

8.0 Cumulative Effects

Policy makers are increasingly seeing Cumulative Effects Assessment (“CEA”) as representing a *best practice* for effects assessment (IAIA, 1999). Consequently, the recognition of CEA as a best practice is now reflected in many provincial regulatory documents. With regard to development of hydrocarbon pipelines in Ontario, this best practice principle is reflected in the *OEB’s Guidelines (2003)*, which notes that cumulative effects of pipeline construction should be identified and discussed in the EA as an integral part of the assessment.

Building upon the intent of the *OEB Guidelines (2003)*, the OEB clarified the assessment of cumulative effects associated with a new pipeline system to serve proposed generation facilities (RP-2005-0022 and RP-2005-0478). The OEB (RP-2005-0022) specified that only those effects that are additive or interact with the effects that have already been identified as resulting from the pipeline construction are to be considered under cumulative effects. If the environmental impacts are compounded, it will be necessary to determine whether these effects warrant mitigation measures such as alterations in routing, timing of construction or other measures that can address the cumulative impacts.

In OEB Decision RP-2005-0478 the Board clarified that it has no inherent jurisdiction over environmental matters relating to the construction of new generation or electrical transmission facilities.

This CEA has been prepared with consideration of the above noted decision as well as the *OEB’s Guidelines (2003)*.

8.1 METHODOLOGY

This CEA describes the potential cumulative effects of pipeline construction in combination with the existing environment and the effects of unrelated existing or approved projects that have a high likelihood of proceeding. Cumulative effects include the temporal and spatial accumulations of change that occur within an area or system due to past, present, and future activities. Change can accumulate within systems in either an additive (*i.e.*, cumulative) or interactive (*i.e.*, synergistic) manner.

In terms of CEA methodology, it is generally accepted that due to the uncertainty and complexity of cumulative effects, no standard method of assessment exists. There are two distinct approaches to CEA: i) analytical and ii) planning. Analytical approaches focus on information generation using evaluation tools such as research design and scientific analysis, whereas planning approaches extend beyond analysis, applying planning principles and procedures to set values and address multiple objectives.

Selection of an appropriate approach and evaluation tools depends upon the objectives and issues surrounding the CEA. For construction of the proposed pipeline, the OEB suggests the

use of a planning based approach. By applying the best practice principles of avoidance, minimization, and compensation to limit project-specific effects (**Chapters 6 and 7**), potential adverse effects on socio-economic features and the natural environment have been greatly minimized prior to accounting for the effects of other unrelated projects (*i.e.*, cumulative effects).

Specifically, this CEA methodology is designed to evaluate and manage the additive and interactive effects from the following sources:

- Existing infrastructure, facilities, and activities as determined from available data sets;
- The proposed pipeline and associated infrastructure as described in **Section 1.1** of this ER; and,
- Future activities where the undertaking will proceed, or has a high probability of proceeding.

This planning approach facilitates a landscape level analysis that supplements the regional analysis discussed in **Appendix C2**, and is consistent with recommendations to evaluate potential cumulative effects at various levels. This level of analysis allows the CEA to focus on the issues that are pertinent to the project, and to avoid the generation and evaluation of information that is of little diagnostic value.

8.2 STUDY BOUNDARIES

8.2.1 Spatial

The spatial study boundaries for the CEA were extended beyond the Preferred Route alignment. To make conservative assumptions about the magnitude and probability of possible effects, the original Study Area boundary that was used for the ER was also used for the CEA. The Study Area boundary is beyond the *zone of influence* of pipeline construction and operation activities (*e.g.*, dust and noise), and consequently, the identified effects will diminish to background levels within the Study Area. The Study Area is also considered conservative in terms of managing both effects and risks.

8.2.2 Temporal

The temporal boundaries for this CEA reflect the nature and timing of pipeline activities and the availability of information surrounding future projects that have a high probability of proceeding. The project schedule identifies three key milestone activities; including, i) ER and technical design - 2008; ii) construction - 2009; and, iii) operation - 2009 through 2059. Fifty years of pipeline operation is used as an assumption for the purpose of this CEA, although the pipeline may be operational beyond fifty years. Based upon these milestone activities, three time periods were selected for evaluation in the CEA: 2008, 2009, and 2013.

