DECISION REPORT
Application #9301 - Chem-Security (Alberta) Ltd.

Receipt of Hazardous Waste From Other Canadian Jurisdictions by the Alberta Special Waste Management System

November 1994

NRCB
Natural Resources Conservation Board

RECEIPT OF HAZARDOUS WASTE FROM OTHER CANADIAN JURISDICTIONS BY THE ALBERTA SPECIAL WASTE MANAGEMENT SYSTEM

NRCB Application #9301

November, 1994

Published by:

Natural Resources Conservation Board
11th Floor, Pacific Plaza
10909 Jasper Avenue
Edmonton, Alberta
T5J 3L9

ISBN 0-7732-1552-2

Telephone: (403) 422-1977
Facsimile: (403) 427-0607

Printed on Recycled Paper

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

LIST OF APPENDICES

1. INTRODUCTION

1.1 Background

The Alberta Special Waste Treatment Centre (ASWTC or Treatment Centre) is located approximately 12 kilometres (km) northeast of the Town of Swan Hills (see Figure 1.1). It was constructed during the years 1985 through 1987 and had an incinerator capacity of 13,500 tonnes per annum (t/a) to treat hazardous waste produced in the Province of Alberta. In 1992, Chem-Security (Alberta) Ltd. (the Applicant or Chem-Security) received approval from the Natural Resources Conservation Board (NRCB or the Board) by Application 9101 to add an incinerator with an additional capacity of 40,000 t/a.

By Order in Council 695/93 dated November 18, 1993, the receipt by the Alberta Special Waste Management System (ASWMS) of hazardous wastes from other Canadian jurisdictions for treatment at the ASWTC was prescribed as a reviewable project pursuant to Section 4(f) of the *Natural Resources Conservation Board Act* (the Act).

Chem-Security now seeks approval by Application 9301 for the ASWMS to receive hazardous wastes from other Canadian jurisdictions for treatment at the ASWTC to utilize excess capacity and thereby reduce the forecasted system contribution made by Alberta taxpayers.

1.2 Natural Resources Conservation Board Jurisdiction

The Natural Resources Conservation Board Act established a Board "...to provide for an impartial process to review projects that will or may affect the natural resources of Alberta in order to determine whether, in the Board's opinion, the projects are in the public interest, having regard to the social and economic effects of the project and the effect of the project on the environment." The types of projects that are subject to review, as set out in the Act, include any specific project prescribed by the Lieutenant Governor in Council. The Act further prohibits the commencement of a reviewable project unless the NRCB, on application, has granted approval. Prior to issuing an approval the NRCB must obtain authorization of the Lieutenant Governor in Council.

The jurisdiction of the NRCB in this matter arises directly from Order in Council 695/93 which explicitly prescribes the reviewable project and excludes certain materials required for the compliance test burns of the recently constructed incinerator.

The Board must determine the public interest in the prescribed reviewable project. The Board's review is confined to hazardous wastes properly consigned to the ASWMS from other Canadian jurisdictions. The authority to review and implement changes to hazardous waste policies that apply to all hazardous waste treatment facilities in Alberta rests with the provincial government. The Board will have regard for these policies in its consideration of the anticipated effects of the reviewable project on the public interest.

