

RISK PERCEPTION AND WORST-CASE
CONTINGENCY PLANNING: AN
EXAMINATION OF EMERGENCY
RESPONSE INSIDERS
WITHIN A MAJOR
METROPOLITAN
AREA

By

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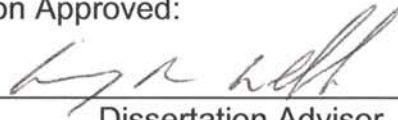
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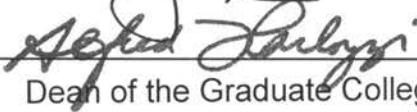
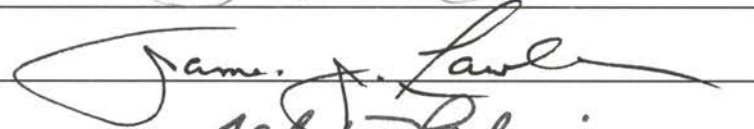
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RISK PERCEPTION AND WORST-CASE CONTINGENCY PLANNING: AN EXAMINATION OF EMERGENCY RESPONSE INSIDERS WITHIN A MAJOR METROPOLITAN AREA**CHAPTER 1: BACKGROUND AND INTRODUCTION**

Bulk quantities of flammable and toxic industrial chemicals are found at manufacturing, processing, storage and transportation facilities across the United States, in many cases co-located with residential populations. Each such facility presents risk to offsite populations as a function of the inherent threats of the materials present and the various engineering and administrative controls in place to reduce that risk. Recent analysis by the United States Environmental Protection Agency (USEPA) found that least 123 U.S. facilities each keep amounts of toxic chemicals onsite that, if released, would endanger more than 1 million people (Pianin 2002). In its own review, the Office of the Army Surgeon General concluded that as many as 2.4 million people could be killed or injured in a terrorist attack against a U.S. toxic chemical facility in a densely populated area (Pianin 2002). Such threats are amplified by the perception of disasters as rare, unexpected events, even with 60,000 chemical accidents reported in the United States each year (Environment News Service 1999).

Current disaster and emergency management (DEM) programs differ from traditional long-term environmental assessment and remediation programs in that DEM focuses on planning for acute, relatively rare, catastrophic events unfolding at unexpected times under uncontrolled conditions, often involving direct threats to human health and welfare. In such an environment, functionality takes the lead, particularly when constrained by limited resources or the simple reality of being unable to intercede effectively once an event occurs. A classic example is

planning or attempting to evacuate large areas following chemical releases when the likely reality is that the expectation of successfully moving tens or hundreds of thousands of people under emergency conditions is optimistic at best. Further adding to the problem is limited or no warning time, as the agent of concern will almost certainly have dispersed over the receiving area before response action can even be initiated. Classic DEM approaches follow no strict protocols, are dominated by military and fire service command and control models (Drabek 1991) and focus on response, not prevention. Such an approach is protective only of general populations, not specific individuals. However, with the drivers of urgency and efficiency, these limitations remain standard design criteria and are simply incorporated into contingency plans. Thus as a practical matter even in the best of situations, the result is that only most of the people within an affected area are protected most of the time, hardly comforting to anyone.

As the basis of all emergency planning and response activities, it is critical that the facility contingency plan accurately identify, assess and communicate risks, and this responsibility falls in large part to the facility personnel developing the plan. However, intentionally or not, organizations tend to underestimate risk. Ignoring the possibility of disaster, paying attention to nuisance problems, neglecting complaints and ignoring warning signs ultimately leads to many disasters (Turner 1976) while a “disqualification heuristic” leads organizations to misperceive risk and assign inadequate risk factors by disregarding unlikely events when framing scenarios (Clarke 1993). Thus, the paradox of reliance on organizations to prevent or adequately respond to incidents since they base

planning and expectations of success on limited past experience and institutionalize the plans and confidence that follows (Clarke and Short 1993). Such “fantasy documents” (p. 1040) reflect ideal conditions and unrealistic expectations, serving to convince audiences that experts have considered every contingency (Clarke and Perrow 1996). As a result, misplaced confidence and decreased vigilance puts all components of society at risk.

Statement of the Problem

A fundamental tenet of emergency response is preservation of life first, property and the environment second. Response agencies and adjacent populations base risk perception, and thus preparation, almost entirely on published contingency plans that typically reflect only direct loss experience and subjective probability ranking. Such plans may not consider potentially catastrophic events and offsite consequences requiring immediate and effective response for fire, medical and evacuation services. The problem, therefore, is that contingency plans that underestimate risk and do not accurately depict worst-case scenarios significantly increase vulnerability and risk for facility, response and offsite personnel.

Purpose of the Study

“Insiders” as referenced in this research include facility Environmental, Health and Safety Managers, State and Federal On-Scene Coordinators and Local Emergency Responders, and it is within this group that risk from the participant facilities is identified, debated and eventually defined and addressed. This study will attempt to address two specific research questions. First, how do insiders

perceive risk and define worst-case scenarios? Second, how does risk perception drive contingency planning? These questions are critical because insiders who perceive risk as low or who disqualify potential worst-case scenarios from consideration may be more likely to develop contingency plans not sufficiently protective of affected populations and facilities. The effect is exacerbated by the use of facility plans by Local Emergency Responders as the foundation for developing Area Contingency Plans, which represent planning and response resources committed across a larger area or region. This research may prove useful to facility Environmental, Health and Safety Managers, emergency responders, regulatory agencies and potentially affected populations since for each of these groups it is critical that contingency plans address realistic worst-case scenarios to properly allocate resources and prevent or safely manage incidents.

Theoretical Frame

The focus of this research is on insider risk perception and how those perceptions drive contingency planning. While the researcher neither finds nor proposes a single theory that universally explains the tendency of organizations to underestimate risk and embrace contingency plans as the ultimate management tool, Clarke's (1993) disqualification heuristic is a key contributor. When risk perception does not reflect scientifically assessed risk, decision-makers can protect themselves from seriously considering the likelihood of disasters, preserving resources by constructing outcomes that avoid extensive response preparedness. Underestimating or disqualifying risk simplifies the

process of controlling it, making “adequate” planning and preparedness a near-certainty. As contingency plans are institutionalized, confidence in the ability to manage all hazards with minimal cost and effort grows, perpetuating the myths of low risk and emergency preparedness.

CHAPTER 2: REGULATORY BACKGROUND

Introduction

There are myriad regulations related to activities conducted at the participant facilities. The purpose of this regulatory review is to provide context and background information on current or pending Federal programs and requirements relevant to the proposed research. Local or State revisions or additions are not addressed for two reasons. First, those standards are outside the scope of this study and, secondly, such an analysis would potentially reveal the setting of the research, violating a confidentiality protection offered to each participant. Not intended to be an exhaustive review of every applicable standard, this review groups regulatory controls of chemical facilities into six major programs which fairly reflect activities related to the scope of this study: *Occupational Safety, Waste Management, Hazardous Material Transportation, Pollution Prevention, Community Emergency Planning, Emergency Response and Security*, concluding with *Summary of Regulatory Review*, which briefly summarizes and relates weaknesses in the current structure to the research.

Occupational Safety

Three relevant occupational safety programs are Hazard Communication (HazCom), Hazardous Waste Operations and Emergency Response (HAZWOPER) and Process Safety Management of Highly Hazardous Chemicals (PSM). As a group, these standards address identification, control and communication of hazards in the workplace. Each requires extensive training and record keeping for employees and contractors as well as documentation of

safe work practices, process and chemical information and detailed procedures to be followed in the event of response to an emergency (Occupational Safety and Health Administration 2002). None of these standards are concerned with offsite activities or impacts with the exception of HAZWOPER, which addresses emergency response activities conducted by response Teams in various locations, such as a HazMat Team covering an entire city. However, even in those situations, the standard pertains only to safety of the response Team, not the public.

Waste Management

Waste management is addressed under the Resource Conservation and Recovery Act (RCRA), which gives the USEPA authority to control the generation, transportation, treatment, storage and disposal of hazardous and nonhazardous waste as well as underground tanks storing petroleum and other hazardous substances. Covered facilities must prepare and implement a written emergency contingency plan that includes design and operation parameters, minimizing potential releases, emergency operations, evacuation plans and arrangements with local authorities (United States Environmental Protection Agency 2002c).

Hazardous Material Transportation

Transportation of hazardous materials, including hazardous waste, is addressed through United States Department of Transportation (USDOT) regulations, which cover all aspects of commercial hazardous material shipment including classification of materials, placarding, packaging performance, shipping papers

(manifests) and registration and training of drivers and other “hazmat” employees. Functions are consolidated into five categories: regulatory development; enforcement; training and information dissemination; domestic and international standards; and inter-agency cooperative activities (United States Department of Transportation 2002).

Pollution Prevention

Pollution prevention is addressed under the Oil Pollution Act (OPA), Spill Prevention, Control and Countermeasures (SPCC), and Clean Water Act (CWA) programs. OPA and SPCC specifically address storage of petroleum products at locations potentially affecting navigable (inland) and coastal waters and require facilities to develop written plans for petroleum management and to implement spill prevention, containment and other countermeasures (United States Environmental Protection Agency 2001b and 2001d). The CWA authorizes each of these programs and additionally sets allowable pollutant concentration limits for ambient waters (United States Environmental Protection Agency 2001e).

Community Emergency Planning

Community emergency planning is addressed through the Emergency Planning and Community Right-to-Know Act (EPCRA). EPCRA is intended to provide local community access to information about chemical hazards and to improve state and local emergency response capabilities through four main objectives: local emergency response planning efforts; improved emergency notification in the event of a release of hazardous chemicals; hazardous chemical inventory reporting; and development of baseline data on chemical releases into the

environment (United States Environmental Protection Agency 2001c). To implement EPCRA, Congress required each state to appoint a State Emergency Response Commission (SERC), develop Emergency Planning Districts and to name a Local Emergency Planning Committee (LEPC) for each district (United States Environmental Protection Agency 2004). The goal of the LEPC is to develop broad representation by firefighters, health officials, government and media representatives, community groups, industrial facilities and emergency managers to ensure that all necessary elements of the planning and response process are represented. All information submitted pursuant to EPCRA regulations is publicly accessible unless protected by an approved trade secret claim.

The Risk Management Program (RMP) is built upon existing industry codes and standards, requiring approximately 15,000 facilities of all sizes that use or store certain flammable or toxic substances at or above threshold quantities to develop a Risk Management Plan (United States Environmental Protection Agency 2001a), and is the only regulatory program to evaluate potential off-site consequences and “worst-case scenarios.” The plan must include a(n): hazard assessment; accident history; evaluation of worst-case and alternative releases; prevention program that includes safety precautions and maintenance, monitoring, and training; and an emergency response program (United States Environmental Protection Agency 1999). Two unique components of the RMP are the analysis of the specified worst-case scenario (WCS) and projection of offsite consequences and affected receptors through an Offsite

Consequence Analysis (OCA). Such information aids local fire, police and emergency response personnel who must prepare for and respond to chemical accidents, and is useful to citizens in understanding the chemical hazards in communities. The USEPA originally anticipated that making the plans available to the public would stimulate communication between industry and the public to improve accident prevention and emergency response practices at the local level. However, since the terrorist attacks of September 11, 2001, public access to these and other planning and consequence documents has been severely restricted. Effectiveness of Risk Management Plans is further handicapped by the use of generic receptor population estimates and generalized modeling using exposure guidelines such as Emergency Response Planning Guidelines (ERPGs). Though highly regarded by response agencies, these guidelines are not based on acute exposure studies, are protective only of “most individuals in the general population” and do not contain the safety factors normally incorporated into exposure guidelines (United States Department of Energy 1998). This leads to Offsite Consequence Analysis mapping of chemical plumes based on many standardized assumptions with no way to quantify effects or receptors.

Federal Emergency Management Agency (FEMA) and National Response Team (NRT) publications are limited in scope and address general industry, business and/or state and local planning agencies. They offer only basic reviews of regulatory programs and general information on vulnerability analysis, incident preparedness, hazard assessment, response coordination, recovery operations,

business maintenance, damage assessments and agency roles (Federal Emergency Management Agency n.d. and 2001; National Response Team 2001).

Emergency Response

Emergency response by federal agencies to hazardous substance releases is addressed under the National Contingency Plan (NCP) and the Comprehensive Environmental Response and Cleanup Liability Act (CERCLA). The NCP is the federal government's blueprint for responding to oil and hazardous substance releases (United States Environmental Protection Agency 2002b) and is authorized by the CWA and CERCLA. CERCLA, commonly known as Superfund, provides broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. Two kinds of response actions are authorized: short-term removals, including emergencies, where actions may be taken to address releases or threatened releases requiring prompt response; and long-term remedial response actions to reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening (United States Environmental Protection Agency 2002a).

Security

American Chemistry Council (ACC) documents are designed to assist member facilities in assessing, improving and preserving security of facility property, records, personnel and electronic systems through the use of audits, training,

surveillance, drug and alcohol testing, access control, hiring practices, weapons and behavior policies, crisis management and threat awareness and assessment (American Chemistry Council 2002a). The ACC *Security Code of Management Practices* is a Responsible Care® initiative intended to enhance security. In June 2002, adoption of this code became mandatory for all ACC members. It addresses: management practices; analysis of threats, vulnerability and consequences; implementation of security measures; information and cyber-security; documentation; training, drills and guidance; communication; response to security threats and incidents; audits; third-party verification; management of change; and continuous improvement (American Chemistry Council 2002b).

The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 addresses preparation for and response to intentional acts of bioterrorism and applies specifically to potable water treatment systems. Community systems serving greater than 3,300 persons must: conduct a vulnerability assessment; certify and submit a copy of the assessment to the USEPA Administrator on a size-weighted schedule, with larger systems due first; prepare or revise an emergency response plan incorporating the results of the vulnerability assessment; and certify to the USEPA Administrator that the system has completed or updated their emergency response plan (United States Environmental Protection Agency 2003). The program is completely oriented toward physical, electronic and administrative security measures and includes no input or review outside of the specific individuals preparing the assessment and plan.

The Sandia Laboratories/Department of Justice (DOJ) *Chemical Facility Vulnerability Assessment Methodology* (CFVAM) is a security assessment tool that provides vulnerability information and incorporates response measures to mitigate the consequences of a successful attack. The 13-step process provides a screening procedure for chemical facilities to identify critical areas that are of greatest concern with respect to a potential off-site release due to an attack. The effectiveness of protection systems is evaluated and relative risk estimated as a function of the severity of consequences of an undesired event, the adversary attack potential and the likelihood of adversary success in causing the undesired event. If the risks are deemed unacceptably high, recommendations can be developed for measures to reduce them (United States Department of Justice 2002). This methodology is the current elective standard for chemical facility self-assessment; however vulnerability assessments being performed by chemical facilities and water treatment systems are restricted from public input or access and will be reviewed only on demand by the United States Department of Homeland Security (DHS) (InsideEPA 2003).

The Chemical Security Act of 2001 (CSA), S.1602, would designate high priority facilities based on specific processes and chemicals and require them to take immediate measures to prevent releases caused by criminal acts. Specified measures include: reduced usage and storage of chemicals; process modifications; implementation of inherently safe processes; and improved mitigation, response and security (Corzine et al. 2001). This bill was reintroduced on 1/14/2003 as "S.157: A bill to help protect the public against the

threat of chemical attacks,” and is now referred to as the Chemical Security Act of 2003. The scope and intent of the original bill remains intact, and the status is: Read twice and referred to the Committee on Environment and Public Works (Corzine et al. 2003).

The movement of most emergency planning, incident management and recovery functions into the Department of Homeland Security is underway with authorization by Homeland Security Presidential Directive-5 (Bush 2003). The draft National Response Plan (NRP) (United States Department of Homeland Security 2003a) and National Incident Management System (NIMS) (United States Department of Homeland Security 2003b). As drafted, these programs effectively give sweeping authorities to the Department of Homeland Security to review vulnerability assessments and manage any emergency incident under the auspices of national security while shielding nearly all related information and activities from public oversight or involvement. The documents remain in draft form and are undergoing extensive review and comment by numerous agencies.

Summary of Regulatory Review

Extensive volumes of regulations, assessments and pending programs aside, governmental controls in the risk assessment and planning process at best provide a framework. Few if any operational details are provided for the regulated and affected community, and they are left to their own devices to construct the appropriate controls and checks, what many respondents referred to in Chapters 5 and 6 of this study as “filling in the blanks.” Presumably, this is a better alternative than having regulators attempt to devise comprehensive “how-

to” approaches that attempt to be all things to all users, unlikely to be feasible even if desired. However, the process of filling in the blanks as examined in this study is precisely where the vulnerabilities to organizational deviance as discussed in Chapter 3 occur. In summary, the current mix of regulations, pending legislation and shielded information has effectively created a risk management honor system of near complete reliance on experts, insiders and contingency plans. This encourages a paternal management approach that promotes misplaced confidence and decreased vigilance, raising serious issues regarding oversight of programs, risk management, safety and public confidence. Such a one-sided process only reinforces the need for thorough analysis and understanding of the relationship between risk perception and worst-case contingency planning at the level of the individual insider and the role of this relationship in the organizational output of the process.

CHAPTER 3: REVIEW OF RELEVANT LITERATURE

Introduction

The purpose of the literature review is to provide context and background information on issues and concepts relevant to the proposed research questions. First, how do insiders perceive risk and define worst-case scenarios? Second, how does risk perception drive contingency planning? Vulnerability to catastrophic events might appear to be a simple matter of good management practices, advanced technology, security or lack thereof. However, researcher experience and examination of literature dealing with characteristics of organizations imply a more complicated picture wherein risk management is not adequately evaluated strictly in terms of simple human error or probabilities of failure. Organizations are much more complex than just an assembly of like-minded employees operating in unison to achieve some common goal, and it is the interaction and outputs of this dynamic environment that are of interest to the researcher. While psychologists tend to treat risk as an individual decision, within organizations it tends to be treated as a social construct, with the role or opinion of individuals essentially rendered irrelevant, as reflected in this study. The review of literature examines organizational practices that influence risk perception and create risk and subsequently vulnerability to disaster. That information is grouped into four themes that illustrate the selected literature: *Risk Perceptions and Individual Behavior*, *Problems with Situation Normal*, *The Myth of Low Risk*, and *The Myth of Emergency Preparedness*. The chapter concludes with *Summary of Literature Review*, which briefly summarizes and relates the

literature and themes and identifies a specific gap in the literature into which this research extends.

Risk Perception and Individual Behavior

Many theories of health behavior speculate that risk judgments play a major role in behavior, and that a self-generated perception of invincibility to harm is responsible for willing engagement in risky behavior. These theories generally assume that with no negative outcomes experienced people engaging in risky behavior have a lower risk judgment than non-engagers.

Contrary to prevailing theory Halpern-Felsher et al. (2001) found that among participants reporting having experienced negative outcomes for events including natural disasters such as earthquakes, there were no significant differences regarding relative risk judgments compared to those who had not. Furthermore, participants reporting a negative outcome experience with the hazard rated the chance of future negative outcomes as lower than participants with no such experience. Regarding all of the risky behaviors and events rated by participants, risk judgments by engagers were lower than judgments of non-engagers. To explain these seemingly counterintuitive findings, the researchers note that many behavioral intervention programs focus on health risks and emphasize the probability that risky behavior almost certainly will lead to a negative outcome. So framed, it is not unexpected then that individuals with no direct experience may believe firmly that the link between behavior and outcome is very strong, judging risks from such events or behavior as high. However, having engaged in the behavior or experienced the event with minimal or no

negative outcomes (i.e., no injuries, no significant losses) these individuals reassess the “real” risk as lower than originally presented. Thus, perceptions of risk may not motivate behavior, as commonly thought, but rather may reflect experience. This theory has a direct implication in the consideration of risk as addressed in the current study, specifically as it may relate to risk disqualification (Clarke 1993) and political sense making (Gephart 1984; Gephart 2004). If individuals and organizations consistently engage in risky behavior with few or no negative outcomes, this might help explain why organizations tend to judge that risk as low when others, such as planners with less or no direct experience might judge the same risk as high.

Weinstein and Klein (1995) noted that people tend to be unrealistically optimistic and claim that they are less likely than their peers to suffer harm. Going beyond common rationales such as inaccurate information or cognitive errors, the researchers propose that individuals are also motivated to avoid anxiety and maintain self-esteem, making them resistant to change. In effect, people tend to overestimate positive, enhancing actions taken by themselves and minimize those taken by others. This phenomenon seems consistent with participant comments made in the current study regarding the risks posed to others by various respondents, particularly regarding worst-case scenarios and response to events at other facilities. Although organizations may not typically be described as being concerned with anxiety and self-esteem, equivalent characteristics could certainly be competitiveness, public image and being a good corporate neighbor. The authors note several studies showing that

generating reasons why certain outcomes might occur or constructing scenarios that might lead to a specific outcome increases the perceived likelihood that the event will actually take place. This observation seems relevant to the current study particularly in the construction and consideration of specified worst-case scenarios and the risks posed to responders and citizens. Scenarios must be constructed to be considered, and as the researcher later concludes this is both the single most important and most vulnerable step in the risk management process. Whether disqualification of any given threat or risk is legitimate is a critical issue, since Weinstein and Klein (1995) conclude that their efforts to reduce optimistic biases regarding health hazards were unsuccessful, finding that biases may actually have been exaggerated by the attention focused on the hazards. As discussed, it may be the case that participants simply do not see themselves as vulnerable and prefer to take little or no protective action.

Norris (1997) found an opposing result, concluding that although the illusion of invulnerability is well documented, precautionary behavior is paradoxically common. The rationale for this seems to be participant beliefs that tragedy and misfortune are preventable or controllable and that one's chances of becoming a victim depend greatly on what one does to protect oneself, including dealing with environmental threats. However, he found that protective behaviors were not consistent and are a complex function of perceived risk, beliefs about the effectiveness of the protective actions, beliefs about one's own ability to perform the behavior and beliefs that others expect them to act or not. This has implications for the current research in that many respondents described citizens

as generally uninterested and nonresponsive regarding environmental threats, relegating them simply to taking action as told to do so by responders or media warnings. Thus as they see the situation the uninterested public may actually be as prepared as they care to be. Without meaningful interaction there is no way to know what they think or why they are thinking it. Engaging this population will be explored as a part of the discussion of implications and future research in the current study.

