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Energy Emergency Preparedness: An Overview

B.K. Barnes and M.H. Rothkopf

June 1988

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ENERGY EMERGENCY PREPAREDNESS:

AN OVERVIEW

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EXECUTIVE SUMMARY

Energy emergency preparedness is the special responsibility of the Deputy Assistant Secretary of Energy Emergencies within the Office of the Assistant Secretary for International Affairs and Energy Emergencies; though other Department of Energy (DOE) offices manage some aspects and DOE also coordinates emergency management with other Federal departments. There are two basic objectives for energy emergency preparedness. The first of these, the *economic stabilization* objective, seeks to ease the impact of an energy supply disruption by facilitating a quick recovery and minimizing the disruption's economic consequences. The second is the *mobilization support* objective to ensure that there is adequate energy and fuel to support defense, defense industrial and critical civilian needs for energy and fuel. While all energy systems are vulnerable they vary in the degree of seriousness and the probability of a disruption. Oil is the most vulnerable, and will become increasingly so in the 1990's, as domestic and reliable foreign sources diminish and the United States relies more on imports from volatile Persian Gulf countries. Electric power is the next most vulnerable system, being open particularly to multi-site terrorist attack.

This overview examines two highly connected organizations: the Office of Energy Emergencies (OEE) itself and the actual response organization, centering on the Energy Emergency Management System (EEMS).

DOE has progressed over the last 2 years in developing a credible organization and identifying appropriate responses. The staff at OEE includes system experts who can respond to most energy emergencies. There is, however, a discrepancy between OEE's response capabilities and the formal response infrastructure. Only a beginning has been made in developing a regional infrastructure. Staff and resource limitations have delayed certain key programs, in particular state liaison and the efforts to continue essential functions in extreme national security and defense crises. Officially sanctioned mobilization plans are stalled. The important public communications function needs further consideration and development.

Behind some of these problems is what appears to be policy conflict in the application of various Administration policies. In particular, laissez-faire conflicts with the requirement to plan for intervention should the market prove to be inadequate during severe crises, such as mobilization or war. There is also potential conflict between the Administration's laissez-faire and federalist policies since a states responses may sometimes conflict with the free market approach.

The centerpiece of DOE responses will be the Strategic Petroleum Reserve (SPR). The SPR was established to supplement oil supplies in an oil supply disruption, help moderate the impact of the disruption on the oil prices, reduce pressure for greater market intervention, deter panic, and provide the time for a diplomatic resolution of the problem. Since the inception of the SPR the nature of the oil market has changed. Now, approximately 50 percent of oil purchases are made in short-term spot markets. These markets are extremely responsive and may help alleviate future crises by facilitating a rapid adjustment to supply disruptions. However, they may instead exacerbate the problem of moderating the price impact of a disruption by introducing panic trading and speculative bidding--which may in turn adversely influence financial markets as a whole. The SPR's ability to meet its current objectives needs reconsideration to ensure that it is still effective in this new context.

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Chapter 1

INTRODUCTION

Energy emergency preparedness is a major DOE concern. Emergencies involving disruptions to the energy supply are the specific responsibility of the Department's Office of Energy Emergencies (OEE). In meeting its energy preparedness responsibilities, OEE translates administration policy into planned strategies for dealing with energy emergencies. These strategies entail the development and testing of various tools and programs that involve DOE organizational resources, those of other Federal bodies, states, local governments, and the private sector. For OEE, the implementation of energy emergency preparedness entails:

- monitoring the nation's energy vulnerability,
- articulating strategic energy security objectives,
- developing response programs to meet these objectives,
- constructing the infrastructure needed to support them, and
- refining that infrastructure as a consequence of testing and reevaluation.

Energy emergencies result from the disruption of energy supply or distribution systems, including oil, natural gas, solid fuels (in particular coal), and electric power systems (including hydroelectric and nuclear power). In early 1987, DOE's *Energy Security* report detailed the nature of the current vulnerabilities of these various systems and presented alternative projections of U.S. energy vulnerability into the 1990's under a variety of political and economic scenarios.[1] A similar review of energy vulnerability is presented in the appendix to this report, *U.S. Energy Vulnerability in the 1990's: A Reassessment.*[2] Both analyses of our current and projected vulnerabilities consider electricity to be the most vulnerable of the energy systems domestically, while, internationally and overall, oil is considered the most vulnerable. The vulnerability of the oil supply has been the primary focus of OEE's preparation efforts.

The Purpose of This Report

The Office of Energy Emergencies continually reviews its programmatic organization to ensure that it is effectively and efficiently developing the strategies and implementation infrastructure needed to meet those energy emergencies that are its specific responsibility. Periodically, workshops are held which bring together DOE personnel with representatives from certain other Federal agencies, the national laboratories, and

private consultants to review U.S. energy vulnerability and evaluate emergency response programs. This report further contributes to the ongoing process of response program evaluation. It builds upon these other efforts, examining the organizational aspects of energy preparedness and, in particular, whether the preplanned organizational infrastructure developed to meet an emergency is adequate to effect the objectives of the energy emergency strategic framework.

The analysis presented in this report is a purely qualitative one and the information upon which it is based comes from OEE policy statements and briefing materials, telephone interviews with key OEE staff, and OEE staff responses to three disruption scenarios. A structured questionnaire was developed for the telephone interviews in order to collect information regarding the current status of the various response programs and the nature of their organization. It consisted of a general section, asked of all contacts, and a specific section tailored to the particular set of programs being examined, based on information supplied in *mission and function* and briefing statements prepared by the various OEE divisions. Because this report was to focus on the organizational aspects of emergency response programs, of particular interest in preparing the structured questionnaire were the organizational charts summarizing the formal structures of the response agencies and their interconnections. Among the various OEE documents there are many such charts and, for the investigator approaching the task of understanding OEE organization, the information contained in them was assumed to be a good basis for the development of major parts of the structured questionnaire. The questionnaire was to be used in the telephone interviews but was often abandoned for a variety of reasons: the ideal agency structures depicted in the various organizational charts were sometimes only partially realized in the current response agency organization; much of the organization had been revised even within the past year, making some charts obsolete and the questions based upon them irrelevant; and there was further evidence from initial interviews that comparisons with ideal formal structures may be poor criteria by which to judge the maturity of the various programs.[3]

Consequently, a more informal approach was used where contacts were asked to describe their divisional responsibilities and organization. Contacts were asked specific questions about various aspects of their programs, the speed with which the program was developing, and the nature of impediments to such development. Finally, they were asked for a candid opinion about their program shortcomings. Twenty-one people were interviewed from OEE and the DOE Offices of Fossil Energy, and Congressional, Intergovernmental, and Public Affairs. Information about each program area was collected from several contacts and most division heads were interviewed. The average interview

lasted approximately 1 hour; where necessary there were shorter follow-up interviews.

Three energy supply disruption scenarios, focussed on oil, were also devised and sent to the heads of divisions whose responsibilities are connected to international oil supply, with a request for a description of how the programs under them would be used in the described circumstances. Such information had some use in confirming descriptions of the actual procedures to be used in meeting those particular kinds of emergencies.

An attempt was made to access the evaluations made of the many OEE exercises since it was felt that such evaluations probably contained critical information. Much of this information is classified, but even the unclassified material was not available for review.

Many of the supporting OEE documents used in compiling this report consisted simply of two to three page internal memoranda. Other critical sources were the DOE report on Energy Security, the Proceedings of the Energy Emergency Preparedness Workshop, the Federal Energy Resource Management Manual (FERMM), and the SPR Fill Analysis.[4]

This study represents a cursory survey of a relatively large and very complex network of individuals, tools, programs, and agencies whose focus is to develop effective response capabilities to meet any foreseeable kind of national emergency involving energy supplies. While recognizing inevitable shortcomings because of the limitations of such data, a general survey of this kind can be beneficial in summarizing the details of the response system and isolating those areas within the total program that may need enhancement. Prior evaluations of the response system have tended to be restricted to particular response capabilities over particular ranges of the response. This is generally true of the OEE emergency response exercises which tend to be restricted to simulations testing the ability of DOE personnel to cooperate as a headquarters-based Energy Emergency Management Team (EEMT). These exercises tend to neglect such things as the regional agencies and their roles in an emergency, and the public reaction and the role of the public communications function. This overview may offer a more general but also a more extensive survey of the response process as it is presently developed.

Strategic Objectives of the Office of Energy Emergencies

The general responsibilities of the Office of the Deputy Assistant Secretary for Energy Emergencies center on directing energy emergency preparedness planning and operations, including the coordination and direction of DOE's Continuity of

Government (COG) program. In meeting these responsibilities OEE is developing a strategic framework around two key objectives. As an immediate objective, the strategic framework aims to ensure reliable energy supplies during a supply emergency, at a reasonable cost, in order to maintain a healthy economy. This objective will be referred to as the *economic stabilization objective.* It directs strategy in preparing to meet most economic disruptions of energy supply and certain kinds of political or military disruptions, such as oil embargoes or disruptions of the Persian Gulf supply. Where there is a severe energy disruption and economic stability is no longer the principal issue, the strategic objective becomes that of ensuring adequate energy resources to fill essential civilian and military needs. To meet particular extreme circumstances this objective necessitates the development of an effective COG program. This strategic objective will be referred to as the *mobilization-support objective.* The capacity to fill essential civilian and military needs is always the responsibility of DOE and energy security is monitored with this objective in mind. In the absence of a major disruption such needs are typically filled through normal market mechanisms, which are monitored and supported under the previous economic stability objective. Normal market mechanisms are regarded as the most efficient ways to ensure adequate supply and the effective pricing and distribution of energy products through the economy. This general policy is sometimes referred to as the *Cornerstone Policy.* In the case of a severe disruption these normal mechanisms may not be adequate to meet the mobilization-support objective. Essential civilian and military needs may need to be filled through other means. In particular, there may be a need for greater Government intervention and regulated control for mobilization support. In such a situation policy directives call for the provision of "both gradual and abrupt replacement of market forces by governmental regulation."[5] Preparation for this real possibility of a need for Government intervention requires the development of a coordinated response in which DOE acts as both a resource agency and a claims agency.

The Office of Energy Emergencies

The rest of this chapter will be devoted to outlining the overall organization of the Office of Energy Emergencies. In the following chapters various programs and programmatic tools will be discussed within the context of the OEE divisions where they are being developed.

To understand the functioning of the Office of Energy Emergencies it is important to have some general sense of the organizational context within which it operates. OEE

is located within the Office of the Assistant Secretary for International Affairs and Energy Emergencies. Within the Department of Energy the offices with which OEE has most interaction include the General Counsel (GC), Congressional, Intergovernmental, and Public Affairs (CP), Fossil Energy (FE), Conservation and Renewable Energy (CE), and the Energy Information Administration (EIA). Relations with the General Counsel are directed towards the articulation and resolution of legal problems or ambiguities having to do with the authorities of response agencies under varying emergency scenarios. Congressional, Intergovernmental, and Public Affairs is the major liaison group for both Congress and the public and oversees the public relations function of energy emergency efforts. The Strategic Petroleum Reserve Office, responsible for the operational development of this critical emergency response tool, is located within Fossil Energy, and Conservation and Renewable Energy is cooperating with the states liaison programs managing the funds available to states for the development of energy emergency plans. The Energy Information Administration is the major statistical and analytical agency within the Department of Energy.

The Office of the Assistant Secretary for International Affairs and Energy Emergencies is functionally divided into two sections. The Deputy Assistant Secretary for International Affairs oversees the Office of International Research and Development Policy, the Office of Nuclear Non-Proliferation Policy, and the Office of International Energy Analysis. The other is headed by the Deputy Assistant Secretary for Energy Emergencies (Figure 1-1). In meeting its strategic objectives the Office of the Deputy Assistant Secretary for Energy Emergencies, currently with a staff of 71, is organized into three offices:

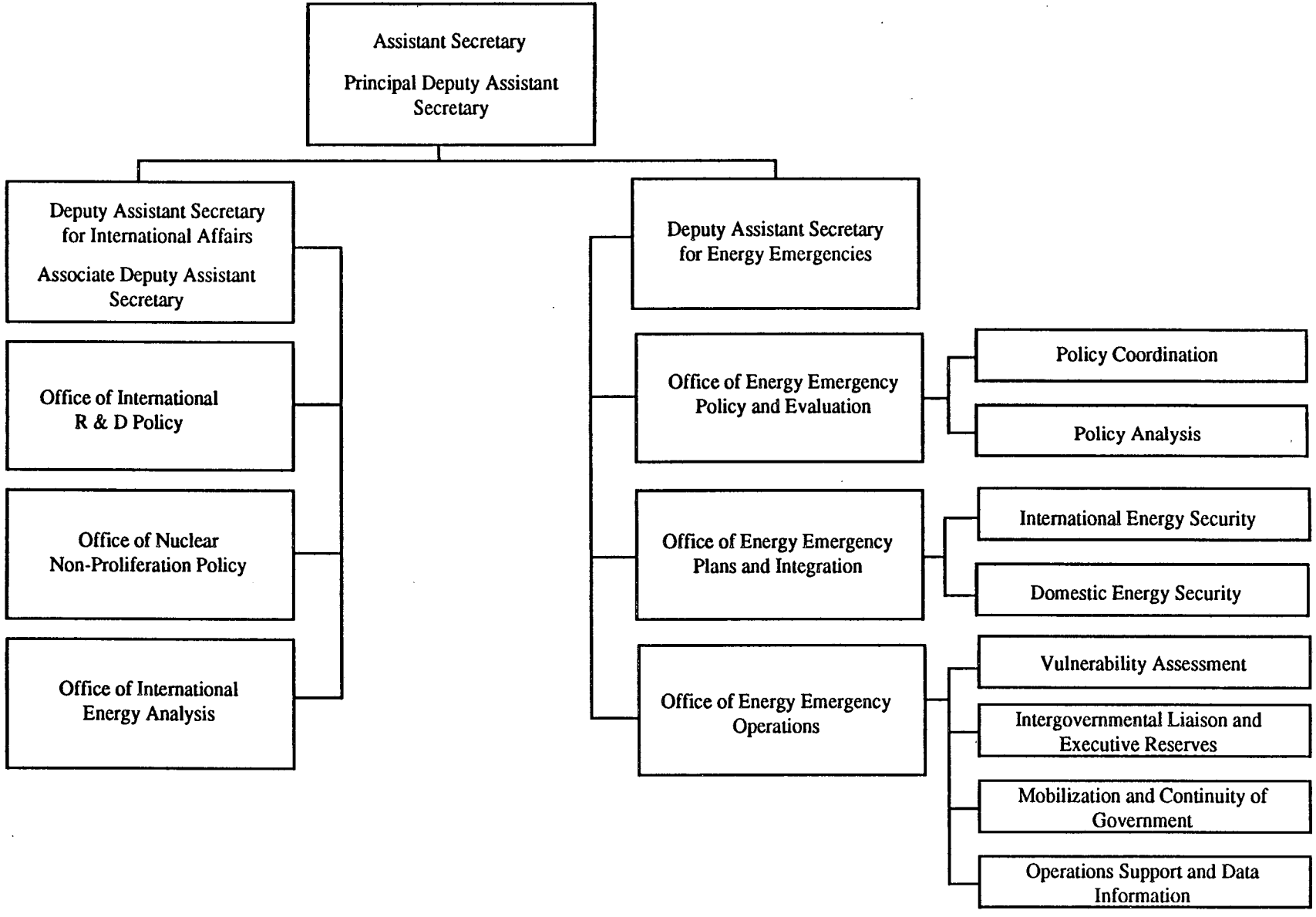
- the Office of Energy Emergency Operations,
- the Office of Energy Emergency Plans and Integration, and
- the Office of Energy Emergency Policy and Evaluation.

The Office of Energy Emergency Operations

This is the largest of the offices in OEE with the major load of programmatic responsibilities and approximately half of the staff. Its purpose is to assess the vulnerability of domestic energy supply systems, to develop and promote strategies for mitigating energy supply system vulnerabilities, to coordinate DOE's Continuity of Government program, to support energy preparedness for national mobilization, and to generally maintain an energy emergency response and operations capability. It is divided

Figure 1 - 1

Office of the Assistant Secretary of International Affairs and Energy Emergencies



into four division offices:

- The *Vulnerability Assessment* divisionwhich is concerned with assessing the vulnerability of domestic energy systems and, in particular, vulnerability to terrorist activities.
- The *Intergovernmental Liaison and Executive Reserve* division which handles the liaison effort with the states and operates the program to recruit private industry executives into a major emergency response resource, the National Defense Executive Reserve (NDER).
- The *Mobilization and Continuity of Government* division which is focused on the mobilization support objectives of OEE. These are connected to wartime emergencies and the preparation of the infrastructure needed to perform essential DOE functions in an emergency where the regular chain of command has been drastically disrupted.
- The *Operations Support and Data Analysis* division which acts as both a data collection facility in its own right and as an in-house connection to the Energy Information Administration and their facilities.

The Office of Energy Emergency Plans and Integration

This office is concerned with coordinating planning for SPR drawdown and distribution, the development and coordination of international energy emergency policy and programs, the maintenance of an integrated departmental energy emergency management system, the design and execution of energy emergency tests and exercises, and the coordination of interagency development of energy emergency response options. This office has two divisions:

- The *The International Energy Security* division which oversees international programs involving North Atlantic Treaty Organization (NATO), and International Energy Agency (IEA) tests and exercises.
- The *Domestic Energy Security* division which attends to the SPR program.

The Office of Energy Emergency Policy and Evaluation

This office conducts analyses of energy emergency policy options and issues, prepares exercise evaluations, and carries on a broad range of coordination and staff functions for the Deputy Assistant Secretary. The Office, which has a staff of 15, is divided into two divisions:

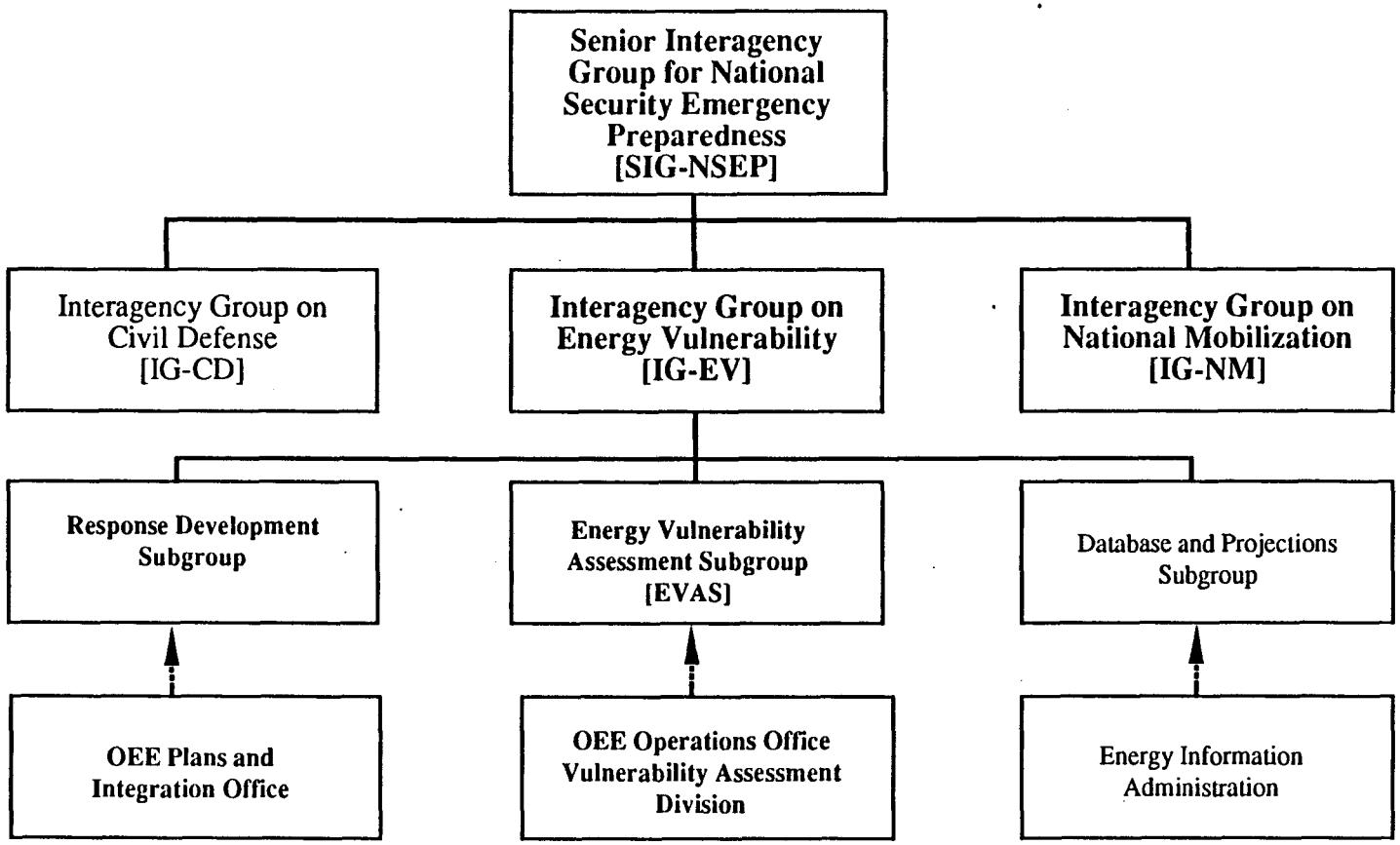
- *Policy Coordination*, and
- *Policy Analysis.*

OEE Participation in Major Interagency Groups

In fulfilling its responsibilities, OEE has a liaison with various Federal agencies, primarily the Departments of Defense, Commerce, Transportation, and State, with whom it works in a series of Interagency Groups to coordinate emergency responses to crises that include energy supply disruptions but also impact areas whose responsibility extends to these other offices. These disruptions would primarily, though not exclusively, involve mobilization where the Departments of Defense, Transportation, and Commerce are important claims agencies; the Department of Commerce is responsible for coordinating defense production. The other significant agency connected to DOE's energy emergency preparedness effort is the Federal Emergency Management Agency (FEMA), which is a liaison group offering support in the coordination of emergency responses.

Some of the cooperation between these various Federal groups is effected through the formal apparatus of interagency groups. The Senior Interagency Group for National Security Emergency Preparedness (SIG-NSEP) oversees a series of specialized groups intended to facilitate the coordination of the efforts of critical Federal agencies in developing joint responses to various kinds of emergencies (Figure 1-2). The group concerned with energy emergencies, chaired by the Assistant Secretary for International Affairs and Energy Emergencies, is the Interagency Group on Energy Vulnerability (IG-EV). This Interagency Group is further divided into three subgroups: the Energy Vulnerability Assessment Subgroup (EVAS), co-chaired by the Department of Defense and the DOE Director of the Office of Energy Emergency Operations; the Database and Projections Subgroup is co-chaired by DOE through the EIA; and the Response Development Subgroup is co-chaired by the State Department and DOE's Director of the Office of Energy Emergency Plans and Integration. EIA personnel in the Database and Projections subgroup have played an important role in the economic modeling connected with planning the use of the Strategic Petroleum Reserves (SPR), a key tool in DOE's emergency response repertoire. The International Security Division of the Office of Plans and Integration works through the Response Development Subgroup in coordinating its activities with the State Department.

Figure 1 - 2
DOE's Participation in Major Interagency Emergency Response Groups



Notes to Chapter 1

1. U.S. Department of Energy, *Energy Security: A Report to the President of the United States*, Washington, DC. March, 1987.

2. C. A. Goldman, M. H. Rothkopf, S. Pantell, and A. Thorpe, *U.S. Energy Vulnerability in the 1990's: A Reassessment.*

   The two reports are mostly in agreement with their assessments. The differences between them have more to do with subject-matter as the DOE report discusses ways of reducing vulnerability in the various energy systems and has a more extensive treatment of all energy systems. The LBL report concentrates on oil vulnerability, offering a Disruption Potential Index as an attempt to quantify the vulnerability of oil supply to small and large disruptions thereby providing an estimate of the possible contribution of the SPR in reducing the disruption potential. The main area where projections do diverge have to do with the growth of oil demand in Less Developed Countries (LDC's), with a much higher estimate of the growth rate in the LBL report.

3. As will be considered in the final chapter's discussion on the preparedness of these response programs, energy emergencies will most likely have many unique unexpected elements that demand both a high level of energy system expertise as well as much flexibility in the response organization. To some extent, these requirements favor a small, highly skilled trouble-shooting task force that defines its own structure at that point of crisis. In such a situation, adequacy of preparedness may best be judged by the availability of necessary expertise and the physical resources or tools required for an effective response. These physical resources include such things as communication systems, hardware and software for data collection and analysis as well as fuel stocks and excess production capacity. These human and physical resources may exist independently of a fully articulated, staffed, and trained formal response structure.

4. Charles River Associates, *Proceedings of the Energy Emergency Preparedness Workshop,* Ft. Belvoir, Virginia, January 20-22, 1987.

5. National Security Decision Directive (NSDD) No. 47, July 22, 1982

Chapter 2

THE NATURE OF ENERGY EMERGENCIES

The energy system is a diverse and complex one and its vulnerability to disruption is consequently variable in both type and degree. This chapter attempts to survey the range of possible energy emergencies for which the Office of Energy Emergencies may have some responsibility. Such a survey can serve as a basis to determine the comprehensiveness of current preparedness programs and as a basis to examine the effectiveness of their organizational infrastructure. Generally, energy emergencies can be categorized according to the energy system involved, the source of the disruption, geographic location, and the stage of development.