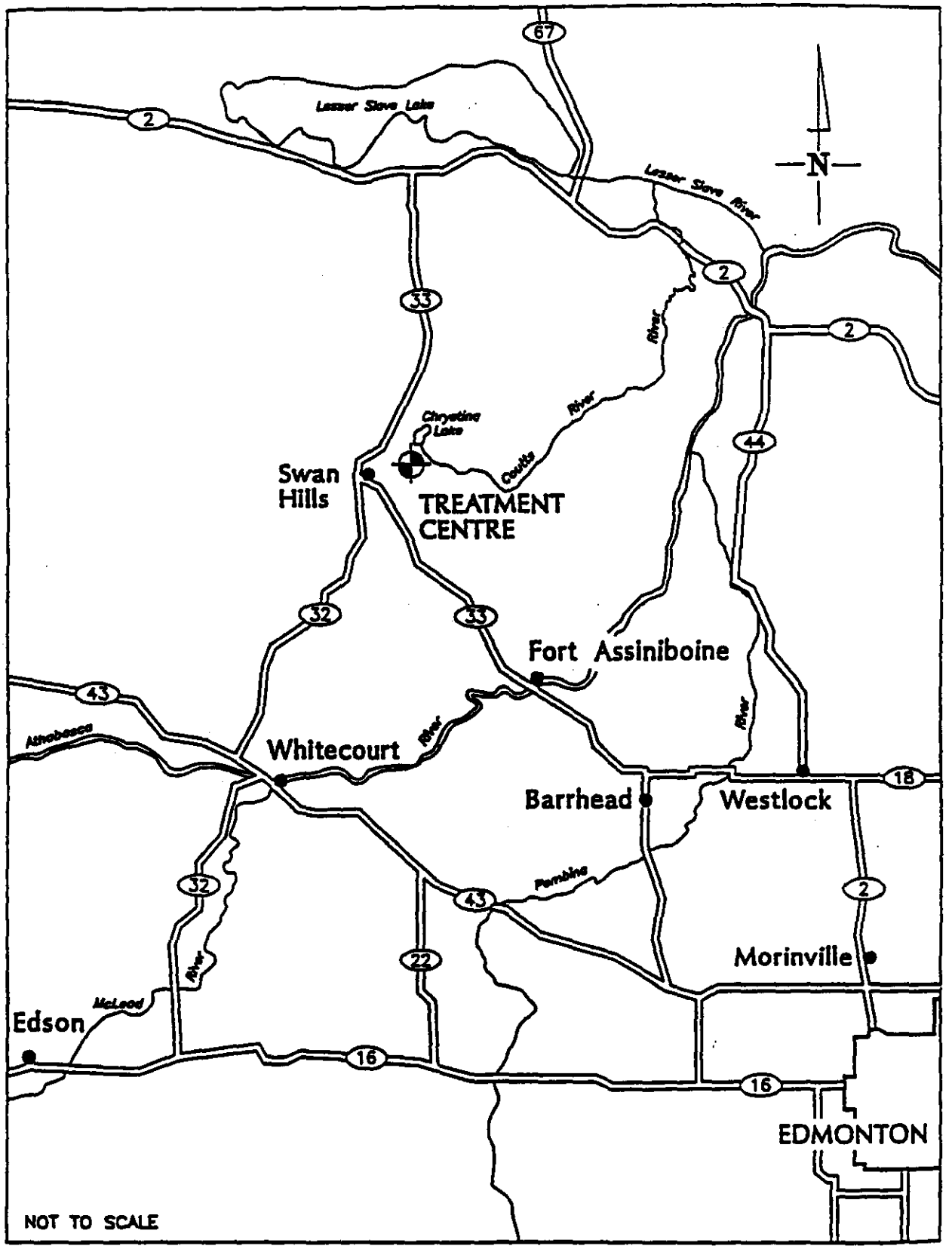


FIGURE 1.1 - LOCATION OF TREATMENT CENTRE

1.3 Natural Resources Conservation Board Review Process

1.3.1 Preparation of Information Requirements

Section 43(2)(b) of the Act provides that the Board may make regulations "respecting the information to be included in or to accompany any application to the Board and by whom the information is to be given in respect of a reviewable project." The Board has set out information requirements in the *Rules of Practice of the Natural Resources Conservation Board* which have been passed as *Alberta Regulation 345/91*. Section 3(1) of the *Rules of Practice* of the NRCB provides that "Every application for the approval of a project shall contain the information set out in the Schedule to the Rules of Practice." The Schedule provides that certain information be filed with the NRCB and directs an applicant to comply with the more specific information requirements that can be found in the Appendix to the Schedule which applies to the particular type of project proposed. The Schedule has detailed appendices for pulp and paper projects, lumber and lumber fabrication projects, recreational or tourism projects, metallic or quarriable mineral projects, and for water management projects, as these types of projects are separately mentioned as reviewable projects in Section 4 of the *NRCB Act*.

In the case of Application 9301, the project was not one which automatically comes to the NRCB for review but was referred to the Board as a "specific project prescribed by the Lieutenant Governor in Council." In this case, as with all other referrals to the NRCB under Section 4(f) of the Act, the Board, in accordance with Appendix 6 to the *Rules of Practice of the NRCB*, "...may prescribe application requirements and directions for any reviewable project prescribed by Section 4(e) or (f) of the Act."

Upon the issuance of Order in Council 695/93 directing the review by the NRCB, the Board published a *Notice of Reviewable Project* dated November 24, 1993, which identified that the Board was in the process of developing preliminary information requirements for the Application and that these would be made available to those parties expressing an interest in the review. In accordance with the *NRCB Regulations*, information requirements were developed that addressed the scope of the review as set forth in the Order in Council. The NRCB issued draft information requirements on December 17, 1993 and issued final information requirements on January 21, 1994.

1.3.2 Receipt and Review of the Application, the Pre-Hearing Conference and the Hearing

Upon receipt of the draft Application on February 1, 1994, the NRCB published a *Preliminary Notice of Application* on February 3, 1994. The Application was received March 15, 1994 and on March 18, 1994 a Request for Supplemental Information was forwarded to Chem-Security. On March 25, 1994, Chem-Security responded to the Request for Supplemental Information. In response to the preliminary notice issued by the Board, submissions from

potential interveners with respect to preliminary and procedural matters were received on March 30, 1994.

The Board held a Pre-Hearing Conference on Preliminary and Procedural Matters on April 5 and 6, 1994 in Edmonton at the Public Utilities Board Hearing Room to hear representations respecting certain aspects of the hearing to be held to consider Application 9301. Copies of the *Report of the Pre-Hearing Conference* are available through the Board's office.

Following the Pre-Hearing Conference, the Board directed its solicitor to engage independent consultants to review the Application in the areas of: transportation and transportation risks; economics; and incremental air emissions associated with the incineration of Canadian wastes and related environmental and health effects. The Board directed its solicitor to select, retain and instruct the consultants in a manner independent of Board involvement. The findings of the contract consultants were made public prior to and tendered at the public hearing and are referred to in Section 3.1.5 and various other sections of this Decision Report.

Following the Pre-Hearing Conference, the Board issued a *Notice of Hearing* dated April 8th, 1994 and scheduled a hearing to commence in the Swan Hills Community Center on May 16th, 1994.

The hearing convened on Monday, May 16th, 1994 at 9:00 a.m. in the Swan Hills Community Center with K.R. Smith, Chair, C.H. Weir and D.M. Derworiz sitting. At that time, the Board received a request for adjournment from Chem-Security and various participants. The Board agreed to the request and issued a *Notice of Adjournment* on May 17th indicating that the hearing would resume in Swan Hills at 9:00 a.m. at the Community Center on Monday, June 27, 1994, and would continue Monday, July 4th in Calgary at Govier Hall in the Energy Resources Building; and Wednesday, July 6th in Edmonton at the Public Utilities Board Hearing Room; and then return Wednesday, July 13th to the Swan Hills Community Center. The hearing participants are listed in Appendix A of this Decision Report.

1.4 Role of Alberta Special Waste Management Corporation and BOVAR Inc.

The Alberta Special Waste Management Corporation (ASWMC or the Corporation) is a Crown corporation of the Government of Alberta whose mission is to promote the establishment and operation of special waste management solutions in Alberta and to protect public health and safety and enhance environmental quality.

The Alberta Special Waste Management System (ASWMS) is a joint venture between private industry and the Government of Alberta. The Corporation owns 40 percent of the assets of the ASWMS through a joint venture agreement with BOVAR Inc. (BOVAR). This agreement is described more fully in Section 5 of this Report.

BOVAR is an Alberta company that provides consulting and technical services, manufactures gas monitoring instrumentation and control equipment, and owns and operates waste management facilities. BOVAR Inc. owns 60 percent of the assets of the ASWMS.

1.5 Decision 9101

This is the second application filed by Chem-Security with the NRCB concerning the ASWTC at Swan Hills. The construction and operation of expanded facilities for the treatment of hazardous wastes generated in Alberta at the ASWTC was previously dealt with in Application 9101. In the review of Application 9101, the Board considered whether an expansion of the ASWTC by the addition of a 40,000 t/a rotary kiln incinerator was in the public interest. At that time, the NRCB reviewed and considered the social, economic and environmental effects anticipated from the expanded facility operating at full capacity.

According to Chem-Security, many of the effects that were identified as a result of the NRCB review of Application 9101 are similar in magnitude to the effects that would be anticipated should the Board approve the current Application and the ASWTC was to operate at near capacity levels. However, even in situations where the effects are similar, the role such effects may play in the determination of the public interest may well differ, given the context of the review. For example, the Board's opinion in Decision 9101 was that the expansion of the ASWTC was justified as the expanded facility was deemed necessary to treat waste that was generated and stored in Alberta.

While the economic considerations of treating Alberta waste may be an important consideration when assessing the public interest from a provincial perspective, the environmental and social benefits of properly treating hazardous waste that is being generated and stored in our community are obvious and less complex to assess in relation to the public interest. With the current Application, the waste stream being received is dependent on the excess capacity that may exist over and above the capacity used to treat Alberta waste. In such a case, the benefits of treating the waste are primarily economic from the Alberta public interest perspective. From a purely environmental point of view, the proper treatment of waste from other Canadian jurisdictions does not produce the readily identifiable benefit to Alberta of reducing the need to locally store hazardous waste indefinitely at some risk to the community.

