and resales, and fire records. The concept of an arson

information management system, also called an arson early warning system, grew out of the efforts of a Boston neighborhood action group, Symphony Tenants Organizing Project (STOP). With technical assistance from USFA, STOP collected information on arson-for-profit which contributed to the breakup of a 26 member, $6 million arson ring.

In a recent report to Congress, USFA recommended implementing arson early warning systems nationwide. As an initial step in such an effort, USFA sponsored an invitational Arson Information Management Systems (AIMS) Conference May 3-5, 1979, in Airlie, Virginia. Participants (listed in Appendix A) were asked to make recommendations regarding the development and implementation of arson information management systems.

To provide a common information base for participants, six speakers discussed major information management system efforts currently underway. The speakers represented the public and private sectors as well as local, state, and federal levels. These presentations and related discussions comprised the first full day of the conference. On the following day, participants broke into small groups on the basis of six disciplines or functions: fire service, research/technical, insurance, resource cities, investigators/prosecutors, and federal agencies. Each group discussed some generic issues which cut across discipline lines, as well as specific group concerns about Arson Information Management Systems. At the conclusion of the conference, each group reported major findings back to the body as a whole. These issues are presented in the next section of this report, followed by synopses of the six speakers' remarks.

Issues of Developing and Implementing Arson Information Systems

As the conference unfolded, it became clear that arson is a complex problem involving many private and public sector actors. Attempts to systematically collect and analyze information to aid in controlling this crime are recent. In fact, most arson information systems described at the meeting are still under development; data on their effectiveness is as yet unavailable. Group discussions revealed that there are still many more questions than answers about the use of information to detect, predict, and prevent incendiary crimes, and to prosecute arsonists. Individuals attending the meeting are among the top in the field; yet they were able to supply few definitive solutions to problems related to information collection, analysis, and use. They were, however, able to clearly identify a variety of issues and concerns, and to make suggestions for future directions in ten areas for improved arson prevention and control efforts.

1. Quality of Information

The quality of available information on incendiary crime was a major topic of discussion at the conference. Participants agreed that reliable information is needed to determine the scope of the arson problem at the local, state, and national levels and to develop appropriate prevention and control strategies. However, participants acknowledged that current data on arson lacks such reliability. States and localities reportedly disagree on what constitutes incendiary crime; they also differ in requirements for recording and reporting such crimes. Such differences make it difficult to aggregate and meaningfully analyze arson incidence data. Consequently, *participants suggested that a standard system for identifying and classifying various crimes of arson be developed. The need for such a classification scheme is particularly acute at the present time because of the various arson information systems currently being developed and implemented. Several participants warned that confusion will result if each system creates it own definitions of arson, or simply uses existing state and local data.*

2. Uses of Information Systems

Conference participants pointed out that information is needed at the local, state and Federal levels for a variety of purposes including arson detection, prediction, prevention, prosecution, and policy making. Information requirements are different for each of these levels and purposes. While participants expressed divergent points of view on what type of information is most urgently needed for what purpose, they generally concurred that potential users should be represented and involved in the development of arson information systems. For example, prosecutors acknowledged that the primary function of an arson early warning system may be to predict and prevent arson. Arson will, nevertheless, occur. It was suggested, therefore, that if information in the early warning system is partially based on suggestions from prosecutors, the system will be capable of assisting in prosecution as well as in prediction and prevention. In other words, *participants urged that information systems be designed in response to multiple needs to the extent possible. Also, several participants suggested that the uses and benefits of such systems must be visible and tangible if state and local agencies are to devote time and resources to data collection activities.*

3. Private/Public Sector Cooperation

Both insurance industry and public sector representatives attending the conference expressed the desire to increase exchanges of information related to incendiary and suspicious fires. Such exchanges are currently inhibited by privacy of information statutes, although many states have enacted laws that grant insurers immunity from suit when they share information with law enforcement officials. These laws, however, relate to incendiary or suspicious fire incidents that have already occurred. According to many conference participants, new immunity laws are needed if the insurance industry and the public sector are to work together not only on prosecution but also on prediction and prevention of arson. In addition, public sector representatives indicated that quicker access to PILR data would assist in prosecution. *As a result of conference discussions, insurance agency representatives volunteered to recommend that the Insurance All Industry Committee for Arson Control create a new subcommittee for the purpose of working with public sector officials on information needs. Also,*

industry representatives indicated that they will recommend that companies provide funds, probably on a matching basis, for demonstration arson information projects in cities with defined needs. They suggested, further, that such cities request assistance from the national headquarters offices of the top underwriters in their locality.

4. Communication Among Public Sector Agencies

In addition to increased cooperation between the public and private sectors, participants called for improved communications among the various public sector agencies that are concerned with the arson problem. At the local level, fire, police, and prosecutorial personnel need to work together if arson is to be alleviated. *Participants indicated that arson task forces, made up on individuals from all relevant city departments and agencies, can provide effective communications mechanisms. Similar arrangements are needed at the state and Federal levels. Also, participants brought attention to the need for creating communications networks across jurisdictional lines. Law enforcement agencies currently have difficulty tracking suspected arsonists who operate by moving from one locale to another.*

5. Dissemination of Information

During the course of the meeting specific manuals, training programs, software packages, and research findings related to the creation and operation of arson information management systems were described by participants. Thus it became clear that useful information exists. Participants recommended that this information be identified, collected, and made available nationwide. *It was suggested that the U.S. Fire Administration serve as a centralized information exchange and provide such materials support to the field. Also, it was suggested that the Fire Administration publish and distribute a newsletter to keep individuals across the country up-to-date on arson-related topics and issues.*

6. Technical Assistance

Participants warned that while dissemination of information is necessary, it is not sufficient. In addition to information about new programs and information systems, local and state personnel require assistance in selecting and adapting programs to meet their particular needs. Conference participants reported that it is possible to transfer successful information systems and other arson detection, prevention and prosecution strategies from one locale to another if adequate assistance is provided. It was suggested that such assistance might mean funding individuals from one city to travel to another city already using a system or program. It might also involve identifying a resource pool of "experts" capable of providing on-site assistance. *Conference participants recommended that a centralized exchange be created for technical assistance as well as for information exchange.*

7. Training

In addition to program-related technical assistance, several other types of training requirements were discussed by participants. It was agreed that local and state fire and police personnel need training on the reporting of incendiary fire information. Such training should focus on the need for and benefits of accurate reporting of data as well as on the mechanics of identifying and classifying incendiary fires. Prosecutors attending the sessions reported that training is required on how to gather and use circumstantial evidence to successfully prosecute arsonists. *It was suggested that case studies be developed for use in such training. Joint training for fire service, police department, and prosecutorial personnel was also recommended as a means of encouraging team efforts in collecting and using data to obtain convictions.*

8. Obstacles to Local Implementation of Arson Information Systems

Representatives of resource cities reported that the greatest obstacles to local implementation are lack of funding and technical assistance. Budgetary constraints impede the decisions to purchase software and hire personnel to operate the system. Thus, additional funding is needed to cover

start-up and initial operating costs. Technical assistance is required as already discussed above. Another obstacle to local implementation is lack of municipal support and leadership. *Participants suggested making arson a public issue through the media, community action groups, or political campaigns. Such strategies have been used to gain the administrative support necessary for initiating an arson information system in several cities.* Excessive caseloads of the investigators was cited as an obstacle to developing an accurate data base for arson information systems. Busy investigators are reluctant to take the time necessary for accurate, complete reporting.

