EMERGENCY PLANNING AND THE ADAPTIVE LOCAL RESPONSE TO THE MT. ST. HELENS ERUPTION

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FINAL REPORT SUBMITTED TO THE NATIONAL SCIENCE FOUNDATION -- GRANT NO. PFR 8020876

November, 1980

THIS REPORT WAS PREPARED AS AN ACCOUNT OF WORK SPONSORED BY THE NATIONAL SCIENCE FOUNDATION. THE VIEWS, OPINIONS, INTERPRETATIONS OF DATA AND CONCLUSIONS DRAWN IN THIS REPORT ARE THOSE OF THE PRINCIPAL AUTHORS AND DO NOT NECESSARILY REPRESENT THOSE OF THE NATIONAL SCIENCE FOUNDATION OR WASHINGTON STATE UNIVERSITY.

HAZARD REDUCTION AND RECOVERY CENTER
ACKNOWLEDGEMENTS

A number of individuals deserve our thanks for their assistance during this research project. Our NSF program monitor, Dr. William A. Anderson, greatly aided us with information and responsive management. William R. Wagner of the Whitman Regional Planning Council, David Scudder of the WSU Sociology Department, Bill Puppo, Administrative Assistant to the Spokane City Manager, Marjorie Greene of the Battelle Memorial Institute-Seattle, and Chuck Mize of the Association of Washington Cities contributed helpful feedback at various stages of the research. Dr. Ronald W. Perry of Battelle deserves special thanks for his comments and interest throughout the project.

All of the local officials participating in the research were extremely cooperative in finding time to work with us during a summer with heavy workloads due to the eruption. Barbara Umathum and Kathy Jonlon of the Environmental Research Center support staff, and Oren House of the Eastern Washington University Center for Urban and Regional Planning, helped us greatly in conducting a project with tight deadlines. Finally, our research assistants, Sue Vogt and Melanie Hitchcock, have our highest appreciation for assuming burdens well beyond the call of duty.

Jack D. Kartez
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SECTION I
INTRODUCTION & SUMMARY REPORT

Introduction

The May 18, 1980 eruption of Mt. St. Helens in Washington's Cascade Range deposited as much as five inches of volcanic ash within a 20,000 square mile area of Northern Idaho and Eastern Washington. Additional eruptions on May 25 and June 12 deposited ash in Southwestern Washington and Northwestern Oregon; however, these eruptions were much smaller than the first. During the first day or two after the May 18 eruption, national attention focused on the destruction immediately surrounding the volcano. Meanwhile, dozens of communities east of Mt. St. Helens were responding to severe problems caused by the ash fallout.

Communities were isolated from outside access because of accumulation of ash on roads. Not only was visibility eliminated by clouds of powder-like substance, but motor vehicles were rendered useless as the abrasive ash ruined engines. Within communities traffic was brought to a halt. Although no lives were lost and property damage was limited, the fallout created a serious emergency. Local governments were faced with an immediate need to clear ash from roads and facilities.

Purpose of Project

This project examines the operational experience of local governments responding to the emergency created by ash fallout. It was rapidly conceived and implemented due to a unique opportunity for studying the local response provided by the National Science Foundation Problem-Focused Research Program. It did not arise out of ongoing research on disaster planning nor even much familiarity with what we have found to be a rich field of investigation.

Information has been collected on the actual strategies local governments adopted to organize their resources, seek external forms of assistance and work with their citizens. Although this emergency was not a tragic one in the nature of an earthquake or hurricane, it required an emergency response from an unprecedented number of local governments in the region. As such, it provided an opportunity to examine the actual implementation of disaster response measures on a regional scale. It was believed that this information might have useful implications for the development of disaster response plans for a variety of agents which impact large areas, such as major earthquakes and radiological emergencies.

Influence of Other Research

One stimulus to undertaking this study was recent work on the subject of "research based community emergency planning" published in the professional planning literature. (Perry 1979). Additional interest came from familiarity
with occasional research by urban planners examining the obstacles to implementing post-disaster reconstruction plans in areas such as Xenia, OH, and Managua, Nicaragua (Hinojosa et al. 1977; Baker 1977; Francaviglia 1978).

Many obstacles are organizational in nature. These difficulties in the process of implementing desired public policies are a major topic of urban and regional planning theory. This prompted our interest in how the eruption response and emergency planning might relate to issues in the field of planning as a whole.

As data collection progressed over the three-month life of this project, we were able to study very recent work by the University of Delaware Disaster Research Project examining emergency planning issues (Wenger et al. 1980). This study has provided a basis for organizing and reporting the results of the quick-response field data collection carried out here. Wenger et al. make research suggestions about what ought to be important in the operational emergency response versus what seems to be important in existing emergency plans.

In addition, Wenger et al. briefly grapple with some fundamental issues in urban planning theory, such as the difference between "allocative" product-oriented planning and process-oriented "innovative" planning. After examining 71 disaster plans, Wenger et al. conclude that emergency planning is too product-oriented with little attention given to the process by which such plans are carried out. This is similar to a fundamental issue in community planning; e.g., the gap between planning goals and implementation. (Friedmann and Hudson 1974).

One limitation of this study was the lack of time to develop a research design for testing specific a priori questions about local government emergency planning. This study has been descriptive and exploratory -- as in many planning process studies. We have used the observations on emergency planning made by Wenger et al. and Perry as a framework for reporting these descriptive results. Research suggestions for the planned emergency response are compared with the actual decisions made by the jurisdictions facing immediate and unplanned for needs. This has greatly aided in organizing the results of what has necessarily been an ad-hoc research effort.

Problem Statement

Ultimately, research insights or knowledge about disaster planning needs must be translated into practice. Friedmann (1979) calls this linkage the "essential meaning of planning." Since the relationship between planning goals and actual implementation is central to the entire field of planning, it should also be relevant to emergency planning. To what extent did the local emergency response to the eruption converge or diverge from the normative expectations for emergency response planning posed by researchers? What was the source of knowledge -- the basis for decisions -- used by local officials? What operational hindrances and opportunities were encountered? Finally, what implications might this experience have for emergency planning?
SECTION II: Project Design

Methodology

Field data were collected through two means: a written survey consisting of forty-three questions, and face-to-face interviews with local officials in twelve jurisdictions. Twenty-six jurisdictions completed the written survey, including eleven of the twelve which were interviewed. Seventeen jurisdictions (65%) were municipalities, six (23%) were counties with road maintenance responsibility and three (12%) were sub-county highway districts in counties without overall road systems.

Field Question Development

The survey and interview questions were developed through a multi-step process which lasted from June 24 through July 11, 1980. During this period, initial phone contacts with local officials and field tests of questions through two interviews led to refinement of specific study questions. A major change was to delete most questions dealing with problems of transportation system (road) design, and to include specific questions regarding emergency communications with citizens and the intergovernmental aspects of resource acquisition.

The early contacts with local officials consistently revealed that physical design questions had little relevance to the emergency response, while emergency communications and resource acquisition were highly important. After this period of refinement ending July 11, the written survey was mailed and follow-up interviews with twelve jurisdictions were carried out.

Nature of Respondents

The respondents in this study are executive level local government officials, including four small community mayors having day-to-day operational responsibilities. Among all twenty-six jurisdictions, the positions of local officials included city managers (38%), county engineers and public works directors (31%), mayors and other elected officials (19%), and other department heads (12%).

The focus of the study was on the operational experiences of local government in the emergency response. This study is not concerned with social-psychological dimensions of human behavior, except insofar as decision-makers take action based on their situations. It does not deal with the personal characteristics of local officials or their citizens.

Limitations of Design and Results

Despite the use of data from a written survey, the exploratory approach of this project is typical of that found in case studies. Like many case studies, the process has been partly a subjective one. Therefore, the evaluations of field data collected should be seen as inductive and descriptive, rather than conclusive in the analytical sense.
The interpretation of results turns to planning theory to draw conclusions about what type of criteria might be used to evaluate emergency planning needs in light of the St. Helens case. This in itself is not unprecedented in either disaster studies or studies of the local planning process. Notwithstanding these arguments, the results of this study must be recognized as descriptive and tentative in nature.

SECTION III: Disaster Research & Urban Planning Theory

Disaster researchers have argued that individual behaviors in emergencies have a regular pattern. It is proposed that if authorities recognize these patterns when designing emergency response plans, their operational effectiveness can be enhanced. Urban and regional planning theory has been concerned with similar issues: they are central to the field of planning. For example, plans which disregard the behavioral basis for community needs, such as urban renewal projects, have been recognized as ineffective or even harmful (Perin 1970; Catanese 1973).

On a more theoretical level, the field of planning is dominated by arguments over the gap between normative or ideal planning objectives and what is actually possible to implement. Much recent planning research argues that attention must be paid to the operational problems of implementing planning policies, programs or strategies of any kind. Even the best of ideas require facilitation that is sensitive to "situational potentials, institutional constraints and client needs" (Susskind 1974). Insights from behavioral disaster research may represent knowledge which faces the need for such successful implementation.

Research-Based Emergency Planning

Disaster researchers have developed specific proposals for designing emergency response strategies which are based on knowledge of behavior. Perry (1979) defines the use of this knowledge by public authorities as "research-based community emergency planning." Perry has given examples of incentive strategies which promote public cooperation with emergency operations such as evacuation or sheltering.

Recent research by Wenger et al (1980) summarizes suggestions from the disaster research field on more general measures which should be considered in the operational preparation for the emergency response. These planning measures fall into three general areas: in-house organization, communications with citizens, and inter-organizational coordination. These areas can almost be considered model "elements" for comprehensive emergency planning.

But there has been limited analysis of the emergency planning process itself. Without knowledge of how and why responsible officials choose certain operational methods, or the constraints on their choices, potentially valuable research knowledge cannot be incorporated into local emergency planning or implemented.
In addition, the implementing agents -- especially the public sector -- continue to be treated as a "black-box." Emergency planning, general purpose local government, and state and federal agencies tend to be aggregated into categorical definitions such as "emergency planners" or "the authorities." In doing so, researchers may obscure the operational dynamics of planning and implementing emergency measures.

This study collects descriptive information on the local emergency response. Observations on emergency planning needs by disaster researchers serve as a partial basis for examining the study results. Three categories of emergency operations are used to summarize and discuss the results: The organization of the local response; communications with citizens; and, resource acquisition and use. These operational aspects of the emergency response correspond to the three areas of emergency planning needs discussed by Wenger et al (1980). Within the limits of this quick response investigation, we attempt to compare these researchers' observations about what ought to be important in emergency operations with the actual experience of local governments. It is hoped that this information may contribute to research-based emergency planning by identifying the opportunities and constraints within which local decisions are made.

SECTION IV: The Local Emergency Response

An Overview From the Written Survey

Between the time when Mt. St. Helens "woke up" in March 1980 and its eruption on May 18, local governments did not expect a hazard from volcanic fallout. When it did arrive, the majority of local governments perceived the eruption as a major transportation emergency by the end of the first day of ashfall. In their immediate response, local units of government utilized existing functional lines of organization, such as those used in day-to-day public service activities.

Only one third of the jurisdictions surveyed reported using an existing countywide emergency preparedness plan as the source of any one of four types of information needed to organize local operations. Forty-eight percent reported no use of a countywide emergency plan at all (Table IV-6). A majority of jurisdictions made financial commitments during the emergency which required the use of special fiscal measures for expenditures. Only six jurisdictions (22%) reported having no immediate needs to organize special sources of emergency funding (Table IV-7).

Jurisdictions were asked to rank the usefulness of various forms of assistance received during the critical first week of emergency response. Local governments ranked their "Own Observation and Judgement" as the most useful tool in this period. The second most useful source of assistance was the "News Media" followed by "Other Cities" and "Other Counties." State and federal government ranked last (Table IV-10).
Twenty-three jurisdictions (85%) found it necessary to seek emergency equipment resources from an outside source. The major equipment sources for this group were private contractors (70%) and other units of local government (52%). (Table IV-8). Citizen volunteers were also a source of emergency assistance. Seven jurisdictions (26%) reported requesting citizen volunteers, and another fifteen (59%) reported some form of spontaneous citizen assistance. Only two jurisdictions reported discouraging citizen volunteerism in cleaning public facilities.

Efforts to communicate with citizens were central to local emergency efforts. Twenty-six jurisdictions (96%) reported using communications methods established by the jurisdiction itself to communicate warning and/or instructions to citizens. Only one jurisdictions reported complete reliance on a countywide emergency broadcast system to communicate with citizens. "Local Radio" was the method of communication used by the highest number of jurisdictions (74%). There was also a significant use of communications methods which were developed and operated through distinct local efforts. These included such methods as: information phone centers for citizens to call (48%); face-to-face or telephone "grapevines" (41%) and; public address systems on moving vehicles (41%). (Table IV-11).

Communications with citizens and acquisition of emergency resources such as equipment were clearly central aspects of the local response. As mentioned previously, however, the organization of this response did not spring primarily from pre-existing emergency plans maintained on a countywide basis. These aspects of the emergency response were examined in greater detail using both survey and interview data. In each case an overall comparison was made between research observations on emergency needs and the experience of jurisdictions in the eruption.

Organization of the Local Response

Wenger et al (1980) identify the establishment of an emergency command post as a key element in organizing the protective response. A central, community-wide command post should serve as a coordination point for all "disaster-relevant" organizations. Such Emergency Operations Centers are "usually under the jurisdiction of local governments, with the local civil defense office responsible for their maintenance and operation." In other words, the county Emergency Preparedness Plan would be the organizational framework for emergency response. Within the St. Helens impact area local civil defense offices are generally under the jurisdiction of county government.

The survey of twenty-six jurisdictions indicated limited use of these countywide plans to seek organizational and procedural cues for disaster operations (Table IV-6). To what extent, then, did local governments establish their own community-wide emergency operations? The information collected in on-site interviews was analyzed to answer this question.

A summary classification of the organization of protective measures in twelve interviewed jurisdictions indicated that local government rather than countywide offices assumed the major organizational responsibilities. A number
of jurisdictions also shared some operational efforts with a countywide emergency organization or coordinator. An average of 58% of jurisdictions assumed the major responsibilities for three operations: communications with citizens; seeking external resources, and; coordinating incoming resources. An average of 28% of jurisdictions shared these responsibilities with a countywide emergency organization. The remaining jurisdictions (15%) assumed only minor roles in these operations. (Table IV-12).

The results of this classification of roles were compared with the reported use of countywide plans by the same jurisdictions in the written survey. This revealed that 86% of the jurisdictions assuming the major role in communications also reported no use of countywide plans to initiate that operation. However, 67% of the jurisdictions classified as having the major role in seeking external assistance indicated use of a countywide plan for that operation. This seemed inconsistent.

Case study analysis of six of the jurisdictions provided further insight into the above results. In many instances the key to finding external resources rested with ad-hoc efforts by local officials despite the use of countywide emergency offices. Innovative search methods or the actions of other jurisdictions with which local officials had close ties were often the reasons for acquiring emergency resources.

But a number of jurisdictions indicated that countywide emergency offices were used to successfully coordinate the use of outside emergency aid. This was consistent with the finding that the highest percentage of jurisdictions (33%) shared responsibility for "coordinating resources" with a countywide emergency office (Table IV-12).

In sum, much of local emergency operations appeared to be the result of ad-hoc adaptation of existing organization rather than the result of implementing formalized (i.e., written) pre-emergency plans. Even so, local governments placed great emphasis on efforts to communicate with citizens and deal with inter- and intra-organizational coordination needs, as suggested by disaster planning research. Further examination of communications and methods of resource acquisition and use indicated the degree to which operational hindrances and opportunities existed in these unplanned actions.

Communications With Citizens

Disaster researchers argue that information distribution during emergencies may not receive the attention it should. It is assumed that "... the mass media serve as the channel for communicating the most information to the public" (Wenger et al 1980: 146). Information concerning local government communications and their perceived effectiveness was collected through the written survey. The results indicated that local government emphasized communications, and that the mass media (radio and television) were the most frequently used method.
However, the data revealed that the frequency and effectiveness of use varied with the specific type of mass media used. In addition, other locally devised means of communication were found to be important.

The four most frequently used communication methods were: Local Radio Stations (74%); Non-Local Radio Stations (59%); Information Phones Set Up Locally (48%); "Grapevines" (41%) and Public Address System on Vehicles (41%). (Table IV-15). Local radio stations ranked highest in both frequency of use and perceived effectiveness. But local officials rated information phones and "grapevines" as more effective than non-local radio stations despite their lesser frequency of use among all 26 jurisdictions.

Three less frequently used methods were non-local T.V. stations (37%); local T.V. stations (33%); and written leaflets distributed to citizens (26%). However, the locally devised method (leaflets) ranked much higher in perceived effectiveness than either local or non-local television. It appeared that some distinction should be drawn between types of mass-media in assessing their role in emergency operations.

Local officials were asked to identify any factors that they thought contributed to the perceived lack of effectiveness in radio and television communications. The major impediment appeared to be "overlapping" of messages from other jurisdictions; these messages frequently contained instructions which were different than those intended for the jurisdiction's own citizens. This problem was reported by 60% of all jurisdictions (Table IV-16). Additional problems cited were incorrect messages (44%), infrequent broadcast of local messages (41%), delays in broadcasting messages (34%), editing of messages by the news media (26%), and giving local messages low priority (23%).

Information from the interviews supported and elaborated on these findings. Local governments attempted to insure the accuracy and frequency of broadcast messages by meeting directly with media personnel, holding regularly scheduled daily news conferences, or taping messages for verbatim broadcast. These techniques were most easily achieved in working with local stations.

Interviewed jurisdictions suggested that overlapping messages were caused by the largest stations in an area broadcasting information that did not reflect operations or instructions for outlying communities. For example, officials in the larger cities of Spokane and Yakima did not report problems with overlap, however, the jurisdictions surrounding their metropolitan areas did. Overlapping broadcast information seemed to reduce the effectiveness of detailed citizen instructions within single communities, such as water rationing restrictions or instructions for organizing neighborhoods. To address this problem, jurisdictions turned to locally "tailored" labor-intensive methods such as phone centers, grapevines and handbills to communicate detailed instructions.

Many disaster researchers have argued that warnings to evacuate or to take protective actions must contain detailed instructions or "adaptive plans." The experience with the eruption suggests that attention should be given to the operational problems of using the broadcast media for such communication in
multi-jurisdictional emergencies. As mentioned earlier, few jurisdictions used countywide emergency plans to set up messaging systems with the media. A comparison of the incidence of overlapping messages with the use of plans in this way revealed that those few jurisdictions that did use plans were no less immune to overlap problems than the other jurisdictions, however. The needed coordination between public officials and media personnel may not be present in existing plans to the degree needed to avoid overlap problems.

Through the written survey, the content of messages was also examined in greater detail. Local officials were asked to identify the types and perceived effectiveness of emergency restrictions and instructions used. The three most frequently used types of messages were emergency speed limits (89% of jurisdictions), instructions to citizens on organizing ash cleanup (70%) and orders not to drive cars at all (60%). (Table IV-19). Instructions to citizens on cleanup operations were seen as being more effective than traffic restrictions. Other types of emergency messages and orders were seen as having been effective in the majority of cases. There was somewhat more variation in the reported effectiveness of both traffic restrictions and cleanup instructions than other types of messages.

Jurisdictions were asked to describe any "incentive strategies" they used to gain citizen cooperation with emergency cleanup operations. Disaster researchers have argued that such incentives are an important part of effective emergency communications (Perry 1979). Twelve jurisdictions (46%) indicated the use of incentives. By far, the most frequent ones reported were providing citizens access to fire hose and public hydrants (seven jurisdictions) and, requiring citizen compliance with instructions before picking up piles of ash from neighborhood roads (also seven). The local use of incentives on an ad-hoc, unplanned basis suggests that such strategies have the operational usefulness suggested by researchers. However, like the use of the broadcast media, there were operational problems associated with such strategies. These are discussed in the next section on Resource Acquisition and Use.

Resource Acquisition and Use

Disaster researchers have suggested that inter-organizational coordination is essential to acquiring and sharing resources in the emergency response, particularly if there is a scarcity of resources. This was no less true for the eruption. Local governments made extensive use of equipment and manpower from a variety of sources. A few of the written survey estimates probed aspects of resource acquisition and inter-organizational coordination.

However, the most valuable information was captured in the interviews with twelve jurisdictions. These revealed further dimensions not tapped by the survey. Nevertheless, because the unique aspects of each jurisdiction's situation shaped its comments, it was not possible to collect strictly comparable information in all cases. Easy categorization could not be accomplished. In addition, preparation of verbatim transcripts and the time needed for a systematic content analysis of all interview data were outside the scope of this project. These are areas in which further research design would be needed in future studies.
Therefore, the review of field data concerning emergency resources which relies on the interviews is highly descriptive and heuristic. Key examples were drawn from interview data to examine: (1) Where local governments acquired equipment; (2) Where the equipment was used in the community; and (3) What aspects of utilizing emergency manpower were important. Some tentative observations are made on this basis.

As noted earlier, private contractors and other local governments were the first and second ranking sources of emergency equipment received. Although seven jurisdictions (27% of all surveyed) were refused equipment by private contractors they normally relied upon, the interviews suggested that this was a minor problem. A more significant operational problem was the negotiation of standard rates for emergency equipment with many separate contractors.

Many local governments provided equipment to those in the impact area. However, this was rarely the result of pre-planned arrangements. Only five jurisdictions of the twenty-six surveyed had pre-existing mutual-aid agreements with their sources of equipment.

Several cases graphically illustrated that delivery of assistance from other jurisdictions did not logically evolve out of geographic proximity or statewide resource allocation. Rather, in some cases, assistance was based on existing professional or cultural ties between managers and local officials. In other situations, the ingenuity of local officials in seeking aid was an important factor. Assistance came from some distance away in all these cases, including across state and national boundaries.