In another interpretation of the relationship between risk perception and behavior Weinstein and Nicolich (1993) propose that many investigators use designs inappropriate for the hypotheses tested or look at incorrect correlations to answer the research questions. Aside from whether “behavior” means current or changed from one study to the next, they see the effects of time and barriers on behavior as critical variables not typically considered. Once a hazard becomes apparent or a new precaution becomes available, some people will likely act to reduce their risk. Others may not, and that lack of action may be due to preventive barriers rather than overt disregard. In those cases the correlation between high risk perception and protective action will be very low and no longer implies that the person will take action. Having not considered the presence of barriers to action or the effects of time on perception, the lack of correlation might be misinterpreted as simple disregard. Over time and given the removal of barriers, people tend to behave in a manner consistent with their perceptions of the risk. An important point in this is the general assumption that when people adopt precautions, they perceive their risk to have been lowered. The implication

of these observations for the current research relates to the inclusion of barriers and time in understanding the perceptions of risk among both respondents and other stakeholders, particularly those living near the chemical facilities. There are obvious environmental justice implications here, in that barriers to taking protective action may be as simple as the inability to move. Others may have adjusted their perception of risk over time and accepted it as low based on perceptions of lack of negative experience, strength of the planning programs in place and reassurances from facility or planning personnel. The apparent lack of protective actions might in these cases be taken as a measure of confidence, but not as a result of meaningful, informed discourse. The stakeholder outreach program recommended by the researcher would go far in correcting this.

Other researchers (Fischhoff et al. 1978; Slovic, Fischhoff and Lichtenstein 1984; Slovic and Weber 2002) have found that environmental risk perception among individuals is not ambiguous at all, particularly regarding low probability/high consequence (LPHC) events such as those referenced in the current study. Consequence matters more than probability due to the influence of psychometric characteristics such as dread, voluntariness, knowledge, controllability and benefit. Participants with low familiarity with the hazard tended to report higher risk judgment, while those with greater familiarity judged risk to be lower. In that research, experience consistently reduced the perception of risk.

Baum and Fleming (1993) propose that application of behavioral research and theory to the issue of toxic hazards is both timely and relevant, observing

that regardless of the level of sophistication or oversight, technology poses hazards that have simply displaced the threats they sought to eliminate. Breakdown of systems are described as unexpected, complex and of low probability, but almost certain to happen, consistent with their reference theory of “normal accidents” (Perrow 1999).

With apparent heightened public concern about serious events such as nuclear accidents, failed toxic waste landfills and chemical mishaps has come an increase in stress over the uncontrollability and effects on exposed populations. Whether this chronic stress and the related psychological consequences can be reliably assessed or even should be considered in the overall impact of an event remains controversial. However, the authors propose that such events share common characteristics, responses are broadly similar and that measurement of such is both possible and beneficial to planners, managers and lawmakers. They subscribe to the notion that technological disasters are different than natural disasters and are more likely to cause long-term stress and concern. The primary reason for this difference is not the duration or even the severity of the event, but rather the cause, which is generally perceived to involve human error or culpability, loss of control and violations of expectations of control, all what Freudenburg (1993) described as recreancy. Implications of their research relevant to the current study are numerous. First, quantifying risk is extremely difficult, even though it is a central part of a variety of environmental activities. The effects of stress, not just direct losses, should be considered in those estimates. This is particularly relevant to the researcher’s recommendation that

more accurate risk assessment tools be developed to promote a more consistent approach and a more universal stakeholder vocabulary. Second, public opinion influences policy. An engaged, well-informed constituency will demand that prioritization, distribution and management of risk be based on the entire scope of hazards, including mental and physical health and quality of life. This has obvious environmental justice implications. Third, the claimed inevitability of accidents makes proper management and understanding of them a top priority for all stakeholders, particularly State and Federal agencies charged with oversight of such facilities. These agencies need to identify and close gaps in existing abilities to do so, as described in the current study. Fourth, the overall issue is not simply the expansion of the study of toxic exposures. Rather it is the need for an integrated approach regarding intervention, assessment, response and resolving conflicts between safety and standard of living.

Weyman and Clarke (2003) describe a shift from the traditional notions of objective versus subjective risk, both rejected as sole explanations of the proper treatment of risk, to a more complex view that involves cognitive, social and cultural influences. Their examination of the effects of organizational roles on risk perception among coal miners in high-hazard deep mining offers relevant insights for the current study. First, they describe widespread acceptance that accident data provide the most available insight into risk potential. While this may be a common practice, accident rates are in reality merely an indication of risk outcomes and are influenced by many factors. As such, they should not be held up as an absolute measure of risk potential, particularly in examinations of

low frequency, high magnitude events. However, it is precisely the tendency to do so that is described in numerous sociological theories of organizational deviance. Sense making (Gephart 1984; Gephart 2004), defining acceptable risk (Clarke 1988), risk disqualification (Clarke 1993) and the use of fantasy documents (Clarke 1999), all imply safety and contribute to the myth of low risk based on a claimed lack of major events. Second, worker perceptions of risk were judged reasonably accurate. This is obviously relevant to the process of risk evaluation since that function falls to the insider group as defined by the current research. Third, workers closest to the production areas rated risks as high, while senior managers and others removed from front-line process areas rated risks as low. In effect, direct experience with the risks results in the perception of increased risk. This seems consistent with the findings of the current study regarding Environmental, Health and Safety Managers, none of which function as front-line workers, who as a group tended to describe their facilities as low risk and not realistically vulnerable to worst-case scenarios. As discussed previously in this literature review, other research contradicts that position, namely Halpern-Felsher et al. (2001) who found that risk judgments by engagers (i.e., closer to the production) were lower than judgments of non-engagers. Were that the case, one would expect workers inside the participant chemical facilities to judge risk as even lower than their managers. In either case, the accuracy of these perceptions becomes an issue. Future study would be required to determine whether front-line chemical facility worker views support either of these theories. Fourth, given that those closest to the risk seem to have

the greatest awareness of it, then risk taking by these individuals is likely not the result of ignorance, lack of insight or lack of risk appreciation. Instead, it implies that the basis for risk taking lies beyond the individual and implicates the setting and culture in which the individuals operate, which is precisely the focus of the sociological theories of organizational deviance that form the foundation of the current research.

Problems with Situation Normal

Turner (1976) evaluated certain incidents where post-incident investigation found that the tragedies were in fact predictable and even expected, finding common characteristics of ignoring the possibility of disaster; paying attention to nuisance problems and none to larger background issues; ignoring outside complaints; ambiguous, vague or complex information; over-reliance on subcontractors; failure to comply with regulations; and ignoring warning signs. These characteristics constitute “the incubation stage in a sequence of disaster development, accumulating unnoticed until a precipitating event leads to the onset of the disaster” (p. 378), with the collective effect described as “failures of foresight” (p. 378). This is found to be a recurring theme throughout the current study, and the researcher will provide additional discussion of how this theory relates to other significant influences.

Following the 1986 Challenger loss, Vaughan (1999) found “routine nonconformity, mistake, misconduct, and disaster systematically produced by the interconnection between environment, organizations, cognition, and choice” (p. 271). Power struggles, goal displacement, cumbersome procedures, high levels

of centralization, competitive environments, structural secrecy, extreme rule-mindedness, mistakes, lack of accountability, conflicts of interest and overt misconduct were identified as components in degrading the organization's mission. Although each of these factors played a part, the decision to launch was actually detailed, well documented and eventually made with Launch Team consensus. No amount of planning, prediction or consensus could overcome the structural secrecy inhibiting the free flow of data and concerns, nor could it anticipate environmental and political influences on the process. Competition, tightening of budgets and hidden agendas conflicted with safety as the main priority, particularly in this technical, hard-to-manage system (Vaughan 1992; Vaughan 1996).

Meyer and Rowan (1991) found that organizations use structure to gain legitimacy while in reality conformity to institutionalized rules often conflicts sharply with requirements for efficiency, leading to claimed practices that differ from actual operating practices. Structure decouples from activity, and in such an environment managers spend far too much time on rituals, myths and abstract structures, generating deviant outcomes from rule violations, unimplemented decisions, problematic technologies and subverted or vague evaluation and inspection systems. Several respondents make a point of discussing facilities at which this seems clearly to be the case. Apparently, some organizations are comfortable with contingency plans that overstate their capabilities, preferring to benefit from the apparent legitimacy and not address the obvious implications of potential or eventual plan failure.

Perrow (1999) takes an opposing view to disaster by deviance, instead describing accidents as normal outputs of complex systems effectively doomed to fail because of inherent human and mechanical error. His model couples complexity with probability and severity of failure, dividing systems based on linear or complex interactions. Presumably, failures (disasters) in complex systems result from unknown interactions, cannot be foreseen and can be analyzed and understood only in hindsight. In effect it is the uncontrollable system that poses the real danger, not the individual components. This theory is strongly embraced by many researchers in the field of psychology, particularly those involved in the study of stress, preparedness, risk judgment and risk behaviors. Relevant pieces are discussed earlier in this review.

Whether by deviance or design, it is apparent that organizations create and institutionalize risk as part of day-to-day “situation normal” activities. Accidents are socialized as a cost of doing business and remain seen as rare, unexpected events, perpetuating the myth of low risk. Specific theories of organizational deviance are clearly operating in this insider system.

The Myth of Low Risk

Janis (1972) proposed that organizations frequently become “victims of groupthink” (p.197) when considering high-risk issues. Several characteristics of this phenomenon fall in line with other sociological theories, all of which contribute to the myth of low risk. In a groupthink environment, members share an illusion of invulnerability that encourages excessive optimism and risk taking. Discounting of warnings is rationalized and the group tends to display an

unquestioned belief in their own inherent morality. Dissent is unacceptable and results in sanctions. These cognitive afflictions may be a mutual effort by the group to maintain self-esteem, particularly when they share responsibility for decisions that might incur social or self-disapproval. With internal reassurances, group members build up mutual confidence and are reassured about unfamiliar risks without pursuing any serious consideration of alternative courses of action.

Gephart (1984) describes organizationally based environmental disasters (OBEDs) involving adverse effects from exploitation of ecosystem resources. Although these cumulative, socially based disasters result from managerial activity and are often featured in news reports, they are largely absent from disaster literature. This is explained as a function of the regulative management of resources for maximum rewards and a self-perceived human exemption from ecological constraints based on discovering and controlling laws applicable to reality and discovering and implementing new technology as needed to overcome constraints or impacts. OBEDs are difficult to conceptualize due to the lack of quantitative methods of analysis to capture the complexities of these situations and the intricate causes, histories, and consequences that produce them. These characteristics are consistent with both the “failures of foresight” (Turner 1976) and “fantasy document” (Clarke and Perrow 1996) views, though Gephart clearly favors Perrow’s “normal accidents” view (Perrow 1999). Parties interested in the preservation of business have a stake in construing accidents as “unanticipated, rare, and which no reasonable precaution could prevent” (p. 211), thus avoiding liability and loss of support. From this, Gephart proposes a theory

of “political sense making” (p. 212), suggesting that contradictory views of the world compete, but organized capital eventually dominates by relying on science to minimize perceived risk. Consequently, society and industry normalize the processes and outcomes, including disasters, as unavoidable costs of doing business.

In more recent work, Gephart (2004) continues his examination of the role of sense making in the social construction of risk, reiterating his strong support of “normal accidents” (Perrow 1999). As sense making involves an attempt to reconcile differing views of the world, power then equates to having the desired account of reality prevail over competing accounts. Organizations apparently influence sense making about the environment and are thus able to develop and implement risky technology while ignoring or externalizing costs and effects onto other groups. This is primarily accomplished through three mechanisms. First, technology designs serve the needs of stakeholders focused on organizational goals and rewards. Having developed complex, intrinsically flawed systems future errors are inevitably assigned to operators, in keeping with Perrow’s (1999) notion of “normal accidents.” Second, extensive reliance on fantasy documents and risk assessments (Clark and Perrow 1996) provides an apparent promise of effective control and response. Opposition to risky technology simply drives the process to be even more reliant of these plans. Third, agencies and institutions face a loss of legitimacy following technology failure or disasters and inevitably conduct inquiries that tend to assign fault to operators. Agency controls are shown to have been adequate but not followed by the faulty

operators, and recommendations for future action focus on correcting those issues, not the technology itself. In that way organizations and risky technologies are legitimated even though they have failed. Key observations in this work are that “micro-level sense making practices produce macro-level phenomena” (p. 25) and that “power lies in mundane features of human communication” (p. 25). This power operates each time that world views compete.

Clarke and Short (1993) examined theories of trust, fairness, expert opinion and other factors in the social construction of definitions of risk, finding that organizations normally have too much information rather than not enough and that the greatest influences on social policy come from interest groups, not the public. They evaluate Perrow’s “normal accidents” model (Perrow 1999) and the tendency to use human error as a primary cause of failure, finding that the value of “normal accidents” is the assignment of organizational fault, dismissing “human error” excuses as denials of systemic failures.

Freudenburg (1993) noted that with division of labor have come specialization and a much lower risk of death. However, labor grows more complex, forcing people to depend on others “performing the necessary calculations” (p. 913). This dependency on others has led to higher probabilities that some “key portions of the system” (p. 914) cannot safely be counted upon to perform as needed, making us more vulnerable. He chooses the term “recreancy” to describe this institutional “failure to follow through on a duty or trust” (p. 916), emphasizing that the use of this term is subject to the points of view of the participants and is directly related to the level of concern

about the issue and effects. The point is illustrated by comparing the reaction to natural disasters, where a “therapeutic community” (p. 928) emerges, pulls together and restores confidence in officials and community, to that of a technological disaster, where a “corrosive community” (p. 928) leads to distrust, estrangement and a realization that the system cannot perform as promised. Vulnerability to recreancy is a commonly expressed concern among Local Emergency Responders in the current study, particularly as related to reliance on contingency plans during responses at chemical facilities.

Clarke (1988) evaluated the process through which social actors make choices among risks, finding that traditional measures of risk assessment imply that the public defines “acceptable risk” when in reality it is almost always the organization. The result is a risk analysis weighing power, not risk. The tendency to treat risk assessment as a scientific issue and risk acceptability as political is a major source of conflict. Many respondents described exactly this conflict, particularly when debating worst-case scenarios and trying to define “realistic.” In the end, they report that the organization authoring the contingency plans generally if not always prevail.

Clarke (1993) reviewed the Exxon Valdez incident in light of a “disqualification heuristic” that leads organizations to misperceive risk. Even with five approved contingency plans in effect to address potential oil spill incidents, each was found to be general and addressed relatively minor events under ideal conditions for weather and preparedness since events deemed unlikely (large spills, bad conditions) were disregarded. In negotiations with regulatory

agencies, Exxon eventually claimed the position of framing the scenarios and assigning risk so that the probability of large spills was considered so remote as not to be included in the talks. Another key factor in planning failures is too much available information coupled with convictions that processes are safe and that all incidents can be controlled. In that context, risk shortcuts are taken and risk perception does not reflect scientifically assessed risk, allowing decision-makers to protect themselves from seriously considering the likelihood of disasters and preserving resources by constructing outcomes that avoid extensive response preparedness. The heuristic is fostered by informational dependencies and power struggles between regulators and organizations that regulators inevitably lose, dependency on the organization to provide data, intense production pressure, disciplinary specialization that relies heavily on assumptions about the process, and the degree of outside scrutiny brought to bear. As the researcher expected, this heuristic was found to be the predominant influence in the risk management process, primarily due to the impact on the initial framing of risk scenarios to be considered.

This organizational tendency to underestimate or disregard risk simplifies the process of controlling it, making “adequate” planning and preparedness a certainty. As contingency plans are institutionalized, confidence in the ability to manage all hazards with minimal cost and effort grows, perpetuating the myth of emergency preparedness.

The Myth of Emergency Preparedness

Clarke and Short (1993) found a paradox in relying on organizations to respond to accidents since organizations base planning and expectations of success on scant past experience, institutionalizing the plans and misplaced confidence that follows. Subsequently, the perception and discussions of risk are based in public relations. Failure of contingency plans and response teams to perform as promised is actually normal and “we should be surprised when organizations do respond well” (p. 394). Related to this, Clarke and Perrow (1996) examined the symbolism of organizational response and contingency plans used to justify themselves to others by demonstrating that high-risk systems pose little or no risk to society. They found that such “fantasy documents” (p. 1040) are “based on sparse or nonexistent experience, and that they are often wildly unrealistic” (p. 1040). Coming to believe in these plans, organizations ignore the reality that not all will go well in an emergency and that conditions and performance of support groups will be far less than predicted. In the current study, many respondents aside from facility Environmental, Health and Safety Managers echoed this, many from direct experience. Failure of the plans and the response resources remains a primary concern for responders and regulators.

Clarke (1999) examined the reasons why organizations develop and rely on “fantasy documents” (p. 136) that will almost certainly fail, concluding that the plans are not lies or deliberate deceptions, but exercises in self-deception generated by managers doing what they are supposed to do: bring order and control to a process and put unknown issues into familiar terms. Such

documents are based almost entirely on predictions influenced by social and organizational forces including the relationship with the intended audience. By not being a lie, the fantasy is even harder to evaluate or contradict since the organization and the experts believe the plan and actively support it. A strong contributing factor is the fundamental business expectation that no problem is unsolvable and no process uncontrollable. The effect of such plans is to influence the audience into concluding that experts have considered and analyzed every relevant contingency despite the lack of direct experience. The audience in most cases is said to be the public--in reality, regulatory agencies--and these documents represent a power struggle between the parties. Assigning accidents the special status of being unexpected and rare hides the reality that they are normal and routine. Thus, plans become undeserved symbols of competence that lead society to normalize risk and the results, shielding elites and organizations from responsibility and actually increasing risk by decreasing vigilance. As protection for planners, "those who would criticize the fantasizers are, by default, extremists" (p. 167) and are ruled out as irrelevant to the discussions. Clarke (1999) speculates that, although unlikely ever to happen, "society would be safer, smarter and fairer if our organizations and their masters could admit their limitations, declaring frankly that they cannot control the uncontrollable" (p. 171). As with many of the theories examined in the current study, facility and outside respondents were sharply divided over this point. Offsite respondents seemed clearly to see this as a major issue, while facility managers effectively dismissed it.

Summary of Literature Review

Perceptions of risk may not motivate behavior, as commonly thought, but rather may reflect experience. If individuals and organizations consistently engage in risky behavior with few or no negative outcomes, this might help explain why organizations tend to judge that risk as low when others, such as planners with less or no direct experience might judge the same risk as high.

Researchers are divided over whether individuals simply do not see themselves as vulnerable and prefer to take little or no protective action, or instead whether precautionary behavior is paradoxically common since individuals believe that tragedy and misfortune are preventable or controllable and that one's chances of becoming a victim depend greatly on what one does to protect oneself, including dealing with environmental threats. In either case, it appears that over time and given the removal of barriers, people tend to behave in a manner consistent with their perceptions of the risk.

An important assumption is that when people adopt precautions, they perceive their risk to have been lowered. This likely includes reliance on planners and emergency responders as one, if not the only, precaution available to proximal residents. The roles, motivations and reactions of individuals remain unclear and at times contradicted by various research, but future management of risk must recognize the need to go beyond the measurement of risk as simply a direct loss or toxic exposure. Quality of life and competing world views are involved and must be taken into account, even if problematic. A major contribution of the psychological research on this topic is the recognition that the

basis for risk taking lies beyond the individual, implicating the setting and culture within which the individual operates. This implication is the focus of the sociological theories of organizational deviance that form the foundation of this research study.

With some disagreement over disasters as either inevitable or as foreseeable and preventable, the open literature clearly establishes the role of organizational deviance in disaster through disqualifying and underestimating risk; avoiding commitment of resources; political power struggles; illusions of low risk and emergency preparedness; and reliance on complex, symbolic contingency plans doomed to failure. These “situation normal” organizational characteristics create misplaced confidence that leads actors and society to rely on what are in reality myths of low risk and emergency preparedness, effectively decreasing vigilance and increasing risk. The current regulatory structure offers little relief, with near complete reliance on information generated by experts and insiders, and public oversight and access to information severely restricted. As will be seen in the data analysis and conclusions, these myths and conflicts are clearly in play within the insider group interviewed for this study. Respondents tended to have strong, often competing opinions regarding the sources and effects of the risk management process failures, and the literature reviewed here fairly describes these conflicts and provided a strong foundation for the research.

Although key figures in the risk management process, within the open literature there had previously been no examination of the self-reported views and roles of risk management insiders in defining and addressing risk from

potential worst-case events at chemical facilities. In conducting this study, the researcher sought to make an intellectual contribution by extending the existing body of work on organizational deviance, risk and disaster to this new area of inquiry. Following this insider examination and having examined the two research questions that form the basis of the current study, the researcher proposes that several existing theories are now clearly confirmed and put into a clear, unique perspective.

CHAPTER 4: SCOPE AND METHODS

Introduction

This chapter addresses: research design; instrument development; participants; sample selection; informed consent; initial interviews; follow-up interviews; ethical considerations; confidentiality; Institutional Review Board Approval; data analysis and coding; document analysis; triangulation; generalizability; and the appropriateness of each, concluding with a discussion of assumptions and limitations.

Research Design

This study focused on two specific research questions. First, how do insiders perceive risk and define worst-case scenarios? Second, how does risk perception drive contingency planning? To examine this topic intimately and collect the rich data desired, a basic interpretive qualitative design based on direct interaction and extended dialogue with the participants was appropriate. Partially structured interviews provided an excellent mechanism by which to collect the necessary data within each participant's operating environment. Core open-ended questions were formulated in advance, order of presentation was flexible, added or modified questions were used and the interviewer requested consent to record responses verbatim using an audio tape recorder. The probability of deep, rich and spontaneous conversations made this method effective for both the primary and follow-up interviews.

In the event that individual participants did not wish to be recorded, the interviewer captured the essence of responses in written notes and jottings, a

technique typically used in semistructured interviews (Gay and Airasian 2000). The effect of note taking on interviews and data accuracy was minimal since the participants tended to provide very succinct answers and rarely elaborated or strayed from the specific question. In the case of the LERs, this was explained as largely a function of having learned to communicate via radio, where brevity and clarity are assets. This was group of few words. For the larger group, the researcher is confident that vigilance and political risk aversion were driving factors. In either case, by no means are these fraternal risk managers a “chatty” group. Still, the answers were candid and illustrative.

Regarding other potential data collection methods: observation was neither feasible nor adequate; totally structured and structured interviews would allow no capture of context or deeper meaning, confining answers to pre-selected, easily analyzed choices; and unstructured interviews would not provide the consistency needed for group data collection on the specific research questions. Future research on this topic might incorporate any or all of these methods as appropriate based on the specific focus and setting.