The Board is aware of the costs associated with preparing an application that includes the detail necessary to satisfy a quasi-judicial decision process. In view of this, and recognizing that the current reviewable project does not involve the construction of any new facilities and that many of the effects attributed to this proposal would be similar to those identified in the earlier application, the NRCB encouraged Chem-Security to utilize, where appropriate, the materials prepared in conjunction with Application 9101. The Board believes that Chem-Security was able to avoid considerable additional expense through the use of the existing information.

As a quasi-judicial tribunal, it is important that all participants in the NRCB process be aware of the evidence that the tribunal will be considering in the course of making a decision. Consequently, the Board insisted that any information that a participant wished to bring before the Board would have to be tendered as new evidence, even if that information was used by one of the participants in the review of Application 9101.

1.6 System Changes Since 1991 - Alberta Special Waste Treatment Centre

Since expansion approval in 1992, the Treatment Centre has undergone various process equipment changes. These include the following:

- the installation of a transformer furnace in 1992 to operate in conjunction with the existing C.E. Raymond rotary kiln incinerator, with a capacity to process approximately 3,000 t/a of PCB transformers and related equipment;
- the construction of a new waste receiving facility;
- the construction of a new laboratory;
- the shut-down in late 1993 of the twin von Roll rocking kiln incinerators and their associated cooling tower, which had a total nominal capacity of 5,000 t/a;
- the construction of a new stabilization facility, with a capacity of approximately 10,000 t/a to complement operation of the incinerators;
- the installation of pollution control equipment in the new Ford, Bacon & Davis (FB&D) incinerator;
- the heightening of the rotary kiln stack by 26 meters and the new FB&D kiln stack by 21 metres;
- the shut-down and cleanup of the original transformer processing area in 1991; and,
- the installation of fugitive emission controls on various building and process units.

The current overall nominal treatment capacity of the ASWTC is approximately 55,000 tonnes per year.

2. THE APPLICATION AND SUPPORTING INFORMATION

This section of the Decision Report summarizes the proposed reviewable project and the information submitted by Chem-Security and is included for those who are unfamiliar with the Application. Those readers who wish to review the total contents of this Application may do so by appointment at the NRCB office in Edmonton during regular office hours.

2.1 The Applicant

Chem-Security (Alberta) Ltd., a company incorporated in Alberta, with its head office located in Calgary, is a wholly owned subsidiary of BOVAR Inc. Chem-Security, through contractual agreements, is the operator of the Alberta Special Waste Management System (ASWMS), which includes waste collection and transportation capabilities, regional transfer stations in Calgary and Nisku, and the Alberta Special Waste Treatment Centre near Swan Hills.

The Board considers that Chem-Security is making the Application on behalf of the owners of the ASWMS, and that the commitments provided by Chem-Security in the Application and at the hearing are given on behalf of the owners (BOVAR and ASWMC). It is the Board's view that the responsibility for the performance of those commitments and proper operation of the Treatment Centre flows through to the owners via the Joint Venture Agreement (JVA).

2.2 The Proposed Project

The Lieutenant Governor in Council, pursuant to Section 4(f) of the *Natural Resources Conservation Board Act*, prescribed as a reviewable project, the receipt by the Alberta Special Waste Management System, operated by Chem-Security (Alberta) Ltd., of any hazardous wastes properly consigned to it from other Canadian jurisdictions for treatment at the Alberta Special Waste Treatment Centre. The reviewable project does not include the receipt of hazardous waste from the Northwest Territories, nor the receipt of hazardous waste from any other Canadian jurisdiction for the compliance test burns of the new incinerator at the Alberta Special Waste Treatment Centre.

The Application could significantly increase the amount of waste treated at the ASWTC. Chem-Security proposes to receive hazardous wastes from other jurisdictions to allow it to operate as close to maximum capacity as possible, so as to attain optimum technical and economic operation of the Treatment Centre. The Application would result in a redistribution of the transportation impact but would not result in any new facilities at the Treatment Centre. Approval of this project would result in the operator, Chem-Security, adopting an "Alberta First" policy for the receiving and processing of wastes in place of the current "Alberta Only" policy.

During the hearing and in its closing arguments Chem-Security stated that:

> "Despite the fact that this policy issue is being reviewed in the form of an application filed by Chem-Security with the Board,

> Chem-Security does not view itself as an applicant in the traditional sense. Rather, Chem-Security sees itself as a party that is bringing this information forward to assist the Board in making recommendations as to whether the Government policy as it pertains to this facility should be changed or not. Chem-Security will continue to operate the System in accordance with its operating approvals issued by Alberta Environmental Protection and other applicable legislation regardless of the result of this hearing." (emphasized in the original)

2.3 Supporting Information

Chem-Security prepared its Application based on the Board's information requirements issued on January 21, 1994. Further information was received from the Applicant on March 25, 1994 in response to the Board's Request for Supplemental Information.

2.3.1 Environmental and Health Effects of Treatment Centre Emissions

The potential environmental and health risk effects of Treatment Centre emissions were assessed in detail during the NRCB review of the facility expansion under Application 9101. Chem-Security stated that the conclusions of the previous review would not be affected by the receipt of hazardous waste from other Canadian jurisdictions.

Chem-Security undertook plume dispersion modelling in this Application to estimate ambient concentrations of six emission parameters, including PCBs, and compared these results to the results of modelling conducted during Application 9101. The current analysis by Chem-Security of the remaining 59 compounds considered in the 1991 assessment indicated that the ambient concentrations for all these compounds would be less than was previously estimated.

The Treatment Centre is licensed by Alberta Environmental Protection and must comply with its licence requirements. The Treatment Centre monitors ambient air, groundwater, surface water, aquatic resources, soil, vegetation, and wildlife. The monitoring data are reviewed by Alberta Environmental Protection on an annual basis. Chem-Security provided portions of its monitoring data during the hearing.

2.3.2 Transportation and Transportation Risk

Chem-Security stated transportation related matters are those of primary relevance to this Application. Chem-Security stated that a change in the source of the waste will result in a redistribution of traffic patterns and potentially minor changes to the previous risk assessment. These potential changes have been assessed by the Institute for Risk Research in its report Transportation Risk Assessment for the Alberta Special Waste Management System (IRR Report). Chem-Security pointed out that the shipment of hazardous waste is subject to the *Transportation of Dangerous Goods Control Act* and its regulations, as well as additional

requirements established by the ASWMS. Chem-Security identified its transportation routes throughout the province. Another transportation related change proposed in the Application would be the change in hours of operation from a daylight, five day work week to a 24 hour, seven days per week operation.