Although a number of jurisdictions reported seeking assistance from state agencies, these ranked low as sources of equipment. This appeared partly due to resource scarcity. State highway agencies, for example, were faced with the awesome task of opening highways. In one case, a district highway office competed with a local government for rental equipment. However, several cases illustrated that failure to gain equipment from the state level was also due to the lack of a co-ordinative mechanism for allocating aid. Where state agency assistance was gained, it was often through direct contact with local or sub-state offices of agencies rather than through centralized coordination.

In some instances there was similar difficulty in acquiring equipment from military installations. Local military authorities could not deploy equipment without authorization at a national level. This frustrated some early requests by local governments for aid.

Priorities

In the survey, all jurisdictions were asked to identify their spatial priorities for using resources in the community. Not surprisingly, the Central Business District and major arterial roads were the first priority in most jurisdictions (Table IV-22). Cleaning "other public buildings" was a strong second priority along with secondary arterials serving residential areas. One local official pointed out that cleaning public places was not only
necessary but was also a "morale booster" to citizens. Many interviewed jurisdictions commented, however, that neighborhood roads were not an immediate priority because of limited resources.

An attempt was made to develop graphic "mental maps" of cleanup efforts with interviewed jurisdictions. This met with limited success. Two case examples, however, illustrated how priorities for cleaning neighborhood areas were decided upon. Although the two approaches were quite different spatially, both were based on pacing the public response (heavy equipment to pick up ash) to the level of citizen effort in each neighborhood (preparing the ash for pickup).

Manpower

Citizens were also a source of emergency manpower resources. However, the strategy of giving citizens access to public resources (such as firehose and hydrants) also presented some operational difficulties. One jurisdiction outlined the organizational demands such an approach places on the limited public personnel and resources in an emergency. To be successful, citizen use of public personnel and resources must be coordinated and supervised. Officials from another jurisdiction echoed these opinions, but they found that neighborhoods with a high level of citizen organization (due to an ongoing community planning program) were more effectively and easily organized.

Utilizing emergency personnel from other local governments and National Guard units also presented operational problems and opportunities. Some jurisdictions stressed that the existing organization of some local government personnel from outside the community was a tangible resource in itself. Such groups were highly effective. The same was true of National Guard units.

Operationally, the major problems with outside personnel were providing them with physical resources in short supply: e.g., adequate housing, food, and necessary hand tools. One jurisdiction made a detailed explanation of how emergency manpower assistance is only effective if supported by adequate housing facilities. Several jurisdictions commented that they were surprised that National Guard personnel arrived without their own hand tools.

Some Further Observations

Local governments experienced a variety of successes and frustrations in efforts to acquire and use emergency resources. Some of the frustrations were related to resource scarcity caused by the magnitude of the area affected by the eruption. But some operational difficulties in acquiring emergency equipment resources or using manpower apparently stemmed from a lack of coordination.

Much of the success observed in specific jurisdictions appeared to be situation-dependent, and was achieved through horizontal rather than vertical relationships. For example, little equipment was acquired through centralized allocation of resources to local needs. Local governments appeared frustrated by lack of access to central decision-makers from state and federal levels who had authority to allocate resources. A frequent comment was "The squeaky wheel gets the grease."
Even within communities, the prioritization of assistance to residential neighborhoods was partly based on a horizontal partnership between citizens and public personnel. Well-organized neighborhood efforts received priority. Less organized areas, such as those consisting of mixed land uses or transitional zones, were reported as receiving the lowest priority in several cases.

These tentative observations generally support the arguments made by disaster researchers that inter-organizational coordination of emergency resource needs is essential to maximize efficiency and minimize conflict. However, in this study, there were few examples collected of successful centralized coordination between levels of government. Indeed, many cases illustrated approaches to problem-solving which developed out of ad-hoc situational factors and a lack of central coordination. This should not be interpreted to mean that such coordination is not necessary or desirable. It does, however, imply that we have no ready prescriptions for making such coordination happen which can be drawn from the eruption response.

SECTION V: Planning Implications

Are there lessons in the local response to the eruption which are transferable to general emergency planning needs? Wenger et al. note that an obstacle "... to effective planning that is espoused by officials is the old 'all disasters are different syndrome.'" (1980: 134). Do the local officials who responded to the eruption share this skepticism about pre-disaster planning? What are the planning implications of the ad-hoc strategies adopted by local jurisdictions?

Planning Attitudes

Local officials were presented with a series of questions probing attitudes towards emergency planning. Seventy-three percent disagreed with the idea that surprise general disasters cannot be planned for. Ninety-three percent agreed that future volcanic hazards may occur and should be planned for. (Table V-1)

With respect to institutional arrangements for emergency planning, 69% disagreed with the proposition that state agencies should be the focus of efforts with local governments following their lead. While 73% agreed that cities and counties should have a lead role in emergency planning programs, a higher percentage (90%) felt that cities, counties and states each have an appropriate role which should be recognized and improved. (Table V-2)

Although jurisdictions appear supportive of emergency planning in light of the eruption, there was less agreement on the need for specific measures to be incorporated into planning efforts. One hundred percent agreed that common sense organizational steps can be taken to prepare for general emergencies, and 93% agreed that local governments can plan to share equipment in emergencies. (Table V-3)
But there was little agreement on plans to pursue two suggested techniques for pre-emergency management planning (Table V-4). Only one jurisdiction reported planning to develop model equipment acquisition contracts or to adopt mutual-aid agreements with sources of equipment used in the emergency. However, six jurisdictions (22%) reported not knowing if they would develop model contracts and an even higher percentage (40%) reported not knowing if they would adopt mutual-aid agreements.

The interview data generally supported the survey results. A few jurisdictions have moved to develop emergency response plans. Not all such plans are volcano-specific. Other jurisdictions have chosen not to undertake comprehensive emergency planning. There is, as one City Manager noted, some pessimism about the interest in emergency planning which can be sustained. In general, the results suggest that local governments in the study area perceive a need for better emergency planning. However, they are not fully decided on what specific techniques to pursue.

Evaluating the Implications

The implications of the local response to Mt. St. Helens can be looked at from at least three perspectives. From an operational point-of-view, the actions taken by jurisdictions indicate useful techniques and common problems which can be given attention in emergency plans. However, these operational lessons must be transferable to other areas or else we are left with a situation where "a disaster is the best stimulus for better disaster planning." One approach to transferring these lessons of experience elsewhere is to institutionalize them in programs which promote pre-emergency planning.

From an institutional point-of-view, the St. Helens experience may indicate that emergency planning programs would benefit from more direct relationships with local government rather than through county coordination systems. It is apparent that county-wide emergency plans had limited applicability to immediate response needs. Functionally speaking, the county-wide model for emergency resource delivery was not as effective as actions taken by individual jurisdictions. However, the intergovernmental funding and training programs for state-wide emergency planning are based on the county-wide model.

A further observation is that current programs may be promoting a two-level system of emergency plans. The first level is the nationally mandated nuclear disaster preparedness system built around county...de emergency plans. The second level consists of the individual plans which each local government appears to develop out of its own needs and experience. The learning about workable techniques and organizational approaches took place on this second level; and it is likely that lessons of experience will be incorporated within each jurisdiction's individual plans rather than at the county-wide level. This may not promote the coordination so obviously needed.

These observations are in need of verification in other regions and emergency situations, but they have two potential implications for the programs supporting local emergency planning. First, if the current intergovernmental coordination framework was less effective than hoped for in the eruption, it may
also be less than effective in meeting current national goals for nuclear disaster preparedness. One local official, commenting on a nuclear preparedness training session, said that "the training session a year ago was useful organizationally, but it would never work operationally."

Secondly, although organizational models for emergency planning can be critiqued, it may be more useful to examine the goals of the program itself. Each approach will have its strengths and weaknesses, but underlying any institutional approach is the question of what the desired end results really are. If the goal is to provide an administrative framework for state and local compliance with national guidelines, perhaps the present system is appropriate. If the goal is to promote improved local capacity for emergency response planning, then an institutional framework which stimulates development of locally conceived strategies and methods may be needed. The implication of the St. Helens experience is that locally conceived plans are likely to have higher effectiveness in responding to some emergency needs than centrally conceived, administrative guidelines.

Finally, there are implications for the actual planning techniques used to promote and develop emergency response plans. How does one stimulate or conduct pre-emergency adaptive problem-solving? Essentially what is called for is a training process. The Federal Emergency Management Agency has recognized the need for such a process and is developing a self-assessment manual for local governments to use in evaluating their own emergency management organization.

However, the ad hoc problem-solving observed among local governments in this study implies that any training or assessment procedure must not be limited to simple verification of existing administrative arrangements. What perhaps is necessary is techniques which stimulate pre-disaster learning experiences similar to those observed to take place in the heat of disaster response. This is not likely to be easily achieved, although such situational problem-solving approaches or "games" have been used with some success in the community land use planning process. For emergency planning needs, one approach to gaming might be to develop simulations of disaster in which a jurisdiction can identify the problems and previously unconsidered techniques which might arise in their emergency operations.

Further Research Needs

Further research is needed to determine if these observations on the St. Helens emergency response are valid and generalizable to other emergency planning situations. Information is needed on crisis problem-solving in other emergencies to determine if there is a general tendency to adopt the innovations and appropriate techniques observed in this case. Existing emergency plans should be assessed on a wide basis to determine if they are based on operational techniques which have low probability of success.

It would also be useful to assess the extent to which localities are maintaining a two-tiered system of emergency plans, and the relationship of individual local government plans to those maintained on a county-wide basis under
federal and state assistance programs. A related question is to examine the extent to which county-wide emergency offices are administrative entities, or organizations with effective functional linkages to general purpose local government.

Finally, there is a need for development and testing of planning techniques which can be successfully used to promote pre-disaster problem-solving. It has been suggested here that situational or simulation "gaming" is one possible technique. There are no doubt other variations on this approach which could be developed and tested.
SECTION II

PROJECT DESIGN

Field data reported in this study were collected through two means: a written survey consisting of forty-three questions, and face-to-face interviews with executive officials in twelve jurisdictions. Twenty-six cities, counties and sub-county highway districts completed the written survey, including eleven of the twelve interviewed jurisdictions. The interview subject areas were organized to reflect and complement the same areas covered by specific close-ended questions in the survey. The interviews themselves collected open-ended responses within the subject areas.

The methodology of this study was somewhat ad-hoc in nature—it evolved rapidly. There was no provision in this quick-response effort for literature review or formalized research modeling prior to field work. To some extent, research questions developed interactively throughout project implementation.

This section concludes with an evaluation of the limitations and opportunities connected with such research conditions and their relationship to other planning-related research. Preceding this is a discussion of how this study relates to a general framework of definitions for emergency planning and disaster response. The process of field question development and choice of data collection methods is reviewed. The sample of jurisdictions is described with respect to jurisdiction type and location, the response rate achieved in the written survey, and the positions of participating local public officials.

A Definitional Framework

Emergency planning has been described as having three overall components: programs for pre-disaster avoidance of hazards; resource delivery systems for responding to disasters when they happen; and financial support programs for post-disaster recovery (Council of State Governments 1979). This study concerns the response or resource delivery aspect of emergency planning.

Within disaster response, there are at least three stages of immediate action: initiating hazard warning; undertaking pre-impact preventive measures such as evacuation or sheltering; and protective actions during and after disaster impact. This study focuses on local actions after the arrival of the ash fallout. In this case, unlike flood or other disaster impacts, the during-disaster emergency response took place over an extended period of days.

The preliminary focus of this study was defined as identification of local governments' adaptive problem-solving procedures to restore transportation services; and the possible implications of this experience for emergency planning. This focus specifically concerns the operational aspects of the local response. It is not concerned with social-psychological dimensions of human behavior, except insofar as public officials make necessary decisions based on their situations. Explicitly, this study is not concerned with the personal characteristics of local officials or their citizens. Actions and their evaluation are the basic dataset of this study.
Development of Field Questions

The preliminary study questions include consideration of both organizational experiences with emergency resource (equipment and manpower) acquisition and technical problems related to the design of the transportation system. These areas of inquiry underwent considerable modification, however, during a three-step process of implementing field data collection.

(1) Initial phone contacts were made with numerous local officials between June 24 and June 26, 1980. The purpose of these contacts was to better ascertain what local governments had done in responding to the May 18 eruption. Additional dimensions of importance to the local response were identified through these open-ended discussions.

Chief among these was the effort to communicate with citizens during the extended emergency response. Interaction between local government and other public and private entities to acquire emergency resources also emerged as an important element. Finally, it became apparent that the role of citizens in volunteer or self-help units was related to the public response.

(2) A series of specific questions was developed encompassing both the initial study questions and those mentioned above. These questions were field-tested through interviews with two municipalities on June 27 and July 1. The information collected in these interviews amplified the importance of communications, inter-governmental relations and citizen roles in organizing emergency operations. Secondary concerns regarding emergency public restrictions and finance were also identified.

The reaction to two types of questions in the preliminary study design was overwhelmingly negative, however. The first was a series of questions probing the impacts of transportation system design on the fallout response effort. Specific design aspects included road surfacing, alignment, drainage improvements, road capacity and the proximity to other land uses. The pre-test jurisdictions indicated that such factors had little relevance to their actions. Therefore, a decision was made to limit this line of inquiry to a few general questions. The eventual results were consistent with the field-testing experience.

The second type of question was designed to ascertain if and when jurisdictions made any significant changes in the conduct of their response based on changing information or conditions. This line of inquiry proved very difficult to implement, more on the basis of question design than because of its validity. Although the question was dropped, some information collected in the study does, in fact, illustrate such changes in response strategies.

(3) A final set of research questions was prepared in the form of a written survey instrument and a set of general interview subject categories. This work was completed between July 2 and July 11. The general interview subjects are listed in Exhibit II-1. Each category reflected specific questions in the written survey. The survey itself consisted of a total of 43 questions, of which thirty-four were fixed and semifixed alternative questions.
July 7, 1980

TO: W.J. Kelly, M.L. Hitchcock

FROM: Jack Kartez

RE: Suggested format for "field reports" of interviews with city managers and local officials.

1. HAZARD PERCEPTION
   When did the fallout become a 'disaster?'

2. ORGANIZATION RESPONSE
   What were the first few day's actions in organizing decisions, personnel, equipment and finance to mitigate the road closures.

3. COMMUNICATIONS
   What methods of communicating with citizens were utilized? How effective were they? Where did 'outside' information come from (on health impacts of the ash, availability of assistance, etc.)?

4. PRIORITIES FOR ROAD CLOSURE MITIGATION: IMPACT DURATION
   How long did the impacts on essential and general traffic last?
   What priorities were established for clean-up? Were there any particular types of roads or land uses which received low-priority treatment? What was the reason?

5. LOCAL SOLUTIONS AND INNOVATIONS
   What techniques were developed locally to meet needs and overcome problems. This category might include communications, finance, equipment acquisition or modification, organization of volunteerism or organization of city resources.
   We generally are not interested in particular methods used to clean the ash, since there were so many local variations, EXCEPT insofar as the method reveals a dimension of the local response pattern.

6. FACILITY DESIGN AND EQUIPMENT PROBLEMS
   Problems with road surfacing and drainage, equipment failures.

7. ATTITUDE TOWARDS DISASTER PREPAREDNESS PLANNING & FUTURE VOLCANO HAZARDS
   Can it be planned for? In what ways? Do you think it will happen again?

8. OVERALL RESPONSE PHILOSOPHY OF COMMUNITY MANAGEMENT
The general categories were eventually re-organized and reduced in number to three for the purpose of reporting and evaluating results. These three categories are: Organization of the Local Response; Communications with Citizens; and Resource Acquisition and Use. Section III of this report explains the rationale for this organization.

A special note should be given to category #4 in Exhibit II-1 (Priorities). It was originally intended to collect graphic "mental maps" of the local response from interviewed jurisdictions. This met with very limited success, as explained in Section IV of this report.

Data Collection Methods

The choice of two data collection methods (surveys and interviews) evolved in response to changing conditions. The initial project plan was to entail twenty on-site interviews with local jurisdictions. It became obvious that coordination and scheduling of interview dates with local officials would take far more time than anticipated. Local officials' own schedules were still disrupted by the eruption in July. Therefore, the number of on-site interviews was reduced to twelve, including the two jurisdictions participating in field-testing.

The decision to rapidly implement a written survey was made in response to the reduction in jurisdictions to be interviewed. One purpose was to maintain some breadth in the size of the study sample by collecting complementary information from mail-surveyed jurisdictions. Another consideration, though, was to provide a further framework within which to summarize and classify the interview data. Data from close-ended questions was seen as providing the benefit of a set of uniform information to compare with the open-ended interview cases.

Each interviewed jurisdiction was asked to complete the written questions prior to the interview session. In practice, some jurisdictions completed the survey during the interview. In one case, we failed to obtain a written response from one interview jurisdiction. This was due to the respondent's perception of time constraints rather than unwillingness to participate, however.

The Sampled Jurisdictions

It was originally intended to examine the experience of cities, counties and highway districts in the May 18 eruption on. By the time of project initiation, Mt. St. Helens had erupted twice more on May 23 and June 12. Both these eruptions impacted parts of southwest Washington and northwest Oregon.

In view of the decision to implement a written mail survey, it was further decided to include a sample of jurisdictions from northwest Oregon. The southwest Washington area was intentionally avoided for two reasons. First, other types of emergency activities relating to expected flood hazards from the volcano were present in the area. Secondly, the area was already being heavily
affected by numerous research projects and management activities. The sample here reflects jurisdictions responding only to volcanic fallout. Map II - 1 displays the jurisdictions included in this study.

Table II - 1 summarizes the distribution of jurisdiction types by three categories: mail-only, interviewed jurisdictions, and the total sample. The relative proportions of cities, counties with road responsibility and sub-county highway districts in counties without road responsibility are representative of the proportions of these jurisdiction types in the area. Table II - 2 summarizes the response to the written survey. The intention was to collect written surveys from about twice as many jurisdictions as the number interviewed, or a ratio of two mail survey responses to each survey collected from an interviewed jurisdiction. The final proportion was much lower, with 15 mail-only responses and 11 survey responses from interviewees.¹

The raw response rate from thirty-five jurisdictions was twenty-nine (83%). The usable response rate was twenty-six jurisdictions (74%). The actual number of responses reported in Section IV totals twenty-seven, however, due to a double-response from one jurisdiction. Both the City Manager and Administrative Aide completed the written questions in one interviewed municipality. There was some variance between the two responses. However, it was impossible to find a criterion for choosing one response over the other. Both local officials felt that the variance in responses to some questions accurately reflected different aspects of their managerial responsibilities. Therefore, the survey data include twenty-seven responses for twenty-six jurisdictions.

It was planned to collect responses through one chief executive officer in each jurisdiction to avoid such complications in the data. Each jurisdiction was also encouraged to include other relevant public officials in preparing the written responses and in the interviews. The purpose was to collect a response representing the management view, rather than a study of individual opinions.

Table II - 3 summarizes the distribution of types of officials responding to the written survey. The total is greater than the number of participant jurisdictions because more than one official was involved in several jurisdictions. It should be noted that the largest community in which the Mayor was a respondent had a population of 5,500 people. The other jurisdictions with a Mayor responding were less than 2,000 persons in size. This was consistent with the study's focus on management decision-making because, in small communities the Mayor is often responsible for many day-to-day operations.

A Methodological Evaluation

The exploratory approach of this project is typical of case studies, despite the use of data from close-ended survey questions. Here, the case studied was phenomenon encompassing many single jurisdictions. Each single case jurisdiction is treated with less detail than would be true of a single-case study. More attention is devoted to identifying trends in the study sample.

¹ However, the results of the final survey question concerning attitudes towards emergency planning include two responses from Oregon communities which only answered this question due to very minor ashfall. See Tables V - 1, V - 2 and V - 3.
### TABLE II - 1
DISTRIBUTION OF STUDY JURISDICTION
BY TYPE & DATA COLLECTION METHOD

<table>
<thead>
<tr>
<th></th>
<th>CITIES</th>
<th></th>
<th>COUNTIES</th>
<th></th>
<th>HWY DISTRICTS</th>
<th></th>
<th>ROW TOTAL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Jurisdictions Only Included In The Mail Survey</td>
<td>10</td>
<td>67%</td>
<td>4</td>
<td>26%</td>
<td>1</td>
<td>7%</td>
<td>15</td>
<td>100%</td>
</tr>
<tr>
<td>Jurisdictions Interviewed</td>
<td>7</td>
<td>64%</td>
<td>2</td>
<td>18%</td>
<td>2</td>
<td>18%</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td>All Jurisdictions</td>
<td>17</td>
<td>65%</td>
<td>6</td>
<td>23%</td>
<td>3</td>
<td>12%</td>
<td>26</td>
<td>100%</td>
</tr>
</tbody>
</table>

### TABLE II - 2
RESPONSE RATES TO THE WRITTEN SURVEY
SUMMARIZED BY DATA COLLECTION METHOD

<table>
<thead>
<tr>
<th></th>
<th>Number of Responses Sought</th>
<th>Raw Response Rate</th>
<th>Useable Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jurisdictions Only Included In The Mail Survey</td>
<td>23 (100%)</td>
<td>18 (78%)</td>
<td>15 (65%)</td>
</tr>
<tr>
<td>Jurisdictions Interviewed</td>
<td>12 (100%)</td>
<td>11 (92%)</td>
<td>11 (92%)</td>
</tr>
<tr>
<td>All Jurisdictions</td>
<td>35 (100%)</td>
<td>29 (83%)</td>
<td>26 (74%)</td>
</tr>
</tbody>
</table>
### TABLE II - 3

**POSITIONS OF LOCAL OFFICIALS RESPONDING IN THE WRITTEN SURVEY.**

<table>
<thead>
<tr>
<th>Position</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>City Managers, Asst.</td>
<td>12</td>
<td>38%</td>
</tr>
<tr>
<td>City Managers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>County Engineers and Public Works Directors</td>
<td>10</td>
<td>31%</td>
</tr>
<tr>
<td>Mayors and County-Level Elected Officials</td>
<td>6</td>
<td>19%</td>
</tr>
<tr>
<td>Other Department Heads and Highway District Supervisors</td>
<td>4</td>
<td>12%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>32</td>
<td>100%</td>
</tr>
</tbody>
</table>

**NOTES:** 1. The total is 32 officials responding for 26 jurisdictions.
as a whole—but not in a formalized statistical sense. Like many case studies, the process has been partly subjective.