9. Local, State and Federal Roles

Conference participants briefly discussed the differing roles of the local, state, and Federal governments in arson detection, prediction, and prosecution. Primary jurisdiction for crimes of arson reside at the state and local levels. State and local agencies are therefore directly responsible for carrying out arson prevention and control activities. *It was agreed that an appropriate Federal role is to assist and encourage local efforts by providing for exchange of information, development of model programs, technical assistance, development of data bases, and analysis of national trends and issues.*

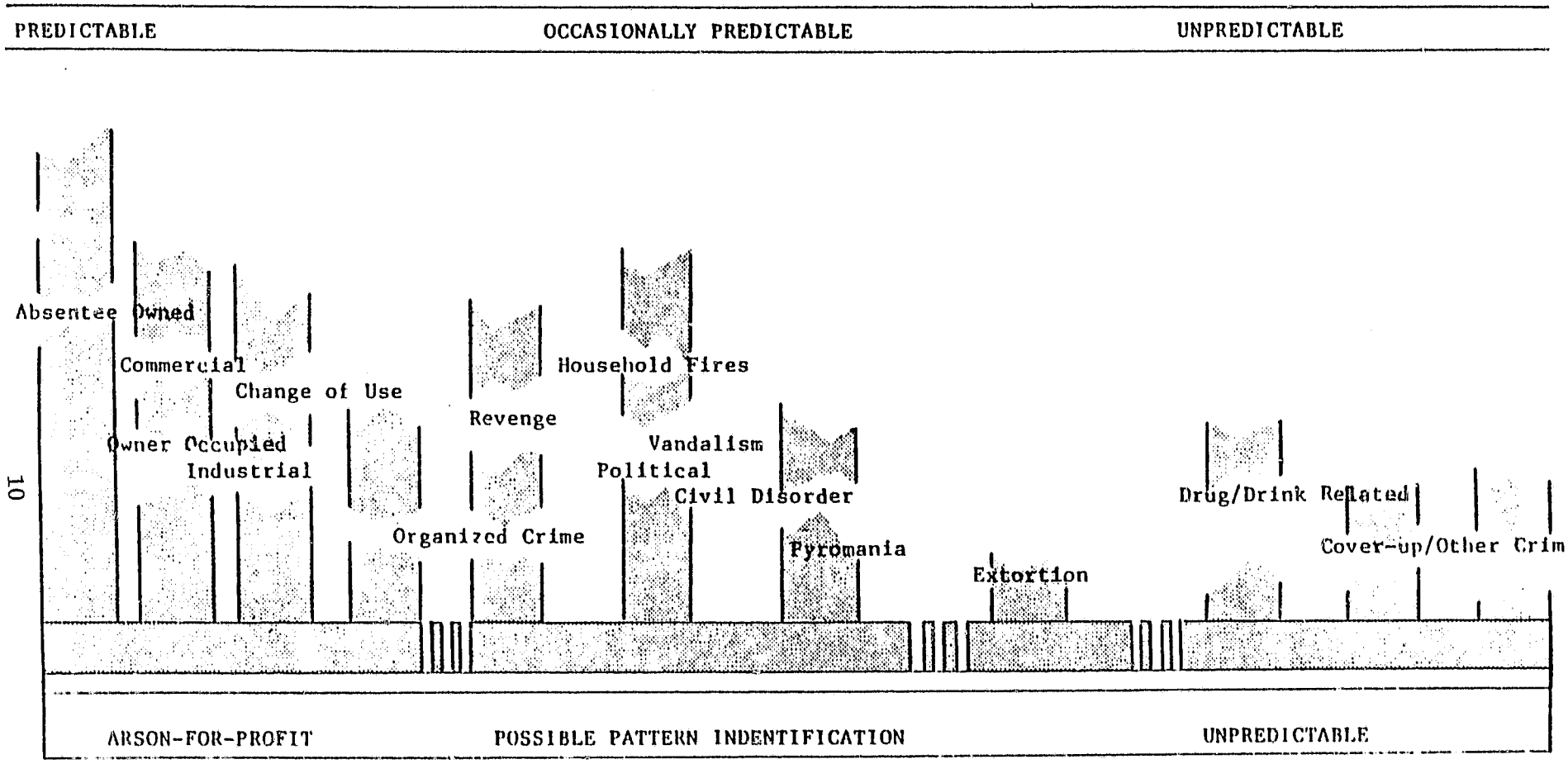
10. Priorities for Federal Support

Discussion groups and individual participants made a variety of suggestions regarding Federal priorities related to arson. A number of these suggestions are already mentioned above, but a more complete list follows:

- fund development, initial start-up costs, and subsequent evaluation of arson information systems;
- arrange for the formulation of uniform classification system for incendiary crime;
- assure that potential users are represented when planning and designing nationwide information systems or when sponsoring development of local systems;
- work with insurance industry representatives to assure development of mutually supportive efforts;

- develop mechanisms for increasing communication among Federal agencies involved in arson;
- establish a centralized information exchange;
- publish a newsletter with nationwide distribution;
- create a nationwide pool or resource persons capable of providing technical assistance;
- support for technical assistance;
- provide incentives for local/state participation in nationwide data collection efforts such as UCR or PROMIS;
- continue to support ongoing research activities and to distribute findings;
- develop case studies of successful arson investigations for use by prosecutors;
- assist local and state jurisdictions in creating resource exchange networks; and
- sponsor future conferences as follow-up to the AIMS meeting; such future meeting might focus on particular concerns or issues raised at AIMS.

FIGURE 1: ARSON PREDICTABILITY SPECTRUM



1. Data showing economic motive and/or economic stress recorded prior to fire for the specific building.

1. Usually can't predict first incident.
2. Patterns become more predictable.
3. Occasionally, can predict event, but not in building specific sense.

1. Lucky 'accidents'
2. Unpredictable

The Speakers: Six Perspectives

As a prelude to the six speakers, John Sawyer of the Massachusetts Arson Prevention Task Force provided conference participants with a framework for looking at incendiary crime and related data requirements. Sawyer's experiences show that different types of data are required to detect, predict, investigate, and prosecute different types of arson. He stated that for data collection and analysis purposes, crimes of arson can be divided into three categories: predictable, occasionally predictable, and unpredictable. According to Sawyer, such a "spectrum of arson" (presented in Figure 1) is useful in designing and evaluating arson information systems. Certain incendiary crimes, such as arson-for-profit schemes, might be detected and prevented through the use of an appropriate predictive information system. Predictable crimes might be controlled once a pattern or trend is identified through data analyses. Unpredictable crimes, in contrast, require a different kind of information -- evidence that can be used after the crime has been committed -- for prosecution.