2.3.3 Socio-Economics

Chem-Security submitted information on issues related to potential social and economic effects which might result if the Application were approved.

Chem-Security described the public consultation process undertaken during the preparation of its Application. The description of the process included Chem-Security's identification of the views and concerns raised by the public and the manner in which Chem-Security believed those views and concerns were reflected in its plans for the project.

Chem-Security also provided its evaluation of the economic effects of the project on the local region and, more generally, within the Province of Alberta. The evaluation included Chem-Security's assessment of total direct, and indirect economic effects. As well, Chem-Security provided estimates of employment impacts associated with the proposed project and an assessment of financial impacts on the Province of Alberta.

3. THE POSITION OF PARTICIPANTS

As in the previous section, this summary of the positions of the participants is provided for the benefit of those unfamiliar with the evidence before the Board. The Board has based its decision on the whole of the public record. Those readers who require more detail with respect to the contents of submissions by participants in the hearing may view the record by appointment at the NRCB during normal office hours.

The Board notes that most hearing participants were opposed to the Application. Some were opposed to the Application because of existing concerns regarding overall government policy decisions relating to the management of hazardous waste including such issues as the initial creation of the Treatment Centre, its location near the Town of Swan Hills, the joint venture agreement with BOVAR and the public subsidy of the facility to name only a few. In the opinion of the Board it is not within its jurisdiction to review existing government hazardous waste policies for the treatment of Alberta wastes.

Participant positions are described in the order of their presentation during the hearing.

3.1 TriWaste Reduction Services Inc.

TriWaste Reduction Services Inc. supported the Application by Chem-Security (Alberta) Ltd. and submitted a written brief describing TriWaste and the company's business interest in the area of hazardous waste. It noted that it currently transports waste on a 24 hour schedule and provided information on the economic and environmental benefits of allowing the receipt of hazardous waste from other Canadian jurisdictions.

3.2 John P. Ogilvie

Mr. Ogilvie supported the Application and provided his view on the economic, environmental and transportation aspects. Mr. Ogilvie believed that the economic benefits of receiving waste from other provinces to facilitate the full capacity operation of the ASWTC outweigh the minimal risks associated with the change in traffic patterns. In addition, in his view the danger of adverse environmental effects would be no different than if all of the wastes received came from within Alberta.

3.3 The Green Alternatives Institute of Alberta

The Green Alternatives Institute of Alberta submitted a written brief opposed to the Application as it believed it is not in the public interest of Albertans to allow unrestricted receipt of hazardous wastes by the Treatment Centre. Concern was expressed about: the potential receipt of hazardous waste from beyond Canada; increased transportation risks; and additional cost to Alberta taxpayers for the perpetual care of the plant site.

3.4 Environment Canada

Environment Canada supported the Application and provided a panel of experts to present evidence on the current situation with respect to the management of hazardous wastes in Canada and on Environment Canada's international and national commitments and goals. Environment Canada supported a harmonized approach to waste management in Canada, provided that the associated facilities and transportation systems are designed and operated in accordance with applicable federal and provincial regulations, guidelines and codes.

3.5 Barbara Collier

Ms. Collier opposed the Application. In her view, oilfield waste should not be exempted from treatment at the ASWTC because this has created the need to receive hazardous waste from other provinces to ensure the viability of the Treatment Centre. Concern was also expressed regarding: the financial burden to Alberta taxpayers for the current subsidy; health and safety risks for both humans and the ecosystem; and, the long term liability of Chem-Security regarding the landfill site at Swan Hills and its implications for Alberta taxpayers. Ms. Collier believed the government should adopt a philosophy of waste reduction and elimination financed by the generator as an alternative to the receipt of waste from other jurisdictions.

3.6 Saskatchewan Environment and Resource Management

Environment and Resource Management, Government of Saskatchewan, supported the Application as they believed it would provide a cornerstone upon which to construct a fully integrated, regional solution to the waste management concerns faced by western Canada. Its experts stated that both Saskatchewan and Alberta would benefit from participation in a regional approach to waste management. Transportation risk and the economic and environmental benefits were addressed in written and verbal submissions.

3.7 Environmental Resource Centre

The Environmental Resource Centre opposed the Application and participated in the hearing by cross-examining Chem-Security and the Board Solicitor's contract consultants on the issues of economics, provincial and extra-provincial policies and waste volume projections. In its view, the receipt of out of province waste is not economically sound and the Board should return the matter to Cabinet with the recommendation that the Government of Alberta review its overall policies concerning the management of hazardous waste in the province.

3.8 Toxics Watch Society (Toxics Watch)

The Toxics Watch Society opposed the Application asserting that approval of the Application would set a precedent that would allow other facilities to receive wastes for "disposal situations" in Alberta and would act as a barrier to waste minimization and toxic waste reduction.

Toxics Watch submitted that the NRCB cannot make an appropriate determination on this Application because of the limited scope of the hearing as defined by the Order in Council. In the view of Toxics Watch, the Alberta Energy and Utilities Board should have participated in the hearing process as they were said to have indicated that they will be bound by the decisions made by the NRCB. Toxics Watch believes the Board must consider the alternative of ending further provincial subsidies to the ASWMS.

3.9 Tooker Gomberg

Mr. Gomberg appeared as a private citizen opposed to the Application due to his perception of the increased transportation risk, the potential impacts of incinerator emissions on northern ecosystems and concern about the economic implications of the Application. In his view, there is a need for a more comprehensive approach to waste reduction, re-use and recycling.

3.10 EcoCity Society of Edmonton (EcoCity)

EcoCity opposed the Application and submitted a copy of a written submission to the Federal Minister of the Environment requesting the federal government to intervene in the review process due to EcoCity's belief in the potential for large scale receipt of toxic waste from the United States. In its submission, EcoCity requested the federal government to hold immediate federal hearings related to interjurisdictional issues surrounding toxic waste shipping, handling, national standards, policies, etc. No response from the federal government was submitted. In verbal testimony, EcoCity stated that it does not support the review by the NRCB or believe the Board has jurisdiction to make any decision on the receipt of hazardous wastes.

3.11 Marianne Lightfoot

Ms. Lightfoot opposed the Application by Chem-Security due to an expected increase in transportation risks and anticipated financial implications to the Alberta taxpayer.

3.12 Lee Morin

Mr. Morin opposed the Application due to his concerns regarding increased transportation risk and financial implications for Albertans. In his view, the ecosystem has already been damaged and the focus should be on ensuring hazardous waste is not generated at the source.

