

FortisBC, in response to the request for reconsideration of the issued Certificate, has provided for consideration by the Commission, a Signed Statement of Work Agreement with Nav Canada and a signed Operating Agreement with Nav Canada. FortisBC has also supplied other requested information in support of the request (copies attached).

The Commission denied the request for reconsideration, as outlined in their letter (L-8-09) of February 3, 2009 and their approval the Lochrem Road site for the Ellison Substation still stands. A copy of that letter is attached to this information report for reference.

3.0 SUMMARY

FortisBC has been working with the BC Utilities Commission (BCUC) to review the issue of potential interference of the substation on the various electronic systems at the nearby Airport facility. The BCUC Commission Panel reviewed all of the submissions received and as stated in their letter dated February 3, 2009 the Commission Panel denied the applications of Concerned Citizens of Quail Ridge and Lochrem Road (CCQRLR) and Quail Ridge Residents Association (QRRRA) for a further expanded reconsideration, and have reaffirmed their approval for the Ellison Substation.



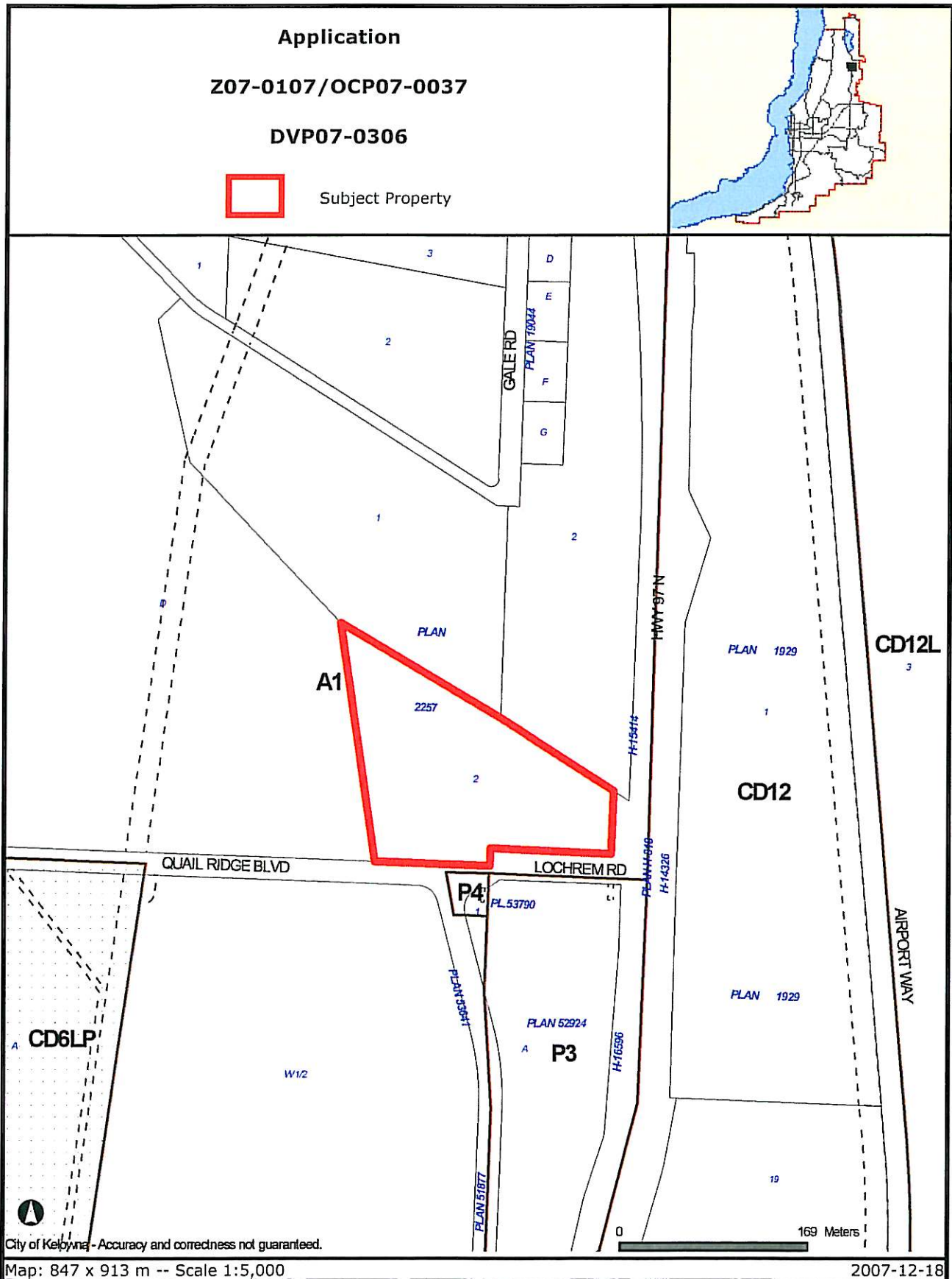
Shelley Gambacort
Director of Land Use Management

PMc/pmc

Attachments

(Not attached to the electronic copy of the report)

- o Subject Property Map
- o Copy of BCUC Letter dated February 3, 2009 L-8-09 (responding to application to reconsider)
- o FortisBC Letter dated December 3, 2008 errata to BCUC from Consultant
- o FortisBC letter dated December 1, 2008 with Technical Report (Exhibit C5-3)
- o Nav Canada May 29, 2008 letter
- o Copy of BCUC Order G-166-08 (application to reconsider decision) dated November 18, 2008
- o Nav Canada – Statement of Work Agreement
- o Nav Canada – Operating Agreement



Certain layers such as lots, zoning and dp areas are updated bi-weekly. This map is for general information only. The City of Kelowna does not guarantee its accuracy. All information should be verified.



LETTER NO. L-8-09

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February 3, 2009

VIA E-MAIL

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R. Horne
President
Concerned Citizens of Quail Ridge and Lochrem Road

Dear Messrs. Andrews, Horne and Cairns:

Re: FortisBC Inc. ("FortisBC")
Ellison Substation Project 3698442
Applications for Reconsideration of Commission Orders C-04-07 and G-75-07

This letter is in response to the letters of September 18, 2008 (Concerned Citizens of Quail Ridge and Lochrem Road "CCQRLR") and September 23, 2008 (Quail Ridge Residents Association "QRRR") in which the respective organizations sought a reconsideration of the Commission's Decision approving the FortisBC Application of October 27, 2006 for a Certificate of Public Convenience and Necessity ("CPCN") for the Ellison Substation at the Lochrem Road site. The relevant Commission Orders that set out the details of the approval are C-4-07 and G-75-07.

Background

The history of the proceedings leading to this reconsideration is set out in the recitals of Order G-166-08 and will not be repeated here.

The Commission granted a reconsideration but limited the scope of the written process that was to follow. Commission Order G-166-08 dated November 18, 2008 sets out the issues that the Commission found were worthy of further examination. The Order provided (in part):

1. The Commission establishes a written hearing to reconsider the Decision, so as to address the initial question of whether the Ellison Substation, as proposed and approved at the Lochrem Road site, will cause problems for the systems at the Kelowna Airport under the terms specified the NAV CANADA Agreements and, if problems are caused, the changes that will be needed to remedy the situation, and the cost of the changes (the "Initial Issue").
2. By Monday, December 1, 2008, FortisBC will file an independent engineering Report (the "Report") by a properly qualified individual or group that reviews the siting and design of the Ellison Substation as proposed and approved, relative to the requirements of NAV CANADA as set out in the Agreements, and which confirms that the substation will comply with the requirements. If this confirmation cannot be provided, the Report will describe the changes to the substation that are needed to bring it into compliance, and the estimated cost of these changes.
3. FortisBC will provide a copy of the Report to Intervenors and Interested Parties in the Ellison Substation CPCN proceeding, parties who participated in the reconsideration phase one comment process and NAV CANADA (collectively the "Participants").

In brief, the Commission was concerned that the matter of possible radio interference with the landing and communication systems at the Kelowna Airport had not been brought to the attention of the Commission Panel considering the CPCN application and as it appears, was not investigated by FortisBC in any detail until after the CPCN had been granted. The Commission notes (as have the Parties and interested persons) that the Transport Canada document TP 1247 Part II, advises that:

"Consultation... must take place at an early stage in the project in order to avoid costly redesign or undue pressure when seeking building and site approvals. It is recommended that consultation take place at the building concept stage, before site approval is sought."

Had FortisBC followed this recommendation and presented the issues associated with radio interference in the original CPCN Application, the Commission Panel dealing with the CPCN application would have had the relevant information before it, on the record, and could have afforded the matter the attention it deserved then, and precluded much of the time, effort, expense and delay that has now come to pass.

The Lochrem site for the Ellison Substation is located closer than 3.2 kilometers from the centre line of a runway of the Kelowna Airport and may therefore cause electromagnetic interference ("EMI") to aircraft landing systems operated by NAV CANADA. FortisBC and NAV CANADA entered into an Operating Agreement and a Statement of Work Agreement dated October 8, 2008 (the "Agreements"). The Agreements oblige FortisBC to monitor the level of EMI levels at the Ellison Substation and to correct the cause if the EMI level exceeds a specified level (Exhibit C5-2).

After reviewing the submissions in the first phase of the reconsideration process, the Commission was unclear as to the materiality of the risk that the Agreements may require FortisBC to make significant changes to the substation, or perhaps relocate it. The additional cost of such changes could impact ratepayers, and consequently the Commission granted a reconsideration on its merits of the "Initial Issue".

This Reconsideration has been considered by a Panel of four Commissioners who have reviewed the record of this Reconsideration and the positions advanced by FortisBC, the CCQRLR, QRRA and the other interested parties that provided submissions and argument.

The Independent Engineering Report (the "Report")

In accordance with Order G-166-08, Fortis filed the Report authored by PDK Airport Planning Inc. and CNSS Engineering Services. The Report was filed as Exhibit C5-3 on December 1, 2008. The Commission Panel has relied upon the professional opinions put forth in the Report and is of the view that the Report meets the requirements set out in the above Order.

However, the Commission Panel does find that the Report would have been more helpful if the authors had canvassed the possible mitigation measures that might be required in more detail, and provided greater specificity as to the range of costs that might be expected. It is understood that no firm pricing estimates could have been given for unknown problem areas or their respective fixes.

The Commission Panel is of the view that the Report, while measured in its language, does provide a balanced and thorough analysis of the technical matters at issue and which could give rise to EMI.

The concluding remarks of the Report state:

- "a) The NavCanada and SHEL-BAR tests at a representative substation site showed negligible amounts of electromagnetic interference being radiated from various components involved in the operation of the substation. As long as all equipment and components in the design of the substation comply with all Industry Canada equipment interference standards and all electrical work is performed to applicable Federal Government and Provincial Electrical Codes, Industry standard substation design will meet NavCanada requirements.
- b) With regard to the proposed Ellison substation site, in order to meet NavCanada's requirements for air navigation at the Kelowna Airport, a monitoring system was identified as a mitigating measure. This measure was requested to insure electromagnetic noise levels at the site do not interfere with airport communication and navigational systems. NavCanada is the owner operator of the Air Navigation System and has approved the site on that basis.
- c) Although detailed analysis and field tests were completed prior to NavCanada developing its mitigating measures for substations located in close proximity to an airport, no amount of analysis can predict previously unknown situations. Corporate agreements usually contain contract clauses for managing "unspecified perils." It is our opinion that the NavCanada clause requesting a complete shutdown or relocation of the substation intends to cover off any "unspecified perils" in the event such things occur. Should the unthinkable occur, other options such as a redesign of the offending component/circuit, relocation of troublesome circuits, and other similar measures would be taken before a total relocation of the substation is even considered.
- d) The proposed Ellison Substation does not violate the Obstacle Limitation Surfaces identified for the Kelowna Airport. With respect to any physical, structural or other geometric elements of the station, as long as these do not penetrate the Obstacle Limitation Surfaces at the airport, they should have no effect on the NavCanada communications or navigational systems."

The Final Statement of the Report is:

“In conclusion, based on our review of the proposed Ellison Substation location, utility construction methods and maintenance practices, and considering our experience and field testing at other in-service substations, it is our expert opinion that the Ellison substation should not cause any problematic interference with the Kelowna Airport Operations. And even if some interference were to result, appropriate contingency measures have been identified and FortisBC has committed to implement these measures to mitigate such interference.”

The authors do not state that there will be “no interference” at all. And no guarantees are proffered that the Ellison substation, when built, will meet all of the requirements or guidelines of NAV CANADA. The Commission Panel acknowledges this level of assurance would be impossible for any professional to provide, at any event before the substation was built.

Other Similar Sites Considered

The Commission Panel takes note of the comparisons that were made with other substations located close to airports including the following:

- The SHEL-BAR study and analysis of the Blackmud substation in Nisku, Alberta; and
- BC Hydro’s Kidd substation near Vancouver International Airport.

While it is difficult to make any firm decisions for a substation yet to be built, on the basis of past experience, the Commission Panel found it reassuring that other substations had been sited close to airports without any reported difficulties. In the Report, the authors state in respect of the Kidd substation (that operates at a higher voltage than will the Ellison substation), “To our knowledge, this facility has not produced any interference issues with the airport’s ILS [“Instrument Landing System”]” (Exhibit C5-3, p. 10).

Further on in the Report, they state: “We have not heard of any substations being required to mitigate electromagnetic noise levels after it was in service.” And “We are not aware of any substations being shutdown or relocated on account of excessive electromagnetic noise.” (Exhibit C5-3, p. 10)

The Commission Panel concludes that there is no evidence that electromagnetic noise (“EMN”) levels generated by substations located near or in proximity to airports or the associated flight paths poses any likely or recurring problem. Indeed, while there are mitigating and remedial steps that could be taken if such interference was experienced, there is nothing on the record to show that such steps have been necessary.

The Kelowna Topography and its Effect on EMN

The impact of the surrounding topography on EMN was raised by Ms. Fortunat (Exhibit C4-2). This concern is addressed within the Report which states that where there are mountains near a site there is a potential for secondary reflection referred to as “multi-path” reflection. The Report goes on to outline the complex nature of such phenomena and their dependence on a variety of local factors such as obstruction size and distance from the site. The Report concludes that “it is very unlikely surrounding topography could elevate electromagnetic noise levels above those expected from a normal operation at the site” (Exhibit C5-3).

The Commission Panel finds that the topography in the vicinity of the Lochrem site is not expected to increase the EMI impact on the systems at the airport.

Proper Equipment, Installation, and Maintenance

The Commission Panel is of the view that the key to minimizing EMI from any electrical apparatus is a combination of component and system design (standards and codes) and good maintenance practices. Perhaps of these, good maintenance procedures are the most important (Exhibit C5-3, p. 9, Question 4). The Ellison Substation will be built to normal standards and codes as prescribed by the various government and industry authorities and the monitoring system as outlined in the Agreements signed with NAV CANADA will provide early warning of any deterioration in system components. The three levels of warning in the Operating Agreement, and the computerized recording and storage of the levels data by NAV CANADA will provide a database that will assist in carrying out timely maintenance as required and if deficiencies are noted, new maintenance routines can be developed.

Mitigating and Remedial Measures

The Commission Panel accepts as a fact that there will be some level of EMN generated at this (and all) high voltage substations. The issue is one of degree and corrective or remedial measures. The EMN levels set out in the Operating Agreement are extremely low and even if exceeded, may not cause operational difficulties for the ILS receivers. In any event, the reporting and remedial measures that are set out in the Operating Agreement appear to the Commission Panel as sufficient to meet most of the definable and expected problems that may arise in the course of operating the substation. There are provisions for notice, negotiation and resolution of any problems. Arbitration is available in the face of deadlock or lack of agreement. There appear to be many measures that can be employed to reduce EMN such as those set out in subsection (c) of the Concluding Remarks of the Report.

Commission Panel Determination

The Commission Panel accepts the position of QRRA and CCQLR that the Report does not conclusively confirm that the Ellison Substation will comply with the requirements of NAV CANADA as set out in the Agreements. Therefore, there is some risk that FortisBC may need to make certain expenditures to meet these requirements. At a minimum, FortisBC estimates that the monitoring equipment will cost \$135,000 and that extra operating and maintenance costs will be \$6,250 per year (Exhibit C5-5, Horne IR 9). However, these additional costs are not sufficient to raise doubts whether the Lochrem Road site is appropriate.

The issue for deciding whether or not to proceed with a full reconsideration of the project as approved at the Lochrem site, is whether there is a material risk that FortisBC will be required to make additional significant expenditures to meet its obligations under the Agreements.

