

**Component Study
Odour
Environmental Impact Statement
Cavendish Cattle Farm
Registration # 2002**

Volume 2i

The Environmental Impact Statement Guidelines (Guidelines) for the Cavendish Beef farm require the preparation of an Odour Component Study as per Section 12 of the Environmental Assessment Regulations. The Guidelines stated Viking “shall conduct a comprehensive modelling study which will consider: 1) the odour baseline from the existing facility, and 2) the projected odour based on the facility operation described in the registration document.

In the Spring of 2020 Viking discussed the preparation and applicability of a modelling study with the Department of Environment and Climate Change. (The Department) The Department concluded a modelling study was not an appropriate means of addressing odour concerns and informed Viking to obtain an alternative from an environmental consulting company. Independent Environmental Consultants Inc. (IEC) was engaged and recommended a ‘risk report’, including public consultations along with recommendations to mitigate odours be prepared. This approach was acceptable to the Department and IEC was contracted by Viking to prepare the study and report.

Background

As stated, Viking discussed the applicability of the Plume Dispersion Modeling approach with the Department to meet the requirements of the EIS Guidelines. It was understood the variety of farm practices with various types of odours, combined with seasonal, indeed daily changes, further complicated by a wide range of meteorological variations resulted in a need to consider alternatives to a modelling study. Furthermore, an approach should include public consultation and recommendations for odour controls.

Independent Environmental Consultants, (IEC) explained a modelling study was not an appropriate method to assess existing and projected odours. IEC stated its conclusions based on the inability of models to relate to changing nature of odour emissions at the farm and in the community as a result of combinations of odorants, variability in odour emission rates and dynamic changes in meteorology. Furthermore, the inability of models to relate to odour intensity, hedonic tone and overall community sensitivity. It was further explained models would be unable to relate to other odours (non-Viking) that may be contributing to concerns. As expressed in their Report, Qualitative Odour Risk Assessment and Mitigation Planning Report, Cavendish Beef Farm, (The Report) “Most importantly, the current method (recommended by IEC and accepted by the Department,) was selected as it employs a community-based engagement and survey approach that focussed on understanding odour effects through a dose response relationship.”

Background to the Odour Component Study

The Risk Report assessed the odour potential of the *proposed* cattle/farmland expansion and the *existing* Viking Fur Farm. The assessment evaluated potential odour risks to the local community originating from Viking's current mink farm, manure spreading activities and future cattle operations.

The Risk Report was prepared as the basis to the Odour Component Study required pursuant to the EIS Guidelines. The Risk assessment, based on odour sources, nature of odour, distances to residents/business/outdoor attractions, maintenance of weather/odour diaries by residents, meteorological data and sensitivity to odour of the residents, explained the likelihood of farm odours being experienced by residents within an area of about five kilometres from the farm. (Beyond the five kilometres distance it was concluded the risk of farm odour was negligible). Whereas, the Risk Assessment concluded there was a risk of strong farm odours from the *existing* mink farm, it recommended several administrative and physical actions which the farm should consider to reduce odours on the *existing* farm.

The IEC Report included a description of odour potential along with an explanation of odour sources on the farm along with controls which Viking has implemented. The Report includes a description of the farm including:

- Farm size
- Manure management system and manure production
- Composting facility and composting techniques
- Manure spreading
- On farm feed production, including feed stock, processing, freezing and delivery to the barns.
- Existing odour management controls
- Odour potential from the proposed cattle farm
- Wind direction and wind speed
- History of Odour Complaints

The Report explains the participation of 19 residents who maintained diaries of odours and weather for one month in the summer of 2020. The results of the resident surveys were an important component in determining the risk/level of farm odours impacting the community.

The Report includes several additional controls than currently practised on the mink farm to reduce/control odours. Furthermore, the Report recommends an Odour Management and Control Plan be implemented for the entire farm. A key component of the Plan would be the participation of the community to assess the effectiveness of controls and as a means to determine how to proceed based on the degree of success of the actions.

