



Understanding “Low Concern” Near the Hazardous Waste Treatment Facility at Swan Hills AB

J. Baxter¹

1. Department of Geography, University of Western Ontario, London, Canada

ABSTRACT: This paper examines why the level of concern about technological hazard risk is low near a hazardous waste treatment facility. The work builds on facility siting and risk perception literatures. The paper describes the findings from a telephone survey conducted in Swan Hills Alberta (n=173). The survey itself was designed from the analysis of almost 38 in-depth interviews in the same community. Swan Hills shows a relatively high percentage of residents who are relatively unconcerned about the facility (69%). Four potential explanations of low concern are tested: sound management, economic and other benefits, sound facility siting, and insider reactions to outsiders. The insider/outsider dichotomy and benefits to community well-being prove to be the only statistically significant predictors of general facility concern. Implications for facility siting, risk communication and media reporting are discussed.

1. INTRODUCTION

How do residents perceive a waste facility *after* it has been located in their community?

While there has been much discussion about how best to find sites for waste facilities (e.g. Armour 1992; Kunreuther et al. 1993; Lober 1995; Rabe 1992) there has been less discussion about local residents' views after the facility becomes operational (Elliot et al. 1997) except in the specific context of environmental justice research (e.g., Cutter 1995). Indeed, resident concern about the threats from waste facilities and other unwanted landuses often prevents facilities from

being built at preferred sites (e.g., Hadden 1991; Lober 1993; Zeiss and Lesfrud, 1996).

Increasingly though, we are seeing siting success stories emerge, partially due to the use of voluntary siting (e.g., Zeiss and Lesfrud), yet in all cases there are few studies that revisit the communities after the facilities become operational.

In this paper I address these issues by reporting on community perceptions of a hazardous waste treatment facility near Swan Hills Alberta Canada, 15 years after it became operational. I focus on general “concern” about the facility and the predictors of those concerns as measured by a telephone survey. This paper is the third in a series concerning the Alberta Special Waste Treatment Facility at Swan Hills, now known as the Swan Hills Treatment Centre (SHTC). The first two are based on in-depth interviews with residents in Swan Hills and residents of three nearby communities: Barrhead, Ft. Assiniboine and Kinuso (Baxter and Lee 2004; Baxter and Greenlaw 2005). Whereas those portions of the study are qualitative and focus on depth of understanding, this portion of the study is quantitative and focuses on how well initial findings extend to the broader Swan Hills population.

2. BACKGROUND

There are a number of potential explanations for why concern would be low near a potentially hazardous operational facility. For instance, in their review of sociodemographic predictors of concern Elliott et al. (1993) point out that men, older people, renters, and households without children are more likely to express lower levels of concern about a technological hazard. I will review the following conceptual explanations of low facility concern: sound management, economic benefits, sound facility siting, and insider reactions to outsiders.

Few studies revisit residents living near waste facilities or other locally unwanted landuses after they have become operational. Among some notable exceptions are three studies of municipal landfills where facility opposition and concern was high during the siting process, but declined considerably once the facilities became operational (Okeke and Armour 2000; Elliott et al. 1997; Furuseth and Johnson 1988). These studies show that even vehement opposition, can be transformed into something much less once the facilities open. Further, these three case

studies provide evidence for the “sound management” explanation of low concern. The high quality of waste management operations and effective mitigation quelled many people’s worst fears.

Others have suggested that concern is muted by economic benefits to the local community from the facility. It is generally assumed there is a cost-benefit tradeoff. Economic benefits like stable jobs, improved wages and other local concessions serve to offset hazard concerns since overall individual, household and community well-being are improved. In a group of studies about views of high level radioactive waste disposal facility siting across the USA, this thesis is tested with mixed results (Dunlap et al. 1993). For example, Krannich et al. (1993) do find that communities closer to the Yucca Mountain (Nevada) site value the economic benefits that a local radioactive waste repository might bring. Consistent with prospect theory (Kahneman and Tversky 1979) these studies also find that concerns about the threats from such facilities typically outweigh the imputed benefits. Further, benefits do not seem to be as important as safety measures and local “political” control over a facility (Jenkins-Smith and Kunreuther 2001; Kasperson 1999).

