THE UNIVERSITY OF CALGARY

Understanding Views of Risk:

A Case Study of Swan Hills, Alberta.

by

Daniel Lee

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF ARTS

DEPARTMENT OF GEOGRAPHY

CALGARY, ALBERTA

MAY, 1999

© Daniel Lee 1999

National Library of Canada
Acquisitions and Bibliographic Services
395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque nationale du Canada
Acquisitions et services bibliographiques
395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence

Our file Notre référence

The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

L'auteur conserve la propriété du droit d'auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-47957-9

Canada

ABSTRACT

This thesis addresses one of the main research problems in the area of environmental risk – to explain why assessments of risk vary between individuals and between groups. It examines why a community seems to accept the risk from a technological development (e.g. hazardous waste facility and nuclear power plants), even though research has shown that often communities tend to oppose such facilities. An argument is made for the social and cultural theories of risk which pay attention to risk in the context of daily life.

This qualitative study involves 27 in-depth face-to-face interviews with the residents of Swan Hills, the site for the Alberta Special Waste Treatment Facility (ASWTF). The interviews were transcribed verbatim and then analyzed for emergent themes with the aid of NUDIST (a qualitative software package).

The findings reveal that the residents of Swan Hills in general view the risk from the ASWTF as low. The key influences in the residents' assessments of risk from the ASWTF are: trust in local leaders, local residents, and Bovar; testing and monitoring; familiarity; economic benefits; social pressures; and responsibility. Nevertheless, some latent concerns over the ASWTF remain which seem to be due to various types of uncertainty. The social amplification (attenuation) of risk framework is used to describe how risk regarding the ASWTF is minimized.

ACKNOWLEDGEMENTS

This thesis has been supported by many. Foremost, I want to thank the 27 people from Swan Hills who welcomed me into their community and shared their stories/views. I would also like to thank my supervisor Jamie Baxter for introducing me to the research topic, for providing me funding through SSHRC, and for his continual support and guidance throughout my thesis research. Dianne Draper also offered valuable advice and encouragement during the past two years.

There are a number of people in the department of Geography, both support staff and fellow graduate students that have assisted me in so many ways and made my grad school days more enjoyable. I would like to especially thank Robin Poitras for his technical support, who graciously helped produce 7 drafts of my conceptual framework. Also thanks to Rob and Kerri-Lynn (my office mates), and Al for helping me cope with stress through hockey and beers, and for reminding me there is more to life than just school (and work).

I would also like to thank my friends and family for their undying encouragement and support. Thanks to the "Cochrane road line-up" for the recreational activities (both sports and drinking), Greg who encourages me to climb harder and higher, friends at TWU for believing in me, to Leah (my swing partner) for listening and supporting me in many ways.

TABLE OF CONTENTS

APPROVAL PAGE ii

ABSTRACT iii

ACKNOWLEDGEMENTS iv

TABLE OF CONTENTS v

LIST OF FIGURES viii

LIST OF TABLES ix

Chapter 1:
Introduction 1
1.1 Research context 1
1.2 Research problem, theoretical and methodological orientation of the thesis 3
1.3 Research objectives 4
1.4 Chapter summaries 5

Chapter 2:
A Review of Approaches to Studying Technological Environmental Risk 7
2.1 Introduction 7
2.2 Geographic approach 8
2.3 Anthropological and sociological approach 12
2.3.1 Cultural theory 13
2.3.2 The social amplification of risk 16
2.3.3 Social arena concept of risk 21
2.3.4 Risk society 26
2.4 Summary 29

Chapter 3:
Research Design 31
3.1 Research objectives 31
3.2 Community of Swan Hills 32
3.2.1 Community profile 32
3.2.2 Site history 36
3.3 Participant selection 41
3.4 Methodological framework 42
3.4.1 Grounded theory 42
3.4.2 Symbolic interactionism 43

3.5 Interview checklist 44
3.6 Analytical procedures 44
3.6.1 Data reduction and analysis 44
3.6.2 Coding procedures 46
3.6.3 Reading & annotating 47
3.6.4 Open coding 48
3.6.5 Methods of creating codes 49
3.6.6 Axial coding 50
3.6.7 Selective coding 51
3.6.8 Memoing 51
3.7 Presentation of findings 52
3.8 Qualitative rigour: strategies to reduce threats to evaluation criteria 53
3.9 Autobiography 56

Chapter 4:
View and Opinions of Risk 59
4.1 Community description 59
4.1.1 Safe place 59
4.1.2 Community values and ways of life 62
4.2 Everyday risks and concerns in Swan Hills 64
4.2.1 Community concerns 65
4.2.2 Environmental risks and concerns 66
4.3 Low concerns and low risks regarding the ASWTF 72
4.4 Summary 80

Chapter 5:
Contextual Influences on the Views of Risk 82
5.1 Community views of plant, workers, and experts 82
5.2 Control 89
5.3 Views of waste and waste facilities 91
5.4 Waste disposal is the responsible thing to do 94
5.5 Community stigmatized by outsiders 97
5.6 Reasons for minimizing risk 103
5.7 Benefits 108
5.8 Latent concerns: reasons for concern 112
5.9 Summary: A conceptual framework for understanding risk at Swan Hills 117

Chapter 6:
Discussion: Attenuation of Risk in Swan Hills 122
6.1 Social amplification (attenuation) of risk 123
6.2 Attenuation of risk in Swan Hills 124
6.2.1 Event characteristics in Swan Hills 127
6.2.2 Information flow in Swan Hills 130
6.2.3 Interpretation and response 132

6.2.4 Ripple effects and type of impacts 134
6.3 Cultural Values 136
6.4 Benefits and value commitments 136
6.5 Sources of trust 141
6.6 Uncertainty and latent concerns 143
6.7 Summary 144

Chapter 7:
Conclusion 145
7.1 Substantive contributions 145
7.2 Theoretical contribution 146
7.3 Methodological contributions 149
7.4 Directions for future research 150

REFERENCES 151

APPENDICES 159

LIST OF FIGURES

Figure 2.1: Social Amplification of Risk Framework 17
Figure 2.2: Social Arena of Risk 23
Figure 3.1: Map of Alberta 33
Figure 5.1: Conceptual Framework 118

LIST OF TABLES

Table 3.1: Selected Census Characteristics (1996) 34
Table 3.2: Selected Census Characteristics (1981, 1986, 1991, 1996) 35
Table 3.3: A Brief Chronology of the ASWTF Siting Process and Key Events 37
Table 3.4: Participant Selection Strategies 42
Table 3.5: Steps in Data Collection and Analysis 45
Table 3.6: Time Line of Data Collection and Analysis 48
Table 3.7: Comparison of Two Different Researchers' Coding 55
Table 4.1: Community Description 60
Table 4.2: Community Concerns 66
Table 4.3: Environmental Risks and Concerns 67
Table 4.4: Descriptions of Low Risk and Low Concerns 73
Table 5.1: Community views of plant, workers, and experts 83
Table 5.2: Control 90
Table 5.3: Views of waste and waste disposal 93
Table 5.4: Resident's View of Media Reporting on ASWTF 98
Table 5.5: Reason for Minimizing Risk 104
Table 5.6: Benefits 109
Table 5.7: Latent Concerns 112

Chapter 1:

Introduction

1.1 Research Context

Modern society is realizing the growing problems of toxic waste. Siting new facilities for the safe treatment and disposal of hazardous waste is considered by many as the first step in solving the toxic waste problem (Ristoratore, 1985). However, the siting of hazardous waste facilities is proving to be a difficult task for both policy-makers and industrial managers because of widespread community disapproval of such sites. Review of past siting efforts for such facilities provide little hope that this trend will change. A national survey by the New York legislative Commission on Toxic Substances and Hazardous Waste (1987) revealed that only one commercial hazardous waste incinerator had received a permit and become operational since 1980, and of 81 applications for waste management facilities received since 1980, only 6 had been successful (Kasperson et al., 1992). Further, Rabe (1994) reports that virtually no new hazardous waste treatment or disposal facilities have been opened in either Canada or the United Sates since the mid-1980s.

Community opposition and conflicts over environmental hazards are likely to continue due to public concerns about the risk of negative impacts from environmental contamination. One of the main indications of conflicts over technological environmental hazards are the different assessments of risk between groups, especially between laypeople and scientific and government experts (Fischhoff et al., 1981). Even though the science of risk assessment is becoming more sophisticated in how it predicts

the probability and magnitude of harm from technological hazards, laypeople still distrust the expert assessment that the risk is low. Experts are realizing that scientific or technical assessments of risk have focused too narrowly on the probability of events and the magnitude of consequences (Freudenburg, 1988). For example, the psychometric paradigm has revealed that decisions of risk are not merely based on estimates of expected mortality and the costs per life saved often used by economists (Krimsky and Golding, 1992), but rather on the bases of multiple attributes that describe the risk event such as *dread* (defined by catastrophic potential, lack of control, involuntariness, inequitable, and dread) and *unknown* (defined by new risk, delayed effects, unknown to science and unobservable) (Slovic, 1997). Douglas and Wildavsky (1982) also add that the way laypeople "evaluate probabilities and magnitudes of unwanted consequences, are less a question of predicated physical outcomes than of values, attitudes, social influences, and cultural identity" (p. 38). Risk, then, concerns more than just the probability of harm (scientific risk assessment), it is also influenced by the social and cultural context in which they occur (Johnson and Covello, 1987; Kasperson, 1992). In cases where assessments of risk vary and conflict is high, risk then can be considered as being socially and culturally constructed (Douglas and Widavsky, 1982; Johnson and Covello, 1987). This study examines how a community which has volunteered to accept an environmental technological hazard constructs and maintains their views of risk. This will help understand why some communities are willing to accept potentially hazardous facilities.

1.2 Research problem, theoretical and methodological orientation of the thesis

This research addresses one of the main research problems in the area of environmental risk – to explain why assessments of risk vary between individuals and between groups. Some individuals and groups seem willing to accept the risks associated with hazardous waste development projects (e.g. landfills, incinerators, hazardous waste disposal sites), while others are not. This research problem is addressed by examining the views of risk from a community which seems willing to accept (assesses as low risk) the risks from an environmental technological hazard.

Although there are several approaches to explain the discrepancies in views about risk (e.g. geographic, econometric, psychometric, social and cultural theories), this thesis is mainly informed by the social and cultural theories of risk. Specifically, this research is guided by four theories: cultural theory of risk, social amplification of risk, social arena concept of risk, and the risk society. The strength of these theories lies in the fact that they examine risk in the context of daily life and they maintain that hazards are deemed "risky" based on a person's or group's values and beliefs (Douglas and Wildavsky, 1982; Johnson and Covello, 1987).

The methodological orientation is interpretive and qualitative. The primary method of data collection was in-depth, face-to-face interviews, set within a broader methodology of symbolic interactionism. The interviews themselves were partially structured by an interview guide, but the participants were also allowed the freedom to express ideas that were important to them. This is important for revealing the contextual influences that shapes people' views of risk (Patton, 1992).

1.3 Research objectives

This research is part of larger project concerned with the meaning of risk, and is sponsored by the Social Sciences and Humanities Research Council of Canada (SSHRCC). It involves a study of views of risk in communities that were part of voluntary siting process for a hazardous waste facility during the early 1980s. This thesis is organized around two interrelated research objectives:

> i) to examine the views of risk among a variety of laypeople within the same community in the context of daily life
> ii) to explore the multiple influences that shape peoples' views of those risks.

These objectives are addressed through a case study of Swan Hills, Alberta, a community which was chosen for the site for a hazardous waste management facility, and has been in operation for the last thirteen years. By choosing to host the Alberta Special Waste Treatment Facility (ASWTF), the residents seemed willing to accept the risks associated with the site (assessed as low). In contrast, just three years prior to the siting of the ASWTF, two communities (Fort Saskatchewan, Alberta and Two Hills, Alberta) rejected the proposal for the same hazardous waste incinerator (Rabe, 1994).

The main objective of this exploratory research is to understand and explain how people in Swan Hills form and maintain their views about environmental risk. Knowing about this formation and maintenance will be useful for anticipating and abating conflict over technological environmental hazards. Specifically, this study is important for four reasons. First, there are many studies that have focused on lay-expert differences of risk assessments and on differences between expert groups (e.g. Fischoff et al., 1981; Slovic, 1987), but there has been little attention paid to the differences between lay groups. This study examines why laypeople groups seem to assess the risks from the same

environmental hazard differently. Specifically, this study will examine why the community of Swan Hills seems to accept the risks from an environmental hazard while others in other communities reject it (assess as high). Second, there are few detailed studies of risk perception in communities that volunteer to accept hazardous facilities. This study may contribute to an understanding of why some communities volunteer to accept potentially hazardous facilities. Third, literature is replete with examples of the failures of risk communication (the grid-lock of siting proposals due to opposition), but there are few examples of successful ones (successful siting of a proposed facility) (Rabe, 1994). The importance of research in the wake of voluntary siting is also important because past paternalistic efforts at siting hazardous facilities have proven to be excessively costly, lengthy and often unsuccessful. As a result, policy makers are looking towards a "voluntary" siting process as a viable solution. Swan Hills is a potential example of a "successful" voluntary siting process for two reasons: i) the siting process was completed within a relatively short period of time (less than two years) and with minimal costs, ii) community turbulence (Edelstein, 1988) usually associated with conflict/opposition was overcome (Rabe, 1994). Fourth, there are few detailed studies examining how the community/individual assessments of risk change over time.

1.4 Chapter summaries

This thesis contains seven chapters. Chapter two contains a review of some of the literature on environmental risk which highlights some of the key concepts and theoretical frameworks for understanding why views of risk vary between individuals and between groups. The review starts with the geographic approach, which is the basis of much of the current literature on risk. Following that is a review of the anthropological

and sociological approach to the study of risk, which is argued to be most relevant to the study of environmental risk.

Chapter three describes the research design for the case study, along with a description of the community and the siting of the ASWTF, as well as some key events, in order to understand the context of the study. Also discussed is the methodology used for interpreting the meaning of phenomena at Swan Hills. Next is a description of how data were managed using a qualitative software package, NUDIST, and interpreted. The chapter ends with a discussion on strategies used to ensure trustworthy findings.

Chapter four and five describe the findings of the study by presenting three types of data from the analysis: themes from NUDIST database, table of theme frequencies, and a conceptual framework for understanding risk at Swan Hills. Chapter four describes how the residents view risk in Swan Hills, especially in regards to the ASWTF. Chapter five discusses the multiple influences (residents views of plant, workers, and experts; benefits; views of waste and waste facilities; minimization of risk; and latent concerns) which shape the residents' views of risk in Swan Hills. The chapter concludes with a summary of the main findings in the form of a conceptual framework.

Chapter six is the discussion chapter and it relates the findings for the case study back to the literature on risk reviewed in Chapter two. An argument is made for the social amplification of risk framework for understanding how the risks related to the ASWTF are attenuated.

Chapter seven outlines the main conclusions from the case study, and then ends with a discussion of directions for future research.

Chapter 2:

A Review of Approaches to Studying Technological Environmental Risk

2.1 Introduction

This chapter reviews the literature on risk to highlight some of the concepts and frameworks which may be useful for understanding how people form their views and opinions of risk in Swan Hills. The review starts with the geographic approach, which is the basis of much of the current literature on risk. Following that is a review of the anthropological and sociological approach to the study of risk. The anthropological and sociological approaches are argued to be most relevant to the study of environmental risk because they highlight the importance of context. Although the psychometric and econometric approaches also contribute to the literature on risk, they will not be covered in detail in this review. While both of these approaches contain a considerable amount of breadth (empirical studies from a wide range of people), they lack some depth regarding some important concepts and definitions (i.e., context is important) because they are derived from studies of general populations and hypothetical conditions. For example, the psychometric approach reveals two main factors which are associated with risk: dread (catastrophic potential, lack of control, involuntariness, inequitable, and dread) and unknown (new risk, delayed effects, unknown to science, and unobservable) (see Fischhoff et al., 1978; Slovic et al., 1982; and Slovic, 1987). However, the psychometric approach is criticized for its focus on the general public, who may or may not face risks and hazards on a daily basis (Elliot et al., in press; Taylor et al., 1992). People who face

risks and hazards on a daily basis may evaluate risks quite differently. Similarly, the econometric approach (see Kahneman and Tversky, 1974, 1979; and Plous, 1993) involves experimental laboratory work documenting peoples' reactions to hypothetical risks or survey work on the general population. The reliance on the general population and hypothetical choices raises questions of reliability of the results (Tversky, 1979). The psychometric and econometric approaches fail to address attitudes towards specific risks in specific contexts. As a result, an argument is made for the use of the social and cultural theories of risk which pay attention to risk in the context of everyday life.

2.2 Geographic Approach

Environmental hazards and risk research have had a long history within geography. The geographic approach to the study of environmental hazards is firmly rooted in the human ecological tradition, focusing specifically on the concept of human adaptation. One of the main criticisms of this approach is the assumption that there is a single standard for rational choices, and that these choice can be achieved by improving or increasing the knowledge of the non-standard decision maker.

One of the first geographers to conduct research on hazards was Gilbert White who examined human adjustments to natural hazards (e.g., floods). He initially sought to explain why people chose to live on floodplains in the U.S. at a time when floodplain disasters were on the increase (White, 1958). White's model (also known as the Burton-Kates-White paradigm, Watts, 1983) focuses on the notion of bounded rationality, first introduced by Slovic et al., (1974) to explain peoples' adjustments to natural hazards (e.g. living on a hazardous flood plain) (White, 1974; Burton et al., 1978; Watts, 1983). Bounded rationality asserts that due to cognitive limitations, decision makers are forced

to construct a simplified model of reality when faced with uncertainty or risk (Slovic et al., 1974). Therefore, inappropriate behaviour (e.g., living on a hazardous flood plain) is viewed as the result of inadequate knowledge or imperfect knowledge, mistaken perceptions, or an inflexible decision-making process. Priority, then, is given to perceptions which are viewed as faulty and inappropriate psychological propensities to explain ineffective hazard response (Watts, 1983). Slovic et al. (1974) reiterate this idea in the following statement:

> Research, in both natural and laboratory settings, strongly supports the view of decision process as boundedly rational. Given this awareness of our cognitive limitations, how are we to maximize our capability for making intelligent decisions about natural hazards? Two answers to this question are considered here. The first is primarily nonanalytic in character and works within the framework of bounded rationality. The second is an analytic approach that accepts the notion that human beings are fallible in processing information, but strives to help them come as close as possible to an ideal conception of rational decision making (199).

They explain further that:

> Knowledge of the workings of bounded rationality forms a basis for understanding constraints on decision making and suggests methods for helping the decision maker improve as an adapting system (200).

Such authors assert that decision makers have constantly underestimated or overestimated the true probability of risk because of bounded rationality. Then, according to these authors, better decisions concerning natural hazards can be made by addressing two issues. First is to make the decision maker's perception of the hazard more accurate. Second is to make him/her more aware the complete set of alternative courses of action (Slovic et al., 1974). According to Slovic, making people aware of the simplifying assumptions and biases they use to make decisions under uncertainty will result in more accurate risk assessments.

One of the main criticisms of the Burton-Kates-White model is their claim that there is only one definition of 'rationality'. There may be many "rationalities" people use when making decisions about risk and uncertainty (e.g., some may accept a hazardous waste facility because of potential economic benefits while others reject it because it is perceived as a high risk). Furthermore, this model ignores the local context in which these decisions are made. Context, such as, economic dependence and other influences such as values, social networks, and media may play an important role in shaping peoples' view of risk. For example, numerous studies have shown that economic benefits (Bourke 1994; Albercht et al, 1996; Spies et al., 1998; Groothuis and Miller, 1994; Timmons, 1997) to be an important factor in influencing peoples' attitude toward hazardous facilities. People may downplay hazardous facilities because of the perceived benefit of increased jobs and tax revenues.

Watts (1983) is also critical of the Burton-Kates-White model because of the narrow role for social theory. Specifically, Watts is critical of the excessive focus on the concepts of adaptation and homeostasis which is seen to be obstructed by behavioural irrationality (due to such things as inadequate knowledge). Inappropriate decisions then are made because of incomplete or inadequate information. Watts points out that different responses to the same hazard exist, but he attributes the social context and political economy as the major influence on individuals' perceptions, not behavioural irrationality (Watts, 1983). For example, trust in community leaders, authorities or experts may heavily influence peoples perception of risks. Furthermore, institutional commitments and obligations may also influence peoples' perceptions.

Palm (1990) addresses the lack of a social theory by reviewing several approaches in geography that theorize the relationships between humans and the environment (determinism, humanism, structuralism and the structure-agency debate). She then offers her own integrative approach which she summarizes in the following passage,

> Research perspectives on the relationships between people in societies and their environments have ignored the linkages between individual-environment interactions and society interactions, how individual responses can modify the system, and how awareness of constraints of the system affects the selection of micro-level behaviours (79).

This resonates with Beck (1992) and Giddens' (1991) idea of reflexivity in that the interaction between individuals and social structures is a two way process, whereby social structures not only affect individuals, but individuals also affect social structures by their actions. This idea will be explored further later on.

White's early work on natural hazards was eventually expanded to include human made technological hazards. Perhaps the most prominent work by a geographer dealing with technological risks is that of Susan Cutter in her book Living with Risk (1993). Cutter's work provides two major contributions to the study of environmental risk. First, she recognizes that in order to understand risk, we must understand how they threaten people in the context of daily life, a focus for the research in this thesis. For example, some may negate the risks from technological hazards because of the economic benefits or institutional obligations. Familiarity and constant exposure to a hazard may also influence the assessment of risk. Rolf (1996) uses the term "hazardous oases" to describe places, where geographic isolation, economic dependence, and familiarity (earlier experience with similar activities) influence attitudes towards hazardous waste facilities. Furthermore, Freudenburg (1991) has found that trust in authorities to be a critical factor

in determining which community members fear and which ignore hazards. Context, then, is key because "those who experience hazards, and the risks associated with them, do so against the backdrop of home life, community life, and the threat of other local hazards" (Baxter, 1997, 18). Cutter uses the Three Mile Island nuclear accident as an example to reinforce how social context, not just the characteristics of the hazards itself, influenced the decision about risk:

> The decision to evacuate may also be influenced by social or institutional factors, such as the actions of friends and neighbors rather than the cognition of risk. The evidence to date suggests that the behavioural effects of risk estimation or evaluation are secondary to contextual or situational factors (Cutter, 1993, 255).

Second, Cutter focuses on the views/assessments of laypeople who face risk directly, rather than on the general population who may or may not face the risks directly. Over the last two decades, research on natural and technological risks, in the geographic literature, have grown substantially, especially in terms of empirical and theoretical contributions. There has been a general trend to incorporate a social theory to the study of risk. The social construction of risk will be dealt with in more detail in the following sections.

2.3 Anthropological and Sociological Approach

The major characteristic of the anthropological and sociological approach to the study of environmental risk is that they tend to focus more on the social and cultural factors that influence peoples' attitudes towards environmental hazards rather than on the characteristics of the hazards themselves (e.g., psychometric and econometric approach). Emphasis is placed on the social, cultural, and institutional factors which influence the way environmental risks are constructed. Context is important because peoples' perceptions often reflect their worldviews (how the world works), which in turn are

influenced by factors such as morals, values, interests, trust, and environmental justice. Dake (1992) reiterates this idea in his statement,

> While individuals perceive risks and have concerns, it is culture that provides socially constructed myths about nature – systems of belief that are shaped and internalized by persons, becoming part of their worldview and influencing their interpretation of natural phenomena (21).

For example, after a tanker car explosion at the Gaylord chemical plant in Bogalusa, Louisiana, the town's reactions were divided. One group of residents perceived the plant as a continuing hazard and demanded compensation, while others believed the risks were minimal and were quick to point out that the plant is the town's primary industry (Timmons, 1997). As a result, different worldviews and values lead to different assessments of risk.

Another characteristic of the anthropological and sociological approach is that they place more emphasis on theoretical development. However, Rayner (1992) points out that this has been largely at the expense of few empirical studies despite its capacity for theoretical development. The following examines cultural theory, the social amplification of risk, the social arena concept, and the risk society framework.

2.3.1 Cultural Theory

The cultural theory of risk contributes to the literatures on risk by pointing out that risks are social and cultural constructions. That is, risk is always biased by social group, and institutional influences in everyday, ordinary social interactions with friends family, friends and colleges (Douglas and Wildavsky, 1982). Conflict over risk, then, are best understood in terms of "plural construction of meaning – i.e., that competing cultures confer different meanings on situations, events, objects, and especially relationships" (Dake 27, 1992).

The main thesis proposed by Douglas and Wildavsky in Risk and Culture (1982), is that societies actively select certain risks for attention, based on their cultural biases. Cultural biases are defined as shared beliefs and values that justify different ways of behaving, that is as "worldviews corresponding to different patterns of social relations" (Dake, 1992, 28). Douglas identifies five different patterns of interpersonal relationships: hierarchical, individualist, egalitarian, fatalist, and autonomous (Douglas, 1970). The social relations, along with the cultural biases that justifies them, give rise to the shared meaning of what constitutes a hazard and what does not (Dake, 1992). That is, adherence to a certain pattern of social relationships generates a distinctive way of looking at the world; adherence to a certain worldview legitimizes a corresponding type of social relations. For example, Douglas and Wildavsky (1982) argue that during the 1970s, out of all possible risks, Americans singled out industrial pollution as the main concern. The authors claim that the reason for the increased concern is the result of environmental groups who had singled out industrial pollution for attention as a rallying point for group solidarity and expansion. Therefore, what society deems risky is partially determined by social and cultural factors, not necessarily in relation to potential threat of danger. According to these authors then, the selection of risk have very little relation to the scientific probability of harm. In recent years, a number of researches have attempted to quantitatively test the cultural theory of risk (e.g. Marris et al., 1998; Brenot et al., 1998). For example, Marris et al, examined whether cultural biases (hierarchical, individualist, egalitarian, fatalist) were associated with distinct patterns of risk perceptions for 13 risk issues. Although the correlation's obtained were low, they were statistically significant.

They conclude that the patterns observed were broadly consistent with the predictions of cultural theory. Brenot et al, also found similar results.

The belief that risks are evaluated with little relation to the threat of harm is one of the major criticisms of this theory (Dake, 1992). However, since the publication of Risk and Culture, major catastrophes such as Three Mile Island, Chernobyl, and Love Cannel have occurred. As a result, environmental movements today may have had impetus from threats from technological developments which have actually been realized. However, Dake (1992) argues that Douglas and her colleagues do not negate the fact that there are real threats to humans and to the environment. Rather, these authors are pointing out that worldviews provide powerful cultural lenses which magnify one danger, obscure another threat, and select others for minimal attention or even disregard (Dake, 1992). Another criticism is that depending on the social role people play, individuals may belong to several social groups. Further, being a member of one social group does not prevent "the capability to understand and accept the rationales of other groups as different but equally legitimate ways of dealing with the issue" (Renn, 1992, 139).

Despite these criticisms, Douglas and Wildavsky's basic thesis that societies selectively choose risks for attention, deserves further attention. They have made significant contribution to the literature on risk by "pointing to the important role of social and cultural factors in setting risk agendas and in determining which risks will be emphasized or de-emphasized" (Covello & Johnson, 1987, x). However, what is largely lacking from this perspective is how people form their views of risk. This case study will explore the local context (e.g., economic benefits, social network, media, and political

influences) which likely influence and shape peoples' views and attitudes of risk related to the hazardous waste facility.

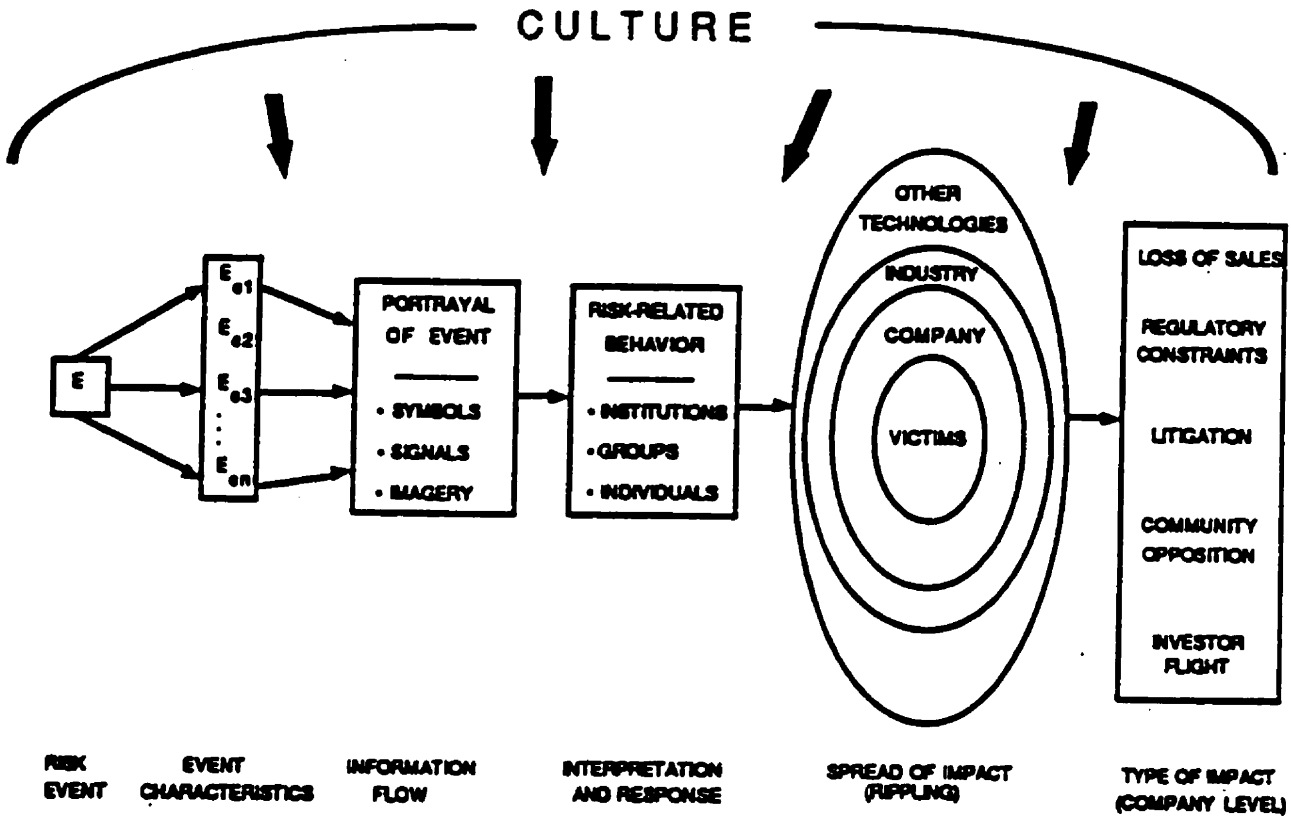
2.3.2 The Social Amplification of Risk

The social amplification of risk framework may be relevant to the study in Swan Hills because it reveals how some risks are attenuated (downplayed) or amplified (magnified), depending on social and cultural values or beliefs. This framework is one of the first to integrate the seemingly fragmented theories of risk up to the late 80's (Kasperson, 1992). The social amplification of risk integrates both the technical assessments of risk and the social experience of risk (Renn, 1992). Initially, this framework was developed to help explain why some seemingly minor risks gain attention in the public eye in some instances, but not in others. According to Kasperson, a risk or risk event is amplified or attenuated by the interplay of psychological, institutional, and cultural factors which shape societal experience of the risk. This interaction can either heighten or attenuate the risk. Risk, then, is defined by both the objective threat of harm (hazards event), and the social and cultural (amplification) process.

The social amplification process (figure 2.1) begins with a risk event (e.g. toxic leak at a chemical waste facility). Then certain characteristics of these events are amplified (or attenuated) by individuals or institutions (e.g. media). According to Kasperson, the amplification process (whether the risk is attenuated or amplified) depends on how the messages are interpreted,

> Role-related considerations and membership in social groups shape the selection of information that the individual regards as significant. Interpretation of signals that are inconsistent with previous beliefs or that contradict the person's values are often ignored or attenuated. They are intensified if the opposite is true" (1992, 159).

Figure 2.1: The Social Amplification of Risk Framework



(Source, Kasperson, 1992)

However, this is further complicated because individuals must also adhere to the *cultural values* and *beliefs* of the organizations they belong to, which may or may not be consistent with individual values or beliefs. For example, after a nuclear accident in Ginna, New York (1982), the reaction was far greater at the national level than the local community. Reduced concerns seems to be the result of either being employed in the facility or the recognition that the facility was an important contributor to the local tax base (Kasperson, 1992). Other studies have found differences between community leaders and local residents (Bailey et al., 1992). For example, Bailey et al. (1992) found strong differences in perceptions of risk between community leaders and the general public in Sumter County, Alabama, the site of the USA's largest hazardous waste landfill. The leaders typically downplay the risks associated with the site, placing greater emphasis on the economic benefits of jobs and tax revenues. On the other hand, local residents view the site as posing a threat of environmental contamination and health endangerment. Differences in the level of concerns have also been found between women and men (Davidson & Freudenburg, 1996; Bord & O'Connor, 1997; Timmons, 1997). For example, Davidson and Freudenburg (1996) have found that women, especially women with children, tended to express higher levels of concern about potential environmental and technological risks than do men. However, other studies have demonstrated no gender differences (e.g. Blocker and Eckberg, 1989; Van Lier and Dunlap, 1980). According to Bord and O'Connor (1997), the reason these studies did not demonstrate any gender differences is because the studies measured environmental attitudes in ways that did not trigger risk perceptions in respondents.

Behavioural responses to risk or risk events are also affected by cultural biases. Due to conflicts between personal values, beliefs, and institutional obligations (e.g., family, job) some responses may evoke negative reaction such as psychological stress, alienation, or anomie (Kasperson, 1992). For example, some may find it difficult to find a balance between family obligations and protest endeavors against noxious facility (Baxter, 1997). In turn, behavioural responses generate *secondary effects*, social or economic consequences that extend far beyond direct harm to humans or the environment, including indirect impacts such as such as impacts on the local economy (e.g., liability and insurance costs), negative attitudes to technology, political and social pressures, social disorder (e.g. protesting, rioting, sabotage, or terrorism), and erosion of public trust towards social institutions (Kasperson, 1992). The perception of secondary effects in turn may create high-order impacts, resulting in a "ripple" effect, which impact other groups, distant locations, or future generations. Therefore, the social amplification is dynamic, and potentially reaches beyond the local context. This idea resonates Giddens theory of structuration. The principle argument of structuration theory is that while human agency does determine human action and meaning, attention must also be paid to the possible influence "cause" of structure in society which may be both constraining and enabling (Dickie-Clark, 1986). Structures, then, are phenomena that are being produced by human agency and at the same time are being reproduced by the conditions of human agency (Baber, 1991). Structuration theory emphasizes the importance of observation to understand the connections between institutional social structure and individual meaning. An example of structural influences in Swan Hills may

be an employee/employer relationship. Commitments to the facility and economic issues may influence residents' views of risk from the waste facility.

The social amplification of risk framework has contributed to the study of risk in several ways. First, the utility of the concept lies in the potential to generate hypotheses (Renn, 1992). The framework is able to explain how a risk or risk event can be attenuated by one group and amplified by another. Second, it is one of the first to integrate the technological, psychological, sociological, anthropological approaches to risk. Third, it recognizes that risks are unique to every situation, and adequately explains how different responses to the same environmental hazard can arise.