Gerald Murphy
Property Insurance Loss Register
American Insurance Association

Gerald Murphy described the purpose, status, and capabilities of the Property Insurance Loss Register (PILR). Currently being established, PILR will be a computerized register of property insurance loss claims operated as a nonprofit subscription service by the American Insurance Association; Murphy is manager of PILR.

"Actually, PILR was started as a result of efforts by the insurance industry to take the profit out of arson," said Murphy. The PILR system is being established to provide information about prior loss claims of individuals or properties. Without such information, investigators are often unable to detect arson insurance fraud schemes.

Initally, claims adjusters from participating companies will be required to submit reports of fire-related claims in excess of $500. Later, other types of property losses such as burglary and theft may also be reported. "The adjuster will fill out an input form immediately after an inspection of loss," said Murphy. "This completed form will be sent to our office. The information will be machine readied and fed into the computer." The PILR form provides for the collection of factual insurance information. "About the only room for opinion on the form is in recording the cause of loss," Murphy stated. "But we stress that we want known cause, not a guess."

The computer system will perform four basic searches:

- a search to determine the prior loss history of the insured individual;
- a search to ascertain whether a previous fire has occurred at the property in question;
- a search to check for additional undisclosed insurance on the property; and
- a search to identify the combinations of people involved in a loss, such as owners, adjusters, contractors, partners, and corporate officers.

Murphy reported that when these four types of searches are combined, the system will do 466 searches on any given report. The combinations of factors will be weighted and when a predetermined threshhold is reached, the system will produce output. For example, if a prior loss history is discovered, the computer will print out information fed in by a previous adjuster(s) as well as that fed in by the current adjuster. This information will then be immediately forwarded to an insurance company officer, usually the local claims manager.

"The information that the manager receives is a tool, and should be considered by the insurance industry only as a tool," cautioned Murphy. "PILR will provide information, and then the insurance investigator has to pick up the ball."

"We are quite certain from our experience that patterns of fraud will develop very quickly. And because of the extensive search capability of the system, I don't think it will take long for the repeater to show up."

Murphy then discussed the possibilities for the private and public sectors to cooperatively use information generated by PILR to take the profit out of arson. The insurance industry, of course, operates under many laws regulating the transfer of information. PILR is being developed in compliance with Federal and State privacy acts and the Fair Credit Reporting Act. Although these laws vary from state to state, they generally restrict the use of claims information by public officials. Also, PILR cannot be used directly by individuals or agencies other than subscribers.

Law enforcement agencies can obtain information from insurance adjusters, however, through subpoena or if the state has an immunity law.

Law enforcement personnel often have difficulty locating adjusters. When PILR is operational, PILR staff will be able to identify adjusters involved in a loss in a matter of days (if provided by arson investigators the date and location of the loss). PILR staff will ask that adjuster to contact the law

enforcement officials investigating the case. "Also, when the investigator and the adjuster make contact, the adjuster already will have in hand any loss history pertaining to the case," Murphy pointed out.

In conclusion, Murphy noted that to conserve resources, the insurance industry is encouraging states to accept the PILR reporting form as a standard way of meeting state fire loss reporting requirements. The cost of filling out a PILR form is estimated to be four to five dollars. If an adjuster has to fill out an additional state form, the cost to the insurance company of reporting a loss is doubled. Thus the industry is working with states to gain acceptance of the PILR form as a universal reporting vehicle.

In the question and answer session that followed his presentation, Murphy made several major points:

- PILR subscribers currently include 413 insurance companies, representing approximately 90 percent of U.S. property loss insurance premiums; all major FAIR plans are participating.

- PILR staff cannot easily turn over data to law enforcement officials because of privacy laws that restrict transfer of information; In many states, however, insurance adjusters have been given limited immunity from libel suits. These adjusters can share fire loss claims information with enforcement agencies without the agencies first obtaining a subpoena.

- PILR handles all fire reports in the same way; the system will not classify a fire as incendiary or suspicious but will provide data that can assist adjusters in detecting arson-for-profit. While the PILR form provides for recording known fire cause (e.g., a gasoline can), there is no provision for classifying a fire.

- PILR will be tested this summer and fall and is expected to be operational by the end of 1979.

- The PILR system is designed for use in detecting fraudulent claims; due to privacy of information laws, it is not designed for use by insurance underwriters.

Harry Bratt
Law Enforcement Assistance Administration

Harry Bratt discussed the activities of the Law Enforcement Assistance Administration (LEAA) related to arson. Bratt is acting director of the National Institute of Law Enforcement and Criminal Justice in LEAA.

Mr. Bratt reported that LEAA is conducting research related to arson; assisting states to include arson as part of their Uniform Crime Reporting program and addressing the problem of juvenile firesetters through their Juvenile Justice Program. For the purposes of internal coordination, LEAA has established a task force on arson. LEAA is working closely with the U.S. Fire Administration. The two agencies have developed an interagency agreement regarding research efforts, technical and financial assistance, data systems, and arson task force support. The agreement spells out major areas of responsibility and activity for each agency.

Following these remarks, Bratt turned to the primary topic of this presentation--the Comprehensive Career Criminal Program (CCCP). CCCP has two parts: the Integrated Criminal Apprehension Program (ICAP), designed primarily for police agencies; and the Career Criminal Program (CCP), created to aid prosecutors. ICAP focuses on increasing the efficiency and effectiveness of all police functions, while CCP seeks to increase the conviction rate of serious offenders.

"The key element of ICAP is the establishment of crime analysis units in police departments," said Bratt. The purpose is to increase the efficiency and effectiveness of police field services by using crime analysis data in a systematic way for directing deployment of personnel and tactical operations. This data is obtained from a variety of sources including offense reports, field information reports, officers' logs, court probation reports, and State police criminal event reports. Crime analysts read the reports and extract and code those descriptors that relate to the pattern of a crime and the criminal who committed the offense. From the analysis, it is possible to identify evolving or existing crime patterns as well as career criminal crime

patterns. "This information can then be used to make police management decisions, including deployment of patrol," said Bratt. "It can also be used to provide investigative leads."

A crime analysis unit need not be automated. In fact, most of the 40 cities participating in the program are using a manual file system at this point. However, LEAA is currently developing a model automated crime analysis system that eventually will be used by many of these cities.

Bratt pointed out the ICAP data is crime specific. That is, particular crimes are targeted by each participating city for pattern analysis. Arson may be included as one of these crimes. Bratt encouraged conference participants from ICAP cities (see Appendix B) to contact their police departments and urge them to tag arson as a crime for analysis if they have not already done so.

The other part of the CCCP is the Career Criminal Program (CCP) which is designed to ensure and expedite the prosecution of career criminals--individuals who have repeatedly committed dangerous crimes, like arson.

It has been statistically demonstrated that a small percentage of individuals are responsible for a disproportionately large percentage of reported crimes. The CCP is an effort to identify such a repeat offender quickly after an apprehension, prioritize the case processing, and obtain conviction on the highest chargeable offenses. "The assumption is that the crime rate can be significantly reduced if career criminals are convicted and incarcerated," said Bratt.