We are to some extent guilty of following what Griffin (1975: 71) calls the "dominant tradition of disaster literature:"

(Disaster research) uses the case study, unstructured or semi-structured interview, one organization, one disaster-type and is highly descriptive but with great claims about developing theory.

This study deviates from the above description in that a number of cases within one disaster impact are involved. However, we fulfill the final ingredient by turning to theory in reporting our results. However, this is urban and regional planning theory rather than social science per se.

Planning theory in the local government setting has not generated an empirical body of literature nor even much agreement on the measurable variables for testing analytical models of the planning process. There is some wariness of the experience with the "urban modeling" movement. Large-scale predictive models of urban growth did little to address the difficulties of the policy-development process itself.

Planning behavior is increasingly recognized as being situation-dependent (see Catanese and Farmer 1978: 179-207). Even recent proposals for objective models of local planning consist of suggesting the "contingent conditions" which are associated with different planning approaches. (Galloway 1979). Much planning research, both theoretical and practical, is descriptive and judgemental in nature.

For example, research on practical techniques may involve comparison of different cases, with identification of operational problems and opportunities, or trends. Research on the planning process itself often relies on case studies which generate speculative criteria rather than test them. Such studies bear some similarity to one school of thought in social science research, as described by Blau and Meyer (1971: in Mileti et al 1975: 50):

Case study methods do not require the investigator to specify detailed hypotheses in advance. He may have a tentative list of propositions he wishes to test, but these can be modified in the course of the research. Conclusions are reached by observing sequences of events and imputing a causal nexus to them.

This study also fits the above description insofar as the interpretations of results should be seen as descriptive and inductive rather than conclusive in the deductive-analytical sense.
SECTION III

DISASTER RESEARCH AND URBAN PLANNING THEORY: KNOWLEDGE vs. ACTION

This section discusses issues in emergency planning research in light of current questions in planning theory to provide a basis for examining the local response to the Mt. St. Helens eruption. Observations on emergency planning are drawn from recent work in disaster behavior. Behavioral disaster research has a rich history. It is most often conducted by social scientists whose focus is on empirical knowledge of the populations' behavior under emergency conditions.

Disaster research insights have potential for saving lives through better understanding, for example, of the propensity of individuals to resist orders to evacuate a hazard area before disaster strikes. Some of this work has investigated the use of research insights in the design of emergency response plans. Resistance to evacuation orders is a good example of a behavioral obstacle— one which has received much attention in disaster research.

Research-Based Community Emergency Planning

For example, Perry (1979) argues for the use of research insights in developing strategies for emergency planning of evacuation. Specific incentives for voluntary compliance with evacuation orders can be designed, based on knowledge of how people have actually reacted to such orders in the past. Using knowledge from behavioral research in emergency preparedness plans can enhance the success of relationships between authorities and citizens during crises.

"Warning confirmation behavior", for example, presents a problem to emergency authorities. Individuals resist an evacuation order until they have tested its validity. Validation can include personal observation of the impending hazard, perception that other members of the community take the warning seriously, or personalized contact with the warning source or community officials. The attempts of many individuals to confirm warnings also leads to overloaded communication systems (convergence) and other problems which increase operational problems for authorities. (Perry 1979; Fritz and Mathewson 1957).

Perry applies this well-documented insight into warning confirmation behavior to operational emergency planning:

One probable incentive would involve developing warning confirmation centers rather than leaving confirmation a haphazard process. Thus citizens could be instructed to contact these centers for warning confirmation and/or more detailed instructions. Such a system could be based on telephone or radio contact and would also serve a rumor control function. (1979: 444)

It is further noted that such incentive strategies are "by no means new ideas" but, that they have not previously "been brought together and scrutinized from a social scientific standpoint." (Perry 1979) Another recent suggestion for more sensitive warning system design suggested that pre-selected residents in geographic planning areas would be warned by telephone. These people would in
turn warn residents in their areas (Holgate 1978). This particular strategy is an "incentive" for successful emergency warning operations for three reasons:

First, it recognizes that people will utilize phone lines despite official requests not to. Some disaster researchers argue that phone systems might as well be used positively in emergency warning and that technical innovations may make this possible. (Quarantelli and Taylor 1977) Second, such a system attempts to provide the warning confirmation that people are seeking, but through organized, preplanned means. Third, the use of community members in the warning confirmation system would create greater effect among citizens towards emergency preparedness plans; e.g., it would make them recognize the plan as their own.

The design of such operational incentive strategies is labeled "research based community emergency planning," stressing that:

"... it is important to build emergency planning around people's known reaction patterns. Too often emergency plans which are administratively devised turn out to be based on misconceptions of how people react and, therefore, potentially create more problems than they solve. (Perry 1979: 446)

Such insight, however, is not that easily incorporated into the actual thinking of decision makers. Disaster research appears to use somewhat categorical definitions of the actors who use and implement such knowledge for public purposes, such as "emergency planners" and the "authorities." The public sector is not monolithic and involves a great many complex relationships within and between local, state and federal levels. Intergovernmental relations and responsibilities in carrying out public programs have increasingly dominated the attention of policy planners in the past fifteen years (see, for example, Rondinelli 1975). The underlying problem of turning knowledge into organized action has increasingly dominated the subject of planning theory during the same period. (Friedmann and Hudson 1974, Friedmann 1979).

One impetus for collecting information on the local government response to the volcanic eruption has been concern for these issues in the field of planning. What actions did local government take in the fallout emergency? What constraints to these actions exist? What implications does this information have for the development and implementation of emergency preparedness planning?

Finally, are there institutional incentives for effective emergency response planning which can be devised by observation of emergency response implementation itself?

The following discussion outlines current issues in planning theory which are related to such questions. This serves as an introduction to discussing the results of a very recent project by disaster researchers identifying key aspects of emergency planning from a theoretical perspective. (Wenger et al, 1980) Their results are then used to outline the format in which we report observations on the local response to Mt. St. Helens in Section IV of this report.
Relevant Issues in Planning Theory

If disaster researchers observe that "administratively devised plans" are often less than effective in emergency response, the entire field of planning can offer little but sympathy. The issues which such researchers have tapped in examining a specialized form of planning are nothing less than central to the field. The recent history of urban reconstruction under Community Renewal, Demonstration Cities and related programs of the 1950's and 1960's is an example. This is a traditional area of planning focusing on the physical renewal of the city.

Perin (1970: 40) observes that the assumptions used by planners and designers in urban revitalization fail to pay heed to the underlying behavior and needs of the society using the city:

The historical European reasons for the plaza - as the sole source of water, as the marshaling yard for baroque ceremonials - do not exist within urbanized society. Yet designers and critics will demand a plaza in order to create a sense of community - and so we make large commitments of public funds to perpetuate yet another pathetic fallacy in design.

The field of urban and regional planning as a whole is subject to the same needs for a more sensitive understanding of behavior which disaster researchers argue for emergency response planning. Planning, however, is concerned not only with design issues but also with failures to effectively implement programs in a highly politicized and complex institutional environment.

Kaplan (1903: v) pinpoints this institutional failure in assessing the urban programs of the 1960's:

Indeed, even at the outset it can be said that the impact of the planning profession on the quality of urban life has been marginal at best and at times negative. Certainly, twenty years of federal planning assistance programs have not visibly built up the planning capacity of local governments or improved the quality of local life. Indeed, the prime beneficiaries of such aid seem to be not local governments or local residents, but local and national consultants.

The issue of institutional capacity-building is relevant to disaster planning. Researchers have made numerous suggestions for better structuring emergency response plans. But, if such technical insights are to be useful, the ability and willingness of authorities to use them should be of interest. In recent years planning theory has increasingly focused on such constraints which bar effective transformation of knowledge into action.

Friedmann (1979) describes the problem as one of "linking knowledge to action" calling this "the essential meaning of planning." The problem is more popularly characterized as the gap between "paper plans" (the traditional product) and "people plans" (institutional and advocate processes). Both descriptions reflect the planning professional's trend away from a role as a dispassionate "source of special knowledge" towards being an "implementation specialist."

We might take the planner's traditional skill area - providing information for decisions - as a more specific example of the issues underlying practice. Michael (1974: 41) has argued that:

Studies of the processes of information utilization clearly demonstrate that usually we fail to discriminate between information dissemination, acquisition and utilization. People assume that if information is disseminated, others will acquire it and having done so will use it. There are, in fact, chasms between each of these activities.

Describing this same general problem applied to day-to-day planning practice, Susskind (1904: 158) identifies the methodology of the planner's emerging implementation role as "strategizing that builds on a ... sensitivity to institutional constraints, client needs, and situational potentials."

It could be a short conceptual step from these concerns in planning theory to the current work of disaster researchers. For example, researchers have provided better information on the evacuee's known behavior. They argue that use of this "situational potential" can result in better emergency response planning. If we were to complete the equation suggested by Susskind above, however, one would then have to ask something about the "institutional constraints and client needs" which intervene between this knowledge and its use.

Social science research attempts to provide understanding - for example, understanding of community behavior and needs - while policy planning research attempts to identify the constraints on the action to address such needs. (Wexler and Peck 1975: 11) In the context of disaster planning, the actual operational choices of decision makers are basic inputs to the process of well-informed planning. The examination of experience with these choices is a basic step in linking knowledge to its use. A very recent evaluation of disaster plans provides a normative evaluation of what ought to be in local government emergency response strategies (Wenger, Faupel and James 1980). We now examine this work as a basis for reporting some of the observations of the local emergency response to the volcanic fallout from Mt. St. Helens in Section IV.

**Research Evaluations of Disaster Plans**

A June, 1980, report of the University of Delaware Disaster Research Project provides a synthesis of past research on the structure and operational characteristics of disaster plans (Wenger, Faupel and James 1980). The primary focus of this project was to assess the extent to which the public and officials harbor "disaster myths" in four communities which have experienced significant emergencies due to floods, hurricanes or tornadoes. The somewhat erroneous belief that crime rises in the wake of a natural disaster is an example of a disaster myth. It is argued that such misconceptions about behavior, on the part of disaster relevant officials, can result in poorly conceived or inefficient response strategies.
As a secondary focus of their work, the authors also examine and analyze the content of formalized written disaster "plans" in their study areas in light of observations about emergency planning from the disaster research community. Borrowing from Friedmann (1973) the authors characterize planning as being either "allocative" or "innovative," concluding that:

Disaster planning is allocative in that it generally represents an attempt to maintain and protect the present social system, not alter it. In some respects it tries to plan so that tomorrow will be like today. As opposed to viewing the disaster event as a precipitant for producing innovative, planned change within the community, disaster planning has traditionally focused its attention upon the preparation and allocation of resources to protect the status quo. (Wenger et al 1980: 134)

They also note that since "most disaster plans are inherently crisis management mechanisms implemented at the time of crisis to protect the system," such plans "fundamentally differ from most future-oriented planning." This is somewhat confusing because Friedmann (1973) describes future oriented comprehensive community planning as "allocative" in criticizing its failures to cope with immediate needs in a turbulent social environment.

Still, it is clear that disaster planning is characterized by the authors as being static and lacking necessary linkage with real time decision processes within the community. This point becomes clear in their statement that "in particular, there is a tendency on the part of officials to see disaster planning as a product, not a process." This conclusion is consistent with Friedmann's criticisms of "allocative" planning and the issue of planning versus implementation in planning theory.

Implementation Roles in Disaster (Some Distinctions)

Wegner, Faupel and James examine seventy-one written "disaster plans" in four communities as a basis for their above-mentioned conclusions. These plans are drawn from a variety of organizations defined as having a substantive role in the emergency response, including:

- Mayor's Office
- Civil Defense
- Local Police
- Local Fire
- Sheriff's Office
- Red Cross
- Salvation Army
- Local Television
- Local Radio
- Local Hospital
- Local Telephone Co.
- Local Power Co.
- National Weather Service
- Army/Air Force Units
- Local Naval Base
- Local Public Works
- Local University
- Other Municipal Organizations
- Local Newspaper

Several distinctions should be made between their definition of disaster-relevant authorities and the focus on local government in this study. Some of these organizations did not have a role in the volcanic emergency. More importantly, their breakdown of agencies within local general purpose government into separate organizations raises some questions:

First, the functional line agencies of local government (police, fire, and public works) are not always independent actors. Although it may be valid to
question what emergency plans each office may actually have, such plans are most likely to stem from some overall policy or emergency response philosophy encouraged by the jurisdiction's elected officials or chief executive officer (CEO).

Secondly, defining the Mayor's Office as a separate organization raises the question of where the City Manager or CEO is placed in this scheme. Under the prevalent council-manager form of municipal government, the manager rather than the mayor is the primary operational decision maker (within general policies set by the mayor and council).

In larger counties, an executive or county engineer may be responsible for a similar management role. However, county law enforcement authority is vested in an independently elected sheriff. Also, fire protection and (in some cases) roadway management may be vested in special purpose rural service districts. These organizational variations have an impact on both normal and emergency service provision, and represent a source of many land use planning issues. Third, in some cases the authors aggregate all types of local, state and federal agencies into the category of "government." These treatments of public organization have some implications for the comparison of their results to the observations reported in this investigation.

This study examines the response of local government (cities, counties and rural highway districts). Local government has a day-to-day role as a service provider which is not comparable with quasi-public and private sector service organizations (such as the Red Cross, utilities and the news media); nor is this role comparable with state and federal agencies. One way to characterize local government's particular status is to point out that only local government has the authority to finance its services through general property taxation of its clients. Another important distinction is that local governmental authority is based on statutory responsibility for protection of the "general health, safety and welfare" and the ability to exercise the police power to meet these goals. Local government has an intimate responsibility for the protection of citizens and property on a daily basis.

A more specific detail to keep in mind is that the local level Civil Defense or emergency organization is often an agency of county government. In some cases the County Sheriff's Office is responsible for Civil Defense planning.

This is an important distinction. Many of the local governments in our study area would characterize the organization of general Civil Defense/Emergency Planning Programs as being mandated at a state level, implemented through county coordinators, and lacking a specific "in-house" interface with municipal government. Therefore, the authors' observation that local civil defense organizations are under the authority of local government should be understood to mean county government in many cases. In sum, the use of generalizations in defining public authorities in disaster planning may obscure the operational dynamics within and between units of government.

Reasons for Ineffective Disaster Planning

Such definitional questions notwithstanding, Wenger, Faupel and James provide a state-of-the-art source of prescriptive observations on what ought to be
in the emergency response. They identify several general barriers to effective response: (1) Ignorance of, or erroneous assumptions concerning disaster behavior, (2) a belief among local officials that disasters "are all different and can't be planned for", (3) a lack of preparation for information dissemination to the public, (4) a lack of preparation for a "command post" or organizational plan, and (5) a lack of provision for inter-organizational cooperation.

These barriers might be summarized as problems stemming from erroneous beliefs (Items 1 and 2) and problems stemming from a lack of operational preparedness (Items 3, 4, and 5). The authors state that "coordination of personnel, allocation of resources, and information distribution are crucial elements of disaster response..." They argue that there are similarities in operational (as well as behavioral) problems which should serve as a basis for emergency planning. Several "components" of emergency response preparedness are put forth as being of importance:

The Public Component: Plans ought to be based on accurate beliefs about public behavior in an emergency and recognize the expectations of the public for aid and services from the agency. A desirable operational measure identified by the author is the provision for adequate information distribution to the public on emergency organization and services.

The Focal Organizational Component: Within an organization there should be provision for establishing a "field command post," provision for a pre-emergency inventory of resources, and provision for making the transition to post-emergency or "normal" status. Each of these is a desirable operational feature.

The Inter-Organizational Component: Every organization should prepare for external relationships with other responding agencies in an emergency. The specific operational feature identified is a plan for coordinating with an overall "community command post."

These "components" might almost serve as plan elements for emergency planning efforts.

Normative Planning Criteria vs. The Local Ad Hoc Response: Some Limitations

Not all of the above mentioned prescriptions for emergency response planning are comparable to the local government response to Mt. St. Helens' ash fallout or the descriptive information collected in this study. Within the public component, no information was collected here assessing the degree of awareness among local officials about public expectations or disaster beliefs. Much information on the degree to which jurisdictions communicated with the public was collected, including information on methods, their relative effectiveness and local government media interaction.

Within the focal organizational component the establishment of a command post is comparable to some information collected here, providing a basis for comparison. For example, there was no direct question asked in the written survey
concerning whether or not a "community command post" was established by each jurisdiction. The open-ended responses to the oral interviews, however, indicate the degree to which jurisdictions actually established an operations center or relied on other organizations.

The provision for a pre-emergency inventory of resources is a very specific type of measure suggested. Information was collected here on the types of resources sought by local governments and the adaptive organizational measures taken to utilize both in-house and external resources. This may be indicative of pre-emergency resource organization which is useful. No information was collected here concerning the provision for a return to a state of normalcy.

Within the intra-organizational component, this study collected information on several aspects of local governments' interaction with other agencies and communities to gain information and resources. This serves as a basis for comparing the actual operational experiences of local government with the suggested need for inter-agency coordination and cooperation. Finally, the need to recognize and interact with a community command post is certainly relevant to the local response to Mt. St. Helens, but no systematic information on this subject was collected here.

However, the authors also observe that community-wide command posts or "Emergency Operations Centers" are usually under the jurisdiction of local government, with the local civil defense office responsible for their maintenance and operation. This is a specific subject which can be compared to the interview data collected here. Who was responsible for community coordination in the Mt. St. Helens response in light of the fact that (a) civil defense agencies are special purpose functions with both state agency and local agency affiliations; and (b) civil defense offices are most often within county governmental organization?

Therefore, it seems possible to use some prescriptions for emergency planning suggested by Wenger, Faupel and James as a partial basis for examining the local government response to the eruption's fallout, with some limitations. Accordingly, some tentative comparisons between disaster research observations on emergency planning and the actual response of local government are made in three areas: The organizational response (e.g. the focal organization element); public communications (e.g. the public component); and resource acquisition (e.g. the inter-organizational component.) This analysis is presented in Section IV of this report.

Additional information concerning the spatial priorities in the local response is also reported in Section IV. Here the interest is in identifying any potential relationships between land use and circulation pattern of communities and the emergency response.

Finally, information on the planning attitudes of local officials is analyzed. In this category Wenger, Faupel and James observe that many local officials do not believe emergency preparedness planning can be effective because "all disasters are different." The attitudes of officials responding to the eruption are compared to this observation in Section V of this report.
SECTION IV
THE LOCAL EMERGENCY RESPONSE TO VOLCANIC Fallout

Introduction

From an operational point of view a disaster might be described as a breakdown in normal services or functions requiring special forms of emergency action. Local governments' response to the ash fallout from Mt. St. Helens can be best described as an effort to maintain services or return services as quickly as possible. It was an operational response which focused on using available resources to clean thousands of miles of roads of the choking ash fallout.

Normally, local government services are somewhat rigidly programmed in advance, even in smaller communities. The allocation of resources is controlled through functions such as budgeting, personnel rules and to varying degrees, a separation of public resources from the private resources of individual citizens. In this current period of fiscal retrenchment, the separation of public and private resources has become more sharply defined than ever before. User fees are increasingly charged for services which were available freely to individual citizens in the past. Cutbacks in local government services from previous levels range from physical maintenance projects to the number of personnel available.

Given such fiscal constraints, the local emergency response to the eruption's impacts can hardly be described as a "normal" provision of services. The use of unbudgeted funds, reliance on assistance from other local units of government and allocation of resources to aid the citizen are examples of actions outside the "normal" scope of local government activity. This section reports on the descriptive information collected from cities, counties and sub-county highway districts concerning their activities in responding to the fallout.

As discussed in Section II, this information was collected from management-level operational decision makers through twelve or more interviews and a written survey totalling twenty-seven responses. In most jurisdictions the respondents are chief executive officers responsible for public services: city managers and public works directors. In the smallest jurisdictions the respondents are mayors or other elected officials such as county commissioners. It is important to keep in mind that in rural jurisdictions the key elected officials often have a role in day-to-day operations.

1. The 27 responses reflect answers by both a city manager and assistant city manager in one municipality, thus totalling 26 jurisdictions.
Organization of Section IV

This section begins with an overview providing the reader with a general description of the local emergency response. Aspects of the local response examined are (1) Hazard Warning (2) Hazard Perception (3) Internal Organization of the Local Response (4) External Assistance Needs of Local Government and, (5) Communications Methods with Citizens.

We then examine three dimensions of the local response in greater detail, utilizing some observations by the disaster researchers discussed in Section III: (1) Local government response organization, in particular the relationship to county-wide emergency preparedness planning; (2) Communications programs set up to organize citizens and their effectiveness and; (3) the acquisition of external resources by local government. These three categories correspond roughly to the needs for "coordination of personnel"; "information distribution;" and "allocation of resources" suggested by Wenger et al(1980).

LIMITATIONS: Two limitations of the data collected and presented here should be kept in mind. First, the results here are not the culmination of a formal research model "testing" our expectations about the local response. As discussed in Section III, we have observed that some aspects of the local ad hoc response bear similarities with normative prescriptions for emergency action suggested by disaster researchers. The observations of some recent disaster research are used to relate the observations here to a more systematic framework of knowledge about emergency needs.

Secondly, the information collected in this study comes from two data-collection instruments: face-to-face interviews and a mail-out written survey. Eleven of the twelve jurisdictions interviewed also completed the written survey as discussed in Section II. The information gained from interviews provides insight into the operational response of units of local government, and amplies the data gained across all jurisdictions through the written survey.