Despite the usefulness of this framework, at least three key criticisms have been identified. These come mainly from other sociologists and culturalists. First, Rip (1988) indicates there is a danger of risk managers using this model as a tool to address the "exaggerated" or "irrational" fears of the public (Kasperson, 1992), rather than as a tool for understanding. There is an inherent danger that this framework will be used to focus attention on how communities amplify risk instead of paying attention to the potential threat of harm posed by an environmental hazard (Baxter, 1997). Second, Rayner (1988) argues that the term amplification is "too passive" because it connotes that individuals merely react to the information flow of risk. There are many cases in which individuals purposefully seek out risks as in the case describe here. However, this oversight has been corrected by placing these exposers of risk/hazards into the "event portrayal" concept in the model (Baxter, 1997). That is, risk seekers can add to the information flow process to amplify the risk. Third, many question the testability and predictability of the framework.

The social amplification of risk framework may be relevant to the study in Swan Hills in two ways. First, this framework may shed some light on how people form their views about the risks associated with Alberta Special Waste Treatment Facility (ASWTF). For example, communities values/beliefs (e.g. economic value) and organizational commitments (e.g., ASWTF) may heavily shape residents' views of risk. Second, it may help explain the seemingly low risk concerns related to the two accidents that occurred at the plant (a PCB leak in October 1996, and an explosion in July 1997). The risks associated with the two incidents may have been attenuated because of value and organizational commitments to Bovar and the community.

2.3.3 Social Arena Concept of Risk

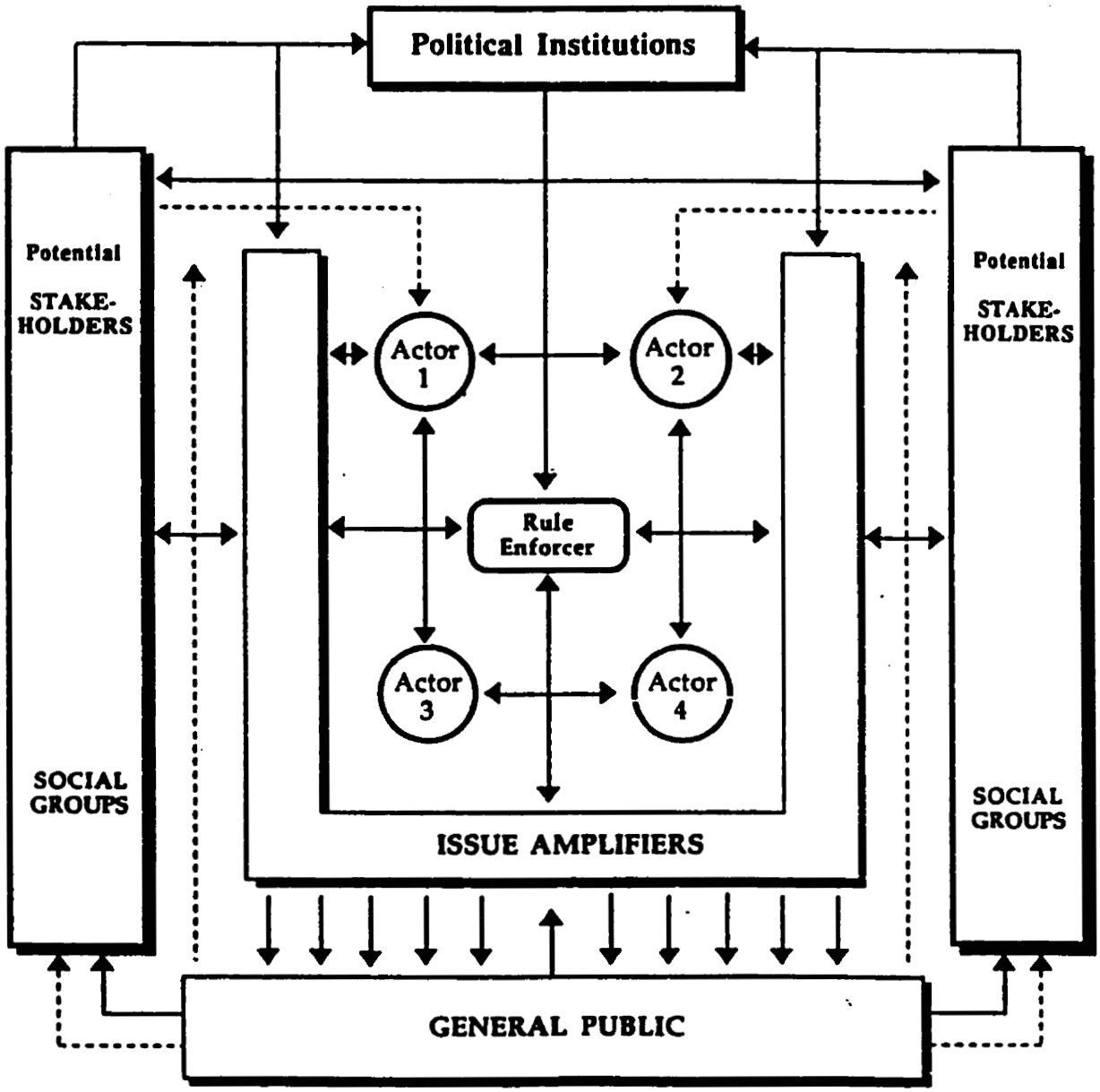
The social arena concept could be potentially useful for revealing how support was gained during the siting process of the Alberta Special Waste Treatment Facility, and maintained after the siting. This concept was first introduced by Renn (1992, 180) because of the inherent lack of attention to the "structural factors that shape interactions among social groups and influence the outcome of conflicts over risk". This theory is mainly informed by a policy analysis framework, which makes it distinct from the other cultural and social theories. The social arena concept focuses on the political arena of risk debates and the behaviour of each group within such debates. Specifically, this theory examines how social groups use the political arena as a means of conflict resolution over environmental risk issues.

Renn describes the social arena as a metaphor for the "symbolic location of political actions that influence collective decisions or policies" (Renn, 1992, p.181). In other words, it describes the political actions of all social actors involved in a specific risk

conflict/issue. The main assumption is that social actors will enter a *risk arena* in attempts to maximize their opportunity to influence the policy process by mobilizing *resources* (figure 2.2). However, each principle actor is constrained by *formal rules* (e.g. laws, acts, and mandated procedures), which are governed by the *rule enforcement agency*, and *informal rules* (e.g., role expectation, regulatory styles, and political climate of group interaction), which are learned and developed through the process of interaction among actors (Renn, 1992). The primary role of *issue amplifiers* (e.g. media), similar to Kasperson's (1992) model, is to observe and report to the general public on what goes on between the principle actors. Then, depending on the influence of *issues amplifiers*, new social groups from the general public may be enticed to participate within the social arena. Consequently, the outcome of the social arena is never pre-determined because the number of stake-holders, and the type and amount of social resources may be constantly changing.

Success in a social arena largely depends on the groups' ability to mobilize social resources. Renn identifies five important resources which are relevant in environmental risk debates: money, power, social influence, values commitments, and evidence. These social resources are used to gain the attention and social support of the general public in order to influence the policy decision. According to Renn, it is the resources themselves and how they are used, and not necessarily the groups themselves that influence policy decisions dealing with risk. However, the outcome is not solely determined by the effective mobilization of social resources, because it is also constrained "by the structural arena rules and the interaction effects among the competing groups" (Renn, 1992, 181).

Figure 2.2: The Social Arena of Risk



Note: Solid arrows show communication flow; dotted arrows the direction of social mobilization.

(Source, Renn, 1992)

Of all the resources, Renn identifies social influence and value commitments to be the two most powerful resources. Social influence becomes an important resource for building trust, while value commitments becomes an important tool to build solidarity by persuading other actors that the commonly shared values, interests, and worldviews, is in accordance with theirs. There are many examples of where citizens have successfully blocked the siting of unwanted facilities, even though the responsible agencies had the power to override such oppositions (Renn, 1992). This reveals that money and power is not enough to influence the policy change. Consequently, all resources are not created equally. Social influence and value commitment become even more important when political risk debates are actually symbolic of other interests or values. Some groups may use the risk arena to mobilize social resources to influence policies in other arenas, such as opposition to big business or favor for deregulation (Renn, 1992). This is similar to Douglas and Wildavsky's idea of cultural biases, where social groups select certain risks for attention based on shared beliefs and values. Actors in a risk debate, therefore, may actually not be concerned about the risk per se. As a result, evidence about actual impacts may be entirely meaningless. However, it still becomes an important resource to have.

This framework is important because it sheds light on several areas of risk issues. First, it reveals that risk debates may not be about actual probability (scientific assessment) of risks, but rather a surrogate for other issues associated with risk. For example, the risk debate in Swan Hills, may be more related to economic stability and the need for economic diversification. With the gradual decline in the oil and gas industry, the residents may be more concerned about the viability and stability of the community.

Although the perception of economic benefits may be an influence on the residents' views of risk, it may not necessarily be the most important. Further, Spies et al., (1998) found economic perception to be only one of three variables (the other two being risk perception and recreancy[1]) which affected the support of facility siting. Concerns over the ASWTF may revolve over other issues such as trust and uncertainty (e.g. controversy and conflicting information) rather than the "actual" risk. As a result, it is important to disentangle such issues in order to effectively deal with risk conflict.

Second, the social arena framework reveals how resources are not created equally or may not be used as effectively by different groups. In many cases no amount of evidence can "convince people if it is not from a trusted source who shares common meanings for the phenomena of interest" (Baxter, 1997, 60). For example, Groothuis and Miller (1997) has shown that individuals who distrust government, news media, and business tend to exhibit higher levels of perceived risk of a hazardous waste disposal facility. This suggests that individuals who are distrustful, may not accept risk information from these sources as credible and may amplify their risk assessment. However, in Swan Hills, trust in community leaders and Bovar may have cause the risks to be attenuated.

Several resources such as social influence, value commitment, and money, may be important resources that were used during the initial siting of the hazardous waste facility in Swan Hills. Residents' assessment of risk may be low because the evidence was from someone who is trusted and someone who has similar value commitments. For example, the residents may tend to trust the assessments from local sources rather than

[1] Recreancy refers to the level of confidence in technology and trust government and private agency running the facility, to ensure public safety regarding the waste facility.

outside sources. Especially important may be the resource of money, which may have been an important resource for gaining support by offering jobs. These resources may still be important influences for continued support of the facility.

Third, the biggest limitation to the social arena framework, however, is the fact that it only considers social groups who enter the arena and mobilize their resources. This implies that groups who are not involved have no stake in the policy decisions. Furthermore, this framework claims that social groups will only enter if they have enough resources and if they think they can successfully affect the policy decision. Fourth, this framework is limited to the social process of risk issues in political debates and it does not consider individuals or groups perceptions or motivations to join a specific risk arena. This study seeks to understand the views and opinions of risk from those people who voted in the plebiscite, as well as those who didn't (were not involved in the political debate). Further, this study seeks to understand how these views and opinions of risk were formed.

2.3.4 Risk Society

Beck's (1992) theory of risk society connects the growing fears of technological hazards to the changing characteristics of late modern society. Specifically, Beck links the institutional developments in modern society with the social process of attitude formation towards risk (Beck, 1992). He asserts that the changing characteristics of new technologies are causing the transition from simple modernity (industrial society) to reflexive modernity (risk society). However, the social characteristics of the latter are largely indeterminate because we are still in the process of transformation toward the risk society.

Security is one of Beck's main concepts for understanding the transformation toward reflexive modernity. Beck argues that the primary social organizing principle in modern society is security, and this is derived from science and technology. The shift towards reflexive modernity is characterized by the presence of global technological hazards with the potential to do large-scale harm to a vast number of people. Also during this transformation, science plays a dominant role in providing security by the diagnosis and control of these hazards - which they continually assess as low risk. However, society gradually becomes aware of the uncertainty associated with the scientific assessments. As a result, throughout the transition towards a risk society, those institutions which formed the foundations of modern society become questioned. As a consequence, society becomes disillusioned to the institution of science and technology as a source of security. Instead, science and technology become the source of fears and doubts. Therefore in the era of reflexive modernity, science no longer proves capable of providing security, resulting in high anxieties and opposition to technological developments. Trust is then an important element in peoples' views of environmental technological hazards. The degree of trust in science and technology may heavily influence peoples' views of certain risks. Similar to Beck's concept of security, Anthony Giddens proposes the idea of a *protective cocoon* in his theory known as the "Juggernaut" society. According to Giddens (1991), in order to prevent anxiety in the face of potentially threatening events, people build a *protective cocoon*, "built on basic trust and the ontological security that interaction with others and with the outside world will be consistent with the maintenance of the cocoon" (Baxter, 1997, 67). When this cocoon is threatened, anxiety results, and as a result, individuals have to choose a course of action

(e.g., joining a grass-roots community group or actively acquiring new knowledge on the issue) (Baxter, 1997) that will rebuild the cocoon.

There are striking similarities between Anthony Giddens' "Juggernaut" society and Beck's risk society. For example, Gidden's major transformation from modernity to late modernity, is roughly along the same time line. Also, they both attribute the emergence of high-consequence risks to be the central social issue which induces the transformation to a risk society.

Thus in the transition towards modern society, science and technology become the central institutions to legitimate those activities that generate modern risk. However, Beck and Gidden's do not pay any attention to the possibility that in order to maintain ontological security, people may ignore the assessments made by scientific experts. Even in cases where risks and hazards are concrete and perceivable, such as in the case of natural hazards, the risks can be downplayed for the benefits of staying in a hazardous prone area (e.g., living in a flood plain). There may be even greater possibilities of ignoring the experts' view concerning modern risks. Rather than drastically changing everyday life to avoid the risk, people may choose to "ignore the experts' and authorities recommendations to the advantage of their routine organizing and monitoring of everyday life" (Lidskog, 1996, 49). For example, some people may find others with similar views in order to validate their own assessments. Others may validate their assessments by maintaining that there has been no immediate impacts (e.g., no increased rate of cancer, asthma) caused from the risk. This may be the case in Swan Hills if the residents ignore the health advisory and any of the negative reports made by the media. Beck and Gidden's theory is also criticized for focusing on high-consequence global

risks. There may be meso (local) level hazards with similar characteristics outlined by Beck and Gidden. Swan Hills may represent one such example which seems to run counter to Beck and Gidden's idea, where the residents ontological security is based on the scientific experts (e.g. Bovar, monitoring, and testing), resulting in reduced concerns and fears. The role of security may be an important issue, influencing residents views and opinion of the hazardous waste facility.

2.4 Summary

Assessments of risk are influenced not only by the nature of the hazard itself but also by the local social and cultural context. For example, peoples' views of risk may be influenced by social networks which will reinforce or counteract views (Johnson and Covello, 1987). Similarly, adherence to cultural and social values, worldviews, economic interests, morals, and institutional or organizational affiliation will all influence peoples' views of risk (Kasperson, 1992). Further, the acceptance and views of risk are also influenced by factors such as credibility and trustworthiness of the source of information (Renn, 1992). Risk then is evaluated on as much as what is valued as it is on what is known (Eyles et al., 1993). Context, including social and cultural process becomes important in shaping views and opinions of risk.

This research is guided mainly by the social and cultural theories of risk which consider risks/hazards in the context of everyday life. The concepts and frameworks from the sociological and anthropological approaches are argued to be the most important for understanding the meaning of risk in everyday life, however, there have been relatively few empirical studies examining their relevance. This case study of Swan Hills provides some empirical evidence to validate the relevance of some of the

anthropological and sociological frameworks such as the social amplification of risk, social arena concept, and Beck's risk society theory. Further, Swan Hills provides a unique case where risk is socially constructed as "low" or "minimal".

Chapter 3:

Research Design

3.1 Research objectives

The purpose of this exploratory research is to understand and explain how people in Swan Hills construct and maintain their views about environmental risk. Knowing about this formation and maintenance will be useful for anticipating and abating conflict over technological environmental hazards. Specifically, there are two interrelated objectives:

i) to examine the views of risk among a variety of laypeople within the same community in the context of daily life
ii) to explore the multiple influences that shape peoples' views of those risks.

Some individuals and groups seem willing to accept the risks associated with potentially hazardous development projects (e.g. landfills, incinerators, and hazardous waste disposal sites), while others are not. This research addresses this problem by asking people within Swan Hills (an "accepting" community) about their views and opinions of risk from the Alberta Special Waste Treatment Facility (ASWTF) that has been in operation for the last thirteen years. By "volunteering" for the hazardous waste treatment facility, the residents of Swan Hills seemed willing to accept the risks associated with site (assessed as low risk). This research explores the role social values and community context play in the assessment of risk.

This chapter starts by examining some selected census characteristics for Swan Hills in order to gain a better understanding of the community. As well, a brief history of the siting process of the ASWTF and some key events are also examined. Following is a

description of the methods used for data collection and analysis. The chapter then ends with a discussion for establishing "rigour" in qualitative research.

3.2 Community of Swan Hills

3.2.1 Community profile

Swan Hills is a small, remote community located in the central part of northern Alberta, approximately 220 km northwest of Edmonton (Figure 3.1). Swan Hills sits in the heart of Grizzly County and is within the largest political region in Alberta, MD 17. Besides being host to the ASWTF, Swan Hills is known for being a "wilderness playground" with hunting in the summers and snowmobiling in the winters. In terms of employment, the primary industry in Swan Hills is oil, providing one-third of the town's employment opportunities, forestry second, and the ASWTF third, employing approximately 180 people.

Between 1991 and 1996, while the province and rest of the region (MD 17) was experiencing a population growth, 5.6% and 11.7% respectively (Table 3.1), the community of Swan Hills was experiencing a general decline in population (-15.5%). Moreover, between 1981 and 1996, Swan Hills experienced a population decline of 23% (Table 3.2). This problem has been further exasperated by the recent buy back of company homes from the oil companies, causing some instability with the housing market, and out migration of people (Table 3.2).

The most notable feature in Swan Hills is its high proportion of people below age 14 (32.3 %) and extremely low proportion of people over age 65 (0.7%) compared to 22.8% and 9.9% for the province and 32.3% and 5.4% for the region. This area also has a slightly higher proportion of males to females (53% and 47% respectively) compared to

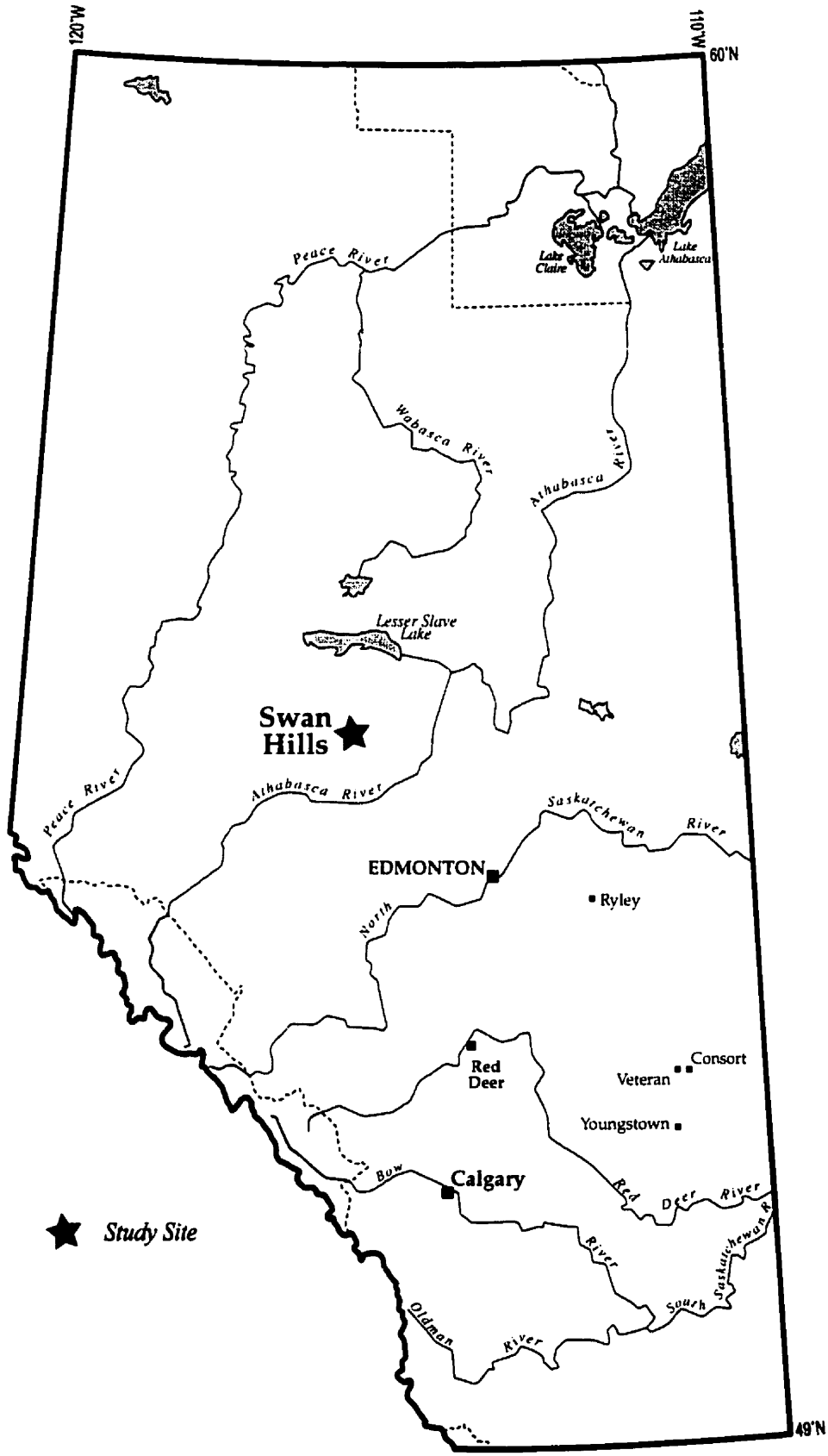


Figure: 3.1 Map of Alberta

52% and 48% for the region and 49% and 51% for the province. Swan Hills has a comparatively higher percentage of "traditional" households as there are 97% husband-wife families and 70% husband-wife families with children at home compared to 87% and 52% for Alberta, and 87.5% and 60% for the region. Of these people, there is a slightly higher proportion living in renter-occupied dwellings (52%) which far exceeds the provincial and regional figures (32% for Alberta and 24% for MD 17, Table 3.1). The general decline in population and high proportion of residents living in renter-

Table 3.1:
Selected Census Characteristics (1996)

Characteristics	Alberta	MD17	Swan Hills
Population Characteristics			
Land area (km^2)	638,232.7	189,540.0	25.5
Total population	2,696,825	54,710	2,030
Males (%)	49	52	53
Females (%)	51	48	47
Proportion < 14 years (%)	22.8	32.3	32.3
Proportion > 65 years (%)	9.9	5.4	0.7
Population percentage change 1991-1996 (%)	5.6	11.7	-15.5
Dwelling Characteristics			
Average dwelling value	$126,979	$76,722	$56,601
Percentage of single-detached dwellings	64	68	57
Total dwellings	979,175	16,380	665
Percentage of owner-occupied dwellings	68	67	49
Percentage of renter-occupied dwelling	32	24	52
Average gross rent	$555	$501	$518
Household Characteristics			
Percentage of husband-wife families	87	88	97
Husband-wife w/ children @ home (%)	52	60	70
Lone parent families (%)	13	13	4
Average children per family	1.2	1.7	1.5
Median household income	$42,701	$39,731	$56,559
Incidence of low income economic families	14.9	16.4	9.1

Source: Statistics Canada (1996)

occupied dwellings reveals the transient or unstable characteristic of Swan Hills. Many of the residents attribute this to the nature of the oil industry. However, many feel that the Swan Hills is becoming more stable and less transient. This is evidenced by the steady decrease in renter-occupied dwellings, from 67% in 1981 to 58% in 1996, and the increasing proportion of people owning their own homes (33% in 1981, 33% in 1986, 40% in 1991, and 49% in 1996, Table 3.2). This is further corroborated with the increasing number of elderly in Swan Hills (0% in 1981, 1986, 1991, and 0.7% in 1996).

Table 3.2
Selected Census Characteristics for Swan Hills

	1981	1986	1991	1996
Characteristics	**Swan Hills**	**Swan Hills**	**Swan Hills**	**Swan Hills**
Population Characteristics				
Total population	2,497	2,403	2,345	2,030
Proportion < 14 years	31.0	31.0	34.0	32.3
Proportion > 65 years	0.0	0.0	0.0	0.7
Dwelling Characteristics				
Average dwelling value	$43,285	$34,704	$51,679	$56,601
Percentage of owner-occupied dwellings	33.0	33.0	40.3	48.9
Percentage of renter-occupied dwelling	67.0	66.0	59.1	51.9
Household Characteristics				
Median household income	$28,866	$45,422	$50,836	$56,559
Incidence of low income economic families	3.9	6.6	5.5	9.1

Source: Statistics Canada (1981, 1986, 1991, 1996)

The higher than average wealth for the community is evidenced by two characteristics: a median household income of $56,559, which is almost $14,000 higher than the province and $16,000 higher than the region, and a very low incidence of low income families at 9.1% compared to 14.9% for the province and 16.4% for the region.

In addition, the median income in Swan Hills has increased from $28,866 in 1981 to $56,559 in 1996 (Table 3.2). However, the level of incidence of low income economic families has also increased from 3.9% in 1981 to 9.1% in 1996. In contrast, the higher than average wealth is not reflected in the average dwelling values, only $56,601 for Swan Hills compared to $76,722 and $126,979 for the region and province respectively. Notwithstanding, the average dwelling value in Swan Hills has increased from $43,285 in 1981 to $56,601 in 1996.

The statistical profile suggests that Swan Hills is a relatively young community and family oriented. The profile also suggests that the community has a higher than average median household income. These facts may be important for the attenuation or amplification of risk. For example, families with young children (especially women) may be more sensitive to the risks associated with the ASWTF, and as a result tend to amplify the risks. On the other hand, community members (e.g. community leaders, Bovar employees) who value the economic benefits of having the plant may tend to attenuate the risks associated with the site.

3.2.2 Site history

Table 3.3 provides a brief history for the siting of special waste treatment facility, including key events. The Table also includes the start and finish dates of the interviews. The selection process for the treatment facility began in 1981, with over 120 communities volunteering to be part of the initial siting process. All the communities received a briefing session and general information on the types of criteria to be used in a plant siting program. Upon completion of the introductory meetings, local authorities then had the option to go no further in the program, or request a detailed regional analysis of their

Table 3.3: A Brief Chronology of the ASWTF Siting Process and Some Key Research Events

Date	Event
1981	• Alberta Environment hosts over 120 community meetings which include a briefing session and general information on the types of criteria to be used in a plant siting program. • County managers from 52 communities (out of a possible 70 jurisdictions), request detailed regional analysis of their area for the suitability for a plant. • Thirteen communities requests further consideration as a possible host community for the waste treatment plant. • Environmental constraints exclude many sites, and public opposition causes others to be dropped from consideration. • Five communities (Swan Hills, Ryley, Consort, Veteran, Youngstown) requested detailed drilling to test the suitability of the local geology then entered into a program of intensive seminar sessions.
Aug 1982	• Ryley plebiscite: 219-64 (77%) in favor of hosting the special waste treatment facility.
Sept 1982	• Swan Hills plebiscite: 381-103 (79%) in favor of hosting the special waste treatment facility.
1982-1984	• Chem-Security Ltd., is chosen to build, own and operate the proposed facility.
March 1984	• Swan Hills is selected as the site for the special waste facility.
April 1984	• Alberta Special Waste Management Corporation (ASWMC) is established as a Crown corporation which owned 40% of the plant.
Dec 1984	• BVRS (Bow Valley Resources Services) purchases Chem-Security and signs an agreement with the ASWMC to design and construct a hazardous waste facility
March 1985	• Construction of the treatment facility begins.
Sept 1987	• Swan Hills treatment facility officially opens.
May 1992	• NRCB approves expansion (new incinerator) of the special waste facility.
Feb 1995	• Government approves the importation of out of province waste.
July 1996	• The Alberta government ends the joint-venture agreement and pays Bovar $140 million to buy out of the deal.
Oct 1996	• The ASWTF leaks PCBs, dioxins and furans after a mechanical failure, an event that the plant owner (Monty Davis) announces three weeks after the occurance.
Dec 1996	• Alberta Health studies reveal elevated levels of PCBs, furans, and dioxins in a deer and moose killed after the PCB leak. • As a result, Alberta Health issued an advisory against eating large amounts of game taken within a 30 kilometer radius of the plant because of the airborne leak of PCBs.
Dec 1996	• Bovar is faced with charges of six environmental violations under AEPEA.

Table 3.3 Continued

July 1997	• An explosion in the main incinerator causing it to be shut down.
Aug 1997	• Report prepared for Lessor Slave Lake Indian Regional Council concluded that the treatment plant has been contaminating a large area around the facility for a number of years with PCBs, dioxins, and furans (Edmonton Journal, 1997) • Health Canada announces it will test aboriginals in the area for contamination of PCBs, dioxins, and furans (Thorne, 1997).
Sept 1997	• Alberta Health tests of blood samples of the region's population show normal levels of PCBs, dioxins, and furans (Laforest, 1997). • However, studies reveal levels of PCBs in animals near the site area are still high. • A report from plant owner Bovar Inc admits the facility has been responsible for a general deterioration of the environment near the plant (Calgary Herald, 1997).
Oct 1997	• University of Alberta studies (Dr. Schindler) reveal that a small lake near the treatment plant is highly contaminated (Edmonton Journal, 1997). • Alberta Health issues an update warning on eating fish near the plant
Jan 1998	• Bovar announces it will not contest three of the environmental charges, while the province agrees to drop the remaining three (Hryciuk, 1998).
Feb 1998	• The main incinerators are restarted after repairs and environmental tests
March 1998	• Monty Davis, Bovar President and CEO resigns and John Kuziak (vice president) takes over
April 1998	• Native bands agree to drop all legal action against the plant in return for payment of $100,000 a year from Bovar, to enable the bands to conduct their own environmental monitoring of the plant. In return for the financial package, the council will not proceed with a number of planned law suits related to the pollution of traditional lands surrounding the plant (Hryciuk, 1998).
May 1998	• Forest fires causes town to be evacuated
June 1998	• Beginning of interviews • A toxicologist told provincial court that Environmental contamination from 1996 leak of toxic chemicals from the Swan Hills plant has generally declined • Tests on voles and mice show reduced levels or no detectable traces of PCBs, compared to 1996 levels.
Aug 1998	• End of Interviews
Oct 1998	• Bovar is fined $625,000 (the largest fine ever in the province) for three charges to which it pleaded guilty in January.
Dec 1998	• Health Canada study on First Nations people consuming wild game are below acceptable guidelines for PCBs and no immediate effects were observed.

area. Out of a possible of 70 jurisdictions, there were 52 invitations from community managers to assess the suitability for a plant in their towns. Environmental constraints excluded many sites, while public opposition caused others to be dropped from consideration. Through this process of elimination, only five communities (Swan Hills, Ryley, Consort, Vetran, Youngstown, figure, 3.1) received detailed drilling to test the suitability of the local geology and then entered into a program of intensive seminar sessions. Each community received three seminars which informed them on the background of the program, the reasons for the development of a waste management system, the technology available, and the type of operation that would be used (McQuaid-Cook and Simpson, 1986). Then all five communities held plebiscites. The two major contenders, Swan Hills and Ryley, showed results of 79% and 77% respectively, in favour of hosting the plant. The main reason for the high acceptance for the plant was the need for "economic diversification", especially in Swan Hills given its reliance on the oil and gas industry (Rabe, 1994). Finally, on March 1982, the Alberta government announced that Swan Hills was selected as the site for the special waste treatment facility.

Chem-security, a subsidiary of Bow Valley Resource Services Ltd. (BVRS), was responsible for the construction and operation of the plant. Construction of the facility began in March 1985 and the plant officially opened in September 1987. The plant itself was part of a joint-venture agreement between the Alberta Special Waste Management Corporation (ASWMC), the company through which the province owned 40% of the plant, and BVRS (now Bovar) which owned 60%.

Five notable events have occurred since the construction of the facility in 1987 which have caused some controversy and uncertainty. First was the expansion of the plant in 1992, with the addition of a new 55,000-tonne incinerator[2], despite controversy over the increased potential for contamination from the added incinerator. Secondly, in February 1995, Bovar received government approval for the importation of waste, despite the original agreement of the expansion that out-of-province waste would **not** be accepted. Thirdly, two accidents have occurred at the site, namely a PCB leak in October 1996, and an incinerator explosion in July 1997. This latter event raised the airborne PCB levels nine times higher than the original level (Chase, 1997). The fourth event was the end of the joint-venture agreement between Bovar and the government. In July 1996, the Alberta government agreed to pay Bovar $140 million to buy out of the deal. The fifth event was that Bovar was faced with six Environmental Protection Act charges because of the toxin release (including the PCB leak in July 1997) and for its failure to adequately notify the public regarding the release of toxins. The PCB leak also resulted in an Alberta Health Advisory against eating large amounts of wild game taken within a 30 kilometer radius of the plant. The Lesser Slave Lake Regional Indian Council also filed a similar charge related to the release of toxins. However, two health studies, one conducted by the provincial government and the other by the federal government did not reveal any increased levels of contaminants in the blood. Another key event, not directly related to the ASWTF, was forest fires that began just prior to the interviews (May 1998), causing the entire town to be evacuated. As a result, the forest fire was an event that was on the minds of the participants during the interviews in summer 1998.

[2] The new incinerator increased the capacity from 15,000-tonne to 55,000-tonne incinerator.

These events may be a potential source of uncertainty, causing some to assess the special waste treatment facility as a "high risk". As a result, the community of Swan Hills is appropriate for studying how people construct their views of risk.

3.3 Participant selection

This case study involves face-to-face in-depth interviews from three groups: residents, community leaders[3], and workers from the ASWTF. The rationale for the participant selection was to explore diverse sets of opinions and views regarding the special waste treatment facility. Maximum variation sampling was the general strategy used to select a variety of respondents. Literature on environmental risk has suggested that different attitudes to risk exist between the three groups. Some studies have shown that differences exist between leaders and residents in the acceptance of hazardous waste facilities (Bourke, 1994; Spies et al., 1998). For example, Spies et al., (1998) has revealed that community leaders were more likely to view the impact from a hazardous waste facility as economically positive and downplay the potential risks. On the other hand, residents were likely to view the potential hazards to the environment and public health with greater concern. Similarly, it has been suggested that those who work in hazardous facilities tend to assess the risks as low because of institutional obligations or economic concerns (Kasperson, 1992; Eyles et al., 1990).

A modified stratified random sample was used for the participant selection (Table 3.4). The purpose of partially randomizing the small sample was to increase the credibility of the results (Patton, 1992). The potential participants (sample frame) were identified from three sources: the local telephone directory, the Swan Hills web page

[3] Community leaders refers to both formal leaders (e.g. elected officials) and informal leaders such as local business leaders, local media, and Swan Hills liaison committee.

(local business directory), and the NRCB Multiple Stakeholders Report (1991). The sample was also expanded using a snowball technique to ensure an equal number of participants from each group. Snowball sampling involved selecting new participants by asking interviewees to recommend someone who may be willing to participate in the study. Letters were sent out to 60 people and telephone calls were used to screen out those unwilling to participate in the study and to ensure an equal number of men and women (see Appendix A for the refusals). In total, 27 interviews were conducted between June, 1998 and August, 1998.