The selection of cases for such increased prosecutorial emphasis by jurisdictions participating in CCP is accomplished by evaluating felon apprehensions against predetermined and announced selection criteria. These criteria vary from city to city but include such factors as criminal history, type of offense, and strength of evidence. The system of identifying career criminal offenders may be manual or automated. LEAA has developed a successful automated system called PROMIS (PROsecutors,

Management Information System). It has been implemented in several CCP jurisdictions. "PROMIS is an extremely useful case tracking system for prosecutors," reported Bratt. "It enables them to single out a case for intensive preparation, to schedule the case on a priority basis, and to assign the most experienced prosecutors to handle it."

PROMIS provides an example of how LEAA has packaged and made available apparently successful programs and practices. The program is written in a machine-independent computer language. Extensive documentation/evaluation was undertaken while the program was under development. This information is made available to potential users. Also, technical assistance is provided. "We've found that documentation and technical assistance are essential to effective technology transfer," stated Bratt.

In closing, Bratt reported that in addition to encouraging the inclusion of arson in the ICAP and CCP efforts of the LEAA, the agency is working on a model arson information system that will act as a diagnostic tool for fire and police officials. "Basically, this is a system of forms for record keeping and incident reporting, with various data elements," Bratt said. "It's a manual system that has been devised by examining what several cities have already done." The model system will be described in a report scheduled for release in the fall by the National Institute of Law Enforcement and Criminal Justice.

Following his presentation, Bratt made several major points in response to questions from participants:

- ICAP is designed to be institutionalized and the cost assumed by cities after LEAA start-up funding ends.
- If an ICAP city wishes to expand its effort to include arson, technical assistance is available from LEAA.
- It is possible to retrieve information by type of crime from PROMIS; therefore, it is possible to identify persons charged with arson.

- LEAA is aware that there is concern about the way data are collected, classified, and reported for use in PROMIS and UCR (Uniform Crime Reporting System). UCR is administered by the FBI which, like LEAA, is part of the Department of Justice. One problem is lack of uniformity in how incendiary crimes are classified and reported in the two systems. Another problem is that UCR data are collected from police departments; however, in many states fire departments are responsible for statistics on incendiary fires. Thus there is the need to encourage cooperation between police and fire agencies in reporting incendiary fire information.

David Icove
Arson Bureau,
Division of Ohio State Fire Marshal

David Icove focused his presentation on his research related to Arson Pattern Recognition (APR). He has carried out this work during the past several years in conjunction with his professional responsibilities and his doctoral studies at the University of Tennessee. Currently a criminal investigator with the Ohio State Fire Marshal's office, Icove concentrated on how APR techniques can assist investigators at the state and local levels. He described how these techniques have been applied in Ohio.

APR involves using arson incidence data to identify existing or emerging patterns of incendiary crime. These patterns may be simple time-of-day or day-of-the-week trends, or they may involve elaborate multidimensional correlations involving hundreds of fires over several years. In its applications, APR can be either manual or computer-aided.

"APR is a systematic intelligence analysis tool for use by arson investigators in the detection, prediction, and prevention of incendiary crimes," explained Icove. "It is possible to determine where and when incendiary fires will be most likely to occur using APR data analyses. The intelligence analyst can then assign investigators to these areas for patrol and surveillance activities."

The Ohio State Fire Marshal's office is using APR techniques. "We've established a computerized reporting system that cross references and tracks information based on notifications of losses reported through Ohio's Arson Control Act of 1976," stated Icove. This law grants insurers immunity from law suits when they share information about incendiary or suspicious fires with law enforcement officials. The law also permits insurers and arson investigators to exchange information developed during their separate investigations. Pattern recognition techniques are then employed to classify and analyze such information so that it can be used eventually to detect, predict, and prevent incendiary crimes.

Detection involves identifying and classifying incendiary fires. Examples of the types of information included in the Ohio classification scheme are: materials and methods used to set fires; location of fires; time-of-the-day and day-of-the-month of incidents; motives of firesetters; and previous occurrences at the same location.

Prediction entails analyzing and using this information to predict the occurrence of fires. That is, analyses of information reveal patterns or trends that enable investigators to make predictions about future fire incidents.

Prevention of incendiary fires is attained by using the predictive information to devise appropriate patrol and surveillance strategies as well as to take other measures such as boarding up abandoned properties or initiating public education programs.

"APR is a systems approach," said Icove. "It enables investigators to track information, see patterns, and make appropriate decisions. For example, I was involved in an organized crime investigation in which we began to see clusterings of incendiary fire incidents. Another characteristic that emerged was geographic bounding--incidents contained within certain geographic areas. There were also characteristic time-of-day and day-of-the-week trends detected in the data." Icove went on to explain that these patterns revealed that a group, not an individual, was involved. By altering patrol and surveillance activities, the incidents were curbed and the criminals were apprehended.

In conclusion, Icove discussed the advantaged of a computer-aided APR system. He pointed out that such a system is capable of generating maps which graphically display the density of fire incidents over a given geographic area. "These displays give investigators a picture-image of the levels and centers of incendiary crime activities and aid them in establishing prevention priorities," he said.

He also pointed out that the adoption of uniform incidents reporting systems could enable APR systems to be linked by a common computer program. Such an intelligence network could aid in combatting organized incendiary crime activities across the country.

In addition, computer systems make it possible to conduct correlational studies of various trends in incendiary crime, and to isolate patterns from which general rules for decision making can be derived. These general rules can then be made available to law enforcement managers.

Following his presentation, Icove made the following key points in response to questions from other conference participants:

- The APR system makes it possible to maximize the effectiveness of available personnel. For example, if the probability of incendiary fire is found to be high during a four-hour segment of the night, surveillance schedules can be altered to provide increased coverage during those hours and decreased activity at times when such crime is less likely.

- Icove is preparing an APR training manual and an implementation guide which will be available through the U.S. Fire Administration in 1980.

- Research has revealed that incidence rates of particular types of incendiary fires are not constant from one jurisdiction to another. Rather, local incidence rates depend on numerous local factors. Therefore, it is not possible to generalize from one city or state to another.

Cliff Karchmer
Law and Justice Studies Center
Battelle - Seattle Research Center

Cliff Karchmer, research scientist at Battelle - Seattle, discussed organized arson (arson-for-profit) and the involvement of organized crime in arson. Karchmer's research activities at Battelle are aimed at analyzing organized arson and developing models of different kinds of arson rings operating in different types of jurisdictions. "The assumption is that if certain indicators can be associated with particular types of arson rings, then law enforcement agencies can develop different strategies to deal with these arson rings," Karchmer stated. He then went on to discuss differences between organized arson and other types of organized crime, motives for organized arson, organization of arson rings, and ways of breaking such rings.