3.13 Dennis Fenske

Mr. Fenske provided verbal testimony expressing concern regarding the completeness of the Application before the Board. In his view, Chem-Security should have been required to identify the need for a new local development permit when it filed its Application with the NRCB. In his view, Chem-Security's local development permit specifically states the

existing Treatment Centre was designed and built to receive hazardous waste generated within the Province of Alberta. He stated that the current Application before the Board entails a request to amend the development permit which is within the jurisdiction of Improvement District No. 125, not the NRCB.

3.14 Canadians for Responsible Northern Development, The Green Alternatives Institute of Alberta and the Green Party of Canada (Alberta Bioregions)

These groups opposed the Application due to concerns regarding the increased health and transportation risks and the ongoing subsidization of the Treatment Centre by the Alberta taxpayer.

3.15 Board Solicitor's Contract Consultants

3.15.1 GlobalTox International Consultants Inc.

GlobalTox provided an independent expert evaluation of the methods and conclusions relating to human and environmental risks associated with the Application. Issues reviewed by GlobalTox included: PCB emissions; review of historical data; status of Alberta PCBs and likely impact of extra-provincial PCBs; definition of the "base case"; comparison between historical modelling predictions and monitoring data; and, the balance between risks and benefits (i.e. equivalent risks may not be equally acceptable due to differences in the perception of associated benefits).

3.15.2 Dr. Marc Maes

Dr. Marc Maes was engaged as an independent expert to review transportation risk aspects of the Application. Dr. Maes presented a report summarizing the findings resulting from a critical review of the transportation risk assessment submitted by Chem-Security and conducted by the Institute for Risk Research.

3.15.3 Associated Engineering Alberta Ltd.

Associated Engineering provided an independent expert review of transportation issues related to the Application including proposed haul routes, local restrictions and local limits, proposed truck movements on designated routes and compliance with applicable acts and regulations.

The submission by Associated Engineering addressed: effects of traffic re-distribution on existing routes; effects of regulatory changes allowing transportation of hazardous waste on a 24 hour basis; effects of a change in operational procedures to allow for contract carriers including the liability of contract carriers, control of operations, truck/trailer design standards and equipment maintenance and composition of products in a single load; effects of

the change on Alberta Municipalities' Emergency Response Programs; and, transportation related impacts on other provinces.

3.15.4 Stephen Johnson, Chartered Accountants

Hugh Johnson of Stephen Johnson, Chartered Accountants, provided an independent expert review of the financial and economic information submitted by Chem-Security and tested the method and conclusions relied upon by Chem-Security in its cost-benefit analysis assuming: changes in Alberta Only and All Canada waste volume; changes with respect to transportation costs and variable costs; and changes with respect to an increase of Alberta Only waste volumes and a decrease in prices charged for these wastes.

3.16 Town of Swan Hills

The Town of Swan Hills stated it was highly committed to the ASWTC and its mandate to dispose of hazardous waste. The Town submitted a written brief supporting the Application claiming its approval would benefit all of Canada by creating a more environmentally friendly nation, making the Treatment Centre more economically viable by reducing its subsidy from Alberta taxpayers, and adding to the economic stability of the Town of Swan Hills.

The Town addressed five major issues in its submission: viability of the Treatment Centre; causes of the treatment demand shortfall; long-term financial liability; possible access to the ASWTC by United States waste generators under the Canada-US Free Trade Agreement; and, immediate environmental impacts.

3.17 Indian Association of Alberta/Lesser Slave Lake Indian Regional Council (IAA/LSLIRC)

The IAA/LSLIRC opposed the Application and provided evidence on transportation risks; health risks due to the incineration of hazardous wastes received from other Canadian jurisdictions; the economic impact of continued public subsidization of the Treatment Centre at forecast levels; the analysis of waste generation data for Alberta and other Canadian jurisdictions; a review of the off-site treatment and disposal industry serving Alberta generators; a review of public policy issues regarding the receipt of hazardous wastes from other Canadian jurisdictions; and, the need to review the economic impact of options other than the receipt of hazardous wastes from other Canadian jurisdictions. In addition, Chiefs and elders from the area presented personal perspectives on the human health and environmental impacts of the Treatment Centre as part of a panel presentation including expert witnesses who addressed environmental and economic issues.

The IAA/LSLIRC requested that the Board not approve the Application by Chem-Security, that the Treatment Centre be shut-down and that the Joint Venture Agreement be terminated by legislation.

3.18 Municipal District of Woodlands No. 15

The Municipal District of Woodlands No. 15 opposed the Application citing concerns over: the possibility of the Treatment Centre simply becoming a storage site for waste including nuclear and radioactive materials; a belief that generators of waste should pay for the cost of disposal rather than the Alberta taxpayer; and, the fact that the Treatment Centre was believed to be designed and built to receive and treat hazardous waste generated in the Province of Alberta only.

3.19 Improvement District of Big Lakes No. 125

The Improvement District of Big Lakes No. 125 (ID #125) opposed the Application due to concerns regarding the movement of hazardous waste through their community and the existence of the provincial subsidy or system contribution. Should the Board determine that the Application is in the public interest and grant an approval, ID #125 requested that the Board consider the community's requirement for a fully trained and equipped emergency response team and an agreement between ID #125 and Chem-Security to cover the cost of: a special constable to monitor traffic movement; a special constabulary unit to enforce provincial statutes regarding the transportation of hazardous waste; and, to pay the cost of any road construction and maintenance charges for the road access from Highway 33 to the plant site.

3.20 County of Beaver Environmental Protection Association

The County of Beaver Environmental Protection Association expressed concern that approval of this Application could set a precedent for the receipt of hazardous waste from other Canadian jurisdictions to other facilities and, more specifically, the Laidlaw site in the Village of Ryley which recently applied to expand its transfer site to a Class 1 hazardous waste storage and treatment facility. In the Association's view, full utilization of the ASWTC achieved by disallowing the export of Alberta hazardous wastes would mitigate the need for establishment of Class 1 hazardous waste facilities across the province.

3.21 Fort Assiniboine Local Trappers & Alberta Trappers Association

Both the Fort Assiniboine Local Trappers and the Alberta Trappers Association opposed the Application citing three concerns: the Treatment Centre was constructed to deal solely with Alberta waste; increased transportation risk and its possible environmental impact on trapping which might affect tourism and other economic opportunities in the area; and, the ongoing subsidization of the ASWTC by Alberta taxpayers. In its opinion, the Treatment Centre should remain open but should be restricted to treating Alberta hazardous waste only and the operating agreement should be reviewed within the context of today's economic reality.

3.22 Edmonton Friends of the North Environmental Society Ad Hoc Coalition (EFONES Coalition)

The EFONES Coalition opposed the Application and presented evidence on transportation risks and hazards, economic projections, health effects and air emissions. It was the view of the EFONES Coalition that Chem-Security had not proven that the receipt of hazardous waste from other Canadian jurisdictions was in the public interest.