Table 3.4:
Participant Selection Strategies

	TOTAL SAMPLE (males/females)	STRATIFIED RANDOM SAMPLING STRATEGY	SNOWBALL SAMPLING STRATEGY
Residents	10 (4/6)	10	
Community Leaders	9 (2/7)	8	1
Bovar	8 (6/2)	5	3
Total	**27**		

3.4 Methodological framework

3.4.1 Grounded theory

The methodological orientation of this research is largely interpretive and qualitative, and is set in the general strategy of grounded theory. Grounded theory is a general methodology used for developing theory that is grounded in data systematically gathered and analyzed (Strauss and Corbin, 1994). Theory is inductively derived from the study of phenomena it represents. That is, theory is discovered, developed, and verified through data collection and analysis (Strauss and Corbin, 1990). Thus, there is a reciprocal relationship between data collection, analysis, and theory. Instead of

beginning with a theory and proving it, grounded theory begins with an area of study and what is relevant to that area is allowed to emerge (Strauss and Corbin, 1990). One of the main elements of grounded theory is the use of ongoing analysis to guide sampling. In other words, sampling is done on the basis of the evolving theoretical relevance of concepts (Strauss and Corbin, 1990).

3.4.2 Symbolic interactionism

The primary method used in this study is in-depth face-to-face interviews which are guided by symbolic interactionism. While grounded theory provides the general methodological strategy for the research, symbolic interactionism provides the philosophical paradigm (Morse, 1994). The framework of symbolic interactionism allows the interpretation of how people view risk in the context of everyday life. Interpretation is done by placing both the expressed views of the interviewee and my interpretation of their views within the literature on environmental risk. Symbolic interactionism places emphasis on meaning and interpretation as the key to understanding human behaviour. These meanings and interpretations are derived from, or arise out of, the face-to-face interaction with others (Patton, 1992). For example, peoples' opinions about the special waste treatment facility are assumed to be based on interpretations of conversations they have with family members, members of the community groups who support or denounce the facility, and myself during the interviews. This framework is important for highlighting the role of communication between people in the formation and alteration of views of risk about the hazardous waste facility. Symbolic interactionism also stresses the importance of context in which the views and opinions of risk arises, which is also important in the anthropological and sociological theories to

risk. Therefore, in order to understand directly how people construct their views of risk, one needs to have direct, face-to-face contact with participants within their community.

3.5 Interview checklist

The interviews themselves were guided by a checklist of topics (Appendix B) developed from the literature on environmental risk. The checklist was used to ensure consistency of topics covered within the interviews. However, since the interviews were semi-structured, and remained conversational, the interviewees were allowed the freedom to express other ideas that were important to them. This is important for revealing the contextual influences that shape peoples' views of risk associated with the hazardous waste treatment facility (Patton, 1992).

3.6 Analytical procedures

3.6.1 Data reduction and analysis

Transcript coding is the approach used in this thesis for data reduction and analysis (see Table 3.5). It is an inductive process which allows important concepts to emerge from the data (Patton, 1992). Transcript coding refers to the process of selecting, focusing, simplifying, abstracting, and transforming the data (transcripts) in a meaningful way, while keeping the relations between the themes (codes) intact. Codes are tags or labels used for assigning units of meaning to the data. Codes are used to organize and retrieve DUTs[4] so that the researcher can readily find, pull out, and organize the segments relating to a particular research question, hypothesis, construct, or theme (Miles and Huberman, 1994). As Miles and Huberman (1994, p.11) state, coding "is a form of analysis that sharpens, sorts, focuses, discards, and organizes data in such a way that 'final' conclusions can be drawn and verified". Coding is not something that is separate

from analysis, rather it is part of analysis (Miles and Huberman, 1994; Strauss and Corbin, 1994). The researchers' decision about which data chunk to code and what "label" best summarizes a number of DUTs involves analytic choice.

Table 3.5: Steps in Data Collection and Analysis

Data Collection	Data Management	Data Presentation
Participant Selection **Maximum Variation** • 3 groups ⇨ • 2 genders **In-Depth Interviews** • residents • community leaders • Bovar employees • 27 interviews	**Interview Text** • >300 pages **Coding** ⇨ • NUDIST • open/axial coding - 235 themes/sub-themes • selective coding - 100 themes/sub-themes • hierarchical structure	**Concepts** • emergent themes • sub-themes **Form of Findings** • conceptual framework • theme frequency • quotations

Due to the large volume of data generated through this research, a computerized data management system was needed to aid in the coding and organization of the interviews. The 27 interviews in this study averaged approximately 45 minutes in length with some being over 100 minutes and others as short as 30 minutes. This translated into approximately 300 pages of interview data with over 14,000 lines of text. All the interviews were taped, transcribed into WordPerfect, and analyzed for emergent themes with the aid of the qualitative software package NUDIST (Non-numerical, Unstructured Data Indexing System and Theorizing, Richards and Richards, 1994). NUDIST was selected from among a variety of software packages due to its user-friendly tree-

[4] A Discrete Unit of Text (DUT) refers to a "chunk" of data (e.g. a paragraph)

structured indexing system and its ability to handle an evolving system (e.g. merging of themes, cutting and pasting of sub-trees).

3.6.2 Coding procedures

Reading and annotating is the initial step of coding and it involves noting reflections and other remarks (i.e. codes) in the margins of transcripts. The second step of coding involves attaching codes to discrete units of texts (DUTs). DUTs can be categorized into words, lines, sentences, or paragraphs. Essentially, a DUT will determine the 'unit of meaning'. In this study, a DUT is represented by a paragraph. However, there may be several DUTs related to a particular node. The paragraph was used as the DUT in order maintain coherence and clarity of what the interviewee said.

The third step involves sorting and sifting through these materials to identify similar phrases, relationships between variables, patterns, themes, and differences between subgroups. In NUDIST, there are three features that aid in this process: *browse*, *memos*, and *index search*. The browse feature allows one to examine all the DUTs coded at any particular category or node. Memos are notes reflecting my thoughts throughout the analysis procedure. An index search is a Boolean search technique used to help answer questions about the relationship between categories, about patterns of coding, and about the differences between text coded at one and another category. For example, one hypothesis that emerged throughout the coding process was that women, especially women with children, tended to be more concerned about risks. Using the indexing search, I retrieved all the DUTs that were coded at "female", "concern", and restricted it to all the "females with children".

The fourth step is to gradually develop a small set of generalizations (interpretations) that are derived from the interviews. This involves selecting key categories or themes from the NUDIST hierarchical system. This process is aided by the use of memo's and field notes. The final step involves confronting these generalizations (interpretations) with a formalized body of knowledge in the form of constructs or theories. This basic outline of coding can be broken down further into five main procedures: reading and annotating, open coding, axial coding, selective coding, and memoing.

3.6.3 Reading & annotating

Reading and annotating is the first step in the coding process. It involves reading through each transcript and noting remarks (i.e., codes) in the margins of the transcript. The main goal of reading through the transcripts is to prepare the ground for analysis by becoming familiar with the data.

The reading and annotating process began after all the interviews were completed (see Table 3.6 for specific details). Each interview was first transcribed into a WordPerfect document, and then transferred into NUDIST and printed as a hard-copy. Each interview transcript was read while notes were made in the margins about the themes[5] that emerged throughout the interview. During the second reading, DUTs (discrete units of text) were more formally delineated and marked with themes. DUT themes were then transferred into NUDIST.

[5] Code, theme and node are used interchangeably throughout this thesis. Theme and code is the general term used throughout the literature on qualitative analysis, while node is the specific term used in NUDIST.

3.6: Time Line of Data Collection and Analysis

June – Aug, 1998	• Interviews
July – Aug, 1998	• Interviews transcribed
Sept, 1998	• Interviews transferred into NUDIST and printed as hard copy • Researcher triangulation of coding for 3 interviews
Sept – Nov, 1998	• Initial coding of documents (i.e. reading and annotating, and open coding)
Nov – Jan, 1999	• Axial and selective coding
Jan, 1999	• Member check letters sent out

3.6.4 Open coding

Open coding is the process of breaking down, examining, comparing (for similarities and differences), conceptualizing, and categorizing data. It is the process of naming (labeling) and categorizing of phenomena through close examination.

Open coding began with the reading and annotating of the transcripts. The codes that were delineated during the initial reading and annotating were then attached to DUTs in NUDIST, and organized into an emergent hierarchical system[6] (see Appendix C). As the analysis progressed, the list of codes grew. Where codes already existed, the node address was assigned to the DUT. However, if the code did not exist, a new node address and label was assigned to the DUT. For example, DUT-A below represents a segment from a transcribed interview. After reading and interpreting the text, the code "neighbourliness" was assigned to the 2 DUTs (the two paragraphs spoken by Miriam). This label was then organized under a higher order category of 'community description' thus given the address "2 5" (community description/neighbourliness)[7].

[6] There are 235 nodes/codes/themes in the NUDIST database in a four-tier hierarchical system containing 9 themes at the top, 78 at the second level down, 126 at the third level, and 20 at the last level.
[7] / indicates the next lower level on the hierarchical system ("community description" is the top level and "neighbourliness" is the second level).

DUT-A.

> MIRIAM: Basically it's a really good place for the kids to grow up. They have a lot of children's programs here. It's really child orientated. And uh, there's hardly any crime here or anything like that you don't have to worry too much about anything happening to your property it's really nice and laid back. A very easy community to be involved in as much as you want. It's actually the best place we've ever lived. INT: What makes it the best place?
> MIRIAM: Probably because the people are easier to get to know. And they let you become involved with them without basically having, a lot of communities if you're not born or brought up there and you don't have any roots so to speak it takes a longer time to integrate into the community. And here as soon as you know your moving van pulls in someone's asking you to do something or get involved and they really encourage that.

The process of developing codes or themes is one of continuous refinement. Throughout the coding process, nodes were constantly being reviewed and refined (by either eliminating or collapsing codes). After approximately the tenth interview, there were 440 node addresses. Due to the increasing number of nodes (i.e. the inability to remember all the possible codes), 206 codes were eliminated by either merging or eliminating them. Through the process of cut and paste, codes with similar definitions were merged. On the other hand, codes which were not merged and had only one DUT attached to it were eliminated[8]. This process brought the number of codes to a more manageable number of 235. However, merging was done much more frequently than elimination in order to retain as many DUTs as possible. In the end, approximately 15 codes were eliminated.

3.6.5 Methods of creating codes

There were two general methods of creating codes for this thesis. First, was the use of concepts or names derived from a prior reading of literature on hazards and environmental risks (e.g. Beck and Giddens concept of "security"). Although the coding

process in general is an inductive and interpretive process, the review of relevant literature on risk aided in sensitizing for possible codes. Second, was "in vivo" codes (Strauss and Corbin, 1990). These are codes which are derived from the phrases used by the informants. The creation of "in vivo" codes were determined by looking for "recurring regularities" in the data or ones that stood out (e.g. responsible[9]). This process ensured that all the codes were empirically rooted within the context of the data.

3.6.6 Axial coding

Axial coding is the process of recontextualizing the data. While open coding primarily dealt with breaking down of the data into databits (DUTs), axial coding deals with putting the data back together in new ways by making connections between a category and its subcategories. Instead of analysis with the databits, analysis is now done with the categories that have been developed. Comparisons can now be made between all the different databits which have been assigned to a particular category. Although open and axial coding are distinct analytic procedures, when the researcher is actually engaged in analysis he or she alternates between the two modes (Strauss and Corbin, 1990).

Two procedures were used to redefine or recontextualize the data: splitting and splicing. Splitting refers to the task of refining categories by subcategorizing data. In other words, the node was broken down into its lower order categories. For example, the node "environmental issues" was broken down and recoded into six new subcategories[10]. Splicing on the other hand refers to the combining of themes to provide a more integrated conceptualization. Through the use of cut and paste feature in NUDIST, two types of

---

[8] The elimination of codes was not done until all of the interviews were coded
[9] Node address (5 13) in NUDIST in Appendix C

splicing was performed: merge (where nodes with similar definitions were combined) and re-categorize (where themes were re-ordered under a different node address).

3.6.7 Selective coding

Selective coding is the process of selecting core categories, systematically relating it to other categories, validating those relationships, and filling in categories that need further refinement and development. Similar to axial coding, selective coding is the process of selecting and reorganizing the nodes. Out of the 235 original nodes, 100 nodes were selected and reorganized into a new hierarchical system (see Appendix D). These 100 nodes were selected as the core categories because they were the ones that were directly related to the research objectives in this thesis; to determine the residents' views of environmental risk, and how they form their views of those risks.

3.6.8 Memoing

Annotating data or memoing involves making notes about ones' notes. Memos are written records of analysis related to the formulation of theory (Day, 1993). In other words, they represent the written forms of abstract thinking. Memoing is a way of enriching analysis because it is a way of opening up the data, and allowing for a more systematic and thorough analysis. Memos are an important tool which are used to help flag patterns, themes and possible theoretical ideas by indicating links with other categories. By reading memos, one can begin to discover how the categories come together around a core category. Memos are the key for the development of an analytic theory. Further, memos can also be used to highlight or flag possible quotations for display.

---

[10] Node address (3 1) in NUDIST in Appendix C

Two types of memos were used in NUDIST: node memos and document memos. Node memos are annotations about particular nodes of categories, and document nodes are annotations within a particular document (e.g., transcribed interview). Both types of memos were printed out periodically and reviewed throughout the coding and analysis procedure in order to assist in theoretical development process. Notes made in a field notebook during the interview process (e.g. post interview thoughts) were also consulted to provide ideas for the analysis process.

3.7 Presentation of findings

One of the challenges of qualitative analysis is to present the full range of ideas represented by the 100 themes in a concise manner. In this thesis three different types of data are presented in order to present the ideas represented by the NUDIST themes. First, DUTs are used to show how participants talked about ideas developed in the interpretation. Although there are several DUTs associated with any one code, only a fraction of these DUTs are presented in the findings. As a result, the presentation of DUTs and interpretation are selective. In order to select a DUT, quotations had to satisfy at least one of the four criteria:

i) quotations are most representative of all DUTs for a code;
ii) quotations represent ideas in an articulate and/or concise manner;
iii) quotations contain ideas that contradict the main findings (i.e. negative case);
iv) quotations from a particular speaker are rare.

These coded DUTs were selected and retrieved to be presented as quotations representing participants views and opinions about environmental risk. Using the words of the respondents helps ensure that my interpretations are an accurate representation of what the respondents said.

Secondly, tables are used to show all the related themes for each quotation and to indicate how the themes are connected within the hierarchical indexing system. These tables consist of three columns: the theme from the NUDIST indexing system, the number of times that theme was mentioned by the respondents, and the number of participants who said something related to that theme. The tables of frequency counts are important because they indicate how many times a certain theme is mentioned and if the theme was raised by only a few participants or a variety of participants. Frequency counts are also important because they help corroborate the findings. The third type of data presented takes the form of a conceptual framework which connects the most important themes in the findings (see Figure 5.1).

3.8 Qualitative rigour: strategies to reduce threats to evaluation criteria

Qualitative research is often criticized for failing to pass tests of methodological rigour, of establishing trustworthy findings (Sandelowski, 1986). Trustworthiness refers to qualitative rigour or "findings which are worth paying attention to, worth taking account of" (Lincoln and Guba, 1985, 290). Proponents of quantitative research are critical of qualitative research for not adhering to the scientific, positivistic canons. However, because the nature and the goals of qualitative research are different from quantitative research, the same criteria cannot used. Furthermore, there is no standard set of procedures for establishing rigorous findings in qualitative research. In this thesis, four strategies, adapted from Lincoln's and Guba's (1985) model, were used for establishing qualitative rigour. The four strategies helped to ensure that the findings (codes or themes) were grounded within the context of the data (to guard against threats to trustworthiness).

Researcher triangulation was the first strategy used to help ensure consistent and accurate interpretation and coding of interviews. Researcher triangulation involves the coding of the same transcripts by two or more researchers, and then comparing the results. In this study, three interviews, one from each group (i.e. community leader, resident, worker), were chosen at random. Both Jamie Baxter and I coded the documents separately and compared our codes (see Table 3.7). Table 3.7 may suggest two different interpretations could be developed from the same data because of the number of mismatches in coding (different meanings), especially at the lowest level (Baxter and Eyles, 1999). However, discrepancies does not necessarily mean discrepancies about the meaning about the discrete unit of text. Rather it tends to signal that due to the overall richness of the discrete unit of text, it can be interpreted in a number of different ways. Further, Baxter and Eyles (1999) indicate that "the discrepancies also indicate the level of detail in the coding scheme itself and the different predisposition's of the coders (317).

Despite some of the discrepancies in coding, we both have the same general interpretation (similar codes). Generally, inter-code mismatches occurred most frequently at the lower levels (n = 53) in what is a hierarchical coding scheme and less frequently at the highest level (n = 6). The discrepancies usually resulted from subtle differences in interpretations of the transcripts and the fact that some DUTs could easily fit under several themes at once. Further, the coding scheme is highly complex, involving 235 codes which overlap in most cases, so that the likelihood of mismatches is considerably higher than would have been with a shorter list of codes. However, a smaller code set would have made the selection of quotations extremely difficult since numerous DUTs would have to be manually searched for typical cases. The coding of

the rest of the transcripts was done with the differences in mind. For example, the differences in results (e.g. codes interpreted by Jamie but not by me) were used to help sensitize the coding of the remaining transcripts.

The second strategy used was source triangulation. Source triangulation refers to the use of more than one source to establish a concept or theme. Two types of source triangulation were used in this study. One was the use of quotations from several different respondents regarding a particular theme or concept. This reveals how different sources say approximately the same thing (Denzin, 1978). The other was the use of tables derived from NUDIST, which reveal how many people talk similarly about the same issue (frequency count). Frequency counts indicate the number of times and the number of people that mention a particular theme.

Table 3.7: Comparison of Two Different Researchers' Coding

Transcript	Code in *DL but not in JB (total DL codes)	Code in JB but not in DL (total JB codes)	Discrepancies at Highest Level in Index System	Discrepancies at Lowest Level in Index System
Duane	6(36)	7(31)	3	10
Glenda	14(28)	9(23)	3	20
Miriam	14(43)	9(50)	1	22

*DL – Daniel Lee's version of coding
JB – Jamie Baxter's version of coding

The third strategy used was member checking. Member checking involves revealing the research findings to the informants to ensure that the research has accurately translated the participants' viewpoint in the findings. It ensures that the themes and conclusions make sense to the informants, that the findings are accurate representations of the respondents. This helps to decrease the chance of any

misinterpretation. Implicit in this strategy is the notion of validity or Schutz's postulate of adequacy, "whereby interpretations are more credible if they are meaningful for both academia and the group studied" (Baxter and Eyles, 1997, 515). In this study, a letter along with a self-addressed envelope was sent out to all the participants near the end of the analysis process with a summary of the main findings (Appendix E). Also attached was a participant feedback form. In all, there were 12 responses and all 12 respondents believed my preliminary findings accurately reflected their views of risk (Appendix F).

The fourth strategy used to unsure trustworthy findings was the use of low-inference descriptors, whereby the original wording of the participants was maintained as much as possible. This decreased the chance of any misinterpretation. This was accomplished by recording and transcribing the interviews verbatim and maintaining the exact words throughout the analysis process. The original wording was altered only at the stage of preparing the quotations for presentations, eliminating some of the idiosyncratic style of speech. The use of the *Spread* (which expands a DUT to a specified number) and *Jump to source* (which jumps to the original source document) functions in NUDIST also helped keep the informants' meanings in context throughout the analysis.

3.9 Autobiography

An autobiography is another strategy used to establish qualitative rigour. It involves self-reflection, mainly to clarify some of the biases, motivations and interests of the researcher. The goal is not to eliminate these biases per se, rather, to expose them so that they can be evaluated by readers of the research.

During the last few years, the ASWTF has become the centre of controversy. Much of the controversy revolves around the two accidents (a PCB leak and explosion), the health advisory against eating wild game, and legal actions from Alberta Environmental Protection and the Lesser Slave Lake Native Band. As a result, many of the people were suspicious of the study. Conscious of this fact, I was very careful with the wording of questions and usually avoided using words such as "risk" when referring directly to the ASWTF. I also tried to indicate that the research was not specifically about the ASWTF, but rather about environmental risk in general. By reassuring the participants that I was a student examining their views and opinions of risk, and that my intentions are academic and not political, put many people at ease. The rural character of the area and small town atmosphere also helped facilitate friendly conversations during the interviews. In many cases the interview actually included conversations about my future aspirations which helped build a positive rapport.

Generally, because of my attitude towards small towns, I did not expect to be treated differently even though I was probably the only "non-white" in the community. Although I have never lived in small towns, my perceptions of them is one of friendliness, community spirit, and family oriented. In general I have a positive attitude towards the hazardous waste facility. I feel that facilities like these are needed because they help reduce hazardous waste, which would otherwise be buried. However, I began the research under the presumption that the participants would consider the risks from the ASWTF as high and have a high degree of concern because of the two recent accidents and the health advisory. I also presumed that more women would be concerned than men. During the interviewing and interpretations I made a conscious effort to keep these

predisposition's in check. I generally took a neutral stance except in cases where I played "devil's advocate" to urge a participant to think through their position on a issue.

An important issue which is paramount for residents is to clear up the negative perceptions that people outside the community may have regarding the community and the ASWTF. Many of the residents feel that the media has only created negative publicity for the town because of the political nature of the plant. As a result, many of the people were adamant that I clear up those misconceptions, that Swan Hills and the plant is a safe place and it is not contaminated. While I can empathize with how the community feels and their attitudes towards media, this may threaten the reliability of the findings if they favor some residents' point of view to the exclusion of others.

The next two chapters report the main findings from the case study followed by a discussion chapter which links the findings at Swan Hills with the literature on technological risk.

Chapter 4:

View and Opinions of Risk

These next 2 chapters present the findings from the study. This chapter focuses on the residents' descriptions of their community, everyday risks and concerns in Swan Hills, and their descriptions of low concerns and risks regarding the Alberta Special Waste Treatment Facility (ASWTF). Chapter five centers on contextual influences which shape the residents' views of risk from the ASWTF and ends with a summary of findings within a conceptual framework for understanding risk at Swan Hills.

4.1 Community description

This section deals with how the residents of Swan Hills describe their community. That is, the following are responses when asked what they valued most about living in Swan Hills. Many would often mention "safety" and "nature", while others would generally allude to the rural, traditional, conservative, ways of life.

4.1.1 Safe place

Swan Hills is a safe place (100 1 5)[11] and low crime/violence (100 1 1)

Many of the residents regard Swan Hills as one of the safest communities (m=19, n=13)[12]. Generally, these residents equate safety with crime and violence and not environmental issues (table 4.1). For example, Helen describes Swan Hills as one of the safest communities she has lived in because it has one of the lowest crime rates,

---

[11] Refers to the four-tier hierarchical coding system (see chapter 3). The first number represents the highest order node and each consecutive number represents the next lower level in the hierarchical system. See appendix D for full list of codes.

[12] m refers to the number of mentions (DUTS – see chapter 3) of this code throughout the 27 interview transcripts and n refers to the number of people who mentioned the theme.

INT: How would you describe Swan Hills in terms of safety?
HELEN[13]: It's a safe community, we're classed as one of the lowest crime rate communities. We have an excellent RCMP force. They have very good programs for the kids, and as far as I know they have good programs in the school. I would classify Swan Hills as one of the safest communities that I've lived in. And I've lived in about 6 different communities. Swan Hills is the safest. It's where I want to raise my child.

Table 4.1[14]:
Community Description

Theme	Number of times topic was mentioned (m)	Number of people who mentioned the topic (% of the 27) (n)
small town	37	20(74)
nature	33	13(48)
low crime/violence	28	18(66)
neighbourly	23	16(59)
family oriented	22	12(44)
Swan Hills is a safe place	19	13(48)
quiet	13	5(19)
cheap housing	6	3(11)
isolated	4	4(15)
maximum for entire data set	86	23(85)

For people such as Helen, safety, in terms of raising her child, seems to be very important. Likewise, Nigel also claims Swan Hills is one of the safest communities in all of Alberta and reiterates this idea by commenting on the fact that he never has to lock the doors to his house or car,

INT: How about in terms of safety how would you describe this place?
NIGEL: Safest community in Alberta.
INT: Why do you say that?
NIGEL: Because of 69 municipal RCMP detachments, one being high, Swan Hills is number 69 and I have seen the statistical reports that rate us as number 69 and they don't leave the RCMP members here very long because it's too quiet. There are people I bumped into the other day that said, Oh, some people came in from the city visiting and they came in and locked their cars up and one of the

[13] All the name presented in this thesis are pseudonym (fake names).
[14] Although there are a number of themes for each table, only the most prominent codes (shaded) will be elaborated.

parties said "You don't lock your cars?" And I said we don't lock our house unless we're going away for a weekend or something.

Generally when solicited about safety in Swan Hills, the ASWTF was rarely the first thing the residents mentioned. For instance there were only three mentions of the ASWTF when asked to describe Swan Hills in terms of safety. Further, when asked to describe the ASWTF in terms of safety, there were 18 mentions (n = 10) that the plant was safe (see table 4.4). Paradoxically, Duane, Annette, and Roy all mention the ASWTF in passing but they do not consider the plant as a major concern. For example, Annette comments that even despite the two accidents, she considers Swan Hills as one of the safer places on earth,

INT: In terms of safety how would you describe this place?
ANNETTE: Well like I said when we were threatened with the forest fire it wasn't going to be that our houses were going to become cindered, they would have foamed the town or waterbombed the town or whatever it took. And as far as the waste treatment centre goes it's like they've got that thing under a microscope, and a little mouse goes pee and they squawk. When they checked us out, the people here in town had less PCBs than those in Edmonton or Whitecourt. The animals they tested all had less PCBs than the Whitecourt forest area except the one deer who'd been in the compound eating the grass for 2 weeks when the spill had occurred. So as far as safety goes it's probably one of the safer places on earth to be.

Similarly, Duane expresses that he has no concerns about the special waste treatment facility,

INT: How would you describe Swan Hills in terms of safety?
DUANE: Safety, from the viewpoint of the gas industry and the waste plant or the town?
INT: Whatever you think safety is.
DUANE: Well there's safety in your own neighbourhood and there's safety environmentally as well. In town, it's a pretty safe town and people are aware of kids on the streets and they drive slow and you know everybody's cautious of everybody else's kids and you know that type of thing. Safety? And if I look outside of town with the gas plants and the waste plant, like everybody is safety conscious. You know safety is first in all the industries around town, so from that

> standpoint I'm not too worried. You do get the odd bear in town now and then but we don't worry about that too much.

When asked what makes a place safe or unsafe to live in, many mentioned a small town atmosphere (m=37 and n=20) (table 4.1). For example, Dagmar comments that small towns tend to have less crime, traffic, and less pollution than cities,

> INT: What do you think makes a place safe or unsafe to live in?
> DAGMAR: That's a different question, I guess I've never really thought about it. I think safety has to do with traffic, we have low traffic here. And, environmentally we don't have the smog and the sewers and we don't have the crime like in the cities. We don't have the crime like even up north. Just it feels very safe here, I can walk down the street 2 or 3 o'clock in the morning and walk downtown and it wouldn't bother me at all. That would be my terms of safety I think.

Dina also feels Swan Hills is safe because she believes small communities tend to be safer,

> DINA: I think it's a safe place to be. I feel very safe here. Small communities tend to be safer than larger cities. I like it here, I think it's a safe community.

4.1.2 Community values and ways of life

The themes in table 4.1 reveal the residents' values and beliefs, which support a particular way of life. Examples of ways of life in Swan Hills include safe environment for raising family, neighbourly, and nature.

small town (100 1 2), family oriented (100 1 3), and neighbourly (100 1 4)

As evidenced by the high number of families and children (see section 3.2.1), Swan Hills is a family oriented community. For example, Miriam touts Swan Hills' many children's programs and low crime rate,

> INT: So what is it that you like about this place? What are some qualities that you like?
> MIRIAM: Basically it's a really good place for the kids to grow up. They have a lot of children's programs here. It's really child orientated. And there's hardly any crime here or anything like that. You don't have to worry too much about

> anything happening to your property it's really nice and laid back. A very easy community to be involved in as much as you want. It's actually the best place we've ever lived.

People like Miriam feel that a small town provides a safe environment to raise children. They feel small towns are safer for children than the city because small towns are family oriented and have less problems with such things as traffic, crime, pollution and drugs. For example, Duane comments on his concerns with city life,

> INT: Do you think there's any risks living in Swan Hills?
> DUANE: Well from a family standpoint the risks are smaller than in the city. The thing that always worries me is drugs and stuff like that with the kids. I think a small town is a safer place because you know everybody's watching everybody else. So if something's happening we find out before your kids can tell. So from that standpoint it's a small, fairly closeknit community that way..... And you know your neighbours and if you're on holidays they are going to watch your place and stuff. I mean I feel more safe here than I would living in the city let's put it that way.

Similarly, Richard comments that it is the small town character of Swan Hills which he identifies most with,

> INT: What do you like about Swan Hills?
> RICHARD: You know I didn't like it for a long time when I got divorced and I didn't have any company. And now that I've got my wife and kids here with me, which they've been with me a long time now, it's great and what I learned to like about Swan Hills is it's quiet, it's relatively crime free. You can leave for the weekend and leave your door wide open. So things like that, I can't imagine actually raising kids in Edmonton or Calgary. I realize that's a small town attitude but I don't know, I like the fact that there's basically no organized crime influence or gang influence or things like that. Just the fact that it's quiet and pretty crime free.

According to such residents, small towns also tend to be safer because they are more neighbourly, where everyone tends to know each other and everyone watches out for each other's well being. Glenda reinforces Duane's comments that Swan Hills is extremely safe because neighbours watch for each other,

> INT: How would you describe Swan Hills in terms of safety?
> GLENDA: I think it's an extremely safe place, in a lot ways. I think like neighbours watch out for neighbours and it's small enough that everybody knows your kids and knows your property and stuff and they watch out for each other and I think it's a safe place. Our crime rate's real low.

nature (100 1 6)

When asked what the residents value most about Swan Hills (table 4.1), many of the residents identified nature (m=33, n=12). Generally, the residents would mention things like clean air, open space, hunting, camping, and other recreational activities. These residents boast that Swan Hills has clean air, especially when compared to the city. For example, Annette reasons that since the air is cleaner than the city, the accidents did not pose any risks,

> INT: The accidents didn't concern you at all?
> ANNETTE: No.
> INT: Why is that?
> ANNETTE: Well I figure the air is clearer here than a lot of the cities in Canada anyway and that by the time the wind blows it and it travels through the trees and everywhere else that there's going to be a lot less, you know, per million, parts per million in the air you know than there would be if it was downtown Edmonton sort of thing. You know add it to the carbon monoxide and all the other junk going out. But like I said they're very good so about the only think that comes out of their smokestacks after everything's burnt is pretty well carbon dioxide.

Risk, then, in Swan Hills is identified more readily with safety issues such as city life, crime and violence, and safety of children. As a result, the residents believe Swan Hills provides a low risk environment to raise a family.

4.2 Everyday Risks and Concerns in Swan Hills

When asked about some of the everyday risks and concerns in Swan Hills, the ASWTF was rarely the first thing people mentioned. More pressing matters were related to social (e.g., community stability, lack of amenities) and economic concern (e.g., possible closure of the plant, downsizing of the oil industry).

4.2.1 Community concerns

lack medical facilities and doctors (100 2 1)

Some concerns the residents do have are related to the lack of amenities and lack of services (table 4.2). One concern which plagues Swan Hills residents is not having a full time doctor. As a result, many feel that there is inadequate health care for their children. For instance, Alan feels that the lack of adequate medical facilities is a risk of living in Swan Hills,

> INT: What do you think some risks related to living here are?
> ALAN: One thing we do have a problem with is the lack of some of the necessary services, such as the hospital facility. The town has a real hard time trying to get doctors to try and live up here. The fact that the closest major centre being Edmonton is 2 1/2 hour drive, that scares a lot of people. They don't like being that far away from all those other neat fancy amenities that a city can offer. That would be the biggest factor I think on a lot of people's minds, just that the security of having a quick response to a medical facility and some decent doctors type of things.

community stability (100 2 3), plant closure (100 2 2), and oil industry downsizing (100 2 4)

The residents are also concerned about economic and community stability. For example, Robert feels that the slowing down of the oil and gas industry, and the ASWTF will eventually impact Swan Hills economy,

> INT: Do you have any concerns about anything in the future?
> ROBERT: For Swan Hills? It's like anywhere, the oil industry and gas industry around here, you know it's slowing down a little bit. Bovar has also been slowing down a little bit. So there's always a business risk in anything as far as how long it can keep going. The oil and gas and the waste plant keeps this place going. Honestly there's not a whole lot else around here. So, if any one of those dies, it's going to hurt the community.

Jenny also expresses similar concerns. Jenny believes if the plant ever closed down, it would have detrimental consequences for the entire town,

INT: So you're concerned that all those protests and native concerns might cause the plant to shut down?
JENNY: Yeah it might shut it down.
INT: How do you think that would affect you and the community?
JENNY: I think that will be a lot of lost jobs for people and a lot of people moving out and it will just affect everything, such as your price. And the oil patch has slowed down here in the last 10 years, it's slowed down a lot, so the Chem plant has brought a lot more people back in and working. I think it will have a big affect on the town.

As a result, many of the residents seem to downplay the risks about the ASWTF because the facility helps keep the community alive (see section 5.7).

Table 4.2:
Community Concerns

Theme	Number of times topic was mentioned	Number of people who mentioned the topic (% of the 27)
plant closure	26	11(41)
lack medical facilities, doctors	15	6(22)
community stability	12	6(22)
oil industry downsizing	9	5(19)
lack amenities	8	6(22)
decline of property values	8	6(22)
children's future	8	5(19)
maximum for entire data set	86	23(85)

4.2.2 Environmental risks and concerns

The oil and gas industry seems to be a more pressing environmental issue in Swan Hills than the ASWTF (see table 4.3). Further, the residents generally regarded landfills as more of a risk compared to incineration at the ASWTF. However, when solicited, a few residents (n=8) did mention the ASWTF as a risk, but these residents generally seem to have very little concerns with the plant.

environmental issues/oil and gas industry (100 4 1 2)

When asked directly about any environmental issues in Swan Hills, more people mentioned the oil and gas industry than the ASWTF (table 4.3). In fact, there were twice as many people who mentioned the oil and gas industry as an environmental issue compared to the ASWTF (n=7 and n=14, respectively). The third highest mention was the forest fires (n = 10). However, it is not surprising that forest fires was mentioned by so many people because the community had just experienced some of the worst fires condition in years. Despite the fact that the town is dependant on an industry that pollutes, many still regard the oil and gas industry as risk. For example, Jenny describes the oil patch as risky and hard on the environment,

> INT: What do you think some of the main environmental concerns are around here?
> JENNY: I think it's our oil patch. I think that can be very risky. You know there were 4 or 5 spills out in one field and that's hard on the environment. Our forest fires. That's kind of a hard thing because it can be good and it can be bad. But I think that the oil, the stuff that goes on out in the field is hard on the environment.

Table 4.3:
Environmental Risks and Concerns

Theme	Number of times topic was mentioned	Number of people who mentioned the topic (% of the 27)
plant is a risk	23	8(30)
environ issue/oil-gas	18	14(52)
environ issue/forest fires	15	10(37)
landfills as alternative	13	9(33)
environ issue/ASWTF	10	7(26)
transportation concerns	9	5(19)
environ issue/forestry	6	6(22)
environ issue/wildlife	3	3(11)
maximum for entire data set	86	23(85)

environmental issues/ASWTF (100 4 1 1)

However, few residents regarded the ASWTF as a risk, even though the waste facility has caused some negative environmental impacts (e.g. PCB leak, incinerator explosion). Further, just because it is mentioned as an environmental issue, it did not necessarily mean they were concerned. For example Dina defines the plant as an environmental issue but then is quick to respond that the risks have been "overblown,"

> INT: What do you think some of the environmental concerns are around here.
> DINA: Well the waste plant is one. I think the oil fields is another. I think there's environmental risk with any industry, there is a certain element of environmental impact. With the oil companies and leases and just erosion control and things like that can have a lot of environmental impact. I think the plant has been overblown, you know the environmental risk, the PCBs or dioxins and the furans. I think the pulp mills, I mean you take Slave Lake and Whitecourt, I think you have as great a chance or maybe even better of a chance of toxins being present in the atmosphere in the pulp mills or paper mills than you do from the plant.