Having reviewed all the submissions of the Parties and the findings in the Report, the Commission Panel finds that the Ellison Substation, as proposed and approved at the Lochrem Road site, is very unlikely in the extreme, to cause any problems for the systems at the Kelowna Airport. Further, the Commission Panel is convinced that the monitoring system and the remedial measures anticipated in the Operating Agreement between FortisBC and NAV CANADA will be sufficient to provide advanced warning of any problem EMN and to provide a context for resolution of any such problem once identified.

In the absence of persuasive evidence that FortisBC will be unable to meet its obligations under the Agreements or that FortisBC is at significant risk of having to make material additional expenditures to comply with the Agreements, a full reconsideration of the Commission's decision to grant a CPCN for the Ellison Substation at the Lochrem site is not warranted.

Therefore, the Commission Panel denies the applications of CCQRLR and QRRR for a further expanded reconsideration, and reaffirms the approval for the Ellison Substation as set out in Orders C-4-07 and G-75-07.

Yours truly,

Original signed by:

Erica M. Hamilton

ac

cc: Mr. David Bennett
Vice President, Regulatory Affairs & General Counsel
Regulatory Affairs Department
FortisBC Inc.
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(Via e-mail: david.bennett@fortisbc.com; regulatory@fortisbc.com)

Interested Parties (*FBC-EllisonCPCN-IP*)



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December 3, 2008

Via Email

Ms. Erica M. Hamilton
Commission Secretary
BC Utilities Commission
Sixth Floor, 900 Howe Street, Box 250
Vancouver, BC V6Z 2N3

Dear Ms. Hamilton:

**Re: *FortisBC Inc. ("FortisBC") Ellison Substation Project 3698442
Applications for Reconsideration of Commission Orders C-04-07 and G-75-07***

Please find attached an erratum to the report filed by FortisBC on December 1, 2008 regarding the above reconsideration.

This does not impact the conclusions of the report but is a correction with regard to the Electromagnetic Noise Values in the response to question 5 at page 9.

Sincerely,

A handwritten signature in black ink, appearing to be "DS", with a long horizontal line extending to the right.

Dennis Swanson,
Director, Regulatory Affairs

cc: Registered Intervenors

3 December 2008



Mr. Martin Ward
Project Manager
FortisBC Inc.
Suite 200-2076 Enterprise Way
Kelowna, B.C.
V1Y 6H7

Dear Martin:

Further to our recent report to you re the Ellison Substation, in reviewing some of the calculations in the report, we have noticed a significant error in the answer to question 5.

I have attached a page with appropriate errata to reflect this change. On its own, this error was inconsequential and does not in any way reflect on any of the conclusions or other statements in the report, but for clarity and consistency we felt that we should point this out.

Please forward this information to the Commission to add to our report to ensure that they have a complete and accurate document.

Again sorry for the confusion.

suite 243

2631 Viking Way

Richmond, BC

Canada V6V 3B5

tel: 604.207.0117

fax: 604.638.6078

web: www.papi.ca

A handwritten signature in black ink, appearing to read 'Peter Bianconi', is written over a horizontal line.

Peter Bianconi
President

ERRATA

RE: Siting and Review of Ellison Substation Page 9 – Question 5

Electromagnetic Noise Values shown in Response to Question 5 are in error. A calculation error produced a result 1 million times greater than the correct values. The correct values are:

Level 1 (-90 dBm) represents an electromagnetic noise level of **.000000000001** watts at the receiver input.

Level 2 (-76 dBm) represents an electromagnetic noise level of **.000000000025** watts at the receiver input.

Level 3 (-56 dBm) represents an electromagnetic noise level of **.0000000025** watts at the receiver input.

Please amend your copy of the siting review with the correct values.

December 3, 2008

December 1, 2008

FORTISBC INC. – ELLISON SUBSTATION PROJECT RECONSIDERATION OF BCUC ORDERS C-04-07 AND G-75-07	EXHIBIT	C5-3
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Via Email

Ms. Erica M. Hamilton
Commission Secretary
BC Utilities Commission
Sixth Floor, 900 Howe Street, Box 250
Vancouver, BC V6Z 2N3

Dear Ms. Hamilton:

**Re: FortisBC Inc. (“FortisBC”) Ellison Substation Project 3698442
Applications for Reconsideration of Commission Orders C-04-07 and G-75-07**

By Order G-166-08, the Commission established a written hearing process for the reconsideration of Orders C-04-07 and G-75-07, limited to the “Initial Issue”. The Initial Issue is described in the Order as,

...whether the Ellison Substation, as proposed and approved at the Lochrem Road site, will cause problems for the systems at the Kelowna Airport under the terms specified the Agreements and, if problems are caused, the changes that will be needed to remedy the situation, and the cost of the changes...

Further, the Commission directed FortisBC to,

...file an independent engineering Report (the “Report”) by a properly qualified individual or group that reviews the siting and design of the Ellison Substation as proposed and approved, relative to the requirements of NAV CANADA as set out in the Agreements, and which confirms that the substation will comply with the requirements. If this confirmation cannot be provided, the Report will describe the changes to the substation that are needed to bring it into compliance, and the estimated cost of these changes.

In response, upon the recommendation of NavCan, FortisBC engaged PDK Airport Planning Inc. (“PDK”), and CNSS Engineering Services (“CNSS”), to produce the Report, a copy of which is attached to this letter.

The Report includes the independent conclusions of PDK and CNSS as well the responses to a series of questions supplied by FortisBC in anticipation of some key considerations that are germane to this particular proceeding.

Copies of the Report have been provided to registered intervenors as required by the Order.

Sincerely,

A handwritten signature in black ink, appearing to be 'DS', with a long horizontal flourish extending to the right.

Dennis Swanson,
Director, Regulatory Affairs

cc: Registered Intervenors

1 Report Objective

This report comments on the siting and design of the Ellison Substation based on the NavCanada Operating Agreement requirements and confirms FortisBC efforts to comply with those requirements.

2 Introduction

This report is authored by Mr. Peter Bianconi, P. Eng, of PDK Airport Planning Inc. (PAPI), in Vancouver BC, and Mr. Ehor Mazurok, P. Eng, of CNS Engineering Services, Edmonton AB.

Mr. Peter Bianconi is a registered Professional Engineer in the Province of British Columbia and Mr. Ehor Mazurok a registered Professional Engineer in the Province of Alberta. Mr. Bianconi has been a practicing engineer since 1978, and Mr. Mazurok since 1972.

Mr. Bianconi's professional career began with Transport Canada in Ottawa in 1978, in airport development. After Transport Canada, Mr. Bianconi secured a position with the Vancouver International Airport Authority (YVRAA) in planning and development of lands in the vicinity of airports. This work required knowledge of various Transport Canada regulations and guidelines regarding airport development, to minimize its effect on aircraft approaches to the airport, on navigational systems supporting those approaches, and the impact it could have on Air Traffic Control operations at the airport.

In 2000 Mr. Bianconi, started his own consulting firm, PDK Airport Planning Inc., providing consultant services to YVRAA, YVRAS and airport authorities at major international airports as well as regional ones. Mr. Bianconi has a well established working relationship with Transport Canada, NavCanada and various airport authorities.

Mr. Mazurok's professional career began with Transport Canada in Edmonton as a Navigational Systems Engineer. Shortly after, Mr. Mazurok assumed the position of Project Engineer responsible for design, construction and proof-of-performance of Communication, Navigational, and Surveillance (CNS) systems supporting air navigation in the Western Region encompassing the Province of Alberta, Northern British Columbia, the Yukon and the High Arctic.

After 13 years Mr. Mazurok became the head of CNS Engineering in Edmonton that employed, Professional Engineers, Electronics Technicians and a Drafting unit. In this capacity, Mr. Mazurok was responsible for the life-cycle installation of CNS systems in the Western Region, as well as, administering TP1247E guidelines on proposed development at, or in the vicinity of Transport Canada airports.

Prior to the devolution of Transport Canada to Nav Canada, Mr. Mazurok started CNS Engineering Services providing consultant services to International and Regional Airports on the impact of proposed development on existing air navigation systems, on mitigating practices for development exceeding established guidelines, and optimal configuration of navigational systems for airport runway expansion programs. Mr. Mazurok participated in NavCanada's evaluation of the AltaLink Blackmud Substation submission, in the electromagnetic noise level tests at comparable facilities, and in mitigating measures developed to ensure the proposed

substation would not affect the instrument landing system at the Edmonton International Airport.

Resumes for Mr. Peter Bianconi and Mr. Ehor Mazurok are enclosed in Appendix A.

3 Land Use in the Vicinity of Airports

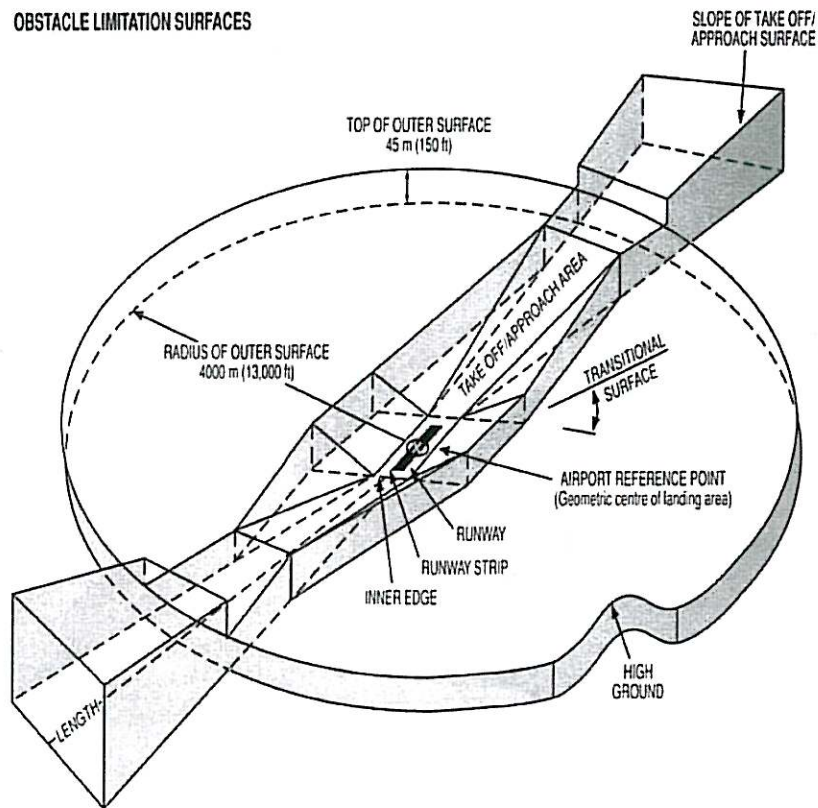
Obstacles and activities around airports are controlled for the safety of aircraft operations. Such control is enacted through Registered Airport Zoning and through regulations enacted under the authority of the Aeronautics Act.

The purpose of Registered Airport Zoning is to prevent lands in the vicinity of an airport being developed in a way that is incompatible with the operation of an airport. This includes limiting heights of structures in the flight ways surrounding an airport, preventing development that limits visibility in critical operating areas, and limiting development that would cause interference to airport communication and navigational systems.

The standards and recommended practices for Land Use in the Vicinity of Airports are found in Transport Canada "TP" publications. TP 312E prescribes the **Aerodrome Standards and Recommended Practices** to be used in building and operating an airport. This publication specifies the geometry and dimensions of the *Obstacle Limitation Surfaces* that are required to create and maintain an obstacle-free environment for aircraft taking off, landing and manoeuvring in the vicinity of an airport.

Figure 1, shows a schematic of the *Obstacle Limitation Surfaces* around a single runway at an airport.

Figure 1: Obstacle Limitation Surfaces



Recommended practices for development that could cause interference to airport communication and navigational systems are detailed in Aviation Publication TP 1247 – “Land Use in the Vicinity of Airports.” Of particular interest to this report is Part II of that publication, “Protection of Telecommunications and Electronic Systems.”

It is a requirement of Airport Certification that these standards must be met. Deviations from standards may occur, if studies show that off-setting procedures or other mitigation methods will provide equivalent levels of safety.

4 Industry Canada EMI Standards and TP 1247E Part II

In 1974, Department of Transport Aviation (Transport Canada today) assembled a manual of regulations and recommended practices for each branch. The practices outlined in the Telecommunications and Electronics manual eventually were included in TP 1247E as Part II of the publication. The recommended practices in Part II have changed little since 1974.

At the time very few standards were developed regarding Electromagnetic Interference (EMI) and Electromagnetic Noise (EMN). Most electronic devices in 1974 were hybrids consisting of tubes and semiconductor devices that generated significant amounts of electromagnetic noise. The recommended practices in siting communication and navigational systems for aviation were based on electromagnetic noise produced by those devices.

As the number of electronic devices increased, electromagnetic interference with commercial radio services became more prevalent. On receiving numerous complaints from public and commercial users, the Department of Communication (Industry Canada today) developed standards limiting electromagnetic emissions from electronic devices. A list of some of these standards is shown in Figure 2.

Figure 2: Standards Limiting electromagnetic emissions from electronic devices



Industry
Canada

Industria
Canada



Industry Canada > Radio, Spectrum and Telecommunications > Spectrum Management and Telecommunications > Official Publications > Standards > Interference - Causing Equipment Standards (ICES)

Spectrum Management and Telecommunications

Interference - Causing Equipment Standards

[ICES-001 - Industrial, Scientific and Medical \(ISM\) Radio Frequency Generators](#)
Issue 4, June 2006

[ICES-002 - Spark Ignition Systems of Vehicles and Other Devices Equipped with Internal Combustion Engines](#)
Issue 4, February 2007

[ICES-003 - Digital Apparatus](#)
Issue 4, February 7, 2004

[ICES-004 - Alternating Current High Voltage Power Systems](#)
Issue 3, December 2001

[ICES-005 - Radio Frequency Lighting Devices](#)
Issue 2, February 2007

[ICES-006 - AC Wire Carrier Current Devices \(Unintentional Radiators\)](#)
Issue 1, August 25, 2001



Date Modified: 2008-11-10



Regarding Part II of TP 1247E, some electronic devices that do not comply with the new standards still exist. For this reason, Part II recommendations are still in effect today. Those recommendations are part of an initial screening process that determines if the proposed facility will have any effect on existing aviation systems.

If a proposed facility does not meet Part II guidelines, then NavCanada can be requested to evaluate the proposal in relation to aviation systems in the area.

For facilities that comply with Industry Canada equipment standards, NavCanada in most cases can relax guidelines, or request mitigating measures. This aspect of the review process is identified in Section 2.1 of TP 1247E Part II and reproduced in Figure 3.

Figure 3: Excerpt – Sec 2.1 TP1247 Part II

	Transport Canada	Transports Canada			
Français	Contact Us	Help	Search	Canada Site	
Home	About us	Media room	Environment	Emergencies	
Air	Marine	Rail	Road	Major issues	

 Civil Aviation Home	<h2>Part II - Protection of Telecommunications and Electronic Systems</h2>	
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<p>TP 1247</p> <ul style="list-style-type: none">▪ Abstract▪ Introduction▪ Definitions▪ Part I - Obstacle Limitation Surfaces▪ Part II - Protection of Telecommunications and Electronic Systems▪ Part III - Bird Hazards▪ Part IV - Aircraft Noise▪ Part V - Restrictions to Visibility▪ Part VI - Site Protection and Line of Sight Requirements▪ Appendix A	<h3>2.1 GENERAL</h3> <p>The information contained in this part represents the minimum standards normally required by the Technical Services Branch for the protection of navigational aids and other telecommunications systems. Structures conforming to these standards would normally be acceptable; however, confirmation must be obtained from the approving authority in the region, i.e., the Regional Director, Technical Services.</p> <p>Planners should also be aware that specific applications which contravene the standards contained herein may sometimes be approved, provided analysis indicates that such approvals will be on a non-interfering basis.</p> <p>Consultation with the Regional Director, Technical Services must take place at an early stage in the project in order to avoid costly redesign or undue pressure when seeking building and site approvals. It is recommended that consultation take place at the building concept stage, before site approval is sought.</p> <p>It is the responsibility of the Regional Director, Technical Services to ensure that full co-ordination takes place with operational authorities where there is any operational impact anticipated. This is usually done through the Regional Land Use Committee.</p> <p>NOTE:</p> <p>The standards with respect to protection of telecommunications and electronics systems are published in the Technical Services Branch Standards and Procedures manuals (TESPs), which are the governing documents.</p>
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← Previous	Next →
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Last updated: 2007-12-11

[Important Notices](#)

The Ellison Substation Project 3698442 has been evaluated by NavCanada and approved on the basis that mitigating measures (a monitoring system) will be installed at the Ellison site. The purpose of this monitoring system is to ensure that electromagnetic noise, or interference does not exceed a specified limit (-56 dBm). Even if this limit is reached at the site, it does not mean the operation of electronic systems at the airport will be compromised. Physical systems are not error free and as a result, NavCanada has added a contingency factor to mitigate this risk.