Each interview was, however, somewhat individualized, ranging in length from one and one half to four hours. A limitation is that strictly comparable information on a very specific subject was never captured across all twelve interviewed jurisdictions. As discussed earlier in Section II, we were often in the position of discovering new dimensions of the local response from individual jurisdictions as we interviewed them.

However, an attempt has been made to classify four overall dimensions of the local response from interview results, for the purpose of comparison to the emergency planning needs suggested by Wenger et al. No attempt is made, however, to suggest that these comparisons are significant from a statistical viewpoint. The methodology for this coding is explained in the subsection on "Organization of the Local Response." The narrative case examples drawn from interview results provide further clarification of operational experiences.

2. The length of time required to cover all categories of information we had originally planned on proved a constraint in some cases. (See Wenger et al pg. 27 for additional comments on this aspect of studying public officials rather than the general population.)
Overview of the Local Response

Every type of disaster impact has a certain set of experiences associated with it, e.g. marshalling sandbags in floods, evacuation or sheltering in "hardened" areas in hurricanes and tornadoes, etc. Cleaning up millions of tons of the tenacious ash dust is without doubt the aspect of this experience which persists in people's memories. No less is true of the public officials we interviewed. The ash presented formidable problems. Each jurisdiction developed solutions to the problem of cleaning up the ash based on the depth and type of ash in their jurisdiction.

There can be little doubt that the fallout presented a true problem, although fortunately not a tragic one. Jurisdictions were asked to estimate the number of days during which essential and general traffic was disrupted by the fallout. The median duration of essential traffic disruption was three days. The median duration of general traffic disruption was ten days. (Tables IV-1A&B).

The range of ash cleaning methods included washing it, scraping ash into dump trucks for solid waste disposal, mixing it with sawdust and even vacuuming it up with industrial machinery. Given the multiple eruptions of Mt. St. Helens since May 18, 1980, the possibility of further fallout has probably generated another "disaster subculture" such as those described by Moore (1964), Anderson (1965) and many other subsequent researchers.

However, while the methods of cleaning ash are germane to this particular hazard, they are not the focus of this investigation. Therefore, we do not devote attention to them, focusing rather on the organizational adaption of local government's response. Similarly, while further research might verify the emergence of a volcanic hazard subculture and its impacts on emergency planning in the Pacific Northwest, this investigation merely reports observations of the immediate operational response to an unexpected emergency. Finally, we wish to point out that there was little correlation between the depth of ash in each community and the length of traffic disruption or types of adaptive response reported. Obviously, communities with large ashfalls had to work harder to clean it up.

Hazard Warning

Local governments had little warning of the possibility of ash fallout following an eruption of Mt. St. Helens. Only nineteen percent (19%) of mail surveyed jurisdictions reported perceiving a fallout hazard prior to the eruption(s) impacting them. Of these 19 percent (N=5), two were jurisdictions impacted by the first (May 18th) eruption. (Table IV-2). Among these five jurisdictions, eighty percent (80%) reported the general news media as the source of pre-eruption information on potential fallout hazards. Two jurisdictions (40%) reported the "personal knowledge" of local staff as source of pre-eruption hazard information. A university and a state emergency services agency were cited as sources by one jurisdiction each. (Table IV-3). These data indicate that most local governments were not in a warned state prior to the eruption(s).

Hazard Perception

Only four jurisdictions (15%) reported perceiving the ash fallout as a hazard to transportation after receiving notice of the eruption (but before ashfall). An additional eight (30%) of jurisdictions reported perceiving the transportation impacts of the fallout as soon as it began falling in their area. Before the end of the first day of ashfall, twenty-one (78%) perceived the fallout as a transportation problem. (Table IV-4).
Table IV-1A

REPORTED DURATION OF ESSENTIAL
TRAFFIC DISRUPTION

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>3 days</td>
</tr>
<tr>
<td>Mean</td>
<td>3.3 days</td>
</tr>
<tr>
<td>Range</td>
<td>0 - 14 days</td>
</tr>
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<td>N</td>
<td>27</td>
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</tbody>
</table>

Table IV-1B

REPORTED DURATION OF
GENERAL TRAFFIC DISRUPTION

<p>| | |</p>
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<th></th>
</tr>
</thead>
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<tr>
<td>Median</td>
<td>10 days</td>
</tr>
<tr>
<td>Mean</td>
<td>9.3 days</td>
</tr>
<tr>
<td>Range</td>
<td>0 - 35 days*</td>
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<tr>
<td>N</td>
<td>26</td>
</tr>
</tbody>
</table>

*One jurisdiction reported "730 days" or 2 years. This observation has been deleted.
TABLE IV-2

JURISDICTIONS PERCEIVING A PRE ERUPTION VOLCANIC FALLOUT HAZARD

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Jurisdiction Perceived</td>
<td>5</td>
<td>19%</td>
</tr>
<tr>
<td>Hazard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jurisdiction Did Not</td>
<td>22</td>
<td>81%</td>
</tr>
<tr>
<td>Perceive Hazard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>27</td>
<td>100%</td>
</tr>
</tbody>
</table>

TABLE IV-3

SOURCES OF PRE-ERUPTION HAZARD INFORMATION

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>General News Media</td>
<td>4</td>
<td>(80%)*</td>
</tr>
<tr>
<td>Personal Knowledge or Staff</td>
<td>2</td>
<td>(40%)</td>
</tr>
<tr>
<td>University</td>
<td>1</td>
<td>(20%)</td>
</tr>
<tr>
<td>State Disaster Service Agency</td>
<td>1</td>
<td>(20%)</td>
</tr>
</tbody>
</table>

*Jurisdictions reported more than one source in two cases.

TABLE IV-4

TIME OF THE INITIAL PERCEPTION OF ASH FALLOUT AS A TRANSPORTATION EMERGENCY

1. After notification of eruption, but before ashfall
   4 (15%)
2. At commencement of ashfall
   8 (30%)
3. Before end of the first day of volcanic ashfall
   9 (33%)
4. Day Following ashfall when traffic used the Roads
   5 (19%)
5. Later than Following Day
   1 (4%)
Internal Organization of the Local Response

Most jurisdictions appeared to organize their immediate decision making along existing functional lines. The immediate organizational effort did not revolve around civil defense/emergency preparedness personnel at either local or state levels in the majority of cases. Local officials surveyed were asked to identify who the first people were that they contacted to organize a response to the eruption. Only one jurisdiction reported contacting a state or local emergency service agency. Interestingly, two jurisdictions reported contacting their statewide municipal or county government associations first. Sixteen jurisdictions (59%) reported contacting department heads or operational personnel first. (Table IV-5)

A limitation of this question, however, is that local officials were not asked who their secondary contacts were. The response to this question may have revealed a further pattern of organizational action. However, another question asked across all jurisdictions concerned the use or non-use of a "countwide emergency preparedness plan" to locate four types of needed information in the local response. (Table IV-6)

A maximum of ten jurisdictions (37%) reported utilizing an emergency preparedness plan for any one of our types of information: health impacts, state agency contacts, equipment sources, and media contacts. Across all four types of information needs presented to respondents the average use of emergency plans was twenty-eight percent (28%). (Table IV-6) Thirteen jurisdictions reported making no use of a plan (43%).

Again, the information collected in Table IV-6 could have been expanded to probe specific reasons for the use or non-use of a countwide emergency plan. However, a guarded observation is that the local civil defense/emergency preparedness planning system was not the primary organizational foundation for the local government response. Information from interviews provides further support for this observation, and is discussed later in this section.

The decision-to-spend in meeting immediate emergency needs is also a descriptor of local response organization. One survey question attempted to tap this dimension of the response, but from an operational viewpoint (Table IV-7). Respondents indicated either how they met their short-term cash flow needs or that no short-term cash flow needs existed. While seven jurisdictions (26%) were able to utilize reserve funds on hand to meet needs, ten (37%) reported "borrowing" against other funds in their budgets. Five (19%) reported obtaining bank authorization to issue registered warrants in lieu of payment (a form of short-term loan to the jurisdiction).

Although our question was aimed at identifying specific technical strategies used by local government to meet financial needs, the results also indicate that a majority of local governments went outside their normal budgetary constraints to meet emergency needs. Our impression from this data and interview responses is that very few jurisdictions held back on the decision-to-spend to meet immediate needs. One small city described making the decision within a day or two of the eruption to "spend to get the job done" because of the "futility" of trying to clean up without additional resources.
TABLE IV - 5
FIRST PERSONS CONTACTED BY RESPONDING LOCAL OFFICIALS TO ORGANIZE THE EMERGENCY RESPONSE

<table>
<thead>
<tr>
<th>Category</th>
<th>N</th>
<th>Pct. of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Operational Public Officials Only¹</td>
<td>16</td>
<td>59%</td>
</tr>
<tr>
<td>Local Elected Officials Only²</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Both Elected and Operational Officials</td>
<td>4</td>
<td>15%</td>
</tr>
<tr>
<td>State Agency</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>Local Government Association</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>No Response</td>
<td>3</td>
<td>11%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>27</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

NOTES:

1. Includes City Managers, Aides, County Engineers and Assistants, Public Works Directors and other Department Heads.

2. Mayor or Council members, County Commissioners and Highway Commissioners.
TABLE IV - 6
REPORTED USE OF "COUNTYWIDE EMERGENCY PLANS" TO FIND INFORMATION FOR THE EMERGENCY RESPONSE

<table>
<thead>
<tr>
<th>TYPE OF INFORMATION</th>
<th>PLAN USED</th>
<th></th>
<th>PLAN NOT USED</th>
<th></th>
<th>NO RESPONSE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>1. &quot;Where to Get Information on Health Hazards of Ash&quot;</td>
<td>10</td>
<td>37%</td>
<td>17</td>
<td>63%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2. &quot;Which State Agency to Contact for Assistance&quot;</td>
<td>7</td>
<td>26%</td>
<td>19</td>
<td>71%</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>3. &quot;Where to Get More Equipment&quot;</td>
<td>8</td>
<td>30%</td>
<td>18</td>
<td>67%</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>4. &quot;How to Use Radio or T.V. Media to Send Messages to Citizens&quot;</td>
<td>5</td>
<td>19%</td>
<td>21</td>
<td>77%</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>MEAN RESPONSE</td>
<td>28%</td>
<td></td>
<td>69%</td>
<td></td>
<td>3%</td>
<td></td>
</tr>
</tbody>
</table>
There were exceptions to this pattern, however. One rural jurisdiction reported its decision not to exceed normal budgetary constraints in cleaning up the ash because of prior experience with floods. This jurisdiction felt that the process of seeking state and federal post-disaster financial assistance was not likely to provide adequate reimbursement for emergency expenditures. Therefore, this jurisdiction limited its response to existing manpower, equipment and budgeted working hours.

Another jurisdiction described its decision to limit expenditures as one that best served the community's needs. By limiting expenditures for fallout mitigation, the jurisdiction was not put in the position of overextending itself and being forced to reduce normal services in subsequent months or years. These were the only two instances of interviewed jurisdictions reporting a fiscal reason for limiting their emergency response, however.

External Assistance Needs of Local Government

Two of the key operational features of the local government response to the first (May 18th) eruption of Mt. St. Helens were: (1) the pervasive impact of the fallout isolating many communities within a wide area, and (2) the widespread needs among local governments for logistical assistance beyond their existing equipment resources. Twenty-three (85%) of all jurisdictions reported needing additional equipment from a non-local source. Sixteen (70%) of these jurisdictions reported acquiring equipment from private contractors while 12 (52%) received equipment from other units of local government. (Table IV-8)

The time at which the need for external equipment assistance was perceived varied. Twelve jurisdictions (44%) reported needing additional equipment by the first day after the eruption (Table IV-9). By the second day after the eruption an additional two jurisdictions reported perceiving the need for additional equipment. Six jurisdictions (23%) perceived equipment needs only on days three and four after the eruption. As one city manager said in an interview, the eruption was "a slow disaster." Time was needed to fully perceive emergency needs.

Each jurisdiction was asked to rate the "usefulness" of various sources of first-week assistance on a scale of one to ten. Table IV-10 displays the results of this question for the nine sources of assistance suggested to local officials in the question. The perceived usefulness of each source was rank-ordered using a simple weighting of scores. The sum of scores for each category was divided by the number of jurisdictions responding to that particular category. The number of jurisdictions reporting a score for each category is also shown as a percentage of total jurisdictions (N = 27).

Table IV-10 indicates that local governments overwhelmingly rated their own observation and judgement as a source of assistance in the emergency. Perhaps this is not surprising, if a bit tautological. However, the data also indicate that local governments felt that communications-related agencies were highly important to their immediate emergency needs. The news media ranked second, scoring well above other sources of assistance. The law enforcement teletype network--a basic source of statewide information--ranked third.
<table>
<thead>
<tr>
<th>Strategy</th>
<th>Used</th>
<th>Not Used</th>
<th>No Short-Term Cash Needs</th>
<th>No Response</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>Used Reserve Funds</td>
<td>7 26%</td>
<td>13 48%</td>
<td>6 22%</td>
<td>1 4%</td>
<td>27 100%</td>
</tr>
<tr>
<td>Obtained Bank Authorization to Issue Registered Warrants</td>
<td>5 19%</td>
<td>15 56%</td>
<td>6 22%</td>
<td>1 4%</td>
<td>27 100%</td>
</tr>
<tr>
<td>Borrowed Against Other Funds in Budget</td>
<td>10 37%</td>
<td>10 37%</td>
<td>6 22%</td>
<td>1 4%</td>
<td>27 100%</td>
</tr>
<tr>
<td>Set up Separate &quot;Eruption&quot; Fund for all Expenditures and Disaster Reimbursements</td>
<td>11 41%</td>
<td>9 33%</td>
<td>6 22%</td>
<td>1 4%</td>
<td>27 100%</td>
</tr>
</tbody>
</table>
TABLE IV - 8

SOURCES OF EQUIPMENT ACQUIRED BY LOCAL GOVERNMENTS

N = 23

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Units of Local Government¹</td>
<td>12</td>
<td>52%</td>
</tr>
<tr>
<td>State Agencies</td>
<td>4</td>
<td>17%</td>
</tr>
<tr>
<td>National Guard</td>
<td>7</td>
<td>30%</td>
</tr>
<tr>
<td>Private Contractors</td>
<td>16</td>
<td>70%</td>
</tr>
<tr>
<td>Farmers</td>
<td>7</td>
<td>30%</td>
</tr>
<tr>
<td>Local University</td>
<td>2</td>
<td>9%</td>
</tr>
<tr>
<td>Sales or Rental Dealers</td>
<td>6</td>
<td>25%</td>
</tr>
</tbody>
</table>

Notes: 1. Includes cities; counties; sub-county highway, fire, and school districts.

2. Percentage of N = 23 jurisdictions receiving equipment.
### TABLE IV - 9

**REPORTED TIME AT WHICH ADDITIONAL EQUIPMENT NEEDS WERE PERCEIVED BY RESPONDING JURISDICTIONS**

<table>
<thead>
<tr>
<th>Time of Need Perception</th>
<th>Number</th>
<th>Percent of Total</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Ashfall</td>
<td>1</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Day 1 (after ashfall)</td>
<td>12</td>
<td>44%</td>
<td>48%</td>
</tr>
<tr>
<td>Day 2</td>
<td>2</td>
<td>7%</td>
<td>55%</td>
</tr>
<tr>
<td>Days 3 &amp; 4</td>
<td>6</td>
<td>23%</td>
<td>78%</td>
</tr>
<tr>
<td>After Day 4</td>
<td>1</td>
<td>4%</td>
<td>82%</td>
</tr>
</tbody>
</table>

No Response                      | 1      | 4%               | 86%                |

No Equipment Needs               | 4      | 14%              | 100%               |

**TOTAL**                        | 27     | 100%             | 100%               |
### Table IV - 10

**Perceived Effectiveness of External and Internal Assistance Received During the First Week After Ashfall**

<table>
<thead>
<tr>
<th>Assistance Source</th>
<th>Mean Weighted* Effectiveness Rating</th>
<th>Rank</th>
<th>% of N=27 Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. &quot;Our own observation and judgement&quot;</td>
<td>8.96</td>
<td>1</td>
<td>100%</td>
</tr>
<tr>
<td>2. News Media (Radio, Television, etc.)</td>
<td>6.71</td>
<td>2</td>
<td>78%</td>
</tr>
<tr>
<td>3. County Sheriff or Municipal Police Teletype Net</td>
<td>5.00</td>
<td>3</td>
<td>82%</td>
</tr>
<tr>
<td>4. Other Cities</td>
<td>4.96</td>
<td>4</td>
<td>85%</td>
</tr>
<tr>
<td>5. Other Counties</td>
<td>4.71</td>
<td>5</td>
<td>76%</td>
</tr>
<tr>
<td>6. National Guard</td>
<td>3.78</td>
<td>6</td>
<td>70%</td>
</tr>
<tr>
<td>7. Local University</td>
<td>3.70</td>
<td>7</td>
<td>74%</td>
</tr>
<tr>
<td>8. State Emergency or Civil Defense Agency</td>
<td>3.09</td>
<td>8</td>
<td>82%</td>
</tr>
<tr>
<td>9. State Executive Office</td>
<td>1.90</td>
<td>9</td>
<td>82%</td>
</tr>
</tbody>
</table>

**Note:** '*'10' - 'most effective'; '1' = 'least effective'
Other local governments also represented a valued source of assistance. Cities and counties ranked closely behind statewide information networks. Finally, federal and state government-related sources of assistance ranked relatively lower compared to local levels of government and communications systems.

Citizen volunteerism also played a part in the local response. Citizen volunteers were requested by 26% of surveyed jurisdictions, and an additional 59% of jurisdictions received some form of spontaneous citizen volunteer aid. Only two jurisdictions (7%) discouraged citizen volunteerism.

**Communication Methods with Citizens**

Communications with citizens was an essential component of the local response to which we devote detailed attention later in this section. Local governments were asked to indicate which of nine communications methods were used to communicate with citizens and their effectiveness. The results of this question are summarized in Table IV-11.

Seventy-four percent ($N = 20$) reported using local radio stations to communicate with citizens. Fifty-nine percent reported using a radio station in another community to transmit messages to citizens ($N = 16$). Local governments also used specially devised communication methods requiring adaptive efforts. Forty-eight percent ($N = 13$) reported using information phone numbers set up locally, while forty-one percent ($N = 11$) used direct contact with community leaders through face-to-face or telephone "grapevines". Eleven jurisdictions (41%) also utilized public address systems on vehicles to contact citizens. Only four jurisdictions (15%) reported using only one communication method. Only one jurisdiction reported not initiating its own communications effort. All other respondents indicated use of two or more methods of communications with citizens.

Use of these methods indicates that local governments treated the need to communicate with citizens in more than a passive manner. While there was reliance on radio media (the easiest mode of communication operationally) there was also significant use of special communications methods. Information from interviews reported later in this section further reveals the extent to which local governments developed ad-hoc approaches to communicating with citizens. This effort is impressive when one considers that the volcanic eruption was a complete surprise. There were no existing traditions or policies for "hurricane watches" as exist in some regions with habitual emergency response needs.

**Organization of the Local Response**

Wenger, Faupel and James (1980) identify the establishment of an emergency command post as a key element of internal organization in a disaster. It is suggested that a central, community-wide "Emergency Operations Center" (EOC) should serve as a coordination point for all disaster-relevant organizations and operations. They found that EOC's are "usually under the jurisdiction of local government, with the local civil defense office responsible for their maintenance and operation." In Section III of this study, we noted that in the Mt. St. Helens impact area it would be more accurate to say that local civil defense offices are under the jurisdiction of county government. Consequently, it would be expected that establishment of an EOC would be a crucial part of a county's emergency plan.
TABLE IV - 11

COMMUNICATIONS METHODS USED AND THEIR PERCEIVED EFFECTIVENESS

N = 27

<table>
<thead>
<tr>
<th>TYPE OF METHOD</th>
<th>RANK BY # OF JURISDICTIONS USING METHOD (% OF TOTAL IN PARENTHESES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Radio Station</td>
<td>1 (74%)</td>
</tr>
<tr>
<td>Non-Local Radio Station</td>
<td>2 (59%)</td>
</tr>
<tr>
<td>Information Phones Set Up Locally</td>
<td>3 (48%)</td>
</tr>
<tr>
<td>&quot;Grapevines&quot;</td>
<td>4 (41%)</td>
</tr>
<tr>
<td>Public Address Systems on Vehicles</td>
<td>5 (41%)</td>
</tr>
<tr>
<td>Non-Local T.V. Station</td>
<td>6 (37%)</td>
</tr>
<tr>
<td>Local T.V. Station</td>
<td>7 (33%)</td>
</tr>
<tr>
<td>Written Leaflet Distributed to Residents</td>
<td>8 (26%)</td>
</tr>
<tr>
<td>Citizens Band Radio</td>
<td>9 (26%)</td>
</tr>
</tbody>
</table>
Here we examine the extent to which the local government response fits the above-mentioned normative expectations. The survey of 26 jurisdictions suggests that county-wide emergency plans received mixed use by local governments as a "cue" for their organizational actions. In addition, the extent to which local units of government (cities, counties and highway districts) established their own community-wide operations varies over a wide range.

During the interviews, each jurisdiction provided some information on the details of its organizational response to the eruption. Some descriptions were elaborate, revealing a major assumption of responsibility for such operational tasks as coordinating incoming assistance and communicating orders and instructions to citizens. Other jurisdictions had much less elaborate organizational responses, relying on a county-wide emergency operations system. Finally, some jurisdictions assumed mixed organizational roles, relying both on their own organization and a multi-jurisdictional EOC.