These residents seem to define the terms risk and concern quite differently. Although they did identify the ASWTF as a risk, they had very few concerns with it.

Others such as Glenda also identify the waste facility as an environmental issue but justify the waste facility by explaining that disposing hazardous waste is a responsible thing to do. Glenda believes there would be more risks without such a facility,

> INT: What do you think some of the key environmental concerns or issues are for Swan Hills?
> GLENDA: For Swan Hills? Well I mean there is the waste treatment plant out there. However, I think that the waste treatment plant is a responsible thing to do. There are risks involved with hazardous waste yes, or toxic waste or whatever you want to call it. But are those risks greater by destroying the waste than disposing of it in an unsafe manner, dumping it in ditches or piling it into things like the Love Canal? I think the risks involved with destroying it far outweigh the risks of going back to what it was where people could just dump their waste wherever they want. So I think the Alberta government and Bovar have done the responsible thing by establishing the disposal site.

Mary, on the other hand, has some reservations about the plant. She would like to believe that the plant does not pose any risks but she is uncertain,

> INT: What would be a main environmental issue or concern for Swan Hills?
> MARY: This area? I suppose the plant is a concern, I'm not sure how big of a risk it really is, but it is a concern. And just your normal everyday pollution that you get everywhere else you know. But besides the plant there's really no other concerns. Well the oil and gas there is risk there too. Oil spills, that's not very good for the environment and the smokestacks and stuff like that.

plant risk/concern (100 2 3)

Although there are twenty three mentions (table 4.3) of the plant being a risk or concern, the residents do not see it as a big threat. Further, these concerns were limited to only eight out of the twenty seven respondents. Generally, women, such as Miriam, Mary, and Jenny, who have children seem to be the ones most concerned about the ASWTF. For example, Jenny remarks that perhaps the plant is a risk for living in Swan Hills, but, those risks do not really bother her. However, Jenny may have some latent concerns that perhaps in the future there may be some repercussions (see section 5.8). In this passage, Jenny seems to change her mind and view the waste facility as a risk because of the possibility of effects in the future,

> INT: How would you define the term risk?
> JENNY: That's a very hard question. I don't think of stuff like that, not here I don't think that's a risk. I think if, like our biggest risk is getting mauled by a bear while you're walking through the woods like that to me, like that's the risk here. Like maybe for some people it's living by the plant. You're taking a risk by living here I guess. Like I've thought about it and like I said, maybe we do, maybe in 20 years we'll find out. But no that's probably the biggest risk for living here would be the plant but it still doesn't bother me.

Mary also expresses that she has some concerns but her concerns are not very high. She is more concerned with the type of people that work at the plant,

> MARY: I'm concerned but not very concerned. I'm not concerned about the plant. I'm concerned about how maybe it's managed or the type of people they hire and how safe they work. But I think if it's managed properly and it's safety issues are up to par I think I have no problem with it. It's just human error, human factor that I worry about.

Out of the eight respondents who identified the plant as a risk, Miriam, Jenny, and Richard had explicit concerns with the hazardous waste plant. When Miriam defines risk, she defines it in the context of her family. As a result, she is primarily concerned over the possible impacts of air quality on her children,

> INT: When you talk about risk what do you mean? How would you define it?
> MIRIAM: I guess risk would be more of posing a threat.
> INT: A threat to what?
> MIRIAM: Well to a lot of things, your own survival, or an impact on your family. Especially with the hospital and Bovar and that kind of thing. These are questions I don't really think about that much in depth. It's interesting. I would say there's a risk, it concerns me that there may be a risk that we don't know about to our health. That's number one. We don't really know what the quality of air is like here when things are burnt off at Bovar. So that to me is very risky on our health and especially on my children's health because they're developing so fast and everything's so crucial with their brain development that you wonder is there going to be some side effect. But you know in Edmonton they say they have more PCBs registered in the air there than we do here. But then again you know, I've heard that counteracted a lot of times from different programs and reports. So it is hard to believe.

Similarly, Richard is also concerned with the air quality. He wonders how often Bovar violates the emissions standards. However Richard does not necessarily disagree with the concept of a hazardous waste facility. He sees the need for them, but he questions the location of the plant. He is concerned because he believes that accidents are inevitable and the current site is not a geologically suitable location,

> INT: Would you say that there are benefits of having the waste plant here?
> RICHARD: I never did ever agree in having the waste plant here. And that's simply not because of NIMBY either. But everything runs off here. It can be raining here for 2 weeks, hard and you can go out to a lease and dig down 8 inches and the dust will be flying because there's so much clay in the soil everything runs off into the swamps and the rivers into the lakes. So I certainly

> didn't disagree with the concept of a waste treatment plant at all, but here? I mean when they could put it in the middle of the badlands where the watertable is thousands of feet down, why on earth wouldn't they do that you know what I mean? But here it's gotta be run just right because any mistake, liquid mistake, it's gonna end up in the water table and I don't give a shit what anybody says and you know that's the only thing that bugged me about it here is that the whole premise of their argument was "Well there's not going to be an accident". They might as well say airplane's don't crash and ships don't sink either. I mean they're not supposed to you know. But so their arrogance was more a concern because I just I mean I'm just a simple oil patch worker and I know better than that. There's going to be an accident, there's going to be a mistake so why on earth would you put it in a place where if there is a mistake it's critical right away for a lot of things? So I questions their logic there.

transportation concerns (100 2 4)

Generally, concerns about the hazardous waste facility are on the issue of transportation. The residents are concerned with the possibility that a truck carrying hazardous waste will get into an accident and cause a spill. These residents are also concerned about the government approval of out of province waste because of the increase in the number of trucks transporting waste and the long distances they have to travel. For example, Robert expresses that he has no problem of accepting out of province waste, however, he does have some concern with the transportation,

> INT: What do you think about the fact that other Provinces ship their waste to Alberta or to this plant?
> ROBERT: I've got no problem with that. To me the biggest issue there is the transportation and keeping it safe. To me that was always my fear of accepting out of province waste, a transportation issue. We know it's expensive to build, it's expensive to upgrade and it doesn't matter if it's Alberta or where it is, it is hazardous waste and if we can get rid of it, fine. I have no problem accepting waste.

landfills as an alternative (100 2 2)

When the residents describe the ASWTF they use words such as: "waste", "sterile", "stable", and "inert". Many of the residents associate the term "incineration" with the ASWTF, and equate incineration with "destroying waste". The hazardous waste

facility, then, is seen as a facility that destroys and gets rid of "waste". When people talked about the alternatives to incineration, images of contamination, leaking transformers, Love Canal, and dumping into ditches or farmers fields, were be conjured up in their minds. As a result, the residents view burying or storing as a larger risk and hence a poor alternative to burning the waste at the plant. For example, Lisa describes the unacceptable risk to her of burying waste,

> INT: You said that you are more worried about the oil patch as opposed to the waste plant, why do you say that?
> LISA: Because the waste plant is designed to get rid of waste, I mean they're not generating the waste. When you're generating the waste and you have to pay to get rid of it there's an incentive to hide it, bury it, dump it. They're job is to bring it in and dispose of it, that's what they get paid for so there's no reason for them to hide it or bury it or dump it, that's the job. So I have less concerns about them having a, I mean in industry there's always going to be some risk in that something will blow up or whatever but that's part of doing business and an acceptable risk. An unacceptable risk for me is the fact that somebody wants to save $10,000 and so buries 50 drums in a hill somewhere or in a farmers field, that happened out by Edmonton some guy buried a bunch of junk in some farmer's field. I think that's a bigger risk, somebody trying to short-circuit the system and save a few bucks. Whereas there's no incentive for Bovar to short-circuit the system. That's what they're out there to do.

4.3 Low Concerns and Low Risks Regarding the ASWTF

The residents of Swan Hills generally have few concerns living in Swan Hills. When asked about any risks or concerns in general, a number of residents mentioned they had very little risks or concerns living in Swan Hills. Further, when asked directly about the ASWTF, many of the residents did not identify the plant as a major risk or concern. This section reveals the residents view of low concerns and risks regarding the ASWTF.

low concerns living in Swan Hills (100 1 2 1) and with the ASWTF (100 1 2 2)

In general, the community of Swan Hills has very few community concerns, especially regarding the ASWTF (table 4.4). For example, there are 47 mentions that the

Table 4.4:
Descriptions of Low Risk and Low Concerns

Theme	Number of times topic was mentioned	Number of people who mentioned the topic (% of the 27)
plant is a low concern	47	19(70)
PCBs are a minor risk	41	16(59)
plant is a low risk	35	14(52)
plant safe	18	10(37)
low risks living in Swan Hills	15	10(37)
accidents were minor	10	6(22)
low concerns living in Swan Hills	6	4(15)
maximum for entire data set	86	23(85)

waste facility is a low concern and 34 mentions that the plant is a low risk[15]. Despite the fact that there is some considerable concern regarding the ASWTF from outside the community (e.g. health advisories, Native concerns, and media reports), the residents do not share the concern. For example, Robert comments that although others outside the community view the waste facility as a main environmental concern, he does not feel it is a major one,

> INT: What do you think some of the main environmental concerns or issues are?
> ROBERT: Well some people say that the plant is a big one but I don't, I don't really feel that that's one of the major ones.
> INT: Why do you say that?
> ROBERT: Well I know what the process is, I know how it's operated out there. And right now they're going through some court hearings and some interesting stuff is coming out of that.
> INT: Yeah I bet.
> ROBERT: And it's in our favour which is good right now. PCBs are always the one big thing that they're talking about, and you think that's the only hazard out there, well that's only a minor hazard, there's lots of other ones. Not so much here. I just mean everywhere in Alberta. They're transporting 100% chemicals all over the place, through cities all the time. People don't, whether they're just ignorant of the fact I don't know, but when they hear PCBs they think that its not good. I don't look at it as far as you know, the waste management plant as being a risk. Hazardous waste does not only come through our gates at the plant, but its

[15] The terms risk and concerns were used interchangeably in the interview guide to determine if these two terms were interrelated and if the residents actually distinguish between these two concepts

> also out there all over the country. And you know, it's gotta be dealt with and we're doing our best to do that. So I'd sooner have it that way than have it dumped in a river or stream or something like that. So we're doing the best we can with it.

The reason Robert feels that waste facility is a low risk is because he believes that facility is destroying hazardous waste that would otherwise be dumped into a river or stream. Likewise, Alan realizes there are negative views revolving around the plant, and despite the stigma attached to living in Swan Hills, he has no concerns with the plant,

> INT: What do you think some of the environmental concerns or issues are for Swan Hills?
> ALAN: Some of the environmental issues? I know the waste plant is on a lot of people's minds. That I have no concern with. I've been with them for 10 years, ever since they started up and contrary to a lot of belief I do not glow in the dark, I do not have extra arms or hands. I can function normally.

Further, some of the residents feel that the waste facility is low risk because visually the ASWTF is unassuming. For example, Damgar remarks that she has low concerns because compared to the oil companies who's smoke is black, the smoke that is emitted by the ASWTF is white,

> INT: Are you ever concerned about the plant?
> DAGMAR: Not really. No.
> INT: Why is that?
> DAGMAR: I just know, I know how safe it is out there. I've been there, I've looked into it. Compared to the stacks from the oil companies that are spewing out raw gas everyday and you've got white smoke coming out of ChemSecurity, their emissions are zero or less compared to what's going on west of here. It's just never bothered me. We're 15 miles away too, we're not, it's not right there, it's quite a ways away.

Dagmar seems to believe that a zero or risk free environment can be achieved when she comments "their emissions are zero or less." Dagmar has the opinion that the emissions at the hazardous waste facility is zero, or at least less compared to other

industries, and as a result she has no concerns with the ASWTF. Her (over) minimizing the risks regarding the ASWTF seems to be a way of coping with fears and concerns.

Others such as Crystal have few concerns about ASWTF because they have become accustomed to it. Crystal describes her experience of living in Southern Ontario and she explains that although she may have concerns with the tornados there, she dismisses them as a concern because she has become used to it. In the same way, she feels that the waste facility is not a concern because she has gotten used to it.

> INT: Do you have any concerns about living in Swan Hills?
> CRYSTAL: No, not especially. My biggest problem with living in Swan Hills is I do have to leave Swan Hills to go to a larger centre for services. That's my biggest concern about living here. I take you mean am I concerned the plant, the waste treatment plant's here or the gas plant that is here? No, because I'm comfortable with the fact that these people do know what they're doing and they make every effort to do it properly and if something did happen it is strictly an accident. It's nothing that anyone could foresee so my concern about living here would be the same as my concern about living anywhere else. I come from Southern Ontario. Tornados rip through there on a regular basis, would I have a concern living there? Well, but you get used to it. You get used to living where you live. If you lived in California people are blasé about earthquakes down there because you're secure that your building can handle an earthquake or you're secure that you know what to do in a tornado, you're also secure that these people are doing their best not to cause accidents. And because, I've got friends, relatives that work in these plants, I know what they do to prevent and safety train. They're making every effort not to have problems, but no matter where you're going to go there are going to be problems. There are accidents, genuine accidents, not carelessness or neglect, if they are there's somebody going to get fired, there's going to be problems.....

Interestingly, Crystal makes no distinction between natural and human-made technological risks. She equates the risks from the ASWTF in the same light as risks from tornadoes. Further, she rationalizes that problems at the waste facility (e.g., the PCB leak, incinerator explosion) were the result of accidents. In addition, she places her faith and security in the workers that work at the plant, who also happen to be people who live in Swan Hills.

low risks living in Swan Hills and with the ASWTF (100 1 3 1 & 100 1 3 2)

Generally, the residents feel that there are low risks in Swan Hills (m=15, n=10) and also they feel that the waste facility is a low risk (m=35, n=14) (Table 4.2). When asked what kinds of risks there are living in Swan Hills, there were two types of responses. The first was that there are no risks in Swan Hills. For example, Alan states he cannot apply the term risk to Swan Hills because he does not think there are any hazards in Swan Hills,

> INT: How would you define risk?
> ALAN: A risk to living in town, in this area, how would I define a risk here? That's a good question. When you think of risk right away you think of like a hazard of being situated and I don't know if I could apply it in that sort of way.
> INT: So you don't think there are any hazards or risks living here?
> ALAN: I don't think so, I grew up here, I'm still living.

Alan seems to ignore the risks about the ASWTF because lack of immediate impacts from the hazardous waste facility. The second type of answer was that the risks in Swan Hills are no greater than other places,

> INT: What about risk? Do you think there's any risks living here?
> MONICA: Oh I don't think there's any more risks, in fact I think there's a lot less risks here than most places.
> INT: What kind of risks?
> MONICA: Well, offhand I can't really think of any risks other than maybe at some time or another there was a heck of an explosion at the waste plant. I know there's some but I don't know how many but I know there's a few poison gas wells. I don't know, I just don't feel that we really have any real risks here.

Monica seems to acknowledge that the waste plant may be a risk but she dismisses it as a risk by comparing it to the gas wells. She believes that because the gas wells emits poisonous gas, it poses risk, on the other hand, the ASWTF does not emit any poisonous gas so it is not a risk. Similarly, Monica seems to identify gas wells as a risk

because of observable immediate impacts, whereas, there are no observable immediate impacts from the ASWTF (immediate verses delayed impacts).

While most residents claim that there are very few risks in Swan Hills, there are some people, like Jenny, who seem to have some doubts about the waste facility. She comments that the plant is not a risk, but she also questions her assessment,

> JENNY: That's another thing. I don't know if you can ever guarantee something to be that safe. Maybe it's not I don't know.
> INT: Do you think there's any risks associated with this plant?
> JENNY: No I don't. I don't think there's any risk with this plant. I don't know in time? Like I said before maybe there will be in time, we don't know.
> INT: Do you think they are affecting or polluting the environment?
> JENNY: I don't think so, I don't think it does affect the environment. I really do believe that. Not that I know anything that no one else knows but I just don't think that. I don't think it hurts the environment at all. But then again you never know either. Some of these things don't arise until 20 years later and they say "Hey, all that stuff you did well it screwed your...." It's new, it's such a new thing so I guess it's just a risk we all take you know.
> INT: Why do you think it's not hurting the environment?
> JENNY: I don't really know why. I don't know, I just don't think it does, I don't think they would put our environment at risk.
> INT: What do you mean they?
> JENNY: The government and Bovar. That's what we're trying. I thought that's the whole reason for the plant was to help our environment to make sure that we're disposing it in a proper way so for them to be doing it? But you don't know. Look at Chernobyl, you don't know anymore. Maybe in time we will find out and we'll all be a bunch of fools for sitting here and, like you just believe what someone tells you "It's safe, it's fine, you don't have to worry about anything." But who knows.

Jenny seems to have some latent concerns (see section 5.8) that perhaps in the future there will be some negative consequences. However her concerns are reduced because of her trust and faith in the government and Bovar. She believes that they would not put the environment and the community at risk. Further, she feels that the waste facility is socially responsible by cleaning up hazardous waste in a proper manner.

plant safe (100 1 4)

The reason that many residents view the ASWTF as a low concern or risk is because they believe it is a safe plant. Even though Jenny seems to have some latent concerns, she still assesses the plant as a safe place,

> JENNY: I really think that's it's a safe plant and that it's a good plant. There really should be more of them (laughing). You know like other people have come up from, where did they come from, I think they came from Hong Kong and some representatives from Australia or somewhere and they've come to look at it, to see how it's been built. And I think that's good. More people should come up to see it and find out what's going on.

Monica as well, believes the hazardous waste facility is a safe place,

> MONICA: I would say that this plant is a heck of a lot safer, it's not polluting any lakes, I mean they were reporting that the fish in Windy Lake had mercury, there wasn't mercury at the plant. So this was coming from the fisheries in the first place, but you know, the biggest thing was that they didn't do the testing of the animals, they didn't do the testing of the fish, you know what I mean, before the plant even dug that first hole. Because then they'd have known, they would have had a guideline to go by but that wasn't, they weren't doing testing on vegetation and stuff like this, they didn't do the testing of the fish and all that or not enough of it anyway. We're safe up here, we're as safe as anybody else in the country and that pollution plant is not going to hurt anybody.

However, her description (Freudian slip?) of the waste facility as a "pollution plant" may resonate with Jenny's latent concerns about the facility. That is, Monica may actually consider the waste facility as a risk.

PCBs are a minor risk (100 1 7)

Some of the residents in Swan Hills seem to associate PCBs with the hazardous waste facility. These residents tend to be the ones who believe that PCBs are not dangerous and believe that PCBs will not harm them. Helen for example, comments on how she believes PCBs are not dangerous and has had no damaging effect on her 3 month old baby,

INT: So you're saying that you're not concerned about your health or your children's health, or family's health, why is that?
HELEN: Why is that? Cause I don't think PCBs are gonna kill me. I don't think PCBs are that dangerous that I can die from it. My common-law husband worked out there for a while, his PCB levels had gone up, of course I mean he worked out there it was going to happen. They monitored him quite regularly. I think he was tested every 3 months. And his levels went up and down and up and down and I asked him one night, are you concerned about this, do you think you're going to be affected? And he said no. My doctor, I just had a baby 3 months ago, and when I was going through my first stage of my pregnancy the doctor had asked me if I was concerned with PCBs? "No I'm not and don't ever bring it up again" (laughing). I talked to some of the people in town and there was a guy that was working up here part time for some company and he said he wouldn't move here. I asked him why and he said because I would die from PCBs and I just.... Oh you are so misinformed. And I think that's the biggest problem people are not informed about what PCBs are and I'm not afraid of PCBs. I've got PCBs in me now and it has nothing to do with the plant. Everybody has PCBs. I mean you can go into a store and buy a package of meat that has PCBs in it. And we've been doing this all our lives and we haven't died from it. I've ate wildlife, the wild meat around here for years, I don't eat the fish cause I hate fish but my father he hunts moose and deer and everything. No I'm not afraid of PCBs I think that's probably why I'm more on the calm side of it.

Helen seems to be concerned about the stigma attached with the waste facility. She feels that others (outside the community) are just creating problems when there are none. Further, Helen seems to use a circular argument for her lack of concern for PCBs. She argues that she is healthy and she has PCBs in her. As a result, she concludes that PCBs are not harmful. Interestingly, in her assessment, she makes no reference to any scientific studies. She bases her judgement on her personal experience and immediate appearances, and ignores the possibility of long term effects.

Even in light of the PCB leak and incinerator explosion, the residents of Swan Hills feel the plant is quite safe. They regard the incidents as "minor" events because of the relatively low emissions. Kerri, for example, has low concerns with the two accidents because she believes that PCBs will not harm her. Paradoxically, Kerri believes that PCBs are not harmful because of the uncertainty. She comments that no one really

knows how much PCBs it takes to harm someone, and no one has specifically died as a result of PCB contamination,

> INT: Does it scare you at all that they had those mishaps?
> KERRI: No.
> INT: No? Why? Why is that?
> KERRI: Well, because I don't really think the PCB emissions are going to kill me. The dioxins and furans of course are a different issue. I could go to Whitecourt and not be able to breathe because of the pulp mills, Hinton as well. Like I said I could go out into the oilfield and be knocked down by H_2S gas. Those things will kill me. The PCBs they don't know how many PCBs it takes to kill you. Nobody has died specifically from inhaling a few PCBs. I mean guys in the oilfield and the power people, transmission lines they used to put their arms into drums of PCBs and they're still living. I mean you know, asbestos as insulation kills, they know that now, but they can prove that. The scientists know what a large ingestion of PCBs will do to a person. You'll get sick if you don't know, just like from smoke. And this is what we get it's just smoke, like a campfire I'm sure that has more dioxins and furans. And then how about the fires we've had around here – (*there were lots of*) dioxins and furans? (emphasis added)

Interestingly, many of the residents acknowledge that PCBs are emitted from the special waste treatment facility. However, few made any mentions of dioxins or furans. The residents would generally assess the risks from the ASWTF to be low because they feel that PCBs are a low risk.

4.4 Summary

Despite the fact that the ASWTF is classified as a hazardous waste treatment facility, the residents do not consider the plant as a major risk. These residents appeal to that fact that the special waste treatment facility "destroys" hazardous waste. They feel that ASWTF is a responsible thing to do because the alternative of landfilling hazardous waste would be more of a risk. Even in the wake of the two accidents at the waste facility, the residents do not consider it as a major risk. Generally they feel that the plant is a safe place and they describe the incidents as "minor." A larger concern people have

regarding the ASWTF is associated with the transportation of waste and the threat of facility closure. Many of the residents take pride in the fact that Swan Hills is one of the safest communities. They feel that Swan Hills is a safe place because it is a small town, family oriented and neighbourly. As a result, the residents regard Swan Hills as an ideal community to raise a family. Safety, then is more related with crime and violence than it is with the ASWTF.

Chapter 5:

Contextual Influences on the Views of Risk

This chapter examines the contextual influences that shape the residents' views of risk in Swan Hills. The previous chapter reveals that many of the residents do not view the special waste treatment facility as a major threat to themselves or their community. It is argued that the residents' view of the plant, workers, and, experts, control; views of waste and waste facilities; reasons for minimizing risk; and social and economic benefits, are important influences on their assessment of low risk. For the few who view the waste facility as a risk, various types of uncertainty are the main reason.

5.1 Community views of plant, workers, and experts

The residents view of risk regarding the ASWTF is influenced by how they view the plant, community members, and experts. Generally feel they have a good understanding of the plant and PCB, giving them assurance that the plant is safe. Further, the residents trust in community members, science, government, and Bovar, gives many assurance the plant is not a risk.

knowledge/understanding (101 1 1)

The level of knowledge or understanding is directly related to the residents' assessments of risk and level of concern regarding the special waste treatment facility (Table 5.1). The residents who generally feel that they have an understanding of the processes at the plant are the ones who assess the risks as negligible. These people feel that the plant is not a risk and prefer to point out that the plant destroys hazardous waste

(e.g. PCBs), rather than produces it. According to these residents, a lack of education and understanding is the reason that people outside the community are fearful of the

Table 5.1:
Community Views of Plant, Workers, and Experts

Theme	Number of times topic was mentioned	Number of people who mentioned the topic (% of the 27)
knowledge-understanding of PCBs, plant, & process	52	18(67)
resources, equipment to handle problems	23	12(44)
know workers	23	13(48)
community consensus that plant is not a risk	19	9(33)
trust Bovar	19	11(41)
confidence in science & technology	13	9(33)
trust government	7	6(27)
choice in the siting process	4	4(15)
maximum for entire data set	86	23(85)

hazardous waste facility and are prone to stigmatize Swan Hills. For example, Helen comments that the community is not afraid of the waste plant because they are educated about it,

> INT: Why don't you have any concerns about the plant?
> HELEN: Well because I'm with the newspaper and I went through a lot of in-depth dealings with the plant and even with the oil industry. When the plant was looking at expanding I went to their environmental assessment review and I got a lot of information there. I think, speaking on the plant's side of it, they took and educated the people of Swan Hills. And they went the extra step and told them what are we bringing in, how's it going to affect you, what are PCBs you know all the concerns that are related to that plant. The oil industry, because most of the people in Swan Hills work directly or indirectly with the oil industry, it is a process of growing with the industry, so you're learning as you go. A lot of people in Swan Hills, you'll find them not afraid, they're not afraid of the oil patch and they're not afraid of the waste plant because they've been educated on it. Communities outside of Swan Hills they haven't been given that opportunity, or they were given the opportunity but they didn't go. Like the plant, they had

> information set up in Barrhead and Slave Lake, all the surrounding areas, they had a very, very poor turnout. So they weren't, they weren't concerned then but now because of the media exposure they're concerned but they don't want to learn about it they just hear "waste plant? I don't want to hear it". So Swan Hills has heard it and they're educated enough that they understand it. So I'm not going to say everybody is because some of them aren't. But the great majority are because they know what's happening out there and they understand it and I think that's a benefit. That's why they're not afraid of the plant.

Monica as well feels that the plant is safe because she knows the plant is destroying waste,

> INT: What do you think makes a place safe to live in?
> MONICA: Safe? Well first of all with the way it is nowadays your environment is the first thing, like your clean air. We've got clean air here. Say what they want about the plant but we've got clean air and good water. And to me that's number one. We know, what is there at the waste plant, we know what's happening there. With the oil field and gas field, we don't know what's being buried and what isn't being buried. I also think safe is where you're comfortable, where you feel at home.

From the comments made by Helen and Monica, an effective risk communication program seems to be an important influence in the acceptance of hazardous waste facility. For instance, Alan comments how the community was well educated during the siting of the hazardous waste facility,

> INT: Do you think bringing the plant here unfairly exposed Swan Hills to risks?
> ALAN: Unfairly? No. There was a lot of time spent with the community, educating them, community telling them what they were planning on doing, telling them why the area was chosen, and telling them what kind of waste they were going handle. You know they were very well educated before they went ahead with construction.

Also important is the understanding of PCBs. Many feel that they have a good understanding of PCBs. As a result they feel comfortable with PCBs and believe that they are not dangerous. Not only do the residents feel they have a good understanding of PCBs and their effects, but also that they understand the incinerating technology for PCBs. For example, Anne feels that the technology in the hazardous waste facility has

been researched for a long time, and as a result, she seems to have no concerns about it. She compares the treatment of hazardous waste with nuclear power plants to argue that the hazardous waste facility is not a risk,

> ANNE: People here, like I said, are more educated and were more aware that something had to be done with it. It was researched very well before the plant was built. They researched for years. And this is not something new in the rest of the world, Europe has had waste treatment facilities for ages. Now if we were talking about nuclear wastes there I'd have a little bit of a problem, that's a totally different story.
> INT: Why is that?
> ANNE: Because I don't think that the knowledge is there yet. I would be a little bit worried living around nuclear places or where they're storing nuclear wastes, that would scare me. But paints and paint thinners and PCBs and pills and glue and all the acids and all the stuff they dispose of there? I mean we come in contact with it every day of our lives. My husband in his industry has worked with PCBs, they don't use PCB oil in transformers anymore but they certainly did. Many times he was drenched in the stuff. He's not glowing, he has 34 years in with the company, you have to be able to dispose of the waste somehow. I don't think they handle anything here that they're not sure of either. Everything that comes in is labeled and researched and you know.

Many people, such as Anne, seem to believe that there are far worse things than the PCBs at the waste facility, and as long as that is true, they believe that they are not at a risk.

community consensus (101 1 4) and know workers (101 1 5)

An important aspect of small town life is the close interaction people have with one another. These social networks are the primary means of communicating and sharing of ideas. As a result, peoples' views are influenced by what others in the community have to say. Among the 27 interviewed in Swan Hills, there is a general consensus that the plant does not pose a risk, and this likely extends beyond these 27. Lisa, for example comments that she feels secure with the special waste treatment facility because others in the community have no fears,

> INT: Why do you say that? What makes you believe that the plant is not a risk?
> LISA: Probably the basic is the fact that, have you ever lived in a small town?

INT: No.
LISA: Okay, well in a small town it doesn't take long for the grapevine to run, especially here where I see a large portion of the population come in and out of this store. You'd be surprised how, like you've been here a few minutes and I know everybody by name and hello and we're friendly and chit chat a little bit right. I think, and this is not science it's not anything else it's just that the people that work there have no fear, they don't in any way allude to their worry, they're not hesitant, some of them actually like to go to work, and not everybody likes to go to work. That would probably be my reason for feeling secure. And if I sort of thought about it a little on an intellectual basis, the science that has gone into this and the technology. It's how they determine all this stuff. They've got chemists and all that.... (pause) Where were we?
INT: Talking a little bit about what assures you most.
LISA: Yeah the people and then I'd say the technology and then the science. That would be the order I'd put it in. I don't know much about the kilns other than they burn the sludge and stuff but I couldn't tell you how hot they burn and things like that so. I am impressed with the science involved in that you know, how many tests and how they collect.

Similarly, although Miriam has concerns regarding the ASWTF, her concerns are minimized because others in the community feel safe. Even more reassuring for her is the fact that the mayor, whom she respects and trusts, also seems to have no concern with the plant. When asked if they mayor had any influence on her assessment, Miriam comments that he is probably the main reason she is not too concerned,

INT: Would you say in general that you feel safe about it or how do you feel about it?
MIRIAM: I guess I feel somewhat safe about it. You know since we moved here there's been a lot of issues come forth. The government has said things and then retracted things and so you don't really know what really went on. But the community feels safe here, so you kind of go with everyone and just kind of live with it I guess
INT: Do you think that your concerns has lessened a little bit or increased?
MIRIAM: Yeah it has lessened. I don't know if it's because there's been more happening and that kind of thing or because it doesn't stand out that much but, it's lessened since I first moved here for sure.
INT: And you think the people have a lot to do with that?
MIRIAM: Yeah the people. Most of the people that I really respect don't seem to have much concern. And you kind of trust their judgement.
MIRIAM: We knew friends that moved up here and we wondered why they would even consider coming. Really I guess my only concern was what if I am following a truck or that something could happen on the highway. But then you

know a lot of people have been up here for quite a number of years and they don't seem to have any concerns about it, you know real main issues to be concerned about.
INT: A lot of people seem to have a lot of respect for the mayor, and they seem to feel confident in what he's saying. Does that reassure you?
MIRIAM: Yeah. I have a lot of confidence in him too. And that's probably one of the reasons it's not always on my mind.

Residents also derive security from the fact that many of the workers at the hazardous waste facility live in Swan Hills. For example, Kerri explains that she would not expect the workers to live in town if they thought the site was a risk,

INT: How do you think others in the community feel about the facility?
KERRI: Well if I think of the people that work there, and you know there's a fair number of people that work up there that live in town. I cannot see that if that facility was bad that they would prefer to live so closely to it, let alone working there, husband and wife. You know and some of them have their children working there.

Likewise, Elizabeth feels that the plant is safe, not necessarily because of what Bovar says, but because she knows some of the workers at the plant,

INT: How do you know that you're safe?
ELIZABETH: With the PCB plant?
INT: Yeah, with Bovar.
ELIZABETH: I don't think I'm safe because Bovar tells me I'm safe, I know the people that work there. And there's where you're going to find out how safe it is, from the employees. They know what's going on there and they tell you. You know, you're going to talk over coffee. And yes, they say oh well they're going to lose their job but there isn't any of that. And that was the one thing we told Bovar, if you have a leak, if you have this, we have the right to be the first to be let known and told. And so that was why we were upset with Bovar, about not being told, whether it's minor or not.

trust Bovar (101 1 6)

Nevertheless, trust in Bovar reassures some. Many of the residents who where interviewed, feel that Bovar is a company that they can trust. The reason these residents trust Bovar is because they feel that Bovar is open, and for the most part, the company

keeps them well informed. For example, Jenny comments that many feel "comfortable" with Bovar because Bovar does not hide anything,

> INT: But what makes you trust them, the people Bovar and government.
> JENNY: Probably because we're around it more, I think. I mean I don't go out there especially just to visit but I mean you're more than welcome to go out and look and talk and tour. You can phone the Chem office, you can talk to our mayor he's, he'll gladly talk to you about it. And I think people are more comfortable because we talk about it, cause we know a little bit more about it. If we have any questions we can just call them and ask them and they tell us. So I think that's maybe why people feel more comfortable and they trust it because it's not a big secret and no one's turning you off. They'll always give you an answer to your question so you know you take them at face value and hopefully. But you know, we're the ones, you know we voted our mayor in and stuff and he's the one too that sticks up for it and I really admire him for that. I like what he says, and I believe him.

confidence in science/technology (101 1 8)

The confidence put in science and technology is another reason the residents feel secure. They believe that some of the most advanced technology has been put into the hazardous waste plant. For example, Alan, a Bovar employee, comments on all the safeguards that are put into the system. As a result, he feels the plant will never pose a major risk,

> INT: Why do you say that? What makes you think that the potential for a large scale contamination is "almost zero"?
> ALAN: Just the technology. There are a lot of safeguards within the system that will shut the unit down prior to anything severe. Plus the fact that if there was another release we do have air cleaning systems in place to move all that stuff. You'll never see a great big, like people think probably of a great big huge vapour cloud moving across Alberta. That will never be the case.

Similarly, Duane has faith in science and technology. However, his rationale involves a peculiar tension between technology and uncertainty. Duane feels that because the technology and science involved is so new, and involves uncertainty, it is not worth worrying about,

> INT: How about other scientists? What do you think of them
> DUANE: Well, yeah I guess in a lot of cases it depends on who's paying the bill I think. I've worked with a lot of people, I've worked with consultants that come up here and I asked them about how things are in the States where they were from, different areas. I know some people that have been to Hong Kong and China doing the same type of thing and our facility they say is top notch compared to those. Even in the States and abroad. I mean everybody's going to have some problems but as far as a decently run facility ours, they say, is top notch. I think a lot of the people that are making comments that it's terrible, "anybody living in Swan Hills is retarded" well come and see for yourself, who knows. Maybe down the road I'll regret this but after 9 years, I don't feel any worse you know. I think it's such a new technology and there's so many chemicals out there that people don't know anything about, like even dioxins and furans, there's not that much information worldwide on them so a lot of it is based on stuff that is really unknown so I don't really worry about that.

However, it seems as though Duane has some latent concerns that perhaps down the road he will have some regrets (see section 5.8). As for now, he does not feel any worse, and as a result, Duane has no concerns.

