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REGULATING THE RAPIDLY DEVELOPING OIL SANDS INDUSTRY IN ALBERTA AND ITS IMPLICATIONS ON ENVIRONMENTAL NOISE MONITORING AND ASSESSMENT

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Abstract

Alberta is rapidly developing its extraction industries to mine oil out of sand (oil sands) with currently estimated reserves of 1.7 to 2.5 trillion barrels of oil [1]. The provincial environmental regulator is the Alberta Energy and Utilities Board whose charter includes regulating and facilitating energy development in Alberta.

In 2007, a stricter noise code is being introduced which includes mandatory compliance with 40 dB(A) at 1.5 km from a facility, regardless of whether receptors are present.[2] As well, monitoring, modelling and reporting procedures have changed from previous practice and these are described. The influence of Alberta's regulatory path with other provinces is also described.

In western Canada, the most significant stakeholders after government are First Nations groups. First Nations people in Canada have land treaties with the Canadian government that have been in existence since the settlement of Canada. These treaties have allowed First Nations people in Alberta to maintain their traditional ways and gain from the development. First Nations people in Canada have a significant amount of influence in the environmental approval process. Their role in the project approval process, including noise issues is discussed.

Health Canada, the National Government's Health Authority is also a significant regulator with concerns focusing around land use, controlling sleep disturbance and cumulative impacts. Health Canada's draft 2005 guidelines and the effects of these guidelines to Alberta's development are briefly examined.

1. INTRODUCTION

The Canadian environmental noise scene is an actively developing and emerging environmental field. Provinces in eastern Canada have well defined noise regulations that they have been practicing for many years, whereas western Canada has fallen behind. However with the boom in energy resources in Alberta, notably the oil sands developments, there has been increased pressure for more stringent environmental controls. The pace of this

development has quickened dramatically over the past few years especially in western Canada. The Federal Government of Canada with jurisdiction in certain cases has taken a more active role in providing environmental noise guidelines. As well the province of Alberta is now leading the western and northern provinces/territories into more comprehensive environmental noise guidelines and criteria, in particular through its agency, The Alberta Energy and Utilities Board (EUB).

2. THE REGULATORS

2.1 Federal government involvement

In Canada, the two levels of government directing environmental noise policy are the Federal and Provincial Governments. The Federal Government currently does not have a national noise regulation. However, they are active participants in regulating noise in Alberta when it falls within their jurisdiction. The triggers that include Health Canada's right to intervene include; projects developed on government lands, where federal permits are required (usually when waterways are disturbed) or when federal funding for a project is required.

The Federal Government regulates noise through Health Canada's (HC) advice on guidelines to be applied through the Canadian Environmental Assessment Agency (CEAA). CEAA's role is to provide Canadians with high-quality environmental assessments that contribute to informed decision making, in support of sustainable development. HC is also the reviewing body for federal noise related issues. HC is presently developing guidelines based on a dose response relationship and the concept of limiting the increase of highly annoyed people in the exposed population. HC's concerns extend to effects on worker camps, effects on First Nations special areas, and the consideration for receptors such as schools, hospitals and retirement homes. Sleep disturbance is a primary concern in these guidelines. These concerns are brought together in an Environmental Impact Assessment (EIA) and submitted to the government.

2.2 Provincial government involvement

In Alberta, the Provincial Government has stricter noise regulations than the Federal Government. The environment department, Alberta Environment (AENV) does not regulate noise. AENV only indicates what is needed to be assessed if an application is made and there is public concern. For energy related projects, noise related issues are governed by the Energy and Utilities Board (EUB) environment minister through "Directive 38: Noise Control". There are special cases where a municipal regulator over rules the EUB however for the most part, the energy industry governs itself. Their prime responsibility is to administer and encourage energy related industries to develop in Alberta but they play a dual role. With one arm (environmental) they regulate noise through Directive 38 which imposes noise conditions that must be met by developers. With the other arm (facilitator), they encourage industry development.