- The energy system involved may relate to oil, solid fuel, natural gas, or electricity at either supply or distribution points.
- The emergency source may be natural, accidental, labor-related, economic, political, or military.
- The location may be domestic and constrained to the contiguous states, may involve special problems with regard to Hawaii or Alaska or be international in scope.
- The stage may be either that of non-crisis but with crisis potential, creeping crisis, or actual crisis.

Energy System Vulnerabilities

The nature of the energy supply system and its vulnerability is the subject of the DOE *Energy Security* report and the appendix to this report on *Energy Vulnerability.* These discuss the vulnerability of the various fuel systems as well as something of the different means available to reduce such vulnerability. Both reports agree that the energy systems with real vulnerability to major disruption are domestically, electricity, and internationally, oil.

While electric power transmission and oil supplies are most vulnerable to a major disruption, other energy systems are vulnerable to less severe disruptions. Historically, coal has been most vulnerable to strike activities but transformations in the nature of the labor market and in coal industry technology have reduced the probability of such a disruption happening in the foreseeable future. Accidents at nuclear power plants are the responsibility of the Assistant Secretary of Nuclear Energy (AS/NE). The Office of

Energy Emergencies has an interest in nuclear accidents only when they lead to a major disruption of the energy supply system that may impact on the national security or the national economy. Natural gas is subject to real security vulnerabilities, particularly at pipeline river-crossings and compressor stations. Pipelines are fairly easily replaced. The compressor stations, however, do have sophisticated equipment that may have a long lead time for replacement. Again, any damage that may occur would not have the impact of a major energy disaster, the exception being premeditated damage inflicted by terrorist activity designed to have a major impact.

Vulnerability of the Electricity System

The electric power industry consists of electric utility companies that are organized into regional groups designed to ensure system reliability by adopting appropriate operating and engineering practices. The nine regional reliability councils are in turn organized into the North American Electric Reliability Council (NERC). Each group is located in one of three separate synchronized power grids which are monitored by multiple control centers.[1]

Electricity must be used as produced which means that generation equipment must have the capacity to meet peak loads and have enough excess to cope with seasonal fluctuations, handle maintenance activities, and generally provide for reliability in the face of relatively commonplace though unpredictable system disruptions, such as those caused by lightning or mechanical failures. Except for the New England region where several utilites still operate with tight reserve margins, current reserve margins can meet current peak demands due to what has turned out to be over-capitalization during the 1970s.[2]

The various reports on energy security indicate that the main points of vulnerability in the electric supply system include generation facilities, transmission systems, distribution systems, and the reliability of primary energy sources; e.g., coal and uranium, oil and gas production. The most vulnerable component is the transmission system, due to its exposure to threat and the cost and long lead time involved in the replacement of damaged components. Power plants are also vulnerable to sabotage and to accidents and here the critical elements have to do with the cooling system, turbines, and generators.[3]

Effectively, multiple simultaneous disruptions to the transmission system especially affecting regional interties are required to create a national energy emergency in the electricity system. The system is vulnerable to such disruption through widespread

terrorist activity. However, most disruptions to the system, typically caused by natural events, mechanical failures, and operator errors will be localized and, within a national perspective, relatively minor.

Oil System Vulnerabilities

The predominant energy source has changed with time and in this century has moved from an emphasis on coal to one on oil. Approximately 42 percent of the energy currently used in the United States is oil and by the mid 1990's only 50 percent of this oil will come from domestic sources. These sources include the Alaskan North Slope and major fields in Texas, Louisiana, Oklahoma, and California.[4] Known domestic reserves are at 28 billion barrels, which equals about 9 years of current production. With extensions to and revisions of oil reserves the 9-year horizon has been approximately constant for 35 years.[5] Lifting costs for U.S. oil are high, especially when compared to those in the Persian Gulf fields, and these costs make many known reserves uneconomical to exploit. Due to diminishing domestic resources and the adverse economics of U.S. production of crude oil, by the mid 1990's world oil production will be concentrated in the politically unstable region of the Persian Gulf and it is this factor that makes oil supply particularly vulnerable.

The ability and willingness of industry to increase domestic production in order to meet an external supply disruption is limited, particularly in the short run. Extensions to current oil reserves, whether from new discoveries or the application of new technologies, are likely to come from existing fields with some added expectation of increased supplies from offshore sites in California and new discoveries in Alaska. The uncertainty of price expectations, derived in particular from the price collapse of 1986, suggests that private sector responses directed at refurbishing the domestic industry will be slow since the expected returns on investment may be low or negative. Independents, who have participated heavily in the industry in the past two decades, will have difficulty in getting funding for exploration and development. Skilled workers would be in short supply as a result of the large layoffs effected in 1986 and the dispersion of this skill to other sectors of the economy. In the short run, the domestic response capability is low and there is a question of how much of a long run would be needed for it to reach adequate levels. In the event of an external disruption the domestic crude oil production rate might be raised in the relatively short run: through production from known marginal fields, secondary recovery, and the application of some existing enhanced recovery techniques. DOE policy in meeting such emergencies is to draw upon special crude oil

stocks, the Strategic Petroleum Reserve (SPR), that have been created for the purpose of maintaining supply in the short run until the disruption can be eliminated through diplomatic or other political means. OEE's primary interest is in facilitating economic adjustment and national security in the short run.

In the 1970's the Nation's energy self-sufficiency in oil changed, with oil imports reaching a peak in 1977 at 8.8 MMBD, or approximately 47 percent of all U.S. oil consumption. Since then, imports have been approximately halfed as a result of high prices (until 1986), fuel substitution, and increased energy efficiency of structures and equipment. In the future, dependency is likely to increase though at a slow rate, as domestic resources dwindle.

The sources of external supplies of oil have changed over the years. In 1985, oil exporters from Less Developed Countries (LDC's)--in particular Mexico, Nigeria, Venezuela, and Indonesia--supplied 40 percent of U.S. imports, while Canada and the United Kingdom supplied another 20 percent. Projections are that the supply from the United Kingdom will be sharply reduced in the early 1990's and that the LDC exporters will have to redirect oil supplies to meet increasing home demand.[6] In the future, the expectation is that the Persian Gulf oil suppliers will reestablish themselves as the primary source of imported oil since they have large reserves and low production costs.

The International Oil Market

The availability of oil in the international market is dependent on the nature of that market as a whole. As the Nation loses its oil independence, supply becomes subjected to events in the international marketplace. It is here that prices are set and allocations determined. This means that the Nation must be sensitive to demand changes elsewhere in that marketplace.

Currently, other developed countries are even more dependent on their external energy supplies than is the United States, and this dependency is likely to increase with time. By 1995 the non-U.S. Organization for Economic Cooperation and Development (OECD) oil import level may well reach 75 percent of total consumption as compared to 50 percent for the United States.[7] Japan is totally dependent on imports. Changes in the level of consumption will to some extent mitigate the impact of this increased reliance on imported oil. Demand should stabilize as fuel substitution decreases reliance on oil, technologies become more energy efficient, and industry becomes less energy intensive. Future uncertainties regarding the nature of the international oil market lie elsewhere. In LDC's oil consumption is expected to increase as urbanization develops along

with an industrial base which is more likely to be energy intensive and oil dependent. Energy efficient technologies tend to be too capital intensive and expensive to be attractive to the LDC entrepreneur. There are exceptions to this projection as LDC's vary considerably in their demography, economic structure, and economic potential. Yet, overall the exceptions will make little difference to the final impact of LDC oil demands. The share of world oil going to LDC's increased from 14 percent in 1970 to 24 percent in 1986, while that of OECD countries dropped from 71 percent to 56 percent. In 1985 oil consumption in the OECD countries was slightly lower than in 1970, while that in LDC's had doubled since 1970.[8]

The Source of Energy Emergencies

Generally, energy emergencies belong to one of five types. Either they have been caused by some form of *natural disaster*, such as lightning, hurricane, or earthquake; by some kind of *accidental disruption* of production or distribution systems, such as incorrect operator actions leading to a transmission disruption on a major electrical grid system; by *industrial actions* and, in particular, strike activity; by *political-economic activity* such as an embargo; or by some form of *hostile aggressive action* such as by terrorist sabotage or war.

The Office of Energy Emergencies may well play a role in any of these kinds of emergencies, if only by providing critical information to those most likely to be affected by such a disruption. All such disruptions are likely to be monitored by OEE to see how serious they may become. However, only a few of these kinds of disruptions are of interest to OEE as a response agency.

Natural disasters are most likely to be local or regional in their impact and responses to them are currently built into the different systems most likely to be affected. The system most vulnerable to such impacts is the electric power system and, in particular, its transmission system; however it is well prepared to meet these types of emergencies at the industry level. The only kind of major natural disruption that industry and local response agencies may not be prepared to handle is that of a major earthquake.

Accidents also tend to be local in nature and impact, except perhaps for nuclear accidents, which specifically are excluded as a concern of OEE unless they disrupt the energy supply in a way that threatens energy security. Accidents in the electrical system have had major impacts in the past and, in particular, in the major power blackouts in the Northeast in 1965 and in New York City in 1977. These accidents

prompted an overhaul of the reliability of the electric power system and the development of the regional reliability councils.

In the past, strike action has had a crippling effect on the coal industry. Coal is vulnerable at two points, at the mines and in transportation. Changes in technology, in the degree of unionization of industry employees, and in union/management relations have greatly reduced the probability of such action. Petroleum products may also be vulnerable to industrial action in the transport industry.

Politically and economically motivated disruptions to the energy supply are by their very nature directed at impacting the national economy or security and are the concern of OEE. Energy systems that are most vulnerable to such disruption are those that have some system dependence on external sources. About 2.5 percent of the electric power supply is generated in Canada though particular regions have a very high dependence on this power source, particularly among U.S. members of the Northeast Power Coordinating Council.[9] Canada is considered to be a reliable source and vulnerability at this point in the supply system is considered to be low. The Nation is basically self-contained for coal and natural gas. The system that is most vulnerable to political/economic disruption is that of oil. The oil embargo of 1973 is the most prominent example of such a disruption.

Hostile aggressive actions in the form of terrorist sabotage, military activity directed against other parties in critical production areas or across critical distribution paths, and conventional and nuclear war can all impact the energy system. The energy systems most vulnerable to multi-site sabotage include natural gas and, in particular, pipelines and compressor stations; electric power substations, transmission systems, and generators; and major oil fields, pipelines, pumping stations, refineries, and terminals.[10] Individual systems have had some localized experience with sabotage. In particular, the electric power transmission system has been subjected to significant sabotage and has been adapted to respond to such disruptions by expeditiously restoring service. This system, however, may not be prepared to deal with major multi-site sabotage of the transmission system, especially one directed at the substation. The oil industry has had experience with major military disruptions of supply and distribution. Individual companies have developed a repertoire of responses to deal with sabotage and more limited kinds of military-based scenarios. The current multiplicity of sources of crude oil supplies has also supported effective and fast market-based solutions to disruptions of a military kind but this situation is likely to change as the volatile Persian Gulf becomes increasingly important as a supply source in the next decade. Overall, the individual energy systems are not prepared to deal with major disruptions of a terrorist or military

nature by themselves. The Federal Government, through DOE, the State Department, and, if necessary, the Department of Defense, have the critical part to play in resolving them.

Emergency Locations

The geographical dispersion of an energy system increases its vulnerability. The location of any disruption may constrain the kinds of response that are necessary and possible. Energy emergencies may be either domestic and confined to the contiguous states, may involve Hawaii and Alaska, or may be international in nature. In considering the source of energy disruptions reference was made to those systems that are susceptible to external political, economic, and military activities. In particular, it is the oil system that has such vulnerabilities. These are centered not simply on production but also on distribution. Vulnerabilities of any system are reduced not only when the production area is secured but when the transportation or transmission system is also secure.

Hawaii and Alaska are vulnerable to external disruption due to their isolated positions. Hawaii is dependent on external energy sources and supplies need to be transported through international waters. This makes Hawaii vulnerable for all its energy supplies excepting those derived from renewable sources local to the islands. Alaska is self contained for its energy needs but its isolation from the rest of the country does introduce vulnerabilities in the flow of energy supplies from Alaska to the contiguous states. Again this mostly affects oil supplies.

Developmental Level of the Energy Emergency

Energy emergency preparedness requires the monitoring of the energy market, both domestically and internationally, in order to anticipate possible energy emergencies and optimize response preparations. Some emergencies may be prevented at a very early stage, others may approach a crisis point but be resolved at that time, and others may actually progress to major proportions. The nature of the monitoring effort and response development may change with each of these stages, including changes in the actual response agencies involved.

One classification scheme used to specify the developmental level of an energy emergency in the OEE is that of *pre-crisis, creeping crisis*, and *actual crisis.* This has a general usefulness with the qualification that not all disruptions need progress to the

crisis stage and that actual crises will vary in degree as measured by their impact on economic stability and national security. This scheme mirrors the stages of OEE's programmatic response. At the pre-crisis stage emergency preparedness activity entails monitoring and preparation. During the creeping crisis stage monitoring may be supplemented by the activation of the Energy Emergency Management Team (EEMT), which may develop a situation analysis and a response option report. At the crisis stage, these actions may be continued, interacting with response execution. This programmatic response to energy emergencies will be considered in Chapter 5 in conjunction with the EEMT.

With regard to oil, it has been argued that in the future we might expect an increase in the number of *mini-crises*, with greater and more rapid fluctuations in the price of crude oil but less economic damage, due principally to reduced consumption and greater dispersion in supply.[11]

Only rarely has what constitutes an energy crisis been specified. In part this reflects the complexity of the nature of a genuine crisis, which may not be reducible to simple formulae or a specific disruption threshold. By leaving the criteria open by which to judge the level of emergency, planners allow themselves the greatest flexibility in designing a response to a particular crisis.

There may be a lag between the onset of a crisis and its discernment in the monitoring process as a crisis that warrants activation of the highest level of response measures. Supply conditions are monitored but any crisis will be formed as a result of both supply and demand conditions. Information about demand is not as accessible or as reliable as that about supply. Changes in demand have created crises in the past and not simply supply disruptions. This was evidenced in the 1979 oil crisis where panic and speculative buying by both end-users and distributors combined with faulty demand projections by distributors resulted in a demand-induced component to the crisis. An actual crisis stage may be reached as a result of these demand changes, while the supply monitoring process registers a lower stage of emergency.

Even once an energy emergency has been recognized as a crisis it is not definite that the response machinery would be activated immediately. Energy emergencies are often likely to occur as a consequence of some political conflict or may themselves have sensitive political consequences that preclude immediately activating the preplanned response. The response machinery may be alerted and possibly staffed but actual activation is dependent on decisions made at a higher political and administrative level. In the midst of a crisis political considerations may interfere with or modify the response process.

The Probability of Occurrence and Level of Seriousness

OEE has, on various occasions, attempted to specify and rank energy emergencies in terms of the probability of occurrence and level of seriousness.[12] These attempts are integrated in Figure 2-1.

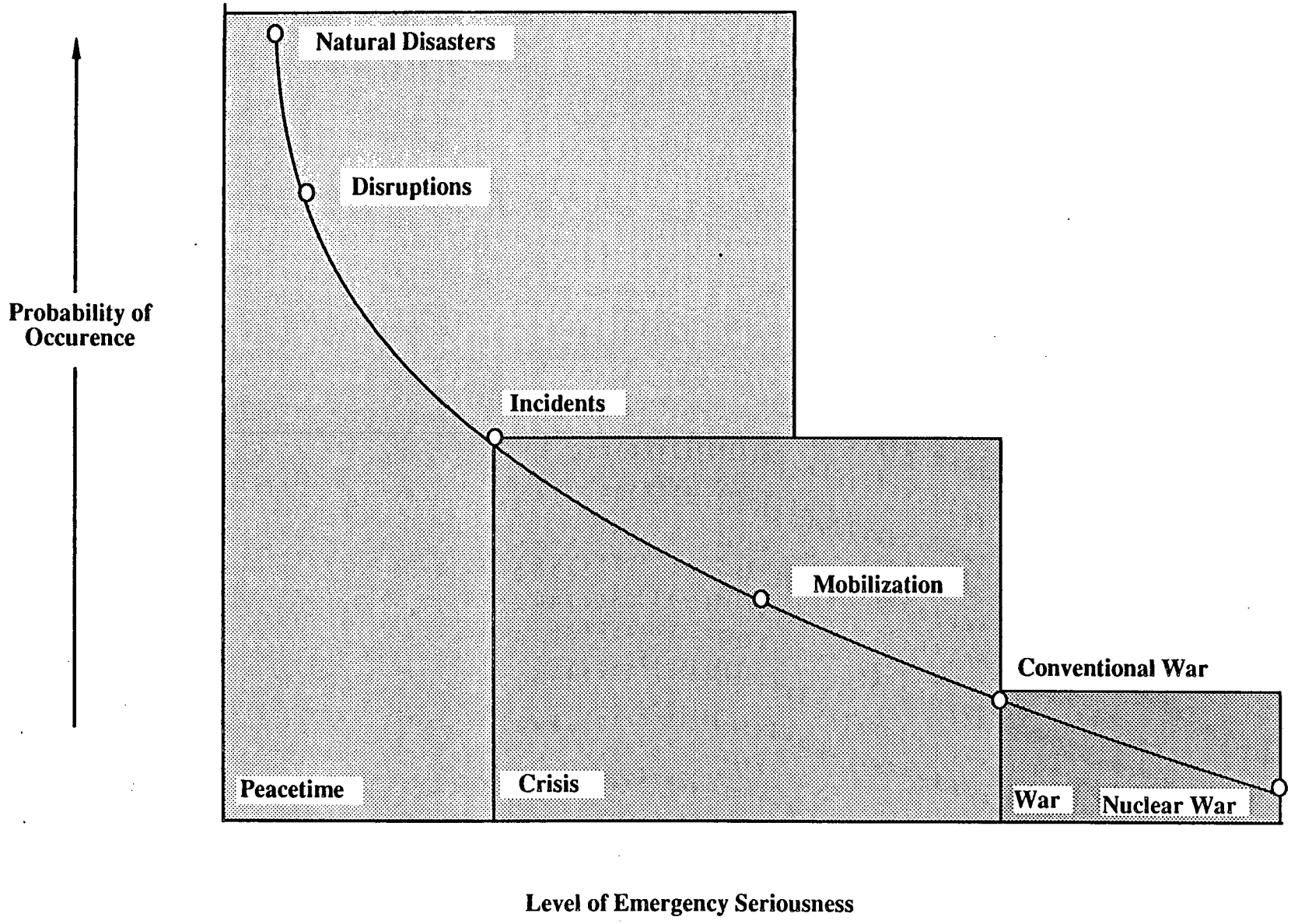
Typically, natural disruptions to energy systems are presented as regional in consequence and, hence, are considered to be outside the responsibilities of OEE. The main exception to this are major earthquakes. Those energy emergencies that clearly are of national significance are specified as including multi-site sabotage, theater war, conventional war, nuclear war, and prolonged attack. In between clearly regional and clearly national concerns is some large body of emergencies that are often only regional though sometimes grow to have national repercussions. It is within this intermediate body of emergencies that there is likely to be some disagreement about whether the emergencies are the responsibility of DOE or not, and how much attention should be devoted to them.

The energy emergency categories presented in the OEE summaries are natural disasters (essentially major earthquakes), disruptions, incidents, mobilization, conventional war, and nuclear war. Supply restraint, such as with an oil embargo, is referred to in the category *disruptions*, which may cover either politically or economically motivated interventions in the normal distribution of energy fuels. *Incidents* refers to terrorist and military related actions aside from mobilization and declared war. The emphasis in the DOE summary is on various kinds of emergencies of a military or terrorist nature.

Much of the discussion that exists as to the likely *national* impact of energy system disruptions has taken place within the context of an economic perspective. Within such a perspective, it is fairly easy to see that many kinds of disruptions are likely to be local in nature. From a security perspective, however, local and regional disasters may have limited economic impact but a significant impact on national security if they compromise the defense system. All disasters are monitored by OEE staff and their threat potential individually assessed so that the security significance of a regional disaster will be recognized by the threat assessment team and will be given its due consideration. Response to such a disaster will still be a regional activity, most probably administered by regional authorities, where OEE will merely provide information as needed and expert help.

Figure 2 - 1

DOE Energy Emergency Curve



There is also likely to be some wide variation in the seriousness of individual emergencies within the various categories. Political disruptions, for example, may result in anything from barely noticeable impacts to major disruptions. In a summary characterization of the level of seriousness of the types of energy emergencies we are really considering the mean expected impact with some allowance for variability of expectations. It is not clear how probabilities and estimates of the seriousness of various types of energy emergencies have been determined in the DOE summaries. For a natural disaster to be a national energy emergency DOE's own assessment is that it must be in the form of a major earthquake. Earthquakes are experienced throughout the United States but the kind of earthquake imagined in this scenario is most likely to be centered in the heavily populated and industrially important areas of California. It is not clear that the economic or defense impact of such a disaster would be as insignificant as suggested in the DOE summary presentation. The areas likely to be affected by such a disaster include significant military installations, defense industries, other industry critical to the national economy, and major universities and research institutions. Strangely, given the overall tendency to downplay this kind of disruption as a significant one for OEE planning, in the DOE summary this kind of disaster is rated with a probability greater than that of political disruption, terrorism, and "incidents."

The probabilities assigned to the various kinds of emergencies do not seem to correspond with the estimations presented and implied elsewhere in OEE literature. The estimations of the probabilities for natural disasters and political or economic disruptions, in particular, need to be reconsidered. Geophysicists are confident in predicting an earthquake with the capacity to inflict a major emergency in the near future with a margin of error of approximately 30 years. Any other kind of natural disaster will, from an economic perspective, be simply a regional emergency. Once natural disaster is specified as referring to a major earthquake, we might reconsider where and how it can be positioned in a chart graphing the probability of occurrence and level of emergency seriousness. As a very simple qualitative exercise, which is useful for heuristic purposes only, it may be more warranted to place natural disasters in the probability vicinity that is less probable than incidents (since incidents with the potential for disrupting fuel supplies do occur frequently in the Persian Gulf area) but greater than mobilization. Once placed in that vicinity, the most probable energy emergency would seem to come from political or economic disruptions to production and fuel supply. It is this kind of energy emergency that is the most probable and may even have a *significantly* higher level of probability than any other form of disruption.

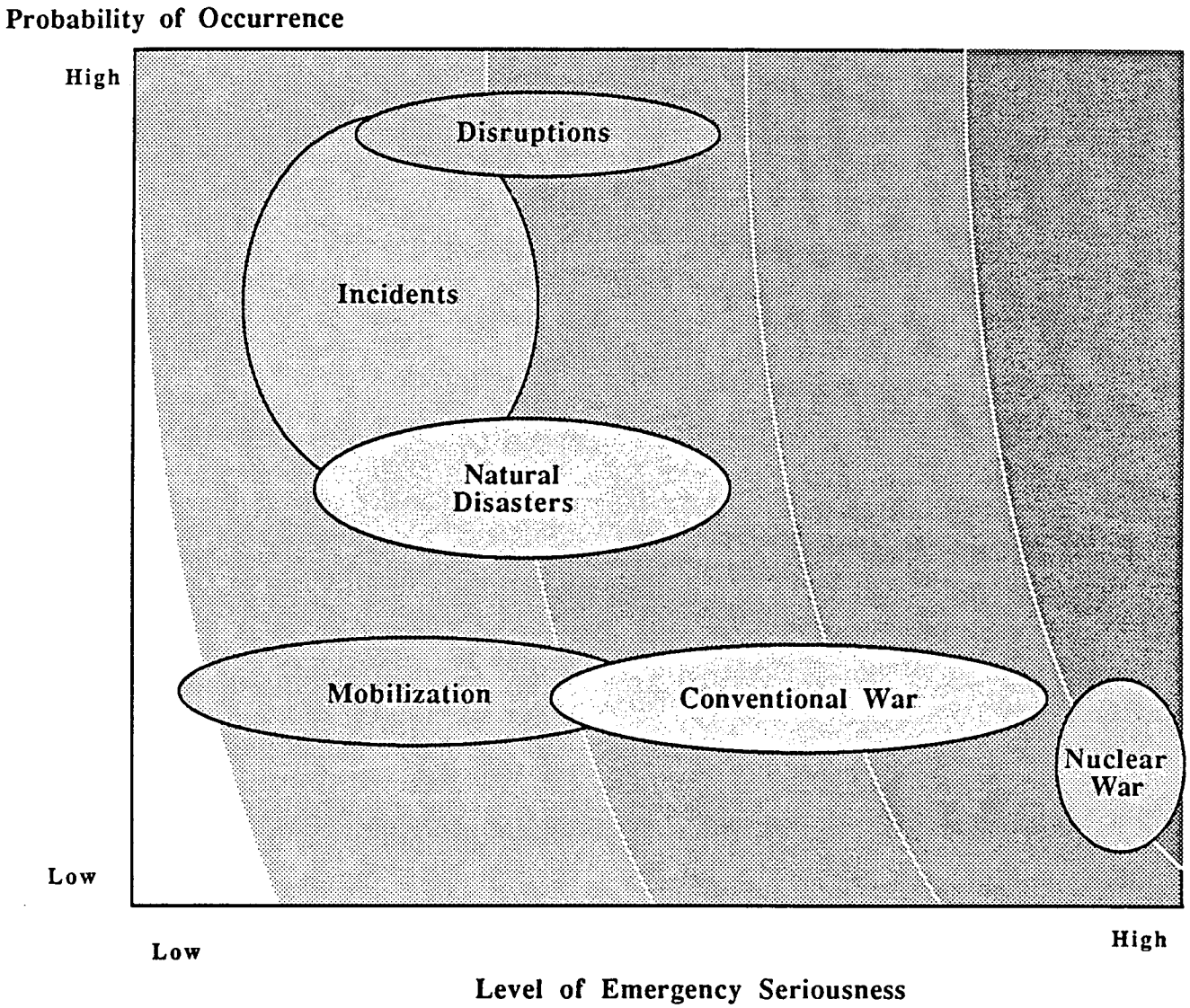
The levels of seriousness attributed to the various kinds of energy emergencies also need reconsideration, in particular, the levels of seriousness attributed to mobilization and military incidents. Thinking about the economic impact of mobilization varies. The current predominant thinking is that military incidents and mobilization need not represent a major disruption to the economic system. Instead, the response to these kinds of emergencies may work through it using normal market mechanisms. Others suggest that the impact of mobilization may be far reaching and may in itself induce a major emergency. In comparing the estimated level of energy seriousness of disruptions caused by terrorism, incidents, earthquakes, mobilization, and conventional war, it is not clear how they could differ to the degree suggested in the OEE summary presentation or that the differences should be in the direction suggested by it. Rather, based on premises suggested by DOE documents, it would seem to be more reasonable to expect that the level of energy seriousness may be comparable. Generally, both the probability of occurrence and the level of seriousness associated with different kinds of energy emergencies needs to be more methodically considered.