The interview data were subjected to content analysis to determine the extent to which each jurisdiction assumed responsibility for organizing four aspects of emergency activities: (1) Seeking external equipment or manpower resources; (2) Coordinating incoming resources; (3) Communicating orders and instructions to citizens; and (4) Organizing citizens directly as emergency manpower.

Each jurisdiction's involvement in these four types of operations were coded as being Major, Shared, or Minor. A jurisdiction which assumed the significant responsibility for an operation was coded "Major." Jurisdictions also relying on a county-wide emergency organization were coded "Shared." Jurisdictions not assuming significant responsibility for a particular operation were coded "Minor." The results of this coding are shown in Table IV-12.

The analysis in Table IV-12 suggests that local government assumed a major role in emergency operations, often independently of the civil defense/emergency organization. The greatest involvement of local emergency offices was in coordinating external assistance with internal needs. This is consistent with an observation by Wenger et al that local civil defense organizations have a strong role in meeting coordination needs (1980, p. 140). However, this civil defense office role was present in only one-third of the jurisdictions interviewed.

Some care should be taken in interpreting the results presented in Table IV-12. Many of the interviewed jurisdictions which assumed major operational command roles also reported using "county-wide emergency plans" in the written survey. Table IV-13 compares the level of involvement in citizen communications with the survey response concerning the use of "emergency plans" to find out "how to use news media to contact citizens." Table IV-14 makes a similar comparison of the interview and survey responses as to involvement in seeking external resources.

The majority of jurisdictions with strong command roles in communications did not report utilizing an emergency plan. In contrast, the majority of jurisdictions with a strong role in seeking external resources also reported using the civil defense/emergency plan to find these resources. The data suggest that individual local governments were the central actors in organizing community
<table>
<thead>
<tr>
<th>OPERATION:</th>
<th>MAJOR*</th>
<th>SHARED*</th>
<th>MINOR*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeking External Resources</td>
<td>7</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>58%</td>
<td>25%</td>
<td>17%</td>
</tr>
<tr>
<td>Coordinating Incoming Resources</td>
<td>6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>50%</td>
<td>33%</td>
<td>17%</td>
</tr>
<tr>
<td>Communications with Citizens</td>
<td>8</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>66%</td>
<td>25%</td>
<td>9%</td>
</tr>
<tr>
<td>Direct Organization of Citizens</td>
<td>4</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>33%</td>
<td>0</td>
<td>66%</td>
</tr>
</tbody>
</table>

*Definitions:  
Major - The jurisdiction assumed significant responsibility for the function.  
Shared - The jurisdiction had significant responsibility shared in part with a countywide, inter-jurisdictional emergency organization.  
Minor - The jurisdiction did not have any significant involvement in the operation.
### TABLE IV - 13

CONSISTENCY BETWEEN LOCAL GOVERNMENT OPERATIONAL INVOLVEMENT AND REPORTED USE OF EMERGENCY PLAN: COMMUNICATIONS

\(N = 11^*\)

<table>
<thead>
<tr>
<th>REPORTED USE OF PLAN</th>
<th>MAJOR</th>
<th>SHARED</th>
<th>MINOR OR NONE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used Plan</td>
<td>1 (9%)</td>
<td>1 (9%)</td>
<td>0</td>
<td>2 (18%)</td>
</tr>
<tr>
<td>Did not use Plan</td>
<td>6 (55%)</td>
<td>2 (18%)</td>
<td>1 (9%)</td>
<td>9 (82%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>7 (64%)</td>
<td>3 (27%)</td>
<td>1 (9%)</td>
<td>11 (100%)</td>
</tr>
</tbody>
</table>

### TABLE IV - 14

CONSISTENCY BETWEEN LOCAL GOVERNMENT OPERATIONAL INVOLVEMENT AND REPORTED USE OF EMERGENCY PLAN: SEEKING RESOURCES

\(N = 11^*\)

<table>
<thead>
<tr>
<th>REPORTED USE OF PLAN</th>
<th>MAJOR</th>
<th>SHARED</th>
<th>MINOR OR NONE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used Plan</td>
<td>4 (33%)</td>
<td>2 (17%)</td>
<td>0</td>
<td>6 (55%)</td>
</tr>
<tr>
<td>Did not use Plan</td>
<td>2 (18%)</td>
<td>1 (9%)</td>
<td>2 (18%)</td>
<td>5 (45%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>6 (55%)</td>
<td>3 (26%)</td>
<td>2 (18%)</td>
<td>11 (100%)</td>
</tr>
</tbody>
</table>

* One interviewed jurisdiction did not complete the survey due to lack of time.
communications, acquiring resources and, to some extent, in coordinating the use of resources. However, a significant number of jurisdictions reported also using emergency plans as a "cue" for their response, particularly in the areas of coordination and the acquisition of outside resources. This presents some apparent inconsistency which can be clarified by examining a number of case studies in greater detail.

Case Studies: As the following case examples show, much more insight concerning the organizational response is gained from examining the unique details of how each jurisdiction reacted to the emergency. This information further reveals the relationship between county-wide emergency organizations and local government in the establishment of emergency operations. For each case study the summary data in Tables IV-12, IV-13 and IV-14 is compared to interview results and clarified.

Case 1: CITY OF MOSCOW, ID

The City of Moscow has a population of about 17,000 people, including the 7,000 students and faculty of the University of Idaho. Spokane is the closest metropolitan area, about 90 miles northwest. The overlying County of Latah, of which Moscow is the seat, maintains a written Civil Defense Plan and maintains a CD/Emergency Office staffed by a Sheriff's Deputy on a part-time basis.

The initial response by the City was to place all city personnel on ten-hour shifts and to run 24-hour road crews. City personnel rules relating to overtime, etc., were temporarily suspended. The City organized its personnel so that each department had specific responsibility in one or more areas of emergency operations. Each operation was given a specific phone number, and these operations and numbers were publicized.

The range of operations covered by what Moscow termed "Public Programs" indicates that they established a multi-purpose command center. Some of these programs were:

A coordination point for citizens wishing to volunteer help and citizens needing aid.

A separate command post for neighborhoods to call for city trucks to pick up ash after it had been piled in streets.

A coordination point maintaining the names of private contractors with equipment available.

Coordination of National Guard personnel in the community.

An inventory of landowners requesting assistance in cleaning larger properties.

In addition, the Mayor was designated as a single public information officer and was responsible for maintaining liaison with state and federal agencies. The
City Manager provided oversight of operational programs. Community restrictions on traffic and safety were handled by City Police.

The City characterized its response as "Taking the existing organizational structure, lifting it up and putting additional resources under it up to the management capability of local government." The basic cue for the City's response was its Snow Removal Plan. This plan was characterized as only a "direction"; the City's commitment of resources and ad hoc organization went far beyond the measures taken for a snowstorm.

Moscow made two observations on the relationship between the County emergency plan and their efforts to establish emergency fallout mitigation programs. The county-wide emergency plan designates the local newspaper as the communication mode for emergency information. The City relied instead, as a number of jurisdictions did, on a mixture of radio, newspaper leaflets and city phone systems as communications mode in the emergency.

Moscow also commented on the fact that the current county-wide emergency plan is set up under county leadership. However, a county's perception of an immediate emergency does not always coincide with a municipality's. Urban residents expect a higher level of response and are more vulnerable to impacts because of higher densities. In both the eruption and a recent flood, the City needed to move faster to implement emergency measures than the overlying county was willing to. For example, in the present case, the City received a water truck from the County highway district because the highway district was limiting its immediate response; but the City of Lewiston (40 miles south) sent equipment to Moscow without even waiting for a request for aid.

Clearly, the City of Moscow's response was built on existing functional lines of municipal organization. The county-wide emergency plan played almost no role in their response. The City of Moscow was coded as having major operational responsibility in all areas except direct citizen organization. The city did not report using the emergency plan to communicate with citizens, but did indicate using the plan as a source of information on external resources. However, it is apparent that equipment resources received from the county and the neighboring City of Lewiston were acquired based on ad hoc decisions made by the actors involved rather than emergency plan procedures.

CASE 2: CITY OF EPHRATA, WA

The City of Ephrata's 5,500 people live 120 miles west of metropolitan Spokane in the arid Columbia Basin. The City is about fifteen miles northwest of the larger Moses Lake area, which is both an industrial and recreation center for the northern Basin. Ephrata is the county seat of Grant County.

Ephrata's efforts to clean the ash were organized under the City Engineer. An operations center was established in the City Hall and rated effective. The City relied essentially on local radio for mass communications. A City Hall "information hotline" was also maintained. Public information releases were prepared and delivered by the Mayor, primarily concerning cleanup activities and safety precautions. Citizens were organized by the City Engineer into nine hose crews to wash ash from main arterials into storm sewers. Communication and
cooperation between the City and Grant County was facilitated by the close proximity of City Hall and the Courthouse and historical small-town partnership. The City was also involved in facilitating the sheltering of 500 stranded motorists in private homes.

Ephrata made use of the county-wide Civil Defense Office and gave it high marks for its assistance. The City made requests for material assistance through the county-wide Civil Defense Office. The only assistance received, however, was 1,200 feet of fire hose from the U.S. Forest Service in Wenatchee (a community spared from the ash). Two National Guard units were in Ephrata at the time of the eruption. One unit was deployed to other communities through the county-wide CD office. Other requests for material assistance made through the county office, such as for a sewer-cleaning jet from the State Emergency Agency, were unsuccessful.

The City "had confidence in emergency assistance from (the State) DES through County Emergency Services," but this assistance didn't arrive. The emergency plan "only operated within county lines," according to local officials. Therefore, on the third day after the eruption, the City made a financial decision to hire contractors and equipment because "help wasn't coming."

Ephrata assumed some of the functions of a community-wide command post, such as citizen communications, restrictions and organization of citizen volunteers to clean public facilities. The role of the county-wide emergency office was viewed as being highly valuable in seeking resources and coordinating their use within the county. However, the emergency office was not much more successful than the city in marshaling desired equipment resources from outside sources.

Ephrata is coded as assuming major responsibilities for communications and organizing citizen manpower in Table IV-12. In seeking external resources and coordinating resources use, the City is coded as having a shared role. Though in the survey the City indicated using the emergency plan to seek resources (but not for information on communications), the interview data ultimately indicate that the City itself assumed partial responsibility for seeking resources.

CASE 3: CITY OF RITZVILLE, WASHINGTON

Ritzville was both the smallest city interviewed (1,940) and one of the communities hardest hit by the ash. Ritzville is about fifty miles west of Spokane and is primarily an agricultural community. The community received five inches of fallout. Ritzville is also adjacent to Interstate Highway 90 which connects Spokane with western Washington. Because of this location, the community was faced with accommodating 2,200 stranded travelers during the four days in which roads were closed.

Not surprisingly, the City's first priority for several days was housing and feeding a group of stranded people exceeding the City's population. Individuals were accommodated in eight churches, two schools, five civic clubs and innumerable private homes. The Mayor and other local officials initiated coordination and distribution of food and medical supplies. A central dispatch was made the focus of this effort to eliminate duplicate food requests and to reduce unnecessary travel. Communications appear to have been handled on a face-to-face basis to a large degree. The Mayor called radio stations directly to
request that messages be aired, and public address systems on the police cruiser were also used to some extent.

By Tuesday afternoon, two days after the eruption, local officials turned their attention to ash removal and control. The scheduled clean-up followed this small city's snow removal routes. Over the next ten days the city's three employees, personnel from the overlying county and other jurisdictions, and a peak of 150 National Guardsmen began moving 1,000,000 cubic yards of ash. The method by which such external assistance was gained is revealing:

The City is the seat of Adams County. The County worked with the City almost immediately. However, an important detail is that the Mayor of Ritzville and one Adams County Commissioner are father and son, thus making local government somewhat of a family affair. In a similar vein, assistance from Kitsap County (some 200 miles west of Ritzville) was gained through the existing ties between county commissioners in both areas. On the fourth day after the eruption, a Kitsap County Commissioner called a long-time friend on the Adams County Board of Commissioners and asked if any help was needed. A total of ten counties eventually sent equipment and public employees to Ritzville.

Finally, the Mayor credited the arrival of needed National Guard manpower to a meeting with President Carter, Governor Ray, and a U.S. Senator in Spokane on the fourth day after the eruption. Notwithstanding these three examples of the ad hoc methods by which assistance was gained, the Mayor gave the Adams County Civil Defense Coordinator high marks for assistance in the emergency response. Ironically, however, the Mayor indicated in the survey that county-wide emergency plan was not used as the basis for the local emergency response in any category of procedures.

In Table IV-12, Ritzville is coded as having a major role in communications and the organization of citizen manpower. Ritzville is classified as having a shared role in seeking and coordinating resources. This classification seems consistent with the City's interview comments on the value of the Emergency Coordinator. However, the operational details of how assistance was gained indicate that Ritzville's success was not really the outgrowth of formalized multi-jurisdictional emergency planning. Rather, it appears to have been a function of intensive and successful informal involvement by all local officials as well as local officials in other jurisdictions.

**CASE 4: SPOKANE CITY AND COUNTY**

This case example is of particular interest because both Spokane and Spokane County were classified in Table IV-12 as having a shared role with a countywide emergency office in organizing communications. This placed both jurisdictions in the minority of three jurisdictions (25%) sharing this role.

Spokane's population, including the urbanized areas of Spokane County adjacent to the city, is about 330,000. The Spokane metropolitan area serves as the regional trade center for eastern Washington, north Idaho, western Montana and eastern British Columbia.
The overall response of the Spokane metropolitan area followed established guidelines adopted 18 months before the eruption in a joint city-county agreement. As one Spokane County official commented, "Gentlemen's mutual aid agreements have historically been in effect between city and county."

In this case, the formal city-county emergency system had been originally proposed by the City in 1978. Both City and County had separate emergency offices prior to that time. Under the joint agreement, the Spokane County Sheriff is the overall emergency authority responsible for public restrictions and information dissemination. An Emergency Executive Board, consisting of the Mayor and Board of County Commissioners, is responsible for policy oversight. Finally, operations are carried out by the line agencies of the separate jurisdictions (e.g., public works, fire, etc.).

In the case of the volcanic eruption, the City of Spokane did not seek outside equipment or manpower resources for their response. However, the City did spearhead an effort to get several hundred thousand respirator masks into the area. The County utilized private contractors in the area through the County Engineer's office. Several decisions were made through the Emergency Executive Board concerning public restrictions. An order was given through the County Sheriff closing public roads; citizens were advised that public authorities could not clean non-arterial roads; schools and businesses were closed.

The primary focus of the city-county emergency authority, in the case of the eruption, was communications. As one official put it, "advice was exchanged in this case rather than equipment or manpower." Designation of the County Sheriff as emergency officer was designed in part to avoid the confusion of having both jurisdictions announcing official warnings and instructions. Although the system worked well in that aspect, several problems were encountered once messages were transmitted to the news media.

First, although some news media were given high marks by officials for their assistance, others edited official instructions to make them "news." Secondly, the Spokane radio and television media, with a range of over 150 miles, created some confusion in smaller jurisdictions throughout the region. In many cases instructions aimed at Spokane area citizens overlapped into jurisdictions as far as 100 miles away.

The emergency organization did not solve some specific operational communications problems encountered by the line agencies of the separate jurisdictions. For example, Spokane County encountered a type of intergovernmental convergence in which dozens of separate state and federal agencies called in seeking information. One public works employee was designated information officer simply to manage this phenomenon. A similar form of "convergence" was also experienced with private contractors from all parts of the United States seeking work for their equipment. Both of these operational communications problems were encountered in several other jurisdictions interviewed in this study.

In Table IV-12, both Spokane City and County are classified as having shared roles in communications. However, in the surveys the City did not
indicate use of the "countywide emergency plan" to establish communications (Table IV-13), although Spokane County did. Both Spokane City and County are classified as having major roles in seeking outside resources in Table IV-12. Again, the City indicated in the survey no use of the "emergency plan" to seek resources while the County did (Table IV-14).

The case of Spokane City and County represents the greatest set of inconsistencies between the classification scheme for survey data presented in Table IV-12 and the detailed information gained from interviews. It is clear in this case that the City and County had developed a highly organized emergency coordination system between jurisdictions. Apparently City officials view this system as the "local" plan, rather than the highly publicized but nuclear disaster evacuation plan adopted in the area about two years ago. One implication of this particular case study is that there may be a need to differentiate between local emergency planning and disaster response planning mandated by other levels of government for different purposes.

CASE 5: CITY OF CHENEY, WA (SPOKANE COUNTY)

Cheney is presented as a final case example for two reasons. First, Cheney is one of the numerous communities surrounding the Spokane metropolitan area, and was classified in Table IV-13 as having a shared role with a countywide system in seeking external resources. Second, Cheney is classified in Table IV-14 as having the major role in communications, even though the primary operational focus of Spokane County's emergency system was in the area of

Cheney's population of about 7,000 people is swelled daily by students, faculty and staff commuting from Spokane to Eastern Washington University. Cheney is otherwise a quiet farming community not dissimilar from Ritzville to the west.

Cheney's immediate response to the eruption was to barricade the central business district and traffic to and from Spokane. These actions were taken on the night of the May 18 eruption. The next morning city staff were organized to assess needs and develop a response strategy. At this time, an immediate request for National Guard assistance was made by Cheney through the Spokane County Sheriff in his role as emergency officer. Later in the day the Cheney City Manager traveled to Spokane to confer with the City Manager of Spokane and the Sheriff.

These actions and the additional procedural measure of declaring a formal emergency to the county authority, were the only major ones taken by Cheney in conjunction with the Spokane County emergency system. External resources in the form of National Guard personnel and respirators were eventually obtained from the Spokane metropolitan area. The bulk of Cheney's operational response was, however, a local matter. While Cheney indicated using the county-wide emergency system for communications and seeking assistance, it was also one of the jurisdictions with the most elaborate ad hoc local response strategy for meeting immediate needs.

The Cheney response included establishing a community-wide operations center in the Police Department; directly organizing citizen volunteers with a
peak of 2,000 persons working under the direction of city employees; extensive efforts to communicate with citizens through both radio media and more direct means such as telephone "grapevines" and handbills; and, an extended effort to find additional equipment needed in the local response, which ultimately resulted in acquiring these resources from Canadian municipalities.

In the area of communications, Cheney found that some overlapping messages from the Spokane area conflicted with the local instructions given to Cheney residents, since the emergency communications system established in the Spokane metropolitan area assumed priority over news concerning outlying areas to some extent. In addition, it was found that information concerning Cheney was broadcast by non-local stations in some cases without verification by Cheney officials. Cheney officials clearly felt that local communication efforts were essential in this situation.

In seeking resources, an ad hoc local response was necessary in addition to positive use of the county-wide emergency system. Again, this case study suggests that each local response was built on the situational potentials existing in each jurisdiction. In Cheney’s case, the use of the county-wide emergency system had only limited applicability to operational intra-local needs.

Conclusions: Organization of the Local Response

The summary classification of the organization of protective measures in twelve interviewed jurisdictions (See Table IV-12) indicates that local governments assumed major responsibilities in emergency operations. An average of 58% assumed the major responsibilities for three operations: communications, seeking external resources, and coordinating these resources in the community. A number of jurisdictions also shared some operational efforts with a county-wide emergency or civil defense office or organization.

When the results of the classification scheme are compared to the reported use of emergency plans by these jurisdictions in the written survey, a further pattern is revealed. While 86% of the jurisdictions assuming the major command role in communications reported no use of the county-wide emergency plan for this operation, the opposite was true in the area of seeking resources. Sixty-seven percent of jurisdictions classified with a major role in seeking resources also reported use of the plan in the survey.

The case study analyses of jurisdictions provides further insight into these results. It was found that jurisdictions reporting use of the plan to seek resources also assumed instrumental roles in acquiring such resources. In many cases the key to finding external resources rested with ad hoc efforts by local officials or the actions of other local jurisdictions with which officials had close ties. Nevertheless, a number of local officials indicated that county-wide emergency offices were particularly valuable in helping to coordinate the use of external resources once they were acquired. This was consistent with the finding in Table IV-12 that the highest percentage of shared responsibility with emergency offices occurred in the area of "coordinating resources."

Much of local government emergency operations, therefore, appears to have been the result of ad hoc adaptation of existing organization rather than
the result of implementing formalized (i.e., written) pre-emergency plans. Notwithstanding this condition, local governments clearly placed great emphasis on efforts to communicate with citizens and deal with intra- and inter-organizational coordination needs. These are the same operational areas of concern suggested by disaster researchers, as reported by Wenger et al (1980).

The experience with communications and resource acquisition are now examined in greater detail, exploring the degree to which operational hindrances and successes existed in these areas of unplanned action.

Communications with Citizens

Wenger et al suggest that "Arrangements for the distribution of information is a dimension of disaster response that is often overlooked in disaster planning." (1980:145). Further, "... incidents such as the Three Mile Island accident have focused attention upon the need for adequate and accurate distribution of emergency information" (1980:146). Here we examine how local governments communicated with citizens and what they communicated in more detail.

The following discussion primarily reviews data from the written survey. As described in Section II, the information received from local officials who were used to pre-test field questions indicated that operational communications methods and experiences deserved specific attention. This resulted in written survey questions which closely examined emergency communications methods, their perceived effectiveness, and the use of emergency plans in establishing public communications.

In addition, data on three specific dimensions of communications are reported. First, operational hindrances to the use of mass media by local officials were examined in detail based on suggestions from pre-tested jurisdictions. Similarly, information on the types of official orders and instructions given to citizens was collected based on comments by pre-tested jurisdictions. Finally, the use of incentive strategies to gain citizen cooperation with emergency programs was explored to investigate to what extent local actions would match the usefulness argued for incentives by Perry (1975) and others.

A variety of methods for communicating with citizens were used by local government. Table IV-11 indicated that local radio stations and non-local stations represented the first and second most frequently used methods. A second cluster of most frequently used methods were information phones set up locally, telephone or face-to-face "grapevines" and public address systems on moving vehicles. This second group of methods differ from radio as a mode of communications because a specific local effort is needed to operationalize them. These locally "tailored" methods require commitments of personnel, equipment and judgement. Radio messages, by comparison, can be initiated with far less effort.

