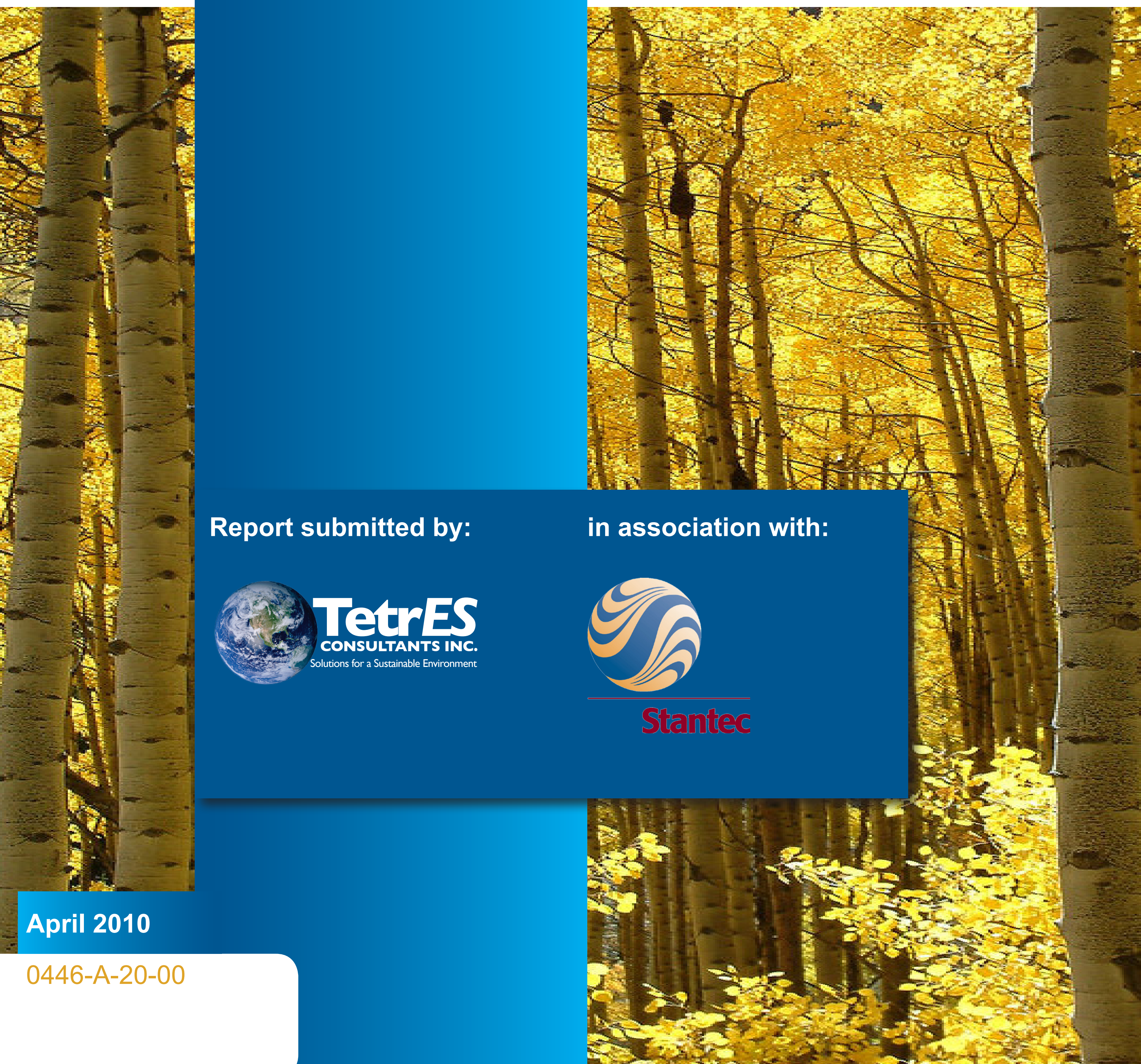
Response to Clean Environment Commission

Report to:
Louisiana-Pacific Canada Ltd.



Report submitted by:

TetrES Consultants Inc.
Solutions for a Sustainable Environment

in association with:

Stantec

April 2010

0446-A-20-00

April 30, 2010

Mr. Edwin Yee
Chair
Manitoba Clean Environment Commission
305-155 Carlton Street
Winnipeg, MB
R3C 3H8

Dear Mr. Yee,

Re: Response to Clean Environment Commission (CEC) Request for Additional Information

Thank you for the opportunity to provide additional information to the CEC to assist in its investigation of LP's application to increase certain emission limits, which would allow for the permanent decommissioning of the Press and Dryer RTOs. In response to the CEC's letter dated October 8, 2009, LP is pleased to submit the following reports for the CEC's consideration:

1. Response to Clean Environment Commission – Report to Louisiana-Pacific Canada (TetrES Consultants Inc., April 2010)
2. Dispersion Modeling Report, Louisiana-Pacific Canada Ltd. Swan Valley OSB Plant (Olsson Associates, April 2010)
3. Louisiana-Pacific Canada Ltd. – Swan Valley OSB Plant Human Health Risk Assessment (Stantec Limited, April 2010)

The TetrES report provides a summary overview of the dispersion modeling and human health risk assessment reports, responding to the specific requests for additional information identified in the October 8, 2009, letter. The TetrES report also provides the context and chronology of events over the past nine years that culminated with the submittal of the application. The Olsson and Stantec reports are appended to the TetrES report.

The Olsson Dispersion Modeling Report is a stand-alone dispersion modeling report that conforms to the Draft Guidelines for Air Dispersion Modeling in Manitoba (November 2006), as per the October 8, 2009, CEC request.

The Stantec Human Health Risk Assessment (HHRA) is a stand-alone report that provides the detailed rationale for all elements of the HHRA, and is fully referenced to allow for peer review, as per the October 8, 2009, CEC request.

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To ensure that the CEC has the most current, accurate and complete information available for its investigation, the following updates have been incorporated into the attached submissions:

- Modeled acrolein and acetaldehyde emissions from the proposed Dryer WESP stack have been increased to account for total emissions from the combined dryer systems (previous assessments were inadvertently based on only one pair of dryers).
- Modeled Thermal Oil Heater HCN emissions have been reduced by one order of magnitude due to a data entry error.
- Modeled Formers Baghouse and Thermal Oil Heater DESP formaldehyde emissions have been reduced based on site-specific test data following the emission factor protocol and rationale established in Appendix C of the dispersion modeling report.
- New or revised ambient air quality criteria for benzene and acrolein adopted since the submittal of the November 18, 2008, application have been incorporated into the dispersion modeling and HHRA analyses.

We trust that all information the CEC requires to formulate its recommendations to the minister is contained explicitly and succinctly in the attached reports.

As always, we remain available at the CEC's convenience to review these submittals, to answer any questions, or to provide additional information.

Sincerely,

Al Hambley
Plant EH&S Manager
LP Swan Valley OSB

Cc: Kevin Betcher, Plant Manager, LP Swan Valley OSB
Kevin Warkentin, Corporate Environmental Manager, LP Canada Ltd.

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Comprehensive Multidisciplinary Environmental Services ***www.tetres.ca***

0446-A-20-00
May 3, 2010

Mr. Kevin Warkentin
Environmental Project Manager
Louisiana-Pacific Canada Ltd.
439 Westwood Road, P.O. Box 998
Swan River, MB R0L 1Z0

Dear Mr. Warkentin

RE: RESPONSE TO CLEAN ENVIRONMENT COMMISSION

We are pleased to provide our report for Louisiana-Pacific Canada (LPC) to the Clean Environment Commission (CEC) to forward in response to its request to LPC of October 8, 2009, for additional information and clarification of the material it has received regarding LPC's submission of November 18, 2008, to Manitoba Conservation. Attached to our report are documents prepared by Olsson Associates and Stantec Consulting which provide the detailed content requested by the CEC.

Thank you for the opportunity to assist the CEC to complete its investigation and deliberations. We are available to assist further if this would be helpful.

Yours truly

Tetr*ES* Consultants Inc.

J.M. McKernan, M.Sc., M.E.S., P.Biol.
Principal

Copy Mr. Z. Kimball, Olsson Associates
Dr. C. Ollson, Stantec Consulting

Attachments

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1003let

Response to Clean Environment Commission

Report to

Louisiana-Pacific Canada

0446-A-20-00
April 2010

TetrES CONSULTANTS INC.
Solutions for a Sustainable Environment

ACKNOWLEDGEMENTS

The Study team acknowledges with appreciation the significant preparations for, guidance of, and contributions of historic information to this report received from Kevin Warkentin and Allan Hambley of LPC Swan River OSB Plant. The modelling work by Zach Kimball of Olsson Associates of Golden, Colorado and monitoring-data quality assurance work of SLR Consulting (Canada) Ltd. of Saskatoon is also acknowledged with appreciation.

STUDY TEAM

The study team was an integrated team of scientists, dispersion modellers and toxicologists from Tetr*ES* Consultants Inc. (TCI) of Winnipeg and Stantec (STN) Consulting Ltd. of Calgary and Burlington. The Study Team personnel were:

- J.M. McKernan, M.Sc., M.E.S., P.Biol., Vice-President & Principal, TCI; Project Manager
- Roger Rempel, B.Sc., P.Eng., Sr. Environmental Engineer & Principal, TCI
- Peter D. Reid, M.A., Sr. Air Quality Scientist, STN
- Ruwan Jayasinghe, M.Sc., Toxicologist, STN
- Christopher Ollson, Ph.D., Toxicology Practice Leader and Principal, STN

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1.0 INTRODUCTION

1.1 LOUISIANA-PACIFIC CANADA

Louisiana-Pacific's Swan Valley OSB plant is an oriented strandboard (OSB) manufacturing facility located on the east ½-section of 16-36-25W near Minitonas, Manitoba, approximately 500 km northwest of Winnipeg, at UTM coordinates of 5772880m Northing and 365168m Easting. The plant is owned by Louisiana-Pacific Canada Ltd. (LPC), a wholly owned subsidiary of Louisiana-Pacific Corporation (LP), headquartered in Nashville, Tennessee. LPC is a premier supplier of building materials, delivering innovative, high-quality commodity and specialty products to its retail, wholesale, homebuilding and industrial customers.

1.1.1 Mill Operations

The Swan Valley OSB plant was started up in January 1996 with an initial design manufacturing capacity of 488 million ft^2 of finished product on a 3/8″ basis (MMSF [3/8″]). The Swan Valley OSB plant is a stand-alone operation; it manufactures OSB in a complete process within the plant. OSB is a structural panel made from wood strands cut from whole logs. The strands are dried and subsequently blended with resin before being formed into a multi-layer mat. The mat is constructed so that each layer of strands is oriented perpendicular to an adjacent layer. The mat is hot pressed to activate the resin, which bind the wood strands together to form a solid wood panel. The plant had its best production year to date in 2006, with an annual production volume of 519 MMSF (3/8″), although a recent decline in the housing market reduced production volume to 163 MMSF (3/8″) in 2009.

When at full capacity, the plant directly employs 144 full-time employees at the plant, plus an additional 11 employees in its forestry operations on a year-round basis. During the summer months, approximately 25 additional summer staff (mainly post-secondary studies returning to school) are employed at the plant and in forestry operations.

1.1.2 Emissions Controls

LPC designed its plant to minimize emissions to and impacts upon the environment. Significant commitment to emissions control is evident in the plant's emissions-capture and cleaning technologies regulated under Licence No. 1900S4. At the time the plant was developed in 1993 and 1994, these emission controls were considered among the best in the world. In providing for Regenerative Thermal Oxidation (RTO) technology, its emissions-control system exceeded the emissions-control technologies at all the OSB mills operated by LPC or others in Canada.

1.1.2.1 Investments in Environmental Protection

LPC's investments in technology since the plant was licensed have included a wide variety of system upgrades which have had direct, or indirect, environmental-protection benefits. A significant number of investments intended to reduce operating costs, energy consumption, or waste-management costs and to improve production-process efficiency have all had the effect, over the years, of reducing waste generation, emissions to the surrounding airshed, or the potential for human-health effects or ecological impacts.

1.1.3 Licences

LPC's mill and woodland operations are both considered "developments" under *The Environment Act*. Both are regulated by separate licences issued pursuant to *The Environment Act* after independent Environmental Impact Assessments (EIA) had been completed (SENTAR Consultants Ltd. 1994, Tetr*ES* Consultants Inc. 1995) and subjected to public and regulatory screening, and after separate public hearings administered by the Clean Environment Commission (CEC). In both cases, these licences were issued by Manitoba Conservation after an interdepartmental, intergovernmental Technical Advisory Committee (TAC) had provided recommendations on licence terms and conditions, and after significant public engagement by both LPC and the Manitoba government during review of the developing EIAs, and in the public hearings for each development at the time.

1.1.3.1 Mill

The OSB mill initially operated under provisions of *Environment Act* Licence No. 1900S3, per recommended limits prescribed by the TAC, which was superceded by Licence No. 1900S4 on October 31, 1997. Various clauses of Licence No. 1900S4 regulate emission rates, monitoring, reporting and disclosure. Prescriptions within this licence were amended on many occasions over the years, usually as mill-process technologies evolved and as the original license terms or conditions required alteration to reflect such process evolution.

1.1.3.2 Wood Supply

LPC's management of the forested lands within which it maintains harvesting operations occurs pursuant to provisions of *The Environment Act* Licence No. 2191E, issued after public and regulatory review of the EIA of its proposed 10-Year Forest Management Plan.

1.1.4 Regulatory Compliance

LPC's corporate commitments include those to environmental stewardship. The operators of the Swan Valley facility, and the woodland operations which supply the mill, have sought to maintain a pattern of environmental stewardship and regulatory compliance. Satisfaction of licence terms and conditions has always been a high priority. These efforts are chronicled in the record of correspondence between LPC and Manitoba Conservation shown in Appendix A.

Over the years, LPC has confronted a variety of management issues and has consistently sought to resolve those through consistent dialogue with Manitoba Conservation (Appendix A). LPC has responded positively to regulatory suggestions for managing these issues, including their suggestions for improvements in operating procedures, management of the woodlots and logging roads, control of nutrients, and management of excess flake and bark.