3. THE STAKEHOLDERS

Stakeholders include any person, group or organization that has interest in the area under development. In Northern Alberta, the main stakeholders are leased federal land (crown-land), First Nation (Indian) reserves and private land. With crown lands, surface and mineral (sub-surface) rights are typically owned by the Federal Government. Usually in cases where

farmers or developers are leasing crown-land, the Federal Government either waits for the lease to run out or the government negotiates a new lease with the leaser. In the case of private lands, the developer usually buys the land from the land owner. These two stakeholders are typically forced to negotiate. With private lands negotiation is usually straight forward. However, in the case of reserves and First Nations lands, negotiations are not so cut and dry. Reserves were developed between the First Nations and Federal Government when Canada was first being developed. Tracts of land were decided on by the first governments of Canada for the First Nations people to settle on. They are by definition in the Canadian Indian Act a “tract of land, the legal title to which is vested in Her Majesty, that has been set apart by Her Majesty for the use and benefit of a band.”[3] The Act also specifies that land reserved for the use and benefit of a band which is not vested in the Crown is also subject to the Indian Act provisions governing reserves. In these cases, the Federal Government owns the land and has agreed with the First Nations people, the use of the land. There is much discrepancy with the titles of most of the First Nations lands in Northern Alberta where most of the resources are found. A more detailed discussion of the background and issues surrounding this issue is given in the Alberta Oil Sands’ section.

4. APPLICATION PROCESSES

How is an application for an energy project completed in Alberta?

An energy project application is started by the client advising CEAA that they are interested in applying for a project. If there is federal funding, if the project is on Crown land or if the project has the potential to disturb waterways than federal involvement is necessary.

On a provincial level, the client meets with Alberta Environment to discuss the necessary requirements; an industrial permit or a Noise Impact Assessment (NIA). The client notifies EUB (if it is an energy related project) of their study project and plan in a public disclosure document. Then, the client informs the general public of the proposed project and holds a public consultation meeting to discuss the issues of concern for the people living in the area. The size and type of project being proposed, determines which regulators and which issues will be addressed. If a project is small, non-energy related and does not trigger federal involvement than no noise assessment needs to be completed. For energy related projects that are small, typically only a noise impact assessment (NIA) is required. If a project is large, is not energy related but there is public concern, than an NIA and/or an EIA may need to be completed. Finally, if the energy related project is large and has strong federal and public concern then an NIA and an EIA are required. Figure 1 illustrates the procedure.