Methods vs. Effectiveness

The data from Table IV-11 is replicated in Table IV-15. Methods used to communicate with citizens are rank-ordered by the frequency of their reported use. To this data has been added a second column showing the effectiveness of each method as perceived by the jurisdiction.
## Table IV - 15

**Communications Methods Used and Their Perceived Effectiveness**

<table>
<thead>
<tr>
<th>1</th>
<th>2* Rank by Frequency of Jurisdictions Using Method (% of Total in Parentheses)</th>
<th>3** Rank by Weighted Mean Effectiveness Score (Rating Shown in Par.)</th>
<th>4 Median Effectiveness Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Radio Station</td>
<td>1 (74%)</td>
<td>1 (8.4)</td>
<td>10</td>
</tr>
<tr>
<td>Non-Local Radio Station</td>
<td>2 (59%)</td>
<td>4 (6.6)</td>
<td>7.5</td>
</tr>
<tr>
<td>Information Phones Set Up Locally</td>
<td>3 (48%)</td>
<td>2 (7.3)</td>
<td>7.5</td>
</tr>
<tr>
<td>&quot;Grapevines&quot;</td>
<td>4 (41%)</td>
<td>3 (6.72)</td>
<td>8</td>
</tr>
<tr>
<td>Public Address Systems on Vehicles</td>
<td>5 (41%)</td>
<td>8 (4.18)</td>
<td>3</td>
</tr>
<tr>
<td>Non-Local T.V. Station</td>
<td>6 (37%)</td>
<td>7 (5.27)</td>
<td>6</td>
</tr>
<tr>
<td>Local T.V. Station</td>
<td>7 (33%)</td>
<td>6 (5.55)</td>
<td>5</td>
</tr>
<tr>
<td>Written Leaflet Distribution to Residents</td>
<td>8 (26%)</td>
<td>5 (6.14)</td>
<td>8</td>
</tr>
<tr>
<td>Citizens Band Radio</td>
<td>9 (26%)</td>
<td>9 (2.71)</td>
<td>4</td>
</tr>
</tbody>
</table>

Notes:
* N = 27

**Weighted Mean Score = \( \frac{\text{Sum of Ratings Reported by n Jurisdictions}}{n} \)**

Spearmar's rho for columns 2 and 3 = 1.0
(Significance testing was not appropriate due to the small number of ranking categories)
Jurisdictions were asked to assign a score to each method used (based on 10 being the most effective result and 1 being the least effective). A simple weighting scheme was used to combine these scores as a mean effectiveness rating for each method. The median score reported for each method is also shown to indicate the skew in each distribution.

A rank-order correlation coefficient was calculated as an interpretive guide rather than as a test of significance (since the number of categories was only nine, significance testing was inappropriate). A coefficient of 1 was obtained. This appeared to indicate a systematic relationship between the frequency with which methods were used and the perception of their effectiveness in hindsight. Information phones set up locally and "grapevines" were rated slightly more effective than non-local radio stations in issuing warnings and instructions to citizens, although a smaller number of jurisdictions used these "localized" methods.

Furthermore, inspection of Table IV-15 shows that the methods ranked 5 through 8 in frequency of use have exactly the opposite ranking with respect to local officials' perception of their usefulness. The most interesting reversal is that of written leaflets distributed to residents. This labor-intensive method ranked eighth in frequency of use; however, it ranked fifth in perceived effectiveness.

This data is somewhat subjective (on the part of a small sample of local officials) and insufficient for tests of statistical significance. A cautious observation, however, is that local governments underwent some degree of experiential learning in finding communications methods which were effective. Although fewer jurisdictions used "tailored" methods such as information phones, grapevines and leaflets, their post-implementation perception is that these methods were somewhat more effective than other methods. In particular, it appears that non-local radio stations and all forms of television media proved less effective for local government than the relative frequency of their use would indicate.

The fact that local radio stations ranked first in both usage and perceived effectiveness is consistent with the observation by Wenger et al. (1980:146) that "Of course, the mass media serve as the channel for communicating most information to the public." The high ranking of news media as sources of assistance in Table IV-10 also support this. However, the consistent ranking of the effectiveness of non-local radio and television below their rank by magnitude of use suggests that operational experiences impacted some attitudes of local officials regarding media effectiveness. This interpretation is further substantiated by the results of a question regarding media effectiveness.

**Media Effectiveness**

Local officials were asked to indicate whether radio and television media were less effective than they had hoped for due to any of six listed reasons. Table IV-16 displays the results of this question. The most frequently encountered problem was that of messages from other jurisdictions "overlapping" into communities. A variety of other operational problems were noted. The second and third most frequent ones were messages given incorrectly or too frequently.
### TABLE IV - 16

FACTORS REPORTED AS LEADING TO COMMUNICATIONS BARRIERS THROUGH RADIO AND TELEVISION NEWS MEDIA

\[ N = 27 \]

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>A REASON FOR INEFFECTIVENESS</th>
<th>NOT A REASON FOR INEFFECTIVENESS</th>
<th>NO RESPONSE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Message delayed</td>
<td>9 (33%)</td>
<td>4 (15%)</td>
<td>14 (52%)</td>
<td>27 (100%)</td>
</tr>
<tr>
<td>2. Media edited the Message</td>
<td>7 (26%)</td>
<td>6 (22%)</td>
<td>15 (52%)</td>
<td>27 (100%)</td>
</tr>
<tr>
<td>3. Message overlapped with those from elsewhere</td>
<td>16 (60%)</td>
<td>2 (7%)</td>
<td>9 (33%)</td>
<td>27 (100%)</td>
</tr>
<tr>
<td>4. Message given incorrectly</td>
<td>12 (44%)</td>
<td>4 (15%)</td>
<td>11 (41%)</td>
<td>27 (100%)</td>
</tr>
<tr>
<td>5. Message given incorrectly</td>
<td>11 (41%)</td>
<td>4 (15%)</td>
<td>12 (44%)</td>
<td>27 (100%)</td>
</tr>
<tr>
<td>6. Our message made secondary to others</td>
<td>6 (23%)</td>
<td>4 (15%)</td>
<td>17 (62%)</td>
<td>27 (100%)</td>
</tr>
</tbody>
</table>

1/ Additional ad-hoc answers included "official notices confused with interviews conducted with private citizens," message given reflected media's own judgement," and "message was not heeded by the public."

2/ A variable number of responding jurisdictions answered each of the six items in this question. Jurisdictions which did not respond to a particular category are included under "NO RESPONSE. It is assumed these jurisdictions found media to be effective."
Overlapping messages, unlike other reported problems represent a special case. The problem of scheduling messages or insuring their accuracy can be handled by local officials on a direct basis with the cooperating media personnel. The phenomenon of electronic overlap, by contrast, involves the difficulty of multi-jurisdictional and multi-media coordination on a regional scale.

Map IV-1 illustrates the location of study jurisdictions reporting overlap in the May 18, May 25 and June 12 eruptions. Map IV-1 suggests that one overlap zone centered around the Spokane metropolitan area, whose news media have an effective broadcast range of almost 100 miles. The Moses Lake and Yakima areas were outside this overlap zone but experienced overlap of their own. In each case the major city itself did not report overlap problems.

The two problems relating to media's use of information as "news" apparently were minor. "Editing" of messages was reported by only 26% of all jurisdictions while 23% reported their official messages being made secondary to other "news." Indeed, the information gained from interviews and the comparative data on effectiveness reported from the written survey in Table IV-15 all indicated that local governments rated local radio very highly.

Operational problems appeared due to the number of jurisdictions involved and the difficulties of interfacing with media in other communities. The interview data suggest that face-to-face communications or other firm methods of communication between officials and media personnel were responsible for positive, accurate messages. This was most easily achieved with local radio stations.

For example, the City of Moses Lake, hard-hit by maximum ashfall, initiated a system of daily messages to the public. One staff member was the spokesman. Each message was taped and played verbatim by local radio stations. These messages continued from May 18 to mid-June. The City's spokesman took on a role as a media personality to beleaguered residents, providing them with encouragement as well as information.

But the use of other communications also suggests some limitations to media effectiveness as a sole method. One city manager commented that residents need to know when messages are given--e.g., every hour, once a day, etc. Another city manager commented that written leaflets distributed by hand were "effective because nothing else was." This leaflet contained both warnings, and instructions on how to clean up. Another jurisdiction which experienced media overlap used a written handbill for water rationing instructions. Reduced water use by 80% indicated some success. These examples indicate that mass media may not necessarily be the most effective communications method when detailed instructions (adaptive plans) must be issued to citizens.

Overlapping messages on the air seemed to primarily reduce the effectiveness of more specific instructions to citizens rather than generalized information. Many disaster researchers have argued that warnings to evacuate must contain specific instructions or "adaptive plans" to be effective. While the case of Mt. St. Helens is somewhat unique, it implies that attention should be given to the problem of coordinating inter-station operations in multi-jurisdictional emergencies.
The importance of this to implementing emergency strategies is also supported by the results of a survey of 1,023 eastern Washington residents impacted by the May 18 eruption. This study, conducted by D. Dillman and J. Short of Washington State University, concludes that:

People rely on not just one source of information but various sources to get different things. When they first learned about the event, it most likely came from other people. ... Then, turning to the news media, we found that people wanting useful information about what to do went to radio first instead of TV. Maybe this was because there are more radio broadcasting stations, and they furnished local, precise information better. (3) Emphasis added.

The results of the Dillman and Short study suggest that citizens perceived local radio as a more effective source of operational information than TV, in much the same way local officials did.

Unfortunately, citizens were not asked to identify communications established by local government (such as phone centers and handbills) as sources of information. We suspect that some sub-set of citizens would have identified such methods as sources of detailed information on emergency operations. Nevertheless, operational barriers to achieving precision in public communications may be as applicable to regional earthquakes or radiological emergencies as they were to the eruption. If so, the extent to which operational decisions were the result of emergency plan use should be of some interest.

Use of Plans in Communications

To what extent were the communications methods and problems in each jurisdiction related to the use of existing county-wide emergency or civil defense plans? An extended multi-variate analysis of the use of plans versus each method and its effectiveness was outside the scope and resources of this investigation. However, a limited analysis is presented in Tables IV-17 and IV-18.

Table IV-17 cross-tabulates the four most frequently used communications methods with the reported use of county-wide plans "to find out how to use radio or TV to send a message to residents." This information was separately presented in Tables IV-15 and IV-6. The results indicate that there was little significant use of plans associated with one form of communication as opposed to another. Interestingly, there was greatest congruence between use of emergency plans and use of "grapevines." Yet interview data from twelve jurisdictions suggest that establishing "grapevines" was not linked with use of emergency plans in any direct way.

Table IV-18 similarly compares the reported incidence of overlapping electronic messages from different communities and the use or non-use of county-wide emergency plans. There was no tendency for communities using plans

TABLE IV - 17

FOUR MOST FREQUENTLY USED METHODS FOR PUBLIC COMMUNICATIONS VERSUS REPORTED USE OF A COUNTYWIDE EMERGENCY PLAN FOR COMMUNICATIONS

<table>
<thead>
<tr>
<th>METHOD USED</th>
<th>PLAN USED</th>
<th>PLAN NOT USED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Local Radio (N=20)</td>
<td>20% (4)</td>
<td>80% (16)</td>
</tr>
<tr>
<td>2. Non-Local Radio (N=16)</td>
<td>19% (3)</td>
<td>81% (13)</td>
</tr>
<tr>
<td>3. Information Phone Numbers set up</td>
<td>23% (3)</td>
<td>77% (10)</td>
</tr>
<tr>
<td>Locally (N=13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. &quot;Grapevines&quot;</td>
<td>36% (4)</td>
<td>64% (7)</td>
</tr>
</tbody>
</table>

Note: Data represents multiple responses on types of communications methods used. Therefore, row totals vary.
TABLE IV - 18

COMPARISON OF REPORTED PROBLEM WITH OVERLAPPING RADIO & T.V. MESSAGES VERSUS REPORTED USE OF COUNTYWIDE EMERGENCY PLAN FOR COMMUNICATIONS PROCEDURES

N = 18

<table>
<thead>
<tr>
<th></th>
<th>PLAN USED</th>
<th>PLAN NOT USED</th>
<th>ROW TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overlapping Messages</td>
<td>3 (17%)</td>
<td>13 (72%)</td>
<td>16 (89%)</td>
</tr>
<tr>
<td>Reported</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overlapping Messages</td>
<td>0</td>
<td>2 (11%)</td>
<td>2 (11%)</td>
</tr>
<tr>
<td>Not Reported</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Column Total</td>
<td>3 (17%)</td>
<td>15 (83%)</td>
<td>18 (100%)</td>
</tr>
</tbody>
</table>

Note: Row and column totals (N = 18) do not equal total sample size (27) because of no response in nine cases.
to also experience less of an overlap problem. In fact, all three communities reporting use of an emergency plan for communications also reported overlapping messages. Interpreted another way, Table IV-18 suggests that there is some need for county-wide (e.g., multi-jurisdictional) emergency response systems to deal with larger scale problems such as message overlap.

Content of Communications

All jurisdictions were asked to indicate which of the nine types of orders listed in Table IV-19 were communicated to citizens. In addition, each jurisdiction indicated the perceived success of these orders as "very" effective, "somewhat" effective, or "not very" effective. Table IV-19 indicates that three types of orders and instructions were given most frequently by the twenty-six jurisdictions surveyed. These were "emergency speed limits" (85% of all jurisdictions); "instructions on how to organize citizen cleanup" (70%); and, "don't drive at all" (59%).

Traffic restrictions were essential to reducing the safety and health impacts of the fallout until it could be cleaned up. Table IV-19 indicates that vehicle restrictions had varying operational success. Twenty-five percent of the 89% imposing speed limits reported that they were not very effective and, an additional 58% of these jurisdictions reported speed limits as being only "somewhat" effective. Efforts to restrict all vehicle use were seen as being much less effective. Fifty-three percent of the jurisdictions asking citizens not to drive at all reported that this order was not very effective.

Instructions to citizens on cleanup efforts represent a different type of content in emergency communications than traffic restrictions. The effort to mitigate the ash fallout was a type of "adaptive plan" specific to this particular emergency, just as evacuation or sheltering in hardened areas is specific to regional hurricanes. Only 17% of the jurisdictions issuing these instructions to citizens reported a lack of effective results.

Surveyed jurisdictions were also asked to indicate if any incentive or aid strategies were useful in organizing citizens in cleanup efforts. The results are shown in Tables IV-20A and IV-20B. Table IV-20A indicates that almost one-half of surveyed jurisdictions believed that specific incentive strategies were useful. Such incentive strategies represent a dimension of emergency communications. Disaster researchers have suggested specific incentive strategies to promote voluntary compliance with evacuation orders, for example (Perry 1979).

Table IV-20B displays the nature of incentive strategies reported by jurisdictions. It should be kept in mind that this was an open-ended question, without any suggested categories, unlike the results of previous questions reported in Section IV. As Table IV-20B indicates, two predominant incentive strategies were adopted among responding jurisdictions. Citizens were provided access to public property, such as fire hose and water hydrants. Citizens were also instructed that public personnel would not pick up loads of ash for dumping unless the ash had been piled according to city-wide instructions.

This result is important not for the specific incentive strategies used so much as for the fact that it indicates local officials can successfully
TABLE IV - 19

TYPE & EFFECTIVENESS OF ORDERS AND INSTRUCTIONS GIVEN DURING FIRST THREE DAYS AFTER ASHFALL

<table>
<thead>
<tr>
<th>ORDER OR INSTRUCTION</th>
<th>PERCEIVED EFFECTIVENESS</th>
<th>NOT USED OR NO RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VERY</td>
<td>SOMewhat</td>
</tr>
<tr>
<td>Emergency Speed Limits</td>
<td>15%**</td>
<td>52%</td>
</tr>
<tr>
<td>Water Rationing</td>
<td>15%</td>
<td>22%</td>
</tr>
<tr>
<td>&quot;Don't drive at all&quot;</td>
<td>7%</td>
<td>15%</td>
</tr>
<tr>
<td>&quot;Don't wash ash into street drains&quot;</td>
<td>4%</td>
<td>22%</td>
</tr>
<tr>
<td>Alcohol Sales Banned</td>
<td>15%</td>
<td>0</td>
</tr>
<tr>
<td>Mandatory Clean-up Required</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td>Instructions on how to Organize Citizen Clean-up</td>
<td>33%</td>
<td>26%</td>
</tr>
<tr>
<td>Travelers Restricted to Shelters</td>
<td>30%</td>
<td>11%</td>
</tr>
<tr>
<td>All Citizens Restricted to Homes</td>
<td>15%</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes: All percentages based on N = 27
Row totals = 100%
TABLE IV - 20A

REPORTED USE OF INCENTIVE STRATEGIES TO ENCOURAGE CITIZENS TO COOPERATE WITH COMMUNITY FALLOUT MITIGATION PROCEDURES

<table>
<thead>
<tr>
<th>Jurisdiction used incentives</th>
<th>12 (46%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jurisdiction did not use incentives</td>
<td>14 (54%)</td>
</tr>
<tr>
<td></td>
<td>26 (100%)*</td>
</tr>
</tbody>
</table>

Note: *Moses Lake was only counted once. Therefore, N = 26

TABLE IV - 20B

INCENTIVE STRATEGIES REPORTED BY N=12 JURISDICTIONS

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Count (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizens provided access to firehose and water hydrants</td>
<td>7 (58%)</td>
</tr>
<tr>
<td>Ash removed only after citizens had piled it, as instructed</td>
<td>7 (58%)</td>
</tr>
<tr>
<td>Water rates reduced to promote washing ash into storm sewers</td>
<td>4 (33%)</td>
</tr>
<tr>
<td>Citizens organized into block or neighborhood crews</td>
<td>2 (17%)</td>
</tr>
<tr>
<td>Citizens provided access to free public dumping site</td>
<td>1 (8%)</td>
</tr>
<tr>
<td>Citizens provided with face respirators</td>
<td>1 (8%)</td>
</tr>
<tr>
<td>Citizens given a specific time by which ash must be piled for pick-up</td>
<td>1 (8%)</td>
</tr>
<tr>
<td>Jurisdiction publicized tax savings which would result from neighborhood efforts</td>
<td>1 (8%)</td>
</tr>
</tbody>
</table>

Notes: Percentages calculated for N = 12 jurisdictions. Jurisdictions provided multiple answers to this question.
adopt incentive strategies designed around the needs specific to different types of emergencies. In fact, incentives may be applicable to a number of stages of the emergency response, such as pre-disaster warning, mitigation during and immediately after impact, and post-disaster reconstruction. In this case, however, there were also operational hindrances involved in working with citizens to c’ean the fallout. These hindrances are relevant to the design of incentive strategies and they are discussed in the next subsection on Resource Acquisition and Use.

Conclusions: Communications with Citizens

Local officials certainly placed as much emphasis on emergency communications as disaster researchers suggest they ought to. Many of their approaches were ad hoc in nature rather than a function of emergency planning. Although the news media were the major form of communications, there were many operational difficulties present. These problems could be addressed by emergency planning.

The use of more localized methods such as handbills or telephone grapevines were also important to the local response. Local officials appear to have used such methods after gaining experience with the limitations of broadcast media as a sole form of communications. These methods appeared to be most effective in conveying detailed operational instructions to citizens.

Many of these methods have also been suggested by disaster planning researchers, thus the experience with this particular emergency response supports the normative arguments for such methods. They were used under system stress. Whether they can be incorporated into pre-disaster planning is another matter. Since their use was almost wholly a function of ad hoc experiential learning, one cannot assume their transferability to other areas.

Resource Acquisition and Use

Wenger et al suggest that inter-organizational coordination is essential to acquiring and sharing resources in an emergency response, especially because ".... there is often a scarcity of resources which may lead to inter-organizational conflict." (1980: 138). Local governments impacted by the eruption made extensive use of equipment and manpower acquired from a variety of sources.

A few of the written survey questions probed aspects of acquiring and using resources, specifically: the incidence of private contractors refusing to rent equipment; legal/procedural hindrances to using personnel; spatial priorities of the local response; and the existence of pre-established mutual aid agreements to share equipment. However, much more information was captured in the interviews with twelve jurisdictions. These revealed facets of resource needs in the emergency response which were not tapped in the written survey. Furthermore, the unique aspects of each jurisdiction's situation and response shaped the context for their comments in the interviews. Thus it was not possible to capture strictly comparable information from each jurisdiction on a specific, given subject area. This was an area where easy categorization was not possible.
Because of these factors, the following discussion of resource acquisition and use is impressionistic in nature. A full analysis of interview tapes would allow a systematic content analysis of each interview. The verbatim transcript and time needed to accomplish this were far outside the scope of this investigation's resources. Instead, key examples are drawn from interview data, in addition to reporting results of the above-mentioned written survey questions.

The following discussion examines: (1) Where local governments acquired equipment; (2) Spatial priorities, e.g. where the equipment was used in the community; and (3) Aspects of utilizing emergency manpower, including citizen volunteers, personnel from other local governments and National Guard, and local personnel on extended duty. Case examples of operational experiences relevant to emergency planning are identified in each of these areas.

**Equipment Acquisition**

The extent and diversity of local efforts to find equipment were a major aspect of the emergency response. As discussed in the "Overview," private contractors and other units of local government were the first and second ranking sources of equipment (Table IV-B). National Guard units and farmers ranked third. State governmental agencies ranked next-to-last, or fifth. These ranks are displayed in Table IV-21.