Contractually, FortisBC must act accordingly if that limit is reached and must not rely on the contingency factor to delay the required response.

Nav Canada approval of the Ellison Substation was based on the results of a previous submission by AltaLink for a substation at the Nisku, Alberta. An in-depth analysis was carried out by Nav Canada for that submission, followed by extensive field tests with NavCanada Engineering Services staff and AltaLink consultant SHEL-BAR Electronic Industries Ltd. The AltaLink Blackmud Substation is of similar capacity and design as the Ellison Substation.

The field tests for the AltaLink submission consisted of measuring electromagnetic noise levels at a substation of similar design and capacity as proposed for the Blackmud site. The tests consisted of switching circuits ON and OFF under full power while monitoring equipment recorded the electric noise emitted from components involved in the operation. The electromagnetic noise levels observed were negligible and did not interfere with communications equipment at the site. Tests taken at other locations at the substation recorded similar results.

Several off-site measurements were taken under transmission lines leading to the substation and at junctions of several circuits. To create a worst case condition at junctions, pole hardware was vigorously vibrated to simulate wind loading. This caused the electromagnetic noise levels to fluctuate from a normal ambient noise level to a maximum level of -66 dBm. After maintenance was performed on the pole hardware simulated wind loading did not raise electromagnetic noise above ambient levels.

On the basis of these tests, NavCanada requested a monitoring system be installed close to a transmission line junction at the Blackmud site. The monitoring system records electromagnetic noise 24 hours a day, stores results in a data file that can be retrieved by NavCanada for analysis. In the event electromagnetic noise levels exceed designated levels, an alarm is automatically sent to a NavCanada center indicating noise levels have increased above levels that existed during normal operation at the site. The Blackmud substation has been in operation continuously for almost 2 years and no alarms have been sent, indicating that electromagnetic noise levels of more than -56 dBm have not been observed.

For the Ellison Substation project, FortisBC employed SHEL-BAR as consultant to perform electromagnetic noise measurements at representative sites similar to those carried out at AltaLink sites in Alberta. On the basis of those results, NavCanada determined that a monitoring system similar to that installed at the AltaLink Blackmud site, would be a sufficient mitigating measure to allow the Ellison Substation project to proceed at the requested location.

5 Concluding Remarks

- a) The NavCanada and SHEL-BAR tests at a representative substation site showed negligible amounts of electromagnetic interference being radiated from various components involved in the operation of the substation. As long as all equipment and components in the design of the substation comply with all Industry Canada equipment interference standards and all electrical work is performed to applicable Federal Government and Provincial Electrical Codes, industry standard substation design will meet NavCanada requirements.

- b) With regard to the proposed Ellison substation site, in order to meet NavCanada's requirements for air navigation at the Kelowna Airport, a monitoring system was identified as a mitigating measure. This measure was requested to insure electromagnetic noise levels at the site do not interfere with airport communication and navigational systems. NavCanada is the owner operator of the Air Navigation System and has approved the site on that basis.
- c) Although detailed analysis and field tests were completed prior to NavCanada developing its mitigating measures for substations located in close proximity to an airport, no amount of analysis can predict previously unknown situations. Corporate agreements usually contain contract clauses for managing "unspecified perils." It is our opinion that the NavCanada clause requesting a complete shutdown or relocation of the substation intends to cover off any "unspecified perils" in the event such things occur. Should the unthinkable occur, other options such as a redesign of the offending component/circuit, relocation of troublesome circuits, and other similar measures would be taken before a total relocation of the substation is even considered.
- d) The proposed Ellison Substation does not violate the Obstacle Limitation Surfaces identified for the Kelowna Airport. With respect to any physical, structural or other geometric elements of the station, as long as these do not penetrate the Obstacle Limitation Surfaces at the airport, they should have no effect on the NavCanada communications or navigational systems.

6 Questions and Answers

The following questions, as supplied by FortisBC, were posed in the context of the proposed Ellison Substation causing potential interference with the ILS (Instrument landing system) at the Kelowna Airport. We provide answers to these questions as supplementary clarification to our report above.

Question 1.

Did you visit the site?

Answer: Yes, Mr. Peter Bianconi, P. Eng. visited the Ellison Site, took pictures to see first hand the layout, etc, and had discussions with Fortis personnel to better understand the issues.

Question 2.

Will the surrounding topography/elevation of the Ellison Substation influence the propagation of electromagnetic interference?

Answer: Site topography can influence propagation of electromagnetic interference. Where a clear line-of-sight exists, normal propagation losses as a function of distance from the site diminish electromagnetic interference in any given direction. If line-of-sight is obstructed by trees or buildings, additional losses in excess of

normal propagation loss are incurred. Losses due to obstructions are usually quite significant and capable of reducing electromagnetic interference anywhere from 1/10th to 1/100th of unobstructed propagation loss.

An elevated site serves to reduce the amount of screening that could occur from line-of-sight obstructions. A prominent site, elevated above all obstructions, will behave no different from a site with a clear line-of-sight. If there are any large obstructions such as mountains near the site, potential for secondary reflections called "multi-path" exist.

Multi-path reflections are very complex phenomena. Secondary reflections are extremely dependent on the physical size of mountains, their distance from the site, their surface structure (smooth rock faces, or covered with vegetation), and their orientation to the source of electromagnetic interference. The distances associated with multi-path reflections are always greater than direct line-of-sight propagation causing those reflections to be significantly weaker when compared with direct line-of-sight propagation.

At the Ellison Substation site it is very unlikely surrounding topography could elevate electromagnetic interference noise levels above those expected from a normal operation at the site.

Question 3.

What aspects of substation design, construction and maintenance are relevant to the generation of objectionable electromagnetic interference?

Answer: Objectionable electromagnetic interference can be generated by installing components in the substation that are non-compliant with legislated electromagnetic interference standards, by construction not adhering to Federal and Provincial Electrical Codes, and by implementing inadequate maintenance programs after construction is completed.

As long as substation design is based on components compliant with legislated electromagnetic interference standards, substation electrical noise is limited to levels below objectionable electromagnetic interference. Wiring not adhering to Electrical Code can result in substandard connections arcing and generating electromagnetic interference above acceptable levels.

Objectionable interference can also be the result of an inadequate maintenance program. High voltage insulators over a period of time accumulate dust, causing voltage to leak across the insulator. Leakage is caused by minute arcs generated in-between dust particles. If the insulator is not maintained, the minute arcs will in time create a conductive path capable of breaking down the insulator and generating objectionable levels of electromagnetic interference.

Generating electromagnetic interference is an economic loss to the power industry. It takes power to generate this interference, power that cannot be sold. As a result, the electric industry has developed design, construction and maintenance practices to minimize those losses.

Question 4:

What are the known causes of electromagnetic interference from utility infrastructure, the typical remedies and the relative cost to remediate?

Answer: Lax and inattentive maintenance allowing the utility infrastructure to degenerate is usually the main cause of electromagnetic interference. If not properly maintained, components degenerate over time. As they degenerate, electromagnetic interference levels increase proportionately. No extra measures are required beyond regularly scheduled maintenance to ensure that electromagnetic interference levels do not exceed acceptable levels.

If an industry standard maintenance program is implemented, no extra costs above those programmed for regular maintenance should be required or any additional remediation.

Question 5:

Please explain the three levels of alarm in the Nav Canada Operating Agreement, the purpose of each and the scale between each level.

Answer: The purpose of the three levels in the Nav Canada Operating Agreement is to monitor electromagnetic interference generated at the substation. A radio receiver with a receiving antenna is installed at the substation and connected to a computer system. The program monitors electromagnetic noise levels received, and when designated levels are reached, a programmed response is transmitted to Nav Canada. Electromagnetic levels at the site are continuously recorded and results stored in a computer file that can be polled by Nav Canada. The results are stored for one year before being over-written with new data.

Level 1 (-90 dBm) is the normal electromagnetic noise level usually found at a site. The purpose of this level is to provide Nav Canada with a database for detecting initial trends should they occur. If a component at the site starts to fail, this would be accompanied by a slight increase in electromagnetic noise and the preset noise level would be exceeded. No maintenance response is programmed at this low level. Nav Canada periodically polls the database to check if some trend is in progress. Level 1 (-90 dBm) represents an electromagnetic noise level of **.000001** watts at the receiver input.

Level 2 (-76 dBm) is 25 times greater than Level 1. When this level is reached, it is an indication that an electromagnetic noise trend may be evolving and corrective maintenance should be carried out as soon as possible. Level 2 (-76 dBm) represents an electromagnetic noise level of **.000025** watts at the receiver input.

Level 3 (-56 dBm) is 100 times greater than Level 2. When this level is reached it is an indication that an electromagnetic noise trend is firmly in place and an immediate maintenance response is required to correct the problem. Level 3 (-56 dBm) represents an electromagnetic noise level of **.0025** watts at the receiver input.

Question 6:

Do you expect that the addition of a second transformer to the Ellison site would cause any additional issues?

Answer: It is presumed the addition of a second transformer would be to increase the power capacity of the site and substation voltage remains the same as it was originally designed. Voltage is required to initiate an arc that generates electromagnetic noise. Higher voltages generate greater levels of electromagnetic noise. Adding more power capacity to the site but keeping voltage the same does not create any additional issues with respect to the monitoring requested by Nav Canada.

Question 7:

How many substations >100Kv are you aware of that are located within 3.2km of an instrument airport.

Answer: We don't have a database showing substation locations relative to airports. But we are aware of one such facility at the Vancouver International Airport where we have done a lot of work. To our knowledge, this facility has not produced any interference issues with the airport's ILS.

Question 8:

Are you aware of any substations in Canada that have required electromagnetic noise mitigation after the substation was placed in service? If yes, what was the mitigation?

Answer: We have not heard of any substations being required to mitigate electromagnetic noise levels after it was in service. Usually, during site selection, proponents for the substation work out all the necessary details to the satisfaction of Nav Canada, where the site will not affect airport operations in the area.

Question 9:

Are you aware of any substations in Canada that required a complete shutdown or relocation due to objectionable electromagnetic noise that could not be mitigated?

Answer: No. We are not aware of any substations being shutdown or relocated on account of excessive electromagnetic noise.

7 Final Statement

In conclusion, based on our review of the proposed Ellison Substation location, utility construction methods and maintenance practices, and considering our experience and field testing at other in-service substations, it is our expert opinion that the Ellison substation should not cause any problematic interference with the Kelowna Airport Operations. And even if some interference were to result, appropriate contingency measures have been identified and FortisBC has committed to implement these measures to mitigate such interference.

Signed and Dated: This 30th day of November, 2008 in the Province of British Columbia



Peter Bianconi, P.Eng
President, PAPI



Ehor Mazurok, P.Eng
Owner, CNSS Engineering

APPENDIX A



Curriculum Vitae of Peter Bianconi

Mr. Bianconi is the founding principal of PDK Airport Planning Inc (PAPI). He has more than 30 years of airport planning and design experience, gained through a number of progressively more responsible positions, first within Transport Canada and later with the Vancouver International Airport Authority and its various subsidiaries, before forming PAPI in 2000.

With PAPI, Mr. Bianconi has worked on a wide variety of airport projects spanning six continents. He has been involved in the site selection, planning and development of a number of new greenfield airports like San Diego, Chicago (South Suburban), Albion Sands and the Louisiana Transportation Centre. As well, he has participated in the development of Master Plans and Land Use Plans for diverse airports such as Moscow (Vnukovo), Montego Bay (Jamaica), Sharm El Sheikh (Egypt), Lima (Peru), Hong Kong, Kamloops, Kelowna and Pemberton in British Columbia. In addition, Mr. Bianconi has contributed to terminal planning and concept development projects for Larnaka and Paphos (Cyprus), Montego Bay, Sharm el Sheikh, Montevideo (Uruguay), Vancouver, Providenciales (Turks and Caicos), Muscat (Oman), Comox, among others. Additionally he led a variety of airside planning and development studies for airports like Prince George, Kamloops, Cranbrook, Las Americas and Puerto Plata in the Dominican Republic and Vancouver. Finally, Mr. Bianconi has been a team member in due diligence exercises at Chicago (Midway), London City, Sydney, Sint Maarten and Curacao in the Caribbean as well as Moncton, Port Hardy and Kamloops in Canada.

At Vancouver International (YVR) Mr. Bianconi was most recently, the Airside Planning Specialist responsible for apron/gate planning, taxiways and runway planning. In this role Mr. Bianconi carried out extensive analysis of airside facilities using SIMMOD. While at YVR he was also involved in wide ranging series of projects from the 1995 Master Plan for the airport, to various design exercises, such as developing the airport's plan for the A380. Projects have included involvement in the design of the new international terminal and the various expansions underway to this terminal, as well as various projects involving the expansion and renovation of the domestic terminal. As well, Mr. Bianconi has done extensive work to improve access to the airport, such as steering the Rapid Bus Project to the airport, initiating the Airport Connector, negotiating with municipal groups and finally to initiation of the Rapid Transit Project (RAV) for the airport.

In his later years at YVR, Mr. Bianconi completed extensive international work for the Airport Services subsidiary of YVR. Projects included Master Plan review, terminal and cargo area design for Santiago, Chile; Master Plan review and various planning



projects for San Jose, Costa Rica; terminal building planning and design for various airports in the Caribbean, including the Dominican Republic, Turks and Caicos, Montego Bay and Bermuda.

In previous roles within Transport Canada, he has also been involved in various domestic projects such as Master (and Land Use) Plans, as well as terminal planning projects for airports such as Regina, Fort St. John, Moncton, Halifax, Winnipeg, Saskatoon, Kamloops, Cranbrook, Hamilton, Abbotsford and other smaller sites and airfield planning projects at Cranbrook, Prince George, Springbank and Calgary.

Selected Project and Professional Experience

- Vancouver International Airport – Northlands Study examining the potential impacts of proposed development in the northlands on CNS equipment at the airport.
- Louisiana Transportation Centre - Development Plan for a major multi-modal transportation facility including airport, port, rail and road facilities, just west of New Orleans.
- Vancouver International Airport/Canada Line – Examination of potential interference impacts of Canada Line operations on YVR CNS equipment.
- Vnukovo International Airport (Moscow) – Master Plan Development and Terminal Space Program.
- Calgary International Airport – Development of guidelines to determine compatibility of various developments in proximity to navigation aids
- Albian Sands Airport – Design development and construction of a new airport to serve the oil sands in Northern Alberta.
- South Suburban Airport, Chicago USA – Contributions to Airport Master Plan and Terminal Development Plan.
- Comox Airport – terminal concept development and apron expansion options
- Kamloops Airport – Prepared a 10-Year Development Plan and Capital Plan for the Airport, and Project Definition (feasibility) for Airport Expansion Project
- Pemberton Airport – a variety of studies including a Land Use Plan, Project Definition Report for major expansion and development guidelines.
- Vancouver International Airport – Master Plan Development.



- Vancouver International Airport Airfield Planning – Various projects including runway length analysis to operational analysis of current problems to design and formulation of solutions, to development of a plan for the A380.
- Santiago International Airport – Design of passenger and cargo terminal apron layouts, including bridges, airfield lighting, etc.
- San Jose, Costa Rica/ Lima, Peru/ Montevideo, Uruguay– Master Plan development and recommendations for facility (especially terminal) development strategies (part of BOT bids).
- Springbank Airport – Assessment of IFR Enhancement options for the airport; Examination of runway extension options.
- Calgary International Airport – Study of options to consolidate Navigation Aids on the airport.
- Sangster International Airport, Montego Bay – Master Plan and terminal development plan for a BOT bid for the airport.
- Providenciales International Airport (Turks and Caicos) – Assessment of Existing Terminal Facilities, Forecast Requirements and Concepts for Expansion, including the landside and aircraft apron.
- Sharm El Sheikh – Technical proposal for Master Plan and terminal development plan as part of a bid for a 30-year concession.
- Larnaka International and Pafos International, Cyprus – Technical proposal for terminal re-development as part of a BOT bid.
- Moncton Airport – Development of Airport Master Plan and Terminal Development Plan for new air terminal building.
- Saskatoon, Thunder Bay, Toronto, Halifax Master Plans – Developed the ground transportation components of these Master Plans.
- Yellowknife Airport – Development of the Master Plan including airside, terminal and landside facilities development.
- Regina Airport Master Plan – Development of the terminal, apron and ground transportation aspects of the overall plan.
- Dominican Republic– Assessments of terminal facility needs at Santo Domingo and Puerto Plata, as well as a runway requirement assessment for Arroyo Baril airport.
- Fort St John Airport Master Plan – Development of the ground transportation and apron components of the plan as well as providing other advice



- Port Hardy, Kamloops and Moncton Airports – Due diligence assessments for clients, in advance of the takeover of these airports from the Canadian Government.
- Bermuda International Airport – Assessment of the arrivals facilities at the terminal and recommended various operational and facility improvements.
- St. Martin and Curacao Airports – Due diligence analysis for potential financiers of these projects.
- Sydney (Kingsford) International Airport – Participation in the preparation of a technical proposal associated with the trade-sale (purchase) of the airport from the Australian government.
- China Aviation Training– Development of a course in airport planning for student/instructor training.
- British Columbia Institute of Technology – Development and delivery, on ongoing assignment, a course on Airport Planning.