Instrument Development

Risk perception data are typically collected by interviews or surveys based on affective, self-report instruments using Likert Scales, Psychometrics (i.e., evaluation of dread, imposition, familiarity and controllability heuristics), concept mapping or mental modeling. An extensive review of sources of test information, including *Mental Measurements Yearbooks*, *Tests in Print*, Pro-Ed Publications and the Educational Testing Service (ETS) Test Collection Database, revealed

no existing instruments suitable for use in this research. Consequently, a project-specific instrument was developed. The instrument was open-ended in that core questions were predetermined, but answers were generated by the respondents.

Participants

Volunteer participants were drawn from within a major metropolitan area found in the Southwestern United States and the USEPA Regional Office with jurisdiction over that area. The city has a population of over 500,000 (United States Census Bureau 2000) and supports a well-developed industrial base. Typical sites include large, complex chemical facilities such as petrochemical refining and associated storage capacity, chemical manufacturing and reaction, water and wastewater treatment and related transportation systems such as pipelines, rail and interstate. There is virtually no limit to the type of chemicals that may be in process, storage or transit within these areas at any given time. Typical chemicals of concern include: flammables such as solvents, fuels and compressed gases; toxics such as chlorine and anhydrous ammonia; and volatile acids such as hydrochloric, hydrofluoric and sulfuric. Inventories of each may reach billions of pounds per site with worst-case significant offsite consequences measured in miles, potentially affecting hundreds of thousands or even millions of people.

Participants were purposefully sampled to represent three distinct information rich populations: facility Environmental, Health and Safety (EHS) Managers; State and Federal On-Scene Coordinators (OSCs); and Local

Emergency Responders (LERs). Facility Environmental, Health and Safety Managers are responsible for risk and consequence analyses relevant to the particular hazards associated with their respective operations and development and implementation of contingency plans in compliance with regulatory and corporate mandates.

On-Scene Coordinators are emergency management representatives of the relevant State and the USEPA and respond to reported or threatened releases that require State and/or Federal intervention, either by statute or by request from the affected facility or jurisdiction. Another large component of their responsibilities is pre-planning for such events with those affected jurisdictions and facilities.

Local Emergency Responders include Hazardous Materials Teams (Hazmat) and Local Emergency Planning Committees. These personnel operate at a local level and have a great degree of familiarity with their respective facilities and associated hazards. Collectively these participants are referred to in this research as “insiders.” It is within this group that risk from chemical facilities is framed, debated and eventually defined and addressed. That process forms the basis for agency and community emergency preparedness. As the insider group was the focus of this research, offsite populations and other non-insiders were not included as participants.

Sample Selection

The researcher conducted initial and in some cases follow-up interviews of 20 volunteer participants. Specifically the sample group was made up of six facility

Environmental, Health and Safety Managers, seven Local Emergency Responders and two State and five Federal On-Scene Coordinators. One senior Environmental, Health and Safety Manager was interviewed at each facility. Those managers represent the best possible sample of the 17 facilities in the study area with the greatest potential offsite impacts based on self-reported Risk Management Program Offsite Consequence Analysis data. The original goal was to interview the top six, however some facility representatives were unavailable or declined to participate. Greatest-impact facilities were preferred since these operations have the potential to affect the greatest number of people and consequently are the object of a proportionately increased amount and intensity of planning both internally and with external agencies. Due to increased planning requirements, these facilities were expected to have greater issue awareness, robust contingency plans, mature training and response programs and increased interaction with local Emergency Responders and Planners.

Local Emergency Responders were selected and interviewed based on purposeful and snowball sampling and self-reported planning and response experience, representing a good combination of Hazmat and Local Emergency Planning Committee personnel. While Local Emergency Responders serve exclusively within their respective cities, On-Scene Coordinators work within a State or multi-state region and are not assigned solely to specific cities or areas. For those interviews, the researcher selected On-Scene Coordinators based on purposeful and snowball sampling and the most extensive self-reported planning

and response interaction, experience and knowledge regarding the metropolitan area of interest.

Informed Consent

The researcher secured fully informed consent from each participant by use of a detailed instrument based on current Oklahoma State University Institutional Review Board (IRB) requirements (Oklahoma State University 2002). That instrument, titled "Informed Consent Letter for Adult Participants," is found in Appendix A. The consent letter was sent to the respective participant in advance of each interview and reviewed again with the participant during the introductory meeting, with specific and adequate attention paid to the topic of confidentiality.

Initial Interviews

The researcher contacted each participant by telephone to schedule an appointment, location and adequate time for the interview. Once onsite the researcher presented a general introduction and overview, reconfirmed consent and conducted the interview. Interview questions were grouped into two categories, risk perception and contingency planning, and administered using the core questions from the Interview Protocol found in Appendix B. At the conclusion of each interview, the researcher conducted a debriefing to discuss questions or concerns and provided copies of notes to the participant. During this debriefing, the researcher requested a participant review of data to solicit feedback regarding accuracy and completeness, particularly regarding quoted statements. To preserve complete confidentiality and encourage free and open

dialogue, interviews were conducted individually, with no discussion or confirmation by the researcher of identities or responses of other participants.

Follow-up Interviews

It was anticipated that the initial data review would identify gaps in the data and generate insightful follow-up questions. In only a few cases, the researcher needed to contact participants by telephone to ask additional questions and to gain clarification of original interview content. Each follow-up interview was concluded by a debriefing and verbal participant review of the collected information and notes. The limited number of follow-up interviews is attributed to both the researcher's increasing competency gained from the interview experiences and the previously discussed tendency for the participants to provide pointed, succinct answers.

On Being an Insider in a Study of Insiders

This qualitative inquiry posed specific challenges in that the researcher had direct interaction with the participants and was attempting to get them to open up and speak frankly and truthfully. Such interaction necessarily results in some amount of "resocialization" (Emerson, Fretz and Shaw 1995:2), creating a need for trust on both sides and imparting a degree of intimacy between the two.

Ethical considerations faced by qualitative researchers are many and include, but are not limited to: building trust and confidence; strict use of informed consent and confidentiality safeguards; minimizing psychological or physical risks to the participants; legal liabilities; political repercussions; gathering data without creating or changing it; data access and ownership; data collection boundaries;

compensation; dealing with confessions or observations or revelations of illegal activities; and the temptation to use deception to gather “good” data (Gay and Airasian 2000; Patton 2002). This study was no different. As qualitative interactions are by nature emergent and somewhat spontaneous, many of these issues surfaced at various points in the interviews. Immersion in the setting and increased understanding could easily have created unanticipated conflicts of interest or obvious areas of relevant follow-up questioning that were not part of the original instrument, Institutional Review Board approval or even the design (Gay and Airasian 2000; Merriam 2002). The researcher had to remain cognizant of his role as a student researcher and restrict questions and probing to only those data relevant to the current study. Each relevant ethical consideration was considered in all steps of this research project and, whatever the potential research gains or dramatic revelations, the overriding goal in every case was the well-being of participants and their right to be fully informed and protected.

The researcher’s current affiliation with the USEPA as a Federal On-Scene Coordinator, strong knowledge of the topic and relationships with many of the potential participants posed a particular challenge. The researcher knows these people, places and topics well enough to instill a high level of trust, confidence and knowledge, all of which contributed to quality research. Within or outside of a research setting, especially with “just the guys talking,” that level of intimacy might very well have generated frank discussions of potential illegal activity, poor planning, political interferences or systemic failures. Although

“getting at the real story” is the point of personal interviews, it obviously raises ethical issues. Being well aware that the researcher could offer no guaranteed confidentiality for illegal acts or protection from legal actions such as subpoenas or suits, he was faced with the very real dilemma of offering the most confidentiality possible while examining a topic that by its nature might have yielded exactly the type of data that could not be absolutely protected. No amount of informed consent or assurances of confidentiality can overcome that. Awareness of this potential conflict highlighted the need for strict observance of the informed consent process, and ultimately each participant decided for himself what the ultimate risk from participation was and how forthcoming to be. The researcher made it clear at every appropriate opportunity that he was conducting these interviews as an individual student researcher to fulfill degree requirements, and that the research was in no way associated with any type of work related activities. There was no evaluation of respondents or facilities outside of that necessary for the data collection and analysis described in this study.

Even with as much objectivity and confidentiality as could be mustered, the researcher is confident that his background and occupation as a USEPA insider affected responses, but primarily to the positive. Many respondents appeared to try to “read” the researcher as responses were given and recorded, ostensibly to evaluate whether the response was adequate or met with approval. There were often inquiries as to whether the researcher or other respondents agreed or how EPA would feel about a particular issue or response. To each of

these the researcher reiterated the confidentiality assurances, his objectivity, his student researcher role and that there were no right or wrong answers. Most seemed cautiously reassured, and participant awareness of the researcher's depth of knowledge seemed to encourage considered responses. Even the Environmental, Health and Safety respondents, who might arguably be thought of as having the most to lose by talking with the researcher seemed to accept the notion of an objective and open evaluation. Overall, the researcher remains convinced that responses were candid and forthright, as evidenced by the data analysis. Clearly, the strong confidentiality assurances, existing relationships and open-ended questions proved the objective intent of the researcher and encouraged open dialogue. Voluntary participation and the abundance of candid and often conflicting opinions are evidence of that.

In summary, all potential participants were adults and professionals in their respective fields and were only asked questions pertaining to their job-related duties, with no personal or facility information or identifiers collected, and no compensation offered or expected. Added to the strict confidentiality procedures, voluntary participation and open-ended questions, there were no added risks to participants beyond those normally encountered in their daily lives and work environment. These study characteristics clearly added to the success of the research.

Confidentiality

Due to security, liability and confidentiality concerns, interview notes and the final research report use only coded identifiers. For example, the identifier for the

initial Environmental, Health and Safety respondent interview is “EHS-1.” An initial interview of an On-Scene Coordinator or Local Emergency Responder was likewise coded as “OSC-1” or “LER-1” respectively. A follow-up interview with EHS-1 was coded as “EHS-1-F.” No location information of any kind was recorded. This coding methodology prevents any identification or linkage of facilities or persons to specific results or even the study, and unless they choose to make known their involvement amongst themselves, participants are not aware of the identities, roles or responses of other participants. Researcher records are being kept in a secure location for the duration of the project and will be destroyed upon expiration of any required retention period. Retained texts were coded (i.e., “EHS-1”) to allow the researcher to link data bits and then immediately redacted to remove any other identifiers related to the document origin.

Institutional Review Board Approval

As this research involved human subjects, Institutional Review Board approval was necessary (Oklahoma State University 2002). In the application, “exempt” review status was requested based on two factors. First, participants were not from designated special or vulnerable populations such as children, wards, prisoners, pregnant women, fetuses or economically or educationally disadvantaged persons. Secondly, risk to participants was low due to measures taken to ensure confidentiality of individuals and data, data reporting and retention. In no case was risk considered to be more than the risk undertaken by these participants in ordinary life. The application was delivered to the Board in

October 2003 and was approved without revision on September 19, 2003 as Application Number GU042. A copy of the approval is found in Appendix C.

Data Analysis and Coding

The emergent nature of qualitative inquiry enables the process of analysis to begin in the field, particularly with the pursuit of follow-up questions or the exploration of spontaneous insights. Thus, the researcher was provided with two main sources for organizing the analysis: questions developed prior to the interviews and insights that emerged during the interviews. Follow-up interviews are the tool by which gaps or the need for clarification within either or both of these sources are resolved (Patton 2002), and worked well for that purpose in the few cases in which they were necessary.

The researcher feels that manual processing of the data provided a more intimate analysis and took advantage of his existing knowledge of the topics and participant roles. This allowed him more meaningful data interaction and opportunities to recognize emergent themes based on context and intuition. Following an analytical framework approach, responses from the original and follow-up interviews were grouped by common questions, with inductive content analysis of grouped responses and related fieldnotes achieved through manual coding and searching for broad, preliminary patterns or themes. Although differences in views and practices were identified between them, this is not a comparative study and no direct attempt at comparison between insider populations or facilities was made.

Data coding is a very subjective process. The method (Otto 2002) adopted for this project combined strengths of several available systems and had proven successful for the researcher in past analysis related to the current topic. For coding, relevant or interesting data from interviews, observations and documents was selected and separated into identifiable units. Each unit, whether a single complete thought, comment or description, was posted onto a separate index card and tagged with a unique source identifier, such as "Source = EHS-1-Q5." That tag designates the source as Question #5 from the interview of Environmental, Health and Safety respondent 1, for example. A data unit from the follow-up interview of EHS-1 would likewise be tagged as "Source = EHS-1-FQx." Redacted documents were similarly referenced using titles, page numbers or other identifiers suitable for efficient data tracking and navigation. An approximately equal number of units were drawn from interviews and fieldnotes, while documents represented a minor portion of the data.

Once all selected units had been carded, the researcher shuffled the cards, read them again and began sorting. The goal was to be "emic" and not try to relate the data to the original questions or documents, but simply to sort units into groups that seem to go together. Data units were assigned to only one category, even if a category of one, with the name of that category added to the card. Each category name was marked on an additional card and added to the stack that it represented. All data cards were reshuffled and again sorted into categories, with category names added or modified as needed. Sorting continued until the arrangement seemed appropriate. Upon completion of the

data coding and sorting, the researcher noted that data units tended to follow the respective questions. As discussed previously, this appears to be due to the pointed and succinct answers generally given by the respondents. In most cases the data units were so specific that they simply sorted into respective categories. Research results were grouped into two analysis chapters, risk perception and contingency planning.

Document Analysis

Written plans, risk assessments or other institutional texts represent the output of the social construction of the risk perceptions and practices that the interviews are seeking to evaluate. Although not a design component of this research, some participants offered documents as part of a response. Those were analyzed within the same theoretical frame and analysis methods as used for interview data. Challenges for analysis included securing permission to retain the document and take it off-site, deconstructing the document contents, assessing accuracy and linkage with fieldnotes (Patton 2002).

Triangulation

Triangulation potentially adds value to this research in two ways: validation of responses and added depth and richness of data. However, opportunities for either were relatively limited as the researcher did not attempt to educate participants or to validate their responses, but only recorded self-reported data regarding existing claimed perceptions and practices. No institutional texts were solicited and participants were not asked questions regarding the accuracy or veracity of responses of any other participant. Participants were not aware of the

identities, roles or responses of other participants unless they chose to make known their involvement amongst themselves. Validation was primarily by participant self-review, achieved during each post-interview debriefing during which responses and fieldnotes were discussed and reviewed for completeness and accuracy. In the few cases where institutional texts or other documents were offered and retained as part of an interview response, the researcher did not attempt to conduct any triangulation of data sources. Participant review of information gathered by telephone follow-up interviews was performed verbally.

Generalizability

Generalizability from this qualitative inquiry is problematical. The use of purposeful and snowball sampling within a particular group not necessarily representative of any larger population precludes statistical inferences. While the project includes no specific claims of external validity, or generalizability, it was likewise not the goal of this researcher to generate findings irrelevant outside of the sample population. It is possible for readers or users of any research, including this project, to evaluate the feasibility of case-to-case transfer (Firestone 1993), determining for themselves whether or how specific research results may be applied to their own circumstances. This is most valid when settings and other relevant conditions are similar to those in the original research, or when differences in those conditions are known and accounted for in the use of the data.

Assumptions and Limitations

The researcher did not attempt to educate participants or to validate their responses. Rather he attempted only to record self-reported data regarding existing claimed perceptions and practices. As such, this research was conducted relying on, and subject to, specific assumptions and limitations. First, it was assumed that responses to interview questions were informed and truthful. Second, self-reporting was assumed a valid and reliable method of measuring individual risk perception. Third, it was assumed that facility self-reporting as required by Federal and State regulations is a valid and reliable method of identifying participant facilities and the magnitude of their respective potential offsite consequences. Based on the researcher's interaction with each of the respondents, these assumptions seem reasonable, and no obvious knowledge deficiencies or excursions from truthfulness were noted. In fact, all of these respondents appeared very knowledgeable regarding the topics covered in the interviews and seemed to genuinely engage the researcher. Regarding the selection of facilities with the largest potential offsite consequences, review of USEPA files and discussions with Federal On-Scene Coordinators lead the researcher to believe that the participant facilities were correctly selected and fairly represent the target population of facilities.

While assumptions that might have influenced the accuracy of data collection appear to have been reasonable, due to the lack of any feasible method of substantiation, they nonetheless imply possible limitations. First, although not suspected, participants may have been evasive or less than truthful

regarding individual questions they may have perceived to be sensitive or potentially controversial. Second, although responses indicated the contrary, not all participants may have been well-informed regarding hazards and planning at the respective facilities, which may have biased responses. Third, facilities were selected based solely on self-reported potential offsite consequences. Inaccurate reporting would have reduced the priority risk ranking for, or omitted facilities that underestimated those impacts or failed to report at all. However, as discussed above this is not thought to be the case. Fourth, a limitation not subject to respondent input was sample size, 20 participants in a single study area. Although the data collected is valid for the participant sample group, risk perception and contingency planning trends identified in this research may not be indicative of other communities due to variances in issue-awareness, personnel competence, or other uncontrolled factors.

CHAPTER 5: ANALYSIS OF RISK PERCEPTION AND DEFINING WORST-CASE SCENARIOS

Introduction

The issues of risk assessment and contingency planning have taken on an increased sense of urgency since the attacks of September 11, 2001. In addition to routine concerns over catastrophic accidental releases, recent threats to civilian American populations by various terror groups have indicated willingness and capability to use unorthodox means including potential attacks on industrial and chemical facilities. The serious consideration of intentional acts or catastrophic accidents poses a unique challenge to planners and emergency responders, in that for either case these events represent low probability, but high potential magnitude scenarios. This requires difficult decisions regarding the investment to be made in the prevention and management of incidents that may never happen. Individual risk perception and organizational dynamics play a key role in making those decisions, and this chapter addresses the first of two research questions: How do insiders perceive risk and define worst-case scenarios?

For the insider group participating in this study, the risk management process begins with the development of potential scenarios by organizations (Environmental, Health and Safety respondents), followed by review and debate within the larger group, which includes Local Emergency Responders and occasionally On-Scene Coordinators. As scenarios and impacts are proposed, debated and eventually adopted, Local Emergency Responders and On-Scene Coordinators develop additional plans and allocate resources to respond

adequately and safety from offsite. Plan events may impact individual or multiple facilities and may result in area or even regional impacts. The evaluation and planning process is not formal and follows no standard protocols or format, which is precisely the reason that this critical and previously unexamined role of the individual insider within the organization is the focus of this study. Respondent interaction and the organizational outputs are the basis for all planning efforts, eventually producing implemented contingency plans, examined in Chapter 6.

To gain a better understanding of the initial assessment and deliberation process, respondents were asked questions regarding risk identification and assessment; potential worst-case scenarios beyond those addressed in contingency plans; the role of Offsite Consequence Analyses; and perceived risk to onsite and offsite responders during worst-case events. Respondents were attentive and generally focused on the specific questions at hand, and interviews were conducted in a variety of settings, ranging from restaurants to offices to airplanes. The often-candid responses provided the researcher with an intimate look at the respective points of view of the participants and, even then, prior to any formal analysis the influence of several sociological theories of organizational deviance was apparent. This chapter is grouped into five themes that emerged from analysis of the data and which seemed to fairly describe the essence of the particular topic: *Experience and Common Sense*; *Predicting the Unpredictable*; *Across the Fence*; *Home Court Advantage*; and *They Aren't Making Ice Cream in Those Plants*, concluding with *Summary of Risk Perception and Worst-Case Scenarios*.

Experience and Common Sense

The process of defining and framing threats and events as “realistic” is perhaps the single most important step in the contingency planning process, as this creates the scenario pool to be considered and eventually acted upon by planners. When asked questions regarding this process, respondents overwhelmingly relied on a definition based on personal, site and industry experience and “common sense.” Groups displayed near-consensus that events must be judged based on “whether something like that could really happen.” Many descriptions of program components were offered in support of what constitutes a reasonable evaluation, including adherence to good engineering and management practices, process safety and other regulations, consideration of site specific conditions, personnel training, specific chemical hazards and predictive models which incorporate estimates and probabilities regarding these and other related criteria. Taken together, such an elaborate but subjective system was put forth as a “reasonable estimate of probability.”

All respondents agreed that response actions since the attacks on September 11, 2001 were “safer and more somber” and that prior to that day the attitude was “respond and rescue at all costs.” This implies both a marked shift in the threshold for perceived “realistic” events and risks and an assumption that prior to that day “all costs” had been well understood and relatively low. Thus, it appears that the magnitude of the events and loss of responders on that day served in one blow to push back the boundaries of disqualification by providing a “real life” demonstration of an “impossible” scenario. Whether those events were

the result or “failures of foresight” (Turner 1976) or disqualification (Clarke 1993), this shift clearly illustrates the role of history and personal experience in the perception of risk.

Regarding threats of worst-case scenarios outside those featured in contingency plans, all respondents felt that going beyond experience and the “common sense” definition of realistic was simply unacceptable. The sole exceptions were those instances where regulatory requirements forced them to do so, as in the case of Risk Management Plans where standardized worst-case scenarios are required from each reporting facility. These mandatory scenarios address either explosions or vapor cloud releases of listed flammable or toxic chemicals, or both if the reporting facility has both classes of materials onsite. Respondents were nearly unified in their positions that such scenarios were so extreme and only so remotely possible as to serve no real purpose beyond “scaring the public.” One noted that past events “are bad enough without having to get too imaginative” and that “everything else was just a guess,” a view shared by nearly all. In sharp contrast, a single Local Emergency Responder admonished planners to “never say never” when evaluating scenarios, however even this person ultimately relied strongly on the “common sense” approach, indicating that he would “just be a little more open-minded when setting the upper end.”

Numerous respondents felt that “we should stop obsessing with extreme scenarios” and be less concerned with “the big one” because “there is a big difference between perception and reality,” referring to the image of “the big one”

as a misrepresentation of a much simpler and safer reality. This view is consistent with both Clarke's (1993) disqualification heuristic and Gephart's (1984) notion of organizationally based environmental disasters (OBEDs) in which business interests construe accidents as "unanticipated, rare" (p. 211) events. When asked by the researcher to examine this position in light of recent world events and consider intentional acts, Environmental, Health and Safety respondents remained unified in their position that such scenarios were so unlikely as to be of no value and relatively low risk. They felt that enhanced security, restriction of "sensitive" information from the public, vulnerability assessments and other "defensive" measures would readily negate such threats. This view was sharply opposed by other respondents, who expressed concern over the potential for large intentional acts, particularly with the loss of public oversight and potentially decreased vigilance. Most Local Emergency responders and On-Scene Coordinators felt that not only could such events occur, but that their response capabilities could easily be exceeded and that planning and preparation must be "comprehensive and out in the open." Environmental, Health and Safety respondents felt that planning for such events was beyond their scope. Arguments for and against this position are examined in *Predicting the Unpredictable* within this chapter.