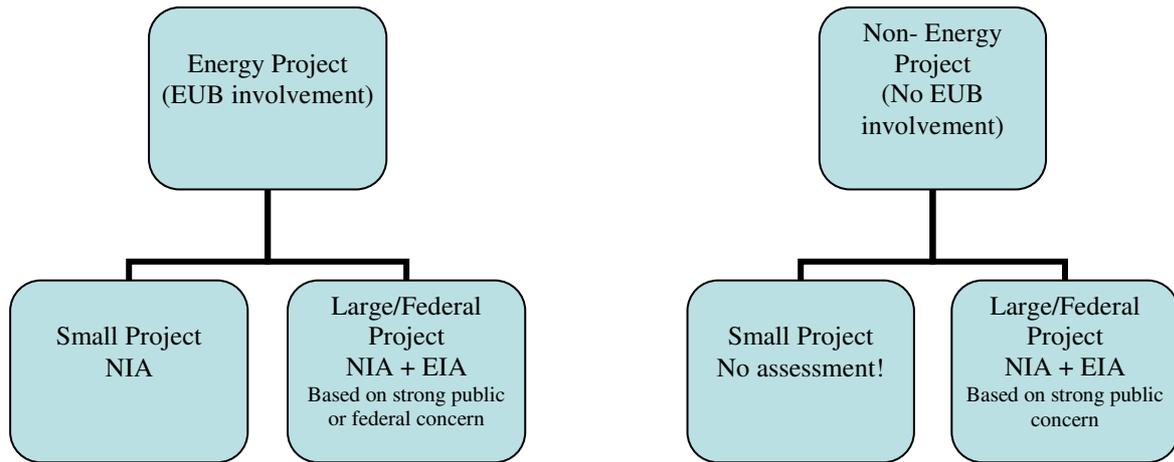


Figure 1 Energy versus non-energy project application qualifiers

Once the project requirements have been determined the client may begin with the application process. Often, part of the initial process involves public consultation with the communities in the affected areas. During this time, the public has the opportunity to voice their concerns or issues with the project. These issues are usually added to the terms of reference (ToR). This is based on the outcomes of the public meetings and on EUB’s discussion.

Once the application has been completed, the review process begins. The information required for the application to be approved depends on clearly defined requirements. In Alberta, an application must be approved by the Alberta Environment minister and by the EUB. This is unique in Canada in terms of Environmental issues because Alberta has a shared response between AENV and EUB but for most provincial environmental applications one department issues a response. The federal requirements and follow-up must also be addressed; however, management of these requirements usually occurs at a provincial level.

5. HEALTH CANADA

Health Canada currently, does not have a national noise regulation but it has published a draft noise guideline document. Even though the document is not widely known, it has been made part of the public record and is now considered by developers seeking federal approval. In the last year, Health Canada indicated that they will be developing a formal federal noise guideline for Canada but in the interim the draft document requires assessments surrounding worker camps, First Nations cultural areas, but also includes sensitive land uses such as residences, schools, pre-school day care, hospitals and retirement homes for both operational and construction noise, with consideration for the characteristics of the noise. These areas revolve around a dose response relationship expressed as a percentage of the population highly annoyed, and sleep disturbance.[4]

6. ALBERTA’S NOISE CRITERIA - DIRECTIVE 38

In Alberta, the EUB Directive is the noise criteria used in noise impact assessments for energy related developments. The western provinces and territories do not have noise guidelines of their own and often use Alberta’s directive for their own noise concerns when completing an assessment. In February of this year, the EUB came out with a revised Directive 38. Features of the Directive are described here.

6.1 Permissible sound level

The PSL is the night time noise level in dB(A) expressed as L_{eq} that is required to be achieved at all receptors. It is made up of a basic sound level (BSL) plus a 5 dBA allowance, plus adjustments intended to more accurately reflect specific aspects of a facility and the environment. A basic sound level (BSL) is determined based on the number of dwellings per 65 hectares of land. Adjustments are made to the BSL which considers daytime level increase, nature of the activity, seasonal adjustment and specific ambient conditions [2].

In a noise impact assessment (NIA), the predicted facility noise levels plus average rural ambient levels are compared to the PSL. For complaint issues, the actual isolated facility noise levels are compared to the PSL. [2]

The PSL is based on summertime conditions since a majority of complaints occur during these times. Normally a facility has to be designed to meet summertime conditions. If complaints occur during the winter and not in the warmer months, then the PSL may be modified for winter conditions after consultation with the EUB.[2] Winter conditions include frozen ground, snow covered ground and temperatures around 0°C.

Sound levels of existing and proposed facilities may not exceed the PSL. In areas with established energy facilities, the licensee may want to discuss the proposed project with adjacent licensees, as the PSL may already be calculated for the nearby residences (a residence can only have a single PSL).[2]

6.2 Sound level limit

Receptors that lie within 1.5 km of a facility fenceline must be included in a noise assessment. Receptors are identified as, permanent and seasonal dwellings however, the Directive also recommends to include wildlife areas in the assessment. Wildlife areas are typically included at the request of First Nations groups since they rely on wild meat such as caribou, moose and deer for food. Since this is a concern for the First Nations, the EUB intends to research the issue further.