Making adjustments to the DOE graph based on the above discussion, the probability and levels of seriousness of various kinds of energy emergencies may look more like that presented in Figure 2-2. What is presented here is a contoured map, much like an indifference curve in microeconomics. The contoured regions represent areas of equal importance for energy emergency considerations. It may be possible for a type of emergency with low probability and moderate seriousness to be rated overall at the same level of interest to energy emergency planning as a type of emergency with a moderate level of probability and a low level of seriousness. The former is less likely to occur, but when it does its impact will be the greater. The latter has less impact, but occurs more frequently. Perhaps their nuisance or cumulative disruption value is the same. Contoured regions in the lower left of the graph indicate those probability and level of seriousness mixes that are of least importance as energy emergencies. The contoured regions in the upper right of the graph represent probability and level of seriousness mixes with the greatest importance as energy emergencies. Specific categories of energy emergencies may vary in terms of both probability and the level of seriousness. An attempt has been made to indicate this in representing possible ranges along both dimensions which, in some instances, means that particular kinds of emergencies are dispersed across interest contours.

Estimations of the frequency and severity of different kinds of energy emergencies are dependent on the definitions involved; e.g. what exactly is an *incident.* As these definitions change so do the estimations. The question we have to ask is: "What set of

Figure 2 - 2

Energy Emergency Interest Map



Contoured bands represent "equivalent" combinations of probability and level of seriousness.

definitions is useful to the development of emergency-response preparation?" We conclude that at present this does not seem to have been rigorously attempted and the estimations of probability and severity are vague and arguable. Economic models have been developed to assess the impact of varying degrees of disruption to the oil supply under varying market conditions. While some attempt has been made to duplicate this kind of analysis for other energy types, that kind of analysis needs to be extended. It will be from these economic studies that a more meaningful assessment of the relative levels of seriousness can be made.

Notes to Chapter 2

1. J.P. Kalt, H. Lee, and J. T. Hamilton, *A Review of the Adequacy of Electric Power Generating Capacity in the United States, 1985-93 and 1993-Beyond*, E86-09, Harvard University, John F. Kennedy School of Government, June 1986, Department of Energy (DOE), *Staff Report: Electric Power Supply and Demand for the Contiguous United States 1986-1995*, DOE/IE-0008, December 1986. There are effectively three transmission networks that operate with a large measure of independence: 1) the Western Interconnected System, covering the United States from the Rocky Mountains west and including Western Canada (coextensive with the Western States Coordinating Council, which is a NERC region); 2) the Texas Interconnected System, which covers much of Texas (coextensive with NERC's Electricity Reliability Council of Texas), and 3) the Eastern Interconnected System, which includes the rest of the United States and Canada. Around 1989 the Texas Interconnection System will be connected to the Eastern Interconnected System.
2. Demand projections were not met due in part to the spillover from oil price shocks and less than anticipated levels of economic growth. Naill and R.W Sant, "Electricity Markets in the 1990's: Feast or Famine", *Public Utilities Fortnightly*, April 26, 1984, Congressional Research Service, *A Perspective on Electric Utility Capacity Planning*, August 1983, and also Kalt, et. al., op. cit.
3. W. Kenneth Davis, *Domestic Energy Security and Preparedness*, Proceedings fo the Energy Emergency Preparedness Workshop, Ft. Belvoir, Virginia, January 20-22, 1987, Charles River Associates.
4. U. S. Department of Energy, *Energy Security: A Report to the President of the United States*, Washington, DC. March, 1987, p. 13.

5. DOE, *Energy Security*, op. cit. p. 50.

6. C. A. Goldman, M. H. Rothkopf, S. Pantell, and A. Thorpe, *U.S. Energy Vulnerability in the 1990's: A Reassessment*, p. V-10.

7. DOE, *Energy Security*, op. cit. p. 25.

8. J. Sathaye, *Increasing Oil Demand in Developing Countries and U.S. Oil Security*, Appendix B to Goldman, et. al., op. cit., p. 4. also: DOE *Energy Security*, op. cit. p. A-6.

   There is some difference in the LBL projections with regard to the likely future growth of LDC oil demand and those made by DOE in the DOE Report. The DOE Report suggests that LDC oil demand growth may be held down "to less than historical rates between now and 1995" with a hanging qualification that there are some "investments in alternatives to imported oil (*Energy Security*, op. cit. p. 225). The LBL report, on the other hand, makes the projection that demand will increase by 3.8 percent a year until 1990, and by 3.9 percent a year after that date (see Sathaye, op. cit., p. 10).

As LDC's become a more significant factor in the international oil market, not simply as suppliers but also as consumers, they potentially become a critical factor in emergency planning that is dependent on activity in this market.

9. Kalt, et. al., op. cit.

10. Davis, op. cit.

11. Michael Lynch, "The Next Oil Crisis," *Technology Review*, November/December 1987.

12. These summary graphs are presented in the the Office of Energy Emergencies' *Strategic Framework* presentations, and in Robert Guth's "OEE Presentation on Vulnerability," in *Proceedings fo the Energy Emergency Preparedness Workshop*, Ft. Belvoir, Virginia, January 20-22, 1987, Charles Rivers Associates.

Chapter 3

THE OFFICE OF ENERGY EMERGENCY OPERATIONS

There is not a strict rationality behind the grouping of the various sub-offices within OEE. In particular, the functional distinction between the Operations Office and the Planning Office is not clear. Within the Operations office we find the Vulnerability Assessment group as well as the Intergovernmental Liaison and Executive Reserves Division, Mobilization and Continuity of Government, and the Operations and Data Support Group (see Figure 3-1). The Vulnerability Assessment Division and the Executive Reserves effort are both largely concerned with mitigation, preparation, and training. Both Vulnerability Assessment and Intergovernmental Liaison have extensive contact with industry and with state governments. It is industry and state relations, which are critical operationally in any major emergency, that functionally unite these groups with the rest of the Operations Office.

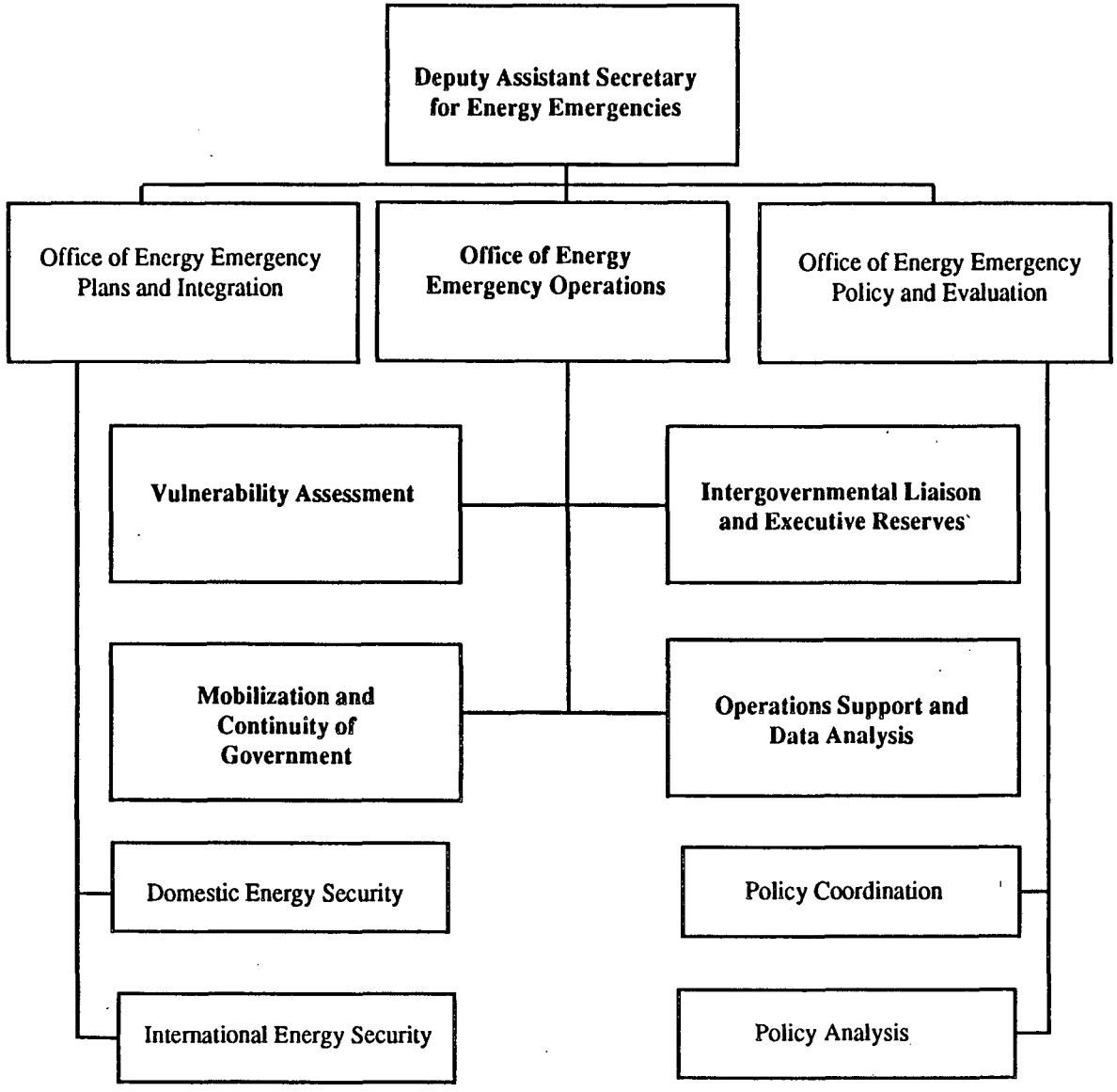
The Division of Vulnerability Assessment[1]

Much of the OEE strategic framework that has been developed is articulated within a broader program of National Security Emergency Preparedness (NSEP). NSEP is coordinated under a Senior Interagency Group for National Security Emergency Preparedness (SIG- NSEP) and is functionally separated into a number of interagency groups including Interagency Groups on Civil Defense, National Mobilization, and Energy Vulnerability. The Interagency Group on Energy Vulnerability is further divided into the Energy Vulnerability Assessment Subgroup (EVAS), the Database and Projections Subgroup, and the Response Development Subgroup (see Figure 1-2). DOE participates in each of these three subgroups, sharing chair responsibilities with the Department of Defense in EVAS and with the State Department in the Response Development Subgroup. DOE alone chairs the Database and Projections Subgroup through the Energy Information Administration. Within DOE, EVAS is the responsibility of the Vulnerability Assessment division in the Operations Office.

The Vulnerability Assessment division is small, consisting of a division head and four professional personnel. It is responsible for assessing the vulnerability of domestic energy systems to disruptions which can affect critical generation, production, refining, transmission, or distribution facilities. The activities of the division are both in support of EVAS activities, which involve selective assessments of the vulnerability of specific

Figure 3 - 1

The Office of Energy Emergency Operations



energy systems or industry components and a general liaison effort directed at raising the levels of energy emergency preparedness of industry as a whole.

For the general liaison activities the operational policy is to encourage private industries to make "introspective" assessments of their own vulnerabilities and formulate their own remedial action if it is determined to be necessary. Once such an assessment has been made and acted upon the EVAS then must determine whether, for national security reasons, some other remedial action needs to be taken and, if so, what this action might be.

Currently, only the electricity power industry has undertaken to do the introspective assessment, through NERC. They expect to look first for no-cost/least cost solutions to any vulnerabilities discovered. An example of the measures being considered by NERC is an industry-wide tracking system for key equipment and parts along with some determination of their interchangeability. Of special interest in this area is such critical equipment as large power transformers. In this particular case, the equipment involved is extremely expensive, large, has a long lifetime, few are stocked, and has a long lead-time for replacement (possibly between 12 and 18 months). Normally, among utilities, financing for such equipment would be rate-based. In return for this investment the utility could expect a normal rate of return. To qualify for inclusion in the rate base equipment must be classified as "used and useful." To date, spares beyond those needed for normal operational risks have not been rate-based by public utility commissions.

Utility companies are anticipating extensive restructuring. In making their investment decisions they now consider a level of competitiveness they have not encountered in 60 years. With some measure of deregulation even the current level of reliability for routine emergencies may be considered to be too high within a newly competitive market. Current reliability has often been purchased with a low or even negative rate of return that has been covered by Public Utility Commission regulated base-rate financing. With greater competitiveness it is unrealistic to anticipate that utility companies will undertake to enhance the strategic security of their plants and equipment if such enhancements are other than no-cost or low cost.

The petroleum and natural gas industries need to perform an industry introspective assessment as well. The petroleum industry will soon be approached to undertake such an introspective assessment through the National Petroleum Council (NPC), an advisory council to the Secretary of the Department of Energy. The request for such an assessment would be processed by the Assistant Secretary for Fossil Energy, which is the DOE contact point for the NPC. Upon receipt of the approved request NPC should form a

special committee to oversee the introspective assessment, which would be carried out by its individual members. If the attempt to encourage an industry-wide introspective fails the Vulnerability Division will attempt to persuade industry by dealing with companies on a one-to-one basis.

The introspective assessments recommended by DOE are general assessments of system vulnerabilities but extend industry emergency perspectives to include major terrorist activities. Existing industry preparedness is based on experience with past exigencies, which have typically included equipment failure, natural disruptions, and local sabotage. OEE feels that multi-site sabotage may be a problem that needs further consideration by individual companies because it is the kind of disruption that industry is least prepared to deal with, it is most likely to involve particularly vulnerable targets, and to be designed to have great impact. To facilitate this more comprehensive introspective assessment the Vulnerability Assessment division offers participating parties a description of threat characteristics, including likely targets and the probable resources of the attack team. Once vulnerabilities have been assessed the participating parties need to determine what cost-effective remedial action may be necessary. Perhaps vulnerability to such terrorist actions can be reduced only marginally because of the widely dispersed and exposed nature of the systems involved. To some extent the physical sites connected to the various energy systems can be hardened and security patrols increased to raise the cost of any attack. Most power systems do have a developed range of effective responses to natural emergencies and many of these will be of use in a strategic security emergency as well.

The Vulnerability Assessment division has made a number of case studies of major energy systems. These cases have been selected either as being typical or especially important and have involved oil pipelines, refineries and offshore platforms, utilities, natural gas distribution, and transport. Such studies assess cases as to whether they are (a) vulnerable and (b) operate under standards that are common in that industry. If the problem is seen to be related to industry practices then it is treated as a generic vulnerability and not unique to a specific energy system under study. EVAS is also conducting an assessment of the vulnerability to disruption of energy supplies to end-users who are essential to national security, health, and safety, and is studying options for mitigating such vulnerabilities.

In its capacity as a liaison group this division is particularly sensitive to industry fears of Government encroachment on traditional roles. Past regulation of the oil industry is having an enduring cost in the suspicions of that industry towards the Government and, in particular, the Department of Energy.

In an actual emergency the staff of this division would work within the EEMS, the main OEE coordinating response agency for non-war emergency scenarios.[2] However, their contribution would no longer involve facility vulnerabilities. Rather, they would become subject-matter experts working with their contacts in industry to collect current data on the energy situation in the field and to facilitate restoration, if need be.

Intergovernmental Liaison and Executive Reserves Division

This division has two programmatic interests. One is the Federal/State Liaison Mission and the other is the National Defense Executive Reserve (NDER). In addition to the division director, who handles one of the NDER units, there is a professional staff of three, with one devoted part-time to intergovernmental liaison and the other two to NDER. Some assistance to the state liaison effort has been forthcoming from a member of the Energy Emergency Policy and Evaluation Division, who has been acting as the OEE congressional liaison.

Federal/State Liaison Program for Energy Emergencies[3]

The state liaison mission is devoted basically to the development of more effective interaction among the states and between the states and the Federal Government in order to facilitate efficient nationwide decisionmaking in times of crisis. The mission's first task is to stimulate state interest in the importance and relevance of energy emergency planning, to make them aware of Federal efforts in this direction, and to make clear Federal policy on strategies to be used in meeting an emergency. The division aims to make states more aware of the problems associated with energy emergencies extending to the national level, that they have a part to play in responding to such emergencies, and need to be prepared to mitigate their effects as part of some coordinated effort. A second objective of the division mission statement has to do with the effective coordination of Federal and state emergency planning. Here, the division aims to articulate the respective roles of both State and Federal Governments in particular kinds of energy emergencies. The division is also developing and refining the actual communications system to be used in both planning and crisis response. The liaison with the states is not to be confined to government bodies but is to include established state and regionwide professional groups representing expertise in fields of relevance to energy emergency preparedness. Finally, the division has further responsibility for coordinating state involvement in preparedness exercises.

In fulfilling its assigned functions Intergovernmental Liaison efforts are interconnected with virtually every other group within OEE as well as many outside of it. In particular, Intergovernmental Liaison works with the Offices of the Assistant Secretary of Congressional, Intergovernmental, and Public Affairs and the Assistant Secretary of Conservation and Renewable Energy. Conservation and Renewable Resources managed the funding for the Emergency Energy Conservation Act (EECA)[4] and monitors or manages funds which can be used for the development of energy emergency plans.

State Energy Emergency Planning Efforts

To effectively carry out its liaison functions and coordinate Federal activities with those of the various states, this division needs to know the states' plans and authorities to respond to an energy emergency. This information was collected and analyzed in 1986; however, the data collected was never completely validated. In early 1987 the DIALCOM system, an electronic mailing system that is critical in the plans for nationwide emergency communications, was used to contact all states and request a validation of the information concerning state emergency authorities. Only half of the states responded to this request. As tentative as the information is about state planning activities, this 1986 data is the best that presently exists and it is useful in suggesting the scope of the problem that lies ahead in interacting with the states.

In 1986 preparedness among the states varied. Most of the plans in existence were developed under EECA; however, neither EECA nor any authority to implement these joint plans currently exists. Ten states apparently do not have any plan to respond to an energy emergency. Only three states (California, New Mexico, and Oklahoma) recognized the national security implications of an energy emergency in their planning documents, most having a more limited concern with the impact of an energy disruption on their state economy. Only nine states suggested that they will communicate with contiguous states and these were mainly confined to the New England States with another cluster in the Rocky Mountains/Northwest.

In preparing for extreme energy emergencies, the 1986 statistics indicate that states varied in the development of supply side measures. Thirty-three had a set-aside program.[5] Thirty-one had mandatory fuel allocation measures and of these 18 had a list of priorities established and 17 had a list of essential services. Twenty-five of the states that had provisions for mandatory programs also had provisions for voluntary programs.

In terms of demand management programs, 25 states had provisions for mandatory temperature restriction measures and 27 had provisions for voluntary temperature

restriction measures. Twenty-three states appear in both these tabulations. Twenty-six states had provisions for efficiency improvements and 31 had provisions for fuel switching. Most states had provisions to reintroduce measures that were believed to be effective in the last crises; viz., establish odd-even allocations, minimum purchases, enforcement of a 55-mile speed limit, flag systems, encourage mass transit, car pools, restricted parking, and compression of the work week. Seventeen states had provisions for mandatory "no drive" days. It should be noted that these measures may not necessarily be used in an emergency, since the authorization to implement them may not clearly exist and there may be reservations about their individual effectiveness and desirability.

State Outreach Programs and the DIALCOM System

The division has embarked on a number of projects, including:

- a regional seminar program,
- increased participation in regional meetings of state government personnel,
- the utilization of established state groups,
- the involvement of state governments in pre- scheduled emergency exercises,
- an information bulletin, and
- the establishment of a two-way communication system through DIALCOM.

The regional seminar project is currently underway with an Interim Steering Committee having been formed. Regions have been defined for this project on the basis of commonality of interests and concerns. Four seminars have been scheduled for 1988. The first was held in mid-April in South Carolina. The purpose of this seminar was to discuss the importance of energy emergency planning by state groups and the respective roles of Federal and State Governments in preparing for and meeting any energy emergency.

There has also been increased participation in meetings of state personnel with the Deputy Assistant Secretary or other top OEE people being scheduled to talk to key organizations such as the National Association of State Energy Officials, the Southern Legislative Conference, the New England Energy Task Force, and those states in the Petroleum Administration for Defense District (PADD) on the west coast (PADD 5). The division is constructing a yearly schedule for key meetings and conventions of different regional state organizations and will use this to present effective OEE speakers.

The intention to utilize existing state and regional groups of energy professionals more effectively is also being realized though only few such groups have been reached to date.

With regard to incorporating states into OEE energy emergency exercises, several high-level simulations have been performed with some state participation. In the future, other states will be included in such exercises. Some states have their own simulations. For example, the California Energy Commission had an emergency simulation, attended by DOE personnel, in late March 1988.

The planned information bulletin has yet to be produced and progress on it has stalled due to current limited staff resources. Ultimately, the bulletin will be distributed through the DIALCOM system.

The more effective use of DIALCOM is also a major objective of the division. DIALCOM is an efficient electronic mailing system with multiple levels, message areas, and message types. All states are currently on DIALCOM except Alaska. At present, the states only have access to the basic system which has certain limitations and may not support the most efficient use of DIALCOM in an energy emergency. The division hopes to promote continued training of state personnel in DIALCOM use. This training will introduce them to newer and more sophisticated features such as electronic mail and a bulletin system called "Tradepost." There is a particular need to plan special procedures with the states to optimize the use of the system in an emergency. An idea favored by the division--part of a drafted DIALCOM Emergency Communication Plan--is to have the country divided into six or seven regions, each with a different electronic access mailbox at DOE to permit faster simultaneous transmission of information.

The Coordination of State Efforts

There needs to be a national consensus of the states to act in a coordinated fashion. Presently, this does not exist nor is there much local coordination between the states. The states in the PADD 5 region, including the Western States through the Rocky Mountains, have met every year since 1981 to discuss petroleum and energy emergency issues, and have worked towards coordination of emergency response plans. It is hoped that the regional seminars will induce the other states to think about emergencies more and get together on a cooperative basis.

It is expected that the main response of the states will be the activation of set-aside programs. These programs typically require that some percentage, from 2 to 5 percent, of gasoline destined for sale within a particular state be set aside for allocation where

needed; i.e., mainly for essential services. Many states have legislated set-aside programs but it is not known how these programs would be implemented. A problem with such programs is that the various private companies do not know what they entail and would not know how to respond to them. The problem would increase if the state set-aside programs were not applied in a consistent fashion across the states. Coordination of such programs, so that their requirements are similar from state to state, will ease the task for private industry of participating and ensure a more effective response.

There is also a variety of demand management strategies that states seem prepared to use, derived mainly from programs utilized or planned in the 1970's. In pursuing their demand management programs, it is expected that states will first introduce various kinds of voluntary demand reduction schemes. These may be followed by mandatory programs including minimum purchase and odd/even days purchasing. During the previous oil crises many demand restraint programs were instituted because of the behavior of contiguous states. At times, this was a matter of one state simply following the actions of the others. In other situations the actions of some states resulted in increased demand pressures on surrounding states that in turn provoked the institution of similar management practices. For example, when mandatory demand restraint action was instituted by one state, some of the residents of that state would simply go to the next state to make their purchases. Such behavior simply shifted the demand burden and promoted localized emergencies which could only be met through the extension of similar demand restraint programs into those contiguous states. The division feels that in this way there was a "migratory crisis" in the sense that an emergency-response induced crisis started in one state and slowly moved across certain state borders. Thus, experience in the last oil crises indicates that contiguous states need to coordinate their efforts with such demand management programs.

Previously, DOE had the authority to regulate this kind of behavior, but this authority no longer exists. Today, DOE can only influence the states through the public communications program and the Federal/state liaison mission. The division believes that in an energy emergency there needs to be early consultations with governors so that DOE can inform the states of the Federal estimation of the seriousness of the emergency and what its likely course will be. The states need to be provided information that can help them decide when they should react, with some kind of suggestion as to what this reaction might be. In this way, it is hoped that State Governors may be dissuaded from overreacting to a crisis and thereby minimize any interference between state-based demand-restraint programs and Federal policy that seeks to minimize government intervention.

The most common energy emergency scenario envisaged by this division starts off locally and builds slowly, providing sufficient time to coordinate a response and systematically upgrade information to the necessary parties. The liaison mission feels that the main vehicle for information dissemination will be DIALCOM. Further, in an energy emergency the states would all be indirectly monitored; e.g., possibly through the kinds of questions they were asking on the DIALCOM and from inquiries from their congressional representatives. This information would indicate the nature of the states reactions and alert DOE to any potential problem involving particular states.