When discussions of the definition process turned to group interaction, most respondents, noting that "this is not an exact science," indicated that although the process might begin with individual experiences and opinions, the final product is eventually "negotiated by committee," with the particular views of

senior emergency managers or planners eventually winning out if there is disagreement. This posed a serious issue for several individuals who recounted examples of “scaling down” or outright disqualification of what they felt were very legitimate scenarios in favor of lesser or simpler ones, completely in line with Clarke (1993). By contrast, no one could dictate any examples of final scenarios being scaled up beyond recommendations. Regarding input to the process from outside the specific assessment or planning group, there was strong consensus that it was welcome, but only on the condition that it meet the “reasonableness” standard employed within the particular group. This position is again reminiscent of Clarke’s (1993; 1999) notions of disqualification and the tendency of planners, or “fantasizers” (p. 167), to rule out those who criticize them as irrelevant to the discussions.

When asked questions about debate or checks and balances between respondent groups, all generally agreed that “‘realistic’ is up to the facility to decide,” and that others, including themselves in the case of Local Emergency Responders and On-Scene Coordinators, had little or no legitimate role in that process. This is consistent with Clarke’s (1988) theory that organizations, in this case chemical facilities, rather than the public define acceptable risk. Although Local Emergency Responders and On-Scene Coordinators did not indicate having lost power struggles or otherwise resisting this outcome, their positions reflected an obvious information dependency with the result of framing of scenarios left to facility Environmental, Health and Safety personnel, again per Clarke (1993).

In summary this first step in the contingency planning process, the social construction of “realistic” as it relates to worst-case scenarios, appears on the surface to be a straightforward, consensus issue of experience and “common sense.” There is a clear trend toward equating history and experience with “common sense” and imposition of that standard on the group process, particularly when dealing with outside input. Mandatory worst-case scenarios are seen as “extreme” and are disregarded in favor of “things that could really happen.” On all of these points respondents readily agree within and across groups. However, when viewed from outside, it is apparent that within this insider group specific sociological theories of organizational deviance play significant roles, Clarke’s (1993) disqualification heuristic being by far the dominant influence.

Local Emergency Responders and On-Scene Coordinators disclaimed any role in the definition of facility risk and clearly illustrated information dependencies, describing “negotiation by committee” and “scaling down” of scenarios by senior managers and planners. With organizations ultimately defining acceptable risk (Clarke 1988) and significant accidents or intentional acts perceived as rare, unanticipated events (Gephart 1984), the organizational output of an elite minority of individuals within this participant group appears essentially unchallenged.

Predicting the Unpredictable

Respondents were asked questions regarding their perception of worst-case scenarios that might affect their respective facilities or, in the case of Local

Emergency Responders and On-Scene Coordinators, any or all of the facilities within the sample population. The researcher explained that this was not intended to evoke a complex process analysis, only general scenarios that might lie outside those reflected in the published contingency plans, which then could be related in simple terms of relative magnitude, i.e. larger, smaller, the same. The object was to explore whether respondents viewed plan scenarios as adequate within their own operating definition of “common sense” and realistic, as discussed in *Experience and Common Sense* within this chapter, and if not what they would put forth instead. Within and across groups, there was sharp disagreement over nearly every aspect of published and alternative scenarios, defining worst-case, regulatory approaches and motives.

The majority view of Local Emergency Responders and On-Scene Coordinators was that worst-case scenarios would almost certainly be “big events that the plans never talk about.” These events would be “much worse than the plan,” with many feeling that facilities “take care of their own” and would not worry about impacts on others, resulting in “bare minimum scenarios where almost none of the events are very bad and everything always works.” Several shared the opinion that “facilities plan only for events that they can afford and manage,” insisting “we should be and are looking at larger, more exotic events,” since they “almost never happen, but do.”

On the surface this position seems to contrast sharply with the views put forth in *Experience and Common Sense*, in which most respondents indicated a common awareness of the paternal role of facilities in defining acceptable risk

and constructing scenarios, and complete agreement that going beyond “common sense” and worrying about extreme scenarios was neither useful nor acceptable. However, the researcher proposes that in fact the views are consistent since at this point the disagreement is not really over *whether* to use “common sense” as the standard for planning, but instead *whose version* of “common sense,” falling squarely back upon Clarke’s (1988; 1993) notions of the disqualification heuristic and the organizational capture of the role of defining risk. A small minority adopted a less jaded view of motives, allowing that potential events would exceed plan estimates simply because “planners might not have adequate experience and awareness.” The lack of regulatory requirements to address criminal acts and “wholesale failures” was blamed by some for “failures due to a low planning bar.” In contrast, another minority group felt that although Risk Management Program requirements allow no flexibility and do not look at intentional or multiple effects, the approach is fair and useful because it is standardized and evenly applied. In all cases, these respondents were in complete agreement that for larger-than-planned events “we would be underprepared and areas and people affected that were thought safe.”

As a group, Environmental, Health and safety respondents offered no scenarios outside of the “reasonably foreseeable events” contained in their respective plans, and described “going to a great deal of effort” to ensure that the plans would be effective. They universally felt that their scenarios represented realistic events, controls and outcomes, disqualifying other possibilities within their control. In this view, they stood alone and in sharp disagreement with the

other respondents. Many Environmental, Health and Safety respondents consistently indicated that mandatory Risk Management Program worst-case scenarios are “extreme and only scare the public.” When asked to speculate how any event might exceed the plan, they indicated concerns of having publicly available planning information used against them by revealing “sensitive data,” thereby allowing someone to exploit the facility contingency plan or even the Area Contingency Plan, which is the integrated planning document for the entire region. They proposed that in such a scenario, facilities would be victims of intentional acts beyond their control, which could not reasonably be anticipated, and for which they should not be held responsible. When asked whether the admitted possibility of such an event made it worthy of consideration for planning, the group felt that such events were beyond the scope of individual facility planning and were a “regional and governmental issue” requiring outside resources and controls. This position is directly in line with Gephart’s (1984) notion of Organizationally Based Environmental Disasters and “political sense-making” (p. 212), wherein capital interests succeed in normalizing negative outcomes and avoid individual liability for these “rare and unpreventable” events. Turner’s (1976) “failures of foresight” model seems applicable here in that Environmental, Health and Safety respondents did not fail to anticipate such events, but instead deflected responsibility and liability, relying on others to shoulder the burden, consequently taking little or no individual action. Reconstruction of an eventual failure of this type would almost certainly illustrate Turner’s criteria of ignoring warning signs and discounting the possibility of

disaster. However, at that point the argument might be made by Environmental, Health and Safety respondent organizations that in fact they anticipated and even warned of such outcomes, but that responsible others failed to take appropriate action to protect them. Thus, these groups might claim victim status by asserting claims of recreancy (Freudenburg 1993) and “failures of foresight” (Turner 1976) against the other victims, those being the government and society. Such a scenario does not support Perrow’s (1999) notion of “normal accidents” in that although an outcome of complex systems, such failures are actually foreseeable and not the result of unknown interactions.

Environmental, Health and Safety respondents noted that external acts should be of much greater concern to planners than “theoretical” catastrophic failures within a facility, which are reportedly minimized by adherence to strong design, safety and security procedures. Most other respondents sharply contrasted these views, indicating that even if letting Environmental, Health and Safety respondent facilities define worst-case scenarios might be more accurate, which they did not believe, “they might not be forthcoming or able to do the job,” voicing skepticism and a concern over vulnerability to recreancy (Freudenburg 1993). The opposing sides of this issue described irritation at the picture painted of them by others, and at having motives questioned.

Several respondents across groups felt that the current “obsession with exotic scenarios” overshadowed day-to-day events and risks, which in their opinion posed the greatest threat to any facility. In explaining this position, this group tended to appear somewhat exasperated, expressing frustration that

worst-case scenarios were seen as predictors of the future, not just theoretical possibilities. No one was happy about it. Some were angry, while others simply shrugged it off as something beyond their control or as a cost of doing business in post-9/11 America. One respondent voiced a distinctly candid view in his description of a worst-case scenario: “Being forced to shut down or relocate due to WMD [Weapons of Mass Destruction] or worst-case scenario paranoia is worse than killing or sickening a few thousand people.” He was admittedly bitter about the perceived treatment of chemical facilities by regulators and public watchdog groups, explaining that he had no wish for anyone to ever be injured, but that trying to reduce all risk to zero was “killing” an industry. In another telling reflection of normalization of negative outcomes (Gephart 1984), his alternative worst-case would be the use of a chemical plant as a Weapon of Mass Destruction, since “people would lose faith in the industry.” Asked what kind of “faith” people had in “the industry,” this person described how people relied everyday on the products and jobs that the chemical industry provides on a reliable and safe basis. The referenced “faith” was that the reliable process was done, and would continue, with the best interest of everyone at heart and with honest motives. Although this individual may or may not have been alone in his thoughts, he was unique in voicing these opinions.

The very few neutral respondents felt that whether the worst case was more or less than the required Risk Management Plan scenarios would depend on the specific facility and their respective conditions and resources, concluding that scenarios “may be worse or better, but they will definitely be different.”

Within this group, certain Local Emergency Responders made a very clear division between human and environmental concerns: “We have to watch out for people, so the environment is on its own.” Said candidly and without emotion, this might seem to an outsider as contradictory to the overall view of community risk management. It is not. The “people first” tenet referenced numerous times in this study is a very real decision-making tool for these respondents. It is not a shirking of duty by ignoring effects on the environment. It is simply a vivid observation that as first responders their job is to save lives. Everything else is a bonus. Reading visual cues during the interviews and listening to the blunt words, it is obvious that these people are serious about their work, and they take the responsibility to heart. Published plans aside, they will intercede on behalf of the public. In their view, a release “does not have to be big, just effective” and so they focus their efforts on areas where “chemicals are in proximity to people” with little regard to plan scenarios.

In summary this step in the contingency planning process, evaluation of the adequacy of worst-case scenarios, appears highly controversial with respondent comments clearly demonstrating the role of organizations in defining acceptable risk (Clarke 1988) and framing significant events as rare and unanticipated (Gephart 1984). While all respondents generally agreed that the scenarios defined within the Risk Management Program were neither adequate nor realistic, the claimed reasons for this were clearly opposing and divided between facilities, which argue that they are extreme and unreasonable, and most others which argue that they do not go far enough in considering intentional

acts or “superevents.” The combination of normalized negative outcomes, facility aversion to liability for planning for external acts or events and the prevalent influence of disqualification results in the construction and institutionalization of worst-case scenarios for which facilities show unwavering support and of which most recipients are openly skeptical.

Across the Fence

One tool available to planners and emergency responders is the Offsite Consequence Analysis required by the Risk Management Program for each of the participant facilities in this study. The analysis considers various site conditions and relies on certain assumptions and models to predict potential offsite impacts and the distances at which they may occur. The type and magnitude of the worst-case scenario varies by chemical, but is specified in the Program rule and cannot be modified by the facility. Respondents were asked questions regarding the use and value of Offsite Consequence Analyses in the planning and response process. While responses revealed some disagreement but no sharp divisions between groups, there was consensus that protecting people was the primary goal, with effects on the environment being of much less concern.

Environmental, Health and Safety respondents were divided on the issue of whether the magnitude of events reflected in the scenarios was reasonable, with approximately half stating that they were subjective and overly conservative, representing scenarios that are “too big,” “extreme” and “unrealistic,” serving only to “scare people rather than educate them.” Because of this, that group viewed

the analyses as not useful and essentially an “exercise for regulatory compliance” with no practical purpose. The remaining respondents were less critical of the large magnitude of the prescribed events, describing them as “somewhere between ignore and absolute science,” indicating that regardless of whether the models were “excessive,” they had value as a tool for prioritizing planning and outreach efforts.

Many respondents voiced the general opinion that since “everything usually makes it across the fence,” Offsite Consequence Analyses were a means to “look outside the fence in a meaningful way” and focus limited resources in areas of greatest concern. The majority saw the analyses as a vehicle to raise awareness for “people in at-risk areas” or for “special populations” such as nursing homes, schools and hospitals. There was general agreement that chemical events “will not kill most people,” making the analyses a good tool with which to engage the media in attempting to devise warnings that could be focused in the appropriate areas. In this way, during an emergency a specific group of affected persons could be reached and instructed to take appropriate action, i.e. evacuate, shelter-in-place, as opposed to broadcasting general warnings across large areas. This raises the issue of whether models are sufficiently accurate to allow such precise demarcation. The consensus response was that even with potentially large margins of error, the conservative nature of the analyses yielded the largest conceivable areas of impact, and therefore probably represented more than the likely worst-case scenario for the specific event. While this argument bolstered Environmental, Health and Safety

respondent claims that the models were indeed excessive, there was near consensus, even if reluctantly, that for a “worst-case” planning tool, this was actually an advantage, in essence “erring on the side of safety.”

A minority view held that the consequence analyses were only useful as a secondary source of information, preferring to base planning on the results of inspections, site history and participation in planning efforts to “get a feel for response needs and capabilities.” Indicating a tendency toward disqualification, these respondents felt that if analyses were not “realistic,” the planning area should be reduced to fit the perceived threat. When other respondents were asked how or whether this specific issue of “scaling down” might influence planning, they were evenly divided between using the predicted extent of the impact as a planning boundary and adjusting the area based on review and group reaction to the area of concern. As the requirement for development of the consequence analyses does not extend to any actual use of the information, this response illustrates the vulnerability of the planning process at this point to disqualification and organizational capture of the role of defining risk (Clarke 1988; 1993).

In summary, arguments continued over whether worst-case events developed for Offsite Consequence Analyses are too unlikely and only “scare people” or they have value as a planning tool. However, in keeping with the “people come first” tenet of this group, respondents were generally able to agree, even if reluctantly, that although possibly extreme and not necessarily accurate, the analyses were at least useful as a guide for prioritizing and delineating

planning and outreach efforts. The key contributions cited by most respondents were use of the models to identify “special populations” which might be affected, and being able to focus warnings within targeted areas of concern. However, concerns and debate were evident over the appropriateness of “scaled down” areas of concern and proportionately reduced levels of effort and resource commitment. Although development of the consequence analyses is mandated by the Risk Management Program, use of this tool for planning is optional and clearly its role is subjective and tends to be “negotiated by committee.” In this environment, disqualification and organizational capture of the role of defining risk (Clarke 1988; 1993) appear to be key influences in the outcome.

Home Court Advantage

Each of the participant facilities in this study maintains an onsite Hazardous Materials Emergency Response Team. These onsite Teams reportedly receive extensive training and resources and are expected to perform as “first responders” in the event of a hazardous material incident at their respective facilities.

To gain a better understanding of the perceived risk to onsite responders, respondents were asked questions regarding risk to their Teams while responding to worst-case events at their respective facilities. There was near consensus that risk for onsite responders should be lower relative to offsite responders due to “home court advantage,” and without exception Environmental, Health and Safety respondents reported this to be the case. They supported this position by highlighting “good training and resources,” noting

that “ER [emergency response] risk is always potentially high for anyone” but these inherent risks are minimized by “stressing safety and preparedness” for these “committed, well trained and professional” Teams. Noting that “we live here and care more than anyone what happens,” several voiced the opinion that “we are in the business of safety and risk reduction and feel very confident of our abilities.” This suggests the influence of other characteristics of Clarke’s (1993) disqualification heuristic, those being a heavy reliance on assumptions about the process and a tendency to view them as safe.

When asked about risk to responders during events that might exceed Plan scenarios, one Environmental, Health and Safety respondent insisted that “The level of risk would not exceed the equipment and training capabilities of our personnel, and nothing is worth getting an employee killed.” All indicated that “they would back off” if necessary in the interest of safety, while one remarked that “sci-fi events are too extreme to be of practical concern,” again exhibiting a tendency toward disqualification (Clarke 1993).

Although divided on the issue, most Local Emergency Responders and On-Scene Coordinators voiced two sharp criticisms of the “home court advantage” theory, the first being a strong concern that although “those guys live there everyday,” which should lower their risk, the familiar routines and experiences actually make them complacent and less cautious. Most felt that while “plans make it sound like very low risk for onsite responders,” at many facilities that assumption is simply not accurate. “Those guys don’t think they can get hurt and are too willing to take significant risks” was a common

reference. However, several within these groups indicated confidence that facilities are more realistic about their own hazards and “know best what needs to be done,” minimizing risk through “greater awareness, process knowledge, preparation and resources.” A distinct minority reported that risk for onsite responders “is all over the board,” is directly related to the level of effort and resources and would vary by facility. The second criticism of “home court advantage” leveled by several Local Emergency Responders and On-Scene Coordinators was that facilities and onsite responders tend to “focus on saving their own” and often “do not look beyond their fence” when planning or responding. This “puts everyone else at risk” due to the lack of information and little or no warning time. This view is in line with Clarke and Short’s (1993) notion of a misplaced reliance on organizations to respond adequately to accidents when in reality failure to perform is actually normal. In those cases where offsite and onsite responders would operate jointly, many respondents felt that risk was higher for everyone due to the lack of extensive experience together and the problem of “having to get to know each other” during a crisis, particularly since the initial stage of an emergency “is always the most dangerous for everyone.” Some indicated that the problem would be exacerbated by reliance on plans which “looked good when we got them,” but failed to adequately address scenarios and resource needs, again referring to arguments put forth in *Predicting the Unpredictable* within this chapter.

In summary, there was consensus among respondents that in theory facility resources, training and process familiarity provided a strong “home court

advantage” that should serve to lower risk significantly for onsite responders. Although Environmental, Health and Safety respondents were unanimous in their agreement with this theory, most other respondents indicated that home court advantage was actually a disadvantage, promoting complacency, feelings of “invincibility” and a willingness to take significant risks, made worse for all by reliance on inadequate plan scenarios and a tendency for facilities to “take care of their own.” These opposing views clearly demonstrate the continuing influence of disqualification (Clarke 1993) on the part of facilities and the institutionalized reliance on facilities to adequately respond to their own events (Clarke and Short 1993) even over the skepticisms and objections of most outside responders and planners (Gephart 1984).

They Aren’t Making Ice Cream in Those Plants

Offsite response Teams are represented primarily by the Local Emergency Responder and On-Scene Coordinator participants in this study. In some cases participant facility onsite Teams have mutual aid agreements whereby they are committed to respond upon request to incidents at other facilities. For the purpose of this study, facility Teams responding to or from other facilities are also considered as “offsite responders.” This data analysis section examines perceived risk to offsite responders while responding to worst-case events at participant facilities.

Respondents were highly divided on this issue, with sharp disagreement over both the degree of risk and the rationales. While most Environmental, Health and Safety respondents indicated that they would prefer to handle

responses “internally as much as possible,” all recognized that during major events there would necessarily be interaction between onsite and offsite responders, and all agreed that these joint operations increased complexity and risk. However, nearly all declined to flatly characterize risk to outside responders, indicating instead that because of differing Standard Operating Procedures (SOPs) and skill levels, “risk to them [outside responders] is not as simple as high or low,” proposing that whether risk was high or low “was up to them [outside responders] to decide.” The remaining Environmental, Health and Safety respondents felt that even with high safety standards, risk to offsite responders would be relatively high, not due to inherently hazardous facilities and processes, but rather “their relative lack of familiarity and experience with our site and people” and because it is “always risky to play outside your own area.”

Respondents were then asked to consider the issue of whether the chemical facilities were inherently high-hazard and facing unforeseeable catastrophic outcomes (Perrow 1999), and whether they saw that as an uncontrollable, high-risk proposition for them. Local Emergency Responders and On-Scene Coordinators generally indicated that although “they aren’t making ice cream in those plants,” there were few if any events that could not be anticipated or prevented with adequate attention paid to warning signs such as “near misses” and simply admitting the possibility of significant events. While giving no support to Perrow’s (1999) notion of “normal accidents,” this view falls completely in line with Turner (1976) and Clarke (1993; 1999). Of course, one must leave open the possibility that even with proper foresight and intervention, the possibility of

Perrow's (1999) inevitable failures cannot be discounted based simply on working or anecdotal observations.

Most On-Scene Coordinators did not characterize themselves as "first responders" since they would not be the first to arrive on-scene, instead relegating "that honor" to the Local Emergency Responders, described by most respondents as "well-trained and professional." Among On-Scene Coordinators there was general agreement that offsite first responders (Local Emergency Responders and Mutual Aid Teams) lacked direct facility knowledge and experience, increasing their risk when responding to major events. While most felt that the resulting high level of apprehension during a major event would serve to make offsite responders more cautious, theoretically reducing risk, all agreed that "surprises" inevitably result in increased risk. However, some respondents indicated that simply being cautious and thereby "delaying response activities" inherently reduced risk, at least for that Team. This was explained as not a reluctance or evasion of duties, but rather avoiding a "fools rush in" response.

Regardless of their feelings on risk to responders, there was general agreement between On-Scene Coordinators that offsite responders do a much better job of "looking beyond the fence" when planning and responding. However, one individual felt that this concern might extend "even to the point of sacrificing it [the facility]," a view later justified by the "people first" paradigm of the Local Emergency Responders and On-Scene Coordinators "if push comes to shove." Overall, every On-Scene Coordinator felt that the key to reducing risk was for responders was to "know their limitations" and be able to react to

“Murphy’s Law,” which many of them described as “the only constant in all of this,” referring to surprises as changing or unexpected conditions which fall outside of the Plan.

Within the Local Emergency Responder group, there was consensus that as first responders the lack of specific experience and familiarity with facility processes and chemicals put them at a decided disadvantage, voiced frequently as “It’s dangerous for us because we don’t live there.” However, beyond the simple, inherent lack of familiarity, several felt that offsite responders are “simply not fully informed” due to standardized plans and reporting documents that are often “big on information, light on details,” reflecting the scientific resolution of risk assessment and the political treatment of risk acceptability (Clark 1988). One Local Emergency Responder noted that in some cases, “You could read it [the Plan] all day and still not know what’s going to happen when you get there.”

Contractors were described as particularly problematic, cited often as the source of facility accidents due to a combination of poor work practices such as “lighting up next to the ‘No Smoking’ signs” and not having the time, ability or inclination to process or understand the information that might be provided them prior to work on a site. These are all characteristics of disasters noted by Turner (1976). While many described “waiting for the other shoe to fall” whenever facilities had large numbers of contractors onsite in “sensitive” areas, Environmental, Health and Safety respondents disagreed, asserting that strong work rules are in place and applicable to everyone on the site and that “awareness and information flow both ways is strong.”