WRITTEN SUBMISSIONS ONLY:

3.23 Native Council of Canada (Alberta)

The Native Council of Canada (Alberta) opposed the Application. No specific concerns were noted.

3.24 British Columbia Hydro and Power Authority (B.C. Hydro)

B.C. Hydro supported the Application as a customer which may be affected by the decision of the Board.

3.25 Northern Light

Northern Light opposed the Application citing concerns with provincial/regional jurisdiction and responsibilities regarding liability for toxic waste produced and the potential for this Application to set a precedent for dealing with toxic waste issues on a site by site basis. Northern Light maintained that regulation and monitoring of activities related to the disposal of hazardous wastes on the site should involve the Alberta environmental community, preferably environmentalists approved by the Alberta Environmental Network.

3.26 Avrum Wright

Mr. Wright submitted a written brief opposing the Application stating that the Treatment Centre was originally approved to handle Alberta generated waste only. As an Albertan, he stated he was not willing to accept Alberta becoming a North American Toxic Waste Treatment Centre or dump.

3.27 Environmental Law Students Society, University of Alberta

The Environmental Law Students Society opposed the Application noting concerns regarding the policy implications that may arise from a decision to allow the receipt of hazardous wastes. The Society submitted that rather than allowing the receipt of out of province waste, the definition of "legally hazardous" waste should be revised to include toxic oilfield wastes. In its view, a change of this nature would result in the existing Treatment Centre being operated at full capacity. The Society also raised concerns regarding transportation risk and the cost to

the taxpayer through continued subsidization of the Treatment Centre. In the view of the Society, a comprehensive approach to hazardous waste management is required.

3.28 Fort Assiniboine District Environmental Action Association

The Fort Assiniboine District Environmental Action Association opposed the Application and expressed concerns regarding environmental and health impacts. It was also concerned that approval would effectively make the area the hazardous waste dump site of western Canada.

3.29 Ed Hanson

Mr. Hanson opposed the Application citing concerns relating to increased transportation risks and the long-term liability of the government for the environmental safety of the Treatment Centre.

3.30 Lorraine Vetsch

Ms. Vetsch opposed the Application due to personal concerns regarding the increased transportation risk she and her family would experience living on a dangerous goods transportation route.

3.31 Smith Environmental Association

Smith Environmental Association submitted a written brief. No specific concerns were noted.

3.32 City of St. Albert

The City of St. Albert submitted a resolution passed by its City Council on June 20, 1994 stating that it had no objection to the Application provided the Special Waste Management Corporation continues its high level of vigilance on transportation and plant safety; and further that the Corporation continues to support municipal programs which support the collection of household hazardous waste.

3.33 Environmental Services Association of Alberta

The Environmental Services Association of Alberta supported the Application on the belief that the removal of interprovincial and international barriers to trade will benefit all Canadians. It stated that open borders will create jobs, reduce Canada's export of hazardous wastes and recyclables, eliminate the Alberta Government's financial support of the ASWMS and benefit many Alberta hazardous waste management firms.

3.34 Rural and Improvement Districts Association of Alberta

The Rural and Improvement Districts Association of Alberta opposed the Application expressing concern over: the proposed regulation change allowing transportation of waste on a 24 hour basis rather than just during daylight hours on weekdays; long term unknown environmental and health risks associated with air, land and water residuals of waste processing; and, financial concerns relating to the ongoing subsidy of the Alberta taxpayer for treatment of waste from outside of Alberta's boundaries.

3.35 Municipal District of Sturgeon No. 90

The Municipal District of Sturgeon No. 90 (MD #90) submitted that it had no objection to the Application providing the ASWMC continues to maintain the high level of vigilance towards transportation and plant safety. MD #90 also stated that as a minimum the ASWMC should continue its current level of support towards municipal programs regarding the collection of household hazardous waste.

3.36 Ivor Edwards

Mr. Edwards neither supported nor opposed the Application but expressed concerns regarding the transportation of hazardous material within Alberta and the financial viability of the existing Treatment Centre. Mr. Edwards provided a number of specific recommendations for the Board's consideration and concluded that if the Treatment Centre is to operate profitably, appropriate utilization fees or charges ought to be imposed on the user. In addition, it was stated that every effort should be made to minimize the risk to which residents are exposed due to the transportation of additional hazardous materials. Lastly, it was stated that emergency response organizations should be sufficiently informed and equipped to deal with an accident, should one occur.

3.37 Vortek International - Dr. Arrison

Dr. Arrison supported the Application stating that proper disposal of hazardous material from other jurisdictions would protect Alberta and Albertans from environmental risk. In addition, he believed that new business opportunities for environmental companies dealing in the research and development field would occur creating more economic activity in general. It was stated that realizing these opportunities would ensure that the province has knowledgeable people with tools to protect Alberta's environment for now and all time.

3.38 Canadian Heritage, Government of Canada, Director of the Rocky Mountain District

The Acting Director of the Rocky Mountain District of the Canadian Heritage Department neither supported nor opposed the Application but expressed concerns regarding safety aspects of transporting the materials through the National Parks. The Board was

requested to require Chem-Security to work with Parks Canada to identify mutually satisfactory procedures to safeguard National Park properties and visitors and three specific recommendations were offered for consideration by the Board.

3.39 County of Leduc No. 25

The County of Leduc passed a resolution on June 30, 1994 to advise the Board that it has no objections to the Application provided that the ASWMC continues its high level of vigilance towards transportation and plant safety and that the ASWMC continues to support municipal programs that support the collection of household hazardous waste.

3.40 Strathcona County

Strathcona County passed a resolution at its meeting of July 5, 1994 to advise the Board that it had no objection to the Application provided that the ASWMC continues its high level of vigilance towards transportation and plant safety and that the ASWMC continues to support municipal programs that support the collection of household hazardous waste.

3.41 Dr. H. A. Scott

A resident of Athabasca, Dr. Scott opposed the Application. In his view, each jurisdiction should be responsible for its own waste disposal.

3.42 Motor Vehicle Manufacturers' Association

The Motor Vehicle Manufacturers' Association supported the Application as it believed the facilities of the ASWMC represent a Canadian solution to the safe disposal and destruction of hazardous waste for industry outside of Alberta.

3.43 City of Fort Saskatchewan

The City of Fort Saskatchewan passed a resolution at its meeting of June 27th, 1994 to advise the Board that it has no objection to the Application provided the ASWMC continues its high level of vigilance towards transportation and plant safety and that the ASWMC continues to support municipal programs that support the collection of household hazardous waste.

3.44 Joussard Area Development Association

The Association opposed the Application noting its concerns regarding increased transportation and health risks.