1.1.5 Regulatory Liaison

Consistent liaison with regulatory authorities has been an integral component of LPC's approach to regulatory compliance. Communications have generally been proactive, timely, and effective in addressing regulatory concerns or suggestions (Appendix A). Reference to Appendix A will indicate that the liaison between the LPC and the regulator has been extensive in the past decade, and has addressed a wide variety of operating challenges.

1.1.6 Previous Proposed Alterations and Regulatory Acceptance

Profitable operations of a facility such as the Swan Valley OSB plant requires a capacity for the mill to evolve with market conditions, changes in logistical costs, and improvements in technology. LPC has sought to maximize efficiency and profitability of the plant while ensuring regulatory compliance and satisfaction of all applicable requirements (Appendix A).

One of the standard procedures for operating processes of the mill to evolve in a fashion consistent with licencing provisions, or statutory requirements, is to advise the Director of Environmental Approvals of any proposed alterations to either the licensed developed, the licence, or both. Consistent with processes outlined under s.14 of *The Environment Act*, numerous such alterations to licence prescriptions or to the mill and its operations have been proposed, approved and implemented since the start-up of the plant (Appendix A). For the most part, these proposed alterations have been readily understood and approved by Manitoba Conservation. Other alterations have required the development of supportive information in longer processes to support the proposed alteration and LPC's request for its approval.

The proposed elimination of the three RTOs (discussed in Section 1.2.4.3) is the only alteration that Manitoba Conservation has deemed to be 'major.' All other alterations of either the plant, or the license, have been determined to be 'minor.'

1.1.7 Emissions Regime and Odour

Tetr*ES* understands that Manitoba Conservation has never received an odour-nuisance complaint from any of LPC's neighbours, (as noted in the notes for the December 8, 2009 meeting LPC had with Manitoba Environment's Environment Officer, Tim Prawdzik). Issues of odour nuisance are addressed specifically through clause 47 of Environment Licence 1900S4.

1.2 PLANT EVOLUTION AND RELATED SUBMISSIONS TO MANITOBA CONSERVATION

1.2.1 Historic Materials-Imbalance

Shortly after mill operations began, LPC realized that there was a raw material imbalance, resulting in excess waste flake and bark that it had to manage relative to the amount expected to require management when the plant was designed. The problem was kept somewhat under control by providing the excess bark to farmers for bedding until it became apparent that several farmers were using it to fill depressions (wetland areas). Manitoba Conservation mandated that LPC develop a formal strategy to manage its excess flake and bark stream whereby use by farmers was temporary. Manitoba Conservation's record of a site inspection on May 30, 2000, notes that "…*waste bark and flake continues to be delivered to area agricultural producers for livestock use as approved. Be advised the approval for all off-site use of waste bark and flake terminates June 30, 2000*." In the same letter to LPC from Manitoba Conservation, the local Environment Officer stated:

> "*Waste flake generation of the plant has increased significantly over the past number of months contrary to the implemented policy developed to reduce this waste stream. This issue is under review of the position of Manitoba Conservation inspecting this matter and will be forwarded to Louisiana Pacific in the near future.*"

With these statements, Manitoba Conservation set LPC upon a five-year course of action to seek better management of a growing mass of excess bark and excess flake.

On June 13, 2000, Manitoba Conservation advised LPC that "*…pursuant Part 2, Clause 5 of Licence 1900S4, Louisiana Pacific is hereby requested to submit to the Director, not later than July 31, 2000, a waste management plan directed to the reduction/recycling of waste flakes generated at the Swan Valley OSB."* On July 30, 2000, LPC submitted a "Waste Flake Management Plan" to Manitoba Conservation identifying a variety of sources, waste-reduction measures, and a waste-recycling program.

LPC developed other measures to contribute to an overall management strategy for the excess bark and flake. On August 10, 2000, LPC advised Manitoba Conservation of its plan to continue to haul excess bark to local area landowners, as an adjunct to the Flake-Management Plan previously submitted, to assist the reduction of excess materials while meeting the needs for animal bedding expressed by the local landowners. On August 29, 2000, Manitoba Conservation conditionally approved LPC's plan for "Construction and Operation of Waste Bark Incinerator," submitted to provide an additional measure for managing excess on-site bark and flake. Other measures to manage the problem were identified by LPC in communications dating November 29, 2000, and December 20, 2000. On March 25, 2001, LPC advised Manitoba Conservation of a request from the Town of Minitonas to use excess bark as cover for the solid-waste disposal grounds. On March 26, 2001, Manitoba Conservation approved the intended use of the surplus bark.

On March 29, 2001, LPC completed planning for its "favoured option" for long-term management of surplus bark, consisting of a new "Continuous Thermal Oxidation" (CTO) process which would require a major ($25M) plant upgrade. The CTO project would involve recirculation of a portion of dry exhaust gases back to the dryer inlet or the combustion unit inlet, and the installation of a new Wet Fuel (i.e., bark) Burner. The long-term plan was submitted on March 30, 2001 (the submission also ensured compliance with Clause 5 of the "Construction and Operation of Waste Bark Incinerator" permit issued by Manitoba Conservation in August of 2000).

On May 28, 2001, Manitoba Conservation provided "agreement-in-principle" with the proposed long-term management plan, and requested additional details and engineering information to facilitate a final and unconditional approval.

On July 26, 2001, the requested additional details for the CTO project were provided by LPC. In this communication, LPC noted that "*New drying technology is also part of the CTO project*. *It is anticipated that LP will incorporate single-pass drying. Single-pass drying, coupled with recirculation of some dryer gases to the new wet fuel burner and dryers, for use as combustion air, will reduce dryer exhaust to less 100,000 ACFM. Operational shutdown of one regenerative thermal oxidizer (RTO) is feasible when gas levels reach below 110,000 ACFM. Consequently, all dryer exhaust can be directed to one RTO. It is also expected that the proposed drying technology will reduce the generation of Volatile Organic Compounds (VOCs), thus the elimination of both dyer RTOs is conceivable. Any changes to the plant emission control strategy would be supported by source test data which demonstrates compliance with conditions, and will be communicated with the Minister in more detail as this project moves forward.*"

This description of the CTO project was the first explicit explanation of the consequences of the $25 M upgrade on the utility of, and need for, RTO technology to manage dryer emissions. Originating as a response to an excess bark and flake problem, the planned Upgrade and its introduction of single-pass drying technology created recognition of reduced need for RTO technology, which was not relied upon at any other LPC OSB mill in Canada.

1.2.2 Regulatory Understanding of Facility Upgrade Implications

At a site meeting on May 25, 2002, LPC and Manitoba Conservation discussed the long-term challenge of managing excess bark. The implications of the major plant upgrade (to manage

TetrES CONSULTANTS INC. Solutions for a Sustainable Environment excess bark) on the possible redundancy of dryer RTOs was acknowledged by Manitoba Conservation. The need for additional dispersion modelling to understand the consequence of the Wet-Fuel Burner project was also acknowledged. From that date, LPC began to systematically plan for the upgrade, with the attendant implication that the dryer RTOs would be less needed and would become less efficient, implying they could be eliminated in a fashion consistent with regulatory due process, if acceptable to Manitoba Conservation.

1.2.3 Regulatory Approval of Upgrade and Long-term Management Plan

On June 10, 2002, Manitoba Conservation was requested to provide an agreement-in-principle for LPC to construct and operate the Wet-Fuel Burner as a key part of LPC's long-term management strategy for excess bark and flake. The requested approval was provided by Manitoba Conservation by letter dated July 2, 2002, wherein a "general agreement" was provided and wherein a formal request for a Notice of Alteration was solicited "*...once the details of the energy system and its potential environmental effects are known.*" A final approval for the Wet Fuel Burner, with its attendant implications for the reduced need for the dryer RTOs, was issued by Manitoba Conservation on March 19, 2003.

1.2.4 Effects of Approved Plant Upgrade

1.2.4.1 Proposed Elimination of Two Dryer RTOs

To support the necessary modelling of the effect of the change in emissions from the altered pollution-control system, LPC submitted a proposed approach to assessment entitled "Proposal for Dispersion Modelling to Eliminate Dryer RTOs" to Manitoba Environment on November 17, 2003. Manitoba Conservation accepted the proposed approach to data gathering and emissions-dispersion modelling on November 20, 2003.

On December 18, 2003, LPC formally proposed elimination of the two dryer RTOs as part of the planned $25M facility upgrade (the "Dryer Energy System" project) to address the excess bark and flake issue, along with proposed changes to the licensed emission rates for chemicals of concern that the elimination implied. (A formal dispersion modelling protocol was included in the submission, as Manitoba Conservation had no dispersion modelling guidelines in place at the time). LPC intended to keep the existing four wet electrostatic precipitators (WESPs), and the other (press) RTO, fully functional, to maintain air-pollution control for the Swan Valley OSB plant (Section 7.1 herein). The Dryer Energy Project was approved and was constructed in 2004.

While LPC characterized the emissions from the RTOs over the period 2004-2007 to support the dispersion modelling, the licence was still fully in place and all RTOs were operating.

1.2.4.2 Proposed Conversion of Press RTO to RCO

In 2006, LPC began to consider converting the Press RTO into a Regenerative Catalytic Oxidizer (RCO), consistent with its experience at its other OSB plants in the US, to reduce natural gas consumption. The expected 50% reduction of natural gas consumption by the press pollution control system was expected to result in a 25% plant-wide reduction in natural gas purchases, and a significant reduction in operating costs and greenhouse gas emissions. Functionally, it was anticipated that the new Press RCO would be constructed using the old RTO, and would be equipped with new catalytic media, while operated at a lower temperature.

In support of LPC's first formal Notice of Alteration (NoA) regarding changes to the plant's pollution-control system, it again filed a modelling plan outlining its plans to gather and use data necessary to evaluate the environmental effects of this proposed change. The August 22, 2007 NoA asked for permission to change the emission rates prescribed in Licence No. 1900S4, and provided copy of initial dispersion modelling results for the proposed alteration, satisfying the government's request for same.

As noted in Section 1.2.8 below, results of the initial dispersion modelling conducted by LPC of the proposed alteration showed that LPC could continue to guarantee compliance with the provincial air-quality guidelines, notwithstanding the new elevated emission rates/limits being proposed by LPC.

In its September 13, 2007 letter to LPC in response to this NoA, Manitoba Conservation approved the conversion of the Press RTO to a new RCO, subject to performance testing to demonstrate what the post-alteration emission limits would be, but did not approve the proposed new emission rates/limits.

1.2.4.3 Proposed Elimination of All Three RTOs

Monitoring of dryer emissions from 2005 through 2007 and subsequent modeling conducted in support of the Dryer RTO elimination, indicated that the Dryers were contributing ~80% of the maximum formaldehyde ambient ground level concentration, with the press being a comparatively minor contributor. With this finding, LPC realized that it could pursue elimination of all three RTOs in the same application because the then-current modelling and preliminary human health risk assessment had indicated no violations of air quality guidelines, and no predicted impact on human health.

The proposed elimination of the three RTOs in LPC's November 18, 2008 submission to Manitoba Conservation was the first alteration that Manitoba Conservation deemed to be 'major.'

1.2.5 Local Public Consultations Since Upgrade

Since the $25 million installation of the state-of-the-art single-pass dryers and wood-fired energy system in 2004, LPC has frequently and openly discussed the eventual decommissioning of the RTOs with local community representatives. Under Terms and Conditions of Licence 1900S4, LPC has participated for over a decade in a Community Liaison Committee (CLC) where matters pertaining to mill operations are regularly discussed, including the decommissioning of the RTOs. The CLC includes elected officials of the Town of Minitonas and RM of Minitonas, Town of Swan River and RM of Swan River, Manitoba Conservation and LPC. Discussions with the CLC about the potential to eliminate the RTOs have occurred since 2002.

1.2.6 Regulatory Guidance and Liaison: Manitoba Conservation Direction to LPC

LPC's formal submission to Manitoba Conservation about the change to its pollution-control systems and licence limits on November 18, 2008, reflected the guidance that it had received from Manitoba Conservation during approximately 18 months of previous technical liaison.

1.2.7 Manitoba Draft Modelling Guidelines

During the years it was considering major plant upgrades and changes to the RTOs, LPC sought guidance from Manitoba Conservation about the information that would be needed for the regulatory review of its proposal to alter emission limits and the pollution-control systems, as noted above. Among other forms of guidance, Manitoba Conservation recommended that LPC have regard to the provinces' November 2006 *draft Guidelines for Air Dispersion Modelling in Manitoba*. LPC forwarded the draft Guidelines to its emissions-dispersion consultant to guide the emissions-modelling work completed to explore the consequences of its proposed alteration to the pollution-control system.

1.2.8 LPC's Dispersion Modelling

To develop the information needed for the regulatory review of the environmental effects of the proposed retirement of the RTOs, LPC has undertaken a series of dispersion modelling activities to help evaluate the effects of the proposed changes in emission rates that would arise from the alteration.

In June 2009, the latest modelling to support LPC's application by Cordilleran Associates of Colorado (which was later acquired by Olsson Associates) was completed, building upon its previous modelling. The key results of the earlier work had been included in prior information sharing with Manitoba Conservation, and were included in LPC's August 22, 2007, and November 18, 2008 filings. The original modeling was done for licenced parameters, which helped LPC define the required stack height needed to achieve compliance of all predicted ground-level concentrations, for all licenced parameters, with limits prescribed by Manitoba. A request by Manitoba Conservation for subsequent hazardous air pollutant (HAP) modeling (acrolein, acetaldehyde, methanol and propionaldehyde) was agreed to and the additional modelling was completed in June 2009 for the additional parameters using the original stack parameters.

The dispersion modelling done by Cordilleran sought to predict the effects of the proposed alterations on ground-level concentrations for the licensed parameters. Cordilleran's initial (2007), subsequent (2008) and current modelling demonstrated that the proposed increases in emissions rates that would occur if the proposed alteration was approved would create concentrations predicted to meet all maximum ground-level air-quality provincial guidelines. As noted and explained in Appendix B, the Ontario AAQC for 24-hr acrolein was predicted to be slightly exceeded by the 2009 modelling, but the exceedance of the Ontario guideline value has no human health risk, as explained in Section 14 herein.