Professional Qualifications

- Bachelor of Engineering, (Civil Engineering) Carleton University, Ottawa
- Master of Engineering, (Transportation Planning) Carleton University, Ottawa
- Member, Association of Professional Engineers and Geologists of British Columbia

RESUME

EHOR MAZUROK B. Sc. P. Eng.

2008

Education	1969	Bachelor of Science, B. Sc. Electronic Engineering and Computer Science University of California, Berkeley, USA.
	1966	Associate Arts Degree A. A. Lower Division Engineering Cerritos College, Norwalk, California.
	1982	Modern Radar Technology and Application, Certificate University of California, Los Angeles UCLA Extension, Los Angeles, California.
	1978	Air Photo Interpretation, Certificate University of Alberta, Extension Edmonton, Alberta.
	1976	Public Presentation, Certificate University of Alberta, Extension Edmonton, Alberta.
	1986	Radar (PSR/ISR) Display/Site Equipment Overview Raytheon Inc. Sudbury, Massachusetts.
	1978	General Management I & II Project Management and Scheduling Transport Canada, Edmonton, Alberta.
	1988	Intermediate Management Transportation Course Transport Canada Training Institute (TCTI) Cornwall, Ontario.
Present Experience		CNSS Engineering Services , fourteen years providing consulting services to corporate clients in Airport planning, development of Communication, ILS Navigation (terrestrial and satellite based GPS), Surveillance and Security Systems. Client profile; -SEA International, Redmond, Washington, USA Air Systems and Airport facilities plans, Indonesia. -Pelorus Navigation Systems Inc., Calgary, Alberta Pelorus/Honeywell SLS-1000 LADGPS assessment. -Frontec Logistics, Edmonton, Alberta Radar Surveillance plan, Kuala Lumpur, Malaysia. GPS and CAATS Systems Overview. Security Consultant RCMP K Division RFP. Airport Explosion Detection Systems Overview. -Nav Canada Area Control Center Security Assessments. Resource Outlines for Radar Program Delivery. Expert consul for Radar, ILS Nav Systems site location analysis. SATNAV Program participant. Develop Technical Requirements for relocating Vancouver ACC from South Terminal to Surrey, B.C. AirNav Communications study with Coverage Profiles. -The Ambidji Group Pty Ltd, Melbourne, Australia NASA Deep Space Network, maintenance plan. Radar System overview & maintenance plan, Canberra Airport. -J.A. Jones, Charlotte NC, USA Electronic Systems Maintenance profile with required staffing and costs for operating DND 5-Wing Goose Bay Airport. Project Management of NDB Tower Replacement contracts

Present Experience	<p>-Calgary Airport Authority, Airport Development plans reviews. Alternate Receiver Site Location Analysis. Expert consul Airport Development impacts on ILS and Communication Systems.</p> <p>-Edmonton Regional Airport Authority Impact Analysis of Proposed Construction on ILS systems. Impact Analysis of Proposed Airport Construction on CNS Systems. Expert consul Airport Development impacts on ILS and Communications Systems.</p> <p>-EBA Engineering, Calgary Impact Analysis of Proposed Construction on ILS systems. Impact Analysis of Proposed Airport Construction.</p> <p>-PAPPI/YVR Airports Calgary International Airport Electric Noise Study. Vancouver International Airport Northlands development outlines for minimizing impacts on ILS and Nav Systems. Abbotsford, Cranbrook,, Kamloops, Kelowna, Prince George, runway expansions impact on ILS systems with mitigating measures for maintaining existing service.</p>
Previous Employment	
1994 - 1982	Transport Canada , thirteen years managing an Engineering Group consisting of Electronic Engineers, Technical Specialists and Electro-Mechanical Draftspersons. Managed design and development of various electronic systems for Air Navigation, ILS, Communications, Radar, Public Address Systems, CCTV and Security Systems. Coordinated installation of Transport Canada electronic systems at CFB (DND) sites at Alsask, Beaverlodge, Namao and Cold Lake. Carried out Engineering Design reviews of proposed DND FOL (Forward Operating Location) sites at Transport Canada airports Inuvik and Yellowknife. Participated in headquarters technical forums on use of GPS for area navigation.
1981 - 1972	Transport Canada , over ten years experience in planning the design and installation of NDB, VOR/DME, ILS and VHF/UHF Communications Systems. Directed activities of Architects, Mechanical, Electrical, Civil Engineers in Design and Construction of combined ATB/FSS terminals for small Alberta Airports. Final design was accepted as National Standard by Transport Canada. Technical representations on forums regarding the safety of Electromagnetic Emissions and development of electronic zoning plans for Airports and Air Navigation Sites at Edmonton, Calgary International Airports and various Municipal Airports in the Province of Alberta.
1971 - 1969	Three years experience in Design, Construction and Installation of remote-control monitoring systems in the Petroleum Industry.
Professional Memberships	Association of Professional Engineers of Alberta (APEGGA) Institute of Electrical, Electronic Engineers (IEEE)
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BRITISH COLUMBIA
UTILITIES COMMISSION

ORDER
NUMBER G-166-08

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IN THE MATTER OF
the Utilities Commission Act, R.S.B.C. 1996, Chapter 473

and

Applications for Reconsideration of
A Decision approving for FortisBC Inc.
a Certificate of Public Convenience and Necessity
for the Ellison Substation Project

BEFORE: L.F. Kelsey, Panel Chair November 18, 2008

O R D E R

WHEREAS:

- A. On October 27, 2006 FortisBC Inc. ("FortisBC") applied (the "Application") to the British Columbia Utilities Commission (the "Commission") for a Certificate of Public Convenience and Necessity ("CPCN") for the Ellison Substation Project (the "Ellison Substation"); and
- B. Following a review of the Application that included an oral public hearing on April 2, 2007, the Commission by Order C-4-07 granted FortisBC a CPCN to construct the Ellison Substation Project – Option 1, and directed FortisBC to file a report assessing the Airport site for the substation as an alternative to the proposed Lochrem Road site; and
- C. On June 6, 2007 FortisBC submitted its report assessing the Airport site; and
- D. By Order G-75-07 dated June 28, 2007, the Commission approved the Lochrem Road site for the Ellison Substation, as applied-for in the Application; and
- E. By letter dated September 18, 2008, the Concerned Citizens of Quail Ridge and Lochrem Road ("CCQRLR") applied for a reconsideration of the Commission's Decision as set out in Orders C-04-07 and G-75-07 (the "Decision"); and
- F. By letter dated September 23, 2008, the Quail Ridge Residents Association ("QRRR") also applied for a reconsideration of the Decision; and
- G. In response to the applications of CCQRLR and QRRR for a reconsideration of the Decision (the "Reconsideration Applications"), on October 21, 2008 FortisBC provided executed copies of an Operating Agreement and Statement of Work Agreement with NAV CANADA (the "Agreements"); and

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- H. By Letter L-50-08 dated October 22, 2008, the Commission established a written comment process on the Reconsideration Applications to address the reconsideration phase one issue of whether a reasonable basis exists to allow a reconsideration; and
- I. CCQRLR, QRRR, FortisBC, Colin Bechtel, Judy Clayton, Rhonie Horne, and Bernice and John Fortunat submitted comments; and
- J. The Commission has considered the submitted comments, and has determined that a reconsideration of the Decision should proceed on a limited basis with regard to the initial question of whether the Ellison Substation as approved at the Lochrem Road site, will cause problems for the systems at the Kelowna Airport under the terms specified in the Agreements with NAV CANADA. The Commission's Reasons for Decision are attached as Appendix B to this Order

NOW THEREFORE the Commission orders as follows:

1. The Commission establishes a written hearing to reconsider the Decision, so as to address the initial question of whether the Ellison Substation, as proposed and approved at the Lochrem Road site, will cause problems for the systems at the Kelowna Airport under the terms specified the Agreements and, if problems are caused, the changes that will be needed to remedy the situation, and the cost of the changes (the "Initial Issue").
2. By Monday, December 1, 2008, FortisBC will file an independent engineering Report (the "Report") by a properly qualified individual or group that reviews the siting and design of the Ellison Substation as proposed and approved, relative to the requirements of NAV CANADA as set out in the Agreements, and which confirms that the substation will comply with the requirements. If this confirmation cannot be provided, the Report will describe the changes to the substation that are needed to bring it into compliance, and the estimated cost of these changes.
3. FortisBC will provide a copy of the Report to Intervenors and Interested Parties in the Ellison Substation CPCN proceeding, parties who participated in the reconsideration phase one comment process and NAV CANADA (collectively the "Participants").
4. The Regulatory Timetable for the written process to address the Initial Issue is attached as Appendix A to this Order.

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5. Following the completion of the written process for the Initial Issue, the Commission may establish a reconsideration of other issues related to the Decision.

DATED at the City of Vancouver, in the Province of British Columbia, this 18th day of November 2008.

BY ORDER

Original signed by:

L.F. Kelsey
Panel Chair

Attachments

Applications for Reconsideration of
Decisions approving for FortisBC Inc.
a Certificate of Public Convenience and Necessity
for the Ellison Substation Project

REGULATORY TIMETABLE

ITEM	DATE (2008)
Filing of Independent Engineering Report	Monday, December 1
Information Requests to FortisBC	Thursday, December 4
FortisBC Responses to Information Request	Wednesday, December 10
Participants File Written Evidence	Monday, December 15
Information Requests on Participant Written Evidence	Thursday, December 18
Response to Information Requests	Wednesday, December 24
	DATE (2009)
CCQRLR and QRRRA Final Submissions	Monday, January 5
FortisBC and other Participants Final Submissions	Friday, January 9
CCQRLR and QRRRA Reply Submissions	Wednesday, January 14

Applications for Reconsideration of
Decisions approving for FortisBC Inc.
a Certificate of Public Convenience and Necessity
for the Ellison Substation Project

REASONS FOR DECISION

INTRODUCTION

In letters dated September 18, 2008 and September 23, 2008 (the "Reconsideration Applications"), counsel for the Concerned Citizens of Quail Ridge and Lochrem Road ("CCQRLR") and Quail Ridge Residents Association ("QRRR"), respectively, requested that the British Columbia Utilities Commission (the "Commission") reconsider its Decision as set out in Orders C-04-07 and G-75-07" (the "Decision") (Exhibits B2-1, B1-1).

An application for reconsideration by the Commission typically proceeds in two phases. By Letter L-50-08 dated October 22, 2008, the Commission established a written comment process on the Reconsideration Applications, to address the first phase issue of whether a reasonable basis exists to allow a reconsideration (Exhibit A-1). Following the completion of the phase one comment process, the Commission typically decides whether or not a reconsideration should proceed. If the reconsideration proceeds to the second phase, the parties are allowed to address the substance of the issues that the Commission approves for reconsideration.

The Commission has reviewed the submission received on the Reconsideration Applications and, as discussed at greater length in the remainder of these Reasons for Decision, has established a reconsideration of the Decision on the limited initial issue of whether the proposed Ellison Substation at the Lochrem Road site will comply with the requirements of NAV CANADA.

BACKGROUND

In Order C-04-07, dated May 9, 2007, the Commission granted a Certificate of Public Convenience and Necessity ("CPCN") to FortisBC to construct the Ellison Substation Project (the "Ellison Substation" or "Project"), and directed FortisBC to submit a written report regarding the site for the substation which was the subject of the CPCN. In Order G-75-07, dated June 28, 2007, the Commission, following review of FortisBC's report, issued an order approving the Lochrem Road site for the construction of the Ellison Substation as applied for in the Application for the CPCN.

In response to the Reconsideration Applications, by letter dated October 21, 2008, FortisBC provided executed copies of an Operating Agreement and Statement of Work Agreement with NAV CANADA (the "Agreements") (Exhibit C5-2). In the letter, FortisBC submitted that compliance with the NAV CANADA guidelines or adherence to the Agreements does not introduce new information of a nature that is material enough to impact the previous Decision, and requested that the Commission not accept the applications for reconsideration.

In the first phase reconsideration written comment process established by Letter L-50-08, the Commission received submissions from CCQRLR, QRRR, FortisBC, Colin Bechtel, Judy Clayton, Rhonie Horne and Bernice and John Fortunat (Exhibits B2-2, B1-5, C5-1, C3-1, C1-1, C6-1 and C4-1, respectively). FortisBC opposed the requests for a reconsideration, while all the other submissions supported a reconsideration.

CCQLR RECONSIDERATION APPLICATION AND RELATED SUBMISSIONS

The CCQLR application enclosed a letter from NAV CANADA that raised no objection to the Ellison Substation providing FortisBC agreed to certain conditions related to electromagnetic noise, and a copy of Transport Canada requirements for facilities near airports (Exhibit B2-1). The CCQLR submitted that this is a material new development that the Commission was not aware of during the CPCN proceeding. CCQLR argued that FortisBC needs to agree to shut down the substation if necessary, and that it cannot make such an agreement without Commission approval. Also, it appears that it is unknown whether the substation at the Lochrem Road site will interfere with NAV CANADA systems, and that this risk may have influenced the Commission's decision had it been aware of the risk. CCQLR also questioned whether FortisBC has Transport Canada approval for the proposed substation.

In its submission dated October 28, 2008, FortisBC argues that there is nothing in the Reconsideration Applications that suggests there is any basis whatsoever for a reconsideration in respect of Order C-04-07 issuing the CPCN for the Ellison Project (Exhibit C5-1). The Reconsideration Applications are in respect of the Lochrem Road site and, accordingly, the only matter arising in the Reconsideration Applications is Order G-75-07. That is, the question is whether there has there been a fundamental change in circumstances or facts since the order approving the Lochrem Road site was issued. Furthermore, FortisBC submits that the change in circumstances or facts must have a significant material implication in order to warrant a reconsideration.

In response to CCQLR, FortisBC argues that it has the authority and capacity to enter into agreements with NAV CANADA without prior Commission approval. With respect to CCQLR's second point FortisBC argues that CCQLR have put forward no evidence that the Ellison Substation will put aviation safety at risk, and that speculation of a change in circumstances in the future if FortisBC is unable to comply with NAV CANADA requirements does not justify a reconsideration. With regard to Transport Canada, FortisBC states that the necessary Transport Canada approval has been obtained.

In its October 31, 2008 Reply Submission, CCQLR argues that the possibility that the substation may need to be relocated at considerable expense is a fundamental change in circumstances (Exhibit B2-2).

QRRR RECONSIDERATION APPLICATION AND RELATED SUBMISSIONS

The QRRR application requests a reconsideration on the basis that NAV CANADA's letter identifies a risk that FortisBC may need to shut down the Ellison Substation after it becomes operational (Exhibit B1-1). Since this risk was not raised in the CPCN proceeding, the letter creates a fundamental change in circumstances or facts.

In response, the FortisBC Final Submission notes that it has provided its Operating Agreement with NAV CANADA, and that rather than contemplating that the substation will be shutdown, the agreement provides for a mutually agreed plan of action to resolve any concerns (Exhibit C5-1). FortisBC states that this undermines the QRRR issue about risk to the use of the site. FortisBC also submits that if the agreement with NAV CANADA had been before the Commission, it is not reasonable to suggest it would have made a difference to the Commission's Decision. FortisBC goes on to argue that the alleged risk of non-compliance with a regulation or law that may impact the suitability of the Lochrem Road site is a risk that could have arisen with other alternative sites, and that this risk is not a fundamental change in facts or circumstances.