<table>
<thead>
<tr>
<th>Source</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Contractors</td>
<td>1</td>
</tr>
<tr>
<td>Other Units of Local</td>
<td>2</td>
</tr>
<tr>
<td>Government</td>
<td></td>
</tr>
<tr>
<td>Farmers</td>
<td>3</td>
</tr>
<tr>
<td>National Guard</td>
<td></td>
</tr>
<tr>
<td>Sales or Rental Dealers</td>
<td>4</td>
</tr>
<tr>
<td>State Agencies</td>
<td>5</td>
</tr>
<tr>
<td>Local University</td>
<td>6</td>
</tr>
</tbody>
</table>

It was found that only five jurisdictions of all those surveyed had existing cooperative or mutual aid agreements with any sources of equipment. In the case of some interviewed jurisdictions, it was found that "vendor lists" of available contractors are maintained by county public works departments for use in periodic floods. Other than this, little systematic pre-planning for equipment acquisition was found among interviewed jurisdictions. While a number of jurisdictions made use of county-wide emergency offices to seek equipment, this had limited results (as discussed earlier).
Private contractors were successfully used as sources of equipment and operators. Although there were seven cases (27%) of jurisdictions being refused emergency equipment among the twenty-six jurisdictions surveyed, the interviews revealed numerous cases where such refusals were temporary for a day or two while private contractors themselves reacted to the impact of the ash. Therefore, the cases of refusal noted may not have been a significant hindrance to the local response. Indeed, most jurisdictions reported needing a day or more themselves to figure out how to use resources.

On the other hand, the negotiation of a price structure for private equipment use did present a time-consuming problem in some of the jurisdictions interviewed. One jurisdiction's city manager reported spending "a good three to four days negotiating a single rate." The City of Ritzville was deluged with over 100 separate contractor offers from as far away as Indiana at highly variable rates.

In this case, the city only contracted for two dump trucks and a front-end loader because considerable assistance was also received from other local governments. Had reliance on contractors been necessary, much work would have been required to negotiate fees. (This would have strained the city's limited public works personnel). Two counties with larger public works staffs designated one engineer simply to manage contracts.

Local governments provided equipment but under highly variable circumstances. For example, the cities of Yakima and Ritzville received significant assistance from other jurisdictions where local officials had strong relationships with their counterparts. Jurisdictions sending assistance were not, however, the closest ones geographically, either.

Yakima received its assistance from Seattle, Portland, and the overlying metropolitan counties of King and Multnomah. Yakima officials commented that the understanding of urban conditions among the supervisors from these large jurisdictions was a definite contribution. Ritzville, a much smaller community, received much of its assistance from several coastal counties hundreds of miles to the west, as well as from some eastern Washington counties. In this case, a good many of the assisting jurisdictions were rural in nature like Ritzville. Local officials in both Yakima and Ritzville acknowledged the instrumental role of statewide and nationwide news coverage of their jurisdictions in prompting assistance from other jurisdictions.

The City of Cheney, by contrast, was not a focus of media attention. While Cheney did receive firehose from the City of Spokane, the staff had to begin a search for high-pressure water-tankers on its own:

We needed water trucks and we couldn't get them... and Tuesday morning we started asking DES (State Emergency Agency) for water trucks, and we got nothing. Then we put out telexes to all points in the country to send us water trucks and we'd get responses back like "$100.00 AN HOUR F.O.B. PHOENIX," or "$125.00 AN HOUR F.O.B. REDDING, CALIFORNIA." We're not going to pay those rates.

So we sat back and thought about it (as) we put out our 10,000th call on the telex and, somebody called British Columbia.
The way that evolved is we're trying to be logical about this. Nobody in Idaho is going to give up anything. I called (a city manager) and we didn't get anything, BUT (he) made me see something that I didn't realize ... that that mountain was going to blow again and he wasn't going to let his equipment go. Nor was anybody over on the west side (of Washington).

About two days later I realized that help was not going to come from within the state. Every available water truck is going to be sucked up by (larger jurisdictions) able to pay those outrageous prices. The nearest people I know that I could "put the arm on" for a water truck are "not in the midwest because that's where all my professional acquaintances are. These are my thought processes...I said, it's so simple ... British Columbia (Canada). Just go up there north of the border. We got a map of British Columbia and started calling the RCMP stations up there (to get phone numbers of local mayors, managers and city engineers). We made four phone calls ... Trail said, "we can only give the truck up for a week." Nelson said, "how can we get it down to you?" Ferny said "you bet."

Again, in the case of Cheney, existing associations between local officials clearly played a role in the search for aid. But in this case we also see the element of scarcity as it affects the availability of aid from other governmental units in a regionwide emergency.

Several other jurisdictions interviewed noted that an emergency affecting "everybody at once" places a strain on the assistance which can be gained from nearby jurisdictions—even those not immediately impacted. Other jurisdictions interviewed experienced refusals of equipment from nearby areas, although this was the exception rather than the rule.

Map IV-2 shows the sources of equipment for Yakima, Ritzville and Cheney, further illustrating that the sources of aid were hardly based on geographical proximity or state political boundaries.

Many jurisdictions turned to state agencies as a logical source of equipment resources beyond local capabilities. The overall equipment resources available from state governments were, in fact, limited, as shown by Table IV-21. Two factors appeared to contribute to the limitations on state level assistance.

First, state highway agencies—the primary sources of heavy equipment—were also confronted with the immediate need to clear roads. Indeed, many communities remained cut off from outside access until this was accomplished. In at least one case, a regional office of a state highway agency was actually competing with a municipality for rental of available equipment. In another case, a municipality was declined equipment needed to open state highways in the area.

A second factor impacting state agency aid was the existing structure of state agency decision-making. For example, some local officials pointed out
that a governor's office cannot authorize use of highway agency equipment in states where an independent highway commission governs the agency. A frequent comment was that the state-level emergency planning agency appeared to have little existing linkage to the state line agencies. Although numerous local units requested equipment resources through the state level emergency agencies, the interviews indicated that equipment aid from state highway and resource management agencies was most often arranged directly at the district (regional) level.

Finally, National Guard units represented a significant source of emergency equipment—ranking third among all sources. However, a number of interviewed jurisdictions also commented that they were surprised when National Guard personnel arrived in their communities without any equipment resources. These comments pertained more to light than heavy equipment, however. Local officials were daunted by shortages of shovels, brooms and similar implements which were needed to make effective use of emergency manpower.

One jurisdiction also expressed disappointment with an attempt to acquire heavy equipment from a nearby military installation. Military officials were unable to release equipment at the local level without authorization from central authorities. This example, again, is consistent with the overall tendency for more equipment to have been successfully acquired through situational factors than through managed allocation. Existing bonds between local officials or direct contact with regional and district state agency offices were more often the instrumental factor in gaining assistance than centralized decision-making.

**Spatial Priorities**

All jurisdictions surveyed were asked to identify their geographical priorities for using equipment and manpower to clean the ash. As Table IV-22 shows, the tendency among all jurisdictions was for the downtown business district (CBD), and through arterials to be first in priority. In many communities the CBD is primarily built around a major through arterial, usually a state highway route. But several of the communities interviewed also indicated that re-opening the CBD was a matter of economic importance too.

Hospitals were also a high priority, but among a smaller number of jurisdictions (12). "Other public buildings" emerged as a relatively strong second priority along with residential arterials. One local official pointed out that cleaning public facilities was a morale-booster and incentive for the entire community as well as being operationally necessary.

Re-opening major public transportation access was, quite obviously, the overall priority. Cleaning secondary arterials serving neighborhoods, for example, was a stronger priority than cleaning neighborhood areas themselves. (Major arterials were clearly a priority over residential arterials.) One community interviewed indicated that its airport was a chief priority because roads were closed:

We were very concerned about the airport—clearing the main runway—because we didn’t know how often, or how bad all this would occur (e.g. eruptions). We might be cut off from land
TABLE IV - 22

RANKING OF FIRST THREE PRIORITY AREAS FOR CLEANING ASH FALLOUT BY LOCAL OFFICIALS

<table>
<thead>
<tr>
<th>Road Type or Land Use</th>
<th>NUMBER OF RESPONSES</th>
<th>TOTAL NO. $^{1/}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First Priority</td>
<td>Second Priority</td>
</tr>
<tr>
<td>Downtown Business District</td>
<td>16</td>
<td>3</td>
</tr>
<tr>
<td>Through Arterials</td>
<td>16</td>
<td>7</td>
</tr>
<tr>
<td>Around Hospitals</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>High Density Residential Areas</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Residential Arterials</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Neighborhood Areas</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Other Public Buildings</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

Notes: $^{1/}$ A variable number of jurisdictions responded to each individual category. Row totals are shown.
transportation. Therefore, we wanted to do what we could with
the airport. A lot of resources--initially in the inter-
mediate period--were concentrated on the airport.

Many jurisdictions commented that devoting resources to public minor or local
streets was impossible with the resources available, at least in the immediate
clean-up effort.

Interviewed jurisdictions were also asked if any particular types of
land uses presented special problems or received a low priority in the clean-
up effort. Response to this question was limited, but several comments were
made indicating that certain types of land uses were more difficult to clean
than others. One community pointed out that shopping centers were difficult to
clean because there was less of an effort by "owners" to organize their own
resources than, for example, downtown business areas or residential areas.
The owners were absentee in nature. Other jurisdictions made similar observa-
tions that vacant lands, some commercial lands, and lands in absentee ownership
or management, took longer to clean. This was generally attributed to a lower
level of owner-response in piling ash, washing ash down storm sewers, or
responding to whatever particular strategy each community adopted for landowner
efforts.

Local officials interviewed were also asked to make a map of their
jurisdiction to graphically indicate the priorities adopted in the effort to
open roads and clean property. Some difficulty was encountered in seeking
these "mental maps" of the local response. In one half of the interviews,
time or the nature of the information presented did not result in completion of
such a map. In some cases, there was simply no relevant information which
participating officials felt could be illustrated in graphic form.

The graphic information collected in some of the other interviews
was very limited in nature. For example, in Spokane County the metropolitan
area surrounding the City of Spokane was the county's priority for action.
The hundreds of miles of outlying rural roads were cleaned on the basis of
road classification--e.g., major arterials first, minor service roads to
extremely rural areas last.

Among the small number of these maps completed with significant in-
formational content, the cases of Cheney and Moscow are representative of two
contrasting types of spatial organization. Map IV-3 illustrates the spatial
organization of the Moscow response. Arterials and the CBD were cleaned ac-
cording to the city's snow removal plan. The remainder of the community was
partitioned into the zones shown as a basis for cleaning secondary and resi-
dential streets with citizen cooperation.

Under this approach, each zone had its own heavy equipment and
operators. This equipment consisted of a front-end loader and a dump truck. A
water fill station was established in each zone to replenish the tanker trucks
used to keep the ash wet. When a neighborhood in a zone had piled ash onto
roadside curbs, they were able to call a central operations center (established
at the City Pump Station) and request a front-end loader and dump truck.
When the bulk of the ash had been removed by truck, the next available tanker truck swept the street, blowing the residual ash into the storm sewers with high-pressure water.

Local officials felt this approach accomplished several objectives. Citizens were given a clear support system for their own efforts to clean residential streets as quickly as possible. Cross-town traveling of heavy equipment causing hazards from blowing ash were reduced. Finally, this particular approach allowed Moscow to use water to wash residual ash down storm drains without risking washing it all down and causing major damage to the drainage system.

There were no special priorities reported in this approach by the City of Moscow. It was based on maximizing the value of citizen efforts to clean neighborhoods and use of limited public resources, as in many other communities. In a sense, this did amount to a prioritization of resource use. If public resources were committed to cleaning one block at a time, many neighborhood areas would have been left waiting for relief for a much longer period.

In Cheney, a community one-half the size of Moscow, major arterials and the CBD were again the priority areas for use of public resources to clear roads. However, a sequential movement of secondary clean-up efforts from one neighborhood to another developed in Cheney as shown in Map IV-4. The organization of efforts began in one neighborhood (as indicated) and generally moved downward (topographically) towards the CBD, with some exceptions.

The evolution of these neighborhood efforts was determined in part by Cheney's limited resources. The first neighborhood was cleaned as the result of the City Manager and Mayor directly organizing citizens and experimenting with methods to remove the ash. Cheney made a decision to use high-pressure firehose to wash all the ash into the storm sewer system. The first neighborhood cleaned was the highest area of the community. The City Manager noted in retrospect that it was "luck" that they started at the highest elevation.

The movement to other neighborhoods was limited by available city personnel to supervise opening hydrants and distribution of hose and by considerations of elevation. However, the areas cleaned last (as indicated on Map IV-4) also represented neighborhoods of mixed land uses where the citizen effort was felt to be less successful than in the single-family neighborhoods.

Therefore, in comparing the approaches taken by Cheney and Moscow, there are perhaps more similarities than differences. First, each approach was based on maximizing the use of the available equipment to clean secondary and local roads. Second, a key component of those resources was the response of citizens themselves. In each approach the pace at which neighborhoods were cleaned was determined by citizen as well as public efforts.

Emergency Manpower

Citizen manpower played a substantive role in many communities. As reported in the "Overview," a total of eighty-five percent of all jurisdictions surveyed experienced some form of requested or spontaneous citizen volunteerism.
Numerous jurisdictions reported giving citizens access to firehose, water hydrants and other public property as an incentive to their efforts to clean neighborhoods. But these efforts were not without their difficulties. Cheney's experience is a good example of major reliance on citizen volunteerism in a small community with limited resources. Cheney went to great lengths to organize this effort, reaching a maximum volunteer force of over 2,000 cleaning main roads. Many incentives were used to sustain this effort, including providing lunch to each person working on the streets in the height of the effort.

But the strategy of allowing citizens access to fire hydrants and hose was not without costs. As in other communities, Cheney experienced losses of equipment in the citizen effort. Ten fire hydrants were damaged from being turned on improperly by citizens. Over 4,000 feet of firehose was lost due to damage from the abrasive ash on the streets. On the other hand, local officials emphatically pointed out that their cost would have been greater had they not tapped citizen resources to deal with the ash.

Yet it was clear that citizen manpower is not a panacea for post-disaster mitigation efforts. Personnel must be allocated for supervising use of public equipment to minimize damage and maximize effectiveness. A decision to allocate scarce resources between uses must be made. In Cheney, for example, the City Fire Chief was genuinely concerned about maintaining adequate firehose and hydrant availability to fight a major fire.

Finally, the organization of citizen manpower may present formidable demands on public resources. The following comments from another city which made a limited amount of resources available to citizens illustrates these concerns:

You've got a problem of, really, organization and supervision there. There are a lot of questions like that. "Why don't you get into the neighborhoods and give 'em a coil of firehose and let them hook up to a hydrant." That sounds great when you talk about it, but it's going to take us days just to set up that sort of a plan, and we're busy doing other things. First of all, who is going to be responsible in the neighborhoods? We are going to have to cut up the city and determine where it's going to go. We're going to have to plan how long it's going to take; we're going to have to pick up the hose. It would be unworkable.

.... That's how (Cheney) got rid of their ash. They're smaller than us and they got less ash.

.... I would say that if we had time to set up that sort of plan and neighborhoods were already organized, that would be a great way to do it. But, on the other hand, I think it would take a long time to put something like that together, and that it would fall apart if you didn't use it. In other words, if we were able to set it up next week, and used it next week, that's great. If we set it up next week and ever used it for a year's time, by that time, well .....
The need to organize citizens was not always a matter of public decision-making, however. In the City of Yakima, a spontaneous effort to hire equipment for neighborhood clean-up was initiated by the Chamber of Commerce and local school district officials.

This effort began with a call for neighborhoods to organize themselves and pile ash to be moved to landfills. The overwhelming citizen response immediately outstripped the resources available. Within a day or two, about 300 residential block areas had requested assistance. At this point (about five days after the May 18 eruption) the City and County of Yakima held a meeting to organize a public response.

The city and county's experience further illustrates the demands caused by citizen involvement in post-disaster response, as well as the opportunities for enhancing its success. First, it illustrates how ad hoc or "ephemeral organizations" (Wegner et al., 1980: 138) may form, and suddenly create "organizational conflict over domain, resources and control." In this case there was a situation in which public officials had to re-allocate resources in response to the independently organized neighborhood clean-up program.

Secondly, it illustrates the demand placed on available public equipment and personnel resources. In this case, the county's public works agency took responsibility for providing block-by-block ash pickups within the western part of the City of Yakima. This part of the city is contiguous with an urbanizing area of the county. This joint assumption of responsibility by city and county made it possible to respond to the magnitude of demand which existed.

Thirdly, the City of Yakima's experience sheds light on how the planning process may contribute to the level of citizen organization necessary to easily tap citizen efforts in an emergency. One local official in Yakima felt that the city's ongoing community planning process made such a contribution:

One of the areas I was really concerned about was the lower-income areas because of the Block Grant (a federally funded neighborhood rehabilitation program). What I found, and I physically went out and checked it, is that those lower-income people had their areas cleaned up quicker and were more organized than anybody else in the community. ...but it was interesting, the citizen participation approach that the people in the Block Grant areas took ... We've gone through that area (in the planning process) so that everybody knows everybody else on their block--have their own little crime watch thing going and those kinds of things down in that area --and they know each other...

I honestly think that because we've had a citizen participation program—not only the Block Grant, we're also in the middle of the (overall) urban area planning process and, we took those same areas that we use, that are familiar with each other, that we've been utilizing for the last two years, and
that's how we broke down our neighborhood clean-up ... The people who we'd been working with... that's who we called and identified as their block leaders and coordinators.

Thus, the successful organization of citizen manpower depended on several factors, including the community's ability to commit resources to such an effort; the impact which independent citizen activities had on public emergency operations; and the overall organization of neighborhoods through non-disaster related programs, such as community planning process.

Use of emergency personnel from outside the community presented a different set of problems and opportunities. One observation is that incoming groups such as National Guard or crews from other jurisdictions are especially useful because of their prior organization. For example, the City of Yakima used crews from King County, Multnomah County, Portland and Seattle in their effort. Allowing each crew to operate as a unit capitalized on their experience in working with each other. National Guard personnel were similarly valued by many jurisdictions because of their discipline and organization.

The major operational problem connected with using external personnel appeared to be the scarcity of tools and housing facilities in a number of cases. Several jurisdictions indicated some difficulties in finding housing for National Guard personnel who were not residents of the community. This was particularly true in smaller municipalities. Finding enough shovels and other hand tools to equip personnel was also a problem. Small jurisdictions reported buying out every store in the community to find such tools. Two communities expressed surprise that National Guard units did not have their own equipment.

A more subjective housing-related problem was maintaining morale. Yakima, for example, attempted to house crews from assisting jurisdictions in a city-owned church being converted to a recreational facility. A local official described the reasons for abandoning that approach in favor of housing personnel in motels:

... you've got to worry about feeding them, the fact that they may be working twelve hour shifts, but they want a little time to do something, just to get away from it ... You can't do that in a church, you can't do that in a recreational facility. By offering them decent food, something they can plan on--we did have trouble getting lunches out to them, the logistics of that needs some work--but by having a good place where they can get away from it and feel that it's clean and not just a bunk bed, that really helped the morale a lot. When you have people working those kinds of hours you've got to keep their morale up.

Finally, two jurisdictions commented on the necessity of using organized, external manpower to maximum effectiveness. Yakima directed the large King County relief crew to opening the airport. Another jurisdiction noted that their National Guard relief unit could have been used to best advantage in undertaking relief for the elderly and others needing immediate assistance with
cleaning their property. The internal organization and esprit d'corps of both civil and military help appeared to be a tangible resource in some jurisdictions.

Finally, expanding local personnel resources was also a form of emergency manpower acquisition. Personnel resources under public jurisdiction were expanded through two methods: hiring short-term help through positions made available by the Comprehensive Employment and Training Act program and extending hours or shifts worked by normal public personnel. Table IV-23 shows the results of a question probing the procedural hindrances encountered in using existing personnel. The four procedural areas used were chosen on an ad hoc basis after interviews with pre-tested jurisdictions.

Clearly, jurisdictions' own personnel rules presented the only significant hindrance among the four included in this question. Interviews with jurisdictions revealed that a common problem was establishing an emergency payroll policy, rather than reluctance to work long hours. Because the ash fallout trapped many public employees at home, some worked in immediate emergency efforts and some did not. Local officials faced the dilemma of making a decision to pay all employees, or only those employees able to report for work.

Only one jurisdiction experienced a challenge to their emergency pay policy from a labor bargaining unit. Local officials described the problem as slight rather than serious. However, it is apparent that emergency personnel policies were an area of concern.

Some jurisdictions reported a slight problem with acquiring manpower through local CETA programs. Interviews revealed that problems were related to the employment eligibility criteria.

Under CETA small jurisdictions found it particularly difficult to find enough individuals locally meeting the program's extended unemployment requirements. One local official directly attributed their success in quickly acquiring 55 CETA personnel to the local program manager's experience with the Tieton Dam disaster in Idaho. The manager was already experienced in facilitating emergency use of CETA funds.

Conclusions: Resource Acquisition and Use

Local governments experienced a variety of successes and frustrations in the effort to acquire and use emergency resources. Some of the frustrations appear related to resource scarcity brought on by the magnitude of the area affected by the eruption. For example, major assistance from other cities and counties came from beyond the impact area in many cases. In some cases, adjacent jurisdictions were reluctant to give up any equipment resources fearing another eruption. Assistance was acquired on the basis of ties between jurisdictions as often as by the logic of geographic proximity. Similarly, some local governments found that state agencies were reluctant to provide emergency equipment because they were also faced with major emergency needs.