1.2.9 LPC's Risk Assessment

Being a member of the National Council for Air and Stream Improvement (NCASI), and aware of the acknowledged expertise of the industrial toxicologists within this specialty research and demonstration centre, LPC retained NCASI specialists to review Cordilleran's dispersion modelling and predicted maximum ground-level concentration for the emissions of concern. As part of the preparations for the November 18, 2009 submission, a human-heath toxicologist (Dr. Vicki Tatum) was retained to provide, and did provide, her expert opinion on the extent of risk to human health posed by the predicted maximum ground-level concentrations of these chemicals. She concluded that no significant increment in human health risk would be expected from the proposed alteration. Her opinion, its derivation and references to supporting literature, were included in the November 18, 2008 submission to Manitoba Conservation.

1.2.10 Regulator's Response

Manitoba Conservation provided questions, specification of uncertainties and requests for clarification and additional detail after its review of the November 18th submission (e.g. email dated December 30, 2008). LPC provided the requested information and clarifications quickly (e.g., email dated December 31, 2008). Manitoba Conservation declared its satisfaction with all of the provided information in an email to LPC on January 5, 2009.

1.3 PUBLIC-REVIEW PROCESS

1.3.1 Background

Minister Struthers' Terms of Reference for a 'public review' of the LPC's November 2008 proposal to decommission the dryer RTOs and to alter the licensed emission rates for chemicals of concern was released on March 26, 2009. The TAC's Summary Report to the Director of Environmental Approvals, acknowledging that LPC had followed all regulatory guidance and recommending approval of LPC's proposal (while acknowledging the need for some additional emissions modelling that LPC had agreed to do), was finalized on May 14, 2009. Its submission to the Director (Appendix C) terminated 18 months of liaison between Manitoba Conservation, members of the TAC and LPC regarding best approaches to evaluating the consequences of the proposed alterations.

1.3.2 LPC Submissions

LPC filed formal documentation of additional dispersion modelling in support of its November 18, 2008 request to have its environmental license prescriptions altered on July 3, 2009, including additional health-risk assessment information. LPC's "Ambient Air Quality Monitoring Report for LPC Swan Valley for Q4 2008," submitted for regulatory review on May 1, 2009, documented that *"…all pollutants measured at the monitoring stations continue to be well below ambient air quality criteria for the period Jan 7, 2009, when the RTOs were shut down on a interim basis, through to the end of February 2009 (the end of the monitoring quarter)…while the data are limited, they clearly demonstrate that there is no discernable change to the ambient air quality with the RTOs operating versus with the RTOs off."* In late July 2009, LPC presented its case (Appendix D) in the public meetings ordered by the Minister.

1.3.3 Third-Party Submissions

Parties opposing LPC's application for an altered license participated in the July 2009 public meetings administered by the CEC. Formal post-meeting submissions were allowed and submissions were filed in early September 2009 by several such parties, including:

- Manitoba Green Party — September 1, 2009
- Intrinsik Environmental Sciences Inc. — September 4, 2009
- RWDI Air Inc. — September 4, 2009
- Precision Analytical Laboratories, Inc. — September 8, 2009
- The Public Interest Law Centre — September 8, 2009

The submissions by Intrinsik, RWDI and PAL were commissioned by the Public Interest Law Centre.

The content of these submissions included challenges to the adequacy of information and analyses supplied by LPC to either Manitoba Conservation or the CEC in areas related to emissions dispersion modelling and/or human health risk assessment.

1.3.4 Regulator's Response

Following review of the above-noted intervener filings, Manitoba Conservation responded to the queries about and challenges to the adequacy of the LPC analyses of emissions dispersion and related risks to human health on September 29, 2009 (Appendix E). Manitoba Conservation reiterated and defended its acceptance of the adequacy of LPC's filings, including LPC's 'screening level' HHRA (presented in its filed information).

1.4 CLEAN ENVIRONMENT COMMISSION LETTER

In respect of the evidentiary information and materials entered into the record before, during and after the July 2009 public meetings, the CEC noted a number of areas of uncertain or insufficient information constraining its decision making. By letter to LPC dated October 8, 2009 (Appendix F), the Commission asked LPC to resolve these uncertainties and to remedy the stated deficiencies. Most of these related to a need for additional elaboration and documentation of the dispersion modelling's applied assumptions and procedures, and a specific request was made for a standalone review of the human-health risk consequences of the proposed alteration.

The CEC noted that an appropriate framework for formulating LPC's response would be the 2006 draft provincial "Guidelines for Air Dispersion Modelling in Manitoba":

> *"The Commission is of the view that Guidelines for Air Dispersion Modelling in Manitoba provide the guidance for the provision of information that the Commission is seeking. By supplying the requested information in a manner in keeping with the guidance in this document, Louisiana-Pacific would be assisting the Commission in the completion of its investigation."*

1.5 LPC RESPONSE

Notwithstanding that LPC believed that it had fully satisfied all of the guidance from Manitoba Conservation regarding the nature of the information that it should provide to the CEC in support of its application, and notwithstanding Manitoba Conservation's acceptance of its filed information, LPC acknowledged the value of the CEC effort to resolve residual uncertainties and information needs.

Accordingly, LPC retained TetrES Consultants Inc. of Winnipeg to assist it to formulate a focussed response to the CEC letter, intended to fully and credibly respond to the CEC's queries and information requests. Tetr*ES* was retained to assist the LPC dispersion modelling to help update and integrate the previous separate modelling documents into a single comprehensive modelling report consistent with the Manitoba Draft 2006 Modelling Guideline. To augment Tetr*ES'* own expertise in dispersion modelling, and to ensure continuity with the previous dispersion modelling undertaken by Cordilleran Associates, LPC again retained Olsson Associates of Golden, Colorado, which had acquired Cordilleran after its initial modelling work for LPC. No new modelling was undertaken by Tetr*ES*. Tetr*ES* was retained the toxicological expertise of Stantec Consulting Inc. (Stantec) to undertake the free-standing Human Health Risk Assessment specifically requested by the CEC.

This document is LPC's response to the CEC's letter of October 8, 2009. Key attachments hereto, relied upon by Tetr*ES* in formulating this report, are the dispersion modelling report completed by Olsson Associates (Appendix B), and the HHRA completed by Stantec (Appendix G). Stantec's report entitled "Louisiana-Pacific Canada Ltd. – Swan Valley OSB Plant Human Health Risk Assessment" evaluates the potential for human-health-related impacts associated with the removal of RTOs from the upgraded plant. This Human-Health Risk Assessment (HHRA) satisfies the CEC request for a standalone risk assessment report that:

- includes a description and rationale of applicable pathways;
- includes a rationale for the selection of health standards used; and
- is fully referenced and can be peer reviewed.

The HHRA evaluates the potential for adverse health outcomes from both short-term (acute) exposures and long-term (chronic) exposures resulting from environmental releases to air, land, and water.

1.6 ORGANIZATION OF THIS REPORT

The organization of this report, as specifically requested by the CEC, closely follows the information prescriptions of the province in its draft 2006 dispersion modelling guidelines document. This report addresses only those questions, or information requests, raised by the CEC in its October 8, 2009 letter, and does not respond to other issues that may have been raised by other parties, including the interveners. The sequence of subjects addressed in this report corresponds with the sequence of subjects set out in the CEC's letter. Table 1-1 is a checklist that indicates where any subject can be found in this report or its appendices.

Table 1-1: CEC Data Request Checklist	
Subject	**Full Details in Section**
Model Selection	2.1 Olsson
Screening Level or Refined Level Modelling	2.1
Provincial Approval for Use of One Year of Meteorological Data in Modelling	3.4.2
Selected Modelling Options	2.1
Start-up/Shutdown/Upset Conditions	1.1.3
Facility Overview	3.0
Topography	3.3.1
Building Dimensions, Locations of Structures	3.5.2, 3.5.3
OSB Process Description	4.1
Released Pollutants Discussion	4.2
Rationale for Pollutants to Model	4.3
Fugitive Emissions	1.1.2
Land Use	3.3.2
Background Air Quality	6.0
GEP Stack Height Discussion	7.0
Rationale for Selecting Air Criteria	8.0
Stand-alone Health Risk Assessment	Appendix G

2.0 MODELLING RESULTS REPORTING

In its October 8, 2009 letter to LPC, the Clean Environment Commission requested that LPC provide its modelling results in a free-standing report that conforms specifically to the draft 2006 Guidelines for Air Dispersion Modelling in Manitoba. LPC so instructed its modelling consultant, Olsson Associates of Denver, Colorado, and Olsson prepared a new, comprehensive and standalone version of the original reporting, fully updated with its latest work. The report is formatted to address the information requirements set out in the draft Guidelines. The Olsson Modelling Report is provided as Appendix B to this document. A report outlining the Quality Assurance review of meteorological data used by Olsson in its dispersion modelling is attached as an appendix to Olsson's Modelling Report.

Several questions of clarification about the basis of modelling, and the model results, were asked by the CEC in its letter to LPC. The Olsson report contains detailed and complete responses to those questions.

This (i.e., the Tetr*ES*/Stantec) document is intended to provide brief summary responses to CEC questions and also provides reference to explicit technical rationale contained within the full Olsson Modelling Report. This allows the reader to review succinct responses to each of the CEC's information requests. Those with interest in more detailed technical discussions are directed to the pertinent sections within the Olsson Modelling Report.

3.0 REFINED MODELLING AND MODEL SELECTION

All dispersion modelling and results discussed in this report pertain to emissions modelling of the LPC Swan Valley OSB Plant as conducted and documented by Olsson Associates of Colorado.

3.1 SCREENING AND REFINED MODELLING OPTION

The CEC requested detail on dispersion model selection and also the level of effort (screening or refined) for the modelling assessment. Two types of dispersion modelling assessments are approved for use under the draft 2006 Modelling Guidelines – 'screening model' and 'refined model' assessments. The Guidelines state that *"…for sources that are sufficiently complex with multiple buildings of varying heights, different types of releases (e.g., stack and fugitive), and numerous release points…the proponent should undertake a more refined air dispersion modelling project*." (p.2).

By this definition, the Swan Valley OSB plant is considered 'complex', with the manufacturing building incorporating varying roof, peak and eave elevations, and eight distinct release points (stacks) to be modelled. **A refined model assessment was therefore selected for this assessment.**

3.2 SELECTED MODEL

A number of modelling tools are approved for regulatory use by assessors. A model is selected with consideration of the nature of the emissions involved in the assessment as well as other considerations including method of pollutant release and the size of study area of interest. Models are typically selected from a list of regulatory-accepted models provided by the regulators in the jurisdiction of the facility.

Olsson's modelling builds upon previous modelling work initiated in 2003 and culminating in results filed with Manitoba Conservation in 2007, 2008 and 2009. At that time, the Industrial Source Complex (ISC) dispersion model was considered to be the primary model for assessment of industrial emissions involving multiple emissions sources. Manitoba Conservation's Draft Guidelines for Dispersion Modelling accepts the following models for use in Refined Modelling:

- AERMOD Model (AERMOD)
- CalPuff Model (CALPUFF)
- Industrial Source Complex Model Version 3 (ISC3)
- Industrial Source Complex-PRIME Model (ISC-Prime)

Olsson selected the Industrial Source Complex 3 Plume Rise Model Enhancements (ISC3-PRIME) steady-state Gaussian plume dispersion modelling executable for use

in all phases of this modelling to ensure consistency with modelling approaches and parameters previously reviewed in December, 2003 and approved in January 2004 by Manitoba Conservation .

The ISC3-PRIME model is used to predict ground-level concentrations for numerous parameters of interest released from a wide variety of industrial complex sources. Model inputs include, but are not limited to, topography, meteorology, building downwash and emission specifications.

ISC3-PRIME is appropriate for use in areas of simple terrain, such as the terrain surrounding the Swan Valley OSB facility. According to the USEPA, "*ISC-PRIME is generally unbiased or overpredicts, so its use is protective of air quality*."[1]

ISC3-PRIME has been used in conjunction with the Building Profile Input Program for PRIME (BPIPPRM). BPIPPRM is a PC-based program designed to incorporate building downwash to correctly implement building heights and projected building widths for simple, multi-tiered, and groups of structures. BPIPPRM includes an algorithm for calculating downwash values for input into the PRIME algorithm which is contained in ISC3-PRIME. Additional information on ISC3-PRIME can be found on the EPA's website (http://www.epa.gov/scram001/dispersion_alt.htm).

A full discussion on model selection is provided in Section 2.1 of the Olsson Modelling Report.

[1] Project Prime: Evaluation of Building Downwash Models Using Field and Wind Tunnel Data available at http://www.epa.gov/scram001/7thconf/iscprime/tekpapr2.pdf

4.0 PROVINCIAL APPROVAL FOR USE OF SINGLE YEAR OF METEOROLOGICAL DATA IN MODELLING

Manitoba's Draft Guidelines for Air Dispersion Modelling in Manitoba allow for the use of either the five most recent, consecutive years of meteorological data from the nearest representative weather station, or one year of site-specific data that have been subjected to QA/QC analysis. EPA Guidelines[2] and Manitoba Conservation[3] require that the meteorological dataset used in dispersion modelling be a minimum of 90% complete.

A review of the site-specific meteorological dataset for the five-year period from 2002 through 2006 indicated that the 90% data-completeness requirement was not met for three of the five most consecutive years (2002, 2004 and 2005). The 90% data completeness requirement was, however, met in 2006, with an overall data collection efficiency of 99.6% and a minimum quarterly data-collection efficiency for any parameter of 98.6%.

As a result, LP proposed the use of the 2006 site-specific meteorological dataset to ensure acceptance of the modelling results under both EPA and Manitoba Guidelines. The use of a single year of site-specific meteorological data was approved in writing on January 20, 2004 and again was verbally approved by Manitoba Conservation in August 2008.