Karchmer noted two differences between intelligence activities related to arson-for-profit and intelligence related to other types of organized crime. First, arson-for-profit is focused around particular market conditions, such as failing businesses, rather than around people who operate as part of an established crime syndicate such as the Mafia. "When investigating arson-for-profit, it's important to look at what types of businesses are vulnerable, and then look at who might be involved," said Karchmer. Second, arson intelligence is used directly, and often immediately, by arson investigation units. "In fact, arson investigators are often the consumers of their own intelligence," noted Karchmer. In contrast, intelligence related to other types of organized crime is most frequently gathered, put in memo form, and filed for use at a later date.

Because arson-for-profit is tied to peculiar and often insular market conditions, the individuals involved differ from those who typically participate in organized crime. "What we're experiencing is an evolution of organized crime to white collar crime," explained Karchmer. "Another crime continuum is street crime as practiced by younger people who graduate to professional crime. Individual criminals move along these two continuums--organized to white-collar, street to professional. Wherever these two continuums meet, we could expect to find a very interesting kind

of crime, with all these different criminal disciplines represented. Here, in fact, is where we find arson-for-profit."

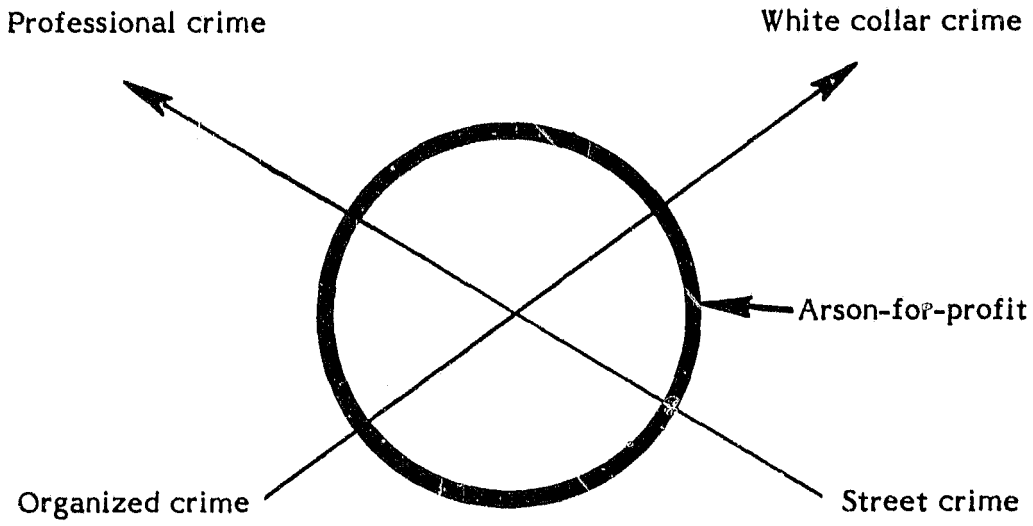


Figure 1. Crime continuums

How and why does arson-for-profit, involving these difference types of criminals, get organized? According to Karchmer, businesses that are facing failure are the focal point of organized arson-for-profit schemes. Into this situation comes the professional arsonist. This person is generally a white collar criminal who may come from any field of endeavor in white collar crime. This entrepreneur identifies businesses that are facing failure and sells them on arson and fraud as a way out of their problems. Karchmer noted that businesses that are already failing are less likely targets because they don't really need a middleman to convince them to turn to arson as a solution. These failing businesses simply need an insurance policy and someone to light the fire; often owners of such businesses set the fire themselves.

Once professional arson-for-profit is started, it's easy for it to become an epidemic. "People in the same kind of business or within a geographic area

begin to realize that arson is a way of solving problems that seems to work," said Karchmer. "This makes the work of the entrepreneur (i.e., the 'fire broker') easier."

"The perception that arson is not easily prosecuted must be changed if such epidemics are to be prevented," he said. "Information about how arson rings are organized and how they operate can assist law enforcement agencies in identifying, investigating and prosecuting organized arson."

Karchmer then presented an example of an arson ring. This particular ring was uncovered in western Pennsylvania. It had done an estimated $125 million worth of business throughout the country before it was stopped.

At the core of the operation were white collar criminals who had been involved previously in phony bank loans, a bad check ring, and a phony coupon scheme. The entrepreneur organized the involvement of other individuals including mortagors who only could get their investments back by having a building torched, a broker who arranged the sale of failing businesses at bargain prices, an insurance agent who got kickbacks from the broker for jacking up insurance policies well beyond market value, a "fence" who sold inventory out the back door prior to a fire, and vendors who provided phony invoices and bills of lading for merchandise that was never purchased. Other participants included an organized crime figure who provided muscle and protected turf, and a public insurance adjuster who inflated claims. In addition, the entrepreneur hired various types of specialists -- for example, a chemist who developed a water soluble accelerant.

How was the ring broken? Cases involving this ring were investigated by federal postal inspectors and FBI agents. To determine which individuals were most vulnerable, they began looking at paper transactions that were generated. The insurance agent, the public adjuster, and the vendors all generated paper. So the postal inspectors located a vendor who had provided phony invoices to a public insurance adjuster. Because they were unable to bring charges of arson, a state violation, the federal investigators charged

mail fraud. The vendor implicated the public adjuster who when turned state's evidence and "gave up" the entrepreneur. The entrepreneur gave up the banker who in turn implicated the insurance agent. The agent gave up the realtor.

"Once the process starts, individuals in a ring will implicate one another as part of plea bargaining," Karchmer pointed out. "It's interesting to note who was not given up, though -- the organized crime figure. The real estate broker didn't give up the organized crime figure because the broker wanted to live."

Karchmer concluded by noting that information about the way arson rings are structured will provide the means of coming up with vulnerability profiles that will help investigators determine where to begin their attack. "Such profiles will allow us to look at who might be the first, second and third guy to fall," said Karchmer.

"The point is very simply that arson-for-profit often is very well organized. We have to be equally well informed and organized if we are to combat such schemes," he concluded.

The question and answer session following Karchmer's presentation focused on the uses of information and intelligence. The following points were made:

- Participants agreed that information about arson rings is needed, but they expressed concern that such information be generated and reported in response to specific needs.
- Different types of information are needed for making public policy, predicting and preventing arson, and prosecuting arsonists.
- Information of the kind that Karchmer spoke of is potentially useful in carrying out all these functions if it is analyzed, packaged, and distributed with the needs of users, especially law enforcement officials, in mind.

Doss Sauerteig
City of New Haven
Arson Warning and Prevention Strategy

Doss Sauerteig discussed New Haven's Arson Warning and Prevention Strategy (AWPS) program which she coordinates. She reviewed the incendiary fire problem in New Haven, outlined steps taken to devise and implement strategies for dealing with the problem, and described the development and potential application of AWPS.

From 1973 to 1976 the number of incendiary and suspicious fires rose from 39 to 159 in New Haven. As a consequence, the state attorney's office requested a grand jury investigation. In response, a grand jury was convened and sat for seven months; testimony was collected on 18 fires that had occurred in the city.