5.2 Control

testing (101 2 1)

One of the most important reasons that the residents do not worry about the waste facility is because the residents feel that there is some degree of control over the plant from outside the community. The testing, conducted not only by Bovar, but also the provincial and federal government is the main reason the residents feel there is some kind of control (Table 5.2). Out of the 27 interviewed, there were 49 mentions from 18 people that testing was a reason why they had very few concerns about the ASWTF. These residents feel the tests on people have revealed that there have been no significant impacts from the two accidents. The tests also revealed that there are lower levels of PCBs in Swan Hills than other cities such as Edmonton. As a result, the residents feel that the waste facility is not a risk. For example, Crystal has no concerns with the two

accidents that occurred at the site because the tests from the provincial study revealed low levels of contaminants in the residents. She feels that the tests were a way to ensure that the plant was doing their job properly,

> INT: What do you think about the accident or explosion did that concern you at all?
> CRYSTAL: No cause they did testing. I feel that same way as most people in town did, we will be concerned when the tests come back saying that everybody's contaminated. Then we have a problem, but we were all reasonably sure, and we trust what they're doing and that they have been doing it right, and when the tests came back showing that everybody was just fine..... But my personal concerns with it was let them do the testing, see if there is any contamination. We just want to ensure that they've been doing their job and if they haven't been doing their job and we found that many people in town were contaminated. Then there would have been lawsuits, absolutely, and you'd see the back of my head leaving town too. But we didn't jump to any conclusions. We waited for the facts and the facts proved how we felt all along that the place has been safe and well operated so everybody's still comfortable with that plant there.

In this statement, Crystal seems to hint that are some social pressure in Swan Hills to be unconcerned about the ASWTF.

Table 5.2:
Control

Theme	Number of times topic was mentioned	Number of people who mentioned the topic (% of the 27)
testing	49	18(67)
scrutiny from public and government	24	17(63)
maximum for entire data set	86	23(85)

scrutiny from public and government (101 2 2)

Public and government scrutiny is another reason the residents feel that there is some control. Outside sources, such as the provincial government, Environment Canada, and the media, are important sources of control. The residents feel that the government is an important source of control because they are the ones that provide strict standards and

regulations to which the waste facility must adhere. Some also feel the plant is safe because the guidelines and standards at the plant are viewed to be "higher" than other industries such as oil and gas. For example, Alan talks about the Alberta Environment Protection and Environment Canada keeping a close eye on the plant to ensure that Bovar is doing their job properly,

> INT: So you think that plant is safe?
> ALAN: Oh absolutely. They have a lot of safeguards, things just don't get out of hand. Alberta Environment, Environment Canada they're the watchdogs, they watch us 24 hours a day, any type of excursion like a little spill of glycol gets reported to Alberta Environment. They're fully aware of everything that goes on. They do routine visits, you probably expect them 2 or 3 times a month popping in and having a look around doing their own audits. Just watching to make sure that what we say we're doing we're actually doing and they're, we have a good relationship with them and they have no problem with the operation of the facility.

Scott also believes that plant is under the scrutiny of the public. Scott argues that although the waste facility had a couple of accidents, they were like any other industrial accident, and accidents like those are bound to happen. Nevertheless, he feels that all the media attention, has made Bovar even more safety conscious,

> INT: So that's some of the risks you have to live with?
> SCOTT: Well the risk, to me there's no risk. It's the only place in Canada that's built like this and it's, right now we have the government, federal and provincial, we have everybody in the surrounding communities watching. Everybody on the news, if somebody jumps the wrong way the news guy out there watches, so we have do to things right. There's no risk. The risk is there like any other industry, you don't think about it. It's just like working in the sulphur plant, in the sulphur plant I had H_2S gas to worry about and I figure that's a lot worse than where I am right now. Cause you could be one breath and you're down in H2S gas. But other than that I can't tell you very much.

5.3 Views of waste and waste facilities

The residents view of waste and waste facilities are important influences on their views of risk. Three most prominent views the residents have regarding waste and waste facilities are: familiarity, nature of waste, and responsible.

familiarity (101 3 1)

The residents' assessment of risk is influenced by the community (geographical and social) context which in turn influences the residents' view of industry and PCBs (Table 5.3). The fact that Swan Hills is an industrial town influences residents' views of the hazardous waste facility. The residents think of the hazardous waste plant as "just another industry." Damgar comments that the hazardous waste plant does not bother her because Swan Hills primarily based on industrial activity (e.g., the oil and gas industry),

> DAGMAR: Like I said it doesn't bother me that it's here. I think in a way it might be a good place for it because the community is based on industry and because of that fact it's readily accepted. So, I think in that respect I don't think you'll find many people in town that are really, really against it because of that mentality. You are in an industry area and that's just part of what goes along with industry.

Further, the residents who are not concerned about the risks from the waste plant are also the ones who seem more familiar with PCBs. For example, Duane maintains that electricians use to work with PCBs for years and as a result feel PCBs are minor risk,

> INT: Going back to the couple of incidents, the one with the health advisory, what do you think about that?
> DUANE: I think the government jumped the gun. You know like they don't seem to realize that there is a hundred people that work there everyday and we get tested, our blood gets tested every year and sometimes every 6 months. I mean sure maybe our PCB levels are up a little bit but what's 5 parts per billion, like it's nothing (laughing)..... This PCB scare is just retarded to me. People worked with PCBs for years. I know electricians used to jump in the stuff to take samples of it and the PCB is a minor thing, like it doesn't scare me at all there's a lot of other stuff out there that's a lot worse.

Table 5.3:
Views of Waste and Waste Facilities

Theme	Number of times topic was mentioned	Number of people who mentioned the topic (% of the 27)
waste disposal is the responsible thing to do	86	23(85)
familiarity with PCBs and industrial activity	38	20(74)
nature of waste (incineration)	37	14(52)
privatization (better)	12	9(33)
maximum for entire data set	86	23(85)

nature of waste (101 3 2)

As discussed in chapter 4, residents seem to equate the hazardous waste facility with the destruction of waste. They would rather see the waste processed at the plant than buried in landfills or disposed of inappropriately. The residents believe that by burning or incinerating the waste, it becomes inert and sterilized. For example, Glenda equates emissions from the oil industry with the colour black and the ASWTF emissions with white,

> INT: Do you ever have concerns for your health or your family's health from that?
> GLENDA: No. It doesn't, there's no smells if you've ever been out to the plant it's a very unassuming plain Jane looking thing. The steam that comes out of the stacks is white, now just to the south of us is Judy Creek Oil Refinery and on a daily regular basis there are black plumes of smoke coming out of there, that can't be good. But I'm not sure if black is dirty and white is clean, I don't know. And we lived at Medicine Hat where they had HandCarb where they make carbon black and I don't know how often that thing would have this great big flare and this great big mushroom cloud of black smoke would come out. That can't be good, that's got to settle down somewhere. So to me it's clean, they're I don't know, it's very unassuming, it's not sloppy or dirty.

Glenda seems to suggests that the smoke that is emitted by Bovar is not harmful because it is white. Further, she believes the plant is not a risk because visually, it is unassuming. Dagmar also has similar sentiments as Glenda (see quotation in section

4.3). These two residents seem to equate "white" with "good" and "black" with "evil." As a result, the ASWTF is seen as "good" because it emits white smoke.

5.4 Waste disposal is the responsible thing to do

Out of all the themes, "responsibility" is the most prominent theme, mentioned 86 times by 23(85%) respondents (table 5.3). Responsibility resonates with the idea of civic duty or moral justification. Residents defend the hazardous waste facility on moral grounds by indicating that it is the responsible thing to do. The residents believe that they are helping the environment by taking all the "garbage" and "destroying" it. They feel they are making the world a "safer place" by disposing the hazardous waste that would otherwise be buried or stored in containers. As a result, they see dumping or storing hazardous waste as more of a risk than incinerating it at the plant. Anne, for example feels that the rest of the province, and the world, should be thankful that there is a place to deal with the hazardous waste and feels that Swan Hills is "doing them a favour" by eliminating it,

> INT: You don't think there's any risk associated with the plant?
> ANNE: No I don't.
> INT: Why is that?
> ANNE: They're monitored quite well. At least they're doing something with it and not burying it..... No there's no risks I'm not worried at all. I'd be worried if I lived in St. Albert and this stuff here was buried next to me without being treated.
> INT: So that fact that they're getting rid of it and it's treated...?
> ANNE: In the proper way, that's right. I think it's very safe and I'm glad that they're doing it and I think the people throughout this province, whoever uses it which is now kind of across Canada, I think they should be very thankful that they have a place to send the stuff to.
> INT: What did you think of the whole siting process? Were you for it?
> ANNE: I think it was good. Yes it was definitely. I felt we were doing a favour to the rest of the world, like somebody has to look after this and a lot of other place were too afraid to. People here, like I said are more educated and were more aware that something has to be done with it and if that's the best method. Like it was researched very well before the plant was built. They researched for years. And this is not something new in the rest of the world, Europe has had

> waste treatment facilities for ages. Now if we were talking nuclear wastes there I'd have a little bit of a problem, that's a totally different story.

Similarly, Clarence feels there would be more risks to the province if the ASWTF did not exist,

> INT: What was your initial reaction or initial thoughts before you came to Swan Hills?
> CLARENCE: The plant facility?
> INT: Yeah.
> CLARENCE: None really I mean I didn't think of it in those terms, I didn't think of it as a risk facility. In fact I think if it isn't there there's more risk to this province than if it isn't there. I've seen in the industries that I worked in and just being around garages and Edmontonions or city people in general they throw away all kinds of garbage that they don't look after that goes down storm sewers, that goes into your rivers, that do all sorts of things. I think if you don't have a facility, like what you've got up here, you've have greater risks. Maybe you can't identify them as easily I mean I think it's as much a political football because this is centralized, you can point a finger at it, you can identify it, you can locate it. You can say "Wow look at that". There are risks everywhere and I think if you don't look after it the products that go into this place then where do they go? Well they'll probably go down your streams and underground and so on. And you can't just put them in barrels and bury them because eventually they just become part of the environment so you have to get rid of them. So in comparison this is the way to go in my mind anyway.

People such as Clarence are concerned that people or companies will merely dump or bury hazardous waste and chemicals which will eventually run into streams and creeks. Not only are these people concerned about the environment but they also link these concerns to their children's future. For example, Dagmar wonders what the future will be like for her grandchildren,

> INT: You think your concerns have changed at all in the last ...?
> DAGMAR: I don't think I was as aware of them 20 years ago as I am now. When I was young and I really didn't think about those things and as you get older and I have a grandson now and I'm seeing these things and I wonder what he's going to have to step into when he's my age. Is he going to, is it going to be more work for him because I'm not doing my part or is it going to be worse or better or you know, what's it going to be like for him in 40 years, 50 years?

These people also support the hazardous waste plant because they realize the local oil and gas industry, on which the town also depends, generates a great deal of hazardous waste. That is, they are being responsible for a variety of hazardous waste which are generated locally. For example, Monica states that at first she opposed the siting of the hazardous waste plant but when she realized she was also polluting the environment, she changed her opinion.

> INT: You fought for it or against it?
> MONICA: Against it.
> INT: Oh really?
> MONICA: Yes because we never, my husband never did work in the oil field so I knew nothing about the oil field or what was happening in the oil field or anything like this and of course they called it hazardous and I was fighting for my kids, like there was nothing going to pollute the air and my kids end up with a disease or something over it. And, they had courses, like educational courses and I went to the first one and they talked at my level and if they said something, like I didn't even have to say a word because they could tell by the look on my face whether I understood it or not and they would just wheel right around and explain it like baking a cake or, so that I understood what was being said and I realized that I was polluting the environment far more than the waste plant would be, you know. So then I started fighting for it, so (laughing). But at first I was death against it.

Monica seems to suggest that in terms of equity, it makes sense to place the waste facility in Swan Hills because Swan Hills is also based on oil and gas industry and as a result benefits from having the ASWTF. Further, Monica seems to individualize a societal concern of hazardous waste production. As sentiments of many of the residents in Swan Hills, Monica feels responsible for helping to solve the problem with hazardous waste.

5.5 Community Stigmatized by Outsiders

Generally, the residents of Swan Hills do not trust any information from outside media. These residents feel the media has created the stigma attached to the ASWTF and Swan Hills.

negative media press (101 3 3)

Despite negative reports from the media, the community is not concerned with the hazardous waste plant. Many feel that the media has made the plant a high profile story by "blowing it out of proportion" and "sensationalizing it" (see table 5.4). Further, many feel that reports are only one sided because they only report the negatives. As a result, many do not view the media as a credible source and do not believe what the media has to say. Anne for example, feels newspapers, such as the Edmonton Journal and Calgary Herald, only report the partial truth (negative reports),

> INT: How about the plant, I mean there's some people that think they are creating or contaminating the environment and the wildlife?
> ANNE: They are not, they are not. They are, the media is very quick to broadcast any little thing that will sell their papers. And what they had broadcasted in the past it wasn't all the truth. It was part, just parts of the truth. Just enough to get everybody's attention and we found out since that since the blood levels were taken of people in town, the PCBs were less here than they are with people in Edmonton. That wasn't broadcast, that wasn't put in the papers. But I'm totally in agreement with the plant, I have no fear of it whatsoever.

Yet, the residents generally trust what the local Swan Hills paper has to say. Crystal for example, comments how only the local paper published the results from the tests conducted by Alberta Health which showed low levels of PCBs in the human population,

> INT: Do you think it makes a difference of who makes those tests?
> CRYSTAL: It does. The Indian bands screamed loud enough to Health Canada to have the tests done. And this is the results from it. They told them right out, "the results may be what you're looking for but if they are not what you are looking for, they will be published as well." Did that make the Edmonton Journal the front page? No. It made the front page of our local paper. The tests came

back and they we're as clean as a whistle. But the Edmonton Journal didn't put it on their news. CFRN didn't run it on the news, and CBS didn't run it on the news. We were just thankful that the press didn't go wild when we had a forest fire headed right toward that poor plant.

Table 5.4:
Resident's View of Media Reporting on ASWTF

Theme	Number of times topic was mentioned	Number of people who mentioned the topic (% of the 27)
stigma caused by media	73	22(81)
political	20	12(44)
blown out of proportion	9	6(22)
sensationalized	7	4(15)
only negative report	5	4(15)
pushed by media	2	2(7)
maximum for entire data set	86	23(85)

As Nigel comments, many also feel that the negative reports have also been politically driven,

> INT: Why do you think the negative part of Swan Hills has been portrayed like that?
> NIGEL: The news media. I suspect that if the plant had been from the private sector, independent dollars, you would not see the furore over it. But because government dollars are involved, as one well respected scientist said to me one day, you have an awful lot of politics and very little science. And I've lived off that statement and that's the way it is.... You've got a lot of politics in it, and it's fairly common knowledge that Edmonton as a city and the Edmonton Journal are liberal oriented, government-wise. They want to feed on it, pound the government, just sock them because of the money they spend up here - millions of dollars. We sent a letter, the Town sent a letter to the liberal opposition critic and said "Why don't you take some of this fact instead of the opinion statements and use that information because you're putting up a smokescreen here." They letter we got back simply stated that "We're the official opposition that's our job". And so now it's a lot of politics in it.

Nigel believes the negative publicity is tacitly used to tarnish the government's reputation for spending millions of dollars of tax payers' money building the ASWTF. Some also feel the negative publicity is also the result of opposition from local Native groups.

However, residents such as Anne, feel money was the main reason local Native groups opposed the ASWTF,

> INT: How do you think other people in surrounding areas think of Swan Hills or view Swan Hills?
> ANNE: I think they're quite comfortable with it. There are a few to the north of us who are not along Lesser Slave Lake. But it seems once we paid money we don't hear anything anymore (laughing). That seemed to quieten everything down. I think they wanted more money than anything else.

stigma caused by media (101 3 5)

The residents generally feel that a negative consequence of hosting the ASWTF is the stigma attached to the waste facility. For example, Aaron realizes that the waste facility is something no one else wanted,

> INT: What do you think of the way the waste facility was sited? Do you think that it was fair?
> AARON: I think it's something that no one wanted to touch and Alberta decided to do something about it, and the government probably saw some economic benefit as well, however, they didn't get anything out of it. I don't think the industry has probably matured yet either, there's a lot of growth yet in that plant.

According to the residents, the reason others outside the community do not want the waste facility is because of the negative views associated with hazardous waste facilities. For example, Annette remarks that often "horror stories" of mutation are conjured up in the minds of people outside the community, when they think of the waste facility,

> INT: You mentioned that other people were glad that it's here but not in their backyard. What did you mean by that?
> ANNETTE: Well they realize that there is a need to get rid of the PCBs and all of the other dangerous stuff. But because of the media hype and all these shows where you see people fall into something and they come out all fried or dead, and their skin falling off, it makes an impact. And they have these visions and hear the horror stories and of course they imagine this..... And so they have this view about the waste facility.

Consequently, many of the residents feel that Swan Hills is viewed negatively. For example, Monica asserts that Swan Hills is automatically associated with PCBs,

> INT: How do you think others in surrounding areas view Swan Hills?
> MONICA: Oh it depends on who your talking to. The media has just blackballed us so bad it isn't even funny. I mean the media really did a number on us as the town because everything was "Swan Hills". They didn't say the Special Waste Plant or anything else, it was Swan Hills, Swan Hills....It just really made it bad, every place we went people went "Oh you're from Swan Hills? Like why do you stay up there?".... I got a phone call one day from someone in Barrhead. He claims that there were PCBs running down the ditch and they were coming from Swan Hills and it's going to kill all his cattle. PCBs running down the ditch? Like give me break. So anyway I phoned one of the fellows from the plant and I said, I don't know what the hell this guy's talking about but I said I'm going out to take a look, he said "I'll go out too. It turns out that it was water coming from one of the power stations or whatever the heck you call them, a little wee stream of water running down the ditch.

Monica feels the media is reason that Swan Hills is perceived so negatively. According to the residents, the waste facility has created negative publicity for the town of Swan Hills. However, the residents also feel the negative publicity has also promoted Swan Hills. For example, Paul describes the media coverage as both good and bad,

> INT: Do you think that has affected Swan Hills as a town?
> PAUL: Definitely. For good and bad. For what it's brought a lot of attention to the town and people when they're travelling will say "Hey let's swing by Swan Hills" whereas normally before none would know where Swan Hills is. So it's been good for the town in one respect but a lot of our media coverage hasn't been positive. So it's bad in that respect.

Likewise, Nigel comments that one of the benefits of hosting the waste facility is the notoriety,

> INT: What do you think some of the benefits are for the community for having that facility here?
> NIGEL: Notoriety, economic development and the spin-offs. I speak of notoriety even though there are occasions where you get negative press. Do you know where Manyberries is or Iron Springs or Welling?
> INT: No.
> NIGEL: Go to these places and ask them if they know about Swan Hills, these are municipalities that would give their eyeteeth to have the notoriety that we have. Even though they see it, as "we're getting beat to a pulp", these other communities are saying give us the opportunity....

Anne also feels that the negative publicity has caused the town of Swan Hills to be unfairly associated with all that is negative about hazardous waste and the hazardous waste facility,

> INT: How do you think other people in surrounding areas view Swan Hills?
> ANNE: I think they're quite comfortable with it. However, there are a few to the north of us who are not. But once we paid some money, it seemed to quiet everything down (laughing). I think they wanted money than anything else. But the papers always, when they talk of the waste treatment centre they say Swan Hills and it's the town. However, there are 2 separate things here. The plant is one industry in the town of Swan Hills but in the paper they never say the Bovar plant, they call us Swan Hills. It's always in great big capital letters. I have a problem with that.

Many of the residents are concerned about the stigma of being contaminated. For example, Duane comments on how people in surrounding communities believe Swan Hills residents will mutate,

> INT: How do you think other people in surrounding communities view Swan Hills?
> DUANE: I think they're slowly coming around. I think like Barrhead and Whitecourt are kind of upset and have that same mindset that they don't want that stuff in their backyard and anybody that works here is going to come out with 3 eyes and 3 legs and all that kind of thing.....

Similarly, Jenny comments on how some people think that Swan Hills is contaminating the entire world,

> INT: How about the plant? What do you think others think of the plant?
> JENNY: There are some people who actually get quite upset about it. However, there are some people who love really close who don't seem to really mind. I know of an incident where my girlfriend was telling me they went to the Rolling Stone concert as they were coming out, they were talking to this fella from Australia. When they told him where they were from. He literally just about got violent with them and told them that we were killing his environment and his breathing air and everything. Claiming that it was our fault..... Why would this plant pollute the whole world. I don't understand their way of thinking. But you do come across people like that. They get really upset about it, and then I just tell them to get educated.

The residents credit the negative views to the media and politics, especially the Liberal government. A number of residents expressed the sentiment that the people outside the community are creating problems when there are none. In particular, some of the residents feel that part of the problem is the result of opposition and appeal from the surrounding aboriginal groups. For example, David comments that the negative views and controversy created by the Natives has produced animosity between local aboriginal groups and Swan Hills residents. As a result, David expresses that it will take some time before things turn back to normal,

> INT: What's your opinion on some of the negative publicity?
> DAVID: Well negative publicity comes mainly from outside the community and people that are not well informed and a lot of it is political. The Alberta Liberal party has been against it from the beginning and they say that the government of Alberta wasted a lot of taxpayers dollars on that plant..... I would say most of the adverse publicity has been political in nature..... There is a lot of resentment in the community towards the Natives as well. That resentment built because there has been a lot of misrepresentation in the news articles by various people, native people or those representing them. We know that those statements are not true and to see them published causes a lot of frustration and resentment..... And to see that this comes out in the media and television and radio and printed media, the distortions and misrepresentation and even out and out lies, from outside the community made it even worse. That's going to take a while before it goes away. If these sources, or these complaints came from within the community or close it would be one thing but when they come from 70 to 120 km away that's another. Some of the scientists also has negative attitudes towards the plant. They are mainly from Edmonton and points beyond Edmonton.

Similarly, Helen feels the media has created the negative views of Swan Hills and she feels the information from the media has been biased and incorrect,

> INT: How do you feel about the information from other newspapers such as the Edmonton journal?
> HELEN: The Edmonton Journal? How do I feel about the Edmonton Journal and their coverage on the waste plant (laughing), don't ask me that one!! I don't think they've been objective, I don't think they get their information correctly.... As soon as they hear Swan Hills the Journal seems to take that aspect "Oh Swan Hills is just bad, bad, bad let's just give them everything negative we can get." And

> that's all we ever get from the Journal. I don't like the coverage that we've been getting, it's not right. It has been, I think it's been incorrect.

Consequently, many of the residents disregard the information from outside sources. For example, Duane believes that the Alberta government should not have issued the health advisory. Although, he admits the PCB levels has increased, Duane indicates that the increase is small,

> INT: Going back to the couple of incidents. What do you think about the health advisory?
> DUANE: I think the government jumped the gun. You know like they don't seem to realize that there is a hundred people that work there everyday and we get tested, our blood gets tested every year and sometimes every 6 months and to me if they ever just come up and check all the blood results from us they'd have seen that there was no problem right. I mean sure maybe our PCB levels are up a little bit but what's 5 parts per billion, like it's nothing (laughing). Like to me the government just jumped the gun..... I think it's a good thing that they checked into it to make sure there were no problems but what I don't like the fact that they never did come back and say "yeah we've done all these checks on all these animals in the area and found them to be edible." I guess the government was just covering their butts. They don't want to get lawsuits from people eating wildgame near Swan Hills and getting sued I suppose. But I mean I've been there like 9 years and throughout these 2 incidents I've been through them and like my blood still gets checked every year and I'm no higher than I was when I started really. When I first started they used to check out your blood in parts per million now it's part per billion. I mean I forget what it was when I first started, maybe 3 parts per million and now the last one I was 9 parts per billion, like those 2 numbers don't even compare (laughing).

5.6 Reasons for minimizing risk

Although the residents admit the special waste treatment facility may be a risk, they seem to justify or rationalize that the plant is not a major risk (Table 5.5).

no immediate (visible) impacts (101 3 2)

One reason the residents believe that the hazardous waste facility is not a risk because there have been no immediate (visible) impacts. For example Paul believes if the plant was a risk, the effects would have shown up in his children,

INT: How about environmental concerns?
PAUL: Environmentally? No I have no concerns. As I said I've been in the business a long time, I've had 3 beautiful children and nothing wrong with them. My oldest is 10 years old and he's an honours student, daughters going the same way and this one is smart as a whip too. And I've been involved like I said longer than the 12 years I've been here. So I've been involved with chemicals pesticides, which can be really nasty for a long time and as long as you're diligent and wear your personal and respiratory protective equipment you're okay. From a town perspective, no.

Table 5.5:
Reasons for Minimizing Risk

Theme	Number of times topic was mentioned	Number of people who mentioned the topic (% of the 27)
worse stuff than PCBs	48	17(63)
low quantities of PCB emissions	37	18(67)
worse places than Swan Hills	26	15(56)
new technology = accident inevitable	24	10(37)
physical properties	22	16(59)
no immediate impact	22	12(44)
maximum for entire data set	86	23(85)

Paul feels that the waste facility is not a risk because there is no immediate visible impacts. Interestingly, Paul does not seem concerned about exposing his children to the potential risks from the ASWTF. Others, such as Glenda, point out that there are not higher rates of incidence of such things as cancer, asthma or birth defects compared to other places,

INT: What do you think about the 2 incidences that occurred in the last couple of years now?
GLENDA: Well I have brothers that work at Dow Chemical, I would say that what happened out here in the last two years is extremely minor to things that have happened to thing that have happened at Dow Chemicals. In talking to the people in the oil patch and stuff and they talk about their oil spills and this and that and the other thing and you think, there's risks involved in every institution, every environment that you work in. They're minor to me, maybe I've just got blinders on I don't know.

> INT: Why do you think they were minor? What makes you certain that they were not impacting?
> GLENDA: Impacting me?
> INT: Yeah.
> GLENDA: I've been here for this long and I still feel really healthy and our children's illnesses, I mean my kids are never sick, that hasn't increased at all since we've moved up here so I just don't think that there's, I don't know, any problem with it. And there's not a lot of people around town, like we don't have a high incidence of cancer or asthma, I work in the health care field so I see it on a regular basis. And when I look at like the asthma's and the breathing problems and things like that that we had in Medicine Hat compared to up here. There's not a lot of birth defects, like they're not getting all that and these are people too that have lived here for quite a while so.

However, Glenda also seems to have some latent concerns by her comment "maybe I've just got blinders on." As for now, though, she has few concerns primarily because there have been no negative impacts on her or her family. Residents, such as Glenda, seem to assess the risks from the ASWTF by contrasting immediate (visible) impacts versus long term impacts.

low quantities of PCB emissions (101 3 3)

The residents also feel the plant is safe because the emissions from the plant are so small, especially when compared to the oil and gas industry. Interestingly, these residents seem to assess the risks from the ASWTF by comparing Swan Hills with other high risk places such as Edmonton's refinery row. However, there are no mentions of rural communities such as Barhead and Slave Lake. Further, the residents also appeal to the test results which have shown that the levels of PCBs are small and has had minimal impacts. David for example comments that the PCBs found in the animals near the plant is just barely over the Health Canada guidelines,

> INT: How do you think things have changed since you've been here?
> DAVID: ....The town itself is pretty well status quo, there's been a new community centre built and renovations to the arena you know there's been some

> changes there. There have been some incidents that happened in the area, a couple of incidents with the waste plant that have really affected the community.
> INT: In what way?
> DAVID: Well, it seems like the community has to defend itself now you know. Outside political forces, mainly from the Liberal Party of Alberta, have said "Well we don't support the special waste plant" have caused us, us being the people in the town of Swan Hills who generally support the waste plant, to defend ourselves..... I support the special waste plant, what it's doing and how it's doing it. They had 2 incidents out there that were very most unfortunate, however we really didn't suffer any permanent damage to the environment and I think the environmental excursions, or the excursions that affected the environment with the October '96 incident, are almost gone and continued testing is being done. There was some PCB, dioxin and furan releases in that incident and it affected wildlife in the close proximity to the plant. However, testing done last fall on animals around the plant last fall indicates that that it's disappearing. Probably in another year or 2 it'll be gone altogether. The readings from those animals collected, 2 animals had fairly high readings but barely just over Health Canada's guidelines for PCBs, dioxins and furans in beef were found in a deer and a moose. Those numbers while they were over the minimum allowed for consumption they were not well over, they were just over. There were smaller readings in other animals, considerably smaller, well within the guidelines.....

As a result, David feels the community is not at a risk. This excerpt reveals an attitude of "us" vs. "them" (community vs. outsiders). For example, David comments "the community has to defend itself from outside forces." This attitude reveals the residents' strong commitment to the community, which results in trust in local community members (including Bovar) and leaders, and skepticism of outside sources (e.g. the media). This further highlights the issue of stigma in Swan Hills (see section 5.5)

Likewise, even though Clarence thinks the waste facility has a potential to be a risk, he does not consider the waste facility as a major risk because the emissions are so minute,

> INT: So you don't think that facility is a major risk?
> CLARENCE: No I don't. I think that it has potential to be a risk, but from what I understand and from what I've seen and from what I've read and from the people that work there, I think it's a well maintained facility. I think they spent a lot of time and effort and money maintaining it and making sure that they check out every avenue to make sure that nothing really does happen you know. And, I

> mean I know if there were a major explosion there'd probably be a lot of PCBs and stuff floating in the air that we certainly don't want. Certainly that's a risk that we have to consider I suppose but I think for the amount of pollutants that have gone into the air, if everyone's being honest and correct about it, it's minute even compared to what a sour well can do when it blows and so on. And no one seems to whine about that. And that sour well isn't there to look after all that other garbage that's in, that's being created it's just to make money you know and that's all there is to it. Where this facility is built to try to eliminate a lot of that stuff. There's bound to be the odd little accident, there's no question and hopefully it's never going to be a big one.

new technology = accidents inevitable (101 3 4)

Some of the residents minimize the risks about the plant by indicating that plant and technology is still relatively new, and as a result, bound to have some accidents. Further, the residents have the opinion that the accidents will only improve or make the plant better. Dina, an employee at Bovar, for example, admits that although the plant has impacted the environment, she feels that Bovar has learned from the incidents. She believes there is always a "learning curve" with new industries such as the ASWTF,

> INT: How much of an impact do you think Bovar has on the surrounding environment?
> DINA: I'd like to think we don't have any, but you know it has been, we have had some. I think part of that is that the industry is new, and you're kind of learning as you go. And we have had an impact, there has been PCBs put into the environment because of the plant. But I think we have learned too. How it happened and what not to do. It's amazing how little the measurements are. They are so minute to begin with, you can show a reading and it's really not a concern with the levels, the allowable levels for their legal limits, you can go and buy a chicken in the grocery story and it will have a higher level than the voles that we're catching at the plant. So you know, it's prevalent everywhere. And it would be nice to say that we never, ever had any escape but it has happened but I think we know better now how to prevent that too.
> INT: Does that concern you at all that it has released PCBs?
> DINA: Oh yes, like I'd like to think that we always can do the job perfectly and never have anything happen, it's proven wrong. That's all you can do is, keep learning. It's a learning curve, it's a new industry and as you go you get better.
> INT: What assures your safety, how do you feel safe about it?
> DINA: You are going back, like a lot of it's new. You put the carbon in, that was discovered afterwards that equipment wasn't meant to deal with what it was put into place to do. But nobody realized that, or knew that, or was aware of it until

> afterwards. You know, like it's not really an oversight, nobody has tried to do that before and now they know, you can't do that process you need these checks in place to do that process. And we still haven't got to where we can do what we need to do. You know it's going to take more time. It's like any industry, all industry is constantly coming up with new ways, more efficient ways to do things. Waste disposal is no different. There's always going to be something else that can be improved on.

5.7 Benefits

According to the residents, Swan Hills has benefited significantly with the addition of the ASWTF. Out of the twenty seven respondents, twenty three people mention that the waste facility is an economic benefit (table 5.6). This is corroborated in Table 3.1 which reveals an extraordinary high median income in Swan Hills compared to the province. The residents also feel that Bovar is a benefit by being a good corporate citizen.

economic diversification (101 6 3) and benefits of out of province waste (101 6 4)

Economic diversification is the most important benefit that the townspeople see from the special waste facility. These interviewed residents comment that not only has the hazardous waste facility provided almost 200 jobs in the community, but it has also brought stability and growth to the community. David for example, expresses his views on the benefits of economic diversification,

> INT: What do you think some of the benefits of having the plant are?
> DAVID: Well it certainly benefits the town. It diversifies the industry base rather than being a one industry town it's now mainly a 2 industry town. I would say 25% of the population work at the plant and most of the other work in the oil and gas industry except for the service industry and town government, so it's basically a 2 main industry town now. The payroll out there is probably 180, 190 people and it certainly benefits the town that way.

Table 5.6:
Benefits

Theme	Number of times topic was mentioned	Number of people who mentioned the topic (% of the 27)
economic diversification	36	23(85)
Bovar is a corporate citizen	21	15(56)
clean/safe environment	14	10(37)
benefits of out of province waste	10	9(33)
cost weighed against benefits	10	5(19)
maximum for entire data set	86	23(85)

Likewise, Alan attributes the waste facility for improving the towns economy,

> INT: What do you think some of the benefits are from having the plant in town?
> ALAN: Well, it's improved the economy of the town. It's given a lot of deadbeats like myself a fairly good position within the company (laughing). I don't know, for anything that starts in a small town is just a big bonus economically.

Not only does the plant provide economic benefits, but also community stability. For example, Dagmar comments that if the plant were to eventually close, it would hurt the town,

> INT: So you think it will disrupt the stability of the community?
> DAGMAR: I think so. It will drop our level of people living in town again and it's hard enough struggling with what we've got and I think it will really come down, I'd hate to see it close up.

Likewise, Dina has similar sentiments. She is concerned that the stability of the community would be impacted if the oil industry or the waste facility were forced to close,

> INT: In a kind of a related question, what would some of your future concerns be?
> DINA: Just the stability of the community. With the community being so reliant on the waste plant and the oil companies, something could happen. The oil prices could go down, causing the oil companies to pull out. And if the waste plant shuts down or whatever, you have to start looking for another job.

Miriam concurs and explains that this is one of the main reasons she believes that many will not speak against the facility,

> INT: Do you think it would be a big loss to this community if it did shut down?
> MIRIAM: Oh yeah. And I think that's another thing, a lot of people in power in the community of course aren't going to say a lot of negative things towards it. That's the bread and butter of this community. You know now that most of us, or Pengrowth employees have chosen to live in Whitecourt as opposed to Swan Hills, the majority of the employees here are out at that plant. And if that goes it would be a ghost town here. And they did talk about it when all these issues and fines and things were coming up last year. Wow, that was a lottery, there'd be nothing to stay here for.
> MIRIAM: But I'm not going out after Bovar. I mean there are so many people that work out there. I like what they do, they support the town so well. They put on so many things for the kids and they put a lot of money into this town and into the community.
> INT: Do you think that makes a huge difference?
> MIRIAM: It does with the people. It sure does. They're very wise to do that. Because it makes them more of a part of the community. I'm sure they're doing a good job out there and everything. Like I said it would just be nice to find something else to do with the stuff.

According to Miriam's remark, there seems to be some underlying social pressures in Swan Hills to be unconcerned (at least publicly) about the ASWTF. This idea is also expressed from Crystal (see quotation in section 5.2). This seems to arise largely due to the fact that the waste facility provides economic benefits and stability.

Further, a number of the residents mentioned they were not perturbed with either the expansion of the waste facility or the approval of having out of province waste shipping to the ASWTF. If fact many acknowledged the benefits of receiving out of province. For example, Dina comments that the importation of waste guarantees her a job and the viability of the plant,

> INT: How do you feel about the Swan Hills receiving waste from out of province?
> DINA: That's one of the thing that guarantees us a job..... Why build another one in Saskatchewan? Spend all these millions of dollars to build another plant to destroy the waste in Saskatchewan, PCB waste is limited, you know there is a

> limited supply of that..... But it's a specialized industry, you have to have a wide market to support that. We're not in production, we're in destruction, so it's not like we can keep producing what we need. We need to pull the market to us. And basically you need a wide market to keep in business for a long time.