Olsson Associates was provided a 2006 meteorological data set for the dispersion modelling. The data set, prepared by SLR Consulting Canada (Ltd.), is complete and of the appropriate format for use with the ISC3-PRIME model. Surface meteorological data utilized in the dispersion modelling were obtained from LPC Swan Valley OSB's meteorological monitoring station located adjacent to the Site 1 ambient air monitoring station, approximately 1.5 km north-northeast of the plant for 2006, providing a complete single year record of hourly observations. A wind rose is provided for this 2006 record of hourly observations in Figure 4-1. Upper air data are not measured by Environment Canada for this location; consequently Manitoba Conservation has authorized the use of upper air data obtained from The Pas, Manitoba, for use in detailed dispersion modelling. The full meteorological dataset of hourly observations for both the surface monitoring station and the upper air data were combined and processed using USEPA Meteorological Processor for Regulatory Models (MPRM, Version 99349).

More information on the meteorological data set including processing options and QA/QC procedures can be found in the appendices of the Olsson Modelling Report (Appendix B), within a QA/QC framework document developed for LPC by SLR (SLR Consulting (Canada) 2003-2009).

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[2] US EPA, 2000. "Meteorological Monitoring Guidance for Regulatory Modelling Applications" (EPA-454/R-99-005)

[3] January 20, 2003(4) letter from Larry Strachan (Director, Environmental Approvals) to Kevin Warkentin, LPC, RE: Proposed Dispersion Modelling Protocol to Support Dryer RTO Elimination. See also November 20, 2003 email from Conservation's Richard Johns to LPC's Kevin Warkentin.

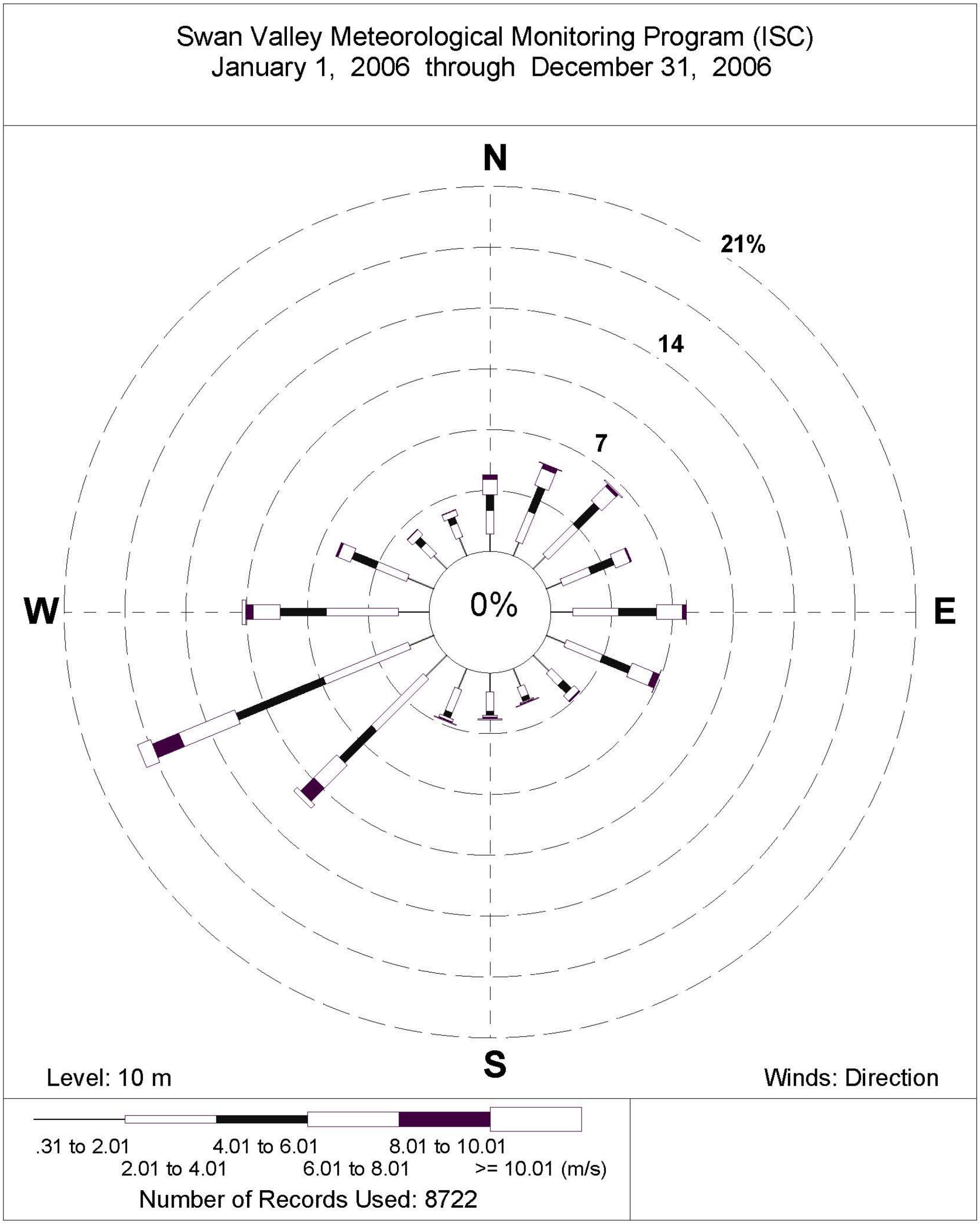


Figure 4-1: Wind Rose for Swan Valley 2006

5.0 SELECTED MODELLING OPTIONS INCORPORATED INTO ASSESSMENT

The CEC requested a declaration and discussion regarding both the model selected for the assessment of LPC's plant emissions and also details on the selected model options applied in the assessment. A discussion of applied modelling options is relevant in order for reviewers of a modelling assessment to fully understand conditions and assumptions set in the model's settings, many with potential to affect the predicted concentrations expressed by the model. In most cases, modellers will use "Regulator Default" settings except where local conditions require selected settings to be altered in the model from the "Default" Mode. This practice is commonly accepted provided that rationale is provided for the use of non-default settings.

The Olsson modelling used default settings with the exception of two instances. These exceptions involved settings pertaining to how the dispersion model handles missing meteorological data points in the processing of short-term averages, and also in a terrain setting where the model was instructed to incorporate local terrain data.

A full discussion of the rationale for selected modelling options is provided in Section 2.1 of the Olsson Modelling Report.

All sources were modeled as point sources, which is appropriate for emissions from a stack.

ISC3-PRIME allows for pollutant average ground-level concentrations to be calculated over any number of different time periods. Modelled pollutants and averaging periods are addressed in Section 8 of the Olsson Modelling Report (Appendix B). Averaging periods for each pollutant were selected based on applicable ambient air-quality criteria.

6.0 START-UP, SHUTDOWN, OR UPSET CONDITIONS

The CEC requested that facility start-up, shutdown or upset conditions be taken into consideration in the modelling. Start-up, shutdown, or upset conditions are of interest due to the fact that they may, in some industrial processes, generate more emissions than a normal, continuous steady-state industrial process. Where start-up, shutdown or upset of an industrial process does not generate a substantial variance from a steady-state process, then atypical conditions are less likely to be modelled and modelling of normal process emissions is considered sufficient.

The Swan Valley OSB plant normally operates on a steady-state basis, 24 hours per day, 7 days per week. Emissions are not expected to vary significantly during normal operations. As described in Section 4.3 of the Olsson report, the emission rates modelled in this assessment are representative of licensed maximum authorized emission rates (either existing or proposed), or actual maximum emission rates where no license limit is in place, under this steady-state operating scenario. These rates therefore represent the potential 'worst case' with respect to impacts on ambient air quality in the vicinity of the plant.

Controlled start-up and shutdown scenarios have not been included in this dispersion modelling assessment as any impacts would be lower than those predicted during normal operations.

Unscheduled shutdown or upset conditions associated with process or control equipment may occur from time to time at the facility, however, these conditions have a limited impact on emissions. Any major upset condition involving process equipment results in the immediate shutdown of that process equipment, although the associated pollution control systems (PCS) will continue to operate. In the event of an upset or unscheduled shutdown of any PCS, the associated process equipment is also generally shut down immediately, thereby eliminating emissions from that source.

It should be noted that upset conditions on the Thermal Oil Heater and Dryer Energy Systems are not impacted by the proposed decommissioning of the RTOs; that is, these upset situations currently and will continue to occur whether or not the RTOs are in use.

A full discussion of the effects of Start-up, Shutdown and Upset conditions on emissions assessed in the dispersion modelling assessment is provided in Section 1.1.3 of the Olsson Modelling Report.

7.0 FACILITY OVERVIEW

The CEC accepted LPC's project overview in its most recent submission to CEC, however it did request additional details about the LPC OSB Facility, such as a site plan and description of the OSB process. The purpose of the overview data is to provide reviewers with sufficient information about the nature of the processes occurring at the plant, the scale of production, the setting of the facility and other general information.

The general layout of the LPC OSB Plant Facility is provided in Figure 7-1.

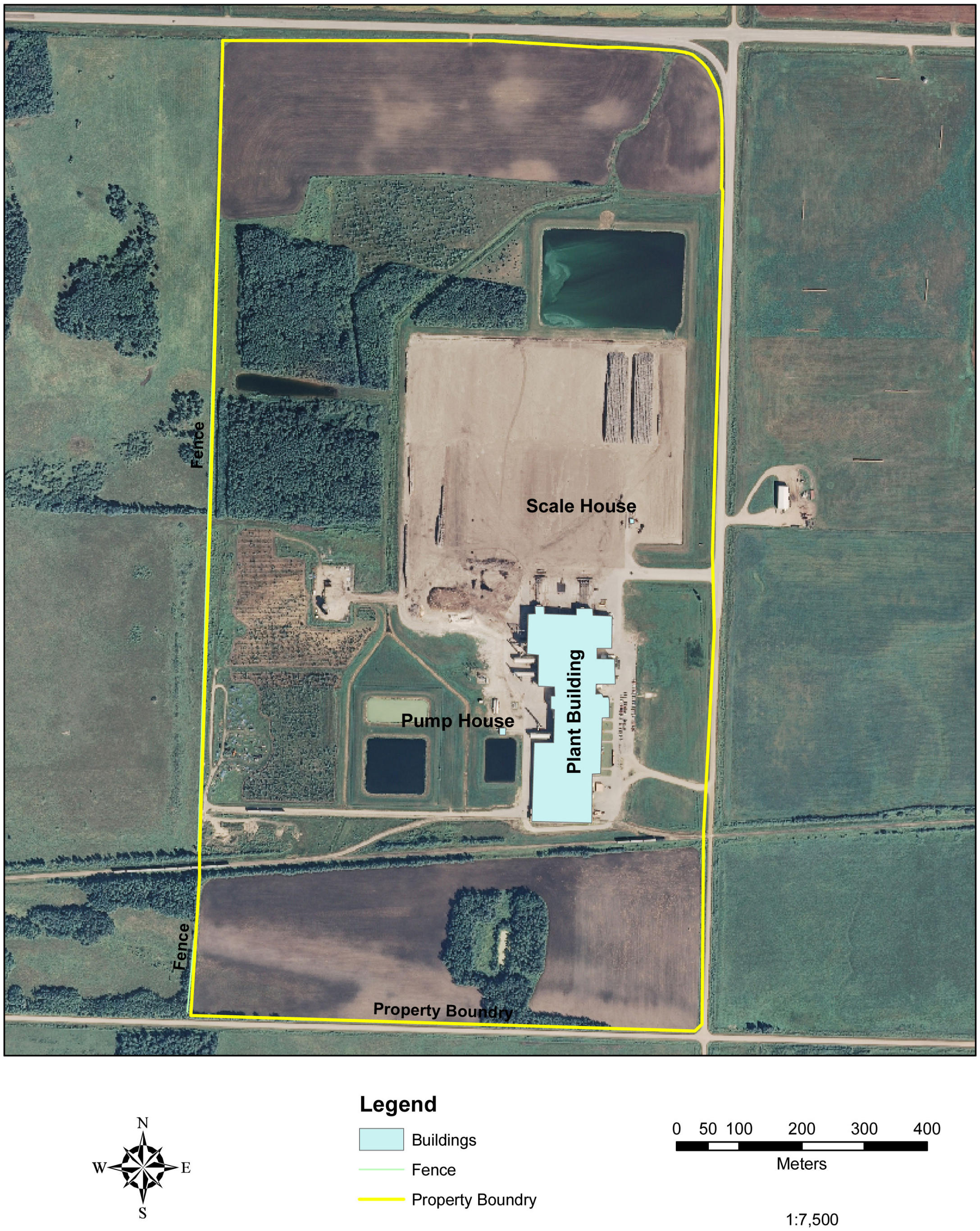


Figure 7-1: General Layout of the LPC OSB Plant Facility

7.1 LPC OSB MANUFACTURING PROCESS

The CEC requested details on the OSB process used at LPC's OSB Plant. A description of the industrial processes occuring at a facility assists reviewers in gaining understanding of the flow of raw materials into a facility, the nature of the wastes and pollutants generated, the fate of wastes and pollutants and points of release, as well as the final products manufactured for a facility. **LP's OSB manufacturing process is described below.**

LPC manufactures finished OSB product within a multi-step process contained on the plant site. The process begins with log receiving and storage within the facility's log yard. The log yard covers approximately 20 hectares with the capacity to store approximately 125,000 cords of wood. Optimal log length is 2.5 m. Prentice loaders transfer the logs to one of six 245,000 litre conditioning ponds. OSB plants in northern locations are often equipped with log conditioning ponds to pre-thaw logs during winter operations. Surface runoff from the log yard is directed to the surface water holding pond (retention pond). Water from the retention pond is used as process make-up water, or may be discharged upon approval from Manitoba Conservation. Logs are heated to a temperature of 21^{o}C to 49^{o}C in the log conditioning ponds and will soak for up to 4.5 hours. Logs are transferred to debarking units by jack ladder chain conveyance.

Once logs are transferred from the log conditioning ponds, they proceed to one of three ring debarkers. The bark is removed by feeding individual logs into the debarkers with a spinning ring with knife-tipped arms circling the log as it passes through. The removed bark falls into a conveyor system under the debarkers and is transported to a grinder or bark hog. The bark hog processes the bark to a uniform size to be used as fuel. The hogged bark is conveyed to two large fuel bins feeding both the Thermal Oil Heater (which provides heat energy for the press, log ponds and building heat), and the Dryer Energy System (which provides heat energy for the four single pass dryers).