In February 1977, the judge issued a report. "The report noted patterns of code violations, police vandalism reports, and collections of large insurance premiums related to the properties that had burned," stated Sauerteig. "A month later, the mayor convened a task force to devise strategies to begin solving the arson problem in New Haven."

The mayor called together representatives of the police department, the fire department, the mayor's office, and administrative staff. These representatives got together with a consulting firm that was engaged with the help of the Connecticut Justice Commission and they came up with three recommendations: 1) that a joint police/fire arson squad be established immediately; 2) that arson training be provided for line fire fighter and police personnel; and 3) that a data collection center be established in the fire department to keep track of the patterns that the report had identified.

These recommendations have all been acted upon. "The police and fire departments each assigned two individuals as full-time arson investigators," said Sauerteig. "These four people were trained and started operating almost immediately as an arson squad. Also, arson awareness training was provided to front line fire and police personnel. And a data collection effort was initiated."

Information collected includes data, location, and time of each fire in New Haven. In the case of suspicious fires, additional information is provided including the type of building involved, where the fire started, how the flame traveled, what the smoke looked like, and what firesetting methods and materials were used. Also, name of individuals who were at the fire are recorded. This information is then coded and fed into a computer.

"We can now retrieve information on fires for the last two years," said Sauerteig. "This kind of information is basic to starting an early warning program."

The Arson Warning and Prevention program was started last year as an attempt to look at patterns in incendiary fires and to develop predictive and preventive strategies. AWPS is funded by a private insurance company and a grant from the U.S. Fire Administration.

"We began by studying variables that affect fires," explained Sauerteig. "We investigated 100 buildings that had suspicious fires in the past five years. And we selected 100 comparable buildings that had no fires to use as controls."

Sauerteig reported that the study group looked at 27 variables to try to understand what differentiates the buildings that burn from those that don't. The fire history of each of the buildings was carefully examined. Police calls, code violations, buildings permits, tax debts, assessed values, fair market values, and sales and resales were reviewed and recorded for each property.

"We finished collecting this data in April," said Sauerteig. Now we're in the process of analyzing it." Preliminary analyses indicate that four important "trigger" variables are likely to emerge. It appears that code violations, police calls to buildings, fire activities, and number of conveyances are frequent in the burned buildings, but few in the control buildings.

"The plan is to identify these trigger variables and then collect such information about buildings in New Haven," explained Sauerteig. "What we hope to develop, then, is a list of 'at risk' buildings. If a building shows up with all four of the trigger variables, we're going to flag it as at risk for arson."

The New Haven task force plans to take a variety of preventive measures after "at risk" buildings are identified. Bankers will be asked by the task force to alert owners holding mortgages on "at-risk" buildings that their properties are being watched. Insurance agents will be watching out for requests for increased insurance on these properties. Also, the city will attempt to deal with the motives for arson by helping owners obtain low cost rehabilitation loans and by allocating a greater portion of community development funds for neighborhood revitalization. A high-level staff position was created within the fire department to conduct a community education program as a long-range deterrent to arson.

"We're also going to take a variety of other steps," said Sauerteig. "We'll be hiring an insurance adjuster to make certain that housing rehabilitation money is appropriately spent and to check on claims for buildings that have been burned. We also plan to increase the capability of the arson squad."

She concluded by noting that the New Haven effort has been possible because of strong support from the mayor's office and interdepartmental cooperation. This support eased the data collection process and made it possible to obtain financial and other resources.

In response to questions, Sauerteig made the following points:

- The task force is aware of the possibility that developing an 'at risk' list could result in abuses -- for example, buildings could be wrongly identified as "at risk." Care will be taken to prevent such abuses.
- The task force anticipates that the first 'at risk' list will be generated in the summer of 1979.
- New Haven has a Code Enforcement Committee and is also looking at other methods of enforcing building codes, such as establishing a special court to handle code violations as has been done in nearby Hartford.

David Scondras
Urban Educational Systems, Inc.

David Scondras presented an overview of the Arson Early Warning System Study being conducted by Urban Educational Systems which he founded. Before discussing the purposes, design and expected outcomes of this research effort, Scondras briefly reviewed events that led to the decision to establish an Arson Early Warning System (AEWS) in Boston.

Beginning in 1974, the number of suspicious fires greatly increased in Boston. In fact, in an area around Symphony Road, 14 major fires displaced about 400-500 people, and nine people were killed in a very short period of time. Scondras lives in this area and became involved in a community group to combat arson. As the result of community activity and attention by the media, public pressure began to build and a major investigation was undertaken. Eventually, 33 persons were arraigned. They were part of an arson ring that involved white-collar professionals, including several lawyers and a detective from the State Fire Marshal's office.

"In the course of these events, we began to notice certain characteristics of buildings that burned," said Scondras. "For example, we noticed that dwellings with absentee landlords burned while owner occupied buildings did not. We also noticed high vacancy rates before a fire. In other words, we began to observe that certain warning signs might be used to predict an incendiary fire."

Scondras went on to explain that these observations led to the assumption that arson-for-profit can be predicted. "We conducted a pilot study to develop a deeper understanding of how arson works in general, not just in our neighborhood," he said. "We now hypothesize that two factors are primarily responsible for arson -- economic stress on a building and certain characteristics of the owner. We anticipate that our study will show that buildings which have been burned were owned by people with certain, identifiable characteristics; also, we expect that these buildings were under a great deal of economic stress."

The sample base for the AEWS study includes 78 residential, absentee-owned, multi-unit rental buildings in Boston that have sustained fire losses of more than $500. These fires can be classified as incendiary, suspicious, or fires causing abandonment. The burned buildings are matched by 78 comparable control buildings with no fires.

"We went back, as best we could, for 10 years on each of these buildings and collected information on their histories," said Scondras. "We expect, of course, that the buildings experiencing fires will show histories that differ consistently from the control buildings."

Among the economic stress factors being examined are equity ratio, sales and resales, building code violations, sanitary code violations, tax arrearages, liens, and information from rent control administration records. Owner characteristics being check include previous fire record, owner's associates, rent control records and housing court citations, and owner's other property including records on the other property.

"We expect to find the greatest incidence of incendiary fires among owners of three to 15 buildings," explained Scondras. "The rationale is that the very small owner gets to know his or her tenants quite well. This personal involvement, I think, would keep such owners from burning the buildings. Owners of more than 15 buildings, on the other hand, are generally successful operators and have more sophisiticated ways of dealing with economic problems. Owners in the medium range appear to us to be the most vulnerable and the most likely to resort to arson."

Like the New Haven study, the Boston effort is directed toward identifying key factors in arson. Information related to these factors is generally available in building records. Thus, if the study reveals that certain economic stress factors and owner characteristics are associated with incendiary fires, this information can be used to determine the risks a particular building has at a particular point in time.

Scondras reported that the results of the study are scheduled to be available in September 1979. "We expect to identify a set of threshold indicators that will, in combination, separate buildings that burn from those that do not . . ." he stated.

Scondras closed his presentation by commenting on the scope of the arson problem. He pointed out that arson may very well be caused, as well as alleviated, by a wide range of institutions and individuals. Included are banks, insurance companies, police and fire departments, code enforcement departments, and neighborhood residents.