Currently, there are no personnel designated to any of these operations. The staff needed for the DIALCOM enhancement, to handle the states' questions in an emergency situation and to fulfill the monitoring function, do not currently exist but need to be allocated at the point of crisis by the main response agency, the EEMT.

State Demand Restraint Programs and Federal Support of the Free Market

In an energy emergency the authority of the Federal Government would not preempt those of the states unless state supply management programs could be shown to interfere with interstate commerce. There does seem to be a potential problem with the state response philosophies embodied in reliance on demand management strategies. These older measures need to be looked at in light of the current DOE policy which relies on the free market to manage in the supply and allocation of energy resources in an emergency. The division's perspective on this is that the policy of this Administration is to emphasize *federalism*, where the most effective response is determined and administered at the local level. The liaison mission sees the role of the Federal authorities as that of providing information to the local Governors involved, so that states' responses are informed and appropriate to the situation. In addition, Federal authorities would provide any technical assistance required by those Governors. From a state liaison perspective the specific role of OEE in such circumstances is to moderate the effects of the energy emergency monitoring for the existence of various problematic "spikes and downturns" in the response process across the Nation.

National Defense Executive Reserve[6]

The other concern of this division is the National Defense Executive Reserve (NDER). These executive reserves are intended to augment existing DOE personnel in those response agencies activated to meet mobilization and wartime emergencies, with

management from industry. The executive reserves might be activated also for a major earthquake. General governmentwide policy guidance on the executive reserves comes from FEMA. The main objective of the division is to recruit executives into the DOE NDER program, bringing it to its full complement which is currently estimated to be 400, facilitate their security clearances, give them comprehensive training, and integrate them into OEE tests and exercises. This manpower reserve is composed of industry personnel, typically operations vice presidents or managers who are experts in critical energy fields. The executive reserves are formally organized into three units: the Emergency Electric Power Executive Reserve (EEPER); the Emergency Petroleum and Natural Gas Executive Reserve (EPGER), which is further separated into oil and natural gas divisions; and the Emergency Solid Fuels Executive Reserve (ESFER).

These reserves are authorized under the Defense Production Act so that the NDER program would be used mainly in a national security emergency such as mobilization. The only non-war situations in which the NDER units might be activated are in the case of a massive earthquake (though typically, earthquakes will be local enough that Federal intervention is unlikely) and a massive multi-site terrorist attack. These would most probably involve only partial activation of the reserves. In a national security emergency reservists would assess damage and restoration possibilities, handle supply priorities, establish manpower and material priorities, and determine restoration priorities. A regional approach to matching supply to demand would then be coordinated on a national basis.

In an emergency situation, where the evaluation process indicates that some or all NDER units need to be activated, DOE would directly, or through FEMA, ask the President for that authority. In a widespread emergency situation the President could also delegate this activating authority to the head of FEMA. An executive order probably would be used to provide that authority. A declaration of a national emergency is likely. In such circumstances the most important and the most numerous field people that DOE would have, with significant expertise in energy resources, would be the reservists. In a localized energy emergency there are some DOE personnel who could be moved to the appropriate regional centers but if the problem is nationwide the needed expertise must come from the executive reserves. In situations where NDER units would not be activated such executive personnel could still cooperate; i.e., in simple liaison but not as activated NDER personnel.

At the beginning of 1988, 124 people had been recruited into the program. For EEPER, there are 35 active reservists; for EPGER, there are 33; and for ESFER, there are 36. There are 10 people in the process of being placed in EEPER, and 10 in

ESFER. The others are being processed for security clearances.

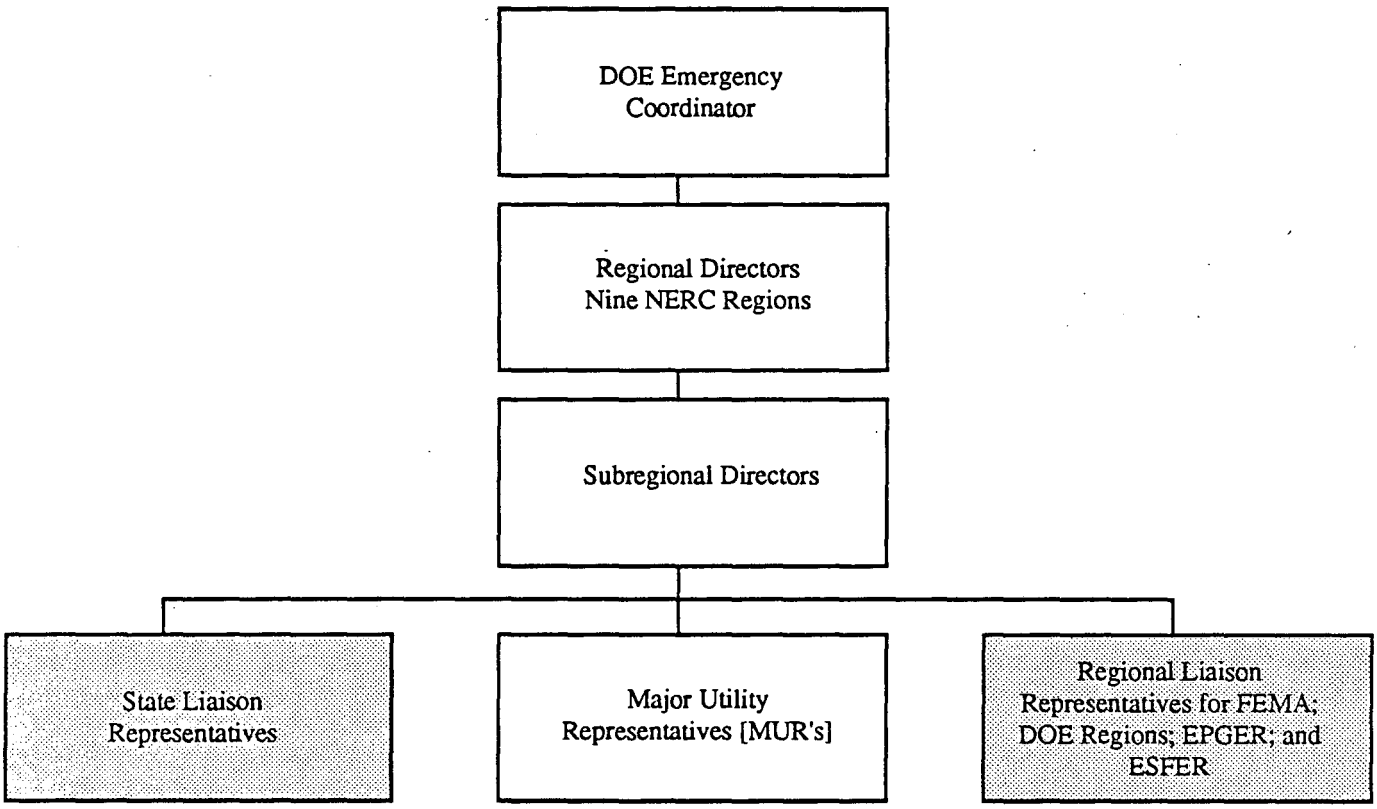
EEPER has an organization that is strongly connected to the NERC. The NERC encompasses nine reliability councils that have been organized to deal with reliability in relatively local domestic emergencies, generally resulting from natural disturbances (floods, hurricanes) and equipment failure. Recruits to EEPER are vice presidents, executive directors and operations managers expert in electric power generation, transmission, and system interconnections. Because of its strong connections with NERC, EEPER is the most complete of the executive reserve units. The formal organization of EEPER includes regional directors and subregional directors who oversee the activities of state liaison representatives, major utility representatives (MUR's), and regional liaison representatives who are to interact with FEMA, DOE regional operations, and the other NDER units (Figure 3-2). The state liaison function is not to be developed until the rest of the organization has been completed. Currently, EEPER has designated its regional directors and approximately two-thirds of the personnel beneath that. In most cases the NERC organizational structure is utilized by EEPER so that Council regional directors are EEPER regional directors. Most utility personnel, in dealing with emergencies, would work from electric company emergency control centers and it is hoped that these will be available to be used in an energy emergency. Such an arrangement has not been worked out.

The ESFER organization is divided into five regional groups connected to major coal production areas. Each area has an Area Leader and Deputy Area leader and the organization is formally divided into four skill groups; i.e., concerned with production, transportation, industry services, and production support (Figure 3-3). Each ESFER area is staffed with a reservist that is expert in at least one of the four ESFER skill categories. Two-thirds of the people currently recruited to ESFER have been either designated or are in the process of being designated. Others are awaiting clearance.

In the oil industry major companies have not cooperated with the program and the EPGER reservists from oil tend to be people who have been in the program for a long time and who come from smaller companies or from associated industries, such as construction companies specializing in building refineries. Some members are now retirees. Ideally, members should be operations managers with current expertise in petroleum international operations, marketing, refining, petroleum production, natural gas transmission, and distribution. EPGER has a petroleum organization that is also based on a preexisting structure: in this case that of the PADD. PADD regions are not related to any existing organization but were developed during the Second World War. When the petroleum industry participates in developing a new EPGER organization, its

Figure 3 - 2

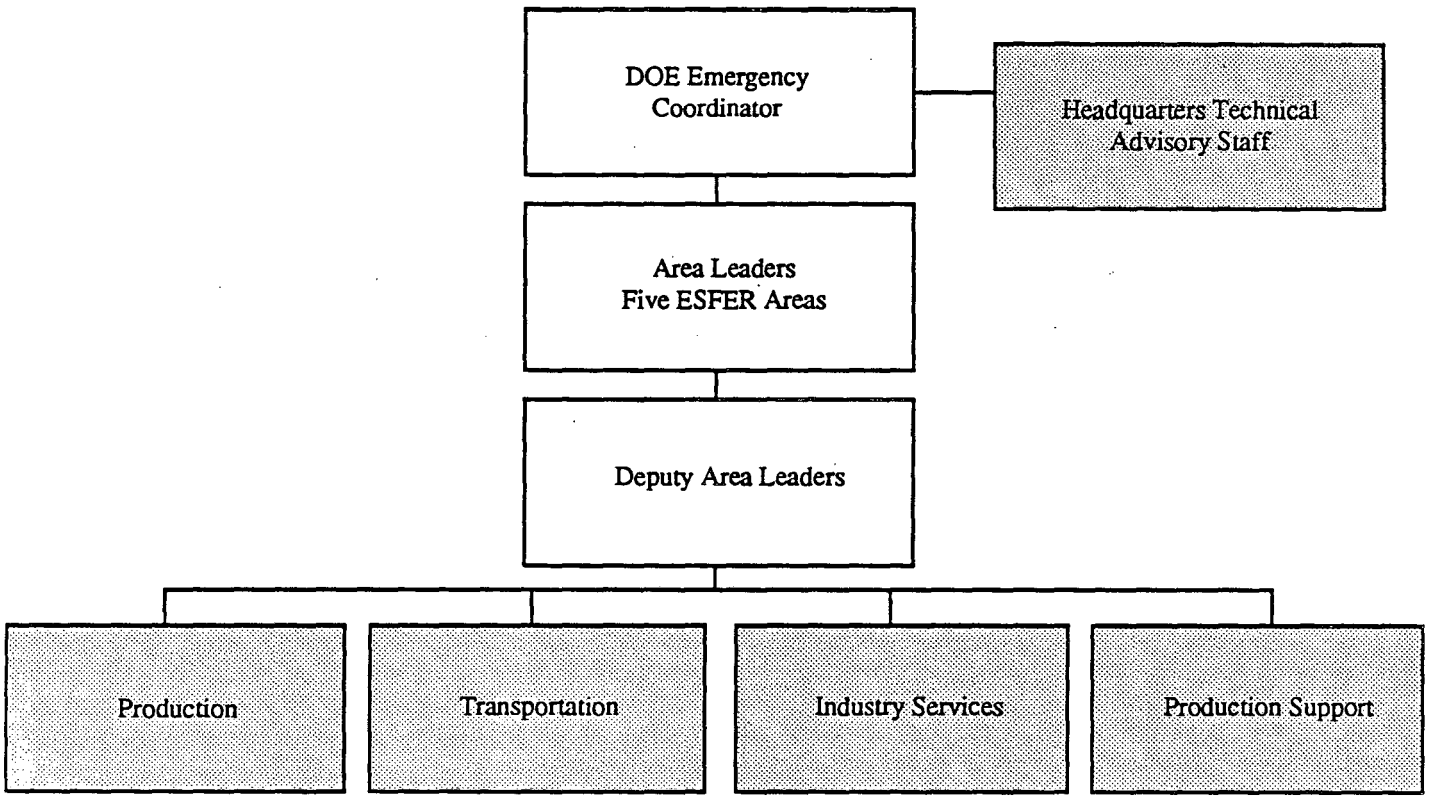
Emergency Electric Power Executive Reserve [EEPER]



Shaded areas represent planned but currently established offices.

Figure 3 - 3

Emergency Solid Fuels Executive Reserve [ESFER]



Shaded areas represent partially staffed offices. Degree of staffing varies by area.

members will determine how the final regions should be organized.

The natural gas industry has been effectively separated from the oil industry in EPGER. Currently, the natural gas industry is much more active than the oil industry and the 11 people in the gas division are to form a nucleus of a new unit. This new unit should eventually have a reserve of approximately 100 people. Interim directors have been appointed for five natural gas districts, which are no longer the same as the PAD districts. The organizational form of this division is currently being drafted. By the end of 1988 the organization should be articulated, though it will still have limited membership due to the long time required to obtain security clearances. This unit is currently known as the Gas Division of EPGER, because there is no delegated authority at present to create a separate unit.

The oil division has nine members who have been given tentative assignments that have no effective meaning, given that such members have little connection to the major companies. In a real emergency the oil companies are expected to change their reluctance to participate in the executive reserve program very quickly and cooperate. At that time, some kind of organization and program will be worked out. In an emergency OEE will try to expedite security clearances.

Conflict of interest laws have been presented as a major reason why oil companies do not participate in the executive reserve program, along with antitrust laws. When there is no national security emergency these legal problems are real but in a national security emergency the legal situation is likely to change. Currently, attempts are being made by OEE and the oil industry to determine ways in which oil company personnel can join the executive reserve unit, be trained, but not be eligible for activation (and potentially be subject to the conflict-of-interest and antitrust laws) until legislation is enacted to provide exemption from such laws.

Beyond these legal concerns the oil companies do not want to help the Government set up an allocation system with the degree of Government interference found in the last oil crises.

How Hawaii and Alaska are to be handled with regard to the executive reserves has not been fully determined. In general, they are highly disconnected from any regional grouping used in the executive reserve system. Individuals will be named in those states for state liaison purposes and designated as liaison of the NDER in gas and another in electricity. However, these individuals will not coordinate their efforts directly with other states. Instead, they will report directly to the national leadership.

The National Defense Executive Reserve Training Program

An agreement was reached with the Department's Central Training Academy (CTA) for the use of that facility for training members of the NDER. CTA is a facility in New Mexico, operated by DOE, for the purpose of training security personnel. Most executive reserve training to date has taken place under ad hoc circumstances; the most recent ad hoc program took place in February 1987.

There is a relatively high internal movement of industry managers, especially in oil companies, as part of their own management development programs. This means that NDER membership will also turnover and new members will have to be trained on a regular basis.

NDER Physical Facilities

At present there is no DOE facility or physical location for the regional NDER personnel. It is hoped that NERC facilities can be used for the regional headquarters in the EEPER program. It has been anticipated that the other personnel in EEPER would use the control houses in the power organizations, simply shifting to their Federal role as needed. In the oil, gas, and coal industries there is the feeling that NDER personnel will need to operate from regional and national headquarters. Major gas companies were approached to see if they were open to the idea of the use of their gas control centers for Federal direction of their industry during emergencies. Their response was that their own operations would use all available space under those circumstances. Currently, the expectation is that in an energy emergency DOE will apply to the General Services Administration for space in a Federal building. For wartime attack recovery, colleges and universities could be selected and outfitted as emergency response facilities for executive reserves. Emergency communications capabilities will be needed where these teams are located. This means that some long term precrisis decision will have to be made so that appropriate communications systems can be installed. Locations could be selected in what are considered to be nontarget areas.

Current Status of the Executive Reserve Program

Progress is currently being made in the electric power, coal, and gas reserve units. The critical shortcoming is the lack of any real oil industry commitment to the program. There is much skepticism concerning the need for energy emergency preparation in the

oil industry that has to be overcome. Conflict of interest and antitrust legislation has also been a problem and without legislation exemptions cannot be provided to eliminate oil company concerns. Nonetheless, the division is working with oil companies to try and overcome this problem, since it may still be possible to plan and develop the EPGER intrastructure.

Because EPGER involves both oil and gas, the oil company representatives were holding up the development of the reserve units for both industries. With a separate gas industry steering committee progress has been made with that industry. For the present, the gas group continues as the gas division of EPGER.

The Mobilization and Continuity of Government Division[7]

The Mobilization and Continuity of Government division (COG) employs 6 people (one member is on leave). Of these, three develop a mobilization program, and two manage COG.

Mobilization

DOE's mobilization program seeks to ensure that the U.S. can meet military defense, industrial, and essential civilian energy needs during national security emergencies Developing the mobilization infrastructure has been a function of the Federal Government since 1942. A number of acts, including the the Defense Production Act (DPA), the National Security Act, the Emergency Procedures and Policy Act, and the Disaster Relief Act authorize it. Mobilization authorities need not simply be invoked with the approach of war. DPA is always available to the President and DOE uses it in peacetime to facilitate procuring supplies to produce nuclear weapons or to secure critical materials to produce or transport fuel and energy products essential for national security and defense; e.g., DOE invoked DPA to provide pipe to build the Alaskan Pipeline.

While there is clear authorization for a DOE mobilization preparedness effort, there are still some administrative and political concerns. They focus on DOE authorities and procedures for intervening in the marketplace to secure fuel and energy products. DOE seeks to rely on the market wherever possible and will use a *graduated approach* for claimancy (i.e., requests for DOE assistance) as well as the exercise of DOE regulation authorities. DOE would invoke such authorities only when the market does not respond

quickly enough to supply essential defense needs. Despite this approach, DOE has not officially endorsed OEE's National Security Energy Preparedness (NSEP) mobilization planning. This planning effort centers on a new Federal Energy Resources Management Manual, (FERMM). Major reservations about FERMM have been expressed by the Office of Policy, Planning, and Analysis as well as the Office of General Counsel (GC). The issues of the free market vs. national security and national defense needs are major reservations.[8]

At DOE, current FERMM procedures specify an Alert Coordination Officer who notifies the Departmental Emergency Coordinator and the OEE Emergency Coordinator. If the crisis is prolonged the executive reserves are activated. The Departmental Emergency Coordinator works with the Core Group of the EEMT and an Augment Group where necessary. The EEMT's Core Group includes DOE's Offices of International Affairs and Energy Emergencies (IE), General Counsel (GC), Defense Programs (DP), Energy Information Administration (EIA), Management and Administration (MA), Policy, Planning and Analysis (PE), Congressional, Intergovernmental, and Public Affairs (CP), and the Office of the Under Secretary. The EEMT Augment Group comes from Fossil Energy (FE), Nuclear Energy (NE) and other offices depending on the type of emergency. The EEMS project has yet to address the mobilization scenario in order to refine operational procedures, though it may do so in the next 12 months. If the emergency involves electricity or natural gas the EEMT will coordinate with the Federal Energy Regulatory Commission, FERC.

DOE's mobilization effort is integrated with that of other major Federal agencies, in particular the Department of Defense (DOD) and the Department of Commerce (DOC)--which is the primary agency assisting DOD with defense production. Much of this integration is effected through the Interagency Group on National Mobilization (IGNM) and, in particular the Response Preparedness Subgroup, where Mobilization and COG division personnel are participants.

In an emergency under the FERMM system, DOE may receive requests for assistance in obtaining *priority* energy supplies from DOD and its contractors holding DOD priority-rated contracts or from other Federal agencies with national security or defense-related responsibilities. Routinely, fuel for direct defense requirements are handled by the Defense Fuel Supply Center with approval from the Assistant Secretary of Defense for Acquisitions and Logistics (ASD[A&L]) who, along with the Joint Chiefs of Staff, will also certify requests from defense priority-rated contractors. Defense-related requests from other Federal agencies are forwarded to DOE after approval by FEMA.

Upon recommendation by ASD(A&L), under FERMM previously unrated defense projects or missions may be assigned an *Energy Priority Rating* by the Secretary of Energy. The priority system can be implemented on a case-by-case or a programmatic basis. While Energy Priority Ratings are connected to projects or missions, *Energy Priority Performance Orders* are directed at particular parties, also on a case-by-case or a programmatic basis, and are issued only after all attempts at some voluntary agreement have failed. Where a programmatic implementation of the priority system is imminent, FERMM indicates that it may be most effectively administered by the appropriate NDER unit.

For the civilian market DPA does authorize the President to control the "general distribution" of petroleum if it is a "scarce and critical material" and defense needs have caused a "dislocation" in the market creating "appreciable hardship." These critical terms from DPA, section 101 (b), are not clearly defined and may deter the use of such an authorization. On the other hand, the vagueness of such terms are presumed to place their interpretation within the discretionary powers of the President. Rationing is permitted only with the approval of Congress. Again, these extreme actions will only be taken in the most unusual circumstances after attempts at voluntary agreements have been exhausted.

Little of the organizational resources and infrastructure needed to support DOE energy mobilization activities currently exists. If the mobilization effort can develop into a program acceptable to PE and GC, regional operational offices will be needed, staffed with trained energy emergency personnel with clear authority to implement the program. This regional operational support for NSEP emergencies does not currently exist in DOE though it has been developed for all other Federal Emergency Resource Departments. As is also apparent from the working procedures, mobilization will require a large degree of cooperation from industry and the participation of trained personnel from the executive reserves. For energy mobilization, it is important that these trained NDER personnel are in place.

Continuity of Government

In a severe national security emergency, including nuclear warfare, the chain of command from the White House and FEMA, through the Secretary of Energy to county/local Emergency Operations Centers, may become disrupted. In that case, energy emergency preparedness requires a prepositioned program that facilitates the

institution of a temporary alternate command structure to preserve the on-going efforts to meet any accompanying energy emergency. This plan is being developed by the COG section of the Mobilization and COG division within the Office of Energy Emergency Operations. There is some coordination of the COG effort with the Intergovernmental Liaison and Executive Reserves division, which is to provide NDER's for the regional COG team. The mobilization and COG projects are largely separate within the Office of Energy Emergency Operations.

The Department of Energy's Continuity of Government strategy will be activated by DOE in situations where the continuity of government is threatened, as prescribed by directives from the White House (in the form of Executive Orders and National Security Decision Directives) and FEMA.

COG planning centers on the development of various *COG Teams*, which are the crisis management teams created to manage a COG emergency. The essential functions of the COG teams will be to make a damage assessment, engage in restoration planning, ensure the preservation of energy supplies or maximize production, and establish a new set of priorities for DOE within that particular emergency situation.

There are two COG teams planned at the national level, COG Team A and COG Team B. COG Team A will consist of those employees deemed essential given the status of the emergency and would be pared down as the Department ceases to perform non-essential functions. This Team will operate at the DOE Headquarters, in the Forrestal Building, during the preattack phase of a nuclear attack and will be evacuated just before the crisis reaches a critical stage. Team A is not expected to be activated until the declaration of civil readiness conditions in an advanced alert. Team B is to be a small cadre of approximately 15 people who would relocate to a crisis-management facility shared by similar teams from other Federal departments and agencies. Team B would be relocated during the advanced alert condition. This group, together with similar groups from other agencies, would perform those functions that are essential to provide Federal Government leadership and policy direction during a COG emergency.

The national COG team is to be supported by regional A teams at each of the DOE field sites and by six regional B teams. The regional A teams are responsible for maintaining essential operations at their sites and for shutting down all other operations. The operations that are essential will change as the crisis worsens and the personnel requirements for Team A will be adjusted accordingly. Region B teams will be located at each of the FEMA Federal Regional Centers along with similar teams from other departments and agencies. These teams provide connectivity with Federal field elements (e.g., the national laboratories, weapons facilities, etc.), state and local

governments, and privately-owned assets (e.g., electric utilities, refineries, pipelines, etc.). The essential functions of the regional B teams will be to assess energy facility damage, help restore energy production capacity, and fulfill civilian and military requirements for fuel. To provide the expertise required on the region B teams, DOE plans to staff them primarily with NDER's. Both the national and regional COG A Teams and the national B Teams have been designated and trained.

The COG team/EEMT boundaries are not clearly defined. It is possible that the EEMT will be absorbed to some extent by the COG teams. The EEMT is involved in mobilization and theater war and in the beginning of a conventional war. Upon the declaration of an advanced alert Team A becomes operational and then, when a full nuclear scenario seems apparent, Team B takes over. For an *initial alert* the EEMT manages things. In an *advanced alert* Team A is involved.

The COG division is working to:

- Validate and refine the essential functions that DOE would have to perform in a COG emergency at both the national and regional levels.
- Establish COG teams at both national and regional levels capable of performing DOE's essential functions and trained in COG emergency procedures.
- Develop preplanned procedures for the performance of DOE's essential functions through the use of the NDER's and DOE field resources. These procedures must be coordinated with other Federal departments, agencies, state/local authorities, and the various energy industries.
- Establish situation analysis capabilities including communications and data collection and analysis for DOE COG personnel at both the national and regional levels.
- Provide adequate administrative and security support for COG activities.
- Participate in the development of training seminars which provide instructions concerning the overall DOE COG missions, objectives, and goals as well as specific subject area training.