Another explanation for low concern is the process for siting the facility itself. A number of facility siting practitioners are hopeful that voluntary facility siting in particular will lead to win-win situations for operators and their “host” communities. In line with the economic explanation suggested above, communities in need of an economic boost typically volunteer to host the facility, ostensibly allowing the operators to focus less attention on community opposition, and more attention on the business of ensuring the facility poses minimal threat. Another advantage of such a process is that it has a strong potential to overcome problems of low trust in operators that plagues situations involving strong facility opposition (Rabe 1992; Zeiss and Lesfrud 1996).

The final explanation I consider comes from phase one of my study, the idea that insiders react to outsiders. In a series of 38 interviews with Swan Hills residents there was frequent mention of the stigmatizing effect of negative images of Swan Hills from media and others *outside* the town. We found that reactions to outsiders reinforced perceptions of low concern, but in the process may have muted outward expression of *any* concern (Baxter and Lee 2004). That is,

despite saying they were *unconcerned* when asked directly, many expressed at least some concerns (latent concerns) about the facility when probed with specific questions. All of these explanations: sound management, economic benefits, sound facility siting, and insider reactions to outsiders; are next explored in the Swan Hills context.

3. METHODOLOGY

Before outlining the survey I will briefly describe four aspects of the community of Swan Hills and the hazardous waste facility that led to their selection for the case study (see also Baxter and Lee 2004; Baxter and Greenlaw 2005). First, the Swan Hills Treatment Center, located 15 kilometres from town (*not* downwind of prevailing winds), is a large scale hazardous waste treatment facility with a relatively high local, provincial, and to some extent national, public profile. Second, the facility was located in Swan Hills using a 'voluntary siting process'. In 1982, 79% of the residents voted in favour of hosting the facility, but since the town is also transient, there is the potential that new residents may be concerned about the facility or even outright oppose it. The transience of the population is largely due to the fact it is a rural resource 'working town' of about 2000 residents, with primary industries such as oil and gas, forestry, and the SHTC as major employers. Nevertheless, working residents are rewarded with above national median incomes (\$56 559 compared to \$42 701 for the Province - Statistics Canada 1996). Third, approximately 10 years after becoming operational in 1987 there were two major incidents at the facility, a leak of PCBs, dioxins and furans in 1996, and a less serious explosion and fire in 1997. Thus, these events enhanced potential for residents to express concerns about facility safety. Fourth, the facility has now changed ownership a total four times (three times at the time of the survey), which could raise concerns about continuity in safety and expertise.

I conducted a telephone survey in the spring of 2002 to test some of the explanations of low concern in residents who do *not* work at the facility and do *not* have family that work at the facility. With 173 completed questionnaires, the survey had a response rate of 69%, with no clear bias in the refusals. The sample itself is largely representative of Swan Hills - actually comprising 8.5% of the entire population - with one notable exception: there is an

overrepresentation of women respondents at 62%. Since women tend to be more concerned about risks from hazards, we might expect the level of concern to be overrepresented (Elliott et al. 1993).

Table 1. Hypothesized predictors of being “unconcerned” (not at all concerned or not too concerned)

Predictors of <i>Low/No</i> General Facility Concern	Hypothesized Relationship
Benefits: employment, stabilize local economy, *community well-being, retain/attract people, maintain/improve town reputation, stimulate local economic activity	More perceived benefits
Information Source Importance Ranked 1st or 2nd: local media, neighbours, family/friends outside community, family/friends inside, community, third party (e.g. library or internet), *outside media	Inside sources more important than outside sources
Statements about “Outsiders”: “Outsiders are saying bad things about Swan Hills without the facts.”, “Swan Hills does not get enough outside credit for hosting the facility.”, “Swan Hills residents need to look out for one another because of the negative things outsiders say about the facility.”	Agree with pejorative statements about outsiders
Trust to Ensure Facility Safety: federal government, provincial government, local government, facility operators, local media, *outside media, environmental groups	Trust operators, local government, and local media
Siting Process: perceived fairness	Process perceived to be fair
Sociodemographics: gender, age, children <18 at home, length of residence, rent/own	Men, older (65+), no children at home, 5+ year residents, own

All but sociodemographics were measured on a 4-point Likert scale with no neutral response

* Statistically significant in crosstabs at 0.05 (in expected direction)

The questionnaire was introduced as a study about “community life and concerns” and there was no mention of the facility until about one third of the way through. This allowed me to ask questions to elicit “unsolicited concern” about the facility. The main topics are summarized in Table 1 which also shows the central hypotheses tested using the survey. Most variables were measured using a four point Likert scale, for example, “not at all concerned”, to “very concerned”, with no neutral response. Each of the four potential explanations - sound management, economic and other benefits, sound facility siting, and insider reactions to outsiders – are represented whereby for example, “sound management” is measured as “trust in facility operators”.