The QRRR Reply Submission dated October 30, 2008 argues that the Operating Agreement with NAV CANADA requires FortisBC to correct a problem that is compromising the Air Traffic Control system (B1-6). QRRR submits that whether FortisBC will be able to prevent the Ellison Substation from interfering with the systems is an evidentiary issue for the reconsideration itself. QRRR also questions whether the Commission has the jurisdiction to resolve disputes, as provided in the Operating Agreement. QRRR also argues that the reconsideration should address the CPCN for the substation as well as the Lochrem Road site. The QRRR Reply Submission also requested that existing Intervenor should be allowed to present evidence relevant to the topics of the reconsideration.

COMMISSION DETERMINATION

The Commission generally agrees with the submission of FortisBC that the Reconsideration Applications relate principally to the suitability of the Lochrem Road site. However, as it would appear that the potential to cause interference with navigation and other systems at the Airport may result from the design of the substation as well as the site, the Commission considers that the Reconsideration Applications address the proposed Ellison Substation at the Lochrem Road site.

The Commission recognizes that CPCN approval for a project is often granted prior to the utility obtaining many of the permits that it will need to construct the project. Obtaining these permits is part of the usual process of carrying out a project, and the utility may need to make certain commitments to regulatory and other government agencies to obtain them.

However, the Commission is concerned that this potentially serious issue has surfaced at this late date in the development of the Ellison Substation Project. It seems clear that the Lochrem Road site is close enough to the Kelowna Airport to fall within the zone of interest of NAV CANADA and Transport Canada. Furthermore, FortisBC has agreed to install monitoring equipment and to correct any issues caused by the substation that are identified under the terms of the Agreements.

A need to relocate or even significantly modify the substation appears likely to be a ratepayer cost. Any such additional costs, if material, would represent a material change to the facts and circumstances that were before the Commission when it granted a CPCN for the Ellison Substation at the Lochrem Road site.

At this time, the Commission is unclear as to the significance of the risk that the Agreements with NAV CANADA may require FortisBC to make significant changes to the substation, or perhaps relocate it. In the interest of regulatory efficiency, the Commission will deal with this initial question by a reconsideration on its merits of this matter, and will limit the reconsideration to this specific issue. Depending on the outcome of this initial stage of the reconsideration, the Commission may need to undertake a more broad reconsideration of other aspects of the Decision, including consideration at some length of alternatives if there is a material problem with the Lochrem Road site.

Therefore, the Commission finds that it will consider the initial issue of whether the Ellison Substation, as proposed and approved at the Lochrem Road site, will cause problems for the systems at the Kelowna Airport as specified in the Agreements and, if problems are caused, the changes that will be needed to remedy the situation, and the cost of the changes (the "Initial Issue"). The Commission hereby establishes a written hearing and Regulatory Timetable to address the Initial Issue.

The Agreements are already on the record (Exhibit C5-2). **To provide evidence to support the consideration of the Initial Issue, by Monday, December 1, 2008, FortisBC will file an independent engineering Report (the "Report") by a properly qualified individual or group that reviews the siting and design of the Ellison Substation as proposed and approved, relative to the requirements of NAV CANADA as set out in the Agreements, and which confirms that the substation will comply with the requirements. If this confirmation cannot be provided, the Report will describe the changes to the substation that are needed to bring it into compliance, and the estimated cost of these changes. FortisBC will provide a copy of the Report to Intervenors and Interested Parties in the Ellison Substation CPCN proceeding, parties who participated in the Phase One comment process and NAV CANADA (collectively, "Participants").**

The Commission determines that Participants will have an opportunity to submit Written Evidence regarding the Initial Issue and the Report.



May 29, 2008

Your file
Ellison Substation and Transmission Line
Our file
08-0774

Mr. Ed Robinson
FortisBC Inc.
2850 Benvoulin Road
Kelowna, BC V1W 2E3

RE: Other Permanent Structures: Electrical Substation (N49° 57' 44" W119° 23' 14") - Kelowna, BC

Dear Mr. Robinson,

We have evaluated the captioned proposal and NAV CANADA has no objection to the project as submitted provided the following criteria are met:

- Agree to use and to provide details on state-of-the-art design techniques, hardware, construction practices and maintenance practices for minimizing the generation of electromagnetic noise.
- Agree to conduct electromagnetic noise measurements before and after energization of the new facility, and to provide test results and analysis to NAV CANADA. The measurement technique and the length of the monitoring period are to be mutually agreed upon. As a minimum, measurements should be made in fair weather (to maximize interference effects from gap discharges) and in foul weather (to maximize effects from corona noise).
- Agree to take immediate corrective action should interference be caused by radiated electromagnetic noise from power lines of substations. Corrective action could consist of relocation, re-design, improved maintenance procedures, replacement, shut-down of power system facility, etc.

Adherence to these conditions is required to mitigate the risk of interference to NAV CANADA systems which are critical for aviation safety. You may contact Jim Stetson at 780-890-3041 or stetsoj@navcanada.ca to coordinate. Please note that all three of these conditions must be met in order to be accepted by NAV CANADA.

Also, in the interest of aviation safety, it is incumbent on NAV CANADA to maintain up-to-date aeronautical publications, and issue Notices to Airmen (NOTAM) as required. To assist us in that end, we ask that you notify us on completion of construction. This notification requirement can be satisfactorily met by returning a completed, signed copy of the attached form to us by mail, or fax at (613) 248-4094. In the event that you should decide not to proceed with this project, please advise us accordingly so that we may formally close the file.

NAV CANADA's land use evaluation is valid for a period of 12 months. It neither constitutes nor replaces any approvals or permits required by Transport Canada, Industry Canada, other Federal Government departments, Provincial or Municipal land use authorities or any other agency from which approval is required.

If you have any questions, contact the Land Use Department by telephone at 1-866-577-0247 or e-mail at landuse@navcanada.ca



Yours truly,

A handwritten signature in black ink, appearing to read "D. Perala".

Darrell Perala
for
Tom Hollinger
Manager, Data Collection
Aeronautical Information Services

cc Yuko Suo, Pacific Region, Transport Canada
cc Jim Stetson, NAV CANADA, Engineering West
cc Paul England, NAV CANADA, Site Manager, Kelowna Tower
cc Sam Samaddar Airport Manager, Kelowna (CYLW)



STATEMENT OF WORK AGREEMENT

Monitoring Program at FortisBC's Ellison Substation

Between

NAV CANADA

77 Metcalfe Street
Ottawa, Ontario K1P 5L6

And

FORTISBC Inc.

Suite 100, 1975 Springfield Road
KELOWNA, BRITISH COLUMBIA V1Y 7V7

Version 2.0
September 24, 2008

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SCHEDULE "A" - DRAWINGS

SCHEDULE "B" - EQUIPMENT SPECIFICATIONS

STATEMENT OF WORK AGREEMENT

THIS AGREEMENT dated the 8th day of October, 2008.

BETWEEN:

NAV CANADA, a company incorporated under the laws of Canada with head office at the City of Ottawa in the Province of Ontario (hereinafter referred to as "NC"),

OF THE FIRST PART,

- and -

FORTISBC INC., a corporation established by a special Act of the Legislature of the Province of British Columbia, having its head office at Suite 100, 1975 Springfield Road, Kelowna, British Columbia, (hereinafter referred to as "FT"),

OF THE SECOND PART.

WHEREAS NC is the private sector, non-share capital corporation that owns and operates Canada's civil air navigation service (ANS).

AND WHEREAS FortisBC is an integrated electric utility that owns an electrical substation located at N49 57 44, W119 23 14 (the "Ellison Substation") with voltage exceeding 100 kV that is located closer than 3.2 kilometers from the centerline or sixteen (16) kilometers from the ends of Runway 16/34 of the Kelowna Airport and may therefore cause television and FM interference (TVI) and electromagnetic interference (EMI) to aircraft instrument landing systems operated by NAV CANADA.

AND WHEREAS NC has a requirement for installation of an EMI (Electromagnetic Interference) Monitoring System (the "Monitoring System") at the Ellison Substation.

AND WHEREAS the Parties wish to provide clarity of their respective accountabilities relating to the performance of the work required by NC to facilitate the installation of the antennas, Aircom ILS Receiver System, VI Logger, PC and associated software and other components comprising such Monitoring System.

NOW THEREFORE THIS AGREEMENT WITNESSES THAT, in consideration of the premises hereof and the mutual covenants and agreements contained herein, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

1. INTERPRETATION

1.1 In this Agreement the expressions below shall respectively have the following meanings:

- 1.1.1 "Agreement" means this Statement of Work Agreement, including the recitals and all Appendices and Schedules attached hereto, as may be amended from time to time;
- 1.1.2 "Party" means either NAV CANADA or FortisBC, as the case may be, and "Parties" means both of them;

2. GENERAL ROLES AND RESPONSIBILITIES

2.1 NC covenants and agrees that it shall:

- 2.1.1 provide a Statement of Work (the "SoW") detailing the work (the "Work") NC requires for the installation of new antenna mounts, antennas, coaxial cables Aircom ILS Receiver System, VI Logger, PC and associated software and other components as required;
- 2.1.2 review and inspect the Work as required; and
- 2.1.3 complete and submit Industry Canada Radio Communication Licence as required.

2.2 FT covenants and agrees that it shall:

- 2.2.1 complete the Work as detailed in the SoW;
- 2.2.2 bear all costs for the Work as detailed herein;
- 2.2.3 supply all materials as detailed in the SoW including but not limited to equipment, antennas, antenna clamps, coaxial cables, connectors, ground kits, and surge protectors (it being acknowledged by the Parties that product supplied may vary from what is defined in the SoW);
- 2.2.4 ship all materials as specified by NC;
- 2.2.5 provide all required resources for testing the Monitoring System;
- 2.2.6 order telecommunication circuits from the service provider as specified by NC;
- 2.2.7 provide design and engineering resources to complete the work as required to establish monitoring from NC to the Ellison Substation;
- 2.2.8 install all material as required by NC (the cost of all such equipment installation, together with rental of space and any other costs incurred as a result of such installation to be solely for FT's account);
- 2.2.9 provide NC with floor space within the Ellison Substation as detailed herein;

- 2.2.10 be solely responsible for the means, methods, techniques and procedures to complete the Work;
- 2.2.11 meet NC design requirements; and
- 2.2.12 coordinate with NC any activities that may impact the existing NC systems and operations.

3. ELLISON SUBSTATION MONITORING PROGRAM

- 3.1 NC's intent is to monitor the EMI generated from the Ellison Substation for aviation safety operation in the Kelowna airport. To achieve such monitoring requires FT to install antennas, coaxial cables, Aircom ILS Receiver System, VI Logger, PC and associated software and other components as required. The detailed requirements are described in this Section 3.
- 3.2 In relation to DESIGN works, FT shall:
 - 3.2.1 provide all design and engineering resources to complete the Work as required by NC; and
 - 3.2.2 supply all material required as listed in Product Specification.
- 3.3 In relation to ANTENNA works, FT shall provide one Dipole VHF antenna (AH system inc, or equivalent). The antenna shall be mounted as shown in the Antenna Layout Drawings shown in Section 1.2 of Schedule A. The antenna specification is also referenced in Schedule B.
- 3.4 In relation to COAXIAL CABLE works, FT shall:
 - 3.4.1 supply adequate quantities of the following: coaxial cable, connectors, coaxial cable ground kits, etc.;
 - 3.4.2 install the coaxial cable and components as per the industry standard; and
 - 3.4.3 install the coaxial cable connectors as required. All exterior cable connections shall be weatherproofed with two wraps of quality vulcanizing rubber tape and two wraps of quality vinyl tape.
- 3.5 In relation to EQUIPMENT works, FT shall:
 - 3.5.1 complete the system design as per NC's requirement and obtain the approval of NC;
 - 3.5.2 use at least one (1) rack to install all the equipment and interconnect them as per industry standard; and
 - 3.5.3 install the interface between the Monitoring System and telecommunication carriers as per industry standard.

- 3.6 In relation to GROUNDING, FT shall install all grounding as per industry standard.
- 3.7 In relation to SYSTEM TESTING, FT shall provide NC 5 days notification as to when the Monitoring System will be ready for testing.

4. TECHNICAL REQUIREMENT AND DATA

- 4.1 FT shall design, supply, construct, maintain and operate FT's facilities in such a manner that FT can monitor and, if necessary, modify its facilities to reduce television and FM interference (TVI) and electromagnetic interference (EMI) to aircraft instrument landing systems (ILS). Specifically, FT shall, design, supply, construct, maintain and operate the following equipment as part of the Monitoring System within the Ellison Substation:

Aircorn electronics portable localizer test-set DMM 1001
with Rockwell Collins VIR-351 (receiver).

FCC-2 dipole antenna.

- 4.2 With reference to the electric noise floor, calculated to be a maximum of -46.56 dBm at the Ellison Substation, FortisBC shall monitor the following noise levels:

4.2.1 Level 1 (-90 dBm). This level is 2 dBm above the normal electrical noise found on a transmission line. The purpose of this threshold is to record instances where electrical noise is above normal level at the Ellison Substation. Values shall be captured for 30-day periods to provide a database for detecting emerging trends.

4.2.2 Level 2 (-76 dBm). This level is -10 dB below the maximum -66 dBm observed during field tests.

4.2.3 Level 3 (-56 dBm). This level is +10 dB above maximums observed during field tests.

- 4.3 In addition to the above noise levels, the Monitoring System shall be capable of recording the following parameters and outputting them in the manner described onto a password-protected Internet URL (over-write of existing data after 6 months):

4.3.1 Parameter 1: Receiver Automatic Gain Control (AGC) level, magnitude, time and date. The receiver AGC level shall be converted to dBm. Monitoring software shall be capable of storing and displaying a maximum receiver AGC level with time and date stamp in a 24-hour day as well as providing time and date of occurrences of noise exceeding noise Levels 1, 2 and 3 (per Section 4.2). Monitoring software shall indicate response taken when the noise exceeds each level and be capable of independently setting Levels 1 to 3;

4.3.2 Parameter 2: 90 Hz output, equivalent DC level, time and date.

4.3.3 Parameter 3: 150 Hz output, equivalent DC level, time and date. Monitoring software shall sum Parameters 2 and 3 and display a "flag current" in

microamperes with time and date stamps for this output. The flag current shall be for the values of the 90 Hz and 150 Hz detected outputs. Monitoring software shall also provide the difference of Parameters 2 and 3 and display current in microamperes (the equivalent of an ILS position) and Difference of Depth of Modulation (DDM) with time and date stamp for this output.

4.4 FortisBC shall correct the cause of the alarm as follows:

4.4.1 Upon receipt of a Level 3 alarm at FortisBC's Control Centre, a response shall be initiated immediately.

4.4.2 If the cause of the Level 3 alarm cannot be identified or rectified within 72 hours, FortisBC will contact NAV CANADA's Manager CNS Engineering at (780) 890-3015. If the Air Traffic Control System ILS is being compromised a mutually agreed on plan of action must be developed to resolve the situation. The FT representative must have the authority to put plan into action.

4.5 NAV CANADA shall be advised of alarms as follows:

4.5.1 Upon receipt of a Level 2 alarm and a component of 90 Hz and/or 150 Hz, FortisBC shall send an e-mail to the NAV CANADA Manager CNS Engineering at LechnS@navcanada.ca.

4.5.2 Upon receipt of a Level 3 alarm and a component of 90 Hz and/or 150 Hz, FortisBC shall telephone NAV CANADA's Manager of CNS Engineering at (780) 890-3015 and send an e-mail to the NAV CANADA Manager of CNS Engineering at LechnS@navcanada.ca.

4.6 FortisBC shall maintain a complete standby monitoring system consisting of:

4.6.1 Aircom Electronics Portable Localizer Test-Set DMM 1001 with Rockwell Collins VIR-351 (receiver).

4.7 FortisBC shall have each of the active and standby Aircom Electronics Portable Localizer Test-Set DMM 1001 with Rockwell Collins VIR-351 (receiver) units calibrated annually by a company approved by NAV CANADA.

4.8 FT shall provide NC as-built documents after 15 days after successfully passing the Monitoring System performance test.

5. **PROJECT SCHEDULE**

5.1 **INSTALLATION SCHEDULE**

5.1.1 FT shall provide NC with appropriate notice of installation activities and completion dates.

5.1.2 NC shall make all reasonable effort to meet the FT schedule(s).

6. **LIMITATION OF LIABILITY**

6.1 Nothing contained within this Agreement is intended to abrogate, alter or diminish the statutory liability protection granted to FT under the *Utilities Commission Act* (British Columbia). If, for any reason, FT is liable to NC under or in connection with this Agreement, then FT is liable only for direct loss or damage suffered or incurred by NC. As used herein, "direct loss or damage" does not include loss of profits, loss of revenue, loss of production, loss of earnings, loss of contract or any other indirect, special or consequential loss or damage whatsoever arising out of or in any way connected with this Agreement.