One of the primary tasks of the COG group is to establish communications with state and local offices and with NDER units. It is anticipated that these groups will be the source of basic information needed in assessing the impact of COG-related catastrophes. The executive reserves will also provide personnel to staff the regional B Teams. The COG state and local government outreach effort is in its infancy but its establishment is essential for the COG program to be fully operational at all levels of government.

In a COG emergency, damage evaluation and assessment will be particularly critical. There will be much reliance on the private sector as well as state and local governments to provide needed data. FEMA will not be able to supply a great deal of data but rather will provide the means to analyze it. In a COG emergency FEMA will not have access to mainframe computers but will have to adapt to a microcomputer environment for its data management and analysis. The use of microcomputers and the special software needed for damage assessment and evaluation activities is only now being considered.

It is uncertain what current laws allow during a COG emergency and there are attempts now underway to clarify what these laws authorize.

The Operations Support and Data Analysis Division[9]

The primary function of this division is to support the needs of the Office of Energy Emergency Operations as they relate to data collection, manipulation, analysis, and presentation. Operations Support also provides hardware and software support and computer graphics services. The division exists as a result of a need for fast turnaround for information and analytical support by eliminating much of the bureaucratic procedures sometimes encountered when dealing with other offices. Most requests to the Operations Support Division for assistance come from the Office of Energy Emergency Operations and it is only in extreme cases, such as when preparing for an exercise, that the other offices approach this division for significant support services. Sometimes, requests for data support come directly from the Deputy Assistant Secretary. The division has currently a staff of nine.

The main products of the division are the *Energy Situation Report* (ESR), the *Daily Energy Situation Report* (DESR), and the *Electric Power Supply and Demand of the Contiguous United States* report. The Support Division is responsible for monitoring daily energy supply data which have to do with events of interest to managers of DOE and which has some immediacy to them. The DESR, a specialized report dealing primarily with electric energy use, nuclear generating capacity, and oil and oil product prices and events, is updated and distributed internally every day. The publication of the DESR fills a niche currently unattended by EIA, which publishes a weekly report. Even though DESR occasionally contains information dealing with the other energy types, the intent is to eventually provide a greater depth of coverage on a more regular basis for these other fuel categories. The ESR is a compendium of electric power,

nuclear energy, natural gas, crude oil, petroleum products, coal, and meteorological data updated as such data becomes available and events warrant. Another report, Electric Power Supply and Demand of the Contiguous United States, is updated and distributed annually. The primary source of data is derived from the nine council elements comprising the NERC.

The division has relatively full and direct access to EIA data files, except for those files containing proprietary information. EIA would permit access to the proprietary data files provided certain criteria are met. In an emergency situation, some difficulty in retrieving data from these files could occur if the data was considered proprietary. Accessing these files could impose some significant delays.

The major portion of the data used by this division comes from EIA, although other public as well as private sources are also used. These additional sources allow for some reliability checking and, because they may use different collection and analysis techniques, can provide for a different analysis and increased validation. The division also has access to news services and uses this information to keep abreast of what the media presents regarding energy and the prospects of an energy emergency.

At present, most of the data collected and analyzed by this group is related to the national level. The group, to date, has provided some limited analysis of data on a regional basis. During an energy emergency where many regions might be involved there could be an immediate problem in fulfilling the data support function. Most likely, EIA would be called in to provide personnel and other assistance.

Programmatically, this group does not actively participate in the ongoing threat assessment function and in an actual energy emergency would simply function as a service. This group has no contact with the Database and Projections Subgroup of the IG-EV.

Notes to Chapter 3

1. Information on the Vulnerability Assessment division came from interviews and Charles River Associates, *Proceedings of the Energy Emergency Preparedness Workshop,* Ft. Belvoir, Virginia, January 20-22, 1987, and Department of Energy, Office of Energy Emergencies, *Energy Emergency Preparedness Programs,* 1987.

2. The Energy Emergency Management System is the main coordinating response agency for energy supply emergencies, set up within DOE by the OEE. It is discussed in chapter 5, since it has been developed primarily by personnel from the Planning Office, which is considered in that chapter.

3. Supporting sources for the information on the state liaison mission include Department of Energy, Office of Energy Emergencies, Federal/State Liaison Program for Energy Emergencies, 1987 and a draft document from the division, *State Energy Emergency Planning*, 1986.

4. The Emergency Energy Conservation Act of 1979 gave the Federal Government authority to set up mandatory conservation measures aimed at reducing energy consumption in the event of a major energy emergency at the state level. Money was allocated to the states to develop "management plans" and the current state energy emergency procedures are a direct consequence of this. When EECA ended, in 1983, the states planning efforts essentially ended. There had been problems with the kind of programs envisioned under EECA. These entailed demand constraint measures aimed at reducing consumption levels, but often state and Federal estimates of base consumption differed significantly and this created friction between the various authorities.

   There are other sources of funds, administered by the Office of Conservation and Renewable Energy. Much money is available from the oil overcharge funds, which are large and still being replenished as individual cases are settled in court. DOE is legally responsible for monitoring the use of these funds by the states.

5. Under a set-aside program a certain percentage of gasoline destined for sale within the state is set aside to be allocated where it is needed; i.e., mainly for essential services but also to mitigate gas lines and appease public demands for governmental action.

6. NDER material comes from interviews and Department of Energy, Office of Energy Emergencies, *National Defense Executive Reserve*, 1987 and *The NDER Program*, 1987.

7. Mobilization material comes from Department of Energy, International Affairs and Energy Emergencies, *Federal Energy Resource Management Manual*, February, 1985. Volume 1. and from Charles River Associates, *Proceedings of the Energy Emergency Preparedness Workshop,* Ft. Belvoir, Virginia, January 20-22, 1987. Continuity of Government material comes from Office of Energy Emergencies, *Continuity of Government*, January 1987.

8. OEE's Mobilization and Continuity of Government division is interested in trying to get something into the Federal Register to replace outdated regulations that currently exist. For example, part 221 of Title 10 specifies that the Economic Regulatory Administration is the contact agency within DOE for energy emergencies. The Mobilization and Continuity of Government division is also interested in implementing a DOE internal order but faces a similar barrier from both GC and PE.

9. Material on the Data Support group comes from interviews and from the Office of Energy Emergencies, *Data Acquisition and Support,* 1987.

Chapter 4

THE OFFICE OF ENERGY EMERGENCY PLANS AND INTEGRATION

Planning for energy emergencies has centered on the oil disruption scenario. Most other countries are relying on demand management programs to meet these kinds of emergencies. In the United States interventional demand management is regarded by DOE as having adverse effects on market adjustments to supply disruptions. DOE policy is to work through the free market, which it feels it is able to do with minimal intervention by using a stockdraw of strategic reserves. The U.S. stock drawdown from strategic reserves will be made in coordination with an integrated response including both stockdraw and demand management on the part of U.S. allies, principally in the International Energy Agency (IEA).

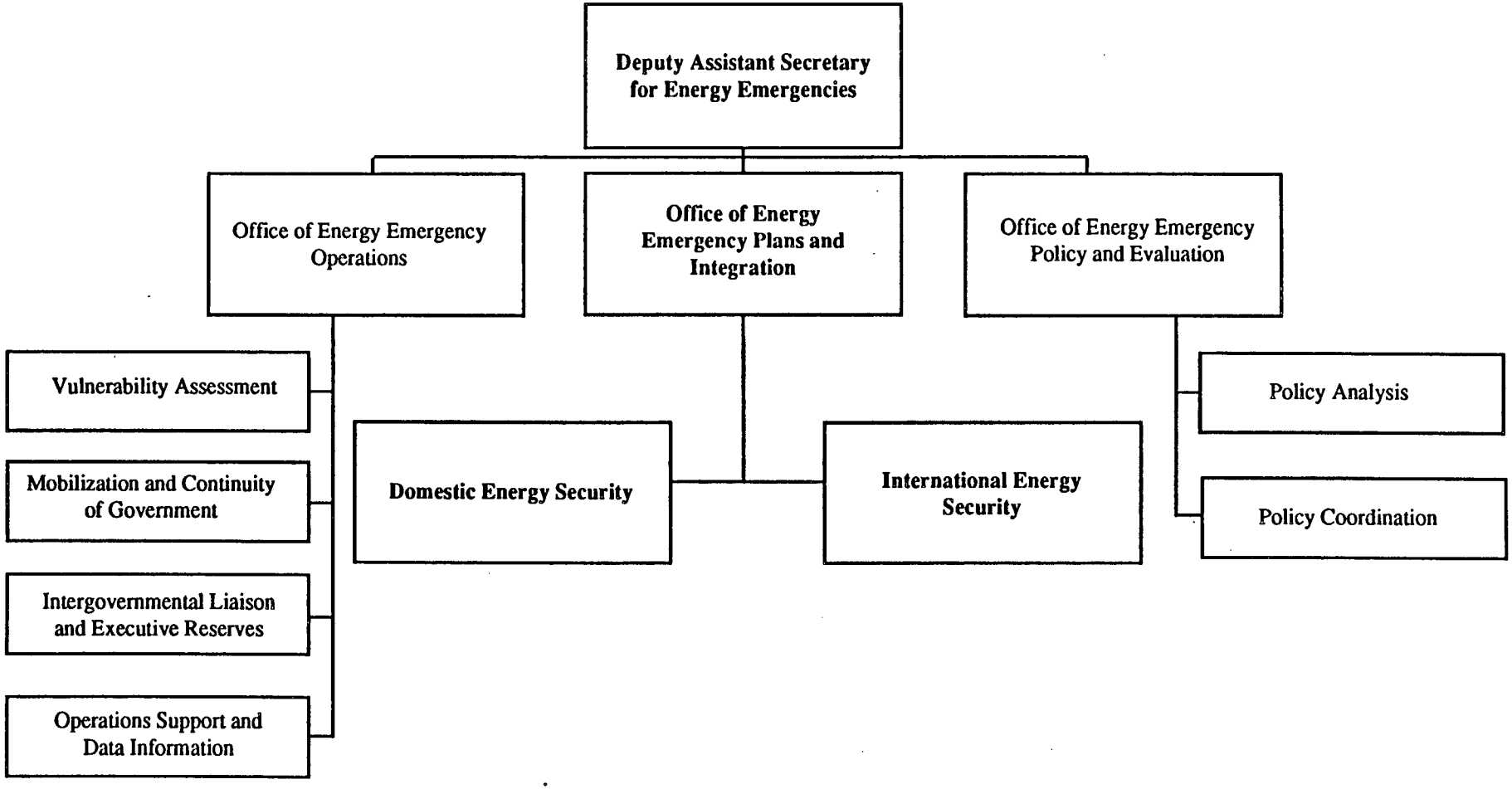
A key assumption to the drawdown strategy is that with the enhancement of price stability resulting from a large, early drawdown, oil producers party to the disruption will suffer declining revenues. This will place strains on any cartel agreement as more heavily populated and less developed oil producers are confronted with a large loss of revenue and are forced politically to increase production. The mean of various strategy planning estimates would anticipate a probable 3-month effective lifetime for such an embargo. The short-term supply stability enhancement by the stockdraw would allow diplomatic and other action to alleviate the supply problem while mitigating the economic impact of a disruption.

The Domestic Energy Security Division

The Domestic Energy Security division is composed of eight personnel with a wide range of responsibilities. Most personnel have very strong working relations with divisions elsewhere in OEE and in DOE. Among these personnel is a data specialist who works directly with EIA, and to some extent with the Operations Support and Data group, to provide information to the division and the Planning Office generally; a funding specialist who works to secure the OEE budget for energy emergency preparedness; a public information liaison specialist; and a natural gas system specialist, who works in cooperation with the FERC planning such things as oil to gas fuel switching as a response to an oil supply disruption. The primary concern of the division is the Strategic Petroleum Reserve (SPR).

Figure 4 - 1

The Office of Energy Emergency Plans and Integration



The Strategic Petroleum Reserve was authorized by the Energy Policy and Conservation Act (EPCA) in 1975 for use in severe emergency situations involving the supply of oil. In 1978 a goal was established to create reserves equal to 750 million barrels of crude oil. Currently (end of first quarter, 1988), the SPR contains in excess of 540 million barrels, which amounts to roughly 90 days of forecast 1988 net U.S. imports. The maximum SPR drawdown capability is 3 million barrels per day for 120 days, with lesser subsequent rates. The selected drawdown rate is a function of projected emergency duration and depth as well as other factors. In FY 1987 the fill rate was 75,000 barrels a day, though this has dropped to about 57,000 barrels a day in FY 1988 in conformance with the Continuing Resolution passed by Congress and may remain at this level for the fiscal year.

The Strategic Petroleum Reserve (SPR) is a resource that is administered by the Strategic Petroleum Reserve Office (SPRO) in the Office of the Deputy Assistant Secretary for Petroleum Reserves, with analytical support from the Planning and Financial Management Office. These offices are under the Assistant Secretary for Fossil Energy. SPRO is primarily concerned with the operational aspects of the SPR and has a lesser concern with the development of policy considerations and the economic modeling which will support strategic use decisions. Their primary mission is to be ready and able to drawdown and distribute as directed. The SPR is, however, the primary response among response options available to meet severe energy emergencies involving an oil shortfall. The response program is developed and planned by the Domestic Energy Security Division of the Office of Energy Emergency Plans and Integration, with critical economic modeling assistance from EIA and the Database and Projections subgroup of IG-EV. Policy support is provided by the Office of Energy Emergency Policy and Evaluation.

As articulated by the SPR emergency response program, the objectives in using the SPR are to "moderate initial price impacts of an oil supply disruption; reduce pressure for market intervention; deter panic buying; and allow time for the diplomatic resolution of any oil supply interruption.... A larger reserve allows added time for economic adjustments to occur, thereby reducing loss of jobs, income, and GNP."[1]

The logic behind the objective of moderating the initial price impacts of a major oil supply disruption is a simple one which posits that if supply is maintained any price increase stimulated by the disruption of the conventional supplies will be minimized over time. The use of the SPR will take place within the context of the turbulence

associated with a systemwide adjustment in the international marketplace. In the event of a major disruption of conventional supplies, it is expected that the international market will respond and alternate supplies will be forthcoming from other suppliers to the economic and political extent they are available. Domestic production may also increase somewhat in the short term. The SPR will be providing the "marginal barrel" that helps keep price down. The Administration's policy with regard to the stockdraw is that it should be early and large and should be coordinated with our allies. The announcement of a significant drawdown is also anticipated to have a public impact by maintaining supply over time and by tending to stabilize prices. Refiners and distributors have been made aware of the reserves and some participate in drawdown exercises.

Another objective for SPR use is to enhance the functioning of the free market and minimize the amount of market intervention. The free market is considered to be far better than Government in effectively allocating supplies and to some large extent this opinion has been validated by the adverse consequences of Government action in the last crises. While Governmental stockdraw is a form of market intervention it is seen as being a discrete one influencing the national and international availability of supplies, while not mandating their allocation or pricing. The market will allocate these supplies in the most effective manner.

The Presidential finding necessary for the SPR drawdown is specified in EPCA, requiring the existence of a severe supply interruption that threatens the national economy and the national security or the imminent likelihood of such an interruption. Alternatively, the drawdown may be required to fulfill U.S. obligations under the IEA. Upon this finding the President makes a declaration that an energy emergency exists and issues an executive order to start the SPR drawdown. The Secretary will then issue a directive for the activation of the SPR drawdown through the Assistant Secretary for Fossil Energy to the SPR Office in New Orleans. An announcement of the SPR plan is made in the *Notice of Sales* about 3 days later This is both mailed and published in major media. Seven days are then allowed for the bids to come in. It is estimated that it will take a further 4 to 5 days to process bids and identify and notify Apparently Successful Offerors. Financial guarantees are required with the bid as well as the contract. To be considered, bidders must be deemed capable of adhering to certain financial and performance standards. In particular, bidders have to demonstrate how they plan to get the SPR oil refined. If the bid is accepted the bid money is transferred, contracts are signed, and schedules for delivery and payments are determined. It is envisaged that the drawdown procedure will then operate in monthly cycles. *In transit* oil will continue arriving for some time and this will help ameliorate the initial physical supply situation

during the 21 to 30 days required to begin to move the SPR oil into the market. Such arrivals will be modified by crisis market conditions such as force majeure clause implementations.

This current plan for the drawdown has met with partial criticism. Some have argued that if the drawdown process was the inevitable front line of the response action then it should be automated through the use of options. This would simplify the procedure at the point of crisis, would provide the oil companies an even stronger guarantee that the SPR would be used, and may deter some large measure of speculative activity in the futures market as the Administration demonstrates more concretely that the stockdraw will be used and used quickly. The current bidding plan, which will be activated upon authorization of the drawdown during the actual crisis, may prove embarrassing if the SPR sale turns into a venue for price escalation through panic overbidding. Pricing is currently to be left to the market in its most volatile and strained condition; the short-term market is the most inflexible in terms of supply and will be subject to the strongest pressures which may force prices for SPR stock beyond any *moderately higher* level. It is to moderate short-term market rigidity that the SPR exists, but how the reserves will be allocated will still be dependent on such a market. This possibility would also be eliminated if options were used with a pricing formula tied more strongly to the immediate precrisis market. Finally, the use of options may reduce the time needed to get the reserve stock into the market from approximately 21 days to perhaps 14, making the response that much quicker.

The SPR Model

SPR size requirements are constantly being reconsidered and the macroeconomic model upon which these predictions are made constantly revised. As part of this monitoring and reassessment process, DOE:

- projects likely import levels for the 1990's,
- assesses possible disruption cases and economic impacts,
- determines a cost-effective reserve size for anticipated world oil market conditions and potential disruptions,
- assesses U.S. stockbuilding efforts, and
- compares SPR costs with the expected economic benefits from releasing SPR oil.

The Department of Energy SPR model, adapted from the original model developed by Thomas Teisberg,[2] is run under a variety of disruption scenarios, with variable world oil prices, disruption sizes, and probabilities. A benefit/cost analysis is performed where

variables include acquisition price, transportation and storage costs, time discounting, and the possibility that no disruption will occur. This analysis estimates probable economic losses. Oil stockbuilding is recommended as long as inventory and storage costs are less than economic benefits.[3]

The model assumes a particular price elasticity of oil supply and demand in disrupted periods, a real discount rate, and an oil price baseline. Program data includes storage costs (capital and operating), holding costs, acquisition and drawdown rate limits, storage capacity expansion schedules, and transportation costs.

The model builders recognize that the model's predictions are particularly sensitive to:

(1) "price elasticity of demand, with higher elasticities reducing the benefits of holding down prices via SPR releases;" and

(2) "the probability and size of possible disruptions, with smaller and less probable disruptions reducing the value of holding SPR inventory".[4]

Termination of the Stockdraw

The decision to drawdown the SPR is the result of a measured series of steps, and there will be a continuous monitoring of the situation. Once initiated, the administration is not committed to continuous stockdraw until the Reserve is exhausted. If it was determined that the emergency response could be enhanced by reducing or stopping the stockdraw then such actions would be taken. The Secretary of Energy has the authority to change the drawdown amount as he deems necessary.

It is hoped that the SPR will be a powerful tool in any diplomatic effort to resolve the supply crisis and that it will be an economic weapon to keep prices of oil down to near predisruption levels in any newly developing short-term supply situation. If an agreement to end the disruption is reached with old suppliers there may be a time-lag between the agreement and the arrival of supplies in the United States. In such a situation the SPR stockdraw could be phased down to promote market stability.

International Energy Security

The U.S. international energy policy concerning major oil supply disruptions is based, among other things, on international cooperation with energy consuming countries to minimize economic losses. Through the International Energy Agency and the

North Atlantic Treaty Organization the United States has participated in the development of a number of international energy emergency response programs. There are three main emergency programs for responding to oil supply disruptions. Two of these, the Coordinated Emergency Response Measures (CERM) program and the Emergency Sharing System (ESS) are part of the emergency response system of the International Energy Agency (IEA). The third program involves the energy emergency response activities within NATO. U.S. participation in the development of these programs is planned and carried out by the staff of the International Energy Security Planning Division of the Office of Energy Emergency Plans and Integration. This division has a staff of eight professionals who work as needed on NATO or IEA planning activities, or in the development and administration of exercises designed to test international oil supply disruption response systems.

International Energy Agency

The IEA consists of 21 OECD members, with France being the notable OECD member that does not belong to IEA. IEA's objective in an oil supply disruption is to limit economic losses and facilitate an effective response. This requires the coordination of members' policies with regard to the best way of meeting a disruption as well as the coordination of differing response capabilities--in terms of the strategic resources of the individual members. Only two countries, Japan and West Germany, have developed strategic stock reserves of a size that may be effective in a disruption--though the Netherlands is also working to build such reserves. IEA nations, excluding the United States, have 225 million barrels of Government-owned stocks and 307 million barrels of Government-controlled stocks available for emergency use. Most allies currently intend to rely primarily on demand management measures rather than stockdraws. This diversity in the capabilities of various members to respond to an energy emergency has been accommodated within the coordinated plans developed under IEA.

Two main emergency response programs have been developed:

- Coordinated Emergency Response Measures (CERM) which provides for a coordinated drawdown of stocks, and
- the IEA Emergency Sharing System (ESS).

Various programs are integrated under the CERM including the stockdraw and demand restraint programs to restore supply-demand balance and the Emergency Data System.

Coordinated Emergency Response Measures

The coordinated drawdown policy is based on an IEA agreement to respond to a supply crisis jointly. It is to consist basically of a drawdown of reserve stocks while individual countries implement supporting measures, such as demand restraint. This coordinated drawdown is to be initiated early in a major disruption. The United States, however, would not feel constrained in responding with a drawdown because of the lack of action on the behalf of the allies and will stockdraw before the allies if necessary.

The events that trigger the activation of a CERM response have not been currently articulated. There is an ongoing consultation process within which a determination will be made on whether the international situation warrants some kind of action. This may be true for either large or small supply disruptions. An early agreement was reached that the consultation process be flexible and informal.

A manual for the coordinated stockdraw implementation procedures has been developed by the Standing Group on Emergency Questions and has been provisionally approved by the IEA Governing Board. The purpose of the manual is to facilitate early consultation among IEA members to arrive at a coordinated response and to establish monitoring facilities and an information exchange. A Consultative Group will be convened to work out a coordinated response which then needs to be endorsed by participating countries.

To facilitate the collection of critical data needed to aid the response process IEA has developed the ongoing Emergency Data System which depends on several questionnaires filled in by participating countries. *Questionnaire A* is addressed to industry and is designed to collect company specific information over a 5-month span [2 previous, current, next 2 months]. *Questionnaire B* is country-specific and includes a review of the country's energy emergency status with a focus on an international oil disruption. Questionnaires A and B were originally intended for use with the ESS. Under certain conditions these would be used in implementing CERM.

Outside of the Emergency Data System there is also a *Questionnaire C.* Questionnaire C is used to collect data on supplies, resources ,and demand on a 3-month basis, and is submitted on the 20th of each month.

The United States has had some limited success in convincing other countries to build strategic reserves, though the situation is still flexible and others may be convinced in the future. In most international energy consultations the strategic stock reserve issue is raised. Last year, talks were held with the European Community (EC)

arguing for stock buildup. West Germany intends to transfer stocks held in private storage to central storage under quasi-Governmental control. Japan has accelerated its stock build and is to engage in its first stockdraw test. The Dutch also have a Government-controlled stockpile, and plan to increase its size.

Emergency Sharing System

The IEA Emergency Sharing System is a plan for allocating oil supplies among member countries involving primarily oil supplies *in transit* though it is theoretically extendible to include the sharing of either stocked supplies or indigenous production. Details of the program are specified in the IEA Emergency Management Manual (EM). General activation of this system requires at least a 7 percent or more reduction in IEA available supply (net imports plus indigenous production) compared to some immediate base period level of consumption. Actual activation is effected by the IEA Executive Director and membership.

A specific formula is used to calculate each IEA member's claim to a share of the total IEA supply in the event of a major disruption. Each member has a Supply Right based on consumption, import dependence, and the size of the shortfall. A member has an Allocation Right (AR) if its available supply is less than its Supply Right. A member has an Allocation Obligation (AO) if its available supply is greater than its Supply Right. Redistribution is to take place through voluntary sales and purchases by oil companies. If voluntary efforts are inadequate IEA members can mandate sales. There is an informal agreement that such mandatory action will be invoked only if a country has a long outstanding AO and other efforts to reduce this AO have been unsuccessful.

ESS operates on a monthly cycle where data from imports, exports, etc. are provided by members to the IEA Secretariat. Private companies provide supply and logistics experts to the IEA headquarters in Paris, and these are the personnel who determine matchups between buyers and sellers.

The system has never been activated so at this stage it cannot be said with certainty whether the United States would have an AO or AR status. Some IEA members, some interested members of Congress, and various energy economists expect that the United States will have Allocation Obligations.[5] EIA's calculations, based on certain likely disruption scenarios, indicate that the United States would usually have an Allocation Right. This expectation is shared by other analysts.[6] DOE has announced to IEA that the EIA modeling capabilities can be shared by other IEA members to confirm the logic behind the U.S. assertion that it is likely to have Allocation Rights in mostly likely

disruptions. This offer of the use of such modeling capabilities also provides an opportunity for these other members to work out their own ESS status under a variety of disruption scenarios. This is being seriously considered at the present.

Few countries, if any, can be expected to have Allocation Obligations in an energy emergency. Countries that are generally thought (by parties outside of DOE) to have Allocation Obligations include the United States, the United Kingdom, Canada, and Australia.[7] For those countries that will have an obligation it is not clear what the benefits are to induce them to cooperate at the point of an emergency. The stability of the international economy is one argument for support. If the market is left without this intervention countries highly dependent on imported oil and with few or no strategic stocks may panic and bid the price of oil up. If there is some assurance of supply through the ESS this panic and speculative bidding may be restricted and their impact on oil prices dampened.[8] In this way all importing countries would benefit including those with Allocation Obligations.