Bovar is a corporate citizen (101 6 1)

Another reason for the acceptance of the hazardous waste facility is because the residents feel that Bovar cares about the community. For example, Anne describes that Bovar is not trying to influence the community with economic incentives, but rather she feels that they are a good corporate citizen,

> INT: You mentioned they get rid of the waste so obviously it's cleaning the environment, so I guess that would be one benefit, is there any other benefits that you can think of?
> ANNE: For the town economically definitely it's a benefit too. I mean it means people live and breath and spend money like the rest of us for the town it's been good. Especially during an oil, you know, a downsizing in the oil industry. And they're good corporate citizens so their people are involved and they support community things, much like any other company. I think that's why Swan Hills is successful we've had the benefit of having large companies in town over the years and we have a lot of things here that we wouldn't have had without them. There's always some money being given and yeah, but I don't think they're bribing us or anything like that but they're just good corporate citizens.

Likewise, Dagmar feels that Bovar is a good corporate citizen because they support the community through a lot of donations,

> INT: How do you think Bovar has contributed to the community?
> DAGMAR: They've done really good. They have a scholarship program, they get very involved in the community. They've given a lot of monies like to ball events and events that we have in the community. They're involved in our Keano Days and they're always giving out donations, you can always count on Bovar for a donation of anything, your saddle club, your skidoo club, all your clubs around here always get a donation from them. And they don't go around, I give them a donation, I mean they're not like that, just whatever you need. If we can spare this much, you know they never turn anybody down, and I think that says a lot for the community when you have an impact like that.

However, the residents do not feel that Bovar is a good corporate citizen just because it contributes to the community with corporate donations, but because they feel

that Bovar cares for and is committed to the community. As a result, they feel that Bovar is honest and trust worthy.

5.8 Latent Concerns: reasons for concern

Although most of the residents support the ASWTF, there are some who have some concerns with the plant. Various types of uncertainty comprise some of the main reasons why some of the residents have some reservations about the waste facility. The biggest uncertainty they have is in terms of latent concerns (table 5.7). Uncertainty, created from outside sources as well as inside sources (within the community), is also a source of concern.

Table 5.7:
Latent Concerns

Theme	Number of times topic was mentioned	Number of people who mentioned the topic (% of the 27)
latent concerns	37	8(30)
unknown-uncertainty to health, impact, technology	24	5(19)
controversy	15	6(22)
conflicting info	14	1(4)
distrust	6	3(11)
maximum for entire data set	86	23(85)

latent concerns (102 6)

Those residents who identified Bovar as a risk were largely concerned about the potential future effects. Although there are no immediate negative impacts, they fear that they will show up sometime in the future. Jenny for instance, comments that perhaps in 20 years she will find out that the plant has been a risk, however she copes by "being stubborn,"

INT: Okay, risks of what? What kind of risks does the plant pose on you?
JENNY: Well, our health. Like maybe they don't know maybe as much as they think they know. And so of course they're not telling us and we are you know eating and drinking and carrying on and maybe we won't see anything until our kids have kids you know. But, I still don't believe that.
INT: Why is that?
JENNY: I don't know if I'm just being stubborn, because people have put our town down for so long I'm being very stubborn about it, I just refuse to listen to anything that's said about it. I find out for myself and you know.

Jenny's remark reveals the important influence of social and political context on her views of risk. As she states, "I just refuse to listen to anything that's said about it." In other words, even though others (e.g. media, environmentalists) argue that the plant is a risk, she refuses to listen them. In contrast, residents such as Duane, believe the waste facility is not a risk because many of the concerns (e.g. mutation, contamination) have not yet materialized (see section 5.6 and Duane's quotation in section 5.5).

unknown-uncertainty to health, impact, and technology (102 2)

Some of the residents seem to be concerned because of the unknown and uncertainty to their health. Out of the twenty seven interviewed, Laura, Miriam, Jenny, and Richard seemed to the ones who were most concerned about the waste facility. These residents are uncertain about the health impacts to themselves and their children. Laura, for example is concerned about the potential impact for her to have children,

INT: Do you think your level of concern has decreased or increased in the last little while?
LAURA: Since I've been here?
INT: Yeah.
LAURA: Increased. Cause when I first came up here, I came with an open mind. I really didn't read a lot, and I didn't know a lot about Bovar before I moved up here. However, since I've worked here, and knowing just how things are done, I'm more concerned than I was before.
INT: What makes you concerned?
LAURA: I might want to reproduce someday. There's only 2 people, that I know of, that have had children after working here. And neither one of them work with the waste. One was in the office and one was in the warehouse. So I don't know.

Similarly, Miriam wonders if there are side effects from the plant on her children (see Miriam's quotation in section 4.2.2). In contrast, Paul does not seem concerned about his children being exposed to the risks from the ASWTF, and he seems to suggest he will leave if his children show any negative effects from the plant (see Paul's quotation in section 5.6). Miriam seems to be concerned because of the uncertainty of the technology involved. She wonders how the technology can be sophisticated if there nothing to gauge the technology against,

> INT: But I mean they say it's supposed to be one of the most sophisticated technology.
> MIRIAM: But what is that balanced against? What are they using to scale that?
> INT: I don't know.
> MIRIAM: But if you were, what do you have to gauge that against? It's one of the few in the country. You don't' have to be that great if there isn't very many of them. You don't have to be that sophisticated if there isn't anything to gauge it against.

As well, Richard seems to be concerned about the waste facility after seeing three locals die from cancer. However, he is not certain if the cancer was caused from the hazardous waste facility or from working in the oil industry,

> RICHARD: If I saw a bunch of data that had me concerned. I'd dearly love to see the rate of cancer, especially soft tissue, I guess any cancer even hard I guess leukemia, even hard tissue cancer would be more appropriate, I'd like to see our rate of cancer compared to the national average.
> INT: Do you ever hear of stories like that around here?
> RICHARD: Well, 3 people I knew, one died of liver cancer, my foreman Jack died stomach cancer, and the guy that lived behind me, he died of some form of lung cancer over 2 years ago. A town of 1800 people that worries me.
> INT: So you think that's from the plant?
> RICHARD: I personally think it's more from the oil field. You know when you got these rugged mechanics, changing oil in the cat and not wearing any gloves, and they are doing it year after year? But I don't know. I don't know why Jack died from cancer, I don't know.

controversy (102 1)

Uncertainty has also been created from all the controversy surrounding the waste facility, primarily from outside the community. Things such as the negative media coverage, legal action from the Natives, and the possibility of the plant being turned over to the government, created some concerns. For example, Miriam believes that there would not be such a controversy if it was not a risk,

> MIRIAM: Well, you know there wouldn't be as many articles published and as many documentaries done that say that that isn't so. If that was it then why all the controversy with the government? Why all the controversy about Bovar getting sued and all this kind of stuff, and politicians hiding files and all this kind of thing? Why have that? If it's true then great. Then everyone should be leaving them alone if it's such a high tech facility, and it's one of the best and nothing's going wrong out there. Why settle with the native government because they're saying there's PCBs in their animals. Then why settle with them? Why give them a couple million dollars or whatever? Why do that if you're so sure you're getting rid of 99.9% of it? That's my question to you.

Similarly, Kathy is concerned because of outside newspaper reports, but she is somewhat reassured because the local Swan Hills paper reports there are no risks from the plant,

> INT: What do you think about the waste treatment plant?
> KATHY: I don't know. I always hear all this stuff in the news, the newspaper that it's bad, but in the local paper they say everything's okay and so I don't know. I don't really know anything about it.

Clarence also dismisses some of the negative reports written by some environmentalists because of the lack of any visible signs (immediate impacts),

> INT: Do you have any concerns about the facility contaminating the wildlife or the environment or anything like that?
> CLARENCE: Yeah that always concerns me of course. If it has, if there's potential of it ever happening it could do something. I don't know, I've heard all sorts of garbage from the area, I mean of fish with 3 heads and so on (laughing) reported in the media and stuff. I mean really garbage stuff you know and it comes from talk show programs in Edmonton and I listen to some of these guys and in fact I don't anymore because my radio doesn't come in all that great but I used to even around the city and that. And you know, I just have to shake my head at it, and you don't know really who to trust because I do know there's been

some environmentalists that have written some pretty damning reports on it and I wish I knew how accurate they were and how much is exaggerated but I'll tell you, I'll be quite honest with you just to be on the safe side I don't go fishing around there you know. And I never did before and I don't do know since the spills and so on. I just think that if I can minimize my risk in that regard why not.

Others, such as Laura are concerned because of the controversy of the plant being turned over to the government,

INT: Has your views changed about the plant since the two incidents at the plant?
LAURA: I think my views have changed as I've grown to know who's in charge of the place you know. You know just heresy just things I hear about management and stuff and it kind of makes me wonder.
INT: Can you elaborate a little bit on that?
LAURA: I don't know I can't really go into it, it's just heresy. And things like giving it back to the government and shutting it down, that's been on the news the last couple days and stuff, I don't know.

conflicting information (102 3)

Miriam's concerns arises out of all the conflicting information and she comments that she does not know who to really trust,

INT: In terms of safety how would you describe this community?
MIRIAM: I think it's fairly safe, violence-wise or criminal-wise it's very safe. There's hardly anything that goes on here which is unusual and a lot of the RCMP members say the same thing we are so fortunate here. And they are really good here. Better detachment than I've ever seen anywhere else, they're really involved and they're out there constantly. As for a town on the whole I think when we went through the evacuations and how well they handled everything in that kind of environmental disaster everything went so well, they did a really good job that way. As far as Bovar goes it's always a concern for me. I think it's a big concern you don't know who to trust, media-wise or if you listen to press releases from them it differs from media, it differs from programs you watch on TV concerning what's going on out there. And it is a big issue.

Further, she has some friends who work at the plant that expressed some concerns,

MIRIAM: Well at first it was on my mind a lot more and it affected you know a lot of my thinking then it just kind of went into the background and didn't really uh, pose much emotional stress. I don't know I mean it's concerning especially when you listen to some of your friends that work out there and what they do say. They just say that there are a lot of contaminants out there that aren't handled up to par and that they're having trouble getting a lot of things washed off you know

> their work coveralls and stuff, and there are still levels of PCB or whatever on them. So I was really surprised when I heard that. So you wonder. But they say it's downwind and it's far enough away and whatnot. But what I say it's a great community if you could move that part away. I guess it's got to be somewhere but.

Despite her concerns about the waste facility, she still feels safe and reassured by the fact that others in the community feel safe,

> INT: Would you say in general that you feel safe about the plant?
> MIRIAM: I guess I feel somewhat safe about it. You know since we moved here there's been a lot of issues come forth. The government has said things and then retracted things and so you don't really know what really went on. But the community feels safe here, so you kind of go with everyone and just kind of live with it I guess.

5.9 Summary: A conceptual framework for understanding risk at Swan Hills

The main findings of the study are summarized within a conceptual framework (Figure 5.1) which describes how the residents in Swan Hills views risk related to the ASWTF. The diagram is largely inductively derived (from the interview transcripts) and descriptive, and it is primarily intended to be a heuristic device for understanding this case study. It describes why many of the residents do not consider the ASWTF as a major risk. Some of the concepts in the framework are partially informed by the literature on environmental risk so that concepts developed from this study can readily be compared to tones in literature.

Although most of the residents view the ASWTF (located in the background) as no or low risk, there are also some who do consider it a risk. Further, although these residents do consider the waste facility a risk, they do not always equate it with high concern, as a result the arrow from (potential) risk can also lead to low concern.

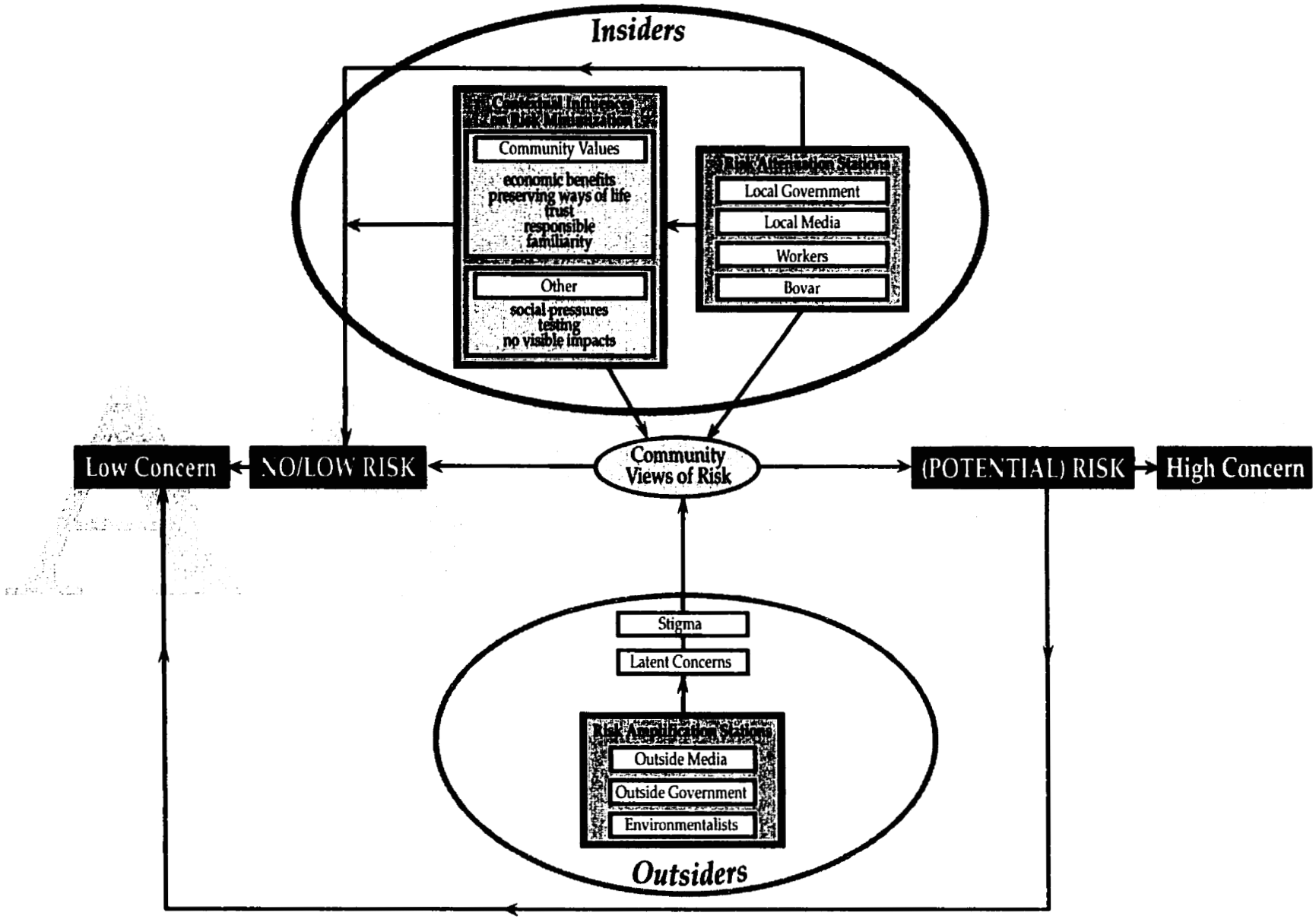


Figure: 5.1 Conceptual Framework for Understanding Risk Reguarding ASWTF.

Generally, sources within the community (upper middle box) do not regard the ASWTF as a major risk. This then filters into the community, and as a result the community does not view the waste facility as a risk. The boxes in the top left represent the contextual influences which shape views of no/low risk in the Swan Hills. Six main contextual influences can be identified for the reason the residents view the waste facility as no/low risk and low concern.

First, because a large proportion of the employees work and live in Swan Hills, many of the residents are friends with or know the employees. Some of the residents even have family members who work at the plant. As a result, these employees give the residents assurance (**security**) that the plant is not a risk. Further, trust in community leaders (e.g., the mayor) and community consensus (the plant is safe) also give assurance to many of the residents. For example, although Miriam has risk concerns about the ASWTF, she feels reassured by the fact that the mayor supports the plant and feels that it is safe.

Second, the residents employ a number of arguments to **minimize the risks** about the waste facility. One, the residents rationalize that there are far more "worse stuff" than the emissions being released from the waste facility. Two, they feel that because the toxic emissions from the waste facility are so low, there is no risk. This is corroborated by the tests from Bovar and the provincial and federal government which has also revealed low levels of PCBs, especially when compared to other places (e.g. Edmonton). The tests from the external sources also reassures them that there some degree of control over the waste facility. Especially with the formal monitoring by the government and the informal monitoring from the media. Three, the residents rationalize that no one in the

community or Bovar employees have show any negative effects from the plant. As a result, they seem to assess the risks from the lack of immediate visible impacts, as opposed to long term impacts. Four, some of the residents rationalize that the plant is new and as a result, accidents are inevitable.

Benefits from Bovar are also an important influence. Many of the residents recognize that economic benefits of having the waste facility in the community. Not only does Bovar diversify the local economy, but they also contribute a great deal to the local community by being corporate citizens. Further, the recognition that the waste facility provides economics benefits and stability or being employed by Bovar seems to create some underlying **social pressures** to be unconcerned (at least publicly) about the ASWTF. The waste facility provides community stability, which is a means of **preserving particular ways of life** (e.g., small town, family oriented, safe place to raise children, see section 4.1). Without the facility, many of the residents feel Swan Hills would become a "ghost town". As a result, many of the residents seem to attenuate the risks about the ASWTF.

The Residents views of waste and waste facilities are also an important influences on the residents' view of low risk. Swan Hills, being mainly an industrial town influences the way residents perceive the hazardous waste facility. Many of the residents view the waste facility like any other industry (e.g., oil and gas industry), and as a result, do not consider it as a major risk. Further, the residents also associate the waste facility with the destruction of waste. Whereas the residents consider burying or landfilling as a risk, they do not consider the waste facility as a risk because they incinerate or destroy hazardous waste. Further, they see the waste facility as a

"responsible" thing because Bovar is getting rid of hazardous waste. As a result, they view Bovar as doing a favor for the rest of the province (and even the country).

However, residents have various types of **latent concerns** about the ASWTF (e.g., unknown future impacts, controversy). These concerns are at least partially fuelled from outside sources (e.g., outside media, outside government, environmentalists). These sources create some uncertainty, causing some of the residents to question the risks regarding the ASWTF. However, the residents often dismiss the information from the outside sources because they are seem as sources that cannot be trusted. On the other hand, sources from within the community are seen as sources that can be trusted, reducing concerns about the ASWTF.

Although the residents do not view the waste facility as a major risk, there is a least one key impact on the community, its **stigmatizing** effect. Generally, the residents are concerned about the negative view (e.g., mutation, contamination) about Swan Hills and the automatic association of the plant with Swan Hills, in particular the stigma from the media. The residents argue that the stigma is mainly created from outside the community. As a result, the stigma in Swan Hills has more to do with the negative reports from such sources as the media than the waste facility itself.

The framework reveals the importance of community context. It reveals that contextual influences such as views of waste and waste facilities; benefits; trust; social pressures; preserving ways of life; local context, and latent concerns help shape the residents' views of risk in Swan Hills. The next chapter discusses how risk is socially constructed as a low risk in Swan Hills.

Chapter 6:

Discussion: Attenuation of Risk in Swan Hills

This chapter links the findings of this research conducted at Swan Hills with the literature on technological risk reviewed in Chapter two in order to broaden the understanding of the case study. While there are many parallels between the findings at Swan Hills and various approaches to studying risk, the focus is on the social amplification (attenuation) of risk, which is argued as most appropriate for understanding why the residents have few concerns about the ASWTF. Nonetheless, concepts from other approaches, such as benefits, cultural values, and trust are also discussed. While there is some empirical support for the social amplification framework in the literature (e.g., Machlis and Rosa, 1990 ; Renn, 1992; Renn et al., 1992; Burns, et al., 1993; Metz, 1996), previous studies tend to examine cases where risk has been amplified. This case study examines how the views of risk concerning the ASWTF have been attenuated (minimized). Within existing literature there has been a substantive amount of work on statistical comparative analysis of hazard events (e.g., Burns, 1990; Renn et al., 1992). However, these studies tend to focus on people who may or may not have experienced the environmental risk directly. This study provides an in-depth treatment of a specific community that has been exposed to a technological environmental risk. Furthermore, although there have been a few in-depth studies examining the amplification (attenuation) process (e.g. Kasperson 1992), they do not address why the risks are amplified or attenuated. This case study examines *why* the risks from the ASWTF are attenuated.

6.1 Social amplification (attenuation) of risk

The central theme in the social amplification of risk framework is that individual and social views of risk and risk behaviours are not only shaped by the risk or risk event, but also by the media, social groups, institutions, individuals, and culture, causing the risk to be either amplified (heightened) or attenuated (downplayed). As Kapserson (1992) notes,

> The experience of risk is therefore both an experience of physical harm and the result of culture and social processes by which individuals or groups acquire or create interpretations of hazards. These interpretations provide rules of how to select, order, and explain signals from the physical world. Additionally, each culture or social group selects certain risks (158).

Risk, then, is conceptualized partly as a social construct and partly as an objective threat from a hazard or event. The social amplification of risk framework, then, attempts to combine the technical assessment of risk (probability and magnitude of a negative consequence) and the social experience of risk.

The social amplification of risk framework was developed to help explain how seemingly "minor" risks gain prominence in the public eye in some instances, but not in others. According to Kasperson (1992), the amplification process begins with a risk event (such as an accident) or a report on an environmental or technological event, release, or exposure (see Figure 2.1). Individuals and groups then select specific characteristics of those events and interpret them according to their perceptions and mental schemes (Renn, 1992). These interpretations are then communicated with other individuals or groups, who act as *amplification (attenuation) stations*[16]. The amplification

---

[16] *Italicized* words refer to concepts from the literature on risk while **bolded** words refers to concepts developed from this case study. However, some of the concepts are both italicized and bold because some of the concepts developed from this study are similar to the concepts from the literature, but defined somewhat differently.

(or attenuation) differs depending on roles as individuals (e.g., as an employee of a large company) or their membership in social groups and public institutions (Kasperson, 1992). If messages are attractive or consistent with previous beliefs (or views) which are shared by the group, the signals are intensified (amplified), and the messages are ignored (attenuated) if the opposite is true (Renn et al., 1992). This process of receiving and processing risk-related information is well researched in the risk perception literature (Slovic 1987; Freudenburg, 1988). However, this is complicated because individuals must also adhere to the values and beliefs of cultural groups and larger social units, influencing the social processing of views on risk. As Covello and Johnson (1987) point out,

> Individuals in their roles as members or employees of social groups or institutions do not only follow their personal values and interpretive patterns; they also perceive risk information and construct the risk "problem" according to cultural biases and the rules of their organization or group (198).

Kasperson terms these larger social units as *social stations of amplification (attenuation)*. In turn, the information flow depicting the risk or risk event and the associated behavioral responses, and the social amplification (or attenuation) stations generate secondary effects, which may spread and ripple to distant locations or future generations. The remainder of this chapter to describe *why* the risks associated with ASWTF were attenuated uses the Social Amplification of risk framework.

6.2 Attenuation of risk in Swan Hills

The central argument in this thesis is that the risks pertaining to the ASWTF are attenuated (downplayed) through the interplay of psychological, social, institutional, and cultural processes. Since the construction of the ASWTF, there have been a number of key events which have had sufficient ingredients, according to the literature on risk, to

produce local controversy and high levels of concern (see Table 3.3). One key event is the expansion of the ASWTF. This was surrounded by the controversy over the increased potential for contamination from the added incinerators. Second, there have been two accidents at the site, a PCB leak in October, 1996, and an explosion in July, 1997. The PCB leak resulted in a health advisory against consuming large amounts of wildgame, while the explosion raised the airborne PCB levels nine times higher than the original level (Chase, 1997). Third, was the approval of the importation of out of province waste in 1995. Again, controversy surrounded the fact that it was the commitment to restrict imports that played a significant role in convincing Swan Hills residents to accept the waste facility in the first place (Rabe, 1994). Fourth, due to high cost of operation, the Alberta government was forced to sell the plant to a private company – Bovar Inc. Now a private company is responsible for the running of the waste facility rather than the government who was originally supposed to run it. Fifth, further controversy surrounded an appeal against Bovar from a local group of aboriginal people (Lesser Slave Lake Indian Regional Council) to the Alberta Environmental Appeal Board regarding the potential threat of contamination to wildgame (Thorne, 1997). This resulted in six environmental charges, three of which were dropped after Bovar announced that it would not contest three of the charges. Despite all these events, chapters four and five show that the community of Swan Hills seems to have very little concern about the hazardous waste facility, and community wide support for the waste facility is still evident. Similarly, Metz (1996) found little evidence of social and economic consequences after the Fernald plant (a high-level nuclear waste facility) in Ohio released between two hundred thousand and three million pounds of uranium into

the environment. During that time, the facility was also under intense scrutiny for a number risk events such as: mismanagement, worker carelessness, exposure of workers, hazardous waste contamination of the underground aquifer, and noncompliance with state safety and environmental regulations (Metz, 1996). Metz argues that local "pragmatic logic," based on local based practical knowledge, experience, and personal contact, was the reason concerns were attenuated. Pragmatic logic may also partially describe some of the views in Swan Hills.

When asked about community risk and safety issues, the ASWTF was rarely the first thing people mentioned, indicating the residents do not view the hazardous waste facility as posing a threat relative to everyday life concerns. The residents usually related safety and risk issues with crime and violence. This points out that, in Swan Hills, environmental safety is not as big an issue for them. This elaborates Drottz-Sjorberg's (1991) findings that people usually define risk by the perceived severity of risk from environmental hazards. The Swan Hills residents were rarely the first to broach the topic of ASWTF unless directly asked. For example, when asked to identify some risks in Swan Hills, one resident replied that he could not apply the term risk to Swan Hills because he believed that there were few risks to living in Swan Hills (see section 4.3, low concerns living in Swan Hills/low concerns with ASWTF). This further indicates that concerns about the ASWTF are in the background. Nevertheless the community is sensitized to the hazard. Even in light of all the media coverage surrounding the facility and the negative reports from some scientists, the residents have very little concerns regarding the waste facility. This is also corroborated from a number of in-depth field studies (see Kasperson, 1992). The studies revealed that heavy and sustained media

coverage of an event did not ensure the emergence of substantial local public concern or that significant amplification of the risk, through enlargement of secondary consequences, would occur. For example, even though there was extensive media coverage after a nuclear accident in Guinna, New York, the local residents expressed very little concern (Kasperson, 1992). Kasperson's social amplification (attenuation) of risk framework best explains how concerns were attenuated (minimized) in Swan Hills.

6.2.1 Event characteristics in Swan Hills

Kasperson asserts the social amplification (attenuation) process begins with a risk event (such as an accident) or a report on adverse effects from an environmental or technological hazard. However, Kasperson's framework considers only one event and considers the hazard characterization as a linear progression. In Swan Hills there are a number of risk events which can be identified (PCB leak, incinerator explosion, Alberta health advisory). It also seems reasonable in the case of Swan Hills, that the siting process for the ASWTF and the construction of the waste facility can also fall within the realm of "hazard events." Further, local community characteristics (e.g., local views of waste and waste facilities) are also an important influence on the residents views of risk regarding the ASWTF, perhaps more so than the event characteristics.

A number of *event characteristics* can also be identified, which seem to have influenced the risks to be attenuated in Swan Hills. First, the siting of the ASWTF was "voluntary", which was important to the acceptance of the risk. *Involuntariness* is an important concept in the risk literature (Slovic, 1987; Starr, 1969). For example, Slovic (1982, 1987) found in his study, hazards that were involuntary were perceived as a higher risk. In other words, risks that people voluntarily accepted (as opposed to risks that were

imposed on them) were perceived as "less risky." The fact that the siting process was voluntary, then, seemed to have influenced the residents' initial acceptance of the hazardous waste facility. The voluntary approach also helped to foster trust between the experts involved in the siting process and the residents. As a result, the residents trusted the expert assessment that Swan Hills was (and still is) an appropriate site for the ASWTF. Correspondingly, Metz (1996) observed a "*halo effect*" of positive attitudes exhibited by residents exposed to a nuclear weapons complex facilities due to several factors such as: the fact that communities volunteered for the facility to locate there, people's familiarity with the facility over time, and the fact that they had more information acquired through knowing people employed at the facility.

Familiarity with the hazard is also another key *event characteristic* which the residents focused on. The reason the residents regard the waste facility as a low risk, even in light of the two accidents and health advisory, is because of prior experience with similar material (e.g. PCBs). Krannich and Albercht (1995), found that prior experience with similar hazards (in this case, radioactive material) and activities (e.g., nuclear facilities) influenced peoples' perceptions of risk to a proposed nuclear hazardous waste facility (see also Stoffel et al., 1988). Similarly Rolf (1996) claims that geographic isolation, economic dependence, and familiarity with an industry seems to foster a positive attitude toward sitings of hazardous activity. In Swan Hills, it is the perceived familiarity with hazardous materials such as PCBs and the fact that the waste facility is viewed like any other industry in town, that influenced the attenuation of risk linked to the ASWTF. Similarly, a factor analysis by Slovic et al., (1982), reveals that *familiarity* is one of the characteristics which influences risk perception and risk acceptance.

However, Kaspersons' portrayal of the event only accounts for the characteristics of the hazard within hazard events, not the social and cultural contexts in which they occur. Although Kasperson does account for social and cultural influences (*interpretation and response, culture)*, it does not take into account the local context explicitly. The local geographic, economic, social, and political context are also important characteristics that will influence the selection of *event characteristics*.

There are number of other characteristics of the event and hazard which the residents focused on to attenuate the risks. First, the residents focused on the view that the PCB contaminants in the surrounding area were minimal (**low quantities**). These residents would appeal to the opinion that the contamination levels were either under or "just barely over the provincial guidelines." Second, they would indicate that, "there are **far worse places** than Swan Hills, and far **worse stuff**" than PCBs. Third, community residents claim that there have been no been no **immediate (negative) impact** on human health (e.g. no increase incidence of asthma, cancer, birth defects) (see Table 3.3 and section 5.5). The residents seem to use these arguments in order to minimize the risks about the ASWTF. Further, minimizing the risks about the ASWTF seems to be an important source of *security* (Beck, 1992). In other words, by minimizing the risks, the residents seem to maintain the belief that the waste facility is a low risk.

According to Kasperson, the *events portrayal* of an event can be supplied through either individuals or institutions. And the way the information (message) is interpreted depends on social and cultural biases. Generally, there are two sources of information depicting the risk or risk event surrounding the ASWTF. The media, usually focused on the "negative" impacts associated with the ASWTF, deeming the waste facility a risk

(e.g., Chase, 1997). According to the social amplification of risk framework, media coverage can play a crucial role in determining the impact of a hazardous event (Burns, et al, 1993). However, the residents at Swan Hills generally disregarded the information and scientific findings from the media, claiming that the media either "sensationalizes" or "blows it out of proportion." On the other hand, Bovar, Bovar employees, and community leaders, generally supported the ASWTF. Despite the two accidents, and the contaminants found in the local environment, they still considered the plant as safe. They would comment on how the contaminant levels were "low" or "minimal," and the tests revealed no significant impact on human health. Despite some of the contrary scientific evidence, the residents usually selected the information from Bovar, Bovar employees, and community leaders over the media (see section 6.3.3).

6.2.2 Information flow in Swan Hills

Kasperson asserts that individuals or groups collect and respond to information about risks, and act as attenuation stations through behavioral responses or communication. The interpretations differ with different roles and memberships in certain groups. In Swan Hills, the interpretation of information is influenced not only by the resident's role as both private citizen, and Bovar employee in many cases, but also through membership to various social groups, and public institutions.

The residents would often interpret the information on what others (social group) in the community would have to say. As Renn (1992) notes, "hazardous events remain largely irrelevant in the social context unless they are observed and communicated to others" (140). Interaction with other community members influenced the residents' views of risk. Generally, the risks about the ASWTF are attenuated because of the

general "**community consensus**" that the risks are low (see section 5.1, community consensus/know workers).

A number of other local *social attenuation stations* can also be identified: community leaders, local media, Bovar, and Bovar employees. The provincial and federal government, and media (e.g., Edmonton Journal, Calgary Herald), represent *social amplification stations*. However, the residents generally tend to ignore these external *amplification stations*, and heed the local social *attenuation stations*. Generally, local stations are seen as sources that can be trusted, while external sources are seen as sources that cannot be trusted (Kasperson, 1992; Kasperson et al., 1992; Renn, 1992; Beck, 1992). For example, the residents seem to trust the information from Bovar because the company is seen as a "corporate citizen" who can be trusted because they have proven that they care about the community. The residents' description of Bovar as a "corporate citizen" points out that Bovar is an integral part of the community. Trust is also bolstered by the fact that many of the workers at the waste facility also live in the community (Stoffel et al, 1988; Roberts, 1997). However, the outside media is seen as a source that cannot be trusted. Generally, the residents are skeptical about the information portrayed by the media because the residents feel that the media is not a credible source and they contend that much of the controversy surrounding the ASWTF is politically driven (see section 5.3, negative media press). As a result, the source of the social attenuation[17] station will influence how the information will be received. However, Kasperson makes no attempt to separate the different types of attenuation stations. In Swan Hills, the attenuation stations can be identified as coming from within the

[17] Throughout the remainder of the chapter, the term attenuation will be used instead of amplification, but it is still in reference to Kaspersons' amplification of risk framework.

community (e.g., Bovar, community leaders, Bovar employees), and from outside the community (e.g., media, government). Community leaders, especially the mayor, seem to be the most important source of attenuation in Swan Hills. For example, a number of residents mentioned that they get their assurance that the waste facility is not a risk because the mayor has very few concerns with it (see section 5.1, community consensus/know workers). Further, out of the nine community leaders interviewed, not one mentioned concerns with the plant, and only one leader identified that the waste facility was a minimal risk.

6.2.3 Interpretation and response

The social amplification of risk framework claims that risks are attenuated partially because of individual and social values or beliefs (e.g., role related considerations). In other words, these values and beliefs influence the way "signals" or the "information flow" is interpreted. For example, individual values (e.g., **economic benefits**) and institutional obligations (e.g., employee obligations to Bovar) are important for the way the information is received and interpreted. If information is consistent with previous beliefs and values (e.g., Swan Hills is a safe place, economic benefits are important) the signals are intensified (e.g., accident posses minimal risk), and information is ignored (attenuated) if the opposite is true (e.g., plant is a risk). Swan Hills residents generally regard Swan Hills as a "**safe place.**" Many of the residents have the opinion that it is the "**small town**" atmosphere that makes Swan Hills an ideal place to raise children. These residents also tout that unlike the big city, Swan Hills has low crime rates, low pollution, and clean air, making it a safe environment in which children may grow up. Further, the residents also indicate that there are far **worse places** than Swan

Hills. Even though there are some negative reports and information from the media and environmentalists, the residents tend to attenuate the risks about the ASWTF.