The debarked logs are transferred by a parallel infeed conveyor into one of three log waferizers. The waferizers slice the logs into small "wafers"" which are approximately 0.7 cm thick, 10.5 cm long and 2 cm wide. Each waferizer has an approximate gross capacity of 27,200 kg/hour. The wafers are conveyed from the waferizers to one of four green (also known as "wet") wafer storage bins, situated above each dryer. Each bin feeds wafers into one of the four single-pass wafer dryers. The bottom of these green bins are large conveyor belts (called live bottom belts) which can be sped up or slowed down to increase or decrease the volume of material put into the dryers. The material remains in the wet bins for varying lengths of time, depending on production levels at which the mill is operating. Each bin has storage capacity of 232 m^3.

The wafers leave the wet bin as "strands" which are dried in one of four single-pass rotary drum dryers. Wet strands are delivered to the rotary inlet airlock at an adjustable rate by the wet bin live bottom belt. The wood strands are carried into the dryer by a stream of hot air supplied from the Dryer Energy System. Within the dryer, the strands are transported by a combination of mechanical and pneumatic conveyance. The strands travel the length of the dryer before exiting, and are dried to the prescribed moisture content, normally 4-6% moisture. The design capacity of each dryer is 29,600 lb/hr (13,500 kg/hr) of strands (dry basis). The Dryer Energy System produces approximately 144 Million BTU/hour of heat energy required to heat the dryers.

Once the strands exit the dryer units, the dried strands are pneumatically conveyed through duct work to a high efficiency cyclone separator ("primary cyclone"), where the strands are separated from the dryer exhaust stream and discharged through an airlock to a diverter gate. The material is routed downstream to the rotary screens, or to the fire dump conveyor. The fire dump conveyor is designed to quickly evacuate the strands from the building in the event of an emergency situation, such as a spark detection in the system. Strands evacuated from the building go into a large, closed concrete vault located outside the plant where hot strands can be easily managed. The fire dump conveyor is also used to return or "reclaim" strands back to the wet bin if the strands are too wet such as occurs occasionally during start up situations.

The gas stream exiting the primary cyclone is treated via a set of four (4) wet electrostatic precipitators (WESP), with one WESP per dryer unit to remove the particulate. The WESPs are designed to remove most of the particulate from the cyclone exhaust. Each WESP uses approximately 30 m^3 of water each day, most of which is recycled through the WESP or transported back to the log conditioning ponds as make-up water.

Up until January 7, 2009, upon exit from the WESP units, the gas stream was processed through one of two Regenerative Thermal Oxidizer (RTO) units servicing the four dryer units. The RTOs combusted natural gas to achieve the high temperatures (760^oC) required to oxidize organic compounds in the dryer exhaust gas stream to carbon dioxide and water. As part of the application to decommission the Dryer RTO units, LPC has proposed a scenario where a single, common stack will be constructed at a height of 49.5 metres to capture the exhaust from the existing four single-pass drying systems after these exhausts pass through the WESPs allocated to each drying unit.

After the product leaves the primary cyclones, the strands are conveyed to a rotary screen, with one screen for each dryer unit. The rotary screen separates the usable wood strands from the small particles of wood ("fines"), which are considered unsuitable for board production. The fines are sent to the dry fuel bin to be mixed with the bark and used as process fuel in either the Thermal Oil Heater or the Dryer Energy System.

After the screening process, the remaining material is sent to storage bins intended for the dry strands ("dry bins"). The dry bins are similar in design to the green bins. The dry bins holding dry strands are located on the top of each blender unit. At the bottom of each dry bin is a large live bottom belt that can be sped up or slowed down to increase or decrease the volume of material placed into the blenders. Strands remain in the bins for varying lengths of time, depending on the production levels at which the mill is operating. The strands are fed continuously into one of two surface blenders or one core blender, which mix the strands with resin and wax. The chemical application to wood strands in Swan Valley OSB include wax, liquid phenol-formaldehyde (PF) (added to the surface and core layers) and MDI (added to the core layer only).

Dried strands blended with the resins and wax are transferred in enclosed conveyors to one of four forming bins, two each for the surface and core layers of the board. These forming heads are positioned over the forming line. The formation of the wood strands into a mat begins with a surface layer that is parallel to the board axis. The core strands are then applied randomly to the board axis. A final top surface layer is applied parallel to the board axis. Each of the forming heads dispense 15%-35% of the final mat weight, with the exact surface to core ratio depending on the product. The forming line system features a steel wire mesh caul screen that transports the mat through a flying cut-off saw, which cuts the mats down to a nominal 2.6 m x 7.5 m (8′ x 24′). The trim from the flying cut-off saw is recycled to the core former.

The individual mats created in the forming process are transported to a fourteen-pallet loader cage. Once the loader has all fourteen mats in place, the mats are loaded simultaneously into the fourteen opening press. The press closing sequence can begin once the press is loaded. The press is heated to a temperature of approximately 221^{o}C by pipes containing thermal oil (heated by the wood-fired Thermal Oil Heater) that circulate through the press plates. The press cycle time varies depending on the thickness of the panels being produced and the press temperature. After pressing, each mat is conveyed to the unloader where screens are separated from the pressed board and returned under the forming line to the beginning of the forming process. The screen's flexible mesh design allows steam ventilation from the centre of the mat after processing and leaves a textured finish on the bottom of the board, which provides a skid resistant surface. The pressed board is weighed and conveyed to the saw line.

Up until January 7, 2009, exhaust from the press was routed through the Press RTO unit and then directed to a 30.5 m stack. As part of the application to decommission the Press RTO, LP intends to route the exhaust from the press through this existing 30.5 m Press RTO stack, although the RTO unit itself will not be operational.

The pressed board is trademarked and run through a finishing step consisting of a series of saws and cut into 4 x 8 feet (1.2 x 2.4 m) panels. A series of nail lines are applied to the screen side of the panels. Finished panels are sent to the appropriate grade bins for stacking. The stacked panels, in unit form, are conveyed through the paint booth, where edge seal is applied as required by the product. Immediately after the paint booth, the LP logo and product information is stenciled on the side of the bundle. The units are strapped, properly identified, and moved to the warehouse to await shipment or further processing.

An optional step takes place for a tongue and groove (T&G) flooring product with boards of varying thickness. This product skips the paint booth step and is moved via forklift to the T&G

line where it is sanded, and machined with tongue and groove profiles. These bundles are edge sealed, packaged, strapped, and stored in the warehouse prior to shipment.

The finished bundles are allowed to cool in the warehouse for a minimum of 24 hours before shipping by rail or truck from the warehouse.

A detailed process flow diagram is provided as Figure 7 in Section 4.1 of the Olsson Modelling Report (Appendix B) provides a detailed process flow diagram of the OSB manufacturing process at LP Swan Valley OSB. Note that the Dryer and Press RTOs are shown on the process flow diagram for completeness only. As described above, a new Dryer WESP stack is proposed in the application that will be located upstream of the Dryer RTOs, and the existing Press RTO stack will be utilized, although the Press RTO itself will not be operational.

7.2 SITE PLAN

The CEC requested overview regarding specific details of the LPC OSB Plant. This section provides requested detail on locations of property lines, the locations and arrangements of structures, building dimensions and emissions source list and locations.

A topographical map of the region surrounding the LPC OSB Plant is provided in the Olsson Modelling Report in Section 3.3.1 as Figure 2.

7.2.1 Property Lines and Boundaries

LPC's Swan Valley OSB property is bounded as follows:

- The northern property line is bounded by Manitoba Provincial Trunk Highway 10 (PTH10)
- The eastern property line is bounded by Road 147W
- The southern property line is bounded by Road 212N
- The western property line is bounded by privately owned agricultural land (pasture).

Property boundaries and fencelines are shown in Figure 7-1.

7.2.2 Locations of All Structures

LPC Swan Valley OSB is comprised of one main manufacturing building, which incorporates all operations, warehousing and plant administrative offices. Shipping lanes and a parking lot are arranged along the southern and eastern perimeters of the building. The log yard and log yard runoff retention pond are located north of the plant building. A small scale shack is located north of the main building at the entrance to the log yard where all log deliveries are accepted. A small fire pond pump house is located west of the main building.

Figure 7-1 presents a view of the plant location relative to property boundaries and fence lines, and the arrangement of the structures and features of the property.

7.2.3 Building Dimensions

ISC3-PRIME allows for the input of building locations and dimensions to determine the appropriate direction-specific parameters to use for each source. **The Emission Source Site Plan (Figure 7-2) includes all building dimensions, roof ridge and roof eave elevations that were incorporated into the modelling utilizing the Building Profile Input Program for PRIME (BPIPPRM). Table 7-1 lists the buildings, roof heights and UTM coordinates for each structure on the LPS OSB site.**

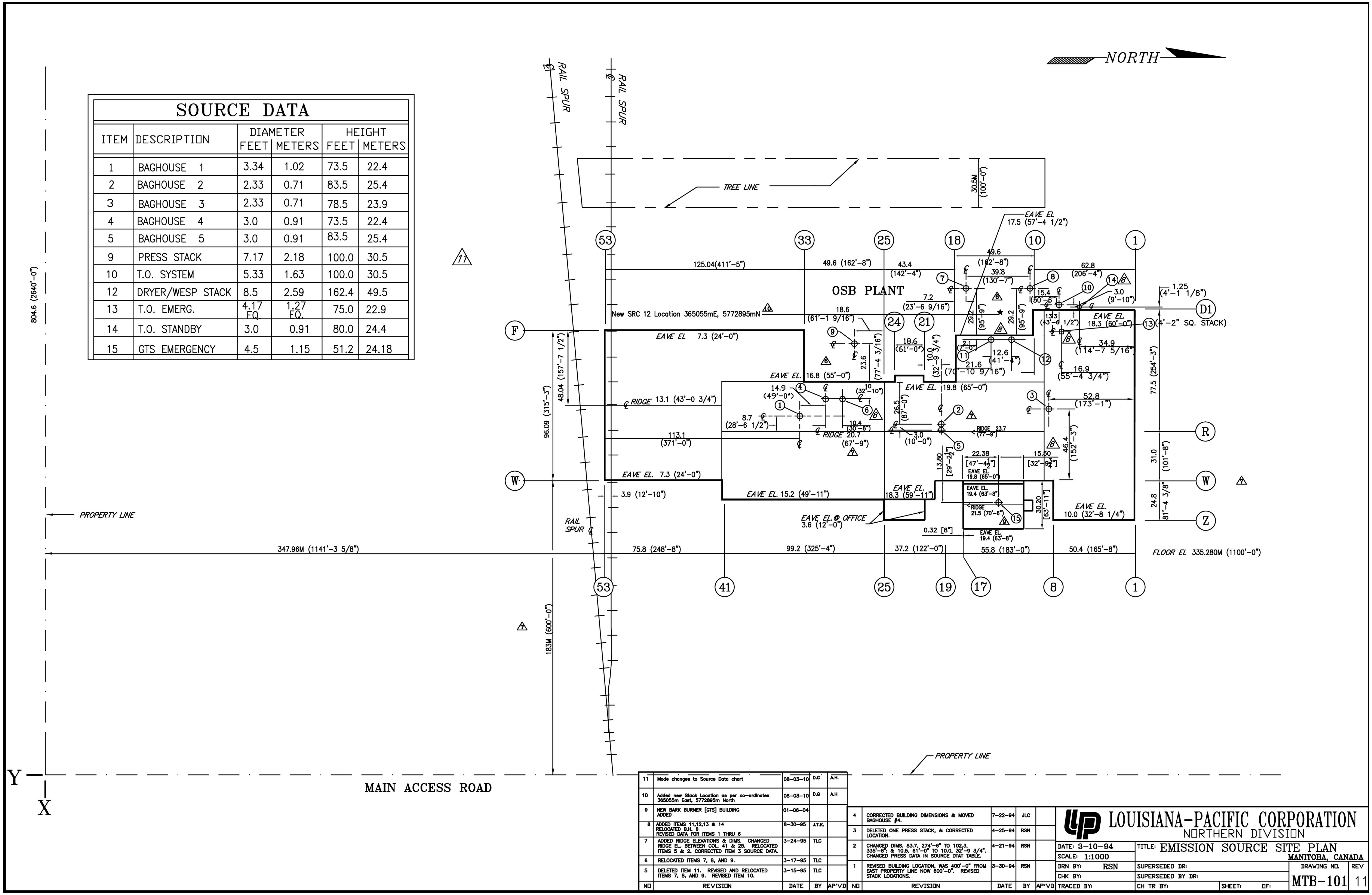
7.2.4 Source List and Source Description

Information pertaining to stack locations and stack characteristics was provided to Olsson for this assessment by LPC. Based upon the information provided, a total of eight (8) active stacks were identified. The stack process areas, stack description, stack dimensions, flow rates and UTM coordinates, are provided in Table 7-2.

Table 7-1: Swan Valley OSB Building Dimensions

Building ID	Height (m)	UTM Coordinates (Zone 14)							
		SW Corner		NW Corner		NE Corner		SE Corner	
		Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing
BLD1*	10.200	365064.90	5772651.00	365064.90	5772776.00	365099.00	5772776.00	365099.00	5772726.80
BLD2	19.950	365099.00	5772726.80	365099.00	5772825.60	365172.40	5772825.60	365172.40	5772726.80
BLD3	19.800	365096.00	5772831.64	365096.00	5772850.24	365099.00	5772850.24	365099.00	5772831.64
BLD4*	21.000	365099.00	5772825.60	365099.00	5772869.00	365161.00	5772869.00	365161.00	5772856.80
BLD5	21.175	365071.10	5772869.00	365071.10	5772918.60	365161.00	5772918.60	365161.00	5772869.00
BLD6*	14.150	365052.50	5772918.70	365052.50	5772981.44	365185.80	5772981.44	365185.80	5772931.04
BLD7	3.600	365173.40	5772826.00	365173.40	5772851.50	365185.80	5772851.50	365185.80	5772826.00
BLD8	20.450	365163.00	5772875.40	365163.00	5772913.28	365193.20	5772913.28	365193.20	5772875.40
BLD9	20.450	365174.00	5772913.40	365174.00	5772918.90	365180.90	5772918.90	365180.90	5772913.40

*These buildings have more than four corners, but have been reduced for simplicity.