3.45 Miller Boatworks - Joussard, Alberta

As the owners of a tourist-based business which depends on the reputation of Lesser Slave Lake for relatively clean water and uncontaminated fish stocks, Paul and Mary Ruth Miller opposed the Application as they believe that any threat to that reputation is a very real threat to their business survival.

3.46 Lesser Slave Lake North Country Community Association

The Association opposed the Application as in their view, the acceptance of wastes from other Canadian jurisdictions would further increase the risk of serious contamination of the air and watershed.

3.47 Bearclaw Holdings Ltd. - Swan Hills

As a company currently engaged in recycling salvageable metals acquired from Chem-Security and the ASWMS, Bearclaw Holdings Ltd. supported the Application. Should the Application not be approved, Mr. Sprague believed that it is conceivable that other sources of salvageable material available in the area would be insufficient and therefore would have a negative economic impact on his company and the livelihood of its employees.

4. BASIS FOR DECISION

Pursuant to the *NRCB Act*, the Board will determine whether, in the Board's opinion, the Application is in the public interest, having regard to the social and economic effects of the project and the effect of the project on the environment.

There are a number of issues relating to the public interest which the Board believes it should assess prior to dealing with economic, environmental, and social effects of the Application. Participants in the hearing raised a number of matters related to public policy and jurisdiction, as well as other preliminary matters related to the ability of the Applicant to carry out the project, the municipal approval process, and the adequacy of evidence tendered during the hearing. The Board is of the opinion that it should first consider:

- public policy;
- jurisdiction; and,
- preliminary matters.

The Board believes that it must then consider in some detail the justification or need for the proposed project. Therefore, the Board will discuss:

- the public cost of avoiding hazardous waste contamination and the projected costs to Alberta taxpayers;
- the economic viability of the Application; and
- reasonable alternatives to the Application.

Within the context of the *NRCB Act*, the Board recognizes the importance of defining the framework of its review. In having regard for the economic, environmental, and social effects, the Board must consider the existing circumstances, so that the effects of the Application may be assessed and considered on an incremental basis. The Board considers that the existing circumstances from which this Application should be considered are those circumstances which would exist if the Board were not to approve the current Application. This involves the recognition that the current circumstances include the expanded Treatment Centre as approved in Decision 9101 and equipment changes since 1992. It is also the Board's view that the waste volumes of the current circumstances would be those which now can be anticipated for receipt by the ASWMS from within Alberta. The Board will consider the evidence put before it to determine what it considers to be the current circumstances for this Application.

If the Board were to conclude that there is sufficient justification for the proposed project, the Board would then go on to assess in detail, having regard for the input received from the participants at the hearing, the effects that would likely result and the mitigative

measures that may be taken to reduce any adverse effects. The Board will deal specifically with the following matters:

- Economic effects, including:
  - market forecasts;
  - net economic benefits to Alberta; and,
  - financial effects on Alberta taxpayers.

- Effects on the environment, including:
  - air emission sources and air quality effects;
  - land and terrestrial effects;
  - water and aquatic effects; and,
  - health risk assessment.

- Transportation effects, involving consideration of:
  - routes, modes and volumes of traffic;
  - regulatory control;
  - Chem-Security's procedures and policies;
  - risk assessment; and,
  - transportation incidents.

- Social effects, including effects on:
  - the Town of Swan Hills and local municipalities;
  - the Aboriginal peoples; and,
  - waste minimization and harmonization.

The Board will make its decision as to whether the proposed project is in the public interest having regard for its conclusions respecting the various effects that would result, some of which may be beneficial and some of which may be adverse to the public interest.

6. PROJECT JUSTIFICATION

6.1 Introduction

Chem-Security has applied to the NRCB for approval to receive hazardous wastes from other Canadian jurisdictions. The reason for requesting the approval, according to Chem-Security, is to utilize excess capacity at the ASWTC and thereby reduce the forecasted taxpayer system contributions over a 15 year period ending in the year 2008 from $379 million to $101 million and reducing the system contribution to zero by year 2000. The Board, as a preliminary matter, will consider the justification and need for the approval to receive hazardous wastes from other Canadian jurisdictions, and the economic viability of the Application.

According to Chem-Security, excess capacity at the ASWTC has occurred due to less than predicted demand for the ASWTC services in the Alberta market. The Board believes that it must consider the reasons for the predicted change in the Alberta market demand from the estimates previously examined by it in Decision 9101. To provide the appropriate context for considering the justification and need for the reviewable project, the Board believes it will be of assistance to review the events that led up to the current circumstances where Chem-Security has forecasted the system contributions to total $379 million over the next 15 years, in addition to the existing $257 million investment in the ASWMC.

After discussing the justification, need and economic viability of the Application, the Board believes it should have regard for reasonable alternatives to the proposed course of action contained in the Application.

6.2 The Public Cost of Avoiding Hazardous Waste Contamination

6.2.1 The Establishment of the ASWTC

The following is a brief summary of the Board's review of the evidence available from a number of documents entered as exhibits during the hearing and from the transcripts.

The Government of Alberta established as an environmental protection priority, the avoidance of hazardous waste contamination. Hazardous waste contamination is avoided when production processes are designed to preclude the generation of hazardous wastes. Processes which produce hazardous wastes require facilities that can effectively treat those wastes to render them safe for disposal.

Hazardous waste treatment facilities that are capable of effectively handling and treating hazardous wastes are expensive to construct and operate, and are subject to economies of scale. Many individual hazardous waste generators have insufficient volumes to justify the capital and operating costs of on-site treatment facilities and seek off-site treatment services and facilities. Off-site treatment facilities are difficult to locate, and are subject to stringent environmental performance standards and operating requirements.

The Government of Alberta established the Alberta Special Waste Treatment Centre near Swan Hills to provide a single, integrated hazardous waste treatment facility to meet the environmental protection priority of avoiding hazardous waste contamination. The economics of hazardous waste management were considered in the decision to establish the ASWTC. Prior to the Environment Council of Alberta (ECA) public hearings in 1980, the Government received advice from the Hazardous Waste Management Committee that a fully integrated hazardous waste management facility might not be feasible in Alberta as a private commercial venture because of high costs and limited volumes of hazardous wastes. It was recognized that the economics of hazardous waste management precluded the private sector from assuming responsibility to establish the required facilities.

The ECA *Report and Recommendations on Hazardous Waste Management in Alberta* addressed the economics of hazardous waste management in some detail. The ECA noted that the economics of hazardous waste management are special and unusual, because of the overriding criterion of safety. The ECA concluded that it is only within the constraints of safety that we can begin to explore ways of handling hazardous wastes with the greatest economy.