Shrader-Frechette (1991) argues that laypeople faced with risks on a daily basis may assess the risk based more on values than on scientific decision-making. While she refers mainly to risk *amplification*, values explain why the residents disregarded some of the scientific evidence (Chase, 1997), and some of the reports from the media that are contrary to popular local beliefs. For example, even though some studies revealed some increase of contaminants in the local environment (see table 3.3), the residents dismissed them as being "slightly" above the guidelines (**low quantities**). Yet, the residents seem to rely on the scientific tests conducted by Bovar and the government (provincial and federal) which revealed no significant impact on human health. The reason some of the scientific tests were heeded (e.g., Bovar, government health tests) and others ignored (e.g., media, health advisory) is because of individual and institutional values and beliefs. In other words, signals (e.g., negative reports) that were inconsistent or contradicted the residents' and institutional values and beliefs were ignored, while signals and information that supported them were heeded. This resonates with Renn's (1992) concepts of *social influence* and *value commitments*. Renn argues that social influence becomes an important resource for building trust, while value commitments become an important tool to build solidarity by persuading other actors that the commonly shared values, interests, and worldviews, are in accordance with theirs. This indicates that no amount of evidence can convince people if it is not from a trusted source who shares common meaning for the phenomena of interest (Baxter, 1997). This seems to be the reason why Swan Hills residents regarded sources inside the community (e.g., community members, Bovar,

Bovar employees) as trustworthy, while sources outside the community were not. Further, Renn (1992) argues that social influence and value commitments may be even more important when risk debates are actually symbolic of other interests or values. In Swan Hills, economic interests and protecting particular ways of life (e.g., community stability) seem to be important issues. Also, the negative media attention may be more related to political issues than safety concerns.

The interpretation of information is also influenced by membership in social groups (e.g., community of Swan Hills) and public institutions (e.g., local government, community leaders). It is the **social pressure** in Swan Hills to be unconcerned about the ASWTF, that seems to be an important influence in the attenuation of risk. For example, although one resident had some latent concerns about the future impacts from the ASWTF (see section 5.2, latent concerns), she dismissed them by "refusing to listen to anything that's said about [the plant]." Further, being a community leader also seems to be an influence in the way the information is interpreted (attenuated).

6.2.4 Ripple effects and type of impacts

According to Kasperson, the information flow and behavioral responses can *generate secondary effects* that extend beyond the people directly affected by the original hazard event or report (e.g., all the events related to the ASWTF). Usually, these secondary impacts are negative consequences, such as impacts on the local economy (e.g., liability and insurance costs), negative attitudes to technology, political and social pressures, social disorder (e.g. protesting, rioting, sabotage, or terrorism), and erosion of public trust towards social institutions (Kasperson, 1992). A negative secondary impact from the ASWTF is *stigma*. Edelstein (1988) claims that "hazardous" facilities are

inherently stigmatizing. Not only are they seen as threatening to a community directly, but also,

> by virtue of physical hazards, indirectly, by virtue of a "courtesy stigma" whereby the community also becomes stigmatized because of its direct association with the hazard (180).

In other words, hazardous waste facilities are stigmatizing because of the likelihood of them being a physical threat, and because the community becomes linked with the hazardous facility. Edelstein (1988) argues that *courtesy stigma* is inherently tied to community image. In Swan Hills, a number of residents expressed their concerns with the some of negative views people have about Swan Hills (e.g., "mutated", "glowing", "contaminated"). Further, some of the residents were also concerned about the automatic association of Swan Hills with the plant, because of the negative view people have about the waste plant. In Swan Hills, courtesy stigma is due to the nature of the facility (e.g., hazardous waste facility), the accidents at the plant, and because the plant was so highly publicized.

However, in Swan Hills, there is also a positive secondary impact. Due to the high level of media attention, the town of Swan Hills has become more visible. For example, many of the residents mentioned that "notoriety" has been one of the benefits of having the hazardous waste facility in Swan Hills. This has turned into an unexpected economic benefit in tourism (Rabe, 1994).

The social amplification of risk framework is useful for explaining *why* the risks associated with the ASWTF were attenuated. The local contextual influences (e.g., social, institutional) were important in the residents assessment of low risk. While some of the reasons of *why* the residents view the ASWTF as a low risk has already been

discussed, three key concepts will be revisited in order to gain a better understanding of how the residents constructed their views of risk: community views of waste and waste facilities, benefits, and trust.

6.3 Community Views of Waste and Waste facilities

An important local community view is that of being socially and environmentally **responsible** through such themes as "destruction of hazardous waste" or "**incineration** of hazardous waste" (see section 5.3, nature of waste and section 6.5). The risks are attenuated because the residents feel that the waste facility is destroying hazardous waste, not creating it. As a result, the residents view the waste facility as a "**better alternative**" than burying hazardous waste in landfills. There is a widespread recognition that hazardous waste is an inevitable component of modern society and as a result there is the recognition that a hazardous waste management facility is needed (Harris, 1993). Consequently, the residents have an attitude that "we have a problem to solve jointly" (Harris, 1993, 4). The residents feel that the waste facility is morally justified because it is helping to clean up all the "garbage" (such as PCBs) by destroying it. Accordingly, as one resident mentioned, they feel that they are doing a "favour for rest of the country" by eliminating the hazardous waste (social responsibility). This local community view, seems to be important influence in the attenuation of risk in Swan Hills. Economic benefits and individual/institutional values commitments also seem to be an important influence in the attenuation of risk.

6.4 Benefits and value commitments

In the social amplification of risk framework, Kasperson conceptualizes *institutional values* mainly in relation to employment. That is, an individuals' role as an

employee influences how a risk is interpreted. In Swan Hills, institutional commitment to Bovar, although important, does not seem to be the most important in the attenuation of risk. More important are the residents' desires for the survival and stability of the community, linked to a desire and value for economic diversification. Often, a common way for experts to frame risk decisions concerning environmental hazards is to *weigh the costs against the benefits* (see Kahneman and Tversky, 1979; Plous 1993). In Swan Hills, many acknowledged the **economic benefits** of having the ASWTF. Although the facility does not provide any direct revenues to the town because it is located outside the town boundaries (Rabe, 1994), it does provide economic benefits through employment and through corporate donations. During the siting of the facility during the early 1980s, Swan Hills was suffering a recession because of oil and gas price instability. Many observers agree that the waste facility has contributed substantially to a direct turn around of the local economy (Rabe, 1994). As a result, the enticements of economic benefits seem to have been an important influence in the acceptance of the waste during the siting processes. Further, economic benefits seems to be an important influence of the residents' assessment of low risk, even in light of the two accidents. Nevertheless, many of the residents do not consider the benefits to be interpreted as bribes (Rabe, 1994). Other studies (e.g., Bourke, 1994; Sherrill et al., 1998; Kasperson, 1992) have also revealed the important impact of benefits on the way risk is viewed. However, this contradicts one of the major findings from the prospect theory, which claim that people generally tend to be risk adverse because the *losses loom larger than gains* (Kahneman and Tversky, 1979). That is prospect theory might predict that individuals or community groups may more readily react against having noxious facilities (e.g., hazardous waste

facility) because the negative value of losses (e.g. potential contamination, health concerns) would be considered greater than the positive value of benefits (e.g., jobs, community facilities). However, in Swan Hills, this does not seem to be the case. The residents seem to suggest that that there are other benefits besides economic ones. Many of the residents generally believe that the risks would be far greater if the facility did not exists. It seems as though these residents believe that the benefits (e.g., economic, clean or safe environment, security) outweigh the costs (e.g., risks).

Not only is the ASWTF important for diversifying the local economy, but it also provides **community stability**. That is, a major benefit of the waste treatment facility is reduction in population transiency. Swan Hills primary industry, oil and gas, is characterized as being extremely transient with a majority of housing being rental property and mobile trailers (Rabe, 1994). However, the transient character of the town has improved (become less transient) in the last few years, partially due to the ASWTF. Throughout the period of 1981 to 1996, the percentage of owner-occupied dwellings jumped from 33% to 49%, contributing to the sense that Swan Hills is beginning to become a community of neighbourhoods instead of transient rental housing (Rabe, 1994). The region on the other hand, experienced a decrease in percentage of owner-occupied dwellings, from 70% to 67, while the province experienced a slight increase from 63% to 68%. As one of the residents mentioned, if it was not for Bovar, Swan Hills would become a "ghost town." Local residents contend that **economic diversification** has translated into the stabilization of the local economy and the community (e.g., less transient) (Rabe, 1994). In reference to the prospect theory, in addition to loss of income are losses of ways of life (e.g., loss of a safe place), that seem to be the risks that "loom

largest" in the minds of the Swan Hills residents. For example, the residents would usually equate risk and safety with "crime and violence", "big city", "traffic", and "safety of children." The residents seem to believe that the ASWTF provides security in preserving traditional ways of life (e.g., child rearing, rural community life). As a result, these residents seem willing to accept the risks from environmental harms to avoid environmental risks (e.g., big city, traffic, safety of children).

Another major benefit of having the waste facility is a clean environment (**social responsibility**). The residents view the waste facility as a solution for getting rid of hazardous waste, creating a clean and safe environment for their children and future generations, reflecting their ways of life: **clean, nature, safe place for family**. The residents are convinced that incineration is the only safe alternative for dealing with hazardous waste. As a result, the residents seem to suggest that it is their social "responsibility" to keep the environment safe. However, this seems to contradict the NIMBY response which has been evident in many waste siting situations (Krannich and Albercht, 1995; Edelstein, 1988). For them, the key difference between landfills and incineration is that landfills remains in the ground over "forever" while it decomposes while incineration destroys the hazardous waste, rendering it inert. As one resident mentioned, "it's being destroyed and stabilized." Baxter (1997) found similar results, where the residents had similar views of waste incineration. Baxter argues that it may have been contextual conditions, such as restricting residents' choices by eliminating alternatives like incineration in the siting process, that contributed to the lower levels of concern about incineration. The positive views of **incineration** in Swan Hills, however, are contrary to the view that the majority of Canadians have about waste incinerators (see

also Baxter, 1997). In one study (Slovic et al., 1993) over 60% of Canadians perceived the health risk from waste incinerators to be either moderate or high. As a result, the contextual influence on the perceived risk of incineration is important in Swan Hills, when compared to the rest of the country.

The concept of benefits is also related to Giddens' idea of structuration and Palm's (1990) treatment of the structure-agency debate. Giddens (1993) tries to strike a balance between meaning and social structure. His principle argument is that while human agency does determine human action and meaning, attention must also be paid to the possible influence (cause) of structure in society which may be both constraining and enabling (Dickie-Clark, 1986). Structures, then, are phenomena that are being produced by human agency and at the same time are being reproduced by the conditions of human agency (Baber, 1991). Not only is there an important relationship between employee and employer at Bovar but also between the community and Bovar. Organizational commitments to Bovar may have an important influence in the attenuation of risk. As a result, Bovar employees may attenuate the risks due to commitments to Bovar. For example, Kasperson (1992) found that after a nuclear accident in Ginna, New York, there were few concerns at the local level. The reduced concerns seemed to be the result of either being employed in the facility or the recognition that the facility was an important contributor to the local tax base. Similarly, community acceptance of the ASWTF seemed to be largely the result of the perceived economic benefits of hosting the waste facility. However, now the facility has become part of the community by contributing to the community stability and a sense of community. Community support and attenuation of risk is now related to the desire for continued stability and survival of the community.

Due to the many residents' need and desire of economic diversification and institutional obligations (e.g. to Bovar and community), the "structures" in Swan Hills seem to be a "constraining" force on their views of risk.

When considered in the context of everyday life at Swan Hills, benefits have much to do with social values as they do with economic issues. The ASWTF assured not only the survival of the community, but also stabilization, creating a sense of community. Similarly, Gardner and Gould (1989), in their study of people's perceptions of the risks & benefits technology, try to separate benefits to include *economic benefits*, *basic needs*, *safety and security*, and *pleasure*. In Swan Hills, the basic need to establish and maintain a community is an important benefit. The social and economic benefits, then, seems to be an important influence in the attenuation of risk. Trust in science and technology, local leaders, Bovar and Bovar employees, and community members also seem to be important influences on the residents' views of risk.

6.5 Sources of trust

Trust in science and technology are important influences on peoples' views of environmental technological hazards (Beck, 1992). However, Beck claims that throughout the transition from late modern society to a risk society, trust in science and technology becomes eroded. Instead, it becomes a source of fear and doubts. However in Swan Hills, residents' trust in science and technology seems to be an important influence in their assessment of low risk. The residents generally feel that science and technology are capable of not only predicting but also controlling the risks from the hazard. First, the residents believe there are good understandings of PCBs and the technology involved in incineration. Second, they believe that there are sufficient

"resources" and equipment to deal with any accidents or spills that may occur at the plant. Likewise, Metz (1996) found decreased concerns and actual increased support for a weapons complex facility in Colorado because the local residents felt that any accidental contamination could be cleaned up quickly. Third, they feel safe because of testing programs that are in place by Bovar and the government and because of public scrutiny. For example, many of the residents base their assessments of risk from the tests conducted by Bovar and the government, which revealed no significant impact on human health. As a result, the residents feel that the waste facility poses no or very little risk.

Trust is now regarded as one of the essential elements of any successful risk communication effort (Covello, 1996; Leiss, 1996; Slovic 1993), and at Swan Hills it seems to have been an important factor in community acceptance and continued acceptance of the hazardous waste facility. Risk communication was effective in four ways. First, the experts were able to effectively convince the residents that the waste facility would have state-of-the-art technology. Second, the experts were able to convince the residents that an integrative waste management system was needed. Risk communication was important for the public education as to the nature of the hazardous waste problem in Alberta and the alternatives. As a result, many of the residents defend the hazardous waste facility as the "responsible" thing to do. Third, genuine efforts were made to involve the community at all stages of the siting process. As one resident mentions, "I think there's been a real effort to keep the public aware of what is going on...." (Rabe, 1994, p. 70). Fourth, effective risk communication was also important in the education about the waste facility and the processes involved (e.g., destroy hazardous

waste), and the **understanding of PCBs**. For example, a number of the residents mentioned that Swan Hills are more educated about the impacts from the plant and PCBs. As a result, trust in science and technology seems to have been evident early in the voluntary siting and seems to be important to the acceptance of the risk process (see section 6.3).

In Swan Hills, sources of trust are not only developed from scientific competence, effective risk communication, and voluntary approach, but also from other community members. Some of the residents get assurance from the fact that others in the community (e.g., other residents, community leaders, Bovar employees) have very little concerns about the waste treatment facility. Further, the workers at the ASWTF is also a source of trust. Knowing workers at waste facility and having the workers live in town assures many the waste facility is a low risk.

6.6 Uncertainty and latent concerns

Generally, the residents in Swan Hills view the waste facility as a technology with impacts that are known to experts. Nonetheless, a number of people have **latent concerns** about the waste facility. These residents are concerned that in the distant future, there may be negative impacts from the waste facility. This uncertainty is primarily the result of social and institutional conditions rather than uncertainty expressed by experts (Slovic, 1992; Beck, 1992). For example, the residents tend to generally ignore some of the scientific tests (e.g. health advisory), and claim that the waste facility is not a risk. However **controversy** created from both community members and the media and the government (e.g., legal action), brings about questions about the risks associated with the facility. In turn, the residents question the impacts on their health,

especially women with children or women thinking of having children in the near future. Increased media attention also creates uncertainties about the impacts from the accidents. Although, the accidents at the waste facility and increased media attention has created some uncertainty, they minimize the risks by indicating that impacts are not immediately visible. Further, these residents discount future risks because at the present, the risks related to the ASWTF are deemed low. Concerns are also minimized because of the assurance from community members that the plant is safe.

6.7 Summary

This chapter links the literature on environmental risk and the findings from the case study and argues that the social amplification of risk framework is most useful for explaining why the residents perceive the risks as low. The central theme throughout this chapter is that risks from a hazard are attenuated because of role related considerations and membership in social groups, and cultural values. These values and belief systems are socially constructed not only in relation to the hazard but also in relation to the social and political climate. Local context is not only important for the construction of values before the risk event (the siting of the ASWTF) but also for helping to shape beliefs after the risk event (e.g. accidents at the waste facility). The social amplification of risk framework accounts for not only the characteristics of the hazard itself (e.g. incinerates waste), but also the social, cultural, and institutional climate in which the hazard is set in. Even though institutions outside the community (e.g. media, health authorities) regarded the waste facility as a risk, the residents of Swan Hills do not regard the waste facility as a risk (i.e., *attenuated*).

Chapter 7:

Conclusion

This thesis involves a case study of a community which volunteered to host a hazardous waste facility. The research was mainly guided by the social and cultural theories of environmental risk. These theories stress the importance of values and beliefs in individual and group assessments of risk. As well, they maintain that views of risk are constructed in the context of daily life (Douglas and Wildavsky, 1982; Johnson and Covello, 1987). The research involves a qualitative study of Swan Hills residents with two main research objectives:

> i) to examine the views of risk among a variety of laypeople within the same community in the context of daily life
> ii) to explore the multiple influences that shape peoples' views of those risks.

This research makes a number of substantive, theoretical, and methodological contributions to the literature on environmental risk and suggests several directions for future research.

7.1 Substantive contributions

There is at least one substantive contributions to the literature on siting environmental hazards. This thesis provides an example of community views of a technological environmental hazard that is regarded as a low threat. Further, community wide approval and acceptance for the ASWTF is still evident today. This is contrary to much of the siting literature. Community opposition, rather than community approval seems to be the general pattern in much of the siting cases. The fact that the waste facility was sited through a voluntary process seems to be an important influence for the initial and continued acceptance of the hazard. The voluntary approach allowed for

community involvement and the feeling of having a "choice," which helped to foster trust between the experts and the residents.

7.2 Theoretical contribution

This exploratory study examines how a community constructs and maintains their views of risk from a technological environmental hazard. There are at least three sets of theoretical contributions from this exploratory study.

First, the social amplification (attenuation) of risk framework is useful for understanding risk in the context of everyday life and describing how some risks become attenuated. Although the social attenuation of risk framework is able to account for the minimization of risk in Swan Hills, it does not explicitly explain why the risk was attenuated in the first place. The framework focuses on how an environmental event (e.g., accident at a hazardous waste facility, contamination) is portrayed and interpreted and less on the characteristics of the community that is involved in portrayal and interpretation. This study shows that in places like Swan Hills, the local, social, and institutional/political context can be important for the attenuation of risk (e.g., familiarity, community consensus, distrust of media) than the particular characteristics of the hazard itself.

Also, many of the current studies which use the social amplification framework tend to focus on cases where risk events become amplified. Further, the framework begins only after a negative "risk event." However, the residents' view of risk about the ASWTF was attenuated (minimized) before and after a "negative event" (e.g., two accidents at the plant) occurred. The social amplification framework also does not distinguish between the sources of the attenuation (amplification) stations. The source of

the amplification/attenuation stations seems to have been an important influence in the residents assessment of risk.

Second, several concepts that exist in the environmental risk literature are reconceptualized in this thesis to understand the attenuation of risk at Swan Hills including: risk and safety, trust, and costs weighed against benefits. The concept of risk and safety are central in the environmental risk literature (e.g., Krimsky and Golding, 1992), however, laypeople may not commonly think of hazards, like a hazardous waste facility, as prominent risk or safety issues. Despite the fact that the Swan Hills is sensitized to a environmental hazard, and the residents knew part of the interview was about the ASWTF, residents relatively rarely mentioned the waste facility as a risk or safety issue. The residents were more likely to mention traffic and crime when asked about these topics. This demonstrates that experts and laypeople talk about technological hazards quite differently and that seemingly straightforward concepts must be considered problematic when doing risk research.

A key concept in the literature is trust (Beck, 1992; Laird, 1989). Beck claims that throughout the transition towards a risk society, we are becoming disillusioned by science and technology. Thus science and technology themselves become sources of fear doubt. As a result, scientists, government and industrial experts are no longer sources that can be trusted to control and identify technological hazards. However, in Swan Hills trust in science and experts was established early through the voluntary siting process. The residents generally believe that science and technology is able to provide security and safety from an environmental hazard (ASWTF). They believe that science is able to predict and control the impacts from hazards, and as a result, many of the residents are

convinced that risks associated with ASWTF was low because of the provincial and federal health studies revealed no negative human impact. Further, trust in experts had as much to do with values (e.g., economic benefits, community stability, trust) as it did with scientific competence. Residents usually trusted assessments of risk when it supported their values and beliefs, and ignored them when it contradicted them. Further it underlines the importance of security and safety for these residents ways of life.

The notion of costs weighed against benefits seem to apply in the Swan Hills case study. Residents mentioned a number of benefits of having the hazardous waste facility. While one of the most important benefits of hosting the waste facility is economic (e.g., many of the residents mentioned the benefit of economic diversification of the local economy and creation of jobs) benefits had as much to do with non-monetary concerns as well. In other words, in the context of everyday life, risk had as much to do with values/beliefs (see also Gregory and Mendelson, 1993). For example, the ASWTF assured the survival of the community and stability (e.g., less transient), creating a heightened sense of community. Further, the residents would assert that the waste facility was their social "responsibility," and the benefit was a cleaner and safer environment.

Third, the research reveals the importance of context (geographical, social, institutional and cultural milieu). Laypeoples' values are linked to place/community context. Not only do people come to places like Swan Hills to share common values, but also the events (e.g., siting process, community consensus) within that place help to shape and reaffirm those values. For example, the low assessment of risk and continued acceptance of the potentially hazardous waste facility (ASWTF) may the result of the

realization of economic benefits and of improved community stability (e.g., less transient). Further, low assessment of risk may also be the result of employee commitments to Bovar.

7.3 Methodological contributions

Two methodological contributions can be identified from this thesis. First, this thesis demonstrates the usefulness of interpretive qualitative research for studying technological environmental risk. However, qualitative methods are rarely used for studying environmental risk because the dominant approaches (e.g., econometric, psychometric) are more amendable to quantitative methods. Also, proponents of quantitative methods usually criticize approaches that employ qualitative methods (e.g., anthropological, sociological) because they tend to focus on theoretical development rather than theoretical verification. However, some notable exceptions are: Douglas and Wildavsky (1982) and Edelstein (1988). This thesis adds to and reinterprets existing concepts, and verifies others.

Secondly, few qualitative environmental risk studies are explicit about their methodology, although qualitative research has no standard practices. However, this thesis is explicit about the rationale for using qualitative methods and gives a detailed account of how in-depth face-to-face interviews were used. Further, this thesis is also explicit about how the interviews were analyzed and methods used to ensure trustworthy findings (e.g., source and investigator triangulation, member checking, low-inference descriptors, and autobiography).

7.4 Directions for future research

There are three main directions for future research. First, qualitative research is often criticized because it sacrifices the generalizability of the findings for depth. As a result, directions for future research should include a quantitative investigation to test the context/place-dependant issues revealed in this qualitative study. The findings from this research are limited to a specific context, and technically, only to the 27 interviews. The challenge will be to determine if these findings are also applicable to a larger population and in different contexts. The use of a quantitative survey will help determine the relevance of the qualitative findings in the wider community. Second, the research should be extended to communities with different views of risk than Swan Hills. For example, some communities/groups seem to assess the risks from the ASWTF as high. Future research should examine why some communities/groups oppose the same environmental hazard. Fort Saskatchewan, a community who opposed the siting of the same facility just two years prior to the siting of the ASWTF, and local aboriginals groups, are potential examples of groups/communities who assess the risks as high. Third, a central idea in the social amplification of risk framework is that media coverage is assumed to have strong and direct effect on an event's impact (Burns, et al., 1993). Future research should further examine the role played by the media in the residents view of risk through media/textual analysis of both local media and media outside the community. Further, the role of media can also be examined for influencing the views of risk for the general population.

REFERENCES

Albercht, S.L, Amey, R.G., and Amir, S. (1996). The Siting of Radioactive Waste Facilities: What Are the Effects on Communities? Rural Sociology, 61(4): 649-673.

Baber, Z. (1991) Beyond the Structure/Agency Dualism: An Evaluation of Giddens' Theory of Structuration, Sociological Inquiry, 16(2): 219-230.

Bailey, C., Faupel, C.E., and Holland, S. (1992) Hazardous Waste and Differing Perceptions of Risk in Sumter County, Alabama. Society of Natural Resources, 5:21-36.

Baxter, J. and Eyles, J. (1999) The Utility of In-Depth Interviews for Studying the Meaning of Environmental Risk, The Professional Geographer, 51(2): 307-320.

Baxter, J. and Eyles, J. (1997) Evaluating Qualitative Research in Social Geography: Establishing 'Rigour' in /interview Analysis, Transactions of the Institute of British Geographers, 505-525.

Baxter, J. (1997) Exploring the Meaning of Environmental Risk and Uncertainty in an Environmentally Sensitized Community. PhD Thesis.

Beck, U. (1992) From Industrial Society to the Risk Society: Questions of Survival, Social Structure and Ecological Enlightenment, Theory Culture and Society, 9, 97-123.

Benford, R, Helen, A., Williams, A., (1993) In whose Backyard?: Concerns about Siting a Nuclear Waste Facility. Sociological Inquiry, 63:30-48.

Blumer, H. (1969) Symbolic Interactionsim. Englewood Cliffs: Prentice-Hall.

Blocker, T., and Eckberg, D. (1989) Environmental Issues as Women's Issues: General Concerns and Local Hazards. Social Science Quarterly, 70: 586-593.

Bord, J., O'Connor, R. (1997) The Gender Gap in Environmental Attitudes: The Case of Perceived Vulnerability to Risk. Social Science Quarterly, 78(4): 830-839.

Bourke, Lisa (1994). Economic Attitudes and Responses to Siting Hazardous Waste Facilities in Rural Utah. Rural Sociology, 59(3): 485-496.

Brenot, J., Bonnefous, S., and Marris, C. (1998) Testing Cultural Theories of Risk in France. Risk Analysis, 18(6): 729-739.

Burns, W., Slovic, P., Kasperson, R., Renn, O., and Sriniva, E., (1993) Incorporating Structural Models into Research on the Social Amplification of Risk: Implications for Theory Construction and Decision Making, Risk Analysis, 13(6): 611-622.

Burton, I., Kates, R., and White, G. (1978) The Environment as Hazard, New York: Oxford University Press.

Chase, S. (1997) "Swan Hills PCBs nine times normal," Calgary Herald, 26 July: A4.

Covello, V. (1996) Risk Perception and Communication: Tools and Techniques for Communicating Risk Information, New York: Columbia University Centre for Risk Communication.

Cutter, S. (1993) Living With Risk, New York: Edward Arnold.

Cutter, S. (1995) Race, Class and Environmental Justice, Progress in Human Geography, 19(1): 111- 122.

Dake, K. (1992) Myths of Nature: Culture and the Social Construction of Risk. Journal of Social Issues, 48(4): 21-37.

Davidson & Freudenburg (1996) Gender and Environmental Risk Concerns: A Review of Analysis of Available Research. Environment and Behavior, 28(3): 302-339.

Day, Ian (1993) Data Analysis: A user friendly guide for social scientists. New York: Routledge.

Dickie-Clark, H.F. (1986) The Making of a Social Theory: Anthony Giddens' Theory of Structuration, Sociological Focus, 19(2): 159-176.

Denzin, N (1978) The Research Act. New York: McGraw-Hill.

Douglas, M (1970) Natural Symbols, London: Barrie and Rockliff.

Douglas, M (1966) Purity and Danger: Concepts of Pollution and Taboo, London: Routledge and Kegan Paul.

Douglas, M. and Wildavsky, A. (1982) Risk and Culture: The Selection of Technological and Environmental Dangers, Berkeley: University of California Press.

Drottz-Sjorberg, B. (1991) Perception of Risk: Studies of Risk Attitudes, Perceptions and Definitions, Stockholm: Stockholm School of Economies Center for Risk Research.

Edelstein, M. (1988) Contaminated Communities: The Social and Psychological Impacts of Residential Toxic Exposure, Boulder, CO: Westview Press.

Elliot, S., Martin, T., Hampson, et al., (1997) 'It's Not Because You Like It Any better....': Residents' Reappraisal of a Landfill Site, Journal of Environmental Psychology, 17: 229-241.

Eyles, J., Taylor, S.M., Baxter, J., Sider,D., and Willms D., (1993) The Social Construction of Risk in a Rural Community: Responses of Local Residents to the 1990 Hagersville (Ontario) Tire Fires, Risk Analysis, 13, 281-290.

Fischhoff, B., Lichtenstein, S., and Slovic, P. (1981) Lay Foibles and Experts Fables in Judgements about Risk, in O'Riordan, T. and Turner, R. (Eds.) Progress in Resource Management and Environmental Planning, Vol. 3, Chichester: Wiley.

Fischhoff, B., Slovic, P., and Lichtenstein, S., (1978) How Safe is Safe Enough? A Psychometric Study of Attitudes Towards Technological Risks and Benefits, Policy Science, 8: 127.

Freudenburg, W. (1988) Perceived risk, real risk: Social science and the art of probabilistic risk assessment. Science, 242, 44-49.

Gardner, G. and Gould, L. (1989) Public Perceptions of Risk and Benefits of Technology, Risk Analysis, 9(2): 225-242).

Giddens, A. (1993) New Rules of Sociological Method: A Positive Critique of Interpretive Sociologies, Stanford: Stanford University Press.

Giddens, A (1991) Modernity and Self Identity: Self Society in the Late Modern Age. Cambridge: Polity Press.

Giddens, A. (1984) The Constitution of Society: Outline of the Theory of Structuration. Cambridge: Policy Press.

Gregory, R. and Mendelsohn, R. (1993) Perceived Risk, Dread, and Benefits, Risk Analysis, 13(3): 259-264.

Groothuis, P.A., and Miller, G. (1994). Locating Hazardous Waste Facilities: The Influence of NIMBY Beliefs. American Journal of Economics and Sociology, 53(3): 335-346.

Groothuis, P.A. and Miller, G. (1997). *The Role of Social Distrust in Risk-Benefit Analysis: A Study of the Siting of a Hazardous Waste Disposal Facility.* Journal of Risk and Uncertainty, 15:241-257.

Harris, W.E. (1993) Siting a Hazardous Waste Facility: A Success Story in Retrospect, Risk Analysis, 13(1): 3-4.

Hryciuk, D. (1998) "Bovar's fine could be highest ever," Calgary Herald, 20 April: A4

Johnson, B. and Covello, V. (1987) Social and Cultural Construction of Risk, Boston: Reidel.

Kahneman, D. and Tvesky, A. (1979) Prospect Theory: An analysis of Decision under Risk, Econometrica, 47(2): 263-291.

Kates R.W. (1978) Risk Assessment of Environmental Hazards: Scope 8, Chichester: John Wiley & Sons.

Kasperson, R. (1992) The Social Amplification of Risk: Progress in Developing an Integrative Framework, in Krimsky, S. and Golding D. (Eds.) Social Theories of Risk, Wesport Ct: Praeger.

Kasperson, R., Golding, D., Tuler, S. (1992) Social Distrust as a Factor in Siting Hazardous Facilities and Communicating Risk, Journal of Social Issues, 48(4): 161-187.

Krannich, R.S. and Albercht, S.L. (1995) *Opportunity/Threat Responses to Nuclear Waste Disposal Facilities*. Rural Sociology, 60(3): 435-453.

Krefting, L. (1991) Rigour in Qualitative Research: The Assessment of Trustworthiness, The American Journal of Occupational Therapy, 45(3): 214-222.

Krewski, D. et al. (1982) Identification and Measurement of Risk, in Burton, I., Fowle, C., and McCullough, R (Eds.) Living with Risk: Environmental Management in Canada, University of Toronto.

Krimsky, S. and Golding, D. (1992) Social Theories of Risk, Wesport Ct: Praeger.

Kuhn, Richard (1998) Social and Political Issues in Siting a Nuclear-Fuel Waste Disposal Facility in Ontario, Canada. The Canadian Geographer, 42(1): 14-28.

Laforest, Mary. (1997) "Tests shows Swan Hills toxix levels normal," Calgary Herald, 5 Sept.

Laird, F. (1989) The Decline in Deference: The Political Context of Risk Communication, Risk Analysis, 9(4): 543-550.

Lawrence, D. (1996) Approaches and Methods of Siting Locally Unwanted Waste Facilities, Journal of Environmental Planning and Management, 39(2): 165-187

Lazarus, R. (1993) Coping theory and research: past, present, and future. Psychosomatic Medicine, 55, 234-247.

Lazarus, R. and Folkman, S. (1984) Stress, Appraisal and Coping. New York: Springer-Verlag.

LeCompte, M. (1982) Problems of Reliability and Validity in Ethnographic Research, Review of Educational Research, 52(1): 31-60.

Leiss, W. (1996) Three Phases in the Evolution of Risk Communication Practice, Annals of the American Academy of Political and Social Science, 545: 85-94.

Lidskog, Rolf (1996). In Science We Trust? On the Relation Between Scientific Knowledge, Risk Consciousness and Public Trust. Acta Sociolgica, 39: 31-56.

Lincoln, Y. and Guba, E. (1985) Naturalistic Inquiry: Beverly Hills: Sage.

Machlis, G., and Rosa, E. (1990) Desired Risk: Broadening the Social Amplification of Risk Framework, Risk Analysis, 10(1):161-168.

Marris, C., Langford, I., Saunderson, T., and O'Riodan, T. (1997) Exploring the "Psychometric Paradigm": Comparisons Between Aggregate and Individual Analyses, Risk Analysis, 17(3): 303-312.

Marris, C., Langford, I.H., and O'Riordan, T. (1998) A Quantitative Test of the Cultural Theory of Risk Perceptions: Comparison with the Psychometric Paradigm. Risk Analysis, 18(5): 635-647.

McQuiad-Cook, J. and Simpson, K. (1986) Siting a Fully Integrated Waste Management Facility in Alberta, Journal of the Air Pollution Control Association, 36(9): 1031-1036.

Miles, M.B. and Huberman, A.M. (1994) Qualitative Data Analysis. Second Edition. Thousand Oaks: Sage.

Mitchell, J. (1989) Hazards Research, in (eds.) Geography in America, Columbus: Gaile and Willmott, 410-424.

Mol, A. and Spaargaren G. (1993) Environment, Modernity and the Risk-Society: The Apocalyptic Horizon of Environmental Reform, International Sociology, 8(4), 431-459.

Morse, Janice (1994) Qualitative Strategies, in Denzin N.K. and Lincoln, Y.S. (eds.) Handbook of Qualitative Research, Thousand Oaks: Sage Publications.

Mouzelis, N. (1989) Restructuring Structuration Theory, Routledge (37)4: 617-635.

Openshaw, S., Carver, S., Fernie, I., (1989) Britain's Nuclear Waste: Safety and Siting, London: Belhaven Press.

O'Riordan (1979) The Scope of Environmental Risk Management. Ambio, 8: 260-264.

Palm, R. (1990) Natural Hazards: An Integrative Framework for Research and Planning, Baltimore: John's Hopkins University Press.

Patton, M.Q. (1990) Qualitative Evaluation and Research Methods. Newbury Park: Sage.

Plous, S. (1993) The Psychology of Judgment and Decision Making, New York: McGraw-Hill.

Peters, E., and Slovic, P. (1996) The Role of Affect and Worldviews as Orienting Dispositions in the Perception and acceptance of Nuclear Power, Journal of Applied Social Psychology, 26(16): 1427-1453.

Rabe, B.G. (1994) Beyond NIMBY: Hazardous Waste Siting in Canada and the United Sates, Washington, D.C.: The Brookings Institution.

Rayner, S. (1992) Cultural Theory and Risk Analysis, in Krimsky, S. and Golding D. (Eds.) Social Theories of Risk, Wesport Ct: Praeger.

Reichardt, C.S. and Cook, T.D. (1979) Beyond Qualitative Versus Quantitative Methods. In T.D. Cook & C.S. Reichardt (Eds.), Qualitative and Quantitative Methods in Evaluation Research. Beverly Hills: Sage.

Renn, O. (1992) The Social Arena Concept of Risk Debates, in Krimsky, S. and Golding D. (Eds.) Social Theories of Risk, Wesport Ct: Praeger.