SOURCE DATA

ITEM	DESCRIPTION	DIAMETER FEET	DIAMETER METERS	HEIGHT FEET	HEIGHT METERS
1	BAGHOUSE 1	3.34	1.02	73.5	22.4
2	BAGHOUSE 2	2.33	0.71	83.5	25.4
3	BAGHOUSE 3	2.33	0.71	78.5	23.9
4	BAGHOUSE 4	3.0	0.91	73.5	22.4
5	BAGHOUSE 5	3.0	0.91	83.5	25.4
9	PRESS STACK	7.17	2.18	100.0	30.5
10	T.O. SYSTEM	5.33	1.63	100.0	30.5
12	DRYER/WESP STACK	8.5	2.59	162.4	49.5
13	T.O. EMERG.	4.17 EQ.	1.27 EQ.	75.0	22.9
14	T.O. STANDBY	3.0	0.91	80.0	24.4
15	GTS EMERGENCY	4.5	1.15	51.2	24.18

NO	REVISION	DATE	BY	AP'VD
11	Made changes to Source Data chart	08-03-10	D.G	A.H.
10	Added new Stack Location as per co-ordinates 365055m East, 5772895m North	08-03-10	D.G	A.H
9	NEW BARK BURNER [GTS] BUILDING ADDED	01-06-04		
8	ADDED ITEMS 11,12,13 & 14 RELOCATED B.H. 6 REVISED DATA FOR ITEMS 1 THRU 6	8-30-95	J.T.K.	
7	ADDED RIDGE ELEVATIONS & DIMS. CHANGED RIDGE EL. BETWEEN COL. 41 & 25. RELOCATED ITEMS 5 & 2. CORRECTED ITEM 3 SOURCE DATA.	3-24-95	TLC	
6	RELOCATED ITEMS 7, 8, AND 9.	3-17-95	TLC	
5	DELETED ITEM 11. REVISED AND RELOCATED ITEMS 7, 8, AND 9. REVISED ITEM 10.	3-15-95	TLC	

NO	REVISION	DATE	BY	AP'VD
4	CORRECTED BUILDING DIMENSIONS & MOVED BAGHOUSE #4.	7-22-94	JLC	
3	DELETED ONE PRESS STACK, & CORRECTED LOCATION.	4-25-94	RSN	
2	CHANGED DIMS. 83.7, 274'-6" TO 102.3, 335'-6"; & 10.5, 61'-0" TO 10.0, 32'-9 3/4". CHANGED PRESS DATA IN SOURCE DTAT TABLE.	4-21-94	RSN	
1	REVISED BUILDING LOCATION, WAS 400'-0" FROM EAST PROPERTY LINE NOW 600'-0". REVISED STACK LOCATIONS.	3-30-94	RSN	

Figure 7-2: Property Map and Building Locations

Table 7-2: Exhaust Stack Descriptions, Locations and Parameters								
Stack ID	**Source Description**	**UTM (Zone 14)**		**Elevation (m)**	**Height (m)**	**Temperature (K)**	**Velocity (m/s)**	**Diameter (m)**
		Easting	**Northing**					
SRC1	Trim Saws	365121.30	5772764.10	335.28	22.400	310.930	12.650	1.020
SRC2	Formers	365126.50	5772860.24	335.28	25.400	317.590	7.850	0.710
SRC3	Raw Fuel Bin	365114.60	5772929.00	335.28	23.900	289.150	13.350	0.710
SRC4	Sander	365109.00	5772779.00	335.28	22.400	289.150	14.667	0.910
SRC5	Flying Cut Off Saws	365129.50	5772860.24	335.28	25.500	309.822	20.830	0.910
SRC9*	Press	365075.40	5772807.04	335.28	30.500	328.150	17.930	2.180
SRC10*	Thermal Oil System	365049.50	5772934.04	335.28	30.500	511.480	15.730	1.630
SRC12*	Combined WESP Stack	365055.00	5772895.00	335.28	49.500	353.430	16.760	2.591

*These stacks were identified as SRC6, SRC7 and STCK1, respectively, in the initial October 2008 modeling. Identifiers were changed prior to the HAP modeling, however all stack parameters were maintained

8.0 RELEASED POLLUTANTS AND RATIONALE FOR MODELLING EMISSIONS

The CEC requested a discussion of released pollutants or a rationale for the pollutants to be modelled. This discussion is necessary to provide an inventory of the types and quantities of emissions resulting from an industry's processes, and also for the modeller to describe their reasoning behind the selection of specific pollutants for emissions modelling. In addition, since the quantification of emissions is a critical input to the dispersion modelling process, it is important for the method of quantifying these emissions to be readily apparent and understood.

In some cases, site-specific stack testing data are available to provide direct calculations for emission rates. Where stack testing data are not available, other accepted emissions approximation techniques are acceptable, provided a full rationale is presented to allow confirmation of the approach by reviewers of the modelling assessment.

A brief discussion of the pollutants released from the LPC OSB Plant and the rationale for estimating emissions is provided in this section, with full details available in the Olsson Modelling Report.

There are three primary sources of pollutant emissions to the atmosphere from the OSB manufacturing process:

- Combustion emissions (i.e., combustion of wood, natural gas or other fuel oil).
- Emissions driven off by drying the wood, releasing to atmosphere naturally occurring materials in the wood.
- Emissions associated with the pressing operations, which include emissions from resins used to bind the wood strands together and from the wood itself.

Pollutants from individual emission sources have been identified and have been modeled at calculated emission rates. Olsson began its final modelling of the proposed alteration of the pollution-control system at the Swan Valley OSB plant in October of 2008. Modeled pollutants included nitrogen oxides (NOx), total volatile organic compounds (VOCs), particulate matter (PM) and the hazardous air pollutants (HAPs) phenol, methylene diphenyl diisocyanate (MDI), hydrogen cyanide (HCN), benzene and formaldehyde. Since the original modelling initiated in 2003 and completed in 2007, and at the request of Manitoba Conservation, LP has requested the modelling of the additional HAPs acetaldehyde, acrolein, methanol, propionaldehyde, as well as PM_{10} and $PM_{2.5}$. The document prepared by Olsson updates and summarizes all modelling performed, and documents model selection, assumptions, inputs and results (Appendix B).

Emission rates for the modelling were provided to Olsson Associates for use in the modelling by LPC.

A supplementary document, entitled "Rationale for Air Dispersion Model Emission Rates" (Emissions Rationale) is provided in the appendices (Olsson Appendix C) to the Olsson Modelling Report (Appendix B). The Emissions Rationale provides details on the emissions-characterization process as well as a detailed description of the calculation methods for the emission rates modeled from all sources included in Olsson's dispersion modelling analysis.

8.1 EMISSION RATES

The CEC requested emissions from each source for each pollutant be stated at annual emissions in tonnes/year and maximum hourly emissions in grams/hour. In addition, the CEC stated that in its previous submission, LP had not provided sufficient rationale and documentation on the source data or the methodology used to determine emission rates. The Commission requested that site-specific data be incorporated into the development of all emissions rates, and if this is not possible, to provide rationales for the substitution of rates that were based on the previous license and environmental impact assessments.

LPC has developed the document "Emission Factor Protocol and Rationale" to provide requested detail pertaining to development of emission rates used in the dispersion modelling. This rationale is provided as an appendix to the Olsson Modelling Report (i.e., Appendix C in Olsson).

Tables 8-1 and 8-2 provide maximum hourly and annual emissions for all parameters based on the operating scenario of 24 hours per day, 365 days per year.

Model ID	Description	Emission Rates (grams/hr)													
		Acet	Acro	Meth	Prop	PM_{10}	$PM_{2.5}$	Benz	Form	HCN	MDI	Phenol	NO_X	VOC	PM
SRC1	Trim Saws					360	ND								540
SRC2	Formers					216	ND		42.48		0.0828	1080			324
SRC3	Raw Fuel Bin					144	ND								324
SRC4	Sander					180	ND								396
SRC5	Flying Cut Off Saws					288	ND								468
SRC9	Press	324	ND	8028	ND	7560	6516	70.92	3960	2.376	320.4	2520	5400	10008	7560
SRC10	Thermal Oil System					6012	2700	23.76	15.48	1.908		1440	19080	5076	7848
SRC12	Combined WESP Stack	3096	1008	8856	900	15228	15228	619.2	14400	1440		1800	19080	75456	18504

Table 8-1: Hourly Emissions Rates (grams/hour)

8.2 FUGITIVE EMISSIONS

The CEC requested a description of potential fugitive emissions associated with LPC's OSB Plant operations. Fugitive emissions can include releases from leaks from pressurized process equipment, evaporative sources such as waste water treatment ponds and storage tanks, dusts from mechanical operations, or materials that are subjected to wind erosion. In some large industrial operations, fugitive emissions can be a significant proportion of total emissions and in those cases those fugitive emissions would need to be included in the modelling effort.

The LPC OSB Plant does not generate sufficient fugitive emissions to warrant their inclusion in the modelling conducted in Olsson's assessment.

There are two potential areas where fugitive emissions could be generated – the log yard and the plant building. The log yard is graveled, and therefore is a potential source of fugitive particulate emissions due to vehicle traffic. However, log yard fugitive particulate emissions have not been quantified, and estimation methods have a high degree of uncertainty. In addition, the plant has implemented a comprehensive log yard dust control program, including twice daily watering during the summer months and annual application of a chemical dust suppressant. The generation of fugitive particulate emissions from the log yard that travel beyond the property boundary is reduced by these operational controls. Finally, as facility particulate emissions are not impacted by the application to decommission the RTOs, no change in ambient particulate concentrations from current levels (which already includes the contribution of log yard-generated fugitive particulate, if any) is expected. As a result, fugitive particulate emissions from the log yard have not been included in the modeling assessment.

Trace levels of modeled pollutants may also be present inside the plant, however these do not contribute to ambient concentrations outside of the plant. The major process sources within the plant draw over 500,000 actual cubic feet per minute (ACFM) of air combined. As a result, air within the plant is continuously being drawn into any one of the numerous process systems as process or make-up air, and ultimately evacuated through the corresponding stack as process exhaust, where emissions have been characterized and modeled. This high demand for process air also creates a constant negative air pressure within the plant, which results in air being continuously drawn *into* the plant through any open doorway or vent. Therefore, any levels of modeled pollutants that may be present in the plant air are not released through openings or doorways as fugitive emissions but are ultimately released through stacks as process exhaust, which have been captured in the model as stack emissions.

Fugitive emissions are described in Section 1.1.2 of the Olsson Report.

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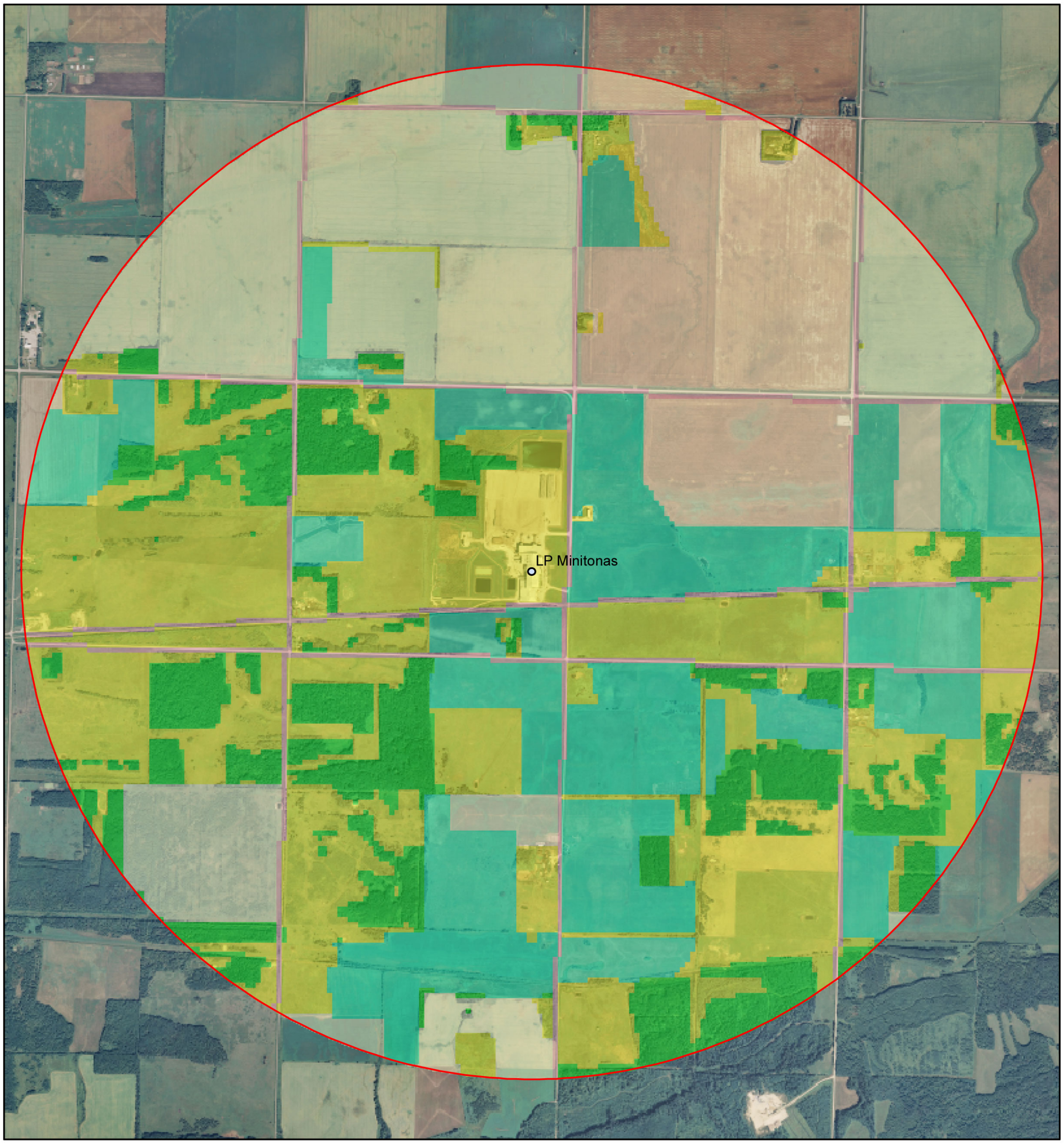
Table 8-2: Annual Emission Rates (tonnes/year)

Model ID	Description	Emission Rates (tonnes/yr)													
		Acet	Acro	Meth	Prop	PM_{10}	$PM_{2.5}$	Benz	Form	HCN	MDI	Phenol	NO_X	VOC	PM
SRC1	Trim Saws					131.4	ND								197.1
SRC2	Formers					78.84	ND		15.51		0.03	394.2			118.26
SRC3	Raw Fuel Bin					52.56	ND								118.26
SRC4	Sander					65.7	ND								154.54
SRC5	Flying Cut Off Saws					105.12	ND								170.82
SRC9	Press	118.26	ND	2930.22	ND	2759.4	2378.34	25.89	1445.4	0.87	116.95	919.8	1971	3652.92	2759.4
SRC10	Thermal Oil System					2194.38	985.5	8.67	5.65	0.70		525.6	6964.2	1852.74	2864.52
SRC12	Combined WESP Stack	1.445	367.92	3232.44	328.5	5558.22	5558.22	226.01	5256	525.6		657	6964.2	27176.44	6753.96

9.0 LAND USE ANALYSIS

The CEC noted that a discussion of the surrounding land use was not present in the previous LPC submission. A discussion of land use analysis is now provided in Section 3.3.2 of the Olsson Modelling Report. Land use analysis is a consideration because the nature of the surrounding land use has impacts on how some dispersion models factor in surface roughness for a given region. The roughness of a surface (i.e. urban downtown compared to rural countryside) will have an effect on dispersion coefficients of any given pollutant in the modelling.