"The number of actors involved in this rather unique crime is almost astronomical," Scondras stated. "Consequently, we need a very clear theory that can point toward the kinds of coordination and cooperation necessary to deal with the problem."

Information provided by AEWS could provide the basis for such cooperation and could help officials enforce laws that are already on the books. Examples include building codes and laws prohibiting over-insurance of property. Also, Scondras pointed out that citizens could be educated to recognize and report warning signs of arson in their neighborhood.

"I think we've been underestimating the scope of the problem," he said. "Between 1970 and 1977, arson fires cost Boston an estimated $39 million in tax revenues. I suspect that's more than we've put into fighting arson in the whole country. We need to organize a coordinated counter-attack using the best information we can obtain if we want to eliminate arson as a major problem."

The following points were made by Scondras and his associates during the question and answer session:

- There was a reduction not only in incendiary fires but all types of fires following the convictions of individuals involved in the Symphony Road arsons. This trend indicates a problem in reporting and classifying fires in Boston. That is, the Symphony Road convictions should not have affected the incidence of accidential fires.

- A lack of correlation was found between the fire records established and maintained by the two agencies having responsibility for fire data in Boston--the police department and the fire department. This lack of correlation further reinforces the notion that fire incidents are not systematically recorded and classified.

- The community group that organized to investigate Symphony Road arsons received minimal support at the local level. Major sources of support were the U.S. Fire Administration, the Massachusetts Attorney General, and local Congressman. Thus, the Boston experience demonstrates that it is possible, although difficult, for citizens to combat arson with limited support from the local power structure.

APPENDIX A

ARSON INFORMATION MANAGEMENT SYSTEMS CONFERENCE

INVITEES

NAME	TITLE/ORGANIZATION/ADDRESS	TELEPHONE NUMBER
ALLEN, Ted	Associate Research Scientist American Institutes for Research 1055 Thomas Jefferson Street, N.W. Washington, D.C. 20007	202-342-5000
APPEL, Craig	Director of Technical Assistance Connecticut Justice Commission 75 Elm Street Hartford, CT 06115	203-566-3020
BARRACATO, John	Arson Consultant Aetna Life and Casualty 151 Farmington Avenue, W.A. Hartford, CT 06156	203-273-0123
BEACH, Charles	Secretary Hartford Insurance Group Hartford Plaza Hartford, CT 06105	203-547-5164
BONISTALLI, John	Assistant Attorney General Attorney General's Office Criminal Division 1 Ashburton Place, 18th Floor Boston, MA 02109	617-727-2200
BRACE, Tom	Director Division of State Fire Marshal Insurance Building Olympia, WA 98504	206-753-3605
BRATT, Harry	Acting Director National Institute of Law Enforcement and Criminal Justice Law Enforcement Assistance Administration 633 Indiana Avenue, N.W. Washington, D.C. 20531	202-492-9108

NAME	TITLE/ORGANIZATION/ADDRESS	TELEPHONE NUMBER
BRUNACINI, Al	Chief Phoenix Fire Department 620 West Washington, Room 343 Phoenix, AZ 85003	602-262-6297
CASPER, Andrew	Chief San Francisco Fire Department 260 Golden Gate Avenue San Francisco, CA 94102	415-861-8000 x281
HOLLAND, Jim	Manager Prohibited Mailing Section Office of Criminal Investigation United States Postal Service 475 L'Enfant Plaza West, S.W. Washington, D.C. 20260	202-245-5304
HOLMES, Carl	Assistant Fire Chief Oklahoma City Fire Department 820 N. W. 5th Oklahoma City, OK 73106	405-235-3314
ICOVE, David J.	Arson Investigator Arson Bureau, Division of State Fire Marshal 8895 East Main Street Reynoldsburg, OH 43068	614-864-5510
JACKSON, Lonnie	Public Education Officer Mt. Prospect Fire Department 112 East Northwest Highway Mt. Prospect, IL 60056	312-392-6000
JACKSON, Ralph	Loss Prevention Manager Allstate Plaza F-3 Northbrook, IL 60062	312-291-5089
KARCHMER, Cliff	Research Scientist Law and Justice Studies Center Battelle Research Center 4000 N. E. 41st Street Seattle, WA 98105	206-525-3130
KATZ, Erwin	Systems Analyst, Safety Dept. 545 North Huron Street Toledo, OH 43604	419-247-6110
KAYE, Frank	Fire Marshals of North America Arlington Fire Department 1020 North Hudson Street Arlington, VA 22201	703-558-2481

INSERT AFTER CASPER ON PAGE A-2

NAME	TITLE/ORGANIZATION/ADDRESS	TELEPHONE NUMBER
CROWLEY, Dennis	Vice President Investigating Services Division First Security Services Corp. 92 State Street Boston, MA 02109	617-367-4517
DERRY, Lou	Manager of Fire Analysis National Fire Protection Assoc. 470 Atlantic Avenue Boston, MA 02210	617-482-8755
EARLE, William	International Association of Arson Investigators Indianapolis Fire Department Station 13 56 South Senate Street Indianapolis, IN 46204	317-635-5841
ENGEL, John P.	Coordinator New York City Arson Strike Force 250 Broadway, Room 1420 New York, NY 10007	212-566-1332
ESTEPP, Jim	Fire Chief Prince Georges County County Administration Building Room 2132 Upper Marlboro, MD 20870	301-952-4730
GLEASON, Al	Explosives Enforcement Officer Bureau of Alcohol, Tobacco and Firearms P.O. Box 784 Washington, D.C. 20044	202-566-7395
HANNINGTON, Pat	Public Technology, Inc. 1140 Connecticut Avenue, N.W. Washington, D.C. 20036	202-452-7803
HAYMAN, Marie	Deputy Director for Research International City Management Association 1140 Connecticut Avenue, N.W. Washington, D.C. 20036	202-828-3641
HENRY, Patrick J.	Academy for Contemporary Problems 440 N. Capitol Street, N.W. Suite 390 Washington, D.C. 20001	202-638-1445

NAME	TITLE/ORGANIZATION/ADDRESS	TELEPHONE NUMBER
KLUGER, Barry	Assistant District Attorney Bronx District Attorney's Office 215 East 161st Street New York, NY 10451	212-590-2000
LEVINE, Robert	Chief, Fire Science Division B 250, Building 224 National Bureau of Standards Department of Commerce Washington, D.C. 20234	202-921-3845
MAY, Robert E.	Executive Secretary International Association of Arson Investigators 97 Paquin Drive Marlboro, MA 01752	617-481-5977
MIKESKA, Leonard	Chief Arson Division Houston Fire Department 410 Bagby Houston, TX 77002	713-222-3591
MURPHY, Gerald	Manager Property Insurance Loss Register American Insurance Association 700 New Brunswick Avenue Rahway, NJ 07065	212-433-4424
NEAL, Sue	Research Economist Office of Policy Development and Research Department of Housing and Urban Development 451 7th St., S.W., Room 4110 Washington, D.C. 20410	202-755-6437
O'CONNOR, Judy	Program Manager Arson Unit Law Enforcement Assistance Administration 633 Indiana Avenue, N.W., Room 1154 Washington, D.C. 20531	202-376-3850
PAIRITZ, Larry	Fire Chief Mt. Prospect Fire Department 112 East Northwest Highway Mt. Prospect, IL 60056	312-392-6000 x165