Existing conditions were considered as those that existed and were identified during the EA process (*i.e.*, 2008). In some cases, published data were not current to 2008 and thus the assessment relied on a combination of best available information, public input, and field

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investigations. The year 2009, covering post construction clean-up activities, was selected to represent the construction and reclamation period, and the year 2013 was selected to represent the operation and maintenance period. Forecasting beyond 2013 increases the uncertainty in predicting whether projects will proceed, and the effects associated with these unrelated projects.

Although rare in occurrence, it is plausible that accidental or emergency events may arise due to an unforeseen chain of events during the pipeline's operational life. As a result of the rarity and magnitude of such events, they have not been assessed here, as they are extreme in nature when compared to the effects of normal maintenance activities, and require separate response plans. Pipeline retirement is another event that is beyond the temporal boundaries of this CEA and will not be assessed here.

8.3 ANALYSIS OF CUMULATIVE EFFECTS

Section 6 of this ER considered the potential effects of construction and operation of the pipeline on specific features and conditions, and proposed mitigation measures to avoid or reduce the potential for impact. This cumulative effects assessment evaluates the significance of residual effects (after mitigation) of the construction and maintenance of the pipeline along with the effects of unrelated projects.

A number of agencies were contacted to determine the nature of any unrelated projects planned in the Study Area that are in the final stages of implementation or approval. The agencies and companies contacted include:

- City of Thorold;
- Regional Municipality of Niagara;
- Niagara Peninsula Conservation Authority;
- Rolling Meadows Developments; and,
- Enbridge Gas Distribution Inc.

Construction activities associated with development of the proposed pipeline and its associated facilities, between 2008 and 2009, will include:

- Field investigations as required along the Preferred Route (winter 2008 through spring 2009);
- Mainline Construction - pipe installation, tie-ins, and commissioning (summer and fall 2009); and,
- Post construction clean-up activities (fall 2009).

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8.3.1 Year 2008: Baseline Conditions

The Study Area comprises a mix of existing land uses including agricultural (cash crop fields), commercial (service stations, hotels, convenience stores), industrial (paper recycling /manufacturing, concrete plant), municipal services (fire station, school) and residential uses (Community of Thorold South and rural residences). Significant socio-economic features include:

- Residences along the Preferred Route on Thorold Townline Road (1 - rural), Beaverdams Road (4 – rural) and Niagara Falls Road (Urban area in Thorold South);
- Ontario Public School (District School Board of Niagara);
- Agricultural lands;
- Welland Canal;
- Enbridge Gas Distribution pipelines and facilities;
- TransCanada PipeLines natural gas transmission corridor;
- Hydro One Electrical Transmission corridors;
- Canadian Nation Railway;
- Abitibi Consolidated Inc., Paper Recycling Mill;
- Georgia Pacific Paper Mill; and,
- Local businesses.

Enbridge and TransCanada PipeLines both operate and maintain networks of natural gas pipelines throughout the Study Area. The existing pipeline system has been operational for several years, and residual impacts on vegetation outside of pipeline easements no longer exist. Detailed environmental and socio-economic conditions within the Study Area are provided in **Appendix C2**.

The Study Area falls within the jurisdiction of the NPCA and is subject to the NPCA Regulations. The Preferred Route crosses Beaver Dams Creek twice. The Study Area is located within the watershed region known as the Lake Ontario Waterfront. The Study Area is within the Great Lakes-St. Lawrence forest region and contains deciduous and coniferous species in the few areas where trees have the ability to grow.

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8.3.2 Year 2009: Construction

Based on information provided by the agencies and companies contacted, there are several projects, unrelated to the construction of this proposed pipeline, which have been identified as having a high probability of proceeding concurrently with construction of this proposed pipeline.

Construction of Thorold CoGen L.P. Project

Thorold CoGen L.P. is planning to construct a natural gas co-generation plant at the site of Abitibi Consolidated Inc.'s Pulp and Paper Mill in Thorold South commencing in 2008. Local residents may experience a larger than normal amount of construction traffic on local streets for the duration of the construction phase. Assessments of the potential environmental and socio-economic impacts associated with the construction of this plant are outside the scope of this study.