Several Local Emergency Responders felt that risk to them would vary by facility, influenced heavily by the facility representatives on which they rely for advice on safety matters, while most echoed the opinion heard from OSCs that heightened awareness and caution on their part should serve to reduce their risk. However, caution aside, all Local Emergency Responders reported feeling very vulnerable to “bad surprises,” having learned “not to blindly trust plans or people,” obviously reacting to the threat of recreancy (Freudenburg 1993) as well as the inherent hazards of “just plain dangerous work.” References to Murphy’s Law were frequent.

A common sentiment expressed by Local Emergency Responders and On-Scene Coordinators regarding the role of communication in response risk management was, “In this business, lack of information kills.” Lack of information and poor communication, either during planning or as events unfold, were cited as “the most common killers” and the primary reasons that responders “might drive right into the cloud.” Regarding the ability of contingency plans to “even this up,” many of these respondents felt that even under the best of conditions and with the best of plans, changing conditions and “surprises” assured a “high risk operation every time.”

Many Local Emergency Responders and On-Scene Coordinators continued to voice concerns that Plans tended to be inadequate. Many Environmental, Health and Safety respondents disagreed, saying, “If they reviewed and understood the information we gave them, risk should be low” particularly during joint operations. However, these are precisely the events that

all other respondents identified as the highest risk for everyone, again demonstrating the influences of disqualification (Clarke 1993) and political sense-making (Gephart 1984). In this case, the respondents preemptively assign blame for potential response failures to human error on the part of the end users, Local Emergency Responders, of a planning process dominated by the originators of the plans, Environmental, Health and Safety respondents and their organizations.

It is appropriate at this point to discuss the cues taken from the participants during this line of questioning that simply could not be captured in field notes. Although Environmental, Health and Safety respondents and On-Scene Coordinators obviously have concerns over safety of everyone, the difference between them and the Local Emergency Responders was striking. For example, when the researcher was told, "They aren't making ice cream in those plants," the voice on the other side of the table was flat and as serious as the proverbial heart attack. There was no humor and the statement was certainly intended to politely answer a question that for these respondents reflects life and death issues. The tone was dark and said far more than the words. Nearly everyone in this Responder group displayed the same grim awareness and acceptance of life threatening work. References to plans "light on details," not knowing "what's going to happen when you get there," "lack of information kills," "waiting for the other shoe to fall" and "bad surprises" were given with calm resolve. These responders are aware that planning and actions by others directly affect their chances of staying alive, and it is apparent that they are not

impressed with the “help” they are getting in the form of contingency plans. In all of these responses, words were few and the eye contact firm, emphasizing the seriousness of the issue. The camaraderie between them was obvious, and frankly the researcher had little need to probe or ask follow-up questions. Plenty was said in those few words.

In summary, there was general agreement that offsite responders face relatively high risk, but various theories as to why. With the exception of the Environmental, Health and Safety group, nearly all respondents made frequent references to “bad surprises” as the “guaranteed wild card” that raises risk for offsite responders “every time.” These surprises were largely attributed to events falling outside of those addressed in institutionalized plans, poor communication and to a lesser extent contractor error and/or “just plain dangerous work.” Outside responders clearly feel a sense of high risk and vulnerability, often “waiting for the other shoe to fall.” This puts them squarely at odds with Environmental, Health and Safety respondents, who tended to describe high risk to outside responders, if it exists at all, as a condition completely of their own making and not due to any inherent hazards of the site. Responses and opposing positions across all groups demonstrate clearly the influences of organizational disqualification (Clarke 1993), conflict over risk assessment and acceptability (Clarke 1988), political sense-making (Gephart 1984), and concerns over vulnerability to recreancy (Freudenburg 1993).

Summary of Risk Perception and Worst-Case Scenarios

This chapter addressed the first of two research questions: How do insiders perceive risk and define worst-case scenarios? Respondents discussed perceptions of risk, defining “realistic,” potential worst-case scenarios beyond those addressed in contingency plans; the role of Offsite Consequence Analyses; and perceived risk to onsite and offsite responders during worst-case events. Regarding the issue of defining “realistic,” there was near consensus on the use of “common sense,” but sharp disagreement over what that was and whose version was accurate. Respondents were deeply divided on the question of defining worst-case scenarios and assessing risk to offsite responders, while on most other questions positions and rationales varied less dramatically.

It is apparent that for this group of respondents the process of defining “realistic” is far from resolved, even with the consensus use of “common sense” as the gauge. In fact, the seemingly intuitive use of “common sense” may actually create the heavy reliance on “experts” and assumptions about complex processes (Clarke 1999), since simplifying and managing complex issues is what experts ostensibly do best. However, this is not a simple matter of availability of information or experience, and expert “common sense” implies full understanding and consideration of every possibility, allowing risk to be managed in a defensible, scientific manner (Clarke 1988). Environmental, Health and Safety respondents saw this as an appropriate application of “common sense,” while other respondents objected strongly, feeling that it is a one-sided approach which favors the facilities, demonstrating a power struggle between the parties (Clarke

1988) that ultimately “scales down” the significance of the threat posed by the facilities or at least the discussion of it.

Regarding the construction of appropriate worst-case scenarios, there is agreement that mandated worst-case scenarios are neither adequate nor realistic. However, the rationales were polarized between Environmental, Health and Safety respondents, arguing that the scenarios are extreme and unreasonable, and most others arguing that the scenarios do not go far enough. Showing unwavering support for scenarios of which most other respondents are openly skeptical, in the end it appears that facility contingency plans won out and planners and responders relegated themselves to managing “surprises” at every turn, openly expressing concerns over vulnerability to the threat of recreancy (Freudenburg 1993). In discussing these “surprises,” outside responders contrasted Environmental, Health and Safety respondent claims of “home court advantage,” voicing concerns over complacency, inadequate plans and a tendency to focus “inside the fence” to the detriment to others. As a result, Local Emergency Responders clearly feel a sense of “high risk” for themselves, putting them directly at odds with Environmental, Health and Safety respondents, who tend to describe outsider risk as a condition completely of their own making. This contrast demonstrates the influences of organizational disqualification (Clarke 1993), conflict over risk assessment and acceptability (Clarke 1988) and political sense making (Gephart 1984).

In conclusion, Environmental, Health and Safety respondent organizations within this participant group have clearly claimed the role of defining acceptable

risk, and within that group Clarke's (1993) disqualification heuristic is by far the dominant influence. Significant accidents or intentional acts remain portrayed as rare, unanticipated events, unrealistic and therefore excluded from consideration in contingency plans. From this the organizational output of a minority of individuals appears to have been implemented and institutionalized even over the concerns of other participants. There is little doubt that careful reconstruction of a catastrophic failure under these conditions would certainly be seen in hindsight as a clear failure of foresight (Turner 1976), following in the example of the "impossible" events of September 11, 2001.

CHAPTER 6: ANALYSIS OF RISK PERCEPTION AS A DRIVER FOR CONTINGENCY PLANNING

Introduction

Purportedly a great deal of effort goes into developing a contingency plan, starting with which scenarios should be considered and why. As a guideline, the Risk Management Program details mandatory worst-case scenarios for each of the participant facilities in this study. However, beyond analyzing those scenarios for offsite consequences, there are no requirements for how that information is used.

As the written output of an internal risk assessment process, a facility contingency plan becomes the foundation for all subsequent internal and external emergency response planning regarding that facility. These Plans incorporate potential event scenarios, process controls, response capabilities and strategies, available resources and estimates of potential event impacts and ostensibly represent the best possible solutions. Onsite and offsite responders rely heavily on contingency plans and regardless of whether they have confidence in them, there is little else to go on for information or preparation.

Chapter 5 of this study, *Analysis of Risk Perception and Defining Worst-Case Scenarios*, examined how emergency response insiders tend to disregard the mandatory scenarios as either too extreme or insufficient, attempting instead to define “realistic” events by relying on “common sense.” The resulting conflicts over what that term means and whose version is correct drive political and scientific power struggles heavily reliant on experts and lead to few if any mutually satisfactory conclusions. From analysis in Chapter 5, it is apparent that

planners and responders are deeply divided and the most significant component of the planning process, what to plan for, is vulnerable to what seems the simplest of questions: What makes sense? Regardless of whose version of common sense wins out, the selection of scenarios sets the stage for all of the planning that follows.

From a “scenario pool” filled with potential events, planners must evaluate and select those deemed appropriate. This chapter examines that process by addressing the second of two research questions: How does risk perception drive contingency planning? To gain a better understanding of this process, respondents were asked questions regarding incorporation of risk perception into contingency plans; use and adequacy of regulations as a basis for planning and response; adequacy and efficacy of contingency plans; the role of the public in planning and response; and recommendations for improvement. As in Chapter 5, the often-candid responses to these questions provided the researcher with an intimate look at the respective points of view of the participants. Again, as in Chapter 5, prior to any formal analysis the influence of several sociological theories of organizational deviance was apparent. This chapter is grouped into five themes that emerged from analysis of the data and which seemed to fairly describe the essence of the particular topic: *Making the Cut*, *Filling in the Blanks*; *They Won't Do the Work*, *Fantasy Documents*; and *The Fix*, concluding with *Summary of Risk Perception as a Driver for Contingency Planning*, which briefly summarizes the analysis and critical points made in the chapter.

Making the Cut

Respondents were asked questions regarding the process by which potential scenarios are selected from the “scenario pool” and eventually incorporated into planning, training and exercises, which they frequently referred to as “making the cut.” They displayed near-consensus on the inclusion of only those deemed “realistic” or “credible” as presented in *Experience and Common Sense* in Chapter 5. “If we think it might happen, we put it in” was a typical sentiment, and some respondents referenced “case studies” as key when attempting to determine potential severity and probability.

Mutually acceptable “benchmark events” continue to be the goal of nearly all of the respondents, but defining them remains elusive and controversial, particularly since there is little agreement across or even within between respondent groups. A few Local Emergency Responders felt that the key to “the right type and amount of planning” was to focus on specific hazards to specific communities, relying heavily on public information and awareness to ensure proper response, like shelter-in-place. In this way, they said, “We keep the reality level where it should be.”

Many respondents noted that regardless of which scenarios are selected, debate continues over not only whether the scenarios are appropriate, but also whether the contingency plan will adequately address them since “big ones can really only be exercised on paper.” While reflecting concerns over the adequacy of scenarios, this also demonstrates a larger concern over the adequacy of contingency plans, which is examined in *Filling in the Blanks* within this chapter.

All respondents agreed that worst-case scenarios as prescribed by the Risk Management Program must be included regardless of whether they were deemed credible by the group. Several Local Emergency Responders noted that those were merely a formality since “no one can handle worst-case scenarios anyway.” A few On-Scene Coordinators indicated that more time spent on “prevention and planning” would alleviate the need for “worst-case scenarios or that mindset,” clarifying that the referenced “prevention and planning” should focus on lesser, more common events, which would avoid the distraction of paying excessive attention to “extremely remote possibilities.” Several respondents from all groups generally agreed that “textbook scenarios must be adjusted with your own opinions, otherwise you will have low credibility and be seen as unrealistic.”

Most respondents openly expressed a tendency to minimize consideration of those scenarios, following the arguments put forth in *Predicting the Unpredictable* in Chapter 5, focusing instead on “alternative scenarios” allowed by the Risk Management Program regulations. However, alternative scenarios are developed by facility risk managers based entirely on their judgment of site conditions, controls and accident experience, and tend to be far less severe than the mandatory worst-case scenarios. Outside of Environmental, Health and Safety respondents, most felt that looking only at alternative scenarios would shift the focus to “less strenuous exercise for them [facilities].” This illustrates the conflict between groups over definition and common sense, marking the “middle ground where the battle is fought,” referring to the mutually acceptable

“benchmark scenarios” that all respondents reportedly seek. A lone dissenter felt that worst-case Risk Management Plan scenarios should be incorporated “by the book, with no room for personal opinion,” eliminating arguments over definition.

As relative outsiders “operating from a distance,” On-Scene Coordinators were strongly and evenly divided on their perceived roles in developing and selecting scenarios for consideration by Local Emergency Responders and Environmental, Health and Safety respondents. Some advised “injecting ourselves into the process and promoting group input” since they saw their role as “helping the audience, and they need to be open to every possibility.” Others felt that the role of an On-Scene Coordinator was “to help only when needed, but not dictate,” giving input only after “the facility does their homework and wants to supplement their plan,” indicating an acknowledgement of the assumed lead role of the Environmental, Health and Safety respondent organization in defining risk and acceptability (Clarke 1988). A third On-Scene Coordinator group felt that they had no role at all in the process, stating that they “don’t believe in worst-case scenarios since they never happen.” These individuals advised that planners should seek only limited outside input and “do the minimum required” for such scenarios, focusing instead on “ones that can really happen,” clearly demonstrating Clarke’s (1993) notion of disqualification.

Local Emergency Responders and Environmental, Health and Safety respondents were likewise mixed on the role of input from On-Scene Coordinators. Local Emergency Responders generally welcomed input, but acknowledged that since opportunities for direct contact with State and Federal

personnel were limited, the On-Scene Coordinator would practically be limited to only a review role.

Environmental, Health and Safety respondents generally felt that On-Scene Coordinators should and did properly assume a role limited to administrative review of contingency plans developed at “the local level.” They argue that since Risk Management Program regulations dictate planning and scenario boundaries, and alternative scenarios are heavily dependent on local considerations and site conditions proposed and debated at the local level, On-Scene Coordinators could offer little in the way of practical insight. While possibly correct from a logistical perspective, such an exclusion of input, even willingly on the part of many On-Scene Coordinators, results in limited overview of the process and increases opportunities for disqualification and a dominant role of Environmental, Health and Safety respondent organizations in defining risk (Clarke 1988; 1993).

Several Local Emergency Responders indicated that once facilities determine what constitutes worst-case scenarios and incorporate these into the contingency plans, “everyone else really just reacts to their information and tries to manage the possibilities” through the Area Contingency Plans. These respondents candidly remarked that in the end, the Area Plans reflect “doing what we can with what we’ve got,” particularly in the face of “the 51 percent vote” of senior Emergency Managers. Describing this “51 percent vote” created discomfort for respondents and a test of the trust between participant and researcher. On a professional level, most of these individuals simply did not like

airing “dirty laundry.” On a more basic level, many of them were aware that the researcher knew their supervisors and co-workers. They were visibly guarded about making comments that might “lead back to them through their bosses.” During this dialogue, each of them watched the researcher intently to get a read on whether they should worry. No one had to ask and no one did. It was simply understood that the matter would not come up again outside the pages of this project. As discussed in others portions of this study, this type of dialogue was precisely why the robust confidentiality measures were needed. As with other topics of discussion, the researcher is certain that the existing relationships and his knowledge of the topic encouraged the frank discussions.

As in other responses, “surprises” continued to be a common concern among all except for Environmental, Health and Safety respondents. Regardless of the concerns voiced over “surprises” during responses at facilities, a few Local Emergency Responders indicated “Transportation events are the worst due to high frequency and unpredictable quantities and conditions, which makes them almost impossible to anticipate.” Others strongly disagreed, noting that although transportation events “might occur any time and any place,” they were much smaller in scope and quicker and easier to bring to conclusion.

On whether selecting scenarios from “the pool” and focusing on those reflected a true incorporation of risk perception into the process, most respondents replied that it was “only a reasonable effort” and was “as good as it gets” given the constraints of politics, time and resources. However, one Environmental, Health and Safety respondent went further, feeling that the best

incorporation of risk perception into planning activities would be to show enough concern to practice the plan, test contact numbers and communications equipment, have biannual meetings with offsite responders to evaluate site conditions and transfer information, conduct drills and most importantly, “be selective when designating response leaders.” The importance of having the “right” response leaders was echoed by all other respondents, particularly as it was related to making good, fast decisions, but most importantly for many Local Emergency Responders and On-Scene Coordinators, being able to anticipate and react to changing conditions and the ubiquitous “surprises.” Environmental, Health and Safety respondents tended to downplay the issue of surprises, instead proposing that it was simply necessary for a good manager to “be flexible” when necessary to “get the job done.”

In summary, respondents relied heavily on criteria of “realistic” or “credible” when determining whether potential scenarios would “make the cut” and be included in planning and exercises. However, the goal of mutually acceptable “benchmark events” remains elusive as respondents voiced opposing opinions on “the middle ground” between the “extreme” Risk Management Plan scenarios and the minimal-impact alternative scenarios put forth by Environmental, Health and Safety respondent organizations. As for incorporating outside input into the process, opinions of On-Scene Coordinators were evenly divided between active engagement, input only upon request and minimal to none. Local Emergency Responders described fighting the “51 percent vote” of senior Emergency Managers and the constant threat of surprises, indicating that

considering politics and the constraints of time and resources, this is “as good as it gets.” Logistics and distance necessarily limited input into the local process by On-Scene Coordinators, which Local Emergency Responders reluctantly accepted, but Environmental, Health and Safety respondents saw as appropriate due to their limited potential insights into a “local process.” All respondents agreed that regardless of the scenarios chosen and the plans made, having the “right” leader was key to a successful response, particularly when faced with changing conditions or surprises.

Filling in the Blanks

Planning and emergency response activities are required and framed by regulatory requirements, but those requirements do not provide detailed guidance for every activity or situation. Instead as examined in Chapter 2, *Regulatory Background*, they generally require or provide only a basic framework, specifying for example that an appropriate Site Safety Plan with certain components is developed for emergency response activities. The precise details of what goes into that Safety Plan are left to those developing it, but will rely heavily on other regulatory requirements, resource constraints, site conditions and perhaps most importantly, experience of the involved individuals.

To gain a better understanding of the regulation/planning dynamic, respondents were asked questions regarding the adequacy of regulations as a basis for their planning and emergency response, and their views on the perceived flexibility or burden of “filling in the blanks and getting the job done.” Without question, the most frequent and immediate response from respondents

in any group regarding regulations as an adequate foundation was an emphatic “They suck,” with little or no elaboration. Mannerisms clearly indicated a feeling of “You had to ask?” aimed at the researcher as if so obvious as to need no question, and certainly no answer. Interestingly, upon further discussion this near-universal reaction was found to represent two sharply opposing views: the majority, who felt that regulations clearly went too far versus those who felt just as strongly that regulations fell short and must do more. The “too far” group knew that a rollback of regulatory framework is unlikely and worried that they might be perceived as simply trying to escape doing a good job. The “do more” group expressed some nervousness over the potential ramifications of asking for more regulations, knowing that the results might be inflexible blanket approaches and likely not the surgical solutions they envisioned. In either case, both groups generally concluded that everyone might be better off simply continuing to “fill in the blanks” and improvise under the current system, fearing that substantial changes might be worse.

Environmental, Health and Safety respondents were mixed in their views on the regulatory foundation. Most generally described regulations as “too rigid” or “complicated,” noting that such a structure forces the creation of “bulky and complex contingency plans” which “prohibits flexibility” and prevents innovative or more cost-effective solutions that might be available. A minority view held that adequacy of regulations depends on the particular facility, observing that “The higher the risk, the more variables you have, and the less effective the regulations.” This was clarified as referring to “filling in the blanks and doing

what it takes,” putting the burden of defining and managing risk directly on the company. Ultimately, they said, “Some are willing to spend the money to meet the spirit of the law, and others are interested only in legal compliance and lower expenses.” Several described planning and emergency response regulations as “a good driver” for the planning process, assigning “some value” in requiring communication with emergency responders, but overall ranking them as “a poor foundation,” too complex and sometimes even contradictory. A common complaint from this Environmental, Health and Safety respondent group was that “Right-to-Know information is not secure enough,” adding to the risk of “outside actions” through exploitation of published contingency plans and related information.

While Local Emergency Responders generally expressed empathy for the complexity and burdens placed upon reporting facilities, most agreed, “Right-to-Know was good for us. It gave firefighters information about hazards.” Beyond that, this group was completely divided on whether the regulatory structure was adequate to “get what we need” and the reasons for that. One felt that regulations are “adequate for everything except OCAs [Offsite Consequence Analyses], because they only require identification of potential impacts and no reduction or prevention. This does not really protect anyone, and the regs [regulations] should watch out for people first.” A second felt that regulations are adequate, but need to be better enforced, which would “make facilities pay more attention to the overall issue of safety and preparedness.” This individual wanted Local Emergency Responders to have more oversight, “because we have no real

input or control, only review and react and it means we have to take most everything on faith,” referring to ongoing concerns over vulnerability to recreancy (Freudenburg 1993). A third felt that regulations “are not very adequate” as a planning and response tool even though “they are really pretty minimal and not that hard to do.” He concludes that most facilities “are either just not committed or have to choose between making or spending money,” illustrating public interest losing out to competing interests (Vaughan 1992; 1996; Meyer and Rowan 1991). A fourth expressed concern that “if regulations were all we had to go by, it would handcuff us,” explaining that the current structure allows no flexibility, forces preparation for extreme events and measures and gives no quarter when it comes to enforcement. He warned, “if tunnel vision and rituals are what you want, be careful what you wish for, you just might get it.” A fifth felt that “Contingency plans are only partially effective, and for some it is a hardship even to comply” because regulations are seen as subjective and vague. A sixth wanted “to see regulations get tighter” and more specific about planning, worst-case scenarios and public involvement. He felt that this would eliminate many “gray areas where we have to just fill in the blanks, since all these different opinions just make that harder.” A seventh Local Emergency Responder deferred the issue to “the facilities” since in his view, “The regulations require facilities to do most of the analysis and planning anyway, so whether they are adequate is really for them to decide,” adding “But it would probably help to require more planning for bigger events.” His deference to the subject facilities

falls directly in line with Clarke's (1988) notion of the organizational capture of this role.