NAME	TITLE/ORGANIZATION/ADDRESS	TELEPHONE NUMBER
PASTERICK, Edward	Deputy Assistant Administrator for Insurance Examination and Actuarial Federal Services Federal Insurance Administration and Mitigation 451 7th Street, S.W. Washington, D.C. 20410	202-755-6713
POOLE, Stan	Fire Captain Prince Georges County County Administration Building Room 2132 Upper Marlboro, MD 20870	301-952-4730
RADFORD, Charles	Coordinator, Arson Task Force San Francisco Fire Department 260 Golden Gate Avenue San Francisco, CA 94102	415-861-8000 x281
REDMAN, William	Chief Toledo Fire Department 545 North Huron Street Toledo, OH 43604	419-247-6110
RISTOW, Richard	Research Director Urban Educational Systems, Inc. 120 Milk Street Boston, MA 02109	617-482-4477
ROBERTSON, J.C.	Chief State Fire Marshal's Office Baltimore, MD 21201	301-383-2520
SAUERTEIG, Doss	Coordinator, City of New Haven Arson Warning and Prevention Strategy 952 Grand Avenue New Haven, CT 06510	203-787-6225
SAWYER, John	Arson Prevention Task Force McGrath, Sylva Associates 15 Court Square Boston, MA 02109	617-227-1142
SCHMIDT, Harvey	Director of Field Research Urban Educational Systems, Inc. 120 Milk Street Boston, MA 02109	617-482-4477

NAME	TITLE/ORGANIZATION/ADDRESS	TELEPHONE NUMBER
SCONDRAS, Dave	President Urban Educational Systems, Inc. 120 Milk Street Boston, MA 02109	617-482-4477
SIEGEL, Jane	Associate Research Scientist American Institutes for Research 4614 Fifth Avenue Pittsburgh, PA 15213	412-681-3000
SHERMAN, Robert P.	Chief, Technical Services Division Office of Technical and Scientific Services Bureau of Alcohol, Tobacco & Firearms P.O. Box 784 Washington, D.C. 20044	202-566-7395
SMALL, Dick	Director, Fire Standards and Accreditation Board 3000 Market St., Suite 258 Salem, OR 97310	503-378-5210
SMITH, Mark	Assistant Director Insurance Crime Prevention Institute 15 Franklin Street Westport, CT 06880	203-226-6347
STEPHENSON, Gelvin	Economic Associate Editor Business Week 1221 Avenue of the Americas New York, NY 10020	212-997-2286
TOREGAS, Costis	Public Technology, Inc. 1140 Connecticut Avenue Washington, D.C. 20036	202-452-7804
WALKER, James	Chief Fire Investigator Phoenix Fire Department 620 West Washington Phoenix, AZ 85003	602-262-6297
WOLFE, Singleton	Assistant Commissioner for Compliance Internal Revenue Service 1111 Constitution Ave., N.W. Washington, D.C. 20224	202-566-4386
WREND, John	Vice President Property Loss Research Bureau 20 North Wacker Drive Chicago, IL 60606	312-558-3843

NAME	TITLE/ORGANIZATION/ADDRESS	TELEPHONE NUMBER
ZANGER, Mark	Urban Educational Systems, Inc. 120 Milk Street Boston, MA 02109	617-482-4477
ZOLBE, Paul	Section Chief Uniform Crime Reporting System Federal Bureau of Investigation Washington, D.C. 20535	202-324-2614

UNITED STATES FIRE ADMINISTRATION

NAME	TITLE/ORGANIZATION/ADDRESS
	Federal Emergency Management Agency Washington, D.C. 20472 202-634-7553
HANBURY, William	Director Interagency Coordination
McKAY, John	Director Intergovernmental Relations
PALUMBO, Victor	National Fire Academy
SCHAENMAN, Phillip	Associate Administrator National Fire Data Center
UNDERWOOD, Mary	Executive Assistant

OFFICE OF PLANNING AND EDUCATION

Richard STROTHER
Associate Administrator

Phineas ANDERSON

Claudia BROGDEN

Laura BUCHBINDER

Jim NEWBY

Herman WEISMAN

Alta WRIGHT

Kristy YOUNG

Consultants

Betsy DAVIS

John LYNCH

APPENDIX B

ICAP Cities and Population

CITY	POPULATION	SWORN OFFICERS	RATIO
1. Atlantic City, NJ	47,897	326	147:1
2. Arlington, TX	90,032	199	452:1
3. Austin, TX	251,808	630	400:1
4. Cambridge, MA	100,361	335	300:1
5. Colorado Springs, CO	135,060	370	365:1
6. E. Providence, RI	48,207	106	455:1
7. Eugene, OR	79,028	207	382:1
8. Fort Worth, TX	393,476	830	474:1
9. Jackson, MS	153,968	443	348:1
10. Jacksonville, FL	528,865	1554	340:1
11. Kansas City, MO	507,330	393	300:1
12. Lawrence, KS	45,698	92	197:1
13. Lexington, KY	108,137	436	248:1
14. Louisville, KY	361,706	1054	343:1
15. Memphis, TN	623,530	1599	390:1
16. Minneapolis, MN	434,400	929	468:1
17. Montgomery County, MD	522,809	947	552:1
18. Nashville, TN	447,877	954	470:1
19. Newbury, NY	26,219	94	279:1
20. New Haven, CT	137,707	465	296:1
21. New Orleans, LA	593,471	2013	295:1
22. Norfolk, VA	307,951	727	424:1

CITY	POPULATION	SWORN OFFICERS	RATIO
23. Oxnard, CA	71,225	131	544:1
24. Pontiac, MI	85,279	269	317:1
25. Portland, ME	65,116	201	324:1
26. Portland, OR	379,967	849	448:1
27. Portsmouth, VA	110,963	269	413:1
28. Pueblo, CO	97,453	243	401:1
29. Quincy, MA	87,966	251	350:1
30. Racine, WI	95,162	283	336:1
31. Salt Lake City, UT	175,885	452	389:1
32. San Diego, CA	697,027	1365	510:1
33. San Francisco, CA	715,674	2095	342:1
34. S. San Francisco, CA	46,646	84	555:1
35. San Jose, CA	445,779	950	469:1
36. San Mateo, Ca	78,991	133	594:1
37. Sun Valley, CA	59,832	80	748:1
38. Springfield, MO	120,096	205	586:1
39. Stockton, CA	109,963	323	340:1
40. University City, MO	47,527	93	511:1
41. Virginia Beach, VA	172,106	326	528:1
4.5% of U.S. POP	9,608,194	24,682	AVE: 412:1

END