4. RESULTS

Concern about the SHTC has remained quite low. The first indication of low concern is that unsolicited; only five residents (2.8%) indicated that the SHTC was their first or second dislike about Swan Hills. Table 2 shows the different types of concern. These represent responses to direct questions about the SHTC and are derived from the face-to-face interviews (Baxter and Lee 2004). The “general concern” category is a catch all, and it was actually asked first in the concern section to test the latent concern idea. There is strong evidence for *relatively* low general concern with only 31% reporting that they were “very concerned” (12%) or “somewhat concerned” (19%). It is worth noting that the 69% “not too concerned” (32%) and “not at all concerned” (36%) combination is only 10% less than the 79% favourable plebiscite vote from more that 20 years previous. As somewhat of an aside, when asked how they would vote if the facility was to be put there “today”, 72% were in favour. However, this apparent low level of general concern seems to some extent, to mask latent concerns. That is, 63% of those who say they are generally unconcerned about the facility still mention being concerned about some other item mentioned in the list in Table 2.

Table 2. Facility-related concerns at Swan Hills (ranked by “very concerned”)

Facility-Related Concerns Frequency (%) N = 173	very concerned	somewhat concerned	not too concerned	not at all concerned	don't know refused
Negative Media Attention	75 (43)	45 (26)	28 (16)	21 (12)	4 (2)
Poor Community Image	24 (14)	75 (43)	26 (15)	46 (27)	2 (1)
Decreased Property Values	24 (14)	29 (17)	28 (16)	81 (47)	11 (6)
Impacts on Hunting and Fishing	23 (13)	38 (22)	27 (16)	82 (47)	3 (2)
GENERAL CONCERN	21 (12)	33 (19)	56 (32)	63 (36)	0 (0)
Poor Use of Taxes (re: Crown Corp)	21 (12)	33 (19)	31 (18)	70 (40)	18 (10)
Cyclical Employment	20 (12)	67 (39)	34 (20)	39 (23)	12 (7)
Health	19 (11)	25 (14)	34 (20)	90 (52)	5 (2)
Contamination	18 (10)	38 (22)	35 (20)	77 (45)	5 (2)
Conflict Between Communities	17 (10)	61 (35)	34 (20)	39 (23)	13 (8)
Transportation Safety	13 (8)	34 (20)	36 (21)	84 ()	5 (2)
Impacts on Tourism	13 (8)	40 (23)	41 (24)	72 (42)	7 (4)
Distribution of Compensation	12 (7)	26 (15)	21 (12)	57 (33)	57 (33)
Conflict Within Swan Hills	9 (5)	33 (19)	37 (21)	89 (51)	5 (2)
Impacts on Farming	7 (4)	8 (5)	12 (7)	127 (73)	19 (11)

The residents seem to agree there are a number of benefits from the facility (Table 3). The three that stand out most are employment benefits (87%), the stabilization of the local economy

(85%), and overall enhanced community well-being (72%). These figures are striking since they actually eclipse the numbers of “concerned” residents. Thus, even concerned residents concede the benefits of the facility for the community. It is worth noting that while the first two of these concern economic benefits specifically, the third – community well-being – is about a much broader form of benefit. Though well-being is likely connected to having steady employment, there are other less tangible forms of well-being that this may be tapping.