On-Scene Coordinators, like the Local Emergency Responders generally acknowledged that regulatory requirements create a significant burden on affected facilities, and a common complaint was that regulations are adequate but confusing because "Lawyers wrote these things. They are not user friendly and are difficult to really understand and comply with." Empathy aside, most echoed the need for good planning as expressed by one respondent: "The current regulations are overwhelming and I wouldn't want to be them [facilities] but the fact is that simple compliance is not enough. Facilities must go beyond that and regulate themselves to a higher standard." One respondent in this group had serious issues with the focus on planning based on listed chemicals and thresholds, stating "it is unrealistic to limit planning to listed chemicals and thresholds, since this exempts many dangerous process and chemicals. Many facilities investigated for fatalities and large releases are exempt from RMP [Risk Management Program] and other regulations." He felt that public perception and "regulatory obsession with unrealistic Worst-Case Scenarios" force complex work-arounds at facilities in an effort to be exempted, increasing hazards from handling smaller amounts of chemicals more frequently. In his view the current system promotes Hazard Analysis of predefined Worst-Case Scenarios over prevention and preparedness for lesser, more realistic events "which should really be the focus." Others argued that while some regulations "are more robust than others, some are simply overkill." They explained that as "only a start" in

the planning process, regulations provide a good structure for plans, but “a plan is much more than just a written document and cannot tell you everything you need to do.” A good contingency plan “must recognize and address relationships and people skills” by using “common sense and the real world to fill in the gaps.” If these factors are not considered, in their view “This is how a facility can comply with regulations and still have a poor program.” Echoing most of the concerns expressed by the Federal On-Scene Coordinators, the State On-Scene Coordinators in this group rated the current regulatory structure as a poor foundation citing “too many gray areas, too many exemptions and lack of enforcement” as the key failures. They also expressed concerns that the regulatory structure lays out many mandates but no funding to complete them adequately. Because of this, they felt that Local Emergency Planning Committees “cannot really be active and Plans sit on shelves.”

In summary, many respondents across groups described planning and emergency response regulations as complex, burdensome, vague, ineffective or even sometimes contradictory, while others defended them saying that although definitely a burden such regulations are necessary “to make it happen.” All agreed that regulations “usually do not address every issue, nor should they try,” and there was near consensus that regulations “are usually open for interpretation,” leading to conflict between parties, particularly EPA and subject facilities. Many respondents from all groups observed that ultimately “the facility must address its own problems in the way best for it,” indicating a reliance on the Environmental, Health and Safety respondent organizations to assume the lead

role in this risk management process, falling directly in line with Clarke's (1988) notion of the organizational capture of that role. It is clear that for these risk management respondents existing regulations can only provide a framework within which a great deal of "filling in the blanks" must occur. It is equally clear that within these "blanks" is where battles are fought over "common sense," "reasonable" and "adequate." The outputs of those battles are institutionalized by the winners within the published contingency plans on which all other planning activities depend.

They Won't Do the Work

Potentially the key points of input into the planning and emergency response process for the general public are mechanisms provided by the Emergency Planning and Community Right-to-Know Act (EPCRA) as discussed in Chapter 2, *Regulatory Background*. Commonly referred to within these respondent groups simply as "Right-to-Know," EPCRA provides local communities open access to information about chemical hazards and emergency response capabilities within their areas (United States Environmental Protection Agency 2001c). When asked questions regarding the role of the public in the planning and emergency response process, respondents generally agreed that the public does have some role, but differed strongly over the scope and value of that role. They were united in their opinions that whatever that role may be, the public generally makes little or no effort to assert it.

Environmental, Health and Safety respondents tended to express the importance of public input and place a high value on interfacing and responding

to the concerns of “their neighbors.” One stated bluntly, “The public can put us out of business and they must be part of our plans. This is why we know our neighbors and have notification plans, to protect them in case of an emergency.” A second echoed that position, noting that “Our doors are always open and we are sensitive to their expectations. We understand our obligation to be good neighbors.” Others commented, “We want our neighbors to be comfortable with what we do and how we do it.” When asked to describe specific avenues for public input or oversight and the types and amount of information that might be shared, this group as a whole relied on EPCRA Right-to-Know mechanisms, voicing positions such as “We comply with Right-to-Know and the public has input through the LEPC [Local Emergency Planning Committee] and other forums designed for this.”

Since Right-to-Know information is limited in scope and entirely dependent on the facility that generated it, respondents in this group were asked whether or how the public might be able to get additional information or participate in the internal planning process. Most indicated that outside of public relations and Right-to-Know reporting, “there are no real mechanisms for direct input at our facility,” adding that “We work with community ER [emergency response] personnel as much as possible.” Some remarked on the level of difficulty of this process, noting that while “useful” input is welcome, “these are complex issues not easily grasped from outside.” When asked to relate how limited access and the apparently high level of complexity supported the generally expressed “open door” policy, the consensus position reflected that of one respondent: “They are

free to inquire at any time and we will tell them as much as we can about our process and plans, within the limits of legal and security constraints.”

With one exception, Local Emergency Responders generally expressed the need for strong public input since “We do all of this for them,” and “The public is the driving force. Everything we do is about how it affects them.” The lone dissenter felt that due to “their lack of knowledge of the subject, the public has no role in the planning process.” He did however, feel that “they do need to be notified of events and releases that might affect them.” One other respondent in this group would limit public input to only those “potentially impacted.” That group he said “has a key role in all aspects,” but if not a vulnerable population, “they have no role at all.” As a group, these respondents agreed that “Our goal is life first, so the public must be aware and prepared.” A major point of concern for this group was the apparent “apathy” on the part of the general public regarding the planning process. One respondent noted, “They [the public] usually don’t care until there’s an alarm. They need to be totally involved, and could be, but they won’t. I don’t know why.” Another observed, “The public is important and should be involved, but they won’t do the work to make a good product. They never care until something is wrong, and then they want a quick, simple fix that makes them totally happy.” Others agreed, expressing their frustration that “We try every way we can to get the public involved, but it’s not a threat to them on the day of the meeting,” adding that “Of course everyone wants to be involved after the event, but then they are so emotional it’s not productive.” On whether this apparent lack of interaction might imply trust whether than apathy, one

remarked, "It's not really trust. It's more like 'that's your job', so it's not their problem. They just expect us to handle it," a view echoed by the entire group.

On-Scene Coordinators generally expressed similar disenchantment with the apparent lack of public interest "on the front end." Many in this group commented on the "sometimes-contentious" nature of working with the public, but maintained that it was necessary or "paramount" even though it might sometimes be "politically uncomfortable." As with certain Local Emergency Responders, some within this group took a paternal position on public input, feeling that the public fit into the process "only on the tail end, once the plan is developed and in place," since at that point, they would reportedly be more able to gain awareness and a comfort level. One insisted, "The public has a right to know about hazards, but no role in defining 'safe'. That is for the response experts to determine and explain." As for what then to do with the information, he declared, "Then the community can judge whether that is 'safe enough for them', with the DEM [Disaster and Emergency Manager] person(s) as their voice."

One On-Scene Coordinator expressed shock at the notion that residents would simply continue to complain in the face of perceived danger while waiting for someone else to rectify the situation. Offering a piece of candid advice, "If you don't feel safe, you shouldn't live there," he described how in his view people must take action for themselves if they truly feel endangered. He felt that many times, residents might describe feeling powerless, but always had the option to simply move. Since many times "the facilities were there first," neighbors needed

to remember that when they buy a house or rent an apartment. He did not consider the financial and social constraints of such a decision to be of practical concern. Fairness of the matter aside, he described little sympathy for those who simply complained instead of acted to “get out of harms way.”

Another respondent in this group would limit input to only “directly affected stakeholders” noting that “they must have a role, but not all of them are an asset to the process because of low awareness and personal or political agendas.” He suggested that this could be improved with education and greater involvement in the process, but “beyond that, the general unaffected public has no role.”

There was general agreement that the public expects that facilities are safe and will “do the right thing if something happens,” and a stated need for the public to understand their role and participate as needed in evacuations and shelters-in-place. Otherwise, these respondents said, “The emergency responders cannot do their job.”

On the issue of trust versus apathy as an explanation for the apparent lack of interest on the part of the public, opinions were mixed. Some felt that the public has a relatively high level of trust in government and facility planners and emergency responders, validated by the “relatively good historical record.” This was said by several to be “OK because we all trust our lives everyday to people we don’t know.” Others disagreed, placing the blame squarely on apathy, insisting that the public has and deserves no role in the planning process because “After 16 years of Right-to-Know, 99.9 percent of the public has no clue and could not care less.” One respondent combined the two, observing, “Trust

and apathy are why the information clampdown after 9/11 was no real loss,” referring to the removal of most Risk Management and contingency planning information from public access websites. Overall, On-Scene Coordinators concurred with one who stated, “The public fits into our work big time, but doesn’t understand us or what we do.” The consensus position of this group was that planners and emergency responders have to share information, educate the public and the media and be sensitive to everyone’s needs, “all while doing high visibility work under the threat of liability and lawsuits.”

In summary, while respondents in all groups generally agreed that the public has a role in the planning and emergency response process, they differed strongly on what that role should be, ranging from “every aspect” to “none.” Public interaction was often described as difficult or contentious, and there was a tendency toward a paternal role on the part of some of these insider respondents, relegating the public primarily to a reactive role of evacuating or taking other measures when told to do so. Though afforded the opportunity to interact via Right-to-Know mechanisms such as Local Emergency Planning Committees, the general public is reportedly effectively absent from the process, and respondents debated whether this was a function of apathy or trust or both. Environmental, Health and Safety respondents generally referred to a desire to be “good neighbors” with an “open door” policy when dealing with the public, but tended to describe interactions based on complying with specific requests for information, not interactive planning activities. They typically indicated that requests would be honored within the bounds of safety and security concerns,

and relied upon Local Emergency Planning Committee meetings and annual reporting of Right-to-Know data as the primary form of “interaction.”

Respondents from all groups frequently referred to “complex processes” and the feeling of “what we do not being understood” by the outsiders, specifically the public. The resulting lack of interaction on the part of the public implies the influence of Freudenburg’s (1993) notion of reliance on others “performing the necessary calculations” (p. 913). This dependence seems encouraged by a “relatively good historical record,” which reinforces the perception of accidents as rare events (Gephart 1984), ostensibly validating the past and future relegation of planning to “the experts.” Such a relationship appears to demonstrate Clarke and Short’s (1993) notion that the greatest influences on social policy come from interest groups, setting the stage for organizations to assume the role of defining risk (Clarke 1988).

Fantasy Documents

Respondents were asked questions regarding both the adequacy of published contingency plans as related to the planning and response process and their individual roles in developing and implementing those Plans. Although displaying strong consensus that contingency plans were nearly always detailed, well-written and compliant with applicable regulations, respondents were deeply divided on the question of adequacy for the intended purpose. The reasons for this varied, often divided along group lines, but clearly there was little affection shown by anyone toward these documents. On the subject of individual roles in development and implementation, lines were clearly drawn between groups.

Facility contingency plans are authored and implemented internally by the respective Environmental, Health and Safety respondent organizations, with little or no outside input. Review of these Plans by Local Emergency Responders or On-Scene Coordinators occurs only upon request, described by all as “very rare” outside of regulatory clarification, or following an incident that calls for investigation by relevant agencies. Area Contingency Plans, however, are developed and implemented primarily by Local Emergency Responders with equal opportunity for outside input from both the public and Environmental, Health and Safety respondents, and are heavily dependent on existing Facility contingency plans for scope and content. This information dependency illustrates Clarke’s (1988) notion of the lead role of organizations in defining “acceptable risk” as opposed to the public, and the vulnerability of the process to disqualification (Clarke 1993) and recreancy (Freudenburg 1993) at the organizational level.

As a group, On-Scene Coordinators described their role in either Area or Facility contingency plan development as “indirect” and only for “technical clarification,” mainly consisting of verifying that the Plans are “technically complete,” meaning that “all the pieces are there,” viewed by all as “far different than ‘adequate’.” A common observation from this group: “As long as it meets the regulations, they can write the plans as they see fit, and it is up to them to make sure it is workable and adequate,” again demonstrating the vulnerability of the process to organizational capture of the role of defining risk (Clarke 1988).

Environmental, Health and Safety respondents tended to characterize their respective contingency plans as “compliant with the law” and avoided concluding whether they were adequate for the intended use. Some responded rhetorically, “What is adequate?” noting that their goal is always to “meet or exceed all applicable requirements.” As a group, Environmental, Health and Safety respondents described thorough, well thought out plans that address every reasonable contingency, noting that doing so requires extensive reviews, compliance with internal and industry good management practices, training and devotion of resources to “make every effort” in ensuring that the contingency plans “meet expectations.” Whether that would pass for “adequate,” they felt, “is open for debate by anyone trying to define that.” However, what they generally felt was not open for debate was the extraordinary economic and social burden of developing and maintaining contingency plans to deal with “completely unlikely events.” In many cases, they argued, routine internal practices would be more than adequate, but regulations forced them to devote resources “where they were not really needed” and trapped them into what Meyer and Rowan (1991) described as rituals, myths and abstract structures where claimed practices conflicted with requirements for efficiency.

Local Emergency Responders and On-Scene Coordinators expressed skepticism over the value of these documents, with some voicing strong opinions that “most contingency plans are worthless to begin with,” and that “Emergency Managers are not running to get them during emergencies.” Several described contingency plans as “really just a lot of paper written because facilities have to

do it,” and made frequent references to that being “a waste of time and effort” since once written, “they just go up on a shelf and no one reads them.” Contingency plans were frequently described by this group as “overwritten volumes of boilerplate, with too much narrative and filler” written to satisfy regulators. One Local Emergency Responder candidly summarized the views of his counterparts saying, “I haven’t looked at a lot of them, and if anybody else has, I don’t know who they are. We are more interested in just knowing who we will be calling at 0300.” Environmental, Health and Safety respondents generally agreed that contingency plans tended to be large, complex documents, but noted that although they attempted to keep them as simple as possible, “these are complex facilities” and regulations are very specific about “what goes in.”

Several Local Emergency Responders and On-Scene Coordinators recounted examples of practices claimed in planning and training being abandoned during emergencies due to resource limitations, urgency or simply “because the plan did not address what we were having to deal with.” Regarding this issue of “sticking to the Plan,” many respondents across groups argued that contingency plans should focus only on “fundamentals such as your individual responsibilities,” describing those as “whom to call and when, and the ability and authority to authorize and organize resources.” Others concurred, adding that the best plans “say the least and give leeway to improvise.” A frequently cited, highly prized characteristic of “having the right guy in charge” was the ability to “know when the Plan isn’t working” and the willingness to “do whatever it takes,” particularly if that required going outside of or even “against the Plan.” When

asked whether the apparently frequent need for this particular talent indicated a fundamental problem with existing contingency plans, respondents were highly divided. Nearly all Local Emergency Responders and On-Scene Coordinators pointed to “scaled down scenarios” and the reliance on facilities to describe “worst-case” as necessarily resulting in “surprises,” while several Environmental, Health and Safety respondents insisted that “although the Plans might not be perfect, they are as good as we can make them,” pointing out that “no plan can anticipate everything.” The argument between these groups appears to continue to be over surprises as the result of “failures of foresight” (Turner 1976) and disqualification (Clarke 1993), as described by Local Emergency Responders and On-Scene Coordinators, or simply the result of “changing conditions” and a need “to be flexible” as described by Environmental, Health and Safety respondents. In either case it is clear that contingency plans are not considered by offsite users as reliable indicators of what to expect during significant events, who note that “everything always works great on paper, but we never know until we get there whether it was enough.”

While still discounting their ultimate value, many Local Emergency Responders and On-Scene Coordinators acknowledged a distinction between the quality and adequacy of contingency plans from various facilities, describing Plans from “the big guys” as much better than others, because of the ability to “devote inordinate resources to redundant systems” and practice “extreme planning.” In some cases this was thought to be due to corporate philosophy and the priority place on those programs, however it was generally attributed to

“being afraid of EPA.” Oil companies were said to be “more capable than chemical companies,” producing much better contingency plans and training programs primarily due to extensive experience with large events such as Exxon Valdez. One On-Scene Coordinator noted that “They [chemical companies] just don’t get that they need to do more than everybody else,” referring to what he and others described as inherently greater hazards at chemical facilities. Overall, this group felt that regardless of whether it was “the little guy who ignores or doesn’t know the regulations,” poor corporate culture or simple inability to “predict the future,” most contingency plans “fall far short of adequate.”

An apparently common practice of using outside consultants to develop facility contingency plans was a point of contention for many Local Emergency Responders and On-Scene Coordinators. Reportedly, outside consultants might visit the site “for only a day,” gathering “only enough ‘intel’ to fill in the blanks” without seriously engaging facility personnel or developing a real understanding of the site, its processes and culture. The resulting lack of verification of field conditions and limited understanding of “what really needs to happen” was cited by this group as a primary reason why “many Plans look good on paper, but fail miserably” during an event when conflicts between operating procedures and published Plans create confusion, delay response activities and ultimately result in failure and regulatory penalties.

These respondents generally divided such failures into two groups. In the first group, contingency plans present capabilities as greater than actual, giving facilities undeserved credibility and confidence and “setting them and us up for

failure.” In the second group, contingency plans apparently impede facilities that may have very good internal practices by burdening them with responsibilities and commitments different from their routine. Such a contingency plan “interferes with a response that might actually succeed if the Plan doesn’t get in the way.” The former clearly falls in line with Meyer and Rowan’s (1991) notion of gaining legitimacy through structure. However, if as most Local Emergency Responders and On-Scene Coordinators presume that contingency plans are not deliberately and maliciously “inadequate,” Clarke’s (1999) notion of “fantasy documents” goes far in explaining how planning becomes an exercise in self-deception. Planners bring order to a complex process by the implied consideration and control of every variable, and within this process Turner’s (1976) over-reliance on subcontractors, Vaughan’s (1999) “routine nonconformity” (p. 271) and Clarke’s (1993) disqualification heuristic are clearly active.

Environmental, Health and Safety respondents defended the extensive use of outside contractors, indicating that the firms “bring outside eyes to the process” and are objective in their findings. Using such firms, they argue, promotes consistency and adherence to high standards in planning for numerous facilities spread over great distances. Local Emergency Responders and On-Scene Coordinators agreed that this might be true in theory, but noted that it also supported their argument of contingency plans as “volumes of boilerplate language” that are “not functional” and are “always well written but hardly ever adequate.”

Regarding whether the focus of contingency plans should be on onsite or offsite impacts, respondents were united in their stated goal of focusing on both. However, they were deeply divided on why that was not actually the practice. Local Emergency Responders and On-Scene Coordinators generally felt that contingency plans reflect “what the facilities feel is important,” qualifying that as “usually from the fence line in.” They described a tendency for facilities to rely heavily, if not entirely on offsite responders to “take care of things outside the fence,” reducing that part of the contingency plan to simple generalizations and expectations of response agency actions with no real commitment or thought to whether “we really have a chance to do all this.” A frequent example was lack of warning time, which often precludes immediate actions by anyone, particularly across large areas. Faced with such constraints and an obligation to protect the public first, “that is exactly what we try to do” by concentrating planning efforts “outside the fence” and leaving the facilities to “worry about themselves.” Environmental, Health and Safety respondents noted that attention paid to “inside the fence” issues was indeed protective of the public, since “we are the first line of defense,” and the high level of effort put forth internally supports that goal. Local Emergency Responders and On-Scene Coordinators agreed in principle, but again expressed concerns that contingency plan failures, overconfidence of and in facility responders and unexpected or disqualified scenarios create the “bad surprises which get us every time.”

In summary, although no respondents specifically labeled contingency plans as “fantasy documents” (Clarke 1999; Clark and Perrow 1996), the

characteristics of this sociological theory are precisely what are being described. These well written, detailed documents are compliant with all applicable regulations and seem to promise order and control, but are universally dismissed by Local Emergency Responders and On-Scene Coordinators as “paper exercises” and “basically worthless.” Reliance on consultants to develop contingency plans is a major point of contention between groups, with Local Emergency Responders and On-Scene Coordinators seeing the detached “cookie-cutter” approach by “outside experts” as a major weakness leading to poor Plans, while Environmental, Health and Safety respondents promote consultants as adding consistency and objectivity to the process. Offsite responders generally dismissed reliability of contingency plans, with the ability to recognize or anticipate Plan failures and “go to Plan B” considered by all respondents a critical characteristic of “having the right guy in charge.” Most respondents advocated simple, role-oriented contingency plans that allow key decision makers leeway to do whatever is needed, while debating whether that flexibility was so frequently necessary due to poor planning or “changing conditions.” There was also strong disagreement over whether facilities overemphasize “inside the fence” planning and whether offsite responders conversely obsess over “outside the fence” impacts. In the end, what seems to be illustrated is the failure of attempts to “control the uncontrollable” (Clarke 1999:171) by way of a written document that necessarily cannot reflect every possibility, but in effect creates the illusion that exactly that goal has been achieved.

The Fix

At the end of each interview, respondents were asked for their recommendations for program changes. The researcher qualified this to indicate not “just making the process smoother or less expensive” for themselves, but changes that would lower risk and increase the success of planning and emergency response for everyone involved. Obviously each respondent was free to interpret this as they saw fit, but the stated goal was to examine “big picture” solutions. “Big picture” aside, recommendations varied widely and tended to be divided along group lines, as did many responses to other questions addressed in this study.

Environmental, Health and Safety respondents tended to focus on two major areas for program improvement. The first was the need to “stop scaring the public” with the current “blanket” regulatory approach to worst-case scenarios and Offsite Consequence Analyses. Instead, they generally recommended that regulators needed to increase public awareness of “low risk and good safety programs” and to allow facilities more individual control over internal planning and prevention activities. This they felt would encourage more local interaction and a focus on “more realistic events,” allowing facilities to implement cost-effective, feasible contingency plans based on site-by-site analysis. The second recommended area for improvement was to “tighten Right-to-Know” access to information. They generally felt that current open and public access to scenarios and planning documents reveal too much information about the process and the response plan, making facilities, responders and adjacent populations vulnerable to outside actions. Some felt that the information should not be available to

anyone outside of emergency response agencies. Another respondent in this group voiced a solitary opinion that measures should be taken by planners and regulators to limit encroachment of residences and offsite populations toward facilities, since this “might put people in harms way through no fault of ours.” Another lone recommendation was to improve the process by “making safety a corporate culture since most accidents can be prevented.” This respondent felt that in such a culture planning would be improved with practice and “always questioning the logic of the plan” by asking, “When will this NOT work?” Most other Environmental, Health and Safety respondents responded that safety was already a very high priority at their facilities.

Local Emergency Responders overwhelmingly referred to the need for more public involvement “earlier and at all steps” as the primary hope for program improvement, with several remarking that this was “the only way it will happen.” They saw increased public awareness as demanding and generating better and more information, which would lead to more and better preparation, particularly, some noted, if “planning included scenarios where things don’t go so well.” As to how to generate this increased public interaction, few offered suggestions or expressed optimism, referring to issues already examined in *They won’t do the Work* within this chapter. Several echoed this sentiment: “If the public wants better protection, they should show it by getting more involved. We can only do so much since we are responders, not lawyers.” Regarding the often-stated negative role of lawyers, several respondents concurred that planning would be improved by involving “real-life people” in making regulations,

and not just “lawyers living in the Beltway.” One Local Emergency Responder described this reported lack of opportunity for input “by anyone outside of Washington,” saying, “Public involvement in the current rule-making structure is a joke. Ads are in tiny print behind the Obits and the government expects intelligent comments on huge programs in 30-45 days.” He counts planning and emergency response personnel among the excluded, pointing out “Even professional groups like Firefighters and LEPCs [Local Emergency Planning Committees] don’t receive direct notice. A lot of times we find out about changes by accident.”