Generally, the sentiment within DOE is that the sharing system is not the appropriate plan to meet an energy emergency. It is felt that it is inefficient, ineffective, economically costly, and has administrative problems. Instead, the U.S. position is that the effective way to deal with a shortfall is with stocks.

NATO Energy Emergency Program Operations

The objectives of the NATO energy emergency program are related to defense fuel priorities and essential civilian fuel needs. There are 16 countries operating in the NATO program. NATO operates on the principle of flexible response where the problem, such as supply shortfall or resupply request, can be resolved by whatever arrangements are appropriate at the time.

During a NATO crisis or war the NATO Wartime Oil Organization (NWOO) would be activated by NATO's Defense Planning Council. There are three functional components to NWOO. They are the NATO Oil Executive Board (NOEB), which performs policy and executive functions; the Joint Operational Staff (JOS), which is staffed primarily by industry experts operating under the guidance of NOEB which provides operational and analytical support to it; and the National Oil Boards (NOB)to carry out the approved NOEB supply scheme. NOB's are located in national capitals and usually comprised of representatives from Departments or Ministries of Energy, In the United States DOE is the NOB. JOS develops a set of recommendations for NOEB. Once approved they are known as the NWOO supply scheme. NOB carries out the approved

supply scheme, and can also make requests for oil.

The supply scheme may include any of the following:

- the reallocation of oil within the alliance,
- the diversions of foreign oil sources,
- demand restraint measures, and
- increased production.

Planning for a wartime energy emergency is actively under way in peacetime through the Petroleum Planning Committee (PPC) of NATO. One of the key PPC peacetime planning activities is to ready the NWOO organization for activation. There is active recruitment of industry and Government personnel to participate in NWOO, and there is an ongoing review of resources needed to meet an international crisis. There has been much success in gaining oil industry involvement. A staffing list of industry and governmental representatives has been developed and is kept up-to-date. Generally, recruitment has been on an annual basis in order to be most responsive to internal management rotations in the oil industry. Recruits in effect become International Civil Servants of NATO. NATO provides funds for NATO-sponsored training and exercises. Recruits are trained on an ongoing basis by NATO and DOE and are placed on standby.

Notes for Chapter 4

1. *U.S. Strategic Petroleum Reserve Fill Analysis*, U.S. Department of Energy, July 1986, p. iv.
2. Teisberg, Thomas J., A Dynamic Programming Model of the U.S. Strategic Petroleum Reserve, *The Bell Journal of Economics*, Vol.12, No. 2, (Autumn 1981), pp. 526-546.
3. ibid, p. 9
4. ibid, p. 14.
5. Bohi, Douglas R., and Michael A. Toman, Oil Supply Disruptions and the Role of the International Energy Agency, *The Energy Journal*, vol. 7, No. 2, 1986, p. 38.
6. Henderson, David, The IEA Oil-Sharing Plan: Who Shares with Whom?, *The Energy Journal*, vol. 8, no. 4., 1987.
7. Bohi and Toman, op. cit., p.38.

Chapter 5

THE OFFICE OF ENERGY EMERGENCY POLICY AND EVALUATION

This office conducts analyses of energy emergency policy options and issues, prepares exercise evaluations, and carries on a broad range of coordination and staff functions for the Deputy Assistant Secretary. The Office, which has a staff of 15, is divided into two divisions: Policy Coordination and Policy Analysis though there is much overlap in their activities.

The Policy Analysis Division

This division is generally concerned with long term policy analysis: reviewing the energy emergency program as a whole and contributing to the formulation of the strategic framework. It's specific responsibilities have been listed as including:

- Analysis of energy emergency policy and issues.
- The development of the Energy Emergency Management System (EEMS) and related procedures.
- Evaluations of exercises.

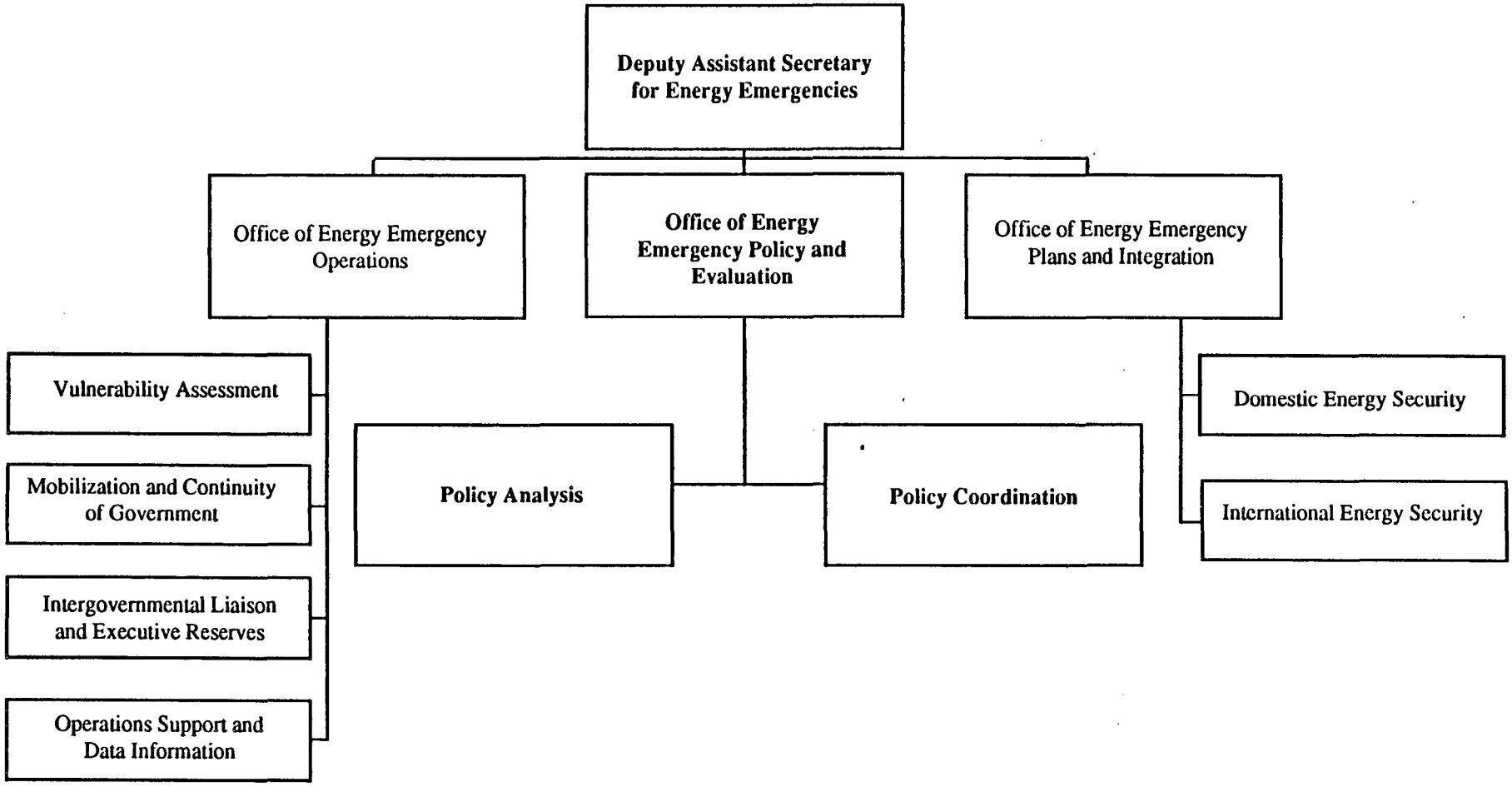
Analysis of SPR Policy Issues

Analysis of policy options and issues has been concentrated principally on issues relating to the SPR. The Division examines on a continuing basis development in world oil markets and their implications
for SPR drawdown policy. Currently, work is under way to analyze which factors are most important to making SPR release decisions, for example, when to draw down, at what rate, with what time profile, and what crude oil mix. The study will develop more explicit guidelines for making these decisions and what data are required for conducting this analysis.

The Policy Analysis Division, with support from the Policy Coordination Division and from the Office of Energy Emergency Plans and Integration, regularly examines a range of issues pertaining to the release and sale of SPR oil. Some examples are: the development of a formula for possible use in establishing a minimum acceptable bid price, an analysis of the use of forward sales contracts, and the development of procedures for making directed sales.

Figure 5 - 1

The Office of Energy Emergency Policy and Evaluation



Structural Changes in Oil Markets

Over the past decade there have been significant structural changes in oil markets, such as a significant increase in the role of the spot market and the emergency and growth of forward and futures markets. The Policy Analysis Division monitors these developments and examines their implications for energy emergency policy, particularly as regards use of the SPR. because of these developments, some oil market observers have expressed concern about the ability of the Strategic Petroleum Reserve to meet its stated objectives. These objectives, as specified in the SPR Fill Analysis of 1986, are to moderate the influence of an oil supply disruption on oil prices, reduce pressure for market intervention, deter panic buying, and allow time for the diplomatic resolution of any oil supply interruption. The key to meeting these objectives lies in the ability of the SPR to deter increases in the price of oil. But the market mechanisms involved in the pricing of oil have changed dramatically since the time when the SPR was first proposed. The economic issues involved here are complex and only a very general overview of a particular set of problems will be presented. In the 1970's, oil was purchased through long term contracts. These contracts were made with the producing countries and used the Official Selling Prices (OSP's) established by the government concerned. For Organization of Petroleum Exporting Countries (OPEC) members, these OSP's, along with individual and group production levels, were basically determined in meetings of OPEC ministers and were characteristically sluggish in responding to short-term market changes. For a while, these OSP's were largely replaced by what were known as *net-back arrangements*, or realization deals, where crude oil was sold at a price that was based on refined product pricing, less refinery, shipping costs, and some refiner profit margin. When prices collapsed in 1986 production quotas were reintroduced and the OSP system reestablished. These production controls were introduced at a tempered pace without the disruption that occurred in 1973. By June 1987 spot crude oil prices were close to OSP levels of approximately $18 a barrel. In the meantime, however, oil purchasing has shifted away from these long-term contracts to short-term agreements made in what is known as the *spot market* and other kinds of longer-term agreements made in the *forward* and the *futures* markets.

Prices determined by producing governments are known as *term prices*. *Spot prices* are determined through the market and are agreed upon for particular cargoes. In 1984 the potential volatility of the spot market resulted in increased exposure of oil companies to the fluctuations of speculative buying. In order to reduce the risks associated with such volatility, the oil companies turned to forward and futures markets to

reintroduce the stability associated with term pricing.

The prices paid for specific cargoes to be delivered at some future time are called *forward prices.* The contracts developed in forward pricing agreements are traded in an unregulated forward market. This is sometimes referred to as *paper barrel* trading. It has been estimated that 95 percent of these transactions never involve physical oil, or *wet barrels*, but rather involve the trading of the entitlement to this physical oil. These entitlements have been traded more than 100 times before final delivery.[1] Typically, the quantity of oil involved in such entitlements is large so that the number of participants in the forward market is limited. However, smaller parcels are also traded in regulated exchanges in the futures market centered in the United States in the New York Mercantile Exchange. Again, the volume of trading is disproportionate to the actual crude oil delivered. In proportion to the total trading activity, trading is rarely done by the actual final purchasers of the oil. In the futures market prices are for *electronic barrels* of crude oil, and this is currently the most dynamic and changing kind of market.

There is one further complication. Recently, oil prices in the futures market have become critical for the bond market. Some traders have been reported as saying that the oil futures market has replaced the value of the U.S. dollar as the key index of inflationary tendencies which erode the value of fixed-income securities. Through the bond market oil pricing may now be implicated critically in the financial markets and may have a more immediate impact on these markets than has been the case in the past.

In 1979 the spot market in crude oil only made up 5 percent of the total market. Currently 50 percent of the market involves spot purchases. This, along with the development of the forward and futures market, must have some large effect on the ability of the Strategic Petroleum Reserve to meet its objective of moderating price impacts and deterring panic. This new market situation is one that allows for a rapid response in the market to any threat of a disruption, and this rapid response may not always be a benign one.

The volatility of the oil market, and particularly the responsiveness of price to changes in market conditions, can be illustrated by examining a 2-week period in December 1987. In that month, OPEC oil ministers effectively failed to develop and endorse a coherent policy to reduce the worldwide oversupply of crude oil. The failure was attributed to the refusal of Iraq to sign any agreement that did not allow it to raise its production levels to that of Iran. The oversupply has in the past forced most OPEC members to sell their surplus at from $1 to $3 dollars below the OPEC agreed price of $18, though product controls introduced in 1986 did help bring spot market prices back

up to near the OSP. Within 1 week prices fell $3.50 a barrel to around $14.50 a barrel, and the stabilized short-term price is expected to be between $15 and $16 a barrel. Oil company stocks fell and demands for an oil-price floor of between $14 and $17 a barrel were repeated by industry leaders. Some domestic oil companies reacted by reducing their workforce. Philips Petroleum reduced its labor force by 10 percent. One week later, however, a production cutback was announced by the United Arab Emirates and Kuwait, which had been key quota violators. Though this cutback was to be approximately 700,000 barrels a day, overall production was still at 2.4 million barrels a day over the OPEC stated limit. In 1 day the basic spot price for American crude gained $1.21 a barrel, and prices for refined products also advanced. All futures contracts for delivery in March or later had risen that day by the $1 a barrel limit permitted on the New York Mercantile Exchange. In response to this, bond prices fell. The next day oil traders moved to take profits in the wake of the rally, and oil prices dropped. This 2-week description of spot market-dependent oil pricing behavior illustrates that oil prices are no longer determined in the way they were, when SPR was inaugurated, and it is no longer clear what "constant" or "moderate price increases" are.

It is currently unlikely that oil producers would all cooperate to impose production restrictions with the impact of the 1973 embargo. The diffused nature of the supply, in particular the current IEA supply from Norway and the United Kingdom, and the reduced reliance on oil make such an agreement a remote possibility for the present. The caution from both the DOE Energy Security report and the appendix to this report on Energy Vulnerability is that the current lower vulnerability of the United States. is unlikely to last and that within the decade Persian Gulf countries will have reasserted their position among producers as IEA supplies are exhausted and LDC supplies are increasingly directed to LDC demands. At some future time, the possibility of a 1973-style embargo is real, and at that time its influence on the U.S. economy will be interactive with its influence on the spot, futures, and bond markets, and even the stock exchange.

The first of the SPR objectives has to do with moderating initial price impacts of an oil supply disruption. The logic behind this is a simple one which posits that as supply increases price drops, or if supply is maintained price will remain fairly constant. However, this does not include consideration of market turbulence in an emergency and associated psychological factors. The administration policy with regard to the stock-draw is that it should be early and large and should be coordinated with the allies. The announcement of a significant drawdown should have an impact since it is expected to

assure the public that oil supply shortages will be mitigated. Ideally demand would remain constant (with no attempts to hoard), and prices stabilized. While this ideal is not likely to be realized, the effect of the SPR drawdown is hoped to significantly minimize the economic impact of the oil supply disruption.

The Presidential finding required for the SPR drawdown is specified in EPCA, 1975 and requires a severe supply interruption which threatens the national economy and the national security. In such a situation there is the possibility of panic by the public, by government agencies and authorities (especially on the state level), and by the oil industry. The effects of the spot market in such a crisis situation is likely to be mixed. In the first instance a large and active spot market may facilitate the introduction of new supplies from producers not a party to the actual crisis or disruption. Accompanying this infusion of new supplies, prices may not increase as would be the case without such a market. However, the spot market also allows the introduction of a financial market mentality that may actually create its own crisis-dynamic and force dramatic price changes. Market demand information is not as easy to come by for oil company and American Petroleum Institute (API) statisticians as supply information is. It takes several months for changes in demand to become apparent and have some impact on the economic planning of petroleum companies. In the meantime, such planners have relatively poor models of consumer response to crisis scenarios, and there may be a considerable discrepancy between predicted demand and actual demand during the first few months of the crisis. In 1979 there was sufficient consumer fuel switching to make a significant impact on residential and utility oil demand. Yet, initially, oil companies were unaware of such demand changes and, consequently, this was not built into their own calculations. It was the industry panic which fueled the bidding war for the available oil supplies. If there is panic, or excessive speculative bidding in the spot and futures markets, oil prices will be forced up. With instant electronic communications and computerized buying strategies any expectation of a major oil disruption may lead through speculative bidding and hedging activities in oil futures to a collapse of the financial market. This can all happen very quickly after the announcement of a major energy emergency.

In an alternative to the above characterization, the development of a futures market in oil may have a positive contribution to the response process. Depending on the nature of the disruption, this futures market will provide certain guaranteed supplies that should curtail industry tendencies to hoard and, hence, relieve the market of these hoarding-induced demand pressures and any consequent tendency of prices to increase.

Overall it is now no longer clear as it once was that the SPR can be used to achieve its economic stabilization objectives as envisioned in current planning.

SPR Without a Drawdown

Alternate ways of using the SPR as a response resource, other than in an early and large drawdown, have been suggested. Some have even argued that the SPR can fulfill its economic stabilization objectives without the stockdraw. By simply existing the SPR may assuage oil company fears over supplies in the immediate future and decrease any impulse to hoard. The inventory in effect exists in the Government-owned stocks, and the cost of the inventory is being shouldered by the Government. Hoarding activity can be a significant factor in increasing demand for oil, driving prices even further. If this hoarding is reduced significantly its contribution to a crisis-induced demand change will be minimized and, hence, the SPR will have helped moderate the crisis impact without actually having been used. The same argument, however, would also mean that private companies may not hold inventories as long as Government-owned ones exist, shifting the cost of the inventory to the Government.

The SPR and the Threat of Industry Hoarding

The existence of the SPR may have a beneficial effect in the reduction of hoarding activity at the point of crisis by ensuring an adequate continuation of oil supplies until the international market can adjust to the disruption. But the threat of a longer term disruption and uncertainties with regard to the international market's abilities to respond efficiently and quickly may result in the oil companies purchasing SPR stock at the point of drawdown to increase inventories which are then hoarded. The motivation behind such hoarding might be to ensure a private reserve stock for use if the disruption is not quickly resolved or it might be for speculative purposes in anticipation of higher prices in the future.

It is hoped that oil company hoarding will not be a problem basically for two reasons. First, the oil companies have a very good knowledge of the SPR and how it will be used to overcome an oil shortage. Consequently, they may act reasonably with the expectation that any disruption will be met through a stockdraw of the Reserve. Second, if prices rise inventories will cost more. Consequently, oil companies may be discouraged from hoarding, depending on any anticipation of speculative future profit or shortage.

Some analysts do not place much faith in such arguments, but believe that oil companies will act to their own economic advantage as they see it at the time and, subject to public relations constraints, will take any opportunities they think are offered by SPR to improve that advantage; possibly by using SPR stock to build private inventories. Also, some companies doubt the Government's determination to use the SPR in an emergency at all given conflicting pressures. These companies are more likely to act independently and at the point of a crisis continue to be concerned about quickly building private inventories.

Possible Long-Term Consequences of an SPR Drawdown

The second objective for the Strategic Petroleum Reserve is to reduce the need for further market intervention through the regulation of prices and supplies. Current policy is that the market is considered to be far better than Government in effectively allocating supplies and the perspective on past Government intervention is that it added to any crisis rather then helped to solve it. If an oil shortfall crisis warrants, there will be a drawdown of SPR, which will be sold competitively and the market will allocate these supplies in the most effective manner.

However, the use of the SPR is a form of intervention and as an intervention may have unintended adverse effects on the economy's adaptation to a supply disruption. For example, if the Strategic Petroleum Reserve is used DOE hopes that it will signal the oil industry that the Government expects the oil disruption to be of a short duration and that they need not panic; i.e, that it can be resolved through diplomacy or that for economic and political reasons less developed oil suppliers will help meet the shortfall in the short run. If the oil industry does interpret SPR release in this intended manner (thought there is no strong reason to expect that this will be the case), there can be no incentive to expand exploration and development efforts which require a long lead time. Questionable short-term economic stabilities may be paid for with unintended long run adjustment problems. The SPR is a tool for short term emergencies and, if these emergencies become long-term ones, under this scenario it may act to merely delay and even exacerbate the adjustment problems.

Overall it is not clear how the SPR will influence the market. Despite DOE insistence that there will be a quick and large drawdown not everyone feels that this will be inevitable. Hence, there is still some uncertainty over its use. If there is a drawdown it may not be interpreted as a strong indication that the crisis will be short lived, and it

is uncertain how the oil companies will respond to it and how they will use the SPR stock. Oil companies have their own sources of information which they might consider to be superior to those of the DOE and which for various reasons they may not want to share with other companies through NDER-mediated information exchange with the Government. Their private analysis of the crisis situation may be quite different to that of DOE and they may not respond in the manner hoped for by DOE in that situation. SPR may become simply another resource for oil companies to use as part of their own response program which may or may not be compatible with that of the Government. These are problems that remain in the development of an effective policy for the use of the SPR and the Policy Analysis Division is currently working to determine plausible solutions.

Energy Emergency Management System

The Energy Emergency Management System is largely a product of the Policy Office though there has been some extensive contribution from each of the divisions within OEE. It was created as a result of DOE Order, 5500-1a, which requires the development of several Emergency Management Systems (EMS) within DOE. The Secretary assigned responsibility for the different kinds of emergencies to various Assistant Secretaries. The EMS for nuclear accidents, for example, has been developed by Nuclear Energy. Each of the Assistant Secretaries assigned such a responsibility is to develop implementation procedures for an emergency management system. The Energy Emergency Management System is an EMS. It is a system that defines the general organizational structures that would be active in an energy emergency, integrating the responses of OEE and other DOE agencies.

In developing an Energy Emergency Management Plan (EEMP), the aim was to allow maximum adaptability to ensure effective responsiveness to the full range of possible crisis situations. Such adaptability was seen to require flexibility in the response-management organization. Consequently, the plan is conceived as a "framework and context" for response-management rather than as a set of ordered and rigid procedures though work is proceeding in specifying such operational procedures at the level of particular programs and in association with the use of particular response resources. Though it aims to be flexible, the EEMP also aims to have as many procedures as possible prepared of the kind that will be necessary in most kinds of emergency situations. Communications networks, request or claimancy procedures, technical resources, expert personnel, and physical resources in the form of strategic reserves, secondary production

capabilities, and alternate fuels all have a durability and usefulness that allows preplanning without compromising organizational flexibility.

The flexible management structure created for the EEMS is intended to operate simultaneously with DOE's normal line structure.

The EEMS functions within the more general operation of the EMS, which is the responsibility of the Under Secretary of Energy, and is developed, coordinated and implemented by the Director of Energy Emergency Operations. The Deputy Assistant Secretary for Energy Emergencies is the Chairman of the Energy Emergency Management Team (EEMT), a group of representatives from IE and other Secretarial-level departmental offices who would constitute the administrative nexus of the crisis management organization. The EEMT is responsible for:

- identifying that there is in fact a crisis,
- assessing the situation and impact response options,
- making recommendations on response options that could be used, and
- overseeing the implementation of the final strategy.

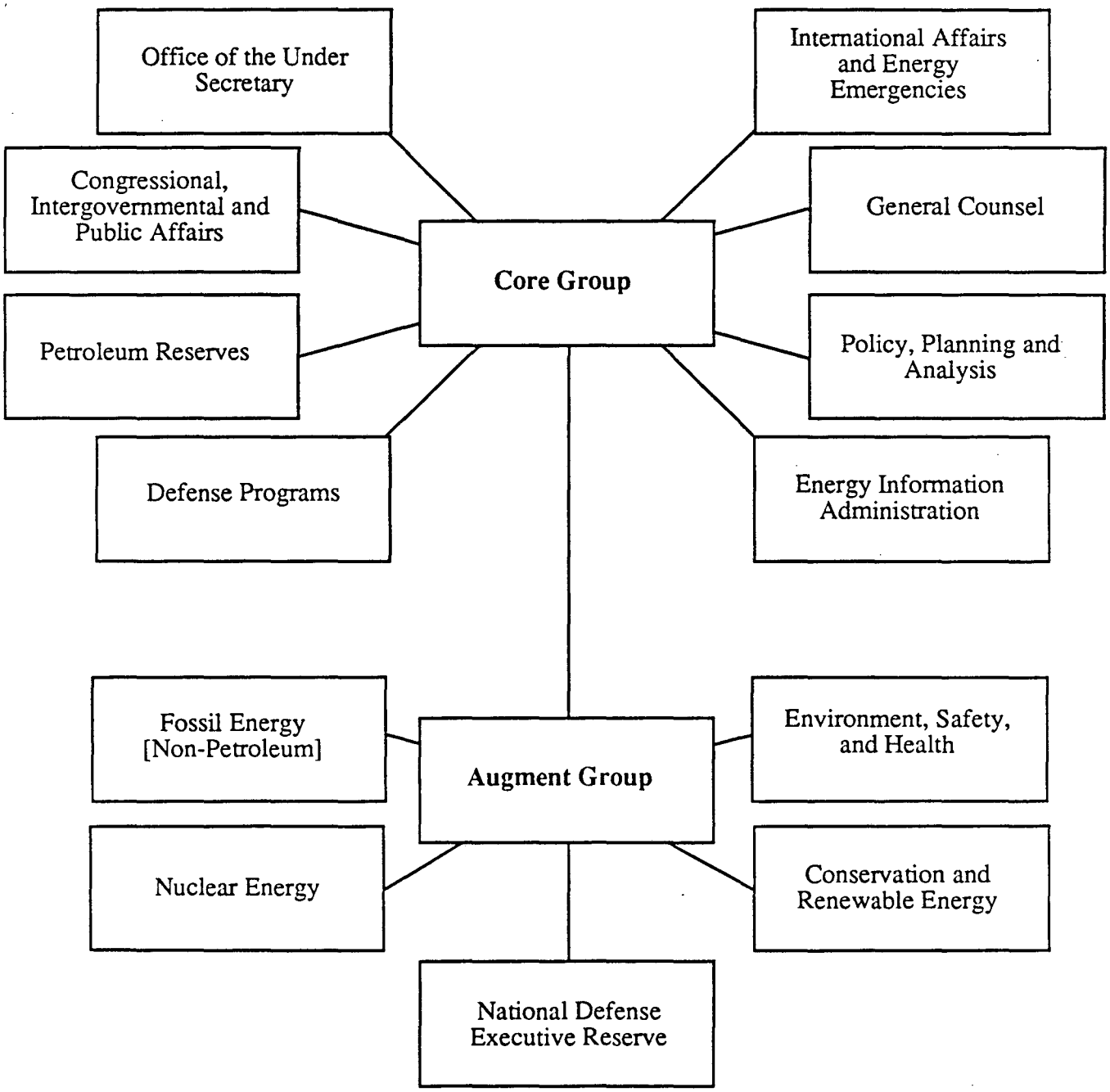
The formal structure of the EEMT consists of a Core and Augment Group (Figure 5-2). The Core Group is involved regardless of the nature of the emergency, while members of the Augment Group get involved only as the emergency warrants. The personnel selected from the various DOE offices include those with high levels of system expertise.