Seasonal dwellings can be cabins that are used sporadically throughout the year for the purposes of hunting/trapping by First Nations people. In the case where there are no seasonal or permanent dwellings, the EUB has regulated that sound levels are not to exceed 40 decibels energy level equivalent (dBA L_{eq}) during the night-time at 1.5 km from an energy facility fence.[2] In other words noise conditions are imposed whether there are receptors or not. This target was not mandatory until the publication of the revised Directive 38 in February. This is intended to take a prudent approach to any future encroachment to development sites as well as cumulative effects for the area. This approach indicates the independent and possibly unpredictable process and land use planning and control with the potential to conflict with good environmental planning. It is interesting to point out that non energy industries are excluded from this requirement.

6.3 Low frequency noise

Low frequency noise is becoming a growing concern to communities, especially for cattle ranchers and possible but as yet unquantified effects on wildlife. The EUB have indicated that low frequency noise should be assessed in cases of wind farms and facilities with LFN possibilities.[2] These possibilities may be situations where the dBA value is satisfactory but there is still a great deal of annoyance created by LFN. The case when LFN should be assessed include new facilities or facility modifications or expansions where a clear tonal component exists at a frequency below 250 Hz, and or when the isolated (i.e., non-facility noise, such as wind noise, has been removed) time-weighted average dBC – dBA value for

the measured day- or night-time period is equal to or greater than 20 dB. The Directive recommends that where data are available, C-weighted sound pressure level (dBC) and A-weighted sound pressure level (dBA) should be assessed to minimize the potential for LFN concerns. The issue of tones and low frequency are considered together in this approach.

6.4 Models

At one time, formal noise models such as SoundPlan and CadnaA were not required for use in predicting noise assessments. The EUB's new directive requires that a predictive noise model be used. Though the acoustic modeller has the flexibility to choose the appropriate model, a list of parameters and conditional inputs must be incorporated in the model. These included;

- geometric spreading,
- barrier effects,
- atmospheric absorption,
- ground attenuation, and
- specific wind speed/direction.

It is noted that mild downwind and/or temperature inversion conditions should be considered, but are not required for modelling [2].

Since most of the issues concerning noise occur during the summertime, the following must be used in modelling summertime conditions for an acceptable NIA;

- wind speed: 5.0 to 7.5 kilometres per hour,
- wind direction: from the facility to the receptor(s),
- temperature: 0 to 25 degrees Celsius,
- relative humidity: 70 to 90 per cent, and
- ground cover: consistent with site conditions. [2]

6.5 Measurement standards

Measurement of noise and baseline conditions are being taken into serious consideration and recognized as an important part of the noise assessment. In particular, meteorological conditions and calibration procedures are changing. Measurement instrumentation, measurement techniques and calibration requirements have been added for sound level meters in accordance with appropriate standards. Meteorological affects such as wind speed and wind direction measurements must be taken near the vicinity of the sound monitoring position. Monitoring cannot be conducted during times of unfavourable weather conditions. These include snow, water or ice on the ground, during periods of precipitation, short-term wind gusts lasting more than five minutes in duration and up to 20 km/hr is not acceptable.[2] Also, microphone position and orientation and abnormal noise event must be taken into consideration when monitoring. The condition of a snow free ground imposes significant constraints for the monitoring season in Canada where snow can lie on the ground for many months. In the oils sands area of Alberta, the field season can last only from June through September.

6.6 Cumulative effects

The Directive 38 changes have been made due to the growing energy industry. One particular part of a noise assessment that has always been assessed by other EIA components except noise has been cumulative effects. Until now, cumulative effects of an area have not been assessed for noise since noise was not a concern. The new Directive 38 assesses cumulative noise using the PSL. The existing and proposed developments must not exceed the PSL for a receptor. Though the Directive has good intentions, the Directive may fall short unless it extends its application of the criteria to include other industries (not just the energy industry)

in order to properly assess cumulative noise effects in an area.