These respondents generally shuddered at the notion of additional regulations, pleading “No more regulation, please!” They consistently reported that while most emergency responders are extremely dedicated and manage “to do what it takes to succeed,” they need more “quality time” in training and exercises, preferably “onsite, practicing tactics.”

A few Local Emergency Responders indicated, “many of us have a sinking feeling about some facilities” due to “information overload” and a lack of time to “properly absorb and prepare,” in line with Clarke and Short’s (1993) notion of organizations generally having too much rather than not enough information. To alleviate this, they felt that they should be able to, but often cannot, rely on facilities “writing realistic plans and then doing what your plan says,” but in their minds there is a simple solution: “If you can’t do that, change your Plan or change what you’re doing.” One respondent felt that in addition to the other recommendations examined, response safety and effectiveness would be greatly

improved by releasing military technology for civilian use, since “they have a lot better stuff.”

On-Scene Coordinators were somewhat divided on recommendations. Some State On-Scene Coordinators promoted stronger enforcement of existing regulations, closing exemptions and loopholes and removing “gray areas.” Others felt that program improvement would come from more public awareness, more Federal funding for regulatory mandates and pressure to increase involvement between affected parties via the Local Emergency Planning Committees. Such actions they claim would encourage “additional monitoring of incidents and actions taken” and raise public awareness and interest. Federal On-Scene Coordinators generally advocated “understanding and enforcing” existing requirements and tended to agree that additional regulations would help nothing, pointing out “Regulations have gone as far as they can.” A few referred to a need for “clear-language versions,” which they felt would reduce confusion for everyone involved. This group generally agreed that the best opportunity for improvement would be to recognize that a contingency plan is not the end of the process and should generate more questions than answers. Involved parties should answer those questions by exercising contingency plans at every opportunity. A common sentiment was “Use the plan. Don’t just write it and shelve it.”

Regarding contingency plan content, several On-Scene Coordinators noted that facilities and agencies should be fair in assessing programs and capabilities, since overconfidence and embellishment only prolongs events and

increases risk for everyone. While acknowledging that they have less direct interaction with Local Emergency Responders and Environmental, Health and Safety respondent organizations than those groups have with each other, several On-Scene Coordinators maintained that increasing their involvement in the local planning process would add “fresh eyes” and improve it due to “our broad experiences” and resources. Several Federal On-Scene Coordinators agreed with their State counterparts in advocating a greater role for Local Emergency Planning Committees, promoting them as “the primary protection” since they are in the best position to interact with all interested parties. Additional funding was the most common recommendation for accomplishing this, as these mandated Committees are generally unfunded and all work performed by them is on a voluntary basis.

In summary, with very few exceptions this insider group did not advocate additional regulations as a desirable option for program improvement, although some felt that better enforcement of existing programs was needed. Beyond the general distaste for a regulatory solution, there was little agreement between groups on any particular risk reduction and planning strategies. Recommendations varied widely and tended to be divided along group lines.

Environmental, Health and Safety respondents generally voiced a need to “stop scaring the public” and promote public awareness of “low risk and good safety programs” while seeking more local and individual control over planning and prevention activities. Their second most frequent recommendation was to restrict “Right-to-Know” access to information to reduce exposure to outside acts.

Local Emergency Responders overwhelmingly advocated more public involvement as the primary, if not the only hope for improvement although none expressed optimism that the public would ever overcome the current perceived apathy to the entire process. As to how public involvement might be increased, this group generally voiced a need to reduce the “lawyer effect” and include “real-life people” in the rule-making process. Exercises were generally regarded as the most effective mechanism for maintaining preparedness and overcoming the effects of “inadequate” contingency plans.

On-Scene Coordinators tended to promote strengthening “understanding and enforcing” current regulations and strengthening and funding Local Emergency Planning Committees. They generally agreed that contingency plans are the beginning of the planning process, not the end, advocating frequent testing of the Plans and resistance by planners to overconfidence and embellishment of capabilities.

Even with the potential improvements voiced by these respondents, the vulnerabilities to deviant outcomes clearly remain. If, as Environmental, Health and Safety respondents advocate, more control was granted to manage planning as a local issue with less severe scenarios, organizational capture of the role of defining risk and disqualification of “extreme” scenarios (Clarke 1988; 1993) seems certain. Information restriction and low public interest only exacerbate the situation, and On-Scene Coordinator recommendations to develop better contingency plans could not be successful under those conditions. Such a situation seems illustrative of both Meyer and Rowan’s (1991) notion of structure

to gain legitimacy and Gephart's (1984) notion of domination through "political sense-making" (p.212).

Summary of Risk Perception as a Driver for Contingency Planning

As the foundation for planning and response activities, facility contingency plans seem to offer a great deal of reassurance. After all, these documents demonstrate the careful consideration of significant events and impacts, and controls and response actions are laid out in great detail by the risk managers. Risk Management Program components require the analysis of standardized worst-case scenarios and potential offsite consequences, and all the information is shared with Local Emergency Responders and State and Federal On-Scene Coordinators. With such in-depth analysis and sharing of information, there would seem to be little potential for error and even less for doubt that everyone's interests are served. However, what is made abundantly clear by the analysis in this chapter is that planners and responders are deeply divided over what to plan for and how to do so. The toughest question to answer for this group seems not to be a scientific one of magnitude or consequences, but rather how to select scenarios in terms of "what makes sense." It is in attempting to answer this question that the influences of individual risk perception are manifested and lines are drawn between insider groups. The mutually acceptable middle ground remains elusive as arguments are made by all sides against scenarios judged too "extreme" or "weak," each group or individual defending their own "common sense" and "realistic" approach.

Regarding regulations as a foundation for planning and response activities, many respondents condemned them as complex, vague, ineffective, even “handcuffing” the process by eliminating flexibility. Others agreed, but insisted that a regulatory approach was necessary “to make it happen.” Presuming that regulations would guide the process and be followed, many respondents indicated a reliance on facilities to assume the lead role in defining and analyzing risk (Clark 1988), while at the same time indicating a discomfort or “sinking feeling” that doing so made them vulnerable to recreancy (Freudenburg 1993), or in their words, “bad surprises.” The resulting contingency plans, offsite responders say, leave all involved doing a great deal of “filling in the blanks.”

The public has a great deal of potential influence in the planning process, but according to these respondents forfeits nearly every opportunity to do so, whether through trust or apathy. Often regarded as “potentially contentious,” most respondents felt that the public should have some role in the process, but disagreed strongly on what that role should be. Some assumed a paternal role while others felt that the public should “drive the whole thing.” Open door policies were blunted by safety and security concerns, and many felt that “complex processes” validated the need for expert analysis. Combined with self-reported feelings of a “relatively good historical record,” organizations assume the role of defining risk (Clarke 1988).

Although no respondents used the term “fantasy documents” (Clarke 1999; Clarke and Perrow 1996) to describe contingency plans, there can be no doubt that this sociological theory is precisely what was being described.

Outside of Environmental, Health and Safety respondents, these documents are generally perceived as well written and compliant, but “worthless” representing only “paper exercises.” Local Emergency Responders and On-Scene Coordinators are critical of the heavy reliance on consultants to develop the Plans, while Environmental, Health and Safety respondents defend the practice as adding consistency and objectivity. In the end, reliability of contingency plans was generally dismissed by outside responders, while all respondents highly valued having key decision makers in place during an emergency that could anticipate and recognize Plan failures. Debate continued over whether the need for that talent was due to poor planning or simply the need to adapt to changing conditions.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

This chapter concludes the research project and is grouped into five sections: *Summary of Research*; *Theoretical Implications*; *Practical Implications*; *Assumptions and Limitations*; concluding with *Directions for Future Research*, which offers recommendations to other researchers for building upon this study.

Summary of Research

The goal of this study was to gain a better understanding of how planning and emergency response “insiders,” which in this study include facility Environmental, Health and Safety Managers, State and Federal On-Scene Coordinators and Local Emergency Responders, identify, debate and eventually define and address risk from the participant facilities. This was done through the examination of two research questions. First, how do insiders perceive risk and define worst-case scenarios? Second, how does risk perception drive contingency planning? In the first chapter, the reader was introduced to the role of facility contingency plans as the basis of all emergency planning and response activities. As a foundation document, it is critical that facility contingency plans accurately identify, assess and communicate risks, and this responsibility falls in large part to the facility personnel developing the plans. However, intentionally or not, organizations tend to underestimate risk, leading to the statement of the problem addressed by this research, which is that contingency plans that underestimate risk and do not accurately depict worst-case scenarios significantly increase vulnerability and risk for facility, response and offsite personnel.

In the second chapter, the researcher presented a brief overview of six major programs that fairly represent the extensive array of existing and pending regulations related to activities conducted at the participant facilities. Regardless of the extensive regulatory framework, regulated and affected communities are left to their own devices to construct the appropriate controls and checks. This critical process is what many respondents referred to in Chapters 5 and 6 of this study as “filling in the blanks” and is precisely where the vulnerabilities to organizational deviance as discussed in Chapter 3 occur. This regulatory void has effectively created a risk management honor system of near complete reliance on experts, insiders and contingency plans, encouraging a paternal management approach that promotes misplaced confidence and decreased vigilance.

In the third chapter, relevant literature was examined to provide context and background information on issues and concepts relevant to the proposed research questions. Finding that that vulnerability to catastrophic events is not a simple reflection of good management practices, advanced technology or security, the researcher notes that organizations are much more complex than just an assembly of like-minded employees operating in unison to achieve some common goal. It is the interaction and outputs of that dynamic environment that are relevant to this research, particularly in the treatment of risk as a social construct, not an individual decision. Using that criterion the review of sociological literature examined organizational practices that influence risk perception and create risk and subsequently vulnerability to disaster. Following

the analysis of how various organizational tendencies create and perpetuate myths of low risk and emergency preparedness, the researcher identified a specific gap in the literature into which this research extends. Specifically that is the absence of any examination of the self-reported views and roles of key figures in the risk management process, individual organization insiders, in defining and addressing risk from potential worst-case events at chemical facilities. Having reviewed the relevant literature, the researcher found that with some disagreement over disasters as inevitable or as foreseeable and preventable, the open literature clearly establishes the role of organizational deviance in disaster. The mechanisms include disqualifying and underestimating risk; avoiding commitment of resources; political power struggles; illusions of low risk and emergency preparedness; and reliance on complex, symbolic contingency plans doomed to failure. These “situation normal” organizational characteristics create misplaced confidence that leads actors and society to rely on what are in reality myths of low risk and emergency preparedness, effectively decreasing vigilance and increasing risk. The current regulatory structure offers little relief, with near complete reliance on information generated by experts and insiders, and public oversight and access to information severely restricted.

In the fourth chapter, the scope and methods of the research were detailed, with specific discussion of the research design, instrument development; participants, sample selection, informed consent, initial interviews, follow-up interviews, ethical considerations, confidentiality, Institutional Review Board Approval, data analysis and coding, document analysis, triangulation and

generalizability. The basic interpretive qualitative design used for this study relied on direct interaction and extended dialogue with the participants, with data collected using partially structured interviews. This approach proved very effective and allowed the researcher to collect the necessary data from each participant within a variety of settings using a project-specific interview protocol.

The 20 volunteer participants were purposefully sampled from within a major metropolitan area found in the Southwestern United States and the USEPA Regional Office with jurisdiction over that area. This city supports a significant industrial base with virtually no limit to the type of chemicals that may be in process, storage or transit within the area at any given time. Chemical inventories at the participant facilities may reach billions of pounds per site with worst-case significant offsite consequences measured in miles, potentially affecting hundreds of thousands or even millions of people. These largest of facilities were preferred since the operations have the potential to affect the greatest number of people and consequently are the object of a proportionately increased degree and intensity of planning both internally and with external agencies. It was felt by the researcher that due to increased planning requirements, these facilities would tend to have greater issue awareness, more robust contingency plans, mature training and response programs and increased interaction with local Emergency Responders and planners.

Following Institutional Review Board approval, each participant granted fully informed consent, participated in the confidential interviews and at the conclusion of each interview and debriefing provided a review of data. To

preserve complete confidentiality and encourage free and open dialogue, interviews were conducted individually, with no discussion or confirmation by the researcher of identities or responses of other participants.

No ethical conflicts were noted and respondents seemed comfortable with the researcher's role as an individual student researcher, separated from his occupational role at the USEPA and drawing no conclusions outside the scope of the research. The confidentiality measures offered to participants were successful and necessary to meaningfully engage this very tight-knit, fraternal group. The researcher's existing relationship with many of the respondents no doubt permitted access and a level of candor not likely to be granted to an unknown outsider.

In the fifth chapter, data analysis addressed the first of two research questions: How do insiders perceive risk and define worst-case scenarios? Since September 11, 2001 planners must seriously consider both routine concerns over accidental releases as well as potential deliberate acts, requiring difficult decisions regarding the investment to be made in the prevention and management of potentially catastrophic incidents that may never happen. Individual risk perception and organizational dynamics play a key role in making those decisions. The process begins with the development of potential scenarios by organizations followed by review and debate within the larger group, which includes Local Emergency Responders and occasionally On-Scene Coordinators. As scenarios and impacts are proposed, debated and eventually adopted, Local Emergency Responders and On-Scene Coordinators develop

additional plans and allocate resources to respond adequately and safety from offsite for events that may involve individual or multiple facilities and have area or even regional impacts.

The evaluation and planning process is not formal and follows no standard protocols or format. To gain a better understanding of the initial risk assessment and deliberation process, respondents were asked questions regarding risk identification and assessment; potential worst-case scenarios beyond those addressed in contingency plans; the role of Offsite Consequence Analyses; and perceived risk to onsite and offsite responders during worst-case events. Even during the interviews and prior to any formal analysis the influence of several sociological theories of organizational deviance was apparent. It is apparent that for this group of respondents the process of defining “realistic” is far from resolved. While displaying near consensus on the use of “common sense,” respondents sharply disagreement over what that was and whose version was accurate.

Respondents were deeply divided on the question of defining worst-case scenarios and assessing risk to offsite responders, while on most other questions positions and rationales varied less dramatically. Reliance on experts was a contentious issue. Environmental, Health and Safety respondents saw this as an appropriate application of “common sense,” while other respondents objected strongly, describing a one-sided approach that favors the facilities, demonstrating a power struggle between the parties (Clarke 1988) that ultimately “scales down” the significance of the threat posed by the facilities or at least the discussion of it.

Facilities and outside responders were polarized regarding worst-case scenarios as both extreme and unreasonable or not going far enough, respectively. Local Emergency Responders clearly feel a sense of “high risk” for themselves, putting them directly at odds with Environmental, Health and Safety respondents, who tended to describe outsider risk as a condition completely of their own making. This contrast demonstrates the influences of organizational disqualification (Clarke 1993), conflict over risk assessment and acceptability (Clarke 1988) and political sense making (Gephart 1984).

In the end Environmental, Health and Safety respondent organizations within this participant group have clearly claimed the role of defining acceptable risk, and within that group Clarke’s (1993) disqualification heuristic is by far the dominant influence. Significant accidents or intentional acts remain portrayed as rare, unanticipated events, unrealistic and are therefore excluded from consideration in contingency plans. From this the organizational output of a minority of individuals appears to have been implemented and institutionalized even over the concerns of other participants.

In the sixth chapter, data analysis addressed the second of two research questions: How does risk perception drive contingency planning? This is a critical issue since as the written output of an internal risk assessment process, a facility contingency plan becomes the foundation for all subsequent planning regarding that facility. Onsite and offsite responders rely heavily on contingency plans regardless of whether they have confidence in them, and frankly there are few alternatives. Data analysis has already demonstrated the tendency of

emergency response insiders to disregard the mandatory scenarios as either too extreme or insufficient, attempting instead to define “realistic” events by relying on “common sense.” The resulting conflicts over what that term means and whose version is correct drive political and scientific power struggles heavily reliant on experts and lead to few if any mutually satisfactory conclusions. From a “scenario pool” of potential events, planners must evaluate and select those deemed appropriate, but it is apparent that this group is deeply divided over what to plan for, being unable to agree on what makes sense. Regardless of whose version of common sense wins out, the selection of scenarios sets the stage for all of the planning that follows.

To gain a better understanding of the planning process, respondents were asked questions regarding incorporation of risk perception into contingency plans; use and adequacy of regulations as a basis for planning and response; adequacy and efficacy of contingency plans; the role of the public in planning and response; and recommendations for improvement. As in Chapter 5, prior to any formal analysis the influence of several sociological theories of organizational deviance was apparent. The foundation for planning and response activities, facility contingency plans seem to offer a great deal of reassurance by demonstrating the careful consideration of significant events, impacts and controls. However, the mutually acceptable middle ground remains elusive as arguments are made by all sides against scenarios judged too “extreme” or “weak,” each group or individual defending their own “common sense” and “realistic” approach. Regulations are apparently not the complete answer for

anyone, condemned variously as complex, vague, ineffective and even “handcuffs.”

Outside responders rely on facilities to assume the lead role in defining and analyzing risk (Clark 1988), while at the same time indicating a discomfort or “sinking feeling” that doing so made them vulnerable to recreancy (Freudenburg 1993), or in their words, “bad surprises.” The resulting contingency plans, offsite responders say, leave all involved doing a great deal of “filling in the blanks” and “hoping for the best.” Though their role remains debated, the “potentially contentious” public is generally reported to have forfeited nearly every opportunity to be involved, whether through trust or apathy.

Although no respondents used the term “fantasy documents” (Clarke 1999; Clarke and Perrow 1996) to describe contingency plans, there can be no doubt that this sociological theory is precisely what was being described. Aside from Environmental, Health and Safety respondents, these documents are generally regarded as well written and compliant, but “basically worthless” representing only “paper exercises.” Local Emergency Responders and On-Scene Coordinators are critical of the heavy reliance on consultants to develop the Plans, while Environmental, Health and Safety respondents defend the practice as adding consistency and objectivity. As a group, reliability of contingency plans was generally dismissed by outside responders, while all respondents highly valued having key decision makers in place during an emergency that could anticipate and recognize Plan failures. There was strong

debate over whether the need for that talent was due to poor planning or simply the need to adapt to changing conditions.

In summary, the researcher found influences of several sociological theories of organizational deviance consistently demonstrated within this insider group of risk managers. Risk perception, the critical first step in the management process, is clearly influenced by Clarke's (1993) disqualification heuristic, particularly within the Environmental, Health and Safety respondent organizations. Thus, subsequent decisions and outcomes are effectively framed if not decided before deliberation outside the organization begins. Through reliance on experts and information dependencies those organizations, not the public, have assumed the lead role in defining and managing risk (Clarke 1988). The resulting contingency plans are openly dismissed by planners and responders outside of those who authored them and clearly are not serving their intended purpose. No one describes feeling safer with them in place, and even their authors decline to characterize plans as adequate for the job, instead relying on compliance with obviously limited regulations as the measure of sufficiency. In every way, these respondents clearly confirm the role of contingency plans as "fantasy documents" (Clarke and Perrow 1996; Clarke 1999), institutionalized even over the objections of most users. Gephart's (1984) notion of political sense-making is supported by this interaction between the parties, particularly in the construction of accidents as rare and unanticipated and the use of science by organized capital to minimize risk. In the cases of facilities described by respondents as knowingly publishing contingency plans that

overestimate capabilities, the researcher sees validation of Meyer and Rowan's (1991) notion of using structure to gain legitimacy.

Theoretical Implications

The focus of this research was on insider risk perception and how those perceptions drive worst-case contingency planning. Although key figures in the risk management process, within the open literature there had previously been no examination of the self-reported views and roles of individual organization insiders in defining and addressing risk from potential worst-case events at chemical facilities. In conducting this study, the researcher sought to make an intellectual contribution by extending the existing body of work on organizational deviance, risk and disaster to this new area of inquiry.

When developing the proposal for this study, the researcher neither found nor proposed a single theory that universally explained the tendency of organizations to underestimate risk and embrace contingency plans as the ultimate management tool. However, Clarke's (1993) disqualification heuristic seemed likely to be a key contributor, particularly in the critical first step of risk assessment for scenarios to be considered. When risk perception does not reflect scientifically assessed risk, decision-makers can protect themselves from seriously considering the likelihood of disasters, preserving resources by constructing outcomes that avoid extensive response preparedness. Underestimating or disqualifying risk simplifies the process of controlling it, making "adequate" planning and preparedness a near-certainty. As contingency plans are institutionalized, confidence in the ability to manage all hazards with

minimal cost and effort grows, perpetuating the myths of low risk and emergency preparedness. Having conducted these personal interviews and carefully analyzed the data, the researcher concludes that this theory is clearly demonstrated within the participant group as the origin of a great deal of conflict within the risk assessment process. While decision-makers conducting the initial evaluation of scenarios may willingly protect themselves from serious consideration of disaster, the second tier of decision-makers, Local Emergency Responders, is effectively prevented from performing any meaningful analysis due to the constraints of the contingency plan from which they must draw their information. Thus the initial framing of risk seals the fate of secondary analysis. On this point the researcher is supported by Gephart's (2004) notion of power in "mundane features of human communication" (p. 25) and the macro-level effects of "micro-level sense making" (p. 25).

On the subject of accountability for deviant outcomes, it occurs to the researcher that two key theories initially seen by him as competing are actually much closer in nature than first thought. Turner's (1976) notion of "failures of foresight" paints disasters as predictable and even expected, finding common characteristics of ignoring the possibility of disaster; paying attention to nuisance problems and none to larger background issues; ignoring outside complaints; ambiguous, vague or complex information; over-reliance on subcontractors; failure to comply with regulations; and ignoring warning signs. Each applicable "failure" is said to be readily identified following the loss and although manifested

prior to the impending disaster was disregarded as a warning, hence “failures of foresight” (p. 378).

Turner’s primary characteristic of failure is ignoring the possibility of disaster, directly in line with Clarke’s (1993) notion of disqualification. Following a disaster, disqualification of the relevant potential hazard or risk inevitably proves in hindsight to have been the “wrong” decision, with all of the accompanying demands for accountability. Such demands are effectively accusations of failures of foresight. In this study, the researcher references the terrorist attacks of September 11, 2001 as a clear example of that but numerous other events well illustrate the point, including *Exxon Valdez*, the Chernobyl reactor meltdown, the near-disaster at Three Mile Island and countless other tragedies ranging from airliner crashes to health crises.

