

Do Sour Gas Facilities Affect Rural Land Values?

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INTRODUCTION

In 1988, a two-part study was initiated by Shell Canada Ltd. to investigate the effects of sour gas facilities on the market value of land. A new sour gas processing plant was proposed for the West Sundre-Caroline area (West Central Alberta), and some landowners were concerned that their property values would decrease. The Sundre-Caroline area has traditionally been a farming community, but recent demands for recreational and country residential property have created competition for property in this area.

There have been both sour and sweet oil and gas facilities in this area for many years. Therefore, analyzing

property sales over an extended time period, while controlling all other variables, would reveal any impact on land value due to sour gas facilities. Jim Lore & Associates Ltd., Calgary, Alberta, conducted the first part of the study. The second part of the study was conducted by Deloitte Haskins & Sells (now known as Deloitte & Touche), Edmonton, Alberta, in three areas of Alberta: Okotoks, Crossfield and Pincher Creek where large sour gas processing facilities already exist. There are, therefore, four independent study areas which can be compared.

The four communities are comparable in that each has existing sour gas facilities and there is a demand for country residential/recreational

and agricultural properties. The Sundre-Caroline area, the Okotoks area, and the Crossfield area are in demand for both recreational/country residential properties and agricultural properties. The Pincher Creek area has great recreational potential, although there were too few country residential/recreation property sales to allow a proper analysis.

DEFINITION OF SOUR

"Sour" facilities are those which have hydrogen sulfide gas associated with them. The definition of "sour" was taken from the Energy Resources Conservation Board directives, which is based on the potential fumigation resulting from an uncontrolled release into the environment. Facilities are considered "sour" if the directives applies. Thus sour facilities are those with sufficient hydrogen sulfide to require a setback (see Table I).

METHODOLOGY

The methodologies used for the different studies and areas were similar. Land sales transfer documents for a ten-year period, 1978 to 1988, were obtained and confirmed to be arm's length sales. Vendor or purchaser interviews were conducted by telephone regarding physical aspects of the property, and listing and price information. The presence or absence of gas facilities on or near the property was confirmed and the interviewees' perception of their effect on sale prices and quality was solicited. In addition, Deloitte Haskins & Sells used a similar questionnaire to interview local authorities and realtors in the three study areas: Crossfield, Okotoks and Pincher Creek.

Confirmed sales were divided into two groups: country residential/recreational properties and agricultural properties. The distinction between the use is not clearly defined

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TABLE I.**Minimum Distance Requirements Separating New Sour Gas Facilities From Residential and Other Developments**

Level of Sour Gas Facility	H ₂ S Release Rate m ³ /sec (Wells)	H ₂ S Release Volume m ³ (Pipelines)	Minimum Separation Distance	
1	≥ 0.01 - <0.3	<300	100 m	(except pipelines)
2	≥ 0.03 - <0.2	300 - 2000	100 m - 500 m -	Individual dwellings Unrestricted country residential Urban center or public facility
3	≥ 2.0 - <6.0	2000 - 6000	100 m - 500 m - 1500 m -	Individual dwellings Unrestricted country development Urban center or public facility
4	≥ 6.0	>6000	As specified by ERCB but not less than level 3.	

Source: ERCB ID 81-2 and ID 87-2.

by size, soil or access. However, size criteria was applied in the Sundre-Caroline area. Properties larger than 79 acres were considered agricultural, and those smaller were considered country residential/recreational. In the other three areas, land use information gained from the sale confirmation was used, but generally properties greater than 60 acres were considered as agricultural.

Three property categories were developed based on proximity to sour gas facilities (well sites, pipelines, plants), considering the setback criteria developed by the Energy Resources Conservation Board (E.R.C.B.) for sour gas facilities (see Table I). The "test group" includes properties with any sour gas facility on the property or within 500 meters

of the property boundary. The "buffer group" properties are within a one-mile radius of a sour gas facility but not part of the test group. Deloitte Haskins & Sells further includes any property within 2.5 miles of a sour gas processing plant in the buffer group. The "control group" consists of those properties which do not fall into the other two groups.

Each land sale was adjusted using standard appraisal techniques. The sales were then analyzed using statistical tests. Jim Lore & Associates Ltd. used two tests: the Paired-Sample t-Test and Regression Analysis. Deloitte Haskins & Sells used the Student's t-Test for Pairs Analysis, Regression Analysis, and Analysis of Variance and Covariance. A confidence level of 90 percent was used in

the analysis of all test results.

Interviews conducted with purchasers and/or vendors of both types of properties documented perceptions of the effects of sour gas facilities on sale prices. The properties were then inspected by an appraiser. Standard appraisal techniques were used to adjust the sale price differences to a standard for comparison purposes. Factors considered were time, Canada Land Inventory (C.L.I.) class (Agriculture), location, size, and improvements.