Table 3. Perceived Facility benefits at Swan Hills

Perceived Facility Benefits Frequency (%) N = 173	strongly benefits	somewhat benefits	not many benefits	no benefits at all	don't know refused
Employment	92 (53)	58 (34)	17 (10)	4 (2)	3 (2)
Stabilize Local Economy	81 (47)	65 (38)	16 (9)	8 (5)	3 (2)
Community Well-Being	39 (23)	85 (49)	29 (17)	10 (6)	10 (6)
Retain/Attract People	37 (21)	64 (37)	36 (21)	26 (15)	10 (6)
Maintain/Improve Town Reputation	36 (21)	70 (40)	32 (18)	23 (13)	12 (7)
Stimulate Local Economic Activity	35 (20)	53 (31)	42 (24)	29 (40)	14 (8)

As a first step in the analysis of the relationships of the predictor variables against general facility concern, crosstabs were run for each pair of variables. All variables except age were collapsed from four categories to two to avoid chi square cell warnings, with the former having only three categories (18-24, 25-64 and 65+). Table 1 shows that only three of the variables (marked *) proved to be statistically significant using a Fisher's Exact one-tailed test at the 0.05 level: benefit - stabilize the local economy; information source importance - outside media; and trust - outside media. All three of these are in the hypothesised direction whereby residents are *less* likely to be concerned about the facility if they: agreed the facility benefits community well-being; did *not* rank outside media as an important facility information source and; did *not* trust outside media to help ensure facility safety.

The second step took the three statistically significant variables from Table 4 and entered them into a binary logistic regression model of general facility concern. Each variable was forced into the model stepwise, in the order listed in the tables. The strength of relationship is measured using the odds ratio, which represents the increased odds of the being unconcerned in the presence of the reference category of the predictor variable. Since the farther an odds ratio is from one the greater the size of the effect, we see modest effects here. For example, residents

who were relatively unconcerned about the facility were: 2.39 times more likely to feel the facility benefits community well-being; 3.39 times more likely *not* to rank outside media as their first or second most important information source about the facility and; 2.04 times more likely *not* to find the outside media trustworthy. The latter, concerning trust, did not prove to be statistically significant at the 0.05 level. Overall the model is good with a Hosmer Lemeshov non-significant goodness of fit value ($p=0.97$), 70% of the cases correctly predicted and, 91 % of the unconcerned residents correctly classified. However; only 29% of the concerned residents were correctly classified. Since, the focus of this paper is on *lack* of concern the failure to classify concerned residents well is not a serious threat to the findings.

Table 4. Binary logistic regression on general facility concern

Predictors of <i>Low/No</i> General Facility Concern	*Odds Ratio	*Direction of Relationship	p value
Benefits: community well-being	2.39	+	0.037
Information Source Importance Ranked 1st or 2nd: outside media	3.39	-	0.014
Trust to Ensure Facility Safety: outside media	2.04	-	0.082
CONSTANT	0.24		0.011

* all categories are set so odds ratios are above 1 and a direction of relationship column is included

5. DISCUSSION

The level of concern about the facility seems to have increased slightly over time rather than decreased. That is, if we accept that the 79% who voted in favour of the facility were indeed “unconcerned”, the value has dropped to 69% measured as a concern variable. It has dropped slightly less, measured as a direct question about voting for the facility “today” (72%). Keep in mind that the sample is somewhat skewed towards concern since it excludes workers and their families and has a higher than representative proportion of women. Even if concern is static though, such a finding contrasts the literature which predicts decreased concern once a facility becomes operational. However, the SHTC case is a unique one in that the level of concern was quite low to begin with, whereas in the literature concern started out high prior to the facility becoming operational (Elliott et al. 1997; Okeke and Armour 2000; Furuseth and Johnson 1988). The effect may simply be due to the well know phenomenon of regression towards the mean, whereby the probability of obtaining higher values when they are already high is quite low. A

second reason may be the site history itself. Since the facility and community have together endured two serious accidents, and experienced three changes of ownership since the SHTC became operational, there may be some increasing doubts in the minds of these non-worker residents.

Though general concern about the facility seems low, there are a number of specific things residents *were* concerned about when asked directly. Thus, there is some evidence of a latent concern effect (Baxter and Lee 2004). Two of the four concerns that rank higher than general concern in the table actually have to do with stigma and media, not *facility* impacts per se. Nevertheless, there remain three other concerns (cyclical employment (51%), conflict between communities (45%), and contamination (32%)) that exceed the 31% unconcerned threshold. The inter-community conflict is consistent with Baxter and Greenlaw's (2005) finding that surrounding communities tend to have more concerns about the facility; causing inter-community friction. It is worth noting that concern may be even higher than the survey could detect since 50 (29%) of the residents openly agreed with the statement, "If somebody in Swan Hills were to speak out publicly against the facility they would be treated with suspicion". Thus, almost a third of surveyed residents indicate there is a social process which may mute concern in the community.