But some operational difficulties in acquiring emergency equipment resources stemmed from problems of coordination. For example, efforts to acquire equipment from state and military agencies were frustrated in some cases...
<table>
<thead>
<tr>
<th>PROCEDURES/PROGRAMS</th>
<th>MAJOR PROBLEM</th>
<th>MINOR PROBLEM</th>
<th>NO PROBLEM</th>
<th>NO RESPONSE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Insurance Coverage</td>
<td>1</td>
<td>4%</td>
<td>4</td>
<td>15%</td>
<td>20</td>
</tr>
<tr>
<td>Personnel Rules (Pay and Overtime Policies)</td>
<td>3</td>
<td>11%</td>
<td>9</td>
<td>33%</td>
<td>14</td>
</tr>
<tr>
<td>CETA Procedures</td>
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<td>0%</td>
<td>4</td>
<td>15%</td>
<td>18</td>
</tr>
<tr>
<td>Public Employees Retirement System Rules</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td>24</td>
</tr>
</tbody>
</table>
by lack of an accessible decision-maker with the authority to allocate resources to local needs. Many local governments acquired emergency equipment through contacts with the local offices of agencies in much the same way that they received assistance from other local governments with which they had close subjective rather than geographic ties.

Using citizens in the physical clean-up effort was also impacted by scarcity and coordination. The ability to organize citizen use of public equipment was impacted by concerns for both the competing uses for the equipment and lack of personnel to distribute and supervise its proper use. Two cases suggested that pre-existing, ongoing organization of neighborhood groups may be an advantage in such situations, at least insofar as it makes supervision more feasible by using citizen coordinators.

Many of the successes observed in case studies appeared to be situation-dependent and achieved through horizontal relationships. Cases of vertical organization in allocating emergency resources (such as by a central decision-making agency at a statewide level) were less apparent. This was even true to some extent in the development of spatial priorities for cleaning residential areas. Two particular cases suggested that prioritization was based on a horizontal system of local government assistance paced to match the level of citizen effort in each neighborhood.

These observations support the argument by researchers that inter-organizational coordination to distribute resources is essential to avoid frustration, inefficiency and conflict in emergency operations. However, there were few observations collected which suggest a good example of successful coordination between separate levels of government or separate jurisdictions within the impacted area. Indeed, many cases illustrated solutions which arose out of an effort to circumvent the lack of desirable coordination.
SECTION V

PLANNING IMPLICATIONS

Are there lessons in the local government response to the eruption which are transferrable to general emergency planning needs? Wenger et al (1980: 134) note that a "detriment to effective planning that is espoused by officials is the old 'all disasters are different syndrome.'" Do the local officials who responded to the eruption share this skepticism towards pre-disaster planning? What are the planning implications of the ad hoc response strategies adopted by local government?

The first question is addressed through an analysis of local officials' attitudes toward emergency planning in light of the eruption. Three evaluative criteria are then used for assessing the planning implications of the Mt. St. Helens experience. These criteria encompass operational, institutional and instrumental planning concerns. Several research questions are posed to further explore use of these criteria for evaluating emergency planning efforts.

Attitudes Towards Emergency Planning

Local officials responded to a final set of written questions concerning their attitudes towards emergency planning in light of the eruption. Some of the results of this line of questions are shown in Tables V-1, V-2 and V-3. These responses include two Oregon jurisdictions which only answered this series of questions (because their eruption response was very limited due to light ashfall from the June 12 eruption). Therefore, 29 responses are included rather than 27.

Table V-1 shows that a very high percentage of local officials (93%) believed they should develop plans to respond to future volcanic hazards. Perhaps more significant, 73% of jurisdictions also believe that emergency planning has value in responding to other, unknown types of general disasters. This indicates that the majority of local officials in this study do not share the belief that "every disaster is different" and therefore can't be planned for.

The statements presented in Table V-2 probe attitudes towards the institutional framework for emergency planning. About one-third of the jurisdictions (69%) believe that emergency planning should be reliant on state level institutional leadership. Approximately the same proportion (73%) believe that emergency planning should be led by cities and counties, with the state in a supportive role only.

However, the strongest response (90%) supports an emergency planning institution where each state and local unit fulfills an appropriate and mutually supportive role. This result is especially relevant when we consider the material gathered in this study. Local governments found that counties could only offer limited operational support of emergency operations, but did fulfill an internal, coordinative role among local jurisdictions themselves. Statewide
### Table V-1

**LOCAL OFFICIALS' ATTITUDES TOWARDS EMERGENCY PLANNING**

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>Agree</th>
<th>Don't Know</th>
<th>Disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Surprise general disasters, such as the eruption, can't be planned for.&quot;</td>
<td>7 (24%)</td>
<td>1 (3%)</td>
<td>21 (73%)</td>
<td>29 (100%)</td>
</tr>
<tr>
<td>&quot;The volcano may erupt again and we should plan for it in some way locally.&quot;</td>
<td>27 (93%)</td>
<td>1 (3%)</td>
<td>1 (3%)</td>
<td>29 (100%)</td>
</tr>
</tbody>
</table>

### Table V-2

**LOCAL OFFICIALS' OPINIONS CONCERNING THE INSTITUTIONAL FRAMEWORK FOR EMERGENCY PLANNING**

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>Agree</th>
<th>Don't Know</th>
<th>Disagree</th>
<th>No Response</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;State agencies should be the focus of emergency planning with cities and counties following their lead.&quot;</td>
<td>9 (31%)</td>
<td>0 (0)</td>
<td>20 (69%)</td>
<td>0 (0)</td>
<td>29 (100%)</td>
</tr>
<tr>
<td>&quot;Cities and counties should be the focus with state agency plans following a local lead.&quot;</td>
<td>21 (73%)</td>
<td>2 (7%)</td>
<td>5 (17%)</td>
<td>1 (3%)</td>
<td>29 (100%)</td>
</tr>
<tr>
<td>&quot;Counties, cities and states have appropriate roles which should be equally recognized and improved.&quot;</td>
<td>26 (90%)</td>
<td>1 (3%)</td>
<td>2 (7%)</td>
<td>0 (0)</td>
<td>29 (100%)</td>
</tr>
<tr>
<td>QUESTION</td>
<td>RESPONSE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>----------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local governments can plan to share equipment and other resources in a general disaster.</td>
<td>Agree: 27 (93%), Don't Know: 1 (3%), Disagree: 1 (3%), Total: 29 (100%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some changes in the design of road drainage systems or surfacing of roads may need to be made because of the eruption.</td>
<td>Agree: 7 (24%), Don't Know: 7 (24%), Disagree: 15 (52%), Total: 29 (100%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are certain types of equipment which we should acquire or modify because of the eruption.</td>
<td>Agree: 16 (55%), Don't Know: 7 (24%), Disagree: 6 (21%), Total: 29 (100%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are some common sense organizational steps which local government can take to prepare for general disasters.</td>
<td>Agree: 29 (100%), Don't Know: 0 (0), Disagree: 0 (0), Total: 29 (100%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
support for local emergency operations was, however, perceived as being less than anticipated.

Local officials were also asked to give their views concerning the usefulness of several types of emergency planning measures, as shown in Table V-3. The results indicate that local governments perceive the major lessons of the emergency response to Mt. St. Helens as being in the area of organization rather than in physical and capital planning.

Almost all jurisdictions (93%) agree that local governments can plan to share resources in a general emergency, much as many of them did in this one. All jurisdictions agreed that organizational planning can have value in responding to general emergencies. Few jurisdictions (24%) felt that the eruption called for changes in the design of roads, although 55% felt that there could be further preparation for emergency equipment needs.

However, Table V-4 illustrates the response to a separate question asking local governments if they plan to develop model vendor contracts, or mutual-aid agreements with local sources of emergency assistance. Only one jurisdiction reported planning to change equipment contracts because of the eruption, and only one jurisdiction reported planning to make inter-local aid agreements. A larger percentage, however, reported "not knowing" if they will make mutual aid agreements (40%) than was the case with equipment vendor contracts (22%).

These data present something of an inconsistency. While local officials appear to value emergency planning in light of the experience with ad hoc emergency measures, they are not strongly motivated to take formal measures to solve two of the significant problems experienced: setting emergency equipment rates and finding local governments willing and capable of sharing assistance. The results suggest that local governments in the study area perceive a need for better emergency planning, but are not fully decided on what specific techniques to pursue.

The interview data generally supported the above analysis. A number of jurisdictions have moved to develop emergency response plans. Not all such plans are volcano-specific. For example, in the small town of Ritzville the Mayor commented on the need for an "emergency handbook" to provide guidance in a variety of emergencies including chemical spills or airplane crashes. (Ritzville is on a main route for rail and in the approach zone for Spokane International Airport). In Spokane the City Manager has asked each department head to conduct a post-emergency assessment, addressing such questions as "organizational lessons learned" and "coordination needs."

Other jurisdictions, however, have chosen not to undertake comprehensive emergency planning efforts in the wake of the eruption. There is, as one City Manager notes, some pessimism about "the interest in emergency planning which can be sustained." Furthermore, there is concern about the funding resources available for emergency planning. In short, some jurisdictions appear undecided about how best to promote and develop further emergency planning.


<table>
<thead>
<tr>
<th>Question</th>
<th>Planned</th>
<th>Don't Know</th>
<th>Not Planned</th>
<th>No Response</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you plan to change the specification of equipment contracts because of the eruption?</td>
<td>1 (4%)</td>
<td>6 (22%)</td>
<td>19 (70%)</td>
<td>1 (4%)</td>
<td>27 (100%)</td>
</tr>
<tr>
<td>Do you plan to make cooperative agreements with any of the sources of emergency equipment you used?</td>
<td>1 (4%)</td>
<td>11 (40%)</td>
<td>14 (52%)</td>
<td>1 (4%)</td>
<td>27 (100%)</td>
</tr>
</tbody>
</table>
Evaluating the Implications

Planning in general is essentially a problem of successfully "linking knowledge to action" (Friedmann 1979). Disaster researchers have recognized this to some extent by noting that "administratively devised solutions" may have low effectiveness in emergency operations (Perry 1979) and that planning must be viewed as a process, not a product (Wenger et al 1980). Wenger et al (1980:156) argue that:

Disaster planning must be integrated into the institutionalized planning process of the community. Too often, disaster planning is isolated from the day-to-day planning process. It is often assigned to organizations, or units within organizations, that are divorced from traditional, institutionalized sources of social power within the community.

Much of the information collected in this study supports this assessment. It is particularly apparent that vesting emergency planning responsibility in county agencies does not always provide useful, functional linkages at the municipal level. The process is not well linked to executive decision-makers such as city managers or even county public works directors. This linkage is essential (Council of State Governments 1979:47).

But arguments by disaster researchers for bringing emergency planning closer to the "institutionalized sources of social power" in the "day-to-day planning process" assume too much about local planning. In fact, the isolation of general planning from decision-making authorities is a major issue in the field. The "machinery of planning" at the disposal of executive decision-makers is often treated as "confirmatory and symbolic, not as relevant to the actual decisions made, which depend on political sensitivity" (Dyckman 1980: 280).

Because of this dilemma there is increasing interest in developing institutions which support effective planning in the decision process rather than simply providing idealized prescriptions to decision-makers which have little impact. It is a reasonable assumption that knowledge about emergency planning needs will see limited application unless a similar effort is made to examine the constraints and opportunities to using such knowledge within emergency planning programs.

The implications of the local experience in the eruption can be viewed from at least three perspectives. First, there are operational lessons suggesting specific problems and techniques important to the emergency response. Second, there are institutional implications in the ad hoc organization of the response. Third, there are implications for the instrumental planning techniques used to facilitate pre-emergency planning. Each of these evaluative criteria are linked to the concerns of planning theory discussed in Section III of this report.

Operational Implications

Local strategies included specific techniques which may be applicable to other emergencies—especially those which have a broad geographical impact
or extended effects requiring ongoing public organization. Two examples are regional earthquakes and radiological emergencies of the Three Mile Island type.

Many ad hoc measures were highly similar to techniques suggested by disaster behavior research. Although it would be possible to develop a laundry list of successful emergency practices, this does little to address the need for planning such practices. If anything, the operations choices made locally should be seen as empirical confirmation of the validity of normative suggestions made by disaster researchers.

More attention needs to be paid to finding methods of transferring such lessons of experience to other situations. The same is true of the inter-organizational problems observed. The need for clear understandings between the media and public authorities, and for regional coordination to prevent message overlap was apparent. The lack of clear intergovernmental assistance strategies between all levels was also apparent. Perhaps local officials will lower their expectations of the operational assistance available from state and federal levels or, conversely, regional plans for delivering such assistance may be developed.

All of this, however, begs the question of planning. If the massive regional impact of the eruption promotes better planning in the area, it still leaves a broader dilemma. Is a disaster still the most effective stimulus for emergency planning? Or are there workable approaches for internalizing the lessons of this end other emergencies, before emergencies arise? Operational innovations or lessons must be looked at in this context or else they remain isolated events without the potential for transfer and application.

### Institutional Implications

Perhaps the most common approach to internalizing lessons of experience is through institutionalizing them. Institutionalization can take the form of incentives (e.g., financial support programs) or controls (statutory requirements) or both. Planning theorists and others, however, are increasingly cautious in institutional approaches to problem-solving. They have the potential for being ineffectual or, worse, creating further counterintuitive problems.

For example, institutional approaches to urban reconstruction have at times ignored the behavioral bases of community needs, creating what Perin (1970) called "fallacies in design." A parallel in nuclear emergency planning can be found in a recent assessment of the Nuclear Regulatory Commission's January 1980 standards for public notification in nuclear power plant emergencies (Lindell et al. 1980). The NRC standard requires notification in the immediate impact area within 15 minutes. Lindell et al examined available knowledge of warning implementation and concluded that "providing prompt notification within 15 minutes may be hard to accomplish in many situations. Alerts may be given within that time frame, but clear instructions about what to do may take longer." (1980: 26). Their conclusion speaks to the underlying programmatic or institutional goals involved, e.g., a warning may be given, but it may be ineffectual. Is the program goal to give an effective warning, or just a warning?
Some disaster researchers have called for increased attention to "goal setting" in emergency planning and efforts to promote change within the "system" (Quarantelli & Tierney in Wenger et al 1980: 134). The desired change appears to be one that will promote pre-disaster planning through "innovation." But this work tends to stop short of examining specific emergency planning institutions and their goals.

The operational experience of local governments in the eruption suggests several avenues for examining the institutional goals of emergency planning programs. Are the goals to create a general purpose emergency response capacity or a disaster-specific response? Furthermore, is the desired response capacity administrative or functional in nature? Finally, where should that capacity reside? Should each community have that capacity or should it be an intergovernmental function?

The organization of the local response illistrates the potential relevance of these questions. It is apparent that county-wide emergency plans had limited applicability to immediate local needs. All municipalities relied on their own internal organization to manage the functional response, and many also relied on their own relationships with other local governments--state and federal agencies--to find resources. The most obvious conclusion is that the existing county-level model for emergency resource delivery was not functional, yet the inter-governmental funding and training programs for statewide emergency planning are based on that model.

Observations collected in this study also tentatively suggest that current intergovernmental funding of local emergency planning is creating a two-tiered system of plans. The first tier consists of the federally mandated nuclear response plans embodied in the county coordination system. The second tier consists of local general emergency procedures which develop out of the context of each jurisdiction's experience, perception of needs, and local potentials and constraints. This observation needs further analysis and verification, but it has some interesting implications even for the existing goals of nuclear preparedness programs.

If the county-wide framework for emergency operations was less effective than it should be for the volcanic fallout response, it may also be less effective than assumed for the massive evacuation plans called for by current civil defense goals. For example, one local official interviewed in this study observed that "The nuclear disaster training a year ago was useful organizationally, but it would never work operationally."

The ad-hoc measures taken by local governments in the eruption episode were in many cases successful, although hardly optimal. One clear implication of the experience is that emergency planning programs may benefit from more direct linkages to general purpose local government on a unit-by-unit basis. Another implication is that local governments both need and would welcome regional or statewide support systems which build direct relationships with local executive and functional decision-makers, rather than an administrative county-wide coordination system. The county-wide coordination system worked best as an adjunct to local government operations. It was less effective in actually leveraging aid from state and federal levels; or as a framework for specific operational measures (such as organizing citizens or deploying equipment and manpower.)
Although the organizational model for intergovernmental emergency planning programs can be critiqued, it may be more useful to examine the underlying goals of such programs. Many organizational alternatives are possible, and each will have particular strengths and weaknesses. But underlying any approach is a question of what the desired end results are.

If the primary goal is to provide an administrative framework for state and local compliance with nationally conceived plans for certain types of emergencies, perhaps the existing model is adequate. If the goal is to promote improved local capacity for, and interest in, pre-emergency planning, then an institutional framework which instigates the development of locally conceived strategies and methods for implementing emergency operations is needed.

Michael (1974: 47) describes such a framework as "planning to learn:"

A variety of societal factors, exemplified by a growing appreciation of the need for orientation to a novel and uncertain future rather than to a familiar and reliable past....will lead to increasing attention to the theory of design of organizations that can learn their way into the future. The necessary components of the planning process constitute a paradigm for cognitive and affective learning...organizations that can learn how to plan.

An example of cognitive learning in the context of this study was the development of local methods for communicating with citizens. Another example was the reliance on horizontal local government ties or innovative search patterns to acquire emergency equipment. Yet another example is the substantive value which neighborhood organization in the community planning process may have in organizing emergency operations such as evacuation or cleaning ash.

If we accept the value of these locally devised methods, then the challenge for emergency planners may be to gain acceptance for programs which support "a process of goal-assessment, future-casting and strategizing that builds on a special sensitivity to institutional constraints, client needs and situational potentials" (Susskind 1974: 158). Program goals might focus on local capacity-building as the development of specific techniques for emergency operations which meet national objectives (but are tailored to what is likely to work in each local context).

**Instrumental Planning Implications**

Assume that an institutional commitment is made to fostering emergency plans which are built up from the local context of experience and problem-solving potentials rather than imposing institutionalized plans. In other words, the institutional goals become "performance-based." The specific operational details or local techniques would vary within the limits of what can be expected to meet the performance standards.

For example, use of mass media to initiate detailed evacuation plans may work in isolated communities but not in densely populated multijurisdictional metropolitan contexts where media overlap is likely. On the other hand, smaller communities lacking accessible radio media may achieve better results through
tailored methods such as handbills or grapevines alerting key actors. The anticipation of operational problems and identification of locally appropriate strategies would develop in the planning process itself—not as a function of local compliance with a set of administratively devised techniques.

What instrumental planning process techniques are actually going to foster this type of "cognitive and affective learning?" Can that learning-evaluating process actually take place outside the context of an emergency episode? The development of such techniques would be essential.

Furthermore, the need for such a process has been recognized by the Federal Emergency Management Agency (FEMA). FEMA is currently sponsoring "development of an easy-to-use, systematic, valid process for use by local governments in evaluating their emergency management organization, including the development of a self-assessment manual for local government emergency management." Whether this manual will meet the hypothetical criteria proposed here for a planning-to-learn system is unknown.

It is not likely to be easy to develop such a process. Essentially, a training process is called for, but it must be one which does not exclude the development of locally appropriate emergency planning approaches. This exclusion of viable alternatives is recognized as a fundamental problem in all planning procedures. Hirschorn (1980: 175) describes the need for "a method...which allows people to imagine surprising developmental paths." The results of this study suggest that such training programs ought to provide ample opportunity for considering the implementation phase of emergency planning. A process limited to verification of existing administrative arrangements will definitely preclude development of new approaches, such as those flowing from behavioral disaster research, and most likely to be effective in a particular jurisdiction.

One potential planning technique may be to conduct a scenario-based or simulated process of pre-disaster problem-solving at the local level (Hirschorn 1980). Michael (1974: 56) describes this process in terms of:

...categorizing crisis conditions for planning systems and... the design of structures and training needed in order to use crises for discovering new options, including the realization of planning efforts during post-disaster periods...

This type of learning process is quite similar to the during-crisis experience of local officials in responding to the St. Helens eruption. If this process can be simulated through training programs, it may lead to effective identification of local response needs before emergencies happen.

In fact, situational "gaming" has been successfully used in training local officials in the community planning process. One example is "Tradeoff: The Land Use Planning Game," developed by Oregon State University and distributed by the Joint Council on Economic Education of New York. Although gaming has been part of the planning scene for some time, the focus has shifted from

allocative, idealized scenarios based on economic principles to simulations of
the problem-solving process which takes place during decision-making.

Further Research Needs

Further research is needed to determine if the implications flowing
from the Mt. St. Helens emergency are valid and generalizable to other emer-
gency planning situations. Although interpretive assessments and recommenda-
tions are a necessary and desirable product of policy studies, they would
benefit from more rigorous testing in this as well as other areas of planning.
The research needed can be summarized under the three assessment categories:
operational, institutional and instrumental concerns.

From an operational perspective, information is needed on the extent
to which crisis problem-solving in other emergencies does or does not result in
the innovations and appropriate techniques observed in the St. Helens case.
The significance of the St. Helens case lies in the observed tendency of a
fairly large sample of jurisdictions to choose much the same techniques disaster
researchers suggest they must choose in order to be effective. However, there
must be some wider evidence that these techniques are workable from the local
functional decision-makers point of view before such techniques can be sug-
gested in practical "how-to" documents.

Institutionally speaking, the St. Helens experience suggests two
general areas of research. First, there is a need to assess the degree to which
current emergency plans are based on techniques which have low probability of
operational success when compared to the techniques developed in crisis condi-
tions. Secondly, it would be useful to assess the extent which localities are
maintaining a two-tiered system of emergency plans. A related question is to
determine the extent to which county-wide emergency offices are administrative
entities or, alternatively, organizational frameworks which have clear linkages
to the functional decision-makers managing emergency operations. Each of these
questions bears on the problem of maintaining institutional programs which
enhance and expand local emergency capabilities: e.g. a system which "plans to
learn" or to incorporate new techniques.

Finally, there is a need for development and testing of instrumental
planning techniques which can be successfully used in training. It has been
suggested here that simulation or situational gaming is c.e technique worth
investigating. There are no doubt other techniques which might be suggested
from a variety of disciplinary perspectives. Prototypes should be developed and
tested for their acceptance by community decision-makers and their ability to
promote effective pre-emergency problem-solving and management planning.
Bibliography