7. **GENERAL**

7.1 This Agreement, together with the Operating Agreement between the Parties dated of even date herewith, and any Appendices and Schedules hereto, represents the entire agreement between the Parties with respect to the matters contemplated herein and supersedes and replaces all prior agreements, oral or written, made by the Parties relating to their respective accountabilities for the enhanced preventative maintenance and monitoring programs which have been established at the Ellison Substation. Except as expressly provided for herein, this Agreement may be amended or superseded only by written agreement of the Parties.

7.2 This Agreement shall be construed according to the laws of the Province of British Columbia and the laws of Canada applicable therein. The Parties hereby irrevocably attorn to the exclusive jurisdiction of the courts of British Columbia.

7.3 Neither Party shall assign this Agreement without the express written consent of the other Party, which consent shall not be unreasonably withheld. Notwithstanding the foregoing, FortisBC may assign this Agreement to an affiliate, to a transferee of ownership of FortisBC's Facilities, or to any other party assuming ownership or operation of FortisBC's operations including FortisBC's Facilities, where the transfer of ownership or operation has been approved by the BCUC.

7.4 This Agreement shall enure to the benefit of and be binding upon the Parties, their successors and permitted assigns. The rights and remedies of the Parties under this Agreement are cumulative and in addition to any other rights and remedies that the Parties may have at law or in equity.

7.5 No waiver of any breach of any term or provision of this Agreement shall be effective or binding unless made in writing and signed by the Party purporting to give the same and, unless otherwise provided in the written waiver, shall be limited to the specific breach waived.

7.6 This Agreement may be executed in any number of counterparts and delivered by facsimile, and all such counterparts together shall constitute one agreement.

IN WITNESS WHEREOF the Parties hereto have executed this Agreement under the hands of their proper officers as of the day and year first above written by their duly authorized representatives in that behalf.

NAV CANADA

Per:  OCT 08 2008


Name: **Sid Lechner**
Title: **Manager, CNS Engineering
Engineering Services - West
NAV CANADA**

Per: _____

Name:

Title:

FortisBC Inc

Per:  _____

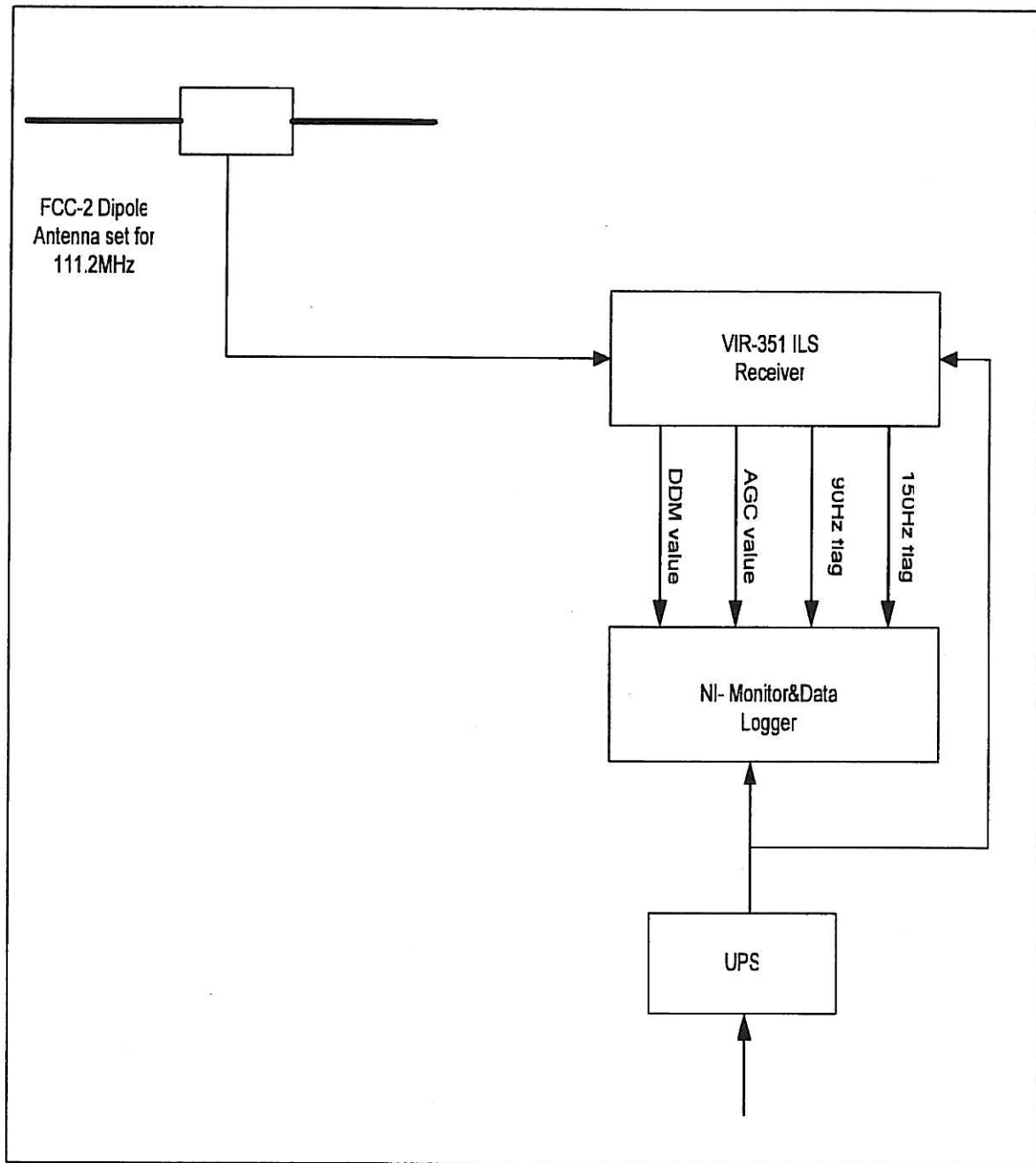
Name: Doyle Sam

Title: VP, ENGINEERING & OPERATIONS

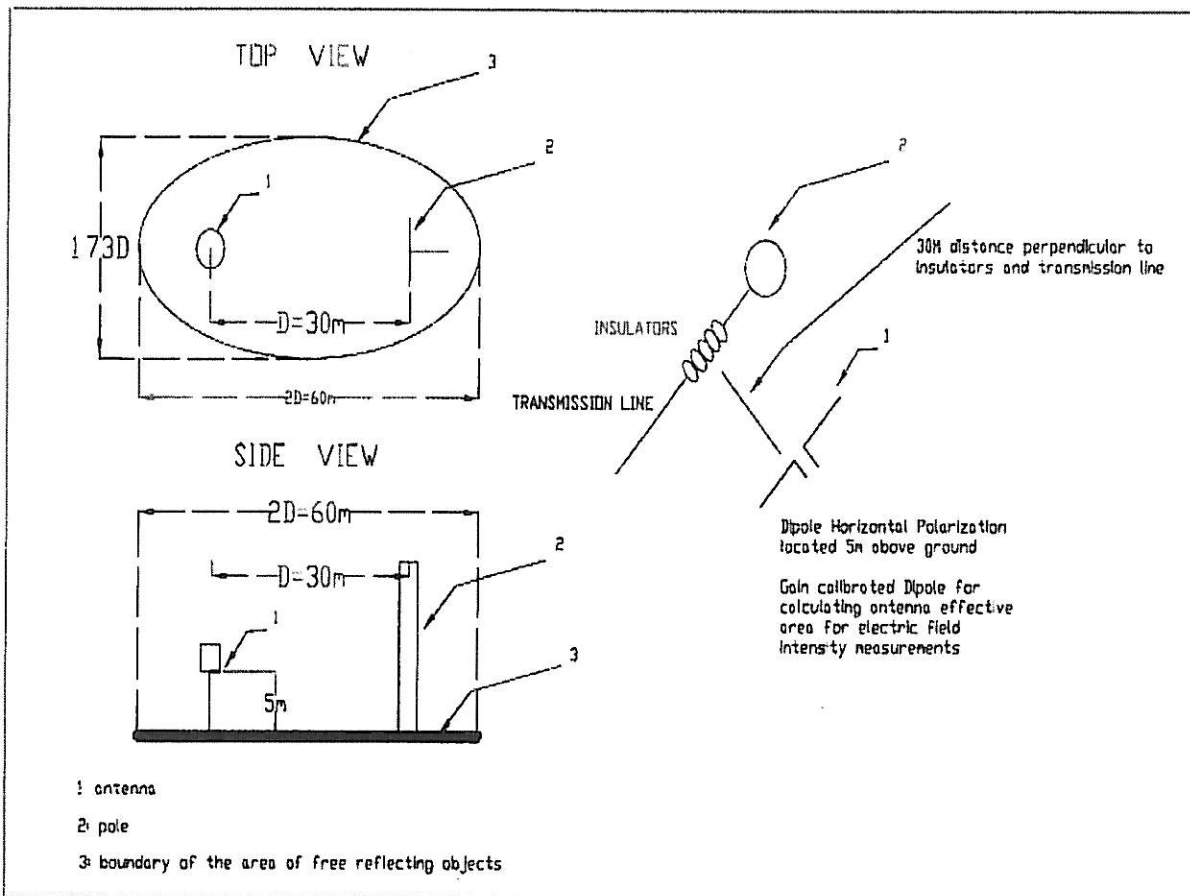
SCHEDULE "A"

DRAWINGS

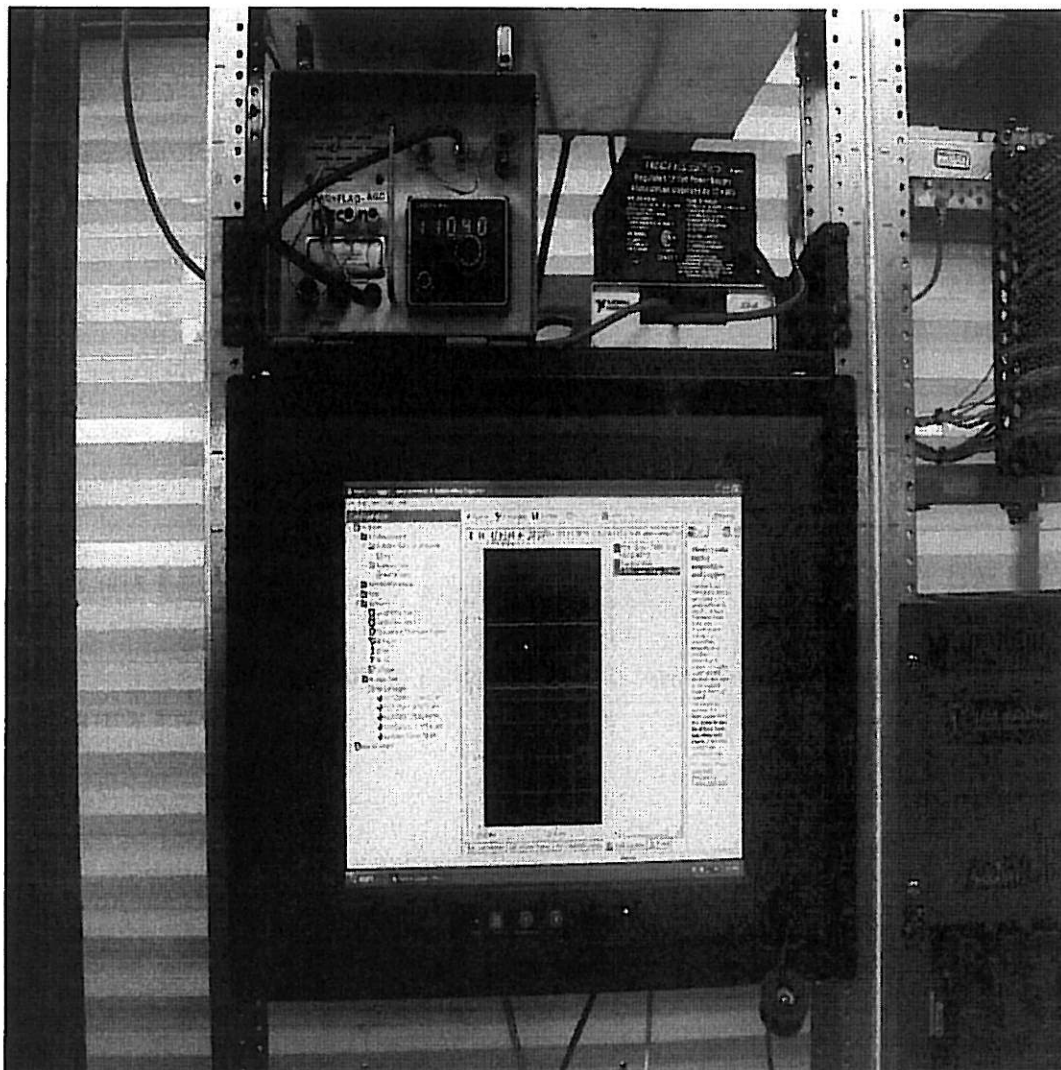
1.1 SYSTEM LAYOUT DRAWING



1.2 ANTENNA LAYOUT DRAWING



1.3 TYPICAL INSTALLATION LAYOUT



SCHEDULE "B"

EQUIPMENT SPECIFICATIONS

TI PPC 2015 PANEL PC, 2.0GHZ WITH WINDOW XP (OR EQUIVALENT)

NI PCI 6220, M SERIES DAQ (16 ANALOG INPUTS, 24 DIGITAL I/O) (OR EQUIVALENT)

SHC68-68-EPM SHIELEDED CABLE 68-POSITION .050 SERIES D-TYPE TO 68-POS .050 SERIES D-TYPE TO 68-POS VHDCI OFFSET, 2M

SCB-68 SHIELDED CONNECTOR BLK

VI LOGGER, DATALOGGING SOFTWARE FOR WINDOWS XP

PPC 2015 RACK MOUNT KIT

ICT WIDE RANGE SERIES 10

AIRCOM ILS REC SYSTEM (OR EQUIVALENT)

AH SYSTEM INC. DIPOLE ANTENNA (OR EQUIVALENT)

ALPHA TECHNOLOGIES UPS TO 110 AC CONVERTER



OPERATING AGREEMENT

Monitoring Program at FortisBC's Ellison Substation

Between

**NAV CANADA
77 Metcalfe Street
Ottawa, Ontario K1P 5L6**

And

**FortisBC Inc.
Suite 100, 1975 Springfield Road
Kelowna, British Columbia V1Y 7V7**

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APPENDIX A: EQUIPMENT LIST

SCHEDULE "A": DISPUTE RESOLUTION

OPERATING AGREEMENT

THIS AGREEMENT dated the 8th day of October, 2008.

BETWEEN:

NAV CANADA, a company incorporated under the laws of Canada with head office at the City of Ottawa in the Province of Ontario (hereinafter referred to as "NAV CANADA"),

OF THE FIRST PART,

- and -

FORTISBC INC., a corporation established by a special Act of the Legislature of the Province of British Columbia, having its head office at Suite 100, 1975 Springfield Road, Kelowna, British Columbia, (hereinafter referred to as "FortisBC"),

OF THE SECOND PART.

WHEREAS NAV CANADA is the private sector, non-share capital corporation that owns and operates Canada's civil air navigation service (ANS).

WHEREAS FortisBC is an integrated electric utility that owns an electrical substation located at N49 57 44, W119 23 14 (the "Ellison Substation") with voltage exceeding 100 kV that is located closer than 3.2 kilometers from the centerline or sixteen (16) kilometers from the ends of Runway 16/34 of the Kelowna Airport and may therefore cause television and FM interference (TVI) and electromagnetic interference (EMI) to aircraft instrument landing systems operated by NAV CANADA.