Most of the predictors of low concern do not show up as significant in the crosstabulations or the logistic regression model. The only significant predictors of low concern are community well-being benefits and the importance of outside media. Both of these are outside the mainstream explanations of sound management, economic benefits, and sound facility siting. The issue of management and accidents is discussed above in this section. As far as benefits are concerned, the findings should not be misinterpreted to mean that residents fail to perceive economic benefits from the facility; indeed 87% do, even 48 of the concerned residents. Yet such benefits simply do not prevent these "concerned" people from expressing general facility concern. Thus, Kahneman and Tversky's (1979) finding holds here, whereby concern about threats may overshadow benefits. This should caution facility siting agents not to overestimate the value of economic benefits for enticing communities to host facilities – bribe accusations may loom large if the perceived threats remain high (Jenkins-Smith and Kunreuther 2001; Kasperson, 1999).

Likewise for facility siting, since perceived facility siting fairness is not an important predictor of concern. This is likely a result of the fact that the voluntary siting process does not keep concern low rather, communities that are prone to low concern, or at least prone to suppress concern in favour of receiving the benefits, self select themselves for such facilities. This finding does not contradict the existing literature on the merits of voluntary siting per se (Rabe 1992; Zeis and Lesfrud 1996), instead it extends those studies to show that a fair siting strategy *may* not sustain low concern in the long run in the absence of trusted safety measures.

The finding regarding the lack of importance of outside media for those who are *unconcerned* is predicted by Baxter and Lee's (2004) finding that the residents seem to be "circling the wagons" to protect against negative community stigma. They report that the outside media is perceived to be publishing reports about the facility that either sensationalize negative facts and underplay, or outright ignore, positive facts about the SHTC and Swan Hills. The survey extends those findings beyond the original 38 people interviewed face-to-face. The distaste for what "outsiders" are saying/writing seems widespread among the least concerned residents in particular. This has potentially profound, and somewhat ironic implications since Lee (1998) points out that one of the consequences of being an "insider" is the lack of objectivity on issues; that is, since insiders are less likely to question the views of the group.

Perhaps the more surprising of the two significant variables in the model is the perceived benefit of community well-being. This is not explicitly predicted by any of the literature on perceived risk or concern about technological hazards that I can find. How residents are defining well-being is not clear, but the measure was actually meant to be a measure of "community health". It may be that residents are focussing specifically on the financial "well-being" that is associated with employment rather than less tangible effects of, for example, support for extracurricular sports such as curling and softball mentioned in the face-to-face interviews. Thus, the precise meaning of "community well-being" needs to be teased out in future research.

6. CONCLUSIONS

Taking into account bias in the survey sample, the level of concern about the SHTC has either increased slightly or stayed roughly the same. This seems to bode well for operators and perhaps the residents themselves. However, this may be deceptively encouraging for two reasons. First, the literature predicts that once a facility becomes operational concern *should* decrease. Second, there is an array of issues that still concern residents ranging from conflict with other communities to contamination. In fact the level of expressed concern may be suppressed somewhat by the social process of an “us” versus “them” response to outsiders who are at least partially comprised of media perceived to be damaging the facility and community reputation. The study also raises some interesting issues for facility operators in the wake of voluntary siting. That the perceived fairness of the process does *not* distinguish concerned residents from unconcerned residents, suggests that the process itself does not necessarily sustain low concern. If operators want to keep concern low in local communities, risk communication efforts should certainly not stop when the siting process does. Indeed risk communication has not stopped in Swan Hills which still has an active Community Liason Committee. Unfortunately, I did not directly test for any effects of the Liason Committee who might evoke trust or exacerbate the insider/outsider dichotomy or both. Likewise the effect of perceived benefits of community well-being on concern needs to be investigated further.

The implications of the insider/outsider effect are summarized in Baxter and Lee (2004, 726); the most serious one being that, “residents may become victims of their own moral stance against outsiders’ views”, if they ignore potential future warnings that the facility has become unsafe. That the survey reinforces this finding makes this issue all the more important to address from the point of view of: helping risk communicators understand and deal with lingering concerns; increasing self-awareness of this issue among residents and, not the least of which; pointing out to the media the potentially serious effects of sensationalized coverage unduly suppressing important local concerns about the facility.

7. ACKNOWLEDGEMENTS

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