RESULTS

Agricultural Properties

Some purchasers of agricultural properties responded that the facilities were a nuisance. With oil and gas

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wells, some purchasers felt that the price had increased. There is an annual payment for well sites, but not for most pipelines and plant sites. If the payment is higher than the nuisance cost, then the surplus may be capitalized into the price. A small proportion of purchasers felt that the price had decreased, but most felt that price had not been affected.

Following standard appraisal techniques, sales were adjusted to reflect sale price differences because of time differences. In general, sale prices increased up to 1982, then decreased to a relatively stable market in 1984.

Agricultural land sales in the Pincher Creek, Crossfield and Okotoks regions were analyzed using both adjusted and unadjusted 1984 values. This was done to minimize the possibility of incorrect adjustments. For the Okotoks and

Crossfield areas, statistical analysis showed land prices were not measurably affected by sour gas facilities.

The sample size in the Pincher Creek area was not sufficient to allow analysis on a C.L.I. soil class basis. Therefore, the results were inconclusive.

Sour gas facilities had no significant effect on agricultural property sale prices in the Sundre-Caroline area. The number of cultivated acres on a property and the C.L.I. rating were the only two factors found to influence sale price.

Country Residential/Recreational Properties

Most purchasers of residential/recreational property in all four areas were aware of oil and gas facilities and their relative distances. However, many people did not know, at the time of sale/purchase, whether a

facility near their property was sour or sweet or if in fact there was a facility on the property they had acquired. None of the purchasers felt that the facilities had increased the price paid and many felt there was no effect on price. Some respondents considered the facilities on their property a nuisance.

For country residential/recreational properties analyzed in the Okotoks region, four variables were significant at the 90 percent level in determining sale price. These variables were total building value, year of sale, total acreage, and distance from Calgary. However, the presence or absence of a sour gas facility was not statistically significant in determining sale price.

In the Crossfield region, regression analysis of the country residential/recreational property sales indicated

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that the total value of the buildings and the total acres were the variables of significance at the 90 percent confidence level. No significant difference in selling price between properties in the test group or the buffer zone could be linked to sour gas facilities and control groups.

as only three sales could be classed in the test group. There was no significant difference in price between the test/buffer group and the control group. Further analysis identified size of property and distance from a town as the most significant factors affecting the price of country residen-

to 40 or more years. At any one time, there is an approximate average of 1.5 to 3 percent of the agricultural land for sale. Location is important to both agricultural property and country residential/recreational property buyers, but soil capability is reflected in agricultural land values. Purchasers with serious objections to sour gas facilities may simply avoid purchasing in areas with extensive sour gas development. Apparently not enough purchasers with this view affect the market. Many factors are considered in a decision to purchase property. Some of these are:

Location is important to both agricultural property and country residential/recreational property buyers, but soil capability is reflected in agricultural land values.

There were not enough sales of country residential/ recreational properties in the Pincher Creek region to provide an adequate sample size for statistical analysis.

For analysis of country residential/recreational sales in the Sundre-Caroline area, the test group was combined with the buffer group,

tial/recreational properties, and location of the property was an important factor.

DISCUSSION

A number of contributory factors may be interconnected in these findings. Agricultural land comes on the market rarely, perhaps once every 10

- Financial capability
- Location, including road quality and distance from towns and proximity to other properties
- Improvements, such as cultivation,

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shelter belts, buildings, etc.

- Soil rating
- Other considerations, i.e., aesthetics

Sour gas facilities, therefore, are not normally of paramount importance.


There are situations in which a measurable decrease in market value could be expected to occur from the presence of a sour gas facility on or near a property, resulting in an adverse price effect. An example would be a quarter section with the potential for urban development which has a sour gas facility rated level 3. The E.R.C.B. setback rules are very specific and reflect the safety factors necessary in case of an uncontrolled H₂S release. The setback ruling precludes urban development within 1.5 kilometers of a level 3 facility. In such

a case, the market value of the property could be adversely affected, creating an injurious effect. The fact that injurious effect to the land related to sour gas facilities was not found in any of the four study areas indicates that no conflict has yet arisen between setback requirements and the highest and best use in the area.

CONCLUSION

The analysis and investigation of sales over a ten-year period in each of four Alberta communities indicates that sour gas facilities do not have an effect on land price. Generally, the perceptions of the purchasers interviewed reflected the statistical findings that most purchasers felt that oil and gas facilities had not influenced price either positively or negatively. The most common complaint in inter-

views was that the oil and gas facilities were a nuisance, primarily because of noise and odors.

Overall, for agricultural properties, factors influencing sale price were those associated with productive capability. For country residential/recreational properties, distance to a town, size of property, and location were the most important factors affecting sale price. For both types of property, presence or absence of oil and gas facilities was not a factor in determining sale price. 

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