Figure 9-1 below identifies the land uses within a 3-km radius of the Swan Valley OSB plant. Using the Auer land-use identification and classification table available in Appendix A of the draft 2006 Air Dispersion Modelling Guidelines, 54.1% of the area is classified as A2 - Agricultural rural (32.1% agricultural and 22.0% forage crops), and 42.1% is classified as A3 – Undeveloped or A4 – Undeveloped rural (29.9% grassland and 12.2% deciduous forest). **Based on the Auer classification scheme, rural dispersion coefficients were selected and used in the dispersion model, in accordance with the Guidelines.**



Legend

Land Use Classification and Area in Hectares

Land Use	Area (ha)
Agriculture	907.7
Deciduous Forest	345.0
Grassland	846.5
Forage Crops	621.0
Roads/Trails	107.1

N W E S

1:30,000

0 250 500 1,000 1,500

Meters

Figure 9-1: Land Use Classification within 3 km of Swan Valley OSB

10.0 LOCAL TOPOGRAPHY

The CEC requested a description of the topography surrounding the LP facility. Local topography describes natural and man-made features of a place or region in order to show their relative positions and elevations. These features are of interest to the modeller and to reviewers of a modelling assessment.

The LPC Swan Valley OSB Plant is located in the Swan River Valley in the R.M. of Minitonas near its shared border with the R.M. of Swan River. The nearest urban community is the Village of Minitonas which is approximately 5 km west of the plant site. The Town of Swan River is 20 km west of the LPC OSB Plant.

The most dominant relief features of the region are the hilly sections of the Duck and Porcupine Forest Reserves. The topography of this region varies from 300 m above sea level in the north to 640 m above seal level to the south.

Section 3.3.1 of the Olsson Modelling Report provides full details on the local topography in the vicinity of the plant.

11.0 BACKGROUND AMBIENT AIR CONCENTRATIONS

The concept of including background ambient concentrations is applied to allow modellers to predict concentrations of a pollutant resulting from the combined presence of a chemical already detected in a location's ambient air (the background concentration) plus the loading of that same chemical due to emissions for an industrial process (i.e., emitting stacks) in the vicinity.

When the background concentration resulting from the existing ambient air is added to the concentrations predicted to occur due to a plant's emissions, it is possible to assess if the combined concentrations of the pre-existing background concentration plus the concentrations from a plant's emissions will result in exceedance of the ambient air quality criteria.

According to the draft 2006 Air Dispersion Modelling Guidelines, background ambient air quality, i.e. existing levels of pollutants in ambient air from either natural or manmade sources, must be considered in a dispersion modelling analysis where predicted concentrations of pollutants from facility emissions have a potentially significant impact.

The CEC, in its review of LP's November 2008 submission that some of the substances modelled may have a potentially significant impact, therefore requested background concentrations be considered.

As part of its operating license requirements, Swan Valley OSB has established an ambient air monitoring program to collect meteorological and air quality data in the vicinity of the plant. The monitoring network has been in operation since January 1995. SLR Consulting (Canada) Ltd. (SLR) (formerly Seacor) has been responsible for management of the monitoring network and data reporting since March 1996.

The ambient air quality monitoring system includes two sites, both of which were commissioned in January 1995:

- Site 1 – This site is located approximately 1.5 km north-northeast of the OSB plant. Air quality and meteorological data are collected at this site.
- Site 2 – This site is located approximately 2.0 km west of the OSB plant. Only air quality data are collected at this site.

For non-continuous sampling methods (all measured parameters with the exception of PM_{10}), ambient air quality samples are collected and analyzed according to the Manitoba Conservation approved methodologies listed below, as per Schedule 1 of Manitoba *Environment Act* Licence 1900S4:

- Benzene and Total VOCs – U.S. EPA Method TO-14

- Formaldehyde – U.S. EPA Method TO-11
- MDI – Huntsman Polyurethanes (formerly ICI Polyurethanes) I-1024G
- Phenol – U.S. EPA Method TO-8
- HCN – NIOSH Method 6010

All ambient air quality monitoring systems are subjected to quarterly calibrations and independent quality assurance performance audits. All calibration and audit equipment is documented as traceable to authoritative standards.

For the continuous PM_{10} samplers, hourly reported flows (main, bypass, and auxiliary) are downloaded and checked daily by SLR personnel as part of the daily data review procedure. In addition, LPC personnel visit the site approximately every three days to note monitor status and record several diagnostic parameters, including monitor flow rates.

Results of all calibrations are documented in the quarterly ambient air monitoring reports submitted to Manitoba Conservation.

Data collection efficiencies for each measured parameter are calculated on a quarterly and annual basis based on the number of collected samples meeting the above quality assurance criteria compared to the number of samples scheduled for the reporting period. For the period from 2004 through Q1 2009, annual data collection efficiencies for each ambient air quality parameter exceeded 90%. Summaries of data collection efficiencies for all parameters for this period have been extracted from the ambient air monitoring reports submitted to Manitoba Conservation and are included in Appendix B.

A full discussion of background ambient air quality monitoring locations, and continuous and non-continuous sampled parameters is provided in Section 6 of the Olsson Modelling Report.

Background concentrations of all locally measured parameters have been evaluated and included in the dispersion modelling analysis where appropriate as described below.

11.1 PM_{10}

Background PM_{10} concentrations were evaluated based on continuous PM_{10} measurements collected at both ambient air monitoring stations for the five-year period from March 1, 2004, through February 28, 2009.

Because continuous PM_{10} concentration data are collected, 1-hr, 24-hr and annual average concentrations can be directly calculated from the measured values. Based on the data from both monitoring stations, average background 1-hr PM_{10} is 12.59 ug/m^3, average background

24-hr PM_{10} is 12.57 ug/m^3 and average annual PM_{10} is 12.57 ug/m^3. **PM_{10} background concentrations have been included in the dispersion modelling results to provide a prediction of total ambient PM_{10} concentrations resulting from the operation of the Swan Valley OSB facility.**

Additional details regarding the background concentrations for PM_{10} are provided in Section 6.1 of the Olsson Report.

11.2 FORMALDEHYDE

Background formaldehyde concentrations were evaluated based on measured one-hour concentrations at the two monitoring sites for the five-year monitoring period from May 15, 2004, through May 13, 2009. Only ambient formaldehyde concentrations uninfluenced by plant emissions were considered in the background calculations. Based on this analysis, average background 1-hr formaldehyde concentrations were calculated to be 1.65 ug/m^3.

While 24-hr and annual background formaldehyde concentrations are not measured by the LPC ambient monitoring program, these can be estimated based on EPA methodology for dispersion models. EPA-454/R-92-019 "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources – Revised" provides factors of 0.4 and 0.08 for converting 1-hr concentrations to 24-hr and annual concentrations, respectively. Based on a measured 1-hr average background formaldehyde concentration of 1.65 ug/m^3, the 24-hr and annual average background formaldehyde concentrations were calculated to be 0.66 ug/m^3 and 0.132 ug/m^3.

Formaldehyde background concentrations were included in the dispersion modelling results to provide a prediction of total ambient formaldehyde concentrations resulting from the operation of the Swan Valley OSB facility.

Additional details regarding the background concentrations for Formaldehyde are provided in Section 6.2 of the Olsson Report.

11.3 BENZENE

Background benzene concentrations were evaluated based on measured 24-hr concentrations collected during the five-year period from June 1, 2004, through May 31, 2004. During this period, ambient concentrations of benzene were measured at the detection limit of 0.003 mg/m^3 in only two (2) of 560, or 0.36%, of samples (one elevated measurement was removed as a contaminated sample), with all other measured levels below the detection limit.

The modelled maximum 24-hr and annual benzene ground level concentrations do not approach the applicable Ontario AAQC, and because there have been only two detectable measurements of ambient benzene concentrations over five years of

monitoring data, background benzene concentrations are considered to be insignificant and were not included in the dispersion-modelling analysis.

Additional details regarding the background concentrations for Benzene are provided in Section 6.3 of the Olsson Report.

11.4 TOTAL VOCS

Background total VOC concentrations were not included in the dispersion modelling analysis as there are no applicable AAQC for total VOCs to compare predicted model results to.

11.5 MDI

MDI is not a substance that is naturally present in the environment. It is a highly reactive material and reacts with hydrogen donors, in some cases violently. Its reaction with water produces carbon dioxide. Because it polymerizes in the presence of water, creating an insoluble compound, its ecological risks are low. Industrial emissions are the only potential source of MDI in ambient air, and LP Swan Valley OSB is the only potential local source of MDI emissions in the vicinity of the plant. As such, **background MDI levels are considered to be zero and MDI background concentrations were not included in the dispersion modelling analysis.**

11.6 PHENOL

Background phenol concentrations were evaluated based on measured 24-hr concentrations collected quarterly during the five=year period from March 1, 2004, through February 28, 2004. During this period, no ambient concentrations of phenol were measured above the method detection limit, which ranged from 6.2 to 7.4 ug/m^3. **Because no detectable levels of phenol have been measured over five years of monitoring data, background phenol concentrations are considered as insignificant and were not included in the dispersion model analysis.**

11.7 HYDROGEN CYANIDE

Background HCN concentrations were evaluated based on measured 24-hr concentrations collected quarterly during the five-year period from March 1, 2004, through February 28, 2004. During this period, ambient concentrations of HCN were measured above the method detection limit were measured in only three of 40, or 7.5%, of samples.

Dispersion model output data presented in the Olsson report (Appendix B) indicates that the maximum predicted 1-hr HCN GLC resulting from facility emissions is 3.873 ug/m^3, or 9.8% of the Manitoba 1-hr AAQC for HCN of 40 ug/m^3. **Because the modelled maximum GLC does not approach the applicable Manitoba AAQC, and because there has been only one detectable measurement of ambient HCN uninfluenced by facility operations over five years of monitoring data, background HCN concentrations are considered to be insignificant and were not included in the dispersion modelling analysis.**

Additional details regarding the background concentrations for HCN are provided in Section 6.7 of the Olsson Report.

11.8 OTHER MODELLED PARAMETERS

Ambient monitoring for total PM, $PM_{2.5}$, NO_x, acetaldehyde, acrolein, methanol, and propionaldehyde is not conducted, therefore local background data for these parameters are not available. Of these parameters, only total PM, $PM_{2.5}$ and NO_x are expected to be present in ambient air in potentially significant concentrations. Based on the PM_{10} data analysis provided above, ambient levels of total PM and $PM_{2.5}$ are likely dominated by regional sources, such as agricultural activity. In addition, PM controls and emission rates are not expected to change following the decommissioning of the RTOs, therefore ambient levels are not expected to change from current levels as a result of the pending application. With respect to NO_x, decommissioning of the RTOs will result in a reduction in NO_x emissions from the facility, with a corresponding decrease in ambient concentrations of NO_x from current levels.

Background concentrations for total PM, $PM_{2.5}$, NO_x, acetaldehyde, acrolein, methanol, and propionaldehyde were not included in the dispersion modelling analysis.

12.0 GOOD ENGINEERING PRACTICE (GEP) STACK HEIGHTS

The CEC requested a discussion of GEP stack heights and the provision of building heights and configurations. Building geometries were discussed in Section 7 of this document, and in detailed information is provided in Sections 3.5.2 and 3.5.3 of the Olsson Modelling Report (Appendix B).

GEP is defined as "*the height necessary to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, and wakes that may be created by the source itself, or nearby structures, or nearby terrain obstacles*." (EPA-450/4-80-023R)

Only one new stack is considered in the application for the dispersion of emissions from the dryer WESPs. All other existing stacks remain unchanged. For the new stack considered for the dryer WESPs, application of the EPA's definition for calculating GEP stack height results in a GEP value of 59.25m for the maximum stack allowable GEP stack height.

A full discussion of the calculation of GEP stack height as it applies to the LPC OSB plant is provided in Section 7 of the Olsson Modelling Report (Appendix B).

13.0 APPLICATION OF AMBIENT AIR QUALITY CRITERIA

The CEC correctly indicated that Manitoba lacks ambient air quality criteria for many emissions associated with OSB production. The CEC noted that LPC had applied a range of criteria to assess the ground level concentrations of these substances, however, there was no rationale included to describe the selection of such criteria.