AND WHEREAS the parties wish to provide clarity of their respective accountabilities for the enhanced preventative maintenance and monitoring programs which shall be established at the Ellison Substation;

AND WHEREAS FortisBC and NAV CANADA agree to said accountabilities under the following terms and conditions;

NOW THEREFORE THIS AGREEMENT WITNESSES THAT, in consideration of the premises hereof and the mutual covenants and agreements contained herein, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

1. INTERPRETATION

1.1 In this Agreement the expressions below shall respectively have the following meanings:

- 1.1.1 "Agreement" means this Operating Agreement, including the recitals and all Appendices and Schedules attached hereto, as may be amended from time to time;
- 1.1.2 "Applicable Laws" means any law, statute, rule or regulation or any ruling, writ, injunction, restriction, order, judgment, decree or other official written act of any governmental or regulatory authority having appropriate jurisdiction over the Parties or matters contemplated herein;

- 1.1.3 "BCUC" means the British Columbia Utilities Commission continued under the *Utilities Commission Act*, R.S.B.C. 1996, c. 473, as amended, or its successors;
- 1.1.4 "Business Day" means a day other than a Saturday, Sunday, or statutory holiday in the Province of British Columbia;
- 1.1.5 "FortisBC's Facilities" means those facilities associated with the Ellison Substation;
- 1.1.6 "Good Electric Operating Practices" means the standard of practice attained by exercising that degree of knowledge, skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced operator engaged in the same type of undertaking under the same or similar circumstances and which is expected to accomplish the desired result at the lowest reasonable cost consistent with reliability, safety of the public, safety of personnel, and expedition, but is not restricted to the optimum practice or course of action to the exclusion of all others but rather to the spectrum of reasonable practices, methods or acts;
- 1.1.7 "Party" means either NAV CANADA or FortisBC, as the case may be, and "Parties" means both of them;
- 1.2 The following are attached hereto and form part of this Agreement:
Appendix A - Equipment List
Schedule "A" - Dispute Resolution (the "Schedule")
- 1.3 In the event of an inconsistency between the body of this Agreement and any Schedule or Appendix, the body of this Agreement shall govern. In the event of an inconsistency between any Schedule and an Appendix thereto, the Schedule shall govern. Except as otherwise provided in any Schedule, the Parties may substitute revised Schedules to this Agreement at any time by agreeing to, signing and attaching a dated copy to this Agreement, which revised Schedules shall from such date be the applicable Schedule.

2. GOVERNING PRINCIPLES AND PROVISIONS

- 2.1 FortisBC shall comply with, and shall perform its obligations under this Agreement in accordance with:
- 2.1.1 the *Safety Standards Act* (British Columbia), the Canadian Electrical Code, the *Electricity and Gas Inspection Act* (Canada), the *Utilities Commission Act* (British Columbia), and any other applicable legislation and regulations, including safety codes and standards promulgated thereunder;
- 2.1.2 any and all BCUC orders and directives, as approved by the BCUC from time to time, which shall, to the extent applicable to the subject matter of this Agreement, take precedence over and supersede the provisions of this Agreement to the extent of any inconsistency.
- 2.2 In the event of a conflict in interpretation or application among any of the operating standards set forth in Subsections 2.1.1 through 2.1.2, the most stringent shall apply.
- 2.3 FortisBC recognizes that the applicable standards imposed by Section 2.1 may change from time

to time, and it shall act in accordance with any such change.

3. TERM AND TERMINATION

3.1 Except as may otherwise be agreed to by the Parties in writing, this Agreement will commence on the date hereof and continue in full force and effect until the date on which:

3.1.1 FortisBC's Facilities have been physically removed, such that FortisBC no longer has an electrical substation of voltage greater than 100 kV within 3.2 km of the centerline or closer than 16 km from the ends of Runway 16/34 of the Kelowna Airport;

3.1.2 the parties mutually agree to terminate this Agreement, or

3.1.3 this agreement is terminated by NAV CANADA.

3.2 Notwithstanding any termination of this Agreement, all rights and obligations of the Parties that have accrued prior to termination shall continue in effect until satisfied.

4. NOTICE

4.1 Any demand, notice or other communication ("Notice") required or permitted to be given in connection with this Agreement shall be given in writing and must be given by personal delivery, registered mail or facsimile transmittal as follows:

4.1.1 Notice to FortisBC shall be addressed to:
FortisBC Inc.
Suite 100, 1975 Springfield Road
Kelowna, British Columbia, V1Y 7V7

Attention: Corporate Secretary
Fax: (866) 266-7976

4.1.2 Notice to NAV CANADA shall be addressed to:
NAV CANADA
Suite 200, 9925 - 109 Street
Edmonton, Alberta T5K 2J8

Attention: Manager of CNS Engineering
Fax: (780) 413-5449

4.2 or to such other address, facsimile number or individual as may be designated by Notice by either Party to the other. Any Notice given by personal delivery shall be conclusively deemed to have been given on the day of actual delivery thereof and, if given by registered mail, five Business Days following the deposit thereof in the mail, and if given by facsimile, on the day of proof of transmittal thereof. If the party giving any Notice knows or ought reasonably to have known of any difficulties with the postal system that might affect the delivery of mail, any such Notice shall not be mailed but shall be given by personal delivery or facsimile.

5. ACCOUNTABILITIES OF FORTISBC

5.1 FortisBC shall operate the Ellison Substation at a nominal operating voltage of 138 kV.

- 5.2** FortisBC shall design, supply, construct, maintain and operate FortisBC's Facilities in such a manner that FortisBC can monitor and, if necessary, modify its facilities to reduce television and FM interference (TVI) and electromagnetic interference (EMI) to aircraft Instrument Landing Systems (ILS) operated by NAV CANADA.
- 5.3** Specifically, FortisBC shall design, supply, construct, maintain and operate the equipment identified in Appendix A within the Ellison Substation.
- 5.4** With reference to the electric noise floor, calculated to be a maximum of -46.56 dBm at the Ellison Substation, FortisBC shall monitor the following noise levels:
- 5.4.1** Level 1 (-90 dBm). This level is 2 dBm above the normal electrical noise found on a transmission line. The purpose of this threshold is to record instances where electrical noise is above normal level at the Ellison Substation. Values shall be captured for 30-day periods to provide a database for detecting emerging trends.
- 5.4.2** Level 2 (-76 dBm). This level is -10 dB below the maximum -66 dBm observed during field tests.
- 5.4.3** Level 3 (-56 dBm). This level is +10 dB above maximums observed during field tests.
- 5.5** In addition to the above noise levels, the monitoring system contemplated by this Agreement shall be capable of recording the following parameters and outputting them in the manner described onto a password-protected Internet URL (over-write of existing data after 6 months):
- 5.5.1** Parameter 1: Receiver Automatic Gain Control (AGC) level, magnitude, time and date. The receiver AGC level shall be converted to dBm. Monitoring software shall be capable of storing and displaying a maximum receiver AGC level with time and date stamp in a 24-hour day as well as providing time and date of occurrences of noise exceeding noise Levels 1, 2 and 3 (per Section 5.4). Monitoring software shall indicate response taken when the noise exceeds each level and be capable of independently setting Levels 1 to 3;
- 5.5.2** Parameter 2: 90 Hz output, equivalent DC level, time and date.
- 5.5.3** Parameter 3: 150 Hz output, equivalent DC level, time and date. Monitoring software shall sum Parameters 2 and 3 and display a "flag current" in microamperes with time and date stamps for this output. The flag current shall be for the values of the 90 Hz and 150 Hz detected outputs. Monitoring software shall also provide the difference of Parameters 2 and 3 and display current in microamperes (the equivalent of an ILS position) and Difference of Depth of Modulation (DDM) with time and date stamp for this output.
- 5.6** FortisBC shall correct the cause of the alarm as follows:
- 5.6.1** Upon receipt of a Level 3 alarm at FortisBC's Control Centre, a response shall be initiated immediately.
- 5.6.2** If the cause of the Level 3 alarm cannot be identified or rectified within 72 hours, FortisBC will contact NAV CANADA's Manager CNS Engineering at (780) 890-3015. If the Air Traffic Control System ILS is being compromised a mutually agreed on plan of action must be developed to resolve the situation.

5.7 NAV CANADA shall be advised of alarms as follows:

5.7.1 Upon receipt of a Level 2 alarm and a component of 90 Hz and/or 150 Hz, FortisBC shall send an e-mail to the NAV CANADA Manager CNS Engineering at LechnS@navcanada.ca.

5.7.2 Upon receipt of a Level 3 alarm and a component of 90 Hz and/or 150 Hz, FortisBC shall telephone NAV CANADA's Manager of CNS Engineering at (780) 890-3015 and send an e-mail to the NAV CANADA Manager of CNS Engineering at LechnS@navcanada.ca.

5.8 FortisBC shall maintain a complete standby monitoring system consisting of:

5.8.1 Aircom Electronics Portable Localizer Test-Set DMM 1001 with Rockwell Collins VIR-351 (receiver).

5.9 FortisBC shall have each of the active and standby Aircom Electronics Portable Localizer Test-Set DMM 1001 with Rockwell Collins VIR-351 (receiver) units calibrated annually by a company approved by NAV CANADA.

6. ACCOUNTABILITIES OF NAV CANADA

6.1 NAV CANADA shall contact FortisBC's Control Centre at (250) 368-0547 if it assesses that the monitoring system contemplated by this Agreement is not functioning as designed in Sections 5.4 and 5.5.

7. CHANGES TO THE AGREEMENT

7.1 The noise levels to be monitored, the parameters to be recorded and output and the resulting action described in Sections 5.4 to 5.7 may be modified at any time by mutual agreement of the Parties.

7.2 Any changes shall be documented as an amendment to this agreement.

8. RIGHT OF WAY ACCESS AND OWNERSHIP

8.1 FortisBC grants to NAV CANADA and its tenants, officers, agents, servants, employees, contractors, subcontractors and licensees during the term of this Agreement and for a reasonable period of time after the termination or expiry of this Agreement until all rights and obligations of the Parties under this Agreement have been satisfied, the right to access FortisBC's Facilities for the purposes and in the manner, if any, outlined below, and the fulfillment of any other rights or obligations of NAV CANADA under this Agreement.

8.2 Access to FortisBC's Facilities is subject to the following guidelines:

8.2.1 Access shall be coordinated within 5 Business Days of a request made by calling FortisBC Control Centre at (250) 368-0547.

8.2.2 In the case of a Level 3 alarm and a component of 90 Hz and/or 150 Hz, NAV CANADA shall be granted access as soon as possible to respond to/validate the alarm. Access shall

be arranged through FortisBC employees, contractors or agents on site or by calling FortisBC's Control Centre at (250) 368-0547.

8.2.3 NAV CANADA personnel, contractors, or agents working in, or present in, FortisBC's fenced yard must comply with all of FortisBC's environmental and occupational health and safety policies and procedures as may be provided by FortisBC to NAV CANADA, from time to time. For the avoidance of doubt, NAV CANADA's personnel, contractors or agents working in, or present in, FortisBC's fenced yard shall have access to FortisBC's buildings.

8.2.4 NAV CANADA personnel, contractors, or agents working in, or present in, FortisBC's fenced yard must be accompanied at all times by a FortisBC employee, contractor or agent. For the avoidance of doubt, NAV CANADA's personnel, contractors or agents working in, or present in, FortisBC's fenced yard shall have access to FortisBC's buildings.

9. FORCE MAJEURE

9.1 If, at any time during the term of this Agreement, the operations of either of the Parties are suspended, curtailed or interfered with owing to an act of God, war, rebellion, sabotage, terrorism, fire or other causes beyond the reasonable control of any Party, such as strikes, differences with workmen or like causes (excepting and excluding however lack of finances or of market for the product of either of the Parties), the Party whose operations are suspended, curtailed or interfered with shall be relieved of its obligations and shall not be liable to the other under this Agreement until the cause or causes thereof have been removed, provided that:

9.1.1 the Party seeking to invoke the benefit of this clause promptly notifies the other Party in writing of the occurrences of the cause or causes and promptly and diligently proceeds to rectify such occurrence;

9.1.2 each Party shall take all reasonable precautions and adopt all reasonable measures to prevent or remove the cause of such suspension, curtailment or interference; and

9.1.3 the Party having invoked this Section under clause 9.1.1 shall give prompt notice of cessation of the cause thereof.

10. LIABILITY AND INDEMNITY

10.1 FortisBC (as applicable, the "Indemnitor") will indemnify and hold harmless NAV CANADA and its directors, officers, employees, subcontractors, agents and representatives ("Indemnitee(s)") from and against any loss, expense, injury, death or damage to Indemnitee and also from all actions, causes of action, suits, claims and demands by any other third party against Indemnitee(s) in respect of loss, expense, injury, death or damage, and any cost and expense relating thereto (including reasonable legal fees) which results from or arises out of the Indemnitor's accountabilities or failure to perform any of its obligations under this Agreement or the negligence or willful act of the Indemnitor or anyone for whom the Indemnitor is responsible in law.

10.2 For the purpose of Section 10.1 "willful act" means any act or omission which is an intentional tort or an intentional breach of any obligations under this Agreement.

10.3 The following provisions will apply to any claim for indemnification pursuant to Section 10.1 (hereinafter, in this Section, called an "Indemnity Claim"):

10.3.1 Promptly after becoming aware of any matter that may give rise to an Indemnity Claim, the Indemnitee will provide to the Indemnitor written notice of the Indemnity Claim specifying (to the extent that information is available) the factual basis for the Indemnity Claim and the amount of the Indemnity Claim or, if an amount is not then determinable, an estimate of the amount of the Indemnity Claim, if an estimate is feasible in the circumstances. The failure to promptly notify the Indemnitor hereunder shall not relieve the Indemnitor of its obligations hereunder, except to the extent that the Indemnitor is actually and materially prejudiced by the failure to so notify promptly;

10.3.2 If an Indemnity Claim relates to an alleged liability to any other person who is not a Party (hereinafter, in this Section, called a "Third Party Liability"), the Indemnitee shall not negotiate, settle, compromise or pay (except in the case of payment of a judgment) any Third Party Liability as to which it proposes to assert an Indemnity Claim, except with the prior written consent of the Indemnitor (which consent shall not be unreasonably withheld or delayed). The absence of such prior written consent shall release the Indemnitor from liability in respect of such claim, unless the Indemnitor has unreasonably withheld its consent;

10.3.3 With respect to any Third Party Liability, provided the Indemnitor first admits the Indemnitee's right to indemnification for the amount of such Third Party Liability which may at any time be determined or settled, then in any legal, administrative or other proceedings in connection with the matters forming the basis of the Third Party Liability, the following procedures will apply:

10.3.4 The Indemnitor will have the right to assume carriage of negotiations respecting the compromise or settlement of the Third Party Liability and the conduct of any related legal, administrative or other proceedings, but the Indemnitee shall have the right and shall be given the opportunity to participate in the defence of the Third Party Liability, to consult with the Indemnitor in the settlement of the Third Party Liability and the conduct of related legal, administrative and other proceedings (including consultation with counsel); and

10.3.5 The Indemnitee, at the Indemnitor's expense, will co-operate with the Indemnitor in relation to the Third Party Liability, will provide it with copies of all relevant documentation as it becomes available, will provide it with access to all records and files relating to the defence of the Third Party Liability and will meet with representatives of the Indemnitor at all reasonable times to discuss the Third Party Liability;

10.3.6 If, with respect to any Third Party Liability, the Indemnitor does not admit the Indemnitee's right to indemnification within thirty (30) days or declines to assume carriage of the settlement or of any legal, administrative or other proceedings relating to the Third Party Liability, then the following provisions will apply:

10.3.7 Notwithstanding Subsection 10.3.2 above, the Indemnitee, at its discretion, may assume carriage of negotiations respecting the compromise or settlement of the Third Party Liability and the conduct of any related legal, administrative or other proceedings and may defend or settle the Third Party Liability on such terms as the Indemnitee, acting in good faith, considers advisable; provided that the Indemnitor shall have the right and

shall be given the opportunity to participate in the defence of the Third Party Liability, to consult with the Indemnitee in the settlement of the Third Party Liability and the conduct of related legal, administrative and other proceedings (including consultation with counsel);

10.3.8 The Indemnitor, at the Indemnitee's expense and using reasonable efforts, will co-operate with the Indemnitee in relation to the Third Party Liability, will provide it with copies of all relevant documentation as it becomes available, will provide it with access to all records and files relating to the defence of the Third Party Liability and will meet with representatives of the Indemnitee to the extent reasonable to discuss the Third Party Liability, provided however that the Indemnitee acknowledges and agrees that any such co-operation by the Indemnitor shall not constitute nor shall it be construed as constituting an admission of the Indemnitee's right to indemnification; and

10.3.9 If the Indemnitee's right to indemnification is established, any cost, loss, damage or expense incurred or suffered by the Indemnitee in the settlement of such Third Party Liability and the conduct of any legal, administrative or other proceedings including, without limitation, legal fees and disbursements on a solicitor and own client basis, shall be paid promptly by the Indemnitor.

11. LIMITATION ON LIABILITY

11.1 Nothing contained within this Agreement is intended to abrogate, alter or diminish the statutory liability protection granted to FortisBC under the *Utilities Commission Act* (British Columbia). Where, as a result of Section 10 of this Agreement or otherwise, the Indemnitor is liable to the Indemnitee, then the Indemnitor is liable only for direct loss or damage suffered or incurred by the Indemnitee. As used herein, "direct loss or damage" does not include loss of profits, loss of revenue, loss of production, loss of earnings, loss of contract or any other indirect, special or consequential loss or damage whatsoever arising out of or in any way connected with this Agreement.