The monitoring of the energy situation is continuous and takes place both in the EIA and in the Operations Support and Data Analysis division of the Energy Emergency Operations Office in OEE, who offer a daily report. There are also experts in various systems scattered throughout the Department who stay up-to-date on market conditions through contacts and trade journals. EIA constantly monitors information and inputs it into the system. A monitoring team would be created in an actual emergency with EIA and IE people from Operations and Planning.

Activation of the EEMS is triggered from the top. For example, when some extraneous event occurs, such as news of an embargo, the Emergency Officer (either the Secretary or the Under Secretary, depending on the kind of emergency) on the advice of the Deputy Assistant Secretary for Energy Emergencies would recommend activating the EEMT for a situation analysis. The Emergency Officer would provide the initial direction and the time-frame for the development of the immediate stages of the response. Alternatively, IE's Operational people have a number of monitoring systems in place checking crude oil, potential sabotage, etc. If they were to see something

Figure 5 - 2

Energy Emergency Management Team Membership



significant they would notify the Deputy Assistant Secretary. The first case is more likely. The specification of a timeframe is necessary in order to determine the immediate procedural nature of the response process; i.e., whether it will be "fast track" (within 24 hours) or "normal track."

There is a broad response process defined in the *Energy Emergency Management Plan.* There are two subgroups within EEMS that tend to run continuously in an emergency:

(i) the Situation Analysis group, which functions to keep constant oversight on the energy situation and

(ii) the Response Option Development group, which recommends actions that the Department should take.

The Situation Analysis group is established and directed out of EIA. The constitution of the Response Option Development team will vary with the emergency. Coordination of response option development with agencies outside of DOE would be effected through the IG-EV which places some responsibility on the Vulnerability Assessment Division in the Office of Energy Emergency Operations to act as a liaison between these various efforts.

The energy emergency response process will be cyclical, as feedback from initial activity is used to modify measures through new situation analyses and response options development, in order to optimize response effectiveness.

The expertise and resources that exist to meet the response development function are currently being catalogued, and the team organization to be developed will be dependent on this information. A task group has been formed, directed by the Policy Office, that is trying to develop in some detail the kinds of information and activities that each office would be responsible for. The manual produced by this task force will specify generic activities for each office and list critical response resources and how to access them, including specific data sources, computer support, etc. The manual will detail actual operational procedures for a comprehensive range of emergencies. Currently, the OEE response procedures for oil are fairly complete and tested. For coal, natural gas, and electric power the plans have not been adequately developed. The task force will look to see if there are any unique requirements imposed by emergencies in these systems. When the review of the unique response needs of the various energy systems is completed a more informed determination can be made as to whether the response option development teams should be organized *functionally* or by *fuel type.* Previously, there has been an attempt at developing some kind of response organization

for fuel type, but that involved much duplication and was cumbersome. Most probably an organization by function will develop.

There would be no peacetime use of executive reserve personnel. Hence, for most scenarios envisioned for the EEMS such personnel would have no formal part to play. Informal contacts among the affected industries will be critical sources of information.

It is not presently clear what the relationship with the COG teams will be. It is uncertain whether such teams may coexist for some range of energy emergency or whether the EEMT will become the COG team.

Relationships between EEMS and the IG-EV are also presently unclear. The IG-EV will be the vehicle for *interagency coordination.* Whether this simply means that it will facilitate information sharing and resource support or whether it means that the IG-EV will assume a lead position in actual crisis management, is unknown. This issue has to do with the degree to which DOE will be able to make energy emergency response decisions autonomously or whether its authority to do so will be circumscribed by the wishes of other agencies.

EEMS has not yet been extended to the regional level though work is underway to define what the role of the DOE regional offices will be. It is currently oriented towards international oil disruptions and, hence, is organized to respond on the national level. How the states will be involved in such as system is currently unknown.

The communication function of EEMS is through Congressional, Intergovernmental and Public Affairs (CP) which is a corporate member of the EEMT, in order to oversee the public activities of the EEMS. It has developed this function mainly around the promotion of the Strategic Petroleum Reserve where it educates industry as to the sales provisions and is responsible for the public relations effort justifying the expense of filling the Reserve. In an emergency, CP would be processing press information.

The EEMS is fully functioning right now and has performed well in past exercises. But, the program tools may not be as comprehensive as they should be. Oil has had the great bulk of attention. The most valuable tool in energy emergency preparedness is the quality of the expert staff available to EEMS. This staff exists and can act as the central and productive part of any task force needed to meet an emergency when it occurs.

Exercise Evaluation

Concurrent with the EEMS design and development the Policy Analysis Division instituted a process to test and evaluate EEMS at crucial developmental stages and to evaluate its operation during major OEE exercises. For example, in the early stages of EEMS development several informal intradepartmental workshops and tabletop exercises were used to fine-tune the broader system and establish a foundation from which detailed operational procedures could be developed. Once a viable system was in place more detailed operational processes were being tested and evaluated through specific assessments of the activities and responsibilities of key organizational entities. These assessments are based on informal tabletop exercises covering activities related to specific fuel types and scenarios as procedures and operational manuals are developed.

This structured approach to evaluating the EEMS activities underscored the need to approach broader OEE exercise activities in a more systematic manner. Until recently evaluations of exercises were performed on an ad hoc basis with little consistency in methodology or implementation of evaluation findings. As a result there was no effective way of using the evaluation process as an analytical tool of use for making longer-term system improvements. The Division is currently establishing systematic evaluation guidelines which will

a) ensure consistency in the evaluation approach and objectives,

b) develop a source of historical evaluation data,

c) create a system to track after-action items to ensure their timely implementation, and

d) ensure that exercise planning activities address those areas identified in prior evaluation findings as requiring greater emphasis or review.

Two recent evaluations, of ESPIRIT and CERM, have emphasized an informal, no-fault approach to evaluation. Several sources of input have been used including an evaluation team's observations, self-evaluation of exercise participants, and suggestions from observers and participants.

Exercises are typically what are known as "command post exercises," which are management simulations carried out entirely within the DOE offices and with no field involvement. Most exercises only involve DOE personnel. There are some simulations, called "high level simulations," where outside people do participate (including executive reservists, state and other federal agencies). There are also other occasional exercises that involve field staff. For example, in 1985 there was a test of the SPR drawdown

process which enacted the entire drawdown operation and included both headquarters and field personnel. This was a very unusual kind of exercise that had been Congressionally mandated.

The Policy Coordination Division

This division was established for the purpose of testimony preparation and speech writing but its functions have evolved beyond this. Some of the Division's effort is still directed to an editing function, as it coordinates the writing of Office reports especially as they involve multiple group or division efforts. However, beyond editing the Division has also taken the lead in preparing a number of major reports,or portions thereof, such as the emergency preparedness chapter of the *Energy Security1 study, published bu the Department in March 1987 and the Persian Gulf Contingency Plans Report to Congress, submitted in April 1988.*

An additional function of the Division is to oversee legislative activities of the Office of Energy Emergencies. Such activities include reviewing legislation proposed by DOE or other Federal Agencies for its effect on energy emergency preparedness policy or programs. As appropriate, the Division seeks input from the other Offices in OEE concerning program impacts of proposed or enacted legislation. The Division is also involved in preparing or assisting in the preparation of testimony and the assembling of materials to brief Departmental witnesses prior to Congressional hearings on legislative authorizations of appropriations. The Division also takes the lead in developing and coordinating responses to pre- or post- hearing questions from Congressional Committees.

Division staff perform other duties which overlap into other Offices or program areas. For example, the staff provides administrative support for the Interagency Group on Energy Vulnerability. This Group, which is chaired by the Assistant Secretary for International Affairs and Energy Emergencies, meets quarterly with the active participation of 14 Executive Branch Departments and Agencies.

Notes for Chapter 5

1. "Oil Prices," *The Shell Briefing Service*, Number 5, 1987

Chapter 6

THE PUBLIC COMMUNICATIONS FUNCTION

There is another component of the Office of Energy Emergencies not included under any of the other separate Offices that is important in emergency response planning and activity; i.e., the *public communications function.* Effective public communications in an energy emergency is specified as a principal activity within the OEE Strategic Framework. In an emergency situation many response activities will require formal authorization from the President accompanied by a declaration of a national energy emergency. The American economy and society are still energy intensive. An energy disruption has far-reaching consequences at both an individual and at a social level that, potentially, a well prepared public communications program can significantly moderate.

The social ramifications connected to the distribution of available energy resources, make the responses to an energy disruption politically volatile. This volatility may then affect the nature of the response process. This politically motivated attempt to influence the nature of the response process will be focused through the states and Congress. At the point of an emergency such attempts may not be reasonably based but impelled by fears over the consequences of that disruption for particular states, communities, or social groups. Such fears may be allayed with greater information, a reasoned appraisal of the emergency situation, and a clear account of how it can be overcome. With this effective communication, the political pressures which may restrain certain kinds of response activities (e.g., regulated allocation in an NSEP crisis) or which may attempt to force others which are inappropriate (e.g., demand restraint actions when the market has yet to have the opportunity to resolve the crisis) can be diffused.

At the level of the individual, anxiety may induce panic and hoarding. The panic can lead to political agitation, with pressures placed on local, state and congressional representatives to act in some overt, highly visible manner in order to appease constituents: such as with demand restraint and supply regulation actions, both of which may severely compromise DOE efforts to resolve the crisis. The hoarding will simply increase demand, place greater pressures on the natural allocation system, drive up prices and pressure the private companies involved to be more competitive in their bidding in the international marketplace; intensifying the impact of the disruption on the international economy. This panic and hoarding can again be largely eliminated or diminished to less significant levels with an effective public communications program.

Private industry may be well prepared to meet a wide array of energy emergencies but mainly if they have to do with exigencies in supply. They are vulnerable to the unexpected in market demand. The public response to an energy crisis is largely unknown, changing as it has with greater public experience of energy crises and near-crises. Panic is one possible public response. But, instead of panic the public response could be one of indifference, depending on the nature of the particular crisis and their past experience with it. To hedge against this uncertainty, industry may be induced to hoard (depending on how they regard the SPR at that time). An effective public communications program can reduce this industry panic and hoarding incentive by moderating the public response, reducing public hoarding and demand increases from this source, while still encouraging normal consumption if that is appropriate. This may assure industry that their demand projections will be relatively stable and that industry does not in turn have to hoard to cover such potential demand fluctuations.

Both the industry and the public are players in financial markets. Panic from either quarter in an energy emergency may be enough to trigger a frenzy of activity in the mercantile and stock exchanges that can potentially thwart the economic stabilization objective of the response program in a short time. Public communications can be the key to stopping such a catastrophe.

Most of the different response preparedness efforts recognize that good public communications is a critical element determining the effectiveness of their individual responses. Public communications is not yet another response activity but is a basic response activity: one upon which all others are dependent for their ultimate success. If public communications fails, so might the entire energy emergency response.

The public communications function is two-fold. First, there is a simple *descriptive* function, sometimes referred to as an external affairs function. Its purpose is to inform a variety of audiences, particularly the public through the media, but also including public interest groups, industry, the states and other Federal agencies, of the nature of DOE's energy emergency response. The descriptive function is essentially passive, something of a formality, and appears as peripheral to the response process itself. Though there is some continuous descriptive information dissemination the function becomes a significant one only at the point of crisis when the assorted audiences need to be provided with information which is adequate for the planning of their individual responses to the energy emergency. The DOE has a legally mandated responsibility to carry out a public communications program of this sort. There is little planning for the execution of this function. Instead, it has been basically articulated as required.

There is a potentially more significant second aspect of public communications, which we will call the *dynamic outreach* function. This function is more interactive and educative and is concerned with the preparation the various audiences to behave more effectively as dynamic response resources. It is essentially a resource management function. Its purpose is not only to attempt to make the public aware of the current and likely future status of the energy supply in an emergency but is presented with an overview of DOE's perception of how the crisis can be worked through, how some kinds of public behavior will help this process move smoothly and more quickly, and how other kinds of behavior will simply impede or make things worse. It is this dynamic outreach aspect of public communications that makes it so critical for the response effort.

Different audiences may need different kinds of information, and the techniques used in presenting that information may change from group to group. From a public communications point of view the industry audience is one such distinctive audience as is the general public, specified into critical geographical regions defined by energy needs. To be successful in terms of dynamic outreach requires some extensive preparation to understand the different audiences and their needs in an energy emergency and develop a style of presenting information that will most effectively reach these audiences and fulfill the function's objectives. Some large portion of the outreach effort must be exercised before the onset of an energy emergency, in the pre- or developing crisis stage, both in preparation and actual public communication. Particularly through its effects in the spot and futures markets, panic can lead to rapid and devastating consequences. An attempt must be made to ensure that this panic is not allowed to develop in the first place. This requires that the public be generally aware of the response capabilities before the emergency begins. No systematic attempt has been successfully made to develop a comprehensive public communications program addressing each of the various audiences.

Presently, the public communications effort is concentrated in justifying budget allocations to Congress for the Strategic Petroleum Reserve and in informing key industry personnel of the stockdraw and bidding procedures connected with the SPR. The public has yet to be prepared for any role in an energy emergency. Previously, the Interim Emergency Public Information Plan (IEPIP) had been formed from within the Office of the Assistant Secretary for International Affairs and Energy Emergencies to develop the tools and infrastructure to carry out the descriptive and dynamic outreach functions of the public communications program. It was meant to function at all stages of a crisis from potential, through creeping to actualized stages. This plan was to provide a centralized office for handling public information in a crisis whose sole focus was

that of energy emergencies. A critical aspect of this plan was to develop a program to meet the dynamic outreach needs of emergency preparedness. At the time the Public Affairs' Central Office within DOE was not an active party to the development of this plan, as it was preoccupied with the transfer of administration and the redirection of the Department as a whole. When it was completed, the IEPIP program was presented to Congress and publicized but ran into opposition from CP who believed that IEPIP merely duplicated the functions of the Central Office and the public affairs office of CP. CP believed that this would add another layer to the organization of the public communications program and have the effect of delaying the dissemination of information. IEPIP was consequently abandoned.

At present, the public communications function is dispersed across many different DOE offices and in a creeping crisis situation is essentially uncoordinated. For example, in nonemergency situations for oil-related activity it is carried out by the following offices:

- the Public Affairs Officer for the Assistant Secretary for International Affairs and Energy Emergencies,
- the Public Affairs Officer for the Assistant Secretary of Fossil Energy.
- the External Affairs Officer in the office of the Assistant Secretary for Congressional, Intergovernmental and Public Affairs,
- the public affairs office of the Oak Ridge Operations Office,
- the SPR Project Office in New Orleans, and
- the Central Press Office at headquarters.

In an actual energy emergency crisis the expectation is that the Public Affairs Office of FEMA will provide the public communications function under the coordination of the White House Press Secretary and that DOE officers will play a secondary support role. In a noncrisis situation public communications is handled by the Public Affairs Officer in IE and the Public Affairs Officer in FE. In a creeping crisis public communications will be coordinated by the Central Press Office. All these efforts are basically concentrated on what was referred to above as descriptive information dissemination.

The Public Affairs Officer for the Assistant Secretary for International Affairs and Energy Emergencies tried several years ago to establish a coordinating committee, that included the other public affairs offices listed above, called the SPR Coordinating Information Team. As part of this effort an inventory of public relations materials was collected including film footage, photos, written material, etc. Plans were started for a 15 minute film on the Strategic Petroleum Reserve. This effort has not been realized due mainly to lack of funding.

Chapter 7

DISCUSSION

Previous chapters have attempted to describe those Office of Energy Emergencies activities aimed at the development of a comprehensive set of energy emergency response programs. These chapters have articulated something of the organization of OEE and DOE as they pertain to the energy emergency effort, while also attempting to describe the organization of the response infrastructure itself. The information presented therein comes from various briefing materials, mission and function statements, and interviews with key personnel in all divisions.

OEE has listed the following as its principal response activities:

- the Strategic Petroleum Reserve drawdown,
- international energy emergency programs,
- defense support and mobilization,
- Continuity of Government,
- Government-industry cooperation,
- state and local programs, and
- emergency public information programs.

Much progress has been made in developing the energy emergency response infrastructure, particularly within the last 2 years. Procedures for the SPR drawdown have been completed and tested, and plans for the CERM and the ESS are generally ready and also tested. Working procedures for mobilization have been completed though they remain to be officially sanctioned. COG teams have been formed though much remains to be done in actual COG planning. Government-industry cooperation exists but the executive reserves, the most important vehicle for this cooperation in a major energy emergency, are being developed at an uneven rate. The oil industry reserve unit, which is the most critical unit among the executive reserves, does not effectively exist due primarily to industry fears of their legal position if they should do so. The energy emergency preparedness of state and local governments is largely unknown. Liaison with them is just beginning so that, in the immediate future, Federal/state liaison will be much improved. No real evidence of an emergency public communications program could be found. While the organization of the response infrastructure at the central headquarters level is progressing well, the regional structure is generally at a low level of development. The actual crisis-management team has been created but awaits the

development, this year, of the procedures necessary to connect it to the various response resources prepared primarily by the assorted divisions within OEE.

Emergency programs, then, are at various stages of development. In terms of contingency planning, the formalized processes to be used to meet major kinds of energy emergencies are not, yet, all in place. This does not necessarily mean that the Office of Energy Emergency cannot currently meet most major energy crises. Multiple tools do exist and a team has been organized and trained to use them effectively. There are highly expert staff in all energy systems, there is much informal contact with private industry, there is a communications system connecting DOE to all field offices and states (excepting Alaska), and there is the Strategic Petroleum Reserves, now over two-thirds filled. Outside of DOE there are other valuable resources in place; for example, the NERC, private industrial resources, and an essentially effective and adaptive economy. Much of the staff feel prepared to meet foreseeable kinds of energy emergencies. There may be, therefore, some discrepancy between the formal preparedness of OEE and its effective readiness; between the development of its ideal organizational structure and its informal task-performance capabilities.

Formal Organizational Preparedness vs Actual Response Capability

Planning of the energy emergency response effort is proceeding in many areas, so that its overall level of completeness is increasing each year. However, at certain points in the response organization decisions have been made to limit precrisis planning. Considerations of external circumstances typically accompany such decisions, and these will be discussed presently. When these decisions are made, most frequently they are based on or accompanied by the belief that an effective short-term response capability can exist, or even does exist, despite an incomplete preplanned response infrastructure.

There were several reasons presented in the survey why short-term response capability might exist currently with an incomplete preplanned response infrastructure. One reason is that the crisis-management team is composed of DOE personnel with both the expertise and the authority to quickly devise appropriate procedures to complete the infrastructure as needed at the point of crisis. A set of critical resources exists and some of the procedures for their use in an energy emergency have been planned. The crisis-management team will consist of DOE and other Federal personnel with much energy system expertise and the authority of their respective offices to enforce most claims on Federal Government resources necessary for the response process. It appears that many OEE staff believe that this system expertise, combined with Federal resource-claimancy

authority, is adequate to bridge those gaps in currently planned procedures or to devise the necessary and customized procedures for a particular emergency.

A second explanation presented in the survey as to why there may be a difference between formal preparedness and actual response capability was that there are certain institutional restrictions to the development of critical aspects of the response infrastructure that in an actual crisis will cease to exist. Consequently, in the initial stages of the crisis response a more complete infrastructure may be developed. These institutional restrictions primarily involve problems in the authorization of the component parts of the response process by Federal agencies outside of OEE. Where the completion of the infrastructure is stalled through lack of authorization, plans for the *working form* of the organization can still proceed so that, at the point of crisis, all that is required is a final authorization. This seems to be the case with the mobilization effort--with the working procedures planned (FERMM), though not yet authorized.

Related to this, yet another reason given why actual response capability is greater than is apparent in terms of formal organization and preplanning, is that present overlap or conflict in fields of authority will be resolved. Certain response activities fall under the authority of multiple command lines. In other cases, out of several possible command lines it is not clear which one will be responsible for that activity in an emergency situation. Lack of clarity and its potential for institutional conflict has resulted in decisions to defer planning action until the point of crisis, when this problem of responsibility must be resolved. For example, public communications will be determined at the point of crisis when it can be determined who is responsible for it; i.e., the Office of Congressional, Intergovernmental, and Public Affairs, FEMA, or the White House.

Connected to the explanation that the planning effort had been essentially frustrated by the action or inaction of external agencies was the belief that cooperation from offices and agencies outside of OEE, and particularly outside of the Federal Government, will exist mainly at the point of crisis. Prior to an actual crisis these other agencies are characterized as believing that the effort required in emergency planning is too great compared to the probability of an emergency. It is felt that only in a crisis situation will they have the motivation, authority, and resources to commit to an energy emergency response effort. Where other agencies are reluctant to participate in this manner, OEE planners have adapted by preplanning what is possible without cooperation from these other critical agencies. Other parts of the response organization remain incomplete in anticipation that, at the point of crisis, cooperation will be forthcoming from these other agencies. With such cooperation, the infrastructure can be completed as needed and in time to fill its function as determined by the crisis-management team.

Again, a substantial planning burden is shifted to the initial crisis-response period. A prime example of this can be found with the executive reserve. Their formal organization is unevenly developed with much work needing to be done in the preparation of the important oil industry group. The cause of the current lack of formal emergency preparation with this particular group clearly lies with the unwillingness of the oil industry to cooperate with the Federal Government in an enterprise that may provide the foundation for future regulation and because of oil industry concern with conflict of interest and antitrust legislation. When an energy emergency occurs it is expected that the oil industry will cooperate and form a task force, at that time, to develop the NDER group as needed, planning its organization and function within a relatively short time (perhaps 4 days).

A variant of this reason was simply that in a crisis more resources will be available--in terms of finances, staff, and technical support--and that with these added resources the response infrastructure can then be completed. What individual OEE Office directors and division heads have been able to accomplish in the development of emergency response preparedness has been constrained by budget and staff limitations. In an energy emergency these resources will be made available and the response organization completed. We find an example of this constraint to infrastructure development in relation to communications with the states. As a result of staff limitations, the staffing of the DIALCOM system, the training of the states in how to effectively use DIALCOM in an emergency, and the monitoring of the state's reactions to an energy emergency are all to be determined and allocated at the point of crisis by the Energy Emergency Management Team--though this is not as yet a developed part of the Energy Emergency Management Plan.

There is a pattern to the kind of planning that is being deferred to the point of crisis. Communications with the states, the public, and with industry, along with the regional infrastructure (that may rely heavily on states and industry) seem to comprise the bulk of what is only partly developed. The organization of central headquarters and relations with other Federal bodies seem to be at a more advanced level of development. Most response preparedness exercises have involved headquarter's staff and have rarely involved these other state, regional, and private elements. Further work needs to be undertaken to ensure that the public response in an emergency has been adequately considered and prepared for in the public communications function.

The more that is left to prepare at the point of crisis the greater the job of the crisis management team, the more vulnerable the organization to component failures,

the greater the stress on the entire organizational structure and, hence, the greater the potential for chaos and the more the organization's responsiveness is reduced. The accumulation of decisions to determine resources and procedures at the point of crisis must be regarded cautiously.

The survey also indicated that there may be other important forms of organizational stress on the energy emergency response system which have the potential for interfering with the response process. In particular, these strains are based in the complexity of the organizational environment of the response system.

Problems Often Associated with Complex Organizations

OEE is not an isolated, autonomous organizational system but exists as a part of the Department of Energy and, further, as a part of the organization of the Federal Government. This immediate organizational environment has to some large degree determined OEE's initial form, set its organizational objectives and responsibilities, specified the nature of particular relations to elements of the larger organization, and regulated the amount of basic resources available to it mainly through the determination of its budget and the legal specification of its authority. There is a large degree of interaction between OEE, other offices within DOE, and other Federal agencies. Particular emergencies involve other Federal agencies, with their own organizational forms, and these disparate efforts need to be integrated in any emergency response. This integration is typically effected through the medium of interagency groups. International aspects of the response have to be coordinated with the IEA and its various agencies along with the response agencies of individual allies. Within OEE, there is the Office's own organization, centered on Operations, Plans and Integration, and Policy and Evaluation, each with their own divisions. These divisions are responsible for many of the organizational, human skill, technical, and physical resources necessary for the formation of an effective energy emergency response. The response itself is to be managed, most often, by a specialized project-management overlay called the Energy Emergency Management Team (EEMT). Preplanned procedures connecting the EEMT to the resources of the various OEE divisions have yet to be developed. The EEMT is not the crisis-management team for all kinds of energy emergencies, however. For COG emergencies the COG Teams will take over this function of crisis management. When and how the translation from the EEMT to the COG Team will be made has yet to be considered. The organizational background to the energy emergency response effort is therefore highly complex, as is the actual response infrastructure. This complexity itself

can be a source of serious impediments to an effective energy emergency response.