Odour Risk of the Existing Mink Farm/ Risk Report

Qualitative Risk Assessment

A qualitative risk assessment was used by IES to evaluate the potential for adverse odour effect on the community. This required an evaluation of:

- the source of odour;
- the pathway through which the odour travels. e.g., distances, terrain, wind direction;
- and the receptors, such as residential dwellings or tourism lodgings.

The scale or impact of odour exposure is determined by the following factors: Frequency, Intensity, Duration, Offensiveness and Location, collectively referred to as FIDOL factors. (Table. 4-1, Summary of FIDOL Factors in the IEC Report.)

Qualitative risk-based assessments are founded on the principal that overall risk of an odour exposure occurring is dependent on the *probability* of an exposure occurring at a given location and the *consequence* of the effect resulting from the exposure. i.e., impact; loss of amenity.

The risk of adverse impact from exposure is effectively described using a “dose-response relationship” whereby the magnitude of the effect is determined by the relative magnitude of the dose and the response. The dose/odour exposure or the impact is determined by the FIDO Factors. The risk of an adverse effect is determined based on the interplay between the severity of the exposure (dose) and the sensitivity of the receptor (response).

Assessment Approach

The relative accuracy of a qualitative risk assessment to predict impact is largely dependent on:

- the accuracy of the ranking of the magnitude of the source release,
- the effectiveness of the pathway and;
- the sensitivity of the receptor.

In terms of **Odour Source Potential**, the risk assessment would consider:

- magnitude of odour release and any odour-control measures (odour from the farm)
- the unpleasantness of the odours and odour associated with the compounds which are the source of the odours.

In regards to **Pathway Effectiveness**, the distance between the source and the receptor (residents/property owners) along with wind direction and speed are important. In addition, topography, the effectiveness of dispersion and of any controls used to reduce odour to the receptor.

These estimates of source odour potential and pathway effectiveness are then considered together to predict **Risk of Odour Exposure** at a given receptor location.

Table 4-2 Risk of Odour Exposure (Source Odour Potential and Pathway Effectiveness)

The final step is to estimate the effect of the odour exposure on the receptor, with consideration to the **Receptor Sensitivity** which is assessed in Table 4-4, Risk Report, Risk Factors for Odour Sources, Pathway and Receptor Sensitivity. The following are examples of the types of considerations which are included in the referenced table.

- a) odour source (e.g., size, odour type, unpleasantness, mitigation /controls etc.)
- b) pathway effectiveness (e.g., proximity to the source, prevailing winds)
- c) receptor sensitivity (e.g., impact on user's enjoyment of property; length of time people are impacted)

On the basis of user expectations on enjoyment of amenity; and the duration and frequency of exposure of individuals, **Risk of Odour Effect** is then characterized as either:

- negligible,
- slightly adverse,
- moderately adverse or;
- substantially adverse.

For development projects, the overall odour effect is likely to be considered significant if it is Moderately Adverse or Substantially adverse, while for Slightly adverse or Negligible effects, the impact may seem to be acceptable or tolerable.

IEC concluded odour from the existing mink farm and manure spreading activities was determined to be moderately adverse within 1,400 metres of the farm and slightly adverse from 1,400 to 3,400 metres. (Table 5-6: Likely Odour Effects Existing Mink Farm and Manure Spreading Activity. In consideration of this table IEC states: "The presence of a **Moderately Adverse** effect at the most sensitive receptors warrants consideration to additional controls to reduce odour risk." IEC recommended supplemental odour controls (mitigative) in Section 6.1 of their report.

Cumulative Effect: Mink farm and the Proposed Cattle Farm

The cumulative effect represents the combination of the existing mink farm, current and future manure management activities and the proposed cattle farming operation including pasture and forage usage. The Report concludes the addition of beef cattle is not expected to increase the cumulative odour risk from the farm. The likely cumulative effect from the release of odours is considered as:

Moderately adverse for the most sensitive receptors (within 1,400 metres)
Slightly adverse for the most sensitive receptors (1,400 to t 3,400 metres)
Negligible greater than 3,400 metres.