12. INSURANCE

12.1 FortisBC (as applicable, for the purposes of this Section 12, referred to as an "Insured Party") shall, without limiting any of its obligations and liabilities under this Agreement, procure and maintain, at its own expense, with respect to and for the duration of this Agreement, appropriate insurance covering its obligations with respect to this Agreement, or such other insurance as FortisBC may be required by law to provide, including the following minimum insurance coverages (collectively, the "Policies"):

12.1.1 Workers' Compensation, to the full extent required in the jurisdiction in which the obligations arise from this Agreement and wherever such Insured Party's contracts of employment with its personnel are made or expressed to be made, or Employer's Liability Insurance covering each of the personnel and providing limits of not less than two million (\$2,000,000) dollars where such personnel are not covered by applicable Worker's Compensation coverage;

12.1.2 Automobile Liability Insurance, covering all owned, leased and hired vehicles used by the Insured Party to perform its obligations hereunder, and providing limits of not less than two million (\$2,000,000) dollars per occurrence for bodily injury, death and property damage; and

- 12.1.3 Commercial General Liability Insurance providing coverage for a combined single limit of not less than five million (\$5,000,000) dollars (plus associated defense costs) for each occurrence resulting in bodily injury, including death, sustained by any person or persons, or resulting in injury to or destruction of property arising out of or in connection with the operations of the Insured Party, their officers, directors, employees and agents. Coverage shall include, but is not limited to, Employer's Liability, Contractual Liability, Owners and Contractor's Protective Liability, Broad Form Property Damage, Cross-Liability, Blanket Contractual Liability, Non-Owned Automobile and Broad Form Products and Completed Operations Liability, and Forest and Prairie Fire Fighting Costs for a sub limit of not less than two million (\$2,000,000) dollars (plus associated defense costs).
- 12.2 With respect to this Agreement, an Insured Party's Policies shall include the other Party and its employees, officers, directors, agents and contractors, as additional insureds, but only with respect to the operations of the Insured Party hereunder. The insurance extended or otherwise afforded to the additional insured under the Policies shall be limited only to the vicarious liability arising from the operations of the named insured.
- 12.3 The Policies shall contain a provision that the insurance thereunder shall be primary and shall not call into contribution any other insurance available to the other Party.
- 12.4 The Policies shall provide that thirty (30) days written notice shall be given to the other Party prior to any material change adversely affecting the Insured Party, or cancellation of any Policy.
- 12.5 If requested to do so, the Insured Party shall provide to the other Party, evidence of renewal of all Policies, within thirty (30) days following the date upon which the applicable Policy must be renewed.
- 12.6 If requested to do so, the Insured Party shall provide a Certificate of Insurance to the other Party evidencing compliance with the insurance requirements set forth in this Section 14, including its certificate number from the appropriate Workers' Compensation Board or Commission, showing that such Insured Party has registered and is in good standing with such Board or Commission.

13. GOVERNMENT APPROVALS

- 13.1 FortisBC shall use all reasonable efforts to obtain and maintain all applicable government orders, permits, approvals, and consents required by law to perform its obligations under this Agreement.

14. DISPUTE RESOLUTION

- 14.1 Except as otherwise stated herein, all disputes arising with respect to the subject matter of this Agreement shall be resolved in accordance with the provisions of Schedule "A".

15. CONFIDENTIALITY

- 15.1 During the term of this Agreement, each Party (the "Recipient") agrees to keep confidential all data and information relating to this Agreement and the business and affairs of the other Party (the "Disclosing Party") (including, without limitation, any data and information obtained from the Disclosing Party or exchanged between the Parties) ("Confidential Information"), except as expressly provided herein and to the extent that such Confidential Information otherwise is in the

public domain, or the Recipient can prove was previously known to the Recipient, is at any time lawfully obtained by the Recipient from a third party without breach of any obligations of confidentiality or was independently developed by the Recipient, or is disclosed with the prior written consent of the Disclosing Party (such consent not to be unreasonably withheld), or the Recipient is compelled to disclose Confidential Information to the ISO pursuant to applicable ISO Rules and policies, or is legally compelled to disclose to a court, government department or agency, or regulatory authority in the proper exercise of its jurisdiction.

- 15.2** In the event that a Recipient is requested or required (by oral questions, interrogatories, requests for information or documents, subpoena, civil investigative demand, or other process) to disclose any Confidential Information, it is agreed that the Recipient will provide the Disclosing Party with reasonable notice of any such request or requirement so the Disclosing Party may seek an appropriate protective order or waive compliance by the Recipient with Section 15.1. If, failing the obtaining of a protective order and failing the receipt of a waiver hereunder, the Recipient is obligated to disclose Confidential Information, the Recipient may disclose only that portion of the Confidential Information which the Recipient is obligated to disclose, and the Recipient will exercise commercially reasonable efforts to obtain reliable assurance that confidential treatment will be afforded such Confidential Information.
- 15.3** Each Recipient agrees that it shall make all reasonable efforts to limit internal disclosure of Confidential Information received from the Disclosing Party to only those of its employees, representatives, directors, contractors or agents who have a reasonable need to know the same to fulfill the obligations of such Recipient under this Agreement.
- 15.4** Each Recipient agrees that it shall take reasonable precautions to ensure that its employees, representatives, directors, contractors or agents (and any third persons to whom such Recipient discloses Confidential Information with the consent of the Disclosing Party) abide by the obligations of confidentiality hereunder, and that it shall be liable to the Disclosing Party for any improper use or disclosure of Confidential Information by such persons.
- 15.5** Each Recipient agrees that it shall not use any Confidential Information received from the Disclosing Party other than for the purposes contemplated by this Agreement.
- 15.6** Notwithstanding the provisions of this Section 15, either Party may disclose Confidential Information to the Board, but shall exercise reasonable efforts to obtain reliable assurance that confidential treatment, to the extent available and practicable, will be accorded the Confidential Information so disclosed.

16. GENERAL

- 16.1** This Agreement, together with the Statement of Work Agreement between the Parties dated of even date herewith, and any Appendices and Schedules hereto, represents the entire agreement between the Parties with respect to the matters contemplated herein and supersedes and replaces all prior agreements, oral or written, made by the Parties relating to their respective accountabilities for the enhanced preventative maintenance and monitoring programs which have been established at the Ellison Substation. Except as expressly provided for herein, this Agreement may be amended or superseded only by written agreement of the Parties.
- 16.2** This Agreement shall be construed according to the laws of the Province of British Columbia and the laws of Canada applicable therein. Subject to Section 14, the Parties hereby irrevocably attorn to the exclusive jurisdiction of the courts of British Columbia.

- 16.3** Neither Party shall assign this Agreement without the express written consent of the other Party, which consent shall not be unreasonably withheld. Notwithstanding the foregoing, FortisBC may assign this Agreement to an affiliate, to a transferee of ownership of FortisBC's Facilities, or to any other party assuming ownership or operation of FortisBC's operations including FortisBC's Facilities, where the transfer of ownership or operation has been approved by the BCUC pursuant to the Applicable Laws.
- 16.4** This Agreement shall enure to the benefit of and be binding upon the Parties, their successors and permitted assigns. The rights and remedies of the Parties under this Agreement are cumulative and in addition to any other rights and remedies that the Parties may have at law or in equity.
- 16.5** No waiver of any breach of any term or provision of this Agreement shall be effective or binding unless made in writing and signed by the Party purporting to give the same and, unless otherwise provided in the written waiver, shall be limited to the specific breach waived.
- 16.6** If any provision of this Agreement is determined to be invalid or unenforceable in whole or in part, such invalidity or unenforceability will attach only to such provision or part thereof, and the remaining part of such provision and all other provisions hereof shall continue in full force and effect.
- 16.7** This Agreement may be executed in any number of counterparts and delivered by facsimile, and all such counterparts together shall constitute one agreement.

(continued)

16.8 The liabilities of the Parties for breach of any covenants, representations or warranties, and any obligations of the Parties under any indemnity contained in this Agreement shall survive termination of this Agreement except as otherwise expressly provided.

IN WITNESS WHEREOF the Parties hereto have executed this Agreement under the hands of their proper officers as of the day and year first above written by their duly authorized representatives in that behalf.

NAV CANADA

Per:  OCT 08 2008

Name: **Sid Lechner**
Title: **Manager, CNS Engineering
Engineering Services - West**

Per: **NAV CANADA**
Name:
Title:

FortisBC Inc.

Per: 

Name: **Doyle Sam**
Title: **VP, ENGINEERING & OPERATIONS**

APPENDIX A

Attached to and forming part of

the Operating Agreement dated _____

BETWEEN

**NAV CANADA
"NAV CANADA"**

AND

**FortisBC Inc.
("FortisBC")**

EQUIPMENT

ELLISON SUBSTATION**EQUIPMENT LIST**

<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY</u>
779562-01	PPC-2015 15" PANEL PC, 2.0 GHZ WITH WINDOWS XP	2
779065-01	NI PCI-6220, M SERIES DAQ (16 ANALOG INPUTS, 24 DIGITAL I/O)	2
192061-02	SHC68-68-EPM SHIELDED CABLE 68- POSITION .050 SERIES D-TYPE TO 68-POS VHDCI OFFSET, 2M	2
776844-01	SCB-68 SHIELDED COMMECTOR BLK	2
778389-03	VI LOGGER, DATALOGGING SOFTWARE FOR WINDOWS	2
779574-01	PPC-2015 RACK MOUNT KIT	2
ICT4812-10A	ICT WIDE RANGE SERIES 10	2
DDM1001	AIRCOM ILS REC SYSTEM	2
FCC-2 (2312)	AH SYSTEM INC. DIPOLE ANTENNA	1
FXM1100	ALPHA TECHNOLOGIES 48 VOLTS DC TO 110AC CONVERTER	2

SCHEDULE "A"

Attached to and forming part of the Operating Agreement

dated _____

BETWEEN

NAV CANADA

AND

FortisBC Inc.

DISPUTE RESOLUTION

DISPUTE RESOLUTION**1. GENERAL****1.1 Purpose and Sequence of Dispute Resolution**

1.1.1 The purpose of this Schedule "A" is to set forth the framework and procedure pursuant to which each Party agrees to use reasonable efforts to resolve disputes that arise under or in connection with this Agreement, given the Parties' shared goal of resolving such disputes without resort to litigation. The Parties agree to use a two-step process to achieve this goal, which process shall be undertaken in the following order:

1.1.1.1 first, by negotiation pursuant to the negotiation procedure set out below (the "Negotiation Procedure"); and

1.1.1.2 second, either by way of an application to the Commission for resolution or by binding arbitration pursuant to the arbitration procedure set out below (the "Arbitration Procedure").

1.2 Confidentiality

1.1.2 All information disclosed by a Party pursuant to the Negotiation Procedure or the Arbitration Procedure shall be treated as privileged, confidential, and without prejudice, and neither the delivery nor disclosure of such information shall represent any waiver of privilege by the Party disclosing the same. Each Party agrees not to disclose information provided by the other Party for the purposes hereof to any other person for any other purpose. Further, such information shall not be used in any subsequent proceedings without the consent of the Party who has made disclosure of the same. The Parties agree that any arbitrator appointed hereunder shall not be subpoenaed or otherwise compelled or compellable as a witness in any proceedings for any purpose whatsoever in relation to this Agreement.

2. NEGOTIATION PROCEDURE

2.1 Except for interlocutory proceedings for the immediate performance or cessation of conduct, all disputes which arise with respect to this Agreement that cannot be resolved at the operating level shall promptly be referred to senior representatives appointed by each Party with authority to resolve the dispute upon either Party requesting such a reference in writing.

2.2 The senior representatives shall promptly meet and attempt, with reasonable diligence, to resolve the dispute. If the senior representatives of the Parties have not resolved the dispute within ten (10) Business Days of the dispute being referred to them, either Party may refer the dispute to the Arbitration Procedure.

3. ARBITRATION PROCEDURE**3.1 Location and Rules**

3.1.1 If the Parties are unable to resolve the dispute through the Negotiation Procedure, either Party (the "Initiating Party") may elect to either (i) make application to the Board to

resolve the dispute or (ii) refer the dispute to binding arbitration, in each case by giving the other Party (the "Receiving Party") written notice of the Initiating Party's intention. If the Initiating Party elects to refer the dispute to binding arbitration, the Receiving Party may, within ten (10) Business Days of the receipt of such notice, either (i) confirm in writing its agreement to submit the dispute to binding arbitration or (ii) elect in writing to have the dispute referred to the Board for resolution. If the Receiving Party does not confirm in writing its agreement to submit the dispute to binding arbitration within such ten (10) day period, then the Receiving Party shall be deemed to have elected to have the dispute referred to the Board for resolution. If the Receiving Party elects (or is deemed to elect) to have the dispute resolved by the Board, the dispute shall be so resolved.

3.1.2 If the Parties agree to submit the dispute to binding arbitration, the arbitration shall be before a board of three (3) arbitrators (unless the Parties concur in the appointment of a single arbitrator) at the offices of the Initiating Party.

3.1.3 Unless otherwise agreed between the Parties in writing the arbitration shall be administered by the ADR Institute of Canada, Inc. (the "Institute") in accordance with its National Arbitration Rules (the "Rules"), except as modified in this Section 3. The "Act" referred to in the Rules shall be the *Commercial Arbitration Act* (British Columbia). If there is a conflict between the Rules (as modified by this Section 3) and the provisions of such Act, the Rules shall prevail.

3.2 Appointment of Arbitrators

3.2.1 Upon agreement of the Receiving Party to refer the dispute to binding arbitration, the Initiating Party shall select one (1) arbitrator and shall send a request to arbitrate in the form prescribed by the Rules (the "Arbitration Notice") to the Receiving Party setting out the name of its arbitrator. The Initiating Party shall be responsible for notifying the Institute of the arbitration under its Rules and for paying the administrative fee for the arbitration to the Institute.

3.2.2 The Receiving Party shall have ten (10) Business Days from receipt of the Arbitration Notice to select its own arbitrator and to notify the Initiating Party of the name of the arbitrator selected by the Receiving Party.

3.2.3 Promptly upon their selection, and in any event within twenty-one (21) Business Days of notification of the appointment of the Initiating Party's arbitrator, the two arbitrators then appointed shall appoint a third arbitrator.

3.2.4 If the Receiving Party fails to appoint an arbitrator, or the selected arbitrators fail to agree upon a third arbitrator within the time limits set forth above, then, pursuant to the Rules, either Party or its representative may request the Institute to promptly appoint the Receiving Party's arbitrator and/or the third arbitrator, as the case may be, and to notify the Parties of such appointment(s). If the Institute or a successor or replacement body no longer exists, the selection of the arbitrator(s) shall be made by the Supreme Court of British Columbia.

3.2.5 The arbitrators appointed pursuant to Subsection 3.2.1, 3.2.2, 3.2.3 or 3.2.4, as the case may be, shall be qualified by education and experience to determine the matter in dispute.

3.2.6 Each arbitrator appointed must be independent and sign a certificate to that effect in accordance with the Rules.

3.3 Procedure

3.3.1 The Parties shall agree in advance as to the manner in which the arbitrators shall promptly hear witnesses and arguments, review documents and otherwise conduct the arbitration procedures. Failing such agreement within ten (10) Business Days from the date of selection or appointment of the third arbitrator, the arbitrators shall use the Rules and promptly commence and expeditiously conduct the arbitration proceedings.

3.3.2 Nothing in this Section 3.3 shall prevent a Party from applying to a court of competent jurisdiction pending final disposition of the arbitration proceeding for such relief as may be necessary to assist the arbitration process, to ensure that the arbitration is carried out in accordance with this arbitration procedure or to prevent manifestly unfair or unequal treatment of any Party to the arbitration.

3.3.3 In no event shall the arbitrators have the jurisdiction to amend or vary the terms of the Arbitration Procedure or the Rules without the Parties' prior written consent.

3.4 Awards

3.4.1 The arbitration award shall be given in writing, shall be final and binding on the Parties, shall not be subject to any appeal and shall deal with the question of costs of the arbitration and all other related matters.

3.4.2 Judgment upon the arbitration award may be entered in any court having jurisdiction, or, application may be made to such court for a judicial recognition of the arbitration award or an order of enforcement thereof, as the case may be.

3.4.3 Subject to Subsection 3.3.2 of this Schedule, and except for interlocutory proceedings for the immediate performance or cessation of conduct, the Parties agree that arbitration pursuant to this Arbitration Procedure shall be the final and exclusive forum for the resolution of a dispute.