In order to evaluate the potential environmental and human health impact of modeled emission rates of the above pollutants, dispersion modelling results are compared to available ambient air quality criteria (AAQC). For this analysis, dispersion model outputs are compared to Manitoba AAQC. Where no Manitoba AAQC exists, model outputs are compared to Ontario AAQC, per the 2006 draft Manitoba Air Dispersion Modelling Guidelines. **The reason for selecting Ontario criteria is due to the fact that Ontario has the most comprehensive and current list of AAQC available of any Canadian jurisdiction, based on the recent promulgation of new air quality rules and standards. It is also a standard and Manitoba Conservation-approved procedure in air assessments to apply Ontario air quality criteria for pollutants with no corresponding Manitoba air quality criteria.**

A summary of the modelled emissions and applied ambient air quality criteria is provided below in Table 13-1.

Table 13-1: Applied Ambient Air Criteria and Modelled Emissions

Chemical	Manitoba AAQC?	Manitoba 1-hr average (ug/m3)	Manitoba 24-hr average (ug/m3)	Manitoba annual average (ug/m3)	Ontario 10-min average (ug/m3)	Ontario 1-hr average (ug/m3)	Ontario 24-hr average (ug/m3)	Ontario annual average (ug/m3)
Formaldehyde	Y	√						
Hydrogen Cyanide (HCN)	Y	√		√				
Methylene Diphenyl Diisocyanate (MDI)	Y	√		√				
Nitrogen dioxide (NO2)	Y	√	√	√				
Phenol	Y	√						
Total Particulate Matter (PM)	Y		√	√				
Particulate Matter <10um (PM10)	Y		√					
Particulate Matter <2.5um (PM2.5)	Y		√					
Benzene	N						√	√

Table 13-1: Applied Ambient Air Criteria and Modelled Emissions								
Chemical	**Manitoba AAQC?**	**Manitoba 1-hr average (ug/m3)**	**Manitoba 24-hr average (ug/m3)**	**Manitoba annual average (ug/m3)**	**Ontario 10-min average (ug/m3)**	**Ontario 1-hr average (ug/m3)**	**Ontario 24-hr average (ug/m3)**	**Ontario annual average (ug/m3)**
Acetaldehyde	N	[redacted]					√	
Acrolein	N	[redacted]				√	E	
Methanol	N	[redacted]					√	
Propionaldehyde	N	[redacted]			√			
Total VOCs	N	[redacted]						

√ indicates the applicable AAQC was met. E indicates an exceedance of the applicable AAQC. Shaded cells indicate no applicable AAQC

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14.0 HEALTH-RISK ASSESSMENT

At the request of the CEC, a stand-alone Human Health Risk Assessment (HHRA) Report has been prepared by Stantec Limited of Burlington, Ontario. This report, entitled "Louisiana Pacific Canada Ltd. – Swan Valley OSB Plant Human Health Risk Assessment, April 19, 2010" is included as Appendix G in this report.

The purpose of Stantec's HHRA was to evaluate the potential for health risk to human receptors exposed to Project-related compounds of potential concern (COPC) under three assessment scenarios that include:

- The plant as originally licenced (i.e., with RTOs).
- The upgraded plant scenario (i.e., new pollution control system and RTOs removed).
- The upgraded plant emissions plus background air quality concentrations.

In all cases, except for the maximum 24-hour ground level concentration of acrolein, risk estimates for all receptors exposed to COPC were found to be below the acceptable inhalation non-carcinogenic benchmark of 1.0 and carcinogenic benchmark of 1-in-100,000.

To put the risk estimate for acrolein in context, it is important to understand that the lowest concentration at which mild eye irritation has been observed in humans (i.e., 140 $\mu g/m^3$) is more than 100-times higher than the maximum modeled 24-hour air concentration of acrolein (0.83 $\mu g/m^3$). Furthermore, for there to be a risk at the maximum ground-level concentration to people breathing air containing 0.83 $\mu g/m^3$ of acrolein, the person or people would have to be present at the same location breathing that air for 24 hours. The likelihood of this occurring is very small. Table 62 of the Olsson report indicates that the probability of a 24-hr concentration of acrolein being equal to 0.688 $\mu g/m^3$, the maximum predicted ("worst case") value, is 0.1% (9 hours per year). The probability of a 24-hr value of 0.832 $\mu g/m^3$ is much lower than 0.1%.

Further evidence that there will not be ongoing human health risk relates to the fact that, as described in Section 2.3.2 of the Stantec report (Appendix G), the Toxicity Reference Values (TRV) used by the Ontario Ministry of Environment to derive the 1-hr and 24-hr air quality guidelines incorporate "safety factors." As illustrated in Figure 14-1, the No Observed Effect Level identified from biomedical research for human exposures (11 $\mu g/m^3$) was divided by a factor of 30 to derive the 24-hr TRV for acrolein. The maximum predicted 24-hr ground-level concentration slightly exceeds a guideline value derived from data indicating **no effect** in humans.

Based on the foregoing, no adverse health risks are predicted for human receptors in the area surrounding the mill under the scenario of the RTO's not functioning and with the emission rates in the November 18, 2008 filing by LPC.

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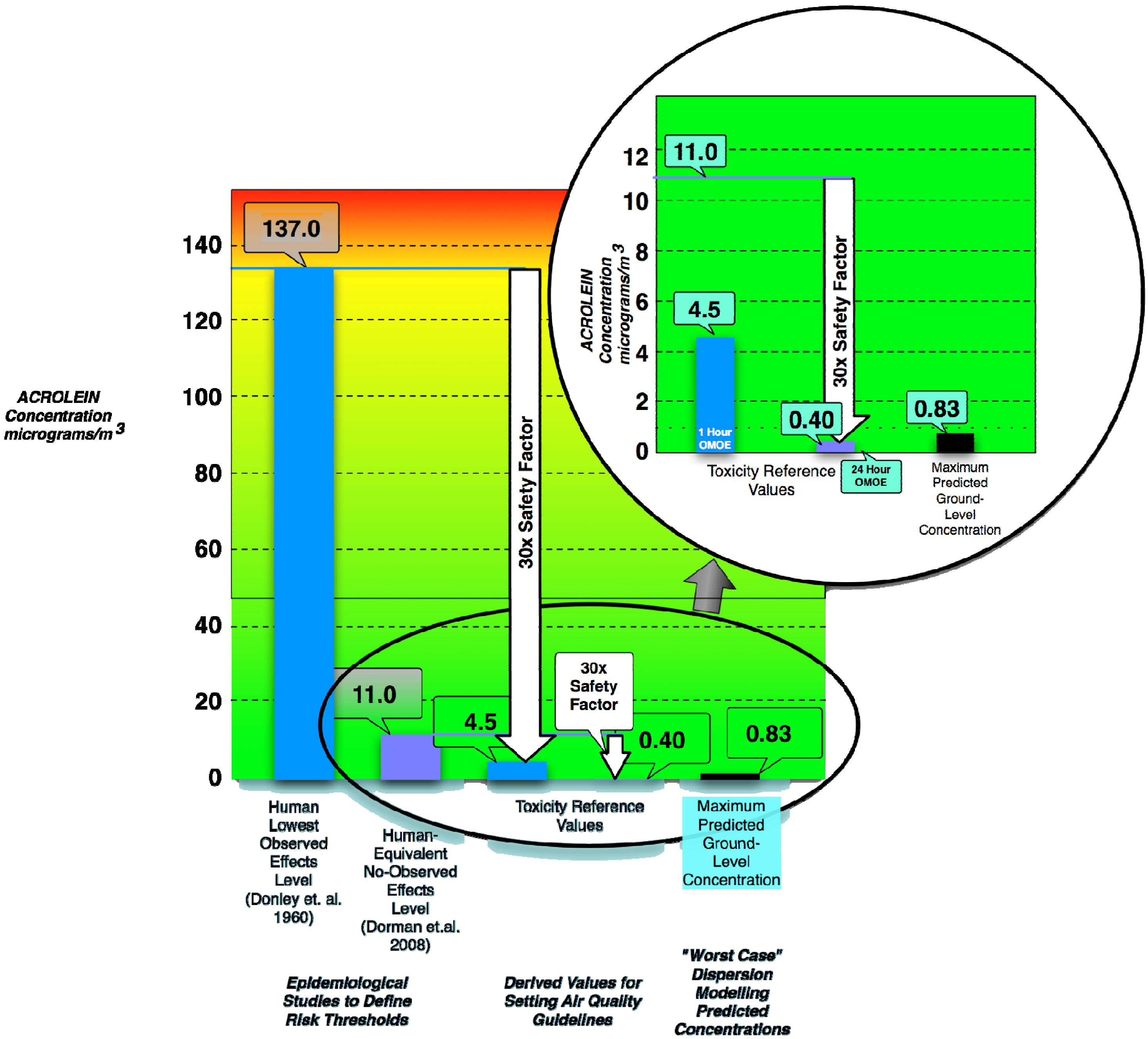

Figure 14-1

Illustration of Safety Factors Used to Derive Air Quality Guidelines from Epidemiological Exposure Studies.

15.0 DOCUMENTATION

The CEC requested greater detail and discussion of the approach applied in LPC's November 2008 submission. Greater detail and discussion are provided in this document for each item of request in the CEC's October 8, 2009 letter, and LPC is providing stand-alone reports for the Dispersion Modelling and Human Health Risk Assessment work associated with their proposal. As noted in Section 1.6, information was tailored specifically to address the requirements in the draft 2006 Guidelines for Air Dispersion Modelling in Manitoba.

16.0 RECOMMENDATIONS

16.1 EMISSIONS FACTOR DATASET

Review of the Olsson Associates report (Appendix B), and the documentation of the derivation of emission rates attached (as "Appendix C" in the Olsson report), indicates that there remains some uncertainty about the derivation of some of the emission factors used in the emissions dispersion modelling due to the lack of published representative data for Canadian wood species and a limited site-specific dataset for some parameters since the upgrades. It is recommended that LPC continue its stack sampling and other emissions monitoring to make the current site-specific emissions database for such parameters more robust and helpful to ongoing data interpretation, trends analysis, liaison with regulators and dispersion modelling.

16.2 ALTERNATIVE STACK DESIGN

The discussion in Section 7 of the Olsson report (Appendix B) notes the reliance on a reference stack height, location and design selected from initial emissions dispersion modelling for licenced air-quality parameters. These same stack design parameters were utilized for subsequent modelling of "Hazardous Air Pollutants" (HAPs) after LPC's November 18, 2008 submission. Notwithstanding the fact that no adverse health effects are predicted for human receptors with the proposed stack design, it is recommended that LPC review the proposed design to determine whether the current exceedance of the Ontario 24-hour acrolein value at the fenceline receptor could be prevented or minimized by alternate stack heights, locations or diameters.

16.3 MONITORING STATIONS

There would be merit in LPC discussing the options with Manitoba Conservation for enhancing the spatial distribution of the local ambient air quality monitoring stations. A new station, or alteration of the current spatial layout, would likely be helpful to ongoing interpretation of accumulated monitoring data. Consideration of the spatial distribution of maximum predicted ground-level concentrations for parameters of concern (Appendix B) should guide the dialogue with Manitoba Conservation.

17.0 CLOSURE

This report compiles information needed to respond to the letter request of the Clean Environment Commission to Louisiana-Pacific Canada on October 8, 2009, for additional information, explanation and clarification of its submission of November 18, 2008, and its presentation to the CEC in July 2009.

The format and organization responds directly to the CEC's request that the report be consistent with the organization and content of the 2006 draft Guidelines for Air Dispersion Modelling in Manitoba. The content of the report responds directly to the queries, suggestions and requests outlined in the CEC's letter.

On the basis of the information assembled by LPC, SLR Consulting, Olsson Associates, Stantec Consulting and Tetr*ES* Consultants, the Tetr*ES*/Stantec Study Team concludes that there is no substantive basis for concluding that the proposed alteration will cause significant environmental or human-health impacts. By any objective review of the scientific facts available within the public domain pertinent to this proposal, the proposed alteration should be granted formal approval, notwithstanding the fact of public controversy, because the potential health and environmental effects of the increased emission limits and the subsequent decommissioning of the Regenerative Thermal Oxidizer are likely to be undetectable.

On the basis of this base of information, we conclude that the request of the CEC to LPC has been fully satisfied. There are no evident information gaps or information deficiencies remaining which constrain the deliberations of the CEC or prevent its preparation of a report and advice to the Minister.

18.0 REFERENCES

Cordilleran Associates. 2009. Summary of the Dispersion Model Prepared by Cordilleran, A Division of Olsson Associated. Report to Louisiana-Pacific Canada Ltd. June 22, 2009.

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Manitoba Conservation. 2006. Draft Guidelines for Air Dispersion Modelling in Manitoba.

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Olsson Associates. 2009. Swan Valley Oriented Strand Board (OSB) Modelling Project, Dispersion Modelling Analysis, Minitonas, Manitoba, Canada. Report to Louisiana-Pacific Canada Ltd. June 22, 2009.

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APPENDIX A

CORRESPONDENCE RECORD BETWEEN LPC AND MANITOBA CONSERVATION REGARDING PLANT OR LICENCE ALTERATIONS OR REGULATORY COMPLIANCE

APPENDIX B

DISPERSION MODELING REPORT BY OLSSON ASSOCIATES

APPENDIX C

TECHNICAL ADVISORY COMMITTEE REPORT TO DIRECTOR OF APPROVALS ("SUMMARY OF COMMENTS/RECOMMENDATIONS")

APPENDIX D

SWAN VALLEY OSB PRESENTATION TO CEC
JULY 2009

APPENDIX E

MANITOBA CONSERVATION RESPONSE TO THE PUBLIC LAW CENTRE SUBMISSION TO THE CEC

APPENDIX F

CLEAN ENVIRONMENT COMMISSION LETTER TO LPC (OCTOBER 8, 2009)

APPENDIX G

LPC SWAN VALLEY OSB PLANT HUMAN HEALTH ASSESSMENT BY STANTEC LIMITED