Sanitary Sewer Replacement on Allanburg Road

The City of Thorold is planning to replace the sanitary sewer line within the road allowance of Allanburg Road between Davis Road (Highway 58) and Niagara Falls Road in Thorold South. The project is tentatively scheduled for 2008, with potential for it to be delayed. Likely, this project will potentially involve a temporary increase in traffic on local streets and temporary traffic stoppages.

Regional Trunk Watermain on Davis Road (Highway 58) and Allanburg Road

The Region of Niagara is planning to construct a new Trunk Watermain along Davis Road (Highway 58) and Allanburg Road between Lundy's Lane (Highway 20) and the water tower just south of Niagara Falls Road. This project is tentatively scheduled for construction in 2008-2009. This project will potentially involve a temporary increase in traffic on local streets and temporary traffic stoppages.

Ground Breaking at Rolling Meadows Development

Rolling Meadows Developments is planning to construct a development in the south eastern half of the Study Area, east of Davis Road (Highway 58). The project is scheduled for groundbreaking in 2008. Work will begin with grades and infrastructure development and progress to house construction in that year. The plan shows 3500 residential lots and approximately 150 acres of employment lands. Employment lands include commercial, highway, light industrial, and heavy industrial land-use designations. Construction is expected to continue for several years because there is no completion date requirement for this development.

During the construction of this proposed development, traffic on local streets and highways is anticipated to increase. Demand for building materials and general supplies are also expected to increase for the duration of construction. Local businesses may experience an increase in sales resulting from this development.

Discussion

To consider the additive and interactive effects at their maximum intensity, it is assumed that construction of the Thorold CoGen L.P. Project, the sanitary sewer replacement (if delayed), the trunk watermain (if delayed), and the Rolling Meadows Development would occur concurrently. Presumably, this approach yields a worst case scenario of the potential cumulative effects. An example of a potential cumulative effect could be increased noise and dust resulting from the interaction of vehicular traffic, construction vehicles using Allanburg Road to transport materials and machinery to the Thorold CoGen L.P. construction site, the sewer and water main projects, the residential development, and this proposed pipeline construction project.

During the construction of this proposed pipeline, vehicular traffic on local streets and proximal highways is anticipated to increase with the importation of materials and machinery and the normal movement of construction related vehicles. Similarly, local vehicular traffic is anticipated to increase as a result of the other unrelated projects. The cumulative effects of these projects on the local traffic patterns are considered to be low.

Largely, the significant effects associated with construction of the proposed pipeline have been minimized through the route selection process and the recommended mitigation measures. By paralleling existing road allowance restrictions on urban expansion and disruption to agricultural lands have been minimized. By limiting the project-specific effects, the potential interaction of effects from construction of the proposed pipeline with other unrelated projects has been considerably reduced.

The majority of impacts associated with construction of the proposed pipeline and interaction with the construction of other projects are considered to have no cumulative significance. Noise and dust disturbances are localized and can be largely dissipated through mitigation. Once construction is complete, noise and dust will no longer be issues relating to these projects.

Vegetation removal, including loss of terrestrial habitat, is also considered to have no cumulative significance since no fragmentation of woodlots will result from the proposed pipeline. The effects of any vegetation impacts, such as effects upon roadside screening, will be minimized through careful pipeline alignment and implementation of Enbridge's Tree Replanting Program.

No cumulative effects are anticipated concerning archaeological resources because none are anticipated to be associated with the proposed pipeline, although a Stage 2 Archaeological Assessment will confirm this. The approval of the other proposed developments are contingent on archaeological assessments uncovering no resources.

Physical and chemical transport, on groundwater, surface water, and aquatic organisms, has not been included in this analysis because of the hydrologically isolated nature of the unrelated projects and the proven success of the mitigation measures to be implemented during pipeline construction.

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The developments explained above will increase the impervious surface area within the Study Area thereby increasing runoff from these areas, which may represent a transport mechanism for the movement of both physical (e.g., sediment) and chemical (e.g., grease and pesticides) contaminants. In the case of groundwater, the simultaneous construction of the projects may result in a short to medium term disturbance to this feature, but recovery to baseline conditions is ultimately expected since the projects are spatially dispersed.

The Preferred Route crosses Beaver Dams Creek in two locations. Surface waters are not expected to experience any disturbance due to the extensive mitigation measures outlined in this report to protect water bodies during pipeline construction.