Odour Management

The IEC Report states the containment and mitigation of odours at the source (farm/manure spreading) through the implementation standard operating procedures (administrative controls) and physical controls (i.e., cover over the manure storage tanks) are effective methods to help control odour formation and dispersal. Whereas the risk of effects of farm odour to the community ranges from slightly adverse to moderately adverse, there is a need for supplemental odour controls, short and long term, to help reduce impacts. A complete list of the controls is listed in section 6.1 of IEC's report. The controls/mitigation proposals are discussed in the EIS and in particular in sections 7.1, 8 and 14.

The Report concludes the implementation of planned or future odour controls should be completed in a stepwise approach whereby a specific control or group of controls are tested/implemented followed by consultation and engagement with the community to determine the effectiveness of the controls.

A comprehensive evaluation of the various control options would be used to support the development of a more detailed Odour Management Control Program. (OMCP) The Program would use a framework which promotes the consistent and regular review, evaluation and improvement of facility management. The Report recommends Viking consider an environmental management system (EMS) which promotes the consistent and regular review, evaluation and improvement of facility performance. The basic elements of an EMS include:

- Defining policies and setting goals
- Analyse environmental impacts
- Selecting targets to reduce impacts
- Establishing programs to meet these targets
- Ensuring employees' environmental awareness and competence; and,
- Reviewing Progress and making improvements.

Details of the OMPF are included in section 6.2 of the IEC Report.

The following is an overview of additional information from the IEC report.

- Dominant wind direction during the summer months, where the majority of historical complaints were received, blow from the south-west, west-south-west and south-west 59% of the time. On that basis, it is likely that winds will be blowing towards sensitive receptors during regular summer farm operations.
- Odour intensity generally decreases as the plume (odour) moves farther away from the source of odours.
- Most of the odour complaints reported to Service NL from March 2014 were outside of the winter months, during the seasons when temperatures and humidity were elevated
- The community-based engagement conducted as part of the Risk Report, reported that 82% of the odour events were downwind of Viking Fur Farm. (northerly direction from the farm)

- On days when Viking spread manure, 11.8% of odour survey responses identified an odour event; on days when they did not spread manure, 9.8% identified an odour event
- 83.7% of the entities, when reporting strong odours recorded a temperature of “warm” or “hot”
- The IEC report explains odour complaints tend to increase proportionally to increase in ambient temperature, humidity and wind speed.
- The exposure to odours would be impacted by the time residents/tourists spent time outdoors or indoors with windows open.
- The proposed cattle operation (pasturing) is considered to have low odour potential
- The existing mink farm and mink manure spreading has a risk potential, described as ‘Moderately Adverse’ for the most sensitive group who lived or operated businesses within 1,400 metres of the farm.
- Mink manure is spread 2 to 3 times a year
- The Cumulative Odour Effect of the *existing mink farm* and the *project proposal* is considered moderately adverse based on the existing mink farm, mink manure spreading and the cattle proposal. Therefore, it is concluded the proposed cattle project would not increase the risk of high odour impacts. As discussed under the atmospheric section, manure spreading on new pasture lands, particularly upwind (prevailing summer winds) may add to the odour to the Brook Cove area. Although concerns of odour are not as prevalent south of the farm towards Cavendish, one business explained, during consultations with the tourism industry odours are occasionally strong if manure is spread during a north wind. At the public information session, an individual explained a residence located a couple of hundred metres south of the proposed expansion has experienced odours on a frequent basis.

Conclusion

In conclusion the proposed cattle farm resulted in a comprehensive review of the existing mink farm in respect to odours. The Report concluded the addition of cattle would result in a negligible increase in odours.

The Report recommended a series of controls to reduce odours. Specifically, to reduce odour in the Brook Cove Area, Viking agreed to cease manure spreading on the oceanside of Route 80 which would also mitigate odours from manure spreading on expanded pasture. This action had encouraging results and combined with the covering of the manure storages in the spring of 2022, odour releases from the mink farm will be further reduced. These concrete actions with a commitment to implement and assess other potential controls will reduce odour and facilitate productive relationships with the community.

The next step would be the development of a more detailed Odour Management Control Program. (OMCP) This program would involve a framework which promotes the consistent and regular review, evaluation and improvement of facility management, for the entire farm. The aim is an ongoing process with community engagement to implement achievable farm practice to reduce odours.