With the clear vision of hindsight, few if any disasters are found to have been completely unforeseeable and therefore in theory all could have been prevented. Of course, debate might rage over what degree of foresight was possible or reasonable, which brings the parties full circle to one of the key arguments between respondents in this study, that being the definition of “realistic” or “reasonable.” Obviously, if the risk is not perceived or is disqualified, then measures to guard against it cannot be employed. This observation was made in historical times by Sun-Tzu in his counseling of Emperors and Generals of circa 600 B.C. China on the successful waging of warfare. The ability to understand those factors that define one’s relationship with the enemy, in our modern case disasters, and actively control and shape the situation to one’s

advantage, in our case risk management, was considered an absolute necessity for the competent commander, in our case a planner (Sun-Tzu n.d.:78). The Master observed succinctly, "All things and events that have a distinguishing shape or disposition can be named, and all things that can be named can be prevailed over" (Sun-Tzu n.d.:79). Then, as now failures of foresight or disqualification of risk often proved deadly, clearly demonstrating the critical role of adequate risk assessment as the foundation of all planning activities.

In summary, the entire process of risk management and contingency planning is required, designed and generally said by these respondents to be "open" in that anyone and everyone may participate and have equal input and influence. However, the reality seems quite the opposite. Insiders operating within various constraints and with sometimes competing interests clearly control the process. Although key figures, within the open literature there had previously been no examination of the self-reported views and roles of individual organization insiders in defining and addressing risk from potential worst-case events at chemical facilities. This research focused on insider risk perception and how those perceptions drive worst-case contingency planning, and has made an intellectual contribution by extending the existing body of work on organizational deviance, risk and disaster to this new area of inquiry. There remains no single theory to universally explain the tendency of organizations to underestimate risk and rely on contingency plans to control worst-case events. As evidenced in this research, many sociological theories of organizational deviance actively influence the risk management and planning process.

However, this study has identified Clarke's (1993) notion of the disqualification heuristic as dominant in that it influences the entire risk management process by effectively framing the critical first step, that being the initial assessment of risk and scenarios. Having limited that step to "winnable" scenarios, the positive outcome of any subsequent planning is assured.

Practical Implications

Although many existing programs require tracking and reporting of hazardous material inventories, usage, emissions and uncontrolled releases, none requires or encourages anything that could be truly interpreted as risk assessment. From a Disaster and Emergency Management perspective, the focus remains first-responder preparedness for acute events affecting large areas and general populations.

Having completed this study, the researcher proposes several practical implications and supporting recommendations. Any or all of these lessons learned may prove useful to the respondents in their respective or joint risk management and planning efforts. While several general implications are discussed, overall it is clear to the researcher that risk managers must address four critical issues. First, the public has not effectively engaged the risk management process. Second, common sense is not a reliable risk evaluation tool. Third, planners and onsite and offsite responders must improve communication and move closer together throughout the entire process. Fourth, contingency plans are not serving their intended purpose for anyone. In the researcher's opinion, the only chance for improvement is more and earlier

external stakeholder input, better understanding of risk and the implications of it and development of more reliable assessment tools.

In attempting to overcome the disadvantages of current risk assessment methods, it is important to integrate the principles of legitimation, democracy and fully informed discourse. This process begins with opening and maintaining a dialogue with interested stakeholders in the community to develop and maintain a collaborative learning process to share information with stakeholders and/or their representatives regarding issues and concerns. In many cases it might be appropriate to use the collaborative learning process to increase stakeholder understanding of issues prior to integrating their input into the decision-making process (Lundgren 1998). Stakeholder input is critical and while On-Scene Coordinators and other insider “experts” might certainly be asked to provide a great deal of information, interpretation and recommendations, this should be offered in conjunction with a group process not in place of it. It is important to let the discussion inform the decision-making and to involve the community in evaluating data and determining acceptable risk levels. It is always difficult to discuss scenarios involving fatalities, fireballs, explosions and chemical contamination without arousing a great deal of concern and based on the lack of experience in most communities with such catastrophic events the initial reaction may well be one of alarm. However, an open-group evaluation process improves community awareness of the issues and increases public confidence in the risk management process. The goal at this stage of the process is to develop specific understandings of “acceptable risk” so that potential mitigation measures

may be evaluated objectively. In all cases, the object is to generate fair and informed discourse and reduce as much risk as possible. Experts are used at this point only to supplement the process and add understanding.

Federal On-Scene Coordinators certainly have a broad view of the issues, and operating in numerous states should give them useful insights into the risk management process. However, many respondents, including On-Scene Coordinators, conceded that the lack of a local presence of Federal representatives prevents them from being actively engaged or even being perceived as a viable resource. The data suggest that one solution to this might be to station these personnel in areas where the response history, complex industrial base and planning needs represent a high demand for their services. Personnel within USEPA frequently refer to this as “outposting” and the practice is employed to great success in various other USEPA regions. The area involved in this study would certainly meet the need criterion. The researcher recommends that USEPA give serious consideration to outposting Federal On-Scene Coordinators to active, high demand areas, creating the opportunity for them to become an integral resource for the local planning and response program. Potential benefits include improved planning, reduced response time and the encouragement of objectivity and public involvement through the Federal presence. As local issues could then become a realistic outreach priority for the On-Scene Coordinators, visibility and effectiveness of the entire process may be enhanced with improved communication. Involved parties would effectively be “closer together” at all levels of planning and response. That approach might be

significantly less expensive and more efficient than the current alternative of simply sending personnel as needed to and from sites, as that increases travel costs and travel time, reducing productivity and available economic resources. Internal analysis could confirm whether economic benefits could be gained.

Regarding contingency plans, the consensus of most respondents and the researcher is that plans must be simplified and made more useful to the process of planning and responding. Currently, they are effectively relegated to a ritualistic compliance document that serves primarily to force the parties to engage in at least some amount of planning. However, it appears that beyond this there is little if any perceived residual value. While written plans would not realistically be done away with, the researcher found it compelling that so many respondents were adamant that “no one” reads them, nor does anyone apparently “run for them” during an event. It was generally considered a far more valuable asset simply to have “the right guy in charge,” who ostensibly knows what to do and how to “get it done.” That qualification fairly represents the typical approach employed successfully by On-Scene Coordinators when responding to major events. Those individuals are highly trained, have significant emergency procurement authorities and integrate with local and federal resources once in the field. With few exceptions, pre-existing contingency plans are not a document held in hand by these professionals while responding. Rather, they employ good use of tactics, resources and skills to rapidly assess the situation and dispatch resources as appropriate to bring the event to a safe and efficient conclusion. However, these personnel do not simply create order out of chaos.

Much credit must be given to the planning that should already have occurred at the facility and in the region, and many people and resources are actively involved, particularly in larger events.

There is no doubt that planning must occur, but flexibility and quality of leadership are equally critical. Poor incident management can and does undo any amount of planning however well done. It is equally true that good management and tactics can overcome poor planning, though the consequences may be greater due to the failure of initial response. Minutes do matter, particularly in an emergency where actions taken in the first few minutes or hours influence everything that follows. For these reasons, the researcher recommends that in addition to regulatory components contingency plans should focus on how and what resources may be brought to bear when events differ from planned. One respondent made a very good point by emphasizing attempts to learn when and where the plan might fail. Exercises are a very good way to do this, but only if done objectively and in earnest. It helps no one to conduct a mild exercise and declare success. Planners must be frank in their estimates of capabilities and outcomes and open in communicating this with stakeholders. If nothing else, the process of planning serves to prioritize, build confidence, illustrate past or potential failures and build on lessons learned. In a speech to the National Defense Executive Reserve Conference then-president Dwight D. Eisenhower (1957) remarked on plans and planning:

I tell this story to illustrate the truth of the statement I heard long ago in the Army: Plans are worthless, but planning is everything. There is a very great distinction because when you are planning for an emergency you must start with this one thing: the very definition of 'emergency' is that it is unexpected, therefore it is not going to happen the way you are planning.

A fundamental step in risk management must be to adequately identify and frame it. As noted previously Sun-Tzu (n.d.) observed, "All things and events that have a distinguishing shape or disposition can be named, and all things that can be named can be prevailed over" (p. 79). In seeking to prevail over chemical facility disasters, the researcher proposes that adequate identification of the potential effects and costs of disasters would drive more serious consideration of the prevention of them. Ultimately this discourse should drive the controls needed to achieve the desired minimized risk. To do this, we as planners must overcome the tendency to rely on hunches, intuition, common sense or other unreliable tools for framing our work. Extensive review of existing resources, including regulatory programs, agency and professional standards, pending legislation, assessment tools and emerging USEPA policies clearly illustrates several shortcomings in our arsenal. Risk from chemical facilities is not systematically assessed; risk reduction is subjective, inefficient and not required; current Offsite Consequence Analysis methods are neither standardized nor rigorous and predict only impact edge effects, not gradients; and receptor analysis is generic and based on census estimates. As a result, risk remains underestimated and loosely managed, even when done according to all current standards. To overcome this we need better tools.

The researcher recommends development of a protocol that adequately quantifies risk and potential impacts and supports community efforts to plan, mitigate, allocate resources and respond effectively to emergencies. All potential losses must be addressed including fatalities, injuries, welfare (property,

services) and environmental. Key components of the protocol would include: incorporation of Risk Management Program requirements dealing with worst-case scenarios and Offsite Consequence Analysis; detailed receptor identification and analysis (Most Exposed Individuals etc.); loss and cost gradients within predicted impact areas; and spatially projected data using a Geographical Information System (GIS). As discussed, with the exception of the Risk Management Program regulatory framework, these necessary components do not currently exist. In this protocol, risk assessment components would be added to Offsite Consequence Analysis requirements to address mitigation evaluation, risk optimization strategies and cost-benefit features. While such a tool would dramatically increase the understanding of the implications of risk at chemical facilities, its real power would lie not in the statistical best estimate of cost or loss, but rather in the discussions that should follow in the open and informed analysis of risk from the perspective of the entire affected community.

On the subject of defining and using worst-case scenarios, Offsite Consequence Analyses or any other assessment criteria, the researcher concludes that benchmarks must be set to provide consistency for at least a minimum of planning. The fact of the matter is that large, catastrophic events do occur at these chemical facilities and that current contingency planning approaches instill little confidence in either the generators or the consumers of the information. The real issues then are how large and what type of events to plan for, what can be done to prevent, respond to or recover from them and how best to do that. In keeping with the goal of community involvement and open

dialogue, it follows that the proper discussion of these matters should fall to the affected stakeholders. Only that group can truly determine how much risk is acceptable and what is to be done about it. The role of the Federal government may be to continue providing the regulatory infrastructure and oversight necessary to ensure a certain planning effort, but communities must take the leadership role in managing that process at their level. Of course, this all hinges on involved parties making honest efforts at every level. As demonstrated in this study many sociological theories of organizational deviance are clearly demonstrated to be active in the risk management process. However, few if any appear to be the result of intentional, strategic designs. They are more likely the products of pervasive influences on people making complex decisions in complex environments. This is all the more reason to conduct risk management under the bright light of open and informed dialogue.

In conclusion, in terms of practical implications insights from this research may help facilities and communities gain a better understanding of the reality of risk and the potential consequences of inadequate framing of it. If acted upon, such awareness should drive stakeholder discussions and serve to legitimately increase confidence while decreasing vulnerability and risk for facility, response and offsite personnel through improved planning and informed discourse.

Directions for Future Research

This research focused on a specific group of planners and emergency response insiders within a single metropolitan area, and the data collected provided many useful insights. However, there are numerous opportunities for future research to

build upon this study. Key areas of interest might include the addition of general public respondents, maturity and robustness of local planning and emergency response programs, inclusion of less significant offsite consequence facilities and studies within or across larger or smaller metropolitan areas. Within each of these potential themes, a researcher may wish to evaluate the influences of economics, education, accident history or other relevant factors. Past research has raised questions of environmental justice regarding many of the issues examined in this study. Future research might look explicitly at this topic by examining factors such as socioeconomic status, race, ethnicity and special populations such as the elderly. Specific recommendations are made in the following discussions as to where this might be appropriate. Of course, opportunities for such analyses are certainly not restricted to those discussed here, and future researchers are encouraged to seek those out as they see fit.

Public perception of the issues addressed in this study could be examined in at least two ways. First, in a given study area members of the general public might be identified who are actively involved in the planning process through Local Emergency Planning Committees or other Right-to-Know or public interaction mechanisms. Although these individuals in theory function within the planning process in an insider role, such individuals are in reality only “quasi-insiders” since their direct knowledge of agency and facility experiences, issues and resources is limited due to a lack of professional immersion in the daily operations of the respective parties. Based on the responses in the current study, these persons would also likely be penalized by insiders whether overtly or

innocently as “non-experts.” Of interest to the researcher, this puts them in a situation not unlike Local Emergency Responders and On-Scene Coordinators in being viewed as relative outsiders to the process and having to consider and act upon plans and information generated almost entirely by facility Environmental, Health and Safety Managers. A second research opportunity for examination of public perspective regarding planning and response issues would be to include representatives from populations adjacent to the participant facilities as respondents. These individuals would effectively be outsiders to the process and almost certainly viewed by insiders as non-experts. However, the views of these outsider respondents would be of great interest in evaluating how these populations feel about the typically paternal management of the planning and response process. Such studies may also prove useful for researchers interested in environmental justice issues.

The participants in the current study are part of a very robust, mature planning and emergency response program. The facilities are very large, internal and municipal response Teams are well trained and equipped and their peers in other communities generally consider the program as arguably the best in the United States. Although resources and training for these planners and responders is not a significant limiting factor in the performance of their duties, it may very well be in other communities. Future research should incorporate some analysis of this to examine whether the strength of the planning and response program is affected by resource constraints and how that might influence the overall contingency planning process.

A similar study conducted in a larger or smaller metropolitan area might yield insights into the dynamics and influences of the various sociological theories noted in the current project and how facility significance within the community affects that. For example, in smaller areas where industrial clusters make the participant facilities disproportionately significant employers or economic contributors, the effects may differ from areas where these facilities are much less “vital” components of the local economy. Such a study might attempt to discern economic impacts as one criterion for evaluating perceived influence. As with the inclusion of the general public as respondents, these avenues of research might generate environmental justice implications. A variant of this approach, additional research could also analyze or compare multiple, similar areas across regions or States to evaluate the relative absence or presence of the sociological theories of organization deviance discussed in the current study in those other areas.

Another potential area of interest for future research would be a focus on facilities with less significant potential offsite consequences. Though individually the potential effects from these facilities are less severe, the sites are much more numerous than the large facilities in the current study and tend to be collocated and intermixed with both residential areas and each other. Examples include farm supply centers with large inventories of anhydrous ammonia and other agricultural chemicals, retail propane distributors with bulk flammable gas storage and virtually countless small to medium sized chemical manufacturing, transportation or processing facilities. These facilities tend to be “lower visibility”

than the very large facilities, as they are often integrated into the community, more accessible and may be engaged in retail activities that directly impact residents, for example filling gas grill cylinders for cooking or ammonia “nurse tanks” for fertilizing fields. Research in this area might focus on whether these “friendly” or “familiar” facilities are seen as safer and why, even though the potential offsite impacts are significant, measured in miles in some cases. They are often less regulated as in the case of retail propane fuel facilities being exempt from Risk Management Program requirements. Several respondents in the current study made note that exempt or minimally regulated facilities were often the source of releases and the focus of after-accident investigations.

A key area of opportunity for future study recommended by the researcher is the research and development of the comprehensive risk assessment protocol discussed in *Practical Implications* within this chapter. The uses for such a tool would not be limited to chemical facilities and could be adapted to assess potential impacts from any disaster, whether technological or natural.

For the current study the basic interpretive qualitative design worked well, with the researcher relying on direct interaction and extended dialogue with participants via partially structured interviews. This approach proved an excellent mechanism by which to collect the necessary data within each participant’s operating environment. The data coding method used was equally effective and the researcher recommends it for future efforts. Another tool sometimes used to evaluate how individuals perceive their environment based on their respective points of view, Q methodology, may be useful for additional analysis of data

collected from this study. To facilitate Q methodology the researcher must compile a sample of statements that represent the expected range of opinions within the participant group regarding the topic of interest. The existing data set would support this additional analysis as most answers were brief and on point and participants provided many relevant quotes and observations.

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APPENDICES

Appendix A: Informed Consent Letter for Adult Participants

Informed Consent Letter for Adult Participants

Risk Perception and Worst-Case Contingency Planning: An Examination of Emergency Response Insiders within a Major Metropolitan Area

Dear Participant:

As part of my Doctoral degree requirements for Oklahoma State University, I am conducting a study of risk perception and contingency planning related to chemical facilities and emergency planning and response “insiders” in your metropolitan area. “Insiders” as referenced in my research include facility Environmental, Health and Safety Managers, State and Federal On-Scene Coordinators and Local Emergency Responders. I am interested in how insiders perceive risk and define worst-case scenarios and how risk perception drives contingency planning. These questions are important because insiders who perceive risk as low or who disqualify potential worst-case scenarios from consideration may be more likely to develop contingency plans not sufficiently protective of affected populations and facilities. This research could prove useful to facility managers, emergency responders, regulatory agencies and potentially affected populations since for each of these groups it is critical that contingency plans address realistic worst-case scenarios to properly allocate resources and prevent or safely manage incidents.

The research is designed as a basic interpretive qualitative study and data will be collected through direct interviews. All participants are adults and professionals in their respective fields and you will only be asked questions pertaining to your job-related duties, with no personal or facility information or identifiers collected. Interview records and the final research report will use only coded identifiers for names and locations, preventing any linkage of facilities or persons to specific results, geographic area or even the study. This letter is to be sent for your review in advance of each interview and reviewed again with you during the introductory meeting, with adequate attention paid to the confidentiality protections offered. At that time, I will answer any questions and ask that you confirm whether you wish to participate in this study by signing and dating this consent form. Your involvement will not be disclosed or confirmed by me to anyone else. I intend to protect your identity to the fullest extent possible.

Following the interview, we will go through a debriefing to discuss questions or concerns. To preserve complete confidentiality and to encourage free and open dialogue, interviews will be conducted individually and at a location of your choosing. I expect that the interview will last less than one (1) hour. Anticipating that the initial interviews and data review will generate insightful follow-up questions, I may contact you by telephone to ask those additional questions and/or to gain clarification of original interview content. The follow-up interview will probably last less than 20 minutes. All records will be kept in a secure location and when no longer needed, will be destroyed.

This study will result in a written dissertation submitted to Oklahoma State University, and the analysis may also result in published articles and presentations at professional conferences. At all times, the confidentiality protections offered will remain in place.

Participation in this study is voluntary. You may decline to participate, and if you initially choose to participate in the study, you are free to withdraw permission at any time upon notifying Scott Harris (Primary Investigator). You will not be penalized for declining or withdrawing, and if at any time during this study you have questions or concerns about your rights as a research participant, you may contact:

Carol Olson, Ph.D., Chair, Institutional Review Board
415 Whitehurst, Oklahoma State University, Stillwater, OK 74078
(405) 744-5700

If you have further questions or concerns, please contact Scott Harris (Primary Investigator) or Dr. Gary Webb (Dissertation Research Advisor) at the following addresses and telephone numbers. Thank you for participating in this study.

Sincerely yours,

Scott Harris
2400 State Highway 121, Apt. 1907
Eules, TX 76039
(817) 399-9515

Gary Webb, Ph.D.
006 Classroom Building
Oklahoma State University
Stillwater, OK 74078
(405) 744-8752

Consent Documentation:

Do you grant permission to participate in this research?

Yes _____ No _____

Do you grant permission to be audiotaped?

Yes _____ No _____

I guarantee that the procedures and confidentiality protections described in this consent letter will be adhered to and agree to these terms:

Signature of researcher _____ Date _____

I have read and fully understand this consent form. I agree to these terms and sign it freely and voluntarily. A copy has been given to me.

Signature of participant _____ Date _____

Appendix B: Interview Protocol

3. How are potential offsite consequences incorporated into the planning and response process?

4. How adequate are the regulations pertaining to this/these facilities as a basis for planning and response?

5. How adequate are the contingency plans addressing this/these facilities?

6. How risky would it be for onsite emergency personnel responding to a worst-case design event at this/these facilities?

7. How risky would it be for offsite emergency personnel responding to a worst-case design event at this/these facilities?

8. How does the public fit into your risk evaluation and planning process?

9. Forget about the written, "official" plans. In your opinion, what is the worst-case scenario for this/these facilities?

10. What should/could be done to lower risk and increase the success of planning and response for this/these facilities?

11. Describe your role in developing or implementing the facility or area CP.

Appendix C: Institutional Review Board Approval

**Oklahoma State University
Institutional Review Board**

Protocol Expires: 9/18/2004

Date: Friday, September 19, 2003

IRB Application No GU042

Proposal Title: Risk Perception and Worst-Case Contingency Planning: An Examination of Emergency Response Insiders Within a Major Metropolitan Area

Principal Investigator(s):

Kenneth Scott Harris

Gary Webb

2400 State Hwy 121

006 Classroom

Stillwater, OK 74078

Stillwater, OK 74078

Unless, X > 6039

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Dear PI :

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact Sharon Bacher, the Executive Secretary to the IRB, in 415 Whitehurst (phone: 405-744-5700, sbacher@okstate.edu).

Sincerely,



Carol Olson, Chair
Institutional Review Board

#2
VITA

Kenneth Scott Harris

Candidate for the Degree of

Doctor of Philosophy

Dissertation: RISK PERCEPTION AND WORST-CASE CONTINGENCY
PLANNING: AN EXAMINATION OF EMERGENCY RESPONSE
INSIDERS WITHIN A MAJOR METROPOLITAN AREA

Major Field: Environmental Science, with a specialization in Disaster and
Emergency Management

Biographical:

Personal: Born in Quantico, Virginia on October 24, 1961, the
son of Thomas and Kay Harris.

Education: Received Bachelor of Science degree in Geology and
a Master of Science degree in Public Health from
Western Kentucky University, Bowling Green,
Kentucky in May 1982 and May 1992, respectively.
Completed the requirements for the Doctor of
Philosophy degree at Oklahoma State University in
May 2004.

Experience: Contributions span 22 years of Environmental, Health
and Safety Management in State and Federal
government, consulting, general industry and
University instruction.

Professional Memberships:

Master Level Certified Hazardous Materials
Manager; Registered Professional Geologist