Renn, O. et al, (1992) The Social Amplification of Risk: Theoretical Foundations and Empirical Applications, Journal of Social Issues, 48(4):137-160

Richards, T.J. and Richards, L. (1994) Using Computers in Qualitative Research, in Denzin N.K. and Lincoln, Y.S. (eds.) Handbook of Qualitative Research, Thousand Oaks: Sage Publications.

Rip, A. (1988) Should Social Amplification of Risk be Counteracted? Risk Analysis, 8(2): 193197.

Rosenbluth, R. (1980) Fair Risk and Technological Change. Engineering Digest., Feb, 35-38.

Rowe, W.D. (1977) The Anatomy of Risk. Wiley, New York.

Sandelowski, M. (1986) The Problem of Rigor in Qualitative Research, Advances in Nursing Science, 8(3): 27-37.

Savage, I. (1993) Demographic Influences of Risk Perceptions, Risk Analysis, 13(4): 413-420.

Sherbaniuk, Richard (1998) The Price of Protection, Alberta Views, 1(3): 26-33

Shrader-Frechette, K. (1991) Risk and Rationality, Berkeley, C.A.: University of California Press.

Slovic, P., Kunreuther, H. and White, G.F. (1972) Decisions Processes, Rationality, and Adjustments to Natural Hazards, in White, G.F. (ed.) Natural Hazards: Local, National, Global, Toronto: Oxford University Press.

Slovic, P. Fischhoff, B. and Lichtenstein, S. (1982) Why Study Risk Perception?, Risk Analysis, 2(2), 83-93.

Slovic, P. (1987) Perception of Risk, Science, 236: 280-285.

Slovic, P. (1992) Perception of Risk: Reflections of the Psychometric Paradigm, in Krimsky, S. and Golding D. (Eds.) Social Theories of Risk, Wesport Ct: Praeger.

Slovic, P. (1993) Perceived Risk, trust, and democracy, Risk Analysis, 13: 675-682.

Slovic, P., Fischhoff, B., and Mertz, C. (1993) Health Risk Perceptions in Canada, Ottawa: Report to the Ministry of Supply and Services.

Spies, Sherrill et al. (1998). Support for Waste Facility Siting: Differences between Community Leaders and Residents. Rural Sociology, 63(1): 65-93.

Starr, C. (1969) Social Benefits Versus Technological Risk, Science, 165: 1232-1238.

Stoffle, R., Traugott, M., Harshbarger, et al, (1988) Perceptions of Risk from Radioactivity: The Superconducting Super Collider in Michigan. Institute for Social Research. Ann Arbor, MI: University of Michigan.

Strauss, A. and Corbin, J. (1990) Basics of Qualitative Research: Grounded Theory Procedures and Techniques. Newbury Park: Sage Publications.

Strauss, A. and Corbin, J. (1994) Grounded Theory: An Overview, in Denzin N.K. and Lincoln, Y.S. (eds.) Handbook of Qualitative Research, Thousand Oaks: Sage Publications.

Taylor, S.M., Frank, J., Walter, S., Haight, M., White, N.F., Steiner, D., Willms, D., and Elliot, S.J. (1992) The Psychological Impact of Exposure to Environmental Contaminants in Ontario, prepared for the Ontario Ministry of the Environment.

Thorne, D. (1997) "Swan Hills: Natives to be tested for toxins," Calgary Herald, 29 Aug.: A1.

Timmons, R. (1997) Negotiating Both Sides of the Plant Gate: Gender, Hazardous Waste Facility Workers and Community Responses to Technological Hazards. Current Sociology, 45(3): 157-177.

Tversky, A. and Kahneman, D. (1974) Judgment Under Uncertainty: Heuristics and Biases, Science, 185: 1124-1131.

Van Liere, K.D. and Dunlap, R.E. (1980) The Bases of Environmental Concern: A Review of Hypotheses, Explanations, and Empirical Evidence. Public Opinion Quarterly, 44: 181-197.

Watts, M. (1983) On the Poverty of Theory: Natural Hazards Research in Context, in Hewitt, K. (ed.) Interpretations of Calamity: The Risks and Hazards Series: 1, London: Allen and Unwin: 231-262.

White, G. (1974) Natural Hazards: Local National, Global, Toronto: Oxford University Press.

White, G. (1958) Changes in Urban Occupance of Floodplains in the United States, Chicago: University of Chicago, Department of Geography, Research Paper No. 57.

Wildavsky, A. (1979) No Risk is the Highest Risk of All, American Scientist, 67: 32-37.

Wildavsky, A. and Dake, K. (1990) Theories of Risk Perception: Who Fears What and Why? Daedalus, 119: 41-60.

Appendix A:

Residents Sampled But Not Interviewed

	R	CPP	NC
Men	9	2	8
Women	7	1	6
Total	16	3	14

R – participant refused
CPP – continued postponement or did not show up for interview
NC – no contact made or moved

Reasons for Refusal to be Involved in the Study

- No I don't have time. I've answered a lot of survey's lately (1)
- Not interested, I'm too busy (3)
- No I don't want to participate (1)
- No thanks, I'll pass (1)
- No I'm not interested (9)
- No I don't want to participate in that because I have some views with that (1)
- No, sorry, I can't participate (1)

Appendix B:

Interview Checklist

Topic	Questions	Probes
Values/Community	What is it that you value most about this place/area? Why did you move/stay here? Can you see you and your family staying here indefinitely?	-environment - quality of life? -work? family and friends? neighbors? for your children? for your future? - why do you say that?
Environmental Issues	What are some of the main environmental issues in your community?	-can you tell me more about...
Safety	In terms of safety, how would you describe this place? What makes a place safe/unsafe to live in?	-why do you say that?
Risk	Are there any risks related to living here? What are the risks which concern you and your family now/future? How are you defining risk?	-environment, health, children, future, livelihood, others? -is it more than that...? -why do you say that?
Concerns	Do you have any other concerns/worries about living here? Have your concerns changed over, say, the last couple of years? What are some of the concerns you have regarding the future?	-environment, health, children, future, livelihood, others? - why do you say that?

Waste Treatment Facility	When you think of the hazardous waste facility, what picture comes to mind? What concerns you the most about the hazardous waste facility?	-why do you say that?
Stigma	How do you think others in the area view this place/hazardous waste facility?	-Why do you say that? -i.e. can you give me an example?
Benefits	Is there any (potential) benefits of having a_ hazardous waste facility in this community? What about others in the community? Do you think they have similar views?	-is there anything else? -how do you know that? -can you give me an example?
Trust	When it comes to getting information about the hazardous waste facility, who do you turn to?/who do you trust?/who do you believe? How much confidence do you have in the facts from the experts?/media?/others?	-media, family and friends, local politicians, Swan Hills liaison committee, Bovar? -why do you say that?
All purpose probes		-why do you say that? -is it more than that...? -can you give me an example (allows them to "tell a story")

Appendix C:

Complete List of NUDIST Theme Indexing System

(1)	/Base data
(1 1)	/Base data/gender
(1 1 1)	/Base data/gender/male
(1 1 2)	/Base data/gender/female
(1 2)	/Base data/age
(1 2 1)	/Base data/age/<20
(1 2 2)	/Base data/age/20s
(1 2 3)	/Base data/age/30s
(1 2 4)	/Base data/age/40s
(1 2 5)	/Base data/age/50s
(1 2 6)	/Base data/age/60s
(1 3)	/Base data/group
(1 3 1)	/Base data/group/resident
(1 3 2)	/Base data/group/leader
(1 3 3)	/Base data/group/Bovar
(1 4)	/Base data/res length
(1 4 1)	/Base data/res length/<1yr
(1 4 2)	/Base data/res length/1-5yrs
(1 4 3)	/Base data/res length/6-10yrs
(1 4 4)	/Base data/res length/11-15yrs
(1 4 5)	/Base data/res length/16-20yrs
(1 4 6)	/Base data/res length/>20yrs
(1 5)	/Base data/chld home
(1 5 1)	/Base data/chld home/yes
(1 5 2)	/Base data/chld home/no
(1 6)	/Base data/married
(1 6 1)	/Base data/married/yes
(1 6 2)	/Base data/married/no
(2)	/Comm description
(2 1)	/Comm description/comm values
(2 1 1)	/Comm description/comm values/family oriented
(2 1 2)	/Comm description/comm values/small twn
(2 1 3)	/Comm description/comm values/nature
(2 1 4)	/Comm description/comm values/grew up here
(2 2)	/Comm description/safety
(2 2 1)	/Comm description/safety/crime~violence
(2 2 2)	/Comm description/safety/traffic
(2 2 5)	/Comm description/safety/safe place
(2 2 6)	/Comm description/safety/safe~unsafe?
(2 3)	/Comm description/quiet
(2 4)	/Comm description/isolated

(2 5) /Comm description/neighborliness
(2 6) /Comm description/changes
(2 6 1) /Comm description/changes/pop decline
(2 6 2) /Comm description/changes/town growing
(2 6 4) /Comm description/changes/more stable
(2 6 5) /Comm description/changes/less transient
(2 7) /Comm description/young
(2 8) /Comm description/cheap housing
(2 9) /Comm description/commitment level
(2 9 1) /Comm description/commitment level/high
(2 9 2) /Comm description/commitment level/low
(2 10) /Comm description/move~stay
(2 10 1) /Comm description/move~stay/SH
(2 10 1 1) /Comm description/move~stay/SH/ASWTF
(2 10 1 2) /Comm description/move~stay/SH/work
(2 10 1 3) /Comm description/move~stay/SH/cheap housing
(2 10 1 4) /Comm description/move~stay/SH/family
(2 10 1 5) /Comm description/move~stay/SH/grew up here
(2 10 2) /Comm description/move~stay/away
(2 10 2 1) /Comm description/move~stay/away/job
(2 10 2 2) /Comm description/move~stay/away/Esso buy back
(2 10 2 3) /Comm description/move~stay/away/family~relationship
(2 11) /Comm description/enviorn consciousness
(3) /Concerns
(3 1) /Concerns/environmental issues
(3 1 1) /Concerns/environmental issues/ASWTF
(3 1 2) /Concerns/environmental issues/pollution
(3 1 3) /Concerns/environmental issues/wildlife
(3 1 4) /Concerns/environmental issues/oil~gas
(3 1 5) /Concerns/environmental issues/forest fires
(3 1 6) /Concerns/environmental issues/forestry practice
(3 2) /Concerns/ASWTF
(3 2 1) /Concerns/ASWTF/reasons
(3 2 1 1) /Concerns/ASWTF/reasons/controversy
(3 2 1 2) /Concerns/ASWTF/reasons/trust issues
(3 2 1 3) /Concerns/ASWTF/reasons/conflicting info
(3 2 1 4) /Concerns/ASWTF/reasons/knowledge
(3 2 1 5) /Concerns/ASWTF/reasons/unknown-uncertainty
(3 2 1 6) /Concerns/ASWTF/reasons/health concerns
(3 2 1 7) /Concerns/ASWTF/reasons/unnatural
(3 2 1 8) /Concerns/ASWTF/reasons/Impacts~effects
(3 2 1 9) /Concerns/ASWTF/reasons/recency effect
(3 2 2) /Concerns/ASWTF/unfair testing~base data
(3 2 3) /Concerns/ASWTF/health advisor
(3 2 4) /Concerns/ASWTF/transportation
(3 2 5) /Concerns/ASWTF/reports~information

(3 2 6) /Concerns/ASWTF/none~low
(3 2 7) /Concerns/ASWTF/diff standards
(3 2 9) /Concerns/ASWTF/affect ground water
(3 2 10) /Concerns/ASWTF/economic
(3 2 11) /Concerns/ASWTF/workers
(3 3) /Concerns/comm concerns
(3 3 1) /Concerns/comm concerns/medical
(3 3 2) /Concerns/comm concerns/landfills
(3 3 3) /Concerns/comm concerns/oil company
(3 3 4) /Concerns/comm concerns/unstability
(3 3 5) /Concerns/comm concerns/property values
(3 3 6) /Concerns/comm concerns/children's safety
(3 3 8) /Concerns/comm concerns/children's future
(3 3 9) /Concerns/comm concerns/drinking water
(3 3 10) /Concerns/comm concerns/lack amenities
(3 4) /Concerns/latent concerns
(4) /Low concerns
(4 1) /Low concerns/testing
(4 2) /Low concerns/confidence in science
(4 3) /Low concerns/comm consensus
(4 4) /Low concerns/monitored
(4 5) /Low concerns/familiarity
(4 6) /Low concerns/senses
(4 7) /Low concerns/low quantity
(4 8) /Low concerns/resources
(4 9) /Low concerns/waste
(4 10) /Low concerns/faith in workers
(4 11) /Low concerns/knowledge~undersatanding
(4 12) /Low concerns/worse stuff
(4 13) /Low concerns/commitment level
(4 15) /Low concerns/Bovar openness
(4 16) /Low concerns/no immediate impacts
(4 17) /Low concerns/physical properties
(4 18) /Low concerns/comfortable
(4 19) /Low concerns/no attention
(4 20) /Low concerns/unknowns in scie
(4 21) /Low concerns/trust govt
(5) /ASWTF
(5 1) /ASWTF/description
(5 1 1) /ASWTF/description/better alternative
(5 1 2) /ASWTF/description/new
(5 1 3) /ASWTF/description/improving
(5 1 4) /ASWTF/description/decently run
(5 1 5) /ASWTF/description/money maker
(5 1 6) /ASWTF/description/high profile
(5 1 7) /ASWTF/description/not perfect

(5 1 8) /ASWTF/description/corporate citizen
(5 2) /ASWTF/incidents
(5 2 1) /ASWTF/incidents/minor
(5 2 2) /ASWTF/incidents/inevitable
(5 2 4) /ASWTF/incidents/future accidents~unlikely
(5 2 5) /ASWTF/incidents/accident
(5 3) /ASWTF/safety
(5 3 1) /ASWTF/safety/safe
(5 3 2) /ASWTF/safety/too much safety
(5 4) /ASWTF/Native issue
(5 5) /ASWTF/others waste
(5 5 1) /ASWTF/others waste/unfair
(5 5 2) /ASWTF/others waste/economic benefit
(5 5 3) /ASWTF/others waste/provides jobs
(5 5 4) /ASWTF/others waste/keeps plant running
(5 6) /ASWTF/political
(5 7) /ASWTF/benefits
(5 7 1) /ASWTF/benefits/jobs
(5 7 2) /ASWTF/benefits/notoriety
(5 7 3) /ASWTF/benefits/economic
(5 7 4) /ASWTF/benefits/environment
(5 7 5) /ASWTF/benefits/social benefits
(5 7 9) /ASWTF/benefits/stability
(5 8) /ASWTF/stigma
(5 8 1) /ASWTF/stigma/contaminated
(5 8 2) /ASWTF/stigma/media
(5 8 3) /ASWTF/stigma/friends~family
(5 8 4) /ASWTF/stigma/neg view
(5 8 5) /ASWTF/stigma/association w plant
(5 9) /ASWTF/siting process
(5 9 1) /ASWTF/siting process/appropriate
(5 9 1 1) /ASWTF/siting process/appropriate/phy conditions
(5 9 1 2) /ASWTF/siting process/appropriate/comm approval
(5 9 2) /ASWTF/siting process/fair
(5 9 3) /ASWTF/siting process/kept in process
(5 10) /ASWTF/business
(5 11) /ASWTF/privatization
(5 11 1) /ASWTF/privatization/more regulations
(5 11 2) /ASWTF/privatization/more responsible
(5 11 3) /ASWTF/privatization/govt lax
(5 11 4) /ASWTF/privatization/better
(5 12) /ASWTF/media
(5 12 1) /ASWTF/media/blown out of proportion
(5 12 2) /ASWTF/media/pushed by media
(5 12 3) /ASWTF/media/only neg report
(5 12 4) /ASWTF/media/sensationalization

(5 13) /ASWTF/responsible
(5 14) /ASWTF/resignation
(5 15) /ASWTF/choice
(5 16) /ASWTF/cost~benefit
(6) /Information
(6 1) /Information/risk communication
(6 1 1) /Information/risk communication/kept informed
(6 1 2) /Information/risk communication/technical?
(6 2) /Information/Bovar's info
(6 3) /Information/trusted
(6 3 1) /Information/trusted /Bovar
(6 3 2) /Information/trusted /regional health auth
(6 3 3) /Information/trusted /naturalists
(6 3 4) /Information/trusted /Alberta report
(6 3 5) /Information/trusted /private industry
(6 3 6) /Information/trusted /friends~workers
(6 3 7) /Information/trusted /experts
(6 3 8) /Information/trusted /mayor
(6 3 9) /Information/trusted /govt
(6 3 10) /Information/trusted /liaison committee
(6 3 11) /Information/trusted /Alberta enviornm
(6 4) /Information/lack trust
(6 4 1) /Information/lack trust/media
(6 4 2) /Information/lack trust/gov't
(6 4 3) /Information/lack trust/science-tech
(6 4 4) /Information/lack trust/too much faith in tech
(6 4 5) /Information/lack trust/Bovar
(6 4 6) /Information/lack trust/management
(6 4 7) /Information/lack trust/big business
(6 5) /Information/info source
(6 5 1) /Information/info source/friend~workers
(6 5 2) /Information/info source/Bovar
(6 5 3) /Information/info source/mayor
(6 5 4) /Information/info source/liaison comm
(6 5 5) /Information/info source/medical officer health
(7) /Coping
(7 1) /Coping/denial
(7 2) /Coping/hope~faith
(7 3) /Coping/not thinking about it
(7 4) /Coping/not being negative
(7 5) /Coping/rationalization
(7 5 1) /Coping/rationalization/could be from anything
(7 5 2) /Coping/rationalization/profit important
(7 5 3) /Coping/rationalization/no worse than..
(8) /Risk Defn
(9) /Worse places

(9 1) /Worse places/refinery row ~ Ed
(9 2) /Worse places/Edmonton
(9 3) /Worse places/Calgary
(9 4) /Worse places/Fort Sask
(9 5) /Worse places/Hamilton
(9 6) /Worse places/Whitecourt
(9 7) /Worse places/city
(9 8) /Worse places/Hinton
(9 9) /Worse places/other places

Appendix D:

Partial List of NUDIST Theme Indexing System

(100) /Views-Opinions of risk
(100 1) /Views-Opinions of risk/community description
(100 1 1) /Views-Opinions of risk/community description/crime-violence
(100 1 2) /Views-Opinions of risk/community description/small town
(100 1 3) /Views-Opinions of risk/community description/family oriented
(100 1 4) /Views-Opinions of risk/community description/neighbourliness
(100 1 5) /Views-Opinions of risk/community description/safe place
(100 1 6) /Views-Opinions of risk/community description/nature
(100 1 7) /Views-Opinions of risk/community description/quiet
(100 1 8) /Views-Opinions of risk/community description/cheap housing
(100 1 9) /Views-Opinions of risk/community description/isolated
(100 2) /Views-Opinions of risk/community concerns
(100 2 1) /Views-Opinions of risk/community concerns/lack medical facilities
(100 2 2) /Views-Opinions of risk/community concerns/plant closure
(100 2 3) /Views-Opinions of risk/community concerns/community stability
(100 2 4) /Views-Opinions of risk/community concerns/oil industry downsizing
(100 2 5) /Views-Opinions of risk/community concerns/lack amenities
(100 2 6) /Views-Opinions of risk/community concerns/decline of property values
(100 2 7) /Views-Opinions of risk/community concerns/children's future
(100 3) /Views-Opinions of risk/low risk-concern
(100 3 2) /Views-Opinions of risk/low risk-concern/no concerns
(100 3 2 1) /Views-Opinions of risk/low risk-concern/no concerns/general
(100 3 2 2) /Views-Opinions of risk/low risk-concern/no concerns/with plant
(100 3 3) /Views-Opinions of risk/low risk-concern/no risks
(100 3 3 1) /Views-Opinions of risk/low risk-concern/no risks/general
(100 3 3 2) /Views-Opinions of risk/low risk-concern/no risks/plant
(100 3 4) /Views-Opinions of risk/low risk-concern/plant safe
(100 3 5) /Views-Opinions of risk/low risk-concern/minor
(100 3 6) /Views-Opinions of risk/low risk-concern/comfortable
(100 3 7) /Views-Opinions of risk/low risk-concern/PCB minor risk
(100 4) /Views-Opinions of risk/risks-concern
(100 4 1) /Views-Opinions of risk/risks-concern/environmental issues
(100 4 1 1) /Views-Opinions of risk/risks-concern/environmental issues/ASWTF
(100 4 1 2) /Views-Opinions of risk/risks-concern/environmental issues/oil-gas
(100 4 1 3) /Views-Opinions of risk/risks-concern/environmental issues/forest fires
(100 4 1 4) /Views-Opinions of risk/risks-concern/environmental issues/forestry practice
(100 4 1 5) /Views-Opinions of risk/risks-concern/environmental issues/wildlife
(100 4 2) /Views-Opinions of risk/risks-concern/landfills
(100 4 3) /Views-Opinions of risk/risks-concern/plant risk
(100 4 4) /Views-Opinions of risk/risks-concern/transportation

(100 5) /Views-Opinions of risk/stigma
(101) /Reasons plant low risk
(101 1) /Reasons plant low risk/security
(101 1 1) /Reasons plant low risk/security/knowledge-understanding
(101 1 2) /Reasons plant low risk/security/resources
(101 1 3) /Reasons plant low risk/security/choice
(101 1 4) /Reasons plant low risk/security/community consensus
(101 1 5) /Reasons plant low risk/security/know workers
(101 1 6) /Reasons plant low risk/security/trust Bovar
(101 1 7) /Reasons plant low risk/security/trust government
(101 1 8) /Reasons plant low risk/security/confidence in science-tech
(101 2) /Reasons plant low risk/control
(101 2 1) /Reasons plant low risk/control/testing
(101 2 2) /Reasons plant low risk/control/monitored
(101 3) /Reasons plant low risk/worldviews
(101 3 1) /Reasons plant low risk/worldviews/familiarity
(101 3 2) /Reasons plant low risk/worldviews/waste
(101 3 2 1) /Reasons plant low risk/worldviews/waste/senses
(101 3 3) /Reasons plant low risk/worldviews/media
(101 3 3 1) /Reasons plant low risk/worldviews/media/blown out of proportion
(101 3 3 2) /Reasons plant low risk/worldviews/media/pushed by media
(101 3 3 3) /Reasons plant low risk/worldviews/media/only neg report
(101 3 3 4) /Reasons plant low risk/worldviews/media/sensationalization
(101 3 3 5) /Reasons plant low risk/worldviews/media/political
(101 3 4) /Reasons plant low risk/worldviews/privatization
(101 3 4 1) /Reasons plant low risk/worldviews/privatization/more regulations
(101 3 4 2) /Reasons plant low risk/worldviews/privatization/more responsible
(101 3 4 3) /Reasons plant low risk/worldviews/privatization/govt. lax
(101 3 4 4) /Reasons plant low risk/worldviews/privatization/better
(101 3 4 5) /Reasons plant low risk/worldviews/privatization/business
(101 3 5) /Reasons plant low risk/stigma
(101 4) /Reasons plant low risk/minimizing risk
(101 4 1) /Reasons plant low risk/minimizing risk/physical properties
(101 4 2) /Reasons plant low risk/minimizing risk/no immediate impacts
(101 4 3) /Reasons plant low risk/minimizing risk/low quantity
(101 4 4) /Reasons plant low risk/minimizing risk/new
(101 4 5) /Reasons plant low risk/minimizing risk/worse stuff
(101 4 6) /Reasons plant low risk/minimizing risk/Worse places
(101 4 6 1) /Reasons plant low risk/minimizing risk/Worse places/Edmonton-ref row
(101 4 6 2) /Reasons plant low risk/minimizing risk/Worse places/Calgary
(101 4 6 3) /Reasons plant low risk/minimizing risk/Worse places/Fort Sask
(101 4 6 4) /Reasons plant low risk/minimizing risk/Worse places/Hamilton
(101 4 6 5) /Reasons plant low risk/minimizing risk/Worse places/Whitecourt
(101 4 6 6) /Reasons plant low risk/minimizing risk/Worse places/Hinton
(101 4 6 7) /Reasons plant low risk/minimizing risk/Worse places/city
(101 4 6 8) /Reasons plant low risk/minimizing risk/Worse places/other places

(101 4 6 9) /Reasons plant low risk/minimizing risk/Worse places/temp
(101 5) /Reasons plant low risk/responsible
(101 6) /Reasons plant low risk/benefits
(101 6 1) /Reasons plant low risk/benefits/corporate citizen
(101 6 2) /Reasons plant low risk/benefits/cost-benefit
(101 6 3) /Reasons plant low risk/benefits/economic
(101 6 4) /Reasons plant low risk/benefits/others waste
(101 6 5) /Reasons plant low risk/benefits/environment
(102) /Uncertainty
(102 1) /Uncertainty/controversy
(102 2) /Uncertainty/unknown-uncertainty
(102 3) /Uncertainty/conflicting info
(102 4) /Uncertainty/distrust
(102 5) /Uncertainty/latent concerns

Appendix E:

Understanding How People Form Their Views And Opinions of Risk In Swan Hills: Preliminary Findings for Participants

(January 20, 1999)

Daniel Lee (MA candidate)
Geography, University of Calgary

What are some of the findings so far?

Most of the residents feel that Swan Hills is a "safe place". Many people (48%) describe Swan Hills as a "safe place" because it is "quiet", a "small town", "family oriented", and because it has a "low crime/violence" rate (see table 1). This makes Swan Hills an ideal place for raising children.

Swan Hills is described as a relatively "young" community in terms of median age (lots of young families with children), and in the age of the community itself. Although there has been a "population decline" during the last few years, the town has become "more stable" and "less transient" because more people are purchasing their homes (instead of renting). In fact many people mentioned that they were planning on retiring in Swan Hills. This high commitment level to Swan Hills seems to foster trust, a great deal of "neighbourliness", and a sense of community.

When asked directly about any risks or concerns about living in Swan Hills, very few people mentioned any concerns or risks (see tables 2 and 3). The majority of environmental concerns people do have is related with the oil and gas industry and forest fires (particularly the one that occurred in the summer of 1998). When asked specifically about the Alberta Special Waste Treatment Facility (ASWTF), a majority of responses were positive. Many feel that the plant is "safe", "comfortable", and it is a "minor" concern.

The community generally sees the risks associated with the ASWTF as low, and this is attributed to my reasons: security, control, cultural values, rationalization, and benefits (see tables 4 to 8). Generally, trust in the community leaders and Bovar, and "community consensus" (that the plant is a safe), brings about "security" (see table 5) and assures many that the ASWTF is low a risk. Security is also related to: "understanding" of PCBs, of what the plant does, and the processes; having a "choice" during the initial siting; and having the "resources" to clean up any spills or having access to any safety equipment. The "testing" and "monitoring" (by Bovar, provincial, and federal government) (see table 4) has also revealed that the PCB emissions are "low quantity" and most feel there has been no "immediate impact" (see table 6) in terms of human health. As a result, the community feels that there is some "control" over the ASWTF because it is being watched by the government. Further, although the community does not generally trust the media, they feel that because the ASWTF is under the watchful of the media, Bovar will be committed to higher safety standards.

Many residents feel that Bovar is doing a "responsible" thing because they are helping to clean up the environment by destroying hazardous "waste" (see table 6). They also feel this business of cleaning the environment has improved since the government has turned over the plant to Bovar. The community feels that the "privatization" of the ASWTF has made it safer because standards will be higher with private business. Further, many feel that businesses should not be run by the government. Finally, many of the residents regard Bovar as a "corporate citizen", helping and supporting the community, not only economically, but also environmentally (see table 8).

Generally, the community does not trust any of the reports of the media. They feel that the media has not accurately reported findings, and has only provided "negative reports". They also feel that the reports about the ASWTF from the media have been "sensationalized" and "blown out of proportion" (see table 7).

However, there were some who did mention some concerns with the ASWTF. Concerns regarding the ASWTF mainly arose due to "uncertainty" (see table 9). This uncertainty usually arose because of the incidents (PCB leak and explosion), "controversy", "conflicting information", "distrust", "health concerns", and "latent concerns". The greatest concern the residents have relates to unknown health impacts. Women with young children and women thinking of having children in the future were the ones especially concerned about potential health impacts. These women were concerned about the unknown impacts on their children or their ability to produce children. A larger concern that people have with the plant regards "transportation" of waste to the plant. People are also concerned with landfills. Many people viewed incineration of hazardous waste as a "better alternative" than burying or dumping it.

Tables

The following tables provide more detailed information on some of the key topics in the findings:

***Table 1:**
How People Describe Their Community

Theme	How many times was this topic mentioned?	How many of the 27 people mentioned the topic (as a % of the 27)?	What percentage of the interviews is devoted to this topic?
low crime/violence	28	18(66)	1.5
nature	27	12(44)	.69
neighbourly	23	16(59)	.84
safe place	19	13(48)	.76
small town	16	14(52)	.69
family oriented	13	12(44)	.56

* see note on tables

Table 2:
Views of Low Risk/Concerns

Theme	How many times was this topic mentioned?	How many of the 27 people mentioned the topic (as a % of the 27)?	What percentage of the interviews is devoted to this topic?
low concerns/plant	47	19(70)	2.2
low risk/plant	34	14(37)	1.8
comfortable	20	13(48)	.71
plant safe	18	10(37)	.76
low risk/swan hills	15	10(37)	1.2
minor concern	10	6(22)	.33
low concerns/swan hills	6	4(15)	.36

Table 3:
Views of Risk/Concerns

Theme	How many times was this topic mentioned?	How many of the 27 people mentioned the topic (as a % of the 27)?	What percentage of the interviews is devoted to this topic?
plant concerns	23	7(26)	.59
environ issue/oil-gas	18	14(52)	1.1
environ issue/forest fires	15	10(37)	.64
landfills	13	9(33)	.36
environ issue/ASWTF	10	7(26)	.51
transportation concerns	9	5(19)	.31
environ issue/forestry	6	6(22)	.31
environ issue/wildlife	3	3(11)	.23

Table 4:
Control

Theme	How many times was this topic mentioned?	How many of the 27 people mentioned the topic (as a % of the 27)?	What percentage of the interviews is devoted to this topic?
testing	49	18(67)	2.0
monitoring	24	17(63)	.99

Table 5:
Security

Theme	How many times was this topic mentioned?	How many of the 27 people mentioned the topic (as a % of the 27)?	What percentage of the interviews is devoted to this topic?
knowledge-understanding of PCBs, plant and process	52	18(67)	2.1
Resources, equipment	23	12(44)	1.1
know workers	23	13(48)	.97
trust Bovar	19	11(41)	.74
community consensus	19	9(33)	.66
confidence science & technology	13	9(33)	.66
trust government	7	6(27)	.23
choice	4	4(15)	.10

Table 6:
Cultural Values

Theme	How many times was this topic mentioned?	How many of the 27 people mentioned the topic (as a % of the 27)?	What percentage of the interviews is devoted to this topic?
responsible (community duty)	86	23(85)	3.6
familiarity with hazards (PCB & oil and gas)	38	20(74)	1.8
waste	37	14(52)	1.3
media/political	20	12(44)	.89
privatization (better)	12	9(33)	.41
media/blown out of proportion	9	6(22)	.38
media/sensationalized	7	4(15)	.31
media/only negative report	5	4(15)	.25
media/pushed by media	2	2(7)	.05

Table 7:
Rationalization

Theme	How many times was this topic mentioned?	How many of the 27 people mentioned the topic (as a % of the 27)?	What percentage of the interviews is devoted to this topic?
worse stuff	48	17(63)	1.9
low quantities	37	18(67)	1.4
newness of technology	24	10(37)	.79
worse places	26	15(56)	.66
physical properties	22	16(59)	1.1
no immediate impact	22	12(44)	.94

Table 8:
Benefits

Theme	How many times was this topic mentioned?	How many of the 27 people mentioned the topic (as a % of the 27)?	What percentage of the interviews is devoted to this topic?
economic	36	23(85)	1.9
corporate citizen	21	15(56)	1.1
environmental	14	10(37)	.59
out of province waste	10	9(33)	.59
cost benefit	10	5(19)	.31

Table 9:
Uncertainty

Theme	How many times was this topic mentioned?	How many of the 27 people mentioned the topic (as a % of the 27)?	What percentage of the interviews is devoted to this topic?
latent concerns	38	9(33)	1.4
unknown-uncertainty	19	5(19)	.66
controversy	15	6(22)	.74
conflicting info	14	1(4)	.36
health concerns	8	3(11)	.20
distrust in Bovar	6	3(11)	.20

***A Note on the Tables**
Most of the findings presented here are in the form of tables rather than quotations from the interviews. Although tables are a good way of summarizing a lot of information, it is important to keep in mind they do not portray the full meaning of what many of you said (quotations are best for this, and will be included in the final report).

Why is this study being done?

The purpose of this study is to develop an understanding of how people form their views and opinions of environmental risk. In particular, we want to understand better how people form their views of risk in light of recent events surrounding the site.

Who is being studied?

We chose Swan Hills as a study area because it is the location of the ASWTF (a potential for environmental risk). We spoke with 3 different groups of people: community leaders, residents of Swan Hills, and workers at Bovar, as each group may have different views about risk. In total, 27 interviews were conducted and the following table show the break down (table 10).

Table 10:
Groups interviewed

Community Leaders	9
Residents	10
Bovar	8
Total	27

How are the interviews analyzed

All of the audio tapes were typed out to make interview transcripts. These transcripts formed the basis of analysis. The 27 interviews translated into over 300 pages of text which has been managed using a computer software package specifically designed for handling interviews.

The basic strategy for interpreting the interview was reading each transcript, looking for themes which arose over and over from transcript to transcript. To do this each transcript was broken down into bits of text (paragraphs) and then themes were attached to them. For example, every time someone mentioned that Swan Hills was a safe place, the theme "safe place" would be attached to the paragraph. This process of reading through the transcripts and looking for themes took me approximately 4 months to complete. In total, over 200 themes were identified.

Next Steps

With analysis almost complete, I would like your feedback on my analysis (if my interpretations make sense). It is important that you recognize some of the things mentioned here in the way you interpret(ed) the situation in Swan Hills. If you do not – we would like to know about it, since it is my intention to best represent how things were perceived by you (see attached form).

Analysis will continue throughout January, and most likely writing the thesis will start in February. I expect to be completed in the summer of 1999.

How do I get more information about the study?

Obviously not all of the over 200 themes were presented here. The purpose of this report was to give you a (relatively) straight-forward summary of what has happened so far. If you would like more information (e.g. a copy of your transcript or a complete list of themes/codes) please feel free to contact Daniel Lee or Jamie Baxter (assistant professor), also a principle investigator in this research.

Daniel Lee
Phone: (403) 220-5584 ext. 4768
e-mail: dalee@ucalgary.ca

Jamie Baxter (supervisor)
Phone: (403) 220-5593
e-mail: baxterj@ucalgary.ca

Participant Feedback Form

I would like to give you an opportunity to comment on my interpretations of peoples' views and opinions of risk in Swan Hills. Below are three questions regarding the preliminary findings. It would be greatly appreciated if you could take some time to answer these questions.

1) Do my interpretations make sense with the way you understand environmental risk in your community?

   Yes No

2) Do you feel that my interpretations are accurate?

   Yes No

3) Do you have any other comments?

Appendix F:

Feedback From Participants Regarding Preliminary Findings

QUESTIONS	YES	NO
1) Do my interpretations make sense with the way you understand environmental risk in your community?	12	
2) Do you feel that my interpretations are accurate?	12	
Total number of responses	**12 /27 (44%)**	

Do you have any other comments?

- I think the report expresses well our feelings on the plant and community.
- I believe you captured the opinions of the citizens of Swan Hills.
- Generally quite good. It would have been nice to see comments from the media such as the Edmonton Journal to see if their views have changed over the years or not.
- Interesting!