Many of the labour requirements and project supplies associated with pipeline construction are unique to the pipeline construction industry and, typically, are not available at a local or regional scale. Accordingly, construction of the proposed pipeline is anticipated to have cumulative effects of very low significance on the local economy.

Another cumulative effect of low significance is the impact of multiple construction projects, such as the Thorold CoGen L.P. Project. For example, construction of these developments will result in a short-term increase in demand, both locally and regionally, for labour and project supplies such as food, accommodation, steel, gravel, and equipment. All projects, including the proposed pipeline, are anticipated to have long-term effects on the economy through their tax contribution to local governments, with limited demand on government services and resources, and their periodic demand for supplies and services.

8.3.3 Year 2013: Maintenance

The pipeline construction is planned for completion in 2009; therefore, pipeline related activities will be limited to the establishment and initiation of routine maintenance efforts. In addition to pipeline maintenance activities, there are several potential projects that may be ongoing or take place within the Study Area in the future. These potential projects include:

Construction of Thorold CoGen L.P. Project on the site of Abitibi Consolidated Inc.

Construction is expected to be complete by the third quarter of 2009. Since this proposed pipeline project is required for the cogeneration project, no direct effects from the cogeneration plant are expected.

Construction of Rolling Meadows Development

Construction of the Rolling Meadows Development is anticipated to be ongoing for several years. Runoff from developments may represent a transport mechanism for the movement of both physical (e.g., sediment) and chemical (e.g., grease and pesticides) contaminants. The construction of the proposed pipeline is planned to be completed in 2009. Once construction is complete no direct effects from the development and relating to ongoing maintenance of the pipeline are expected.

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Regional Trunk Watermain on Davis Road (Highway 58) and Allanburg Road

The Region of Niagara is planning to construct a new Trunk Watermain along Davis Road (Highway 58) and Allanburg Road between Lundy's Lane (Highway 20) and the water tower just south of Niagara Falls Road. This project is tentatively scheduled for construction in 2008-2009. As previously discussed, the construction of the proposed pipeline is planned to be completed in 2009 and once construction is complete no direct effects from the construction of the Trunk Watermain and relating to ongoing maintenance of the pipeline are expected.

Discussion

Once construction is complete, at the end of 2009, the proposed pipeline will be primarily located adjacent to existing roadways and utility corridors. It will not place significant restrictions, outside of the easements, on the commercial and residential growth of Thorold. At that time, activities related to the proposed pipeline will include maintaining vegetation growth on easements that are not leased back and other routine operation and maintenance activities.

The road allowance adjacent to the proposed pipeline will experience limited vegetation removal in 2009 to facilitate construction. Since the proposed pipeline will be constructed mainly within road allowance, no woodlots will be fragmented. Any replanting of trees outside the corridor cleared to accommodate pipeline construction will not be re-established to baseline conditions by 2013.

Potential cumulative effects to terrestrial fauna will diminish between 2009 and 2013, since re-establishment of trees will be underway and dust, noise, and other disturbances will be limited to very infrequent occurrences associated with maintenance activities.

Potential cumulative effects to aquatic fauna are expected to be negligible because Beaver Dams Creek will be directionally drilled at the crossing along Thorold Townline Road and at the crossing of Davis Road (Highway 58). Under these conditions, cumulative effects should dissipate to the 2008 baseline conditions.

Considered collectively, the above cumulative effects are expected to be low in magnitude by 2013. Consequently, no significant cumulative effects are predicted based upon the available data and conservative assumptions made.

Effects to the economy from the proposed project and the other unrelated projects might result in cumulative effects of moderate significance. Each project will provide local governments with an additional tax base with limited demand on government services and resources. An increase to local economies, based on periodic demand for supplies and services, will also be experienced with each project.

8.4 SUMMARY

The potential cumulative effects of construction and maintenance of the proposed pipeline were assessed by considering several other construction projects that have a high probability of occurring at the same time and projects that may continue into the future. The Study Area boundary was used to assess the potential for additive and interactive effects of the proposed pipeline and the unrelated projects on environmental and socio-economic features. By paralleling the existing road allowance, and implementing site-specific mitigation measures, the potential for cumulative effects between this proposed pipeline and other planned construction projects is considered to be insignificant.