An important aspect of this complexity is that the total organization does not have a consistent single line command throughout the organization. As mentioned above, at points there are multiple command lines. Where cooperative effort is required from various Federal agencies, even from within DOE, these command lines converge, typically within an organizational overlay--such as the interagency groups or even the crisis management system itself. What happens at the point of convergence varies. Most commonly, the relative authorities of the various participating agencies are clearly defined; for example, some have claimancy authorities, some are resource managers, and some are included for liaison purposes. Within the intergovernmental groups the lead agencies are always specified, sometimes jointly--though where joint leads exist their respective authorities may not always be clear. For some kinds of emergencies more than an energy emergency may be involved, with claims made on DOE as a resource agency. In this case, patterns of authority may shift depending on the nature of the emergency-at-large.

Sometimes multiple command lines converge outside of the regulated overlay environment of the interagency groups. When this happens, and relations between the multiple command lines are not clearly specified, jurisdictional issues are likely to be raised. This is a special problem for OEE because a large number of critical response resources are the shared responsibility of various other DOE groups. In particular, the Offices of FE, CP, EIA, and PE have responsibilities which overlap those of OEE, and these different responsibilities are not always clearly separated and integrated.

With multiple command lines the commanded human, technical, and physical resources can, to some extent, be shared between the different lines. Often such sharing systems work well, such as in mature matrix organizations, but there is always the danger that the multiple command lines may turn to active competition with one another. Fending off competition can become a significant activity of a potentially threatened command line, and this may have contributed to the demise of the public communications program in the Office of International Affairs and Energy Emergencies as it came into conflict with CP and the General Office.

Another problem with such complex organization has to do with the breakdown of organization design under stress due to confusion in the command lines under exceptional circumstances.[1] This is particularly likely when command procedures for such circumstances are latent rather than clearly articulated beforehand. Time lags in critical strands of the operational process can develop, crippling the entire organization's effort. The multiplication of organizational tasks that are to be determined at the point of

crisis, the currently incomplete regional infrastructure, and the unsanctioned status of key procedural plans suggest that the possibility of this kind of problem needs to be considered further. That it has been a problem for other complex organizations in the past is important and relevant to the organization of energy emergency preparedness.[2]

One possible consequence of multiple command lines is a tendency for decisions to be delayed for clearance at some other level or from another command line. Sometimes differences of opinion are not easily resolved because the authority to resolve them is dispersed, sometimes confusedly, or located at some larger distance up the command chain. OEE requests to the oil industry for introspective vulnerability assessments, for example, must be cleared by the Office of the Assistant Secretary for Fossil Energy, which has its own set of procedures that must be added to the entire request process. The OEE mobilization effort needs much of its work cleared by the Office of Policy, Planning and Analysis, and by the General Counsel. This delay in clearance appears to have affected the development schedule for that program. To the extent that these are continuing problems, they can only be met through the intervention or the redelegation of responsibilities by the Office of the Secretary.

When the organization is complex and much work is devoted to specifying detailed procedures connecting its various parts, some large amount of time is often devoted to process-review.[3] Organizational effort is spent on testing procedures, such as in group exercises. The various OEE exercises have provided an opportunity for the training of the Energy Emergency Management Team to ensure that the staff is sufficiently skilled and work well together. Certain response procedures, typically connected with the stock drawdown and at times within the framework of a coordinated international response, have been tested. But, on several occasions key staff members noted that their divisions had restricted time to work on implementation of plans for response preparedness because they had been occupied in some of the many office exercises. Consequently, they had fallen behind on their implementation schedule. Where staff is limited, exercise-connected tasks can impose an added burden that simply defers the attainment of more primary goals.

Resource Limitations to the Development of an Effective Response Program

As with any government agency, there is a budget restraint to actions generated to meet office objectives. Planning frameworks are formulated, a project organization developed, and suboffice goals set. But they are often contingent on continuing or new funds that are never consistently available. Agency effort has to be adaptable to such financial exigencies and such adaptability, at times, has a cost in sacrificed plans, reduced staffing, and shifting organization. The energy emergency preparedness effort has been subjected to variable funding and has been adaptable, but has paid a cost for this effort.

Budget constraints have had several critical effects on the development of the emergency response program. Due to budget limitations, various individual projects are not on schedules developed as recently as early 1987. Plans, such as for a task force approach to Continuity in Government, have been abandoned. Critical programs have been left to single individuals or, worse, individuals who can only work on them on a part-time basis. The SPR fill rate for 1988 was reduced to approximately 50,000 barrels per day due to Federal budget cutting; the procedural task force for the EEMS effort is currently stalled due to the lack of commitment of funds. The State Liaison effort, requiring some constant contact with all states, the determination of their contingency planning, the development of coordination between their response activities, regional seminars, training in the use of DIALCOM, contact with professional bodies of government employees and private professional groups on a state and regional basis, is handled by one person. This person is also a division director and has administrative and division planning responsibilities, responsibilities to participate in exercises, and work cooperatively with other groups. The Continuity of Government program has two people; one person is working on EPGER, now divided into natural gas and petroleum sections, and one on both ESFER and EEPER. The public communications function within OEE is handled, when time is available or as necessary, by the Public Affairs Officer to the Assistant Secretary for International Affairs and Energy Emergencies. With such limited staffing there is little possibility that these individual programs can be developed efficiently and quickly. Partial successes have been had but various preparedness efforts are still essentially at early stages of development and are not likely to be completed within the near future.

Federalist vs Laissez-faire Ideologies

There is another issue that has to do with crisis management ideology but this one is expressed at a political level. A most glaring potential for inconsistency exists for energy emergency management in the application of administration federalist and laissez-faire ideologies. Laissez-faire is the backbone of the Cornerstone policy, emphasizing the free market as the most effective instrument to adapt to an energy disruption and minimize its economic impacts. Federalism is being used to specify the Federal role in an emergency as one of promoting state coordination and providing technical support to the states' response efforts. The states have their own administrations that need not have a commitment to the laissez-faire philosophy. We do not know the states' current plans for responding to an energy emergency but it seems possible that many states still have demand restraint and supply regulation procedures available to them that were developed for previous energy crises. These interventional procedures, if applied, must interfere with the laissez-faire objectives at the Federal level. In an energy emergency Federal plans would not preempt those of the states unless state programs are shown to interfere with interstate commerce.

The state liaison mission in the Operations Office seems to work within the framework of the administration's federalist ideologies while the Planning Office is depending on an environment of laissez-faire. The state liaison mission is anticipating that in an actual crisis the states will approach DOE for information and guidance through their Congressional Representatives and through the DIALCOM system. With this information, the ideal scenario is one in which the states will be reassured that the crisis-management system is operating and will be effective without their needing to institute demand restraint measures. Such measures can then be used only when the EEMT decides they might enhance the response effort. Consequently, the state response will be coordinated with the Federal effort and there will be no conflict in administration ideologies. Much depends on the effectiveness of this information system, it's use in a crisis, and upon the credibility of DOE to respond effectively to an energy emergency. This increases the burden on the public communications function to assure state residents that governmental authorities are responding quickly and effectively, thereby relieving pressure on State Governors to undertake their own independent action.

The introduction of demand restraint measures by a solitary state may have important consequences on the supply situation in surrounding states, forcing them to consider similar measures. This may be the case if the demand restraint measures involve some form of regulated gasoline distribution and if some critical portion of the

population of the state is distributed within relatively easy access to state borders. This is a concern of the State Liaison Mission and may lead to what was referred to in Chapter 3 as a migratory crisis. Such a migratory crisis was seen as contributing significantly to the emergency in 1973. Current plans to deal with this issue are to approach the states, discuss emergency procedures with them, and suggest that they coordinate their response activities, especially involving demand restraint measures, in the event of a crisis. This plan to raise the issue with the states is only now being implemented through the newly started regional seminar program of the State Liaison Mission.

The laissez-faire policy is currently also in conflict with effective national security emergency planning, and the National Security Emergency Preparedness (NSEP) directives of the National Security Council (NSC). There is a range of emergencies that may require a major response within a timeframe that precludes reliance on the free market. These emergencies involve mobilization and COG. That the Federal Government may be required to intervene in the market, with some measure of regulation, must be accepted as evident. The need to plan for this regulation has been clearly articulated in numerous NSDD orders. Genuine comprehensive planning for mobilization and COG emergencies must include the planning of regulation mechanisms and procedures, and these need to be officially accepted and placed within the existing response structure. An OEE plan for a graduated introduction of procedures meant to enhance market responsiveness to an NSEP crisis, restricted to priority products and services, does exist currently in working form. This is the FERMM. But, FERMM is presently officially unsanctioned due to conflicts with the Administration's laissez-faire policy as perceived by personnel in the Office of General Counsel and Policy, Planning and Analysis. Other departments with NSEP responsibilities, such as DOD, DOC, and DOT, have their mobilization plans officially recognized and in place with no conflict between administration laissez-faire policy and the need for regulation of priority products and services. Only the Department of Energy has failed to endorse such procedures. This impasse needs to be resolved as soon as possible.

Regionality

There are 5 PADD regions, which are used as the current basis of the oil industry NDER regional organization, 5 natural gas NDER regions, 9 EEPER regions, 5 ESFER regions, working plans for 6-7 DIALCOM mailing regions, 10 FEMA regions, and Hawaii and Alaska which seem to be consistently outside any regional organization. The EEMS

is supposed to eventually have a regional organization as well, possibly based on the DOE regional office structure. Then there are the states and Federal territories that have to be integrated into the response organization. Most of these regions have been defined with sound reasoning. Typically, they have boundaries related to energy systems. When the response organization is dependent on existing system regional structures, such as is the case with EEPER and its reliance on NERC, it is natural to take over the regional boundaries of these systems' structures.

However, this regional complexity may introduce management problems that have yet to be adequately addressed. The kind of emergency under which the National Defense Executive Reserve is likely to be activated is one in which all units are activated simultaneously, i.e., wartime scenarios or massive earthquakes. Only with system specific multisite sabotage is it likely that an individual NDER unit would be activated. The regional response to an energy emergency in such situations is expected to be effected with major support from the NDER units. Many kinds of emergency responses, then, will see the activation of all or most regional structures and these are rarely coextensive or complementary.

One of the main functions of the Federal energy emergency response system will be to collect and disseminate information and to coordinate the activities of this complex organization, extending into the states. The collection of energy supply data by the states has been actively discouraged. The collection agencies are EIA and the American Petroleum Institute (API), with the API assuming more of this role. The reliability of this state-based data has been questioned. Consequently, EIA is currently unprepared to provide the information that might be required by all these different response regions. Its focus has been on national energy data analysis. Eventually, EIA would be able to provide such regional data but the complexity of the information needs in an emergency where the regional organization is critical may easily lead to a prolonged system overload. This problem will be exacerbated in a COG emergency when EIA will be microcomputer dependent. Only now is EIA beginning to address the need for programs to provide regional information.

SPR Problems

The economic issues in the determination of potential problems with the SPR are complex, and the general discussion of them in Chapter 4 was simply meant to demonstrate that they need to be considered further. The Strategic Petroleum Reserve is the flagship of the energy emergency preparedness enterprise and may have assumed

something of a sacrosanct position in the thinking of response planners. It has received the great bulk of attention but may not be without potential flaws. What the effect of the SPR will be in a crisis is speculative. These speculations range from attributing the SPR with major positive consequences regardless of whether it is drawndown or not, to major concerns that its ability to meet its objectives has been reduced. Complications arise from the fact that the market for oil has changed dramatically since the time when the SPR was conceived. Key elements in this change have to do with the increased size of the spot market and the development of a futures market.

When the Strategic Petroleum Reserves was first conceived oil was sold through long-term contracts and prices were typically set by the producing countries. Now, approximately 50 percent of oil sold is done so on the spot market. To instill some longer-term stability into the trading of oil the forward and futures markets have also developed. Combined, these markets have added more complexity to oil trading than was the case 10 years ago. It is now unclear whether the SPR can fulfill its objective of moderating the impact of an oil disruption on oil prices and, through oil prices, on the economy as a whole. Much of the trading takes place electronically and oil lots may change hands many times before they reach their ultimate destination. Spot and futures market transactions are often speculative in nature and speculative buying has an impact on price behavior. The focus of the speculation is the anticipated nature of the market at some future date. In a crisis situation speculation may force prices higher in anticipation that supplies will be scarce. In the futures market there is a daily price-increase ceiling, but in the spot market a dramatic price increase can happen in a very short time period. Speculative bidding can be initiated on the strength of rumor or only partially substantiated evidence--evidence that will be insufficient to activate the Energy Emergency Management System. If the crisis is real, by the time EEMS is activated, the emergency situation is analyzed, the emergency is declared, and the drawdown is announced--all of which may take days depending on the emergency-- activity in the spot and futures markets may have already increased oil prices to a level with the kind of serious impact on the economy that the SPR was designed to avoid.

Speculation-induced price increases in the spot and futures markets may affect financial markets, especially as there is some evidence suggesting that bond-market activity is being tied directly to oil prices. Instead of a drawn-out panic, evolving slowly and centered on gas station lines, panic in future oil crises may center on the financial markets. The economic consequences may be felt more immediately and be harder to mitigate. If the crisis shifts to a general economic crisis the effects of the eventual draw-down of SPR stocks, even though it may be announced quickly after the onset of

financial panic, may be marginal.

How the drawdown will be interpreted by both the oil industry and by the general public is also open to question. The planner's intention seems to be to provide oil buyers continuity in supplies in the short-run, providing them with the opportunity to find alternative supplies, or for the Government to act diplomatically and otherwise to remove the disruption. The drawdown is meant to assure industry and the public that action is being taken to minimize the disruption and contain its effects on the economy and Nation. However, the oil industry has its own sources of information and its own analytic capability, and its assessment of the situation may differ from that of the Government. Consequently, oil industry use of the SPR may differ from what is intended by SPR policy planners. Oil company hoarding is a real possibility. If, on the basis of their own information, the oil industry is panicked by its assessment of the situation, SPR may have little effect on prices as company hoarding takes place, increasing demand and driving prices higher.

Not all recent speculation about the use of SPR in an energy emergency is this pessimistic. Further advantages are also being considered. It is evident from the survey that not everyone believes that the stockdraw is inevitable in an oil supply energy emergency. There is an argument that the SPR may still have an effect without being drawndown by reducing oil company incentives for hoarding. As long as the reserves exist they are in effect a low-cost substitute for private inventories and there is less need for private companies to build their inventories at the point of crisis by hoarding. With the SPR, then, oil company hoarding may be reduced significantly below what it would be without SPR, and this may be a major contribution to mitigating the effects of an oil supply disruption on oil prices and the economy. SPR might have this positive effect without actually being drawndown.

Some feel that if DOE was inexorably committed to the stockdraw, procedures would be automated through the use of options. This would guarantee that the stockdraw would happen, may mute speculative buying, and would reduce the drawdown time considerably.

Energy Sharing System

While the United States is championing strategic reserves and the use of stockdraw to meet shortfall emergencies, European allies have been committed to demand restraint strategies. This situation has been slowly changing and West Germany, in particular, has been developing its own stockpiles. The Coordinated Drawdown is the major element of the CERM system of programs. But CERM is not the central strategy in

meeting an energy emergency as far as the IEA is concerned. There the ESS is in the central position. The ESS operates basically on in-transit supplies through a system which allocates specific rights and obligations to IEA members. Countries that are defined to have allocation rights will be supplied with products originally destined to countries with allocation obligations. The general expectation is that the United States will have large allocation obligations and the allies may be expecting that this will be a major source of help in an emergency. The International Energy Security division in OEE and other energy analysts are satisfied that this will not be the case and that the United States will have *allocation rights*--a claim on the in-transit supplies of other nations. Some of these other nations disbelieve this prediction. The International Energy Security division is making an effort to offer the models used to predict allocations rights and obligations in an emergency situation to all nations concerned, so that false expectations will be eliminated. When this is the case, perhaps IEA emphasis will shift from the ESS to CERM, which is favored by the United States. Currently, however, it seems that the program for the international response to an energy emergency is based on a false premise held by foreign governments. If the current situation with regard to this persists it will take an energy emergency to prove it otherwise and may mean delays in a unified coordinated emergency response. Though U.S. policy for a coordinated response is in place, it is not clear that the actual response will be coordinated or will have any independent effect in the resolution of an emergency.

Public Communications

For economic stabilization, the intent of a response program is to maintain the economy's functioning at a normal level or at least to minimize disruption and ensure a smooth and efficient market-determined adjustment to a new supply situation. Public behavior can undermine this general objective if panic becomes widespread and hoarding takes place, increasing demand and putting immediate pressures on the pricing and distribution system. The process by which panic develops and spreads is not a simple nor necessarily a consistent one and it may have become more complex for energy emergency planning purposes since the last oil crisis. In 1973 the crisis was announced by the Saudi government on October 19 but the gas lines did not start until December 1973, and January 1974. The American public did not panic until they were asked or forced to drastically modify their energy-consuming behavior. Announcing a need for major behavior restriction at the point of crisis has not been a successful public communications strategy. Now, the public has had some experience with energy crises, of a

real and simply anticipated kind, and they are familiar with fluctuations in oil prices. We have no idea how these experiences may have modified the responses of the public to another crisis.

Importantly, irrational panic is not a required ingredient in a public response for the economic stabilization objective to be thwarted. Human reasoning may be quite sufficient, as what might appear to be prudent caution leads to various forms of hoarding.

Of equal concern is an industry tendency to hoard. Industry panic and hoarding may have a different form and timing than the public reaction and may be complicated by the spot and futures markets. We have to be concerned with the possibility that a financial panic will follow the announcement of the next crisis. Rather than gas lines, the stock market may be the scene of the next panic reaction to a major energy supply disruption.

Repeatedly, the human response is seen to be a critical variable influencing the success of **any** emergency response program. It has been taken for granted. Simple information at the point of the crisis situation, at the same time as the announcement of a national energy emergency by the President, is treated as if it will allay all fears, stop panic, and deter hoarding activity. The information is to be released at that time by some public affairs office, probably in FEMA or in the White House. The success of any program aimed at meeting economic stability objectives is dependent on this expectation being the correct one. But there is no evidence that this will be the case. Indeed, evidence would seem to suggest otherwise.

There has been little planning of public communications for an energy emergency and the efforts that do exist appear to need more support and coordination. Public action is a critical variable and it can become a major tool. The conservation efforts of the public in the past decade have dramatically reduced the Nation's energy vulnerability. With the right preparation the public can be a major and useful force within a total response strategy. But they will need some preparation beforehand. For example, they have to know what the SPR is, how it can be used, how it will affect them, and what they should be doing to ensure its success before any crisis hits. The public can be educated about different demand restraint measures and when these are appropriate or inappropriate. More work needs to be done in identifying the important elements in industry and the economy that need special information. Parties other than those attending OEE seminars are bidding in the futures market and some means has to be worked out to deal with them.

The Government does not have a monopoly on information. At the point of crisis, public communications efforts may be in competition with other influences on public opinion. Industry may have its own sources which need not always be in agreement with Government assessments. The public media may not communicate the calm and reassurance of the Government message that may be intended. Limitations to an effective public communications effort do exist as limitations to the effectiveness of all response programs exist. The nature of these limitations can only become clear as part of the planning effort for a public communications program which would then seek to ameliorate them. This may be a challenge, but it is important that it be faced.

Conclusion

Key personnel involved with the development of energy emergency response preparedness have consistently expressed the view that within the past 2 years the Office of Energy Emergencies has made great strides in realizing its objectives. The staff of OEE contains much system expertise and have been trained to work well as a crisis-management team. The general capacity to respond to most forms of energy emergencies exists. But, there is some discrepancy between this general capacity and the development of the formal organizational infrastructure. That infrastructure is still in the process of development but progress is being made. The Energy Emergency Management Plan, including the design and preparation of the Energy Emergency Management Team, is approaching an advanced stage and, this coming year, planning of the specific procedures connecting the EEMT to the various component programs and efforts developed within the different OEE Divisions may be completed.

A general survey of energy emergency response preparedness has encountered various aspects of this effort that may need further enhancement, reconsideration, or conciliation. Often, the source of such problems seems to lie outside of OEE and are of a kind that OEE may have little ability to influence. These problems have to do with limited staff resources; conflicts in command-line jurisdictions involving agencies outside of IE; difficulties in getting clearances from other agencies where jurisdictions overlap; conflicts in the use of Administration laissez-faire policy, federalism, and the need for actual Government regulation of energy resources; the lack of cooperation from critical sectors in industry; and differences in strategy for energy emergency response between the United States and European allies, compounded with misunderstandings among the allies about how a key program (ESS) would operate.

Within OEE there are specific potential problems. These have to do with decisions regarding what needs to be preplanned and what should be left to the actual point of crisis; an incomplete regional infrastructure--which in some cases appears to be totally lacking; the current limited ability to provide analytical support to the numerous regional groups (though this is more a problem for EIA); and the strategic issue of the impact of shifts in the oil market and, in particular, the development of the spot and futures markets on the ability of the SPR to meet its stated objectives.

The most pressing concerns appear to be the stalling of the mobilization effort, the incomplete regional infrastructure, and the lack of development of public communications, in particular its dynamic outreach function of preparing various audiences to play their part in meeting an energy emergency response.

Notes for Chapter 7

1. Stanley Davis, and Paul Lawrence, "Problems with Matrix Organizations", *Harvard Business Review*, vol. 56, no. 3, May-June, 1978, pp. 131- 142.
2. When the infrastructure for energy emergency preparedness is more advanced the nature of critical operational lags might be investigated with an activity network analysis, as suggested by the Aerospace Corporation in its work on the EEMT. The Aerospace Corporation, *Energy Emergency Management Plan: Preliminary Draft Report*, April, 1987, p. 24.
3. Chris Argyris, "Today's Problems with Tomorrow's Organizations," *Journal of Management Studies*, February 1967, pp.34-40.

List of Acronyms Used in This Report

AO	Allocation Obligations under ESS
AR	Allocation Rights under ESS
AS/IE	Assistant Secretary International Affairs and Energy Emergencies
AS/NE	Assistant Secretary of Nuclear Energy
CE	Office of the Assistant Secretary for Conservation and Renewable Energy
CP	Office of the Assistant Secretary for Congressional, Intergovernmental, and Public Affairs
DESR	Daily Energy Situation Report
DEO	Director of Emergency Operations
DLC	DOE Laboratory Council
DPA	Defense Production Act
DPS	Database and Projections Subgroup (IG-EV; DOE)
ECAR	East Central Area Reliability Coordination Agreement (EEPER District)
EECA	Emergency Energy Conservation Act
EEMS	Energy Emergency Management System
EEMT	Energy Emergency Management Team
EEPER	Emergency Electric Power Executive Reserve (NDER)
EIA	Energy Information Administration
EM	IEA Emergency Management Manual
EMPB	Emergency Mobilization Preparedness Board
ESR	Energy Situation Report
EOC	Emergency Operations Center
EPGER	Emergency Petroleum and Natural Gas Reserve (NDER)
ERCOT	Electric Reliability Council of Texas (EEPER District)
ESFER	Emergency Solid Fuels Executive Reserve (NDER)
ESS	IEA Emergency Sharing System
EVAS	Energy Vulnerability Assessment Subgroup (IG-EV; DOE/DOD)
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FERMM	Federal Energy Resource Management Manual
GC	General Counsel
IE	Office of the Assistant Secretary for International

	Affairs and Energy Emergencies
IEA	International Energy Agency
IEP	International Energy Program
IG-CD	Interagency Group on Civil Defense
IG-EV	Interagency Group on Energy Vulnerability
IG-NM	Interagency Group on National Mobilization
JOS	Joint Operational Staff (NWOO)
LNG	Liquid Natural Gas
MAAC	Mid-Atlantic Area Council (EEPER District)
MAIN	Mid-America Interpool Network (EEPER District)
MAPP	Mid Continental Area Power Pool (EEPER District)
MUR	Major Utility Representative (EEPER)
NCC	National Coal Council
NDER	National Defense Executive Reserve
NE	Office of the Assistant Secretary for Nuclear Energy
NESC	National Electric Security Committee
NOB	National Oil Board (NWOO)
NOEB	NATO Oil Executive Board (NWOO)
NPC	National Petroleum Council
NPCC	NorthEast Power Coordinating Council (EEPER District)
NSEP	National Security Energy Preparedness
NWOO	NATO Wartime Oil Organization
OECD	Organization for Economic Cooperation and Development
OEE	Office of Energy Emergencies
OPEC	Organization of Petroleum Exporting Countries
PADD	Petroleum Administration for Defense District
RDS	Response Development Subgroup (IG-EV; DOE/State)
RMT	Regional Management Teams (EEPER)
SERC	South Eastern Electric Reliability Council (EEPER District)
SIG-NSEP	Senior Interagency Group for National Security Emergency Preparedness
SPP	SouthWest Power Pool (EEPER District)
SPRO	Strategic Petroleum Reserve Office
WOC	Without Compensation (NDER status)
WSCC	Western Systems Coordinating Council (EEPER District)

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