7. ALBERTA OILSANDS REGION

The largest developed area in Alberta is the oil sands in the boreal forest of northern Alberta. Here crude oil is extracted from sand either by conventional mining or unconventional in situ technology. There are three reserves: Peace River, Cold Lake and Athabasca. Together they are worth \$1.7 trillion and encompass 80,000 km² of land, larger than the size of Tasmania. The Peace River and Cold Lake deposits are at depths greater than 80 metres and are mined by in-situ steam assisted gravity drainage (SAGD). The Athabasca deposit is less than 80 metres below the surface and can be conventionally mined (open pit). Only 20% of the entire oil sands resource is mined by open pit techniques, the other 80% are in-situ extraction.[1]

Understandably, some of the biggest oil companies are developing in the area. Suncor, Syncrude and Albion have been the leading companies in the region gaining from the resource however, in recent years Petro-Canada, Shell Canada, Royal Dutch Shell, Canadian Natural Resources and Imperial Oil are also in the process of developing mines and facilities.

This area of Canada is also largely inhabited by First Nations people. There is active debate between the Federal Government and First Nations groups as to who owns the lands and mineral rights in the oil sands region. In 1899, Canada entered into Treaty 8 with the First Nations groups of northern Alberta. The element of the treaty included provisions to maintain the livelihood for the native populations in 840,000 km² of the region. The affected First Nations were to keep rights to water and minerals, including underground rights. The Federal Government claims the treaty boundaries had surrendered any claim to title except the lands set aside as reserves.[3] Since this debate still exists; First Nations groups are an integral part of the approval process.

Regulators include CEAA (meaning Health Canada in relation to noise), the Alberta Environment and the Alberta Energy and Utilities Board. Noise assessments must be conducted to meet the requirements of all regulators and to satisfy all stakeholder concerns. This means that assessments have to include quite separate assessment methodologies adopted by the different tiers of government as previously described. In addition, with large, multi-regulator approvals there is a required public review and often public hearings. Stakeholder groups can apply for funding to intervene in an approval. Due to the sensitivities around First Nations treaties and ongoing disputes regarding treaty lands, assessments as a matter of course address the concerns of First Nations. As their issues can involve noise both directly (impact on communities) and indirectly (impacts on other aspects of the environment such as animals which may impinge upon their traditional lifestyles) this adds another dimension to the work.

8. DISCUSSION

The 2007 Directive creates the most stringent noise regulations in Canada, however is focussed only on the energy industry. The more stringent criteria are not expected to stifle oil and gas or power sector development (to our knowledge, no project has ever been cancelled due to noise issues), but are expected to make the review and approval process more challenging for areas where cumulative effects are expected to occur. For the oil sands, this means new studies will occur in the coming years to try to determine long-term cumulative noise levels from multiple mine pits and energy projects in close proximity.

When the Directive is combined with the national noise guidelines under development from

Health Canada, the resulting noise assessments become the most thorough in Canada. Other jurisdictions (the National Energy Board, the Provinces of British Columbia and Saskatchewan, the Northwest Territories and Nunavut Territory) have used and continue to use Directive 38 as the standard for noise criteria and assessment. This does not necessarily mean other provinces will apply it for all projects however. Within Alberta, the EUB Directive is the reference method used where public issues arise regarding industrial noise outside the energy sector. The broad use of this Directive within Canada indicates it is a sustainable regulation. The continued use in the coming years will determine if it adequately addresses community issues, whether it sets a clear path for the approval process, how First Nations groups will view the comprehensiveness of their concerns and determine if other areas of concern such as wildlife affects need to be further investigated.

9. SUMMARY

The Alberta EUB has been a leader in developing noise guidelines and criteria in Western Canada. It has taken some time for industry to recognize noise as an environmental concern in Alberta. An increase in energy development and population is leading residents of the province to voice noise as a concern during the public consultation process. In response to the growing public awareness and land disputes, the Federal Government has increased their involvement in CEAA assessments, particularly Alberta's energy development. Though the provincial government still makes final decisions on project approvals, the federal government is becoming more involved in the process which the provincial government will need to address. Changes to noise issues are beginning and this will most likely be the beginning of many more changes to come.

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