The ECA considered waste management facilities and their costs. In discussing system capacity, the ECA considered that the objective was to provide a facility that would be capable of treating all hazardous wastes generated in Alberta and to provide some room to accommodate Alberta's expanding economy. The ECA wanted to "see the treatment plant capable of sustaining itself through fees for service." After recognizing the economic risks associated with uncertain demands and high operating costs, the ECA considered whether the risks were too great to proceed with a system that would be capable of handling all the hazardous waste generated in Alberta in a manner that would assure the future environmental safety of Alberta. The ECA's view was that these economic risks were worth taking.

The ECA anticipated the need for an ongoing operating subsidy. Their analysis was based on the province investing the capital without recovery. The capital cost and the operating subsidy were seen as a reasonable social cost to ensure safe treatment, reasonable access, and appropriate technology.

In discussing ownership, the ECA believed that the best guarantee that safety would remain the overriding criterion was to make a Crown corporation responsible for the management system controlling the treatment and disposal of hazardous waste.

In recommending that the province establish a comprehensive hazardous waste management system, the ECA advised that the system must put safety as an overriding criterion, must be publicly acceptable and must accept all types of hazardous waste generated in Alberta (except radioactive waste) regardless of cost, quantity, convenience, or hazard.

By 1984, the Alberta Special Waste Management Corporation (ASWMC) was established, and later the site for the Treatment Centre had been selected at Swan Hills.

Following a lengthy process to establish the detailed nature of the Treatment Centre to be developed at Swan Hills, the ASWMC examined the financial implications of the ownership options available once a government decision was made to involve the private sector in the development and operation of the ASWMS.

In November 1985, Woods Gordon, a management consultant, produced an analysis for the ASWMC which outlined the financial implications of ownership options involving the ASWMC and the private sector. The analysis was based upon revenue and cost information provided by the ASWMC and Chem-Security Ltd./Bow Valley Resource Services Ltd. At the time, the capital cost of the plant was estimated to be approximately $48 million. It was clearly recognized that the project would not have a positive payback (net cost in 1985 of $21.2 million when discounted at six percent and $24.5 million when discounted at 11 percent) and would only proceed because the social benefits outweighed the potential financial loss. In examining the financial risk associated with each ownership option, Woods Gordon noted there were some very real risks that the Crown's costs could differ significantly under any of the options considered. Woods Gordon noted that changes in prices, volumes, interest rates, and costs were all subject to significant uncertainty. Woods Gordon pointed out to the ASWMC that virtually all risk of inaccurate estimates and unforeseen long term events would rest with the Crown. From a financial and business perspective, this indicated to Woods Gordon that it was more prudent to consider the ASWTC as a public sector project until there was a clear demonstration that the project had economic viability.

However, from the various options considered, a Joint Venture Agreement (JVA) was struck for the construction, ownership and operation of the Alberta Special Waste Management System. The Agreement provided for Bow Valley Resource Services Ltd. (later BOVAR) and the Alberta Special Waste Management Corporation to be the owners of the ASWTC with Chem-Security Ltd. (later Chem-Security (Alberta) Ltd.) as the operator.

The Joint Venture Agreement as described in Section 5.1.4 defines in explicit contractual terms, the nature of the involvement of Alberta taxpayers through the Alberta Special Waste Management Corporation, a Crown corporation wholly owned by the Government of Alberta. As stated in the JVA, the purpose of the agreement was to construct the Swan Hills facility for the purpose of the treatment and disposal of special wastes in a manner which would protect the health and safety of the public and ensure the protection of the environment and to do so in a manner which would provide the owners with a fair and equitable rate of return on their investment.

The Board views the JVA as a complex legal document reflecting a number of fundamental underlying assumptions. First, the ASWTC was recognized to be inherently unprofitable from a private sector perspective. It would not have a positive payback. Second, the private sector would not normally invest in such an unprofitable venture. Third, private sector capital investment would only occur if the capital investment was not at risk, the capital would earn a return, and there was no financial exposure to operating losses. Consequently, the

Board believes the JVA contains some extraordinary and unusual terms that are not normally found in an agreement involving only private sector interests.

The manner in which the JVA addresses return on investment is provided in detail in the Agreement. The JVA provides for a "system contribution" that must be paid to the joint venture by the ASWMC. It has the effect of ensuring that BOVAR receives a minimum return on its capital invested, regardless of the revenues actually earned and losses incurred in treating wastes. Given the financial losses expected at the time the JVA was established, before any private capital was invested in the ASWTC, certain financial commitments were made in the JVA.

The Government of Alberta was committed to providing for the protection of the environment from hazardous waste contamination by establishing treatment facilities that were capable of meeting high standards of environmental protection. The capital cost of meeting this social objective was expected to be $48 million and the financial analysis available at the time showed that the facilities would lose money.

The decision to proceed with the ASWTC was made with full knowledge that the ASWTC was not economically sustainable and would require taxpayer support. It was also known from the financial analysis that there was significant uncertainty in the projections and that the costs to Alberta taxpayers could escalate significantly due to risk factors associated with interest rates, waste volumes and prices, and costs of operation.

Overall, the Board believes that it was the decision to proceed with the ASWTC, not the method of capital financing, that has had the most significant effect on taxpayers. The ASWMC decision to enter into the JVA and share the capital cost of the ASWTC with BOVAR resulted in the taxpayers investing less money in the ASWTC than they would have if ASWMC had developed the Treatment Centre solely with public funds. It also likely resulted in higher operating costs. From the beginning of the decision to establish the ASWTC in the mid-1980s, the ASWMC accepted that there was a public cost to avoiding hazardous waste contamination.

The facilities established in 1987 were small. The initial treatment capacity was about 20,000 tonnes per year, and by 1991 a rotary kiln was added to augment the two rocking kilns to provide 13,500 tonnes per year incinerator capacity.

The Treatment Centre was operating near capacity during the first years of operation and the demand for its services was soon in excess of plant capacity. Due to the economics of the smaller sized hazardous waste treatment facilities, the ASWTC incurred the operating losses that were originally anticipated when the decision to build the Treatment Centre was made.

6.2.2 The NRCB Decision 9101 Regarding Expansion of the ASWTC

The decision to expand the ASWTC incineration capacity has also had an effect on the taxpayers of Alberta. Before discussing the effects of the expanded facilities on Alberta taxpayers through the system contribution required under the JVA, the Board finds it necessary to summarize Decision 9101 on the expansion Application. It will then review the changes that occurred subsequent to Decision 9101 that have led to the current Application to receive waste from other Canadian jurisdictions.

Chem-Security applied to the NRCB in 1991 to expand the incineration capacity of the ASWTC to meet forecasted Alberta hazardous waste treatment requirements. That expansion proposal was the subject of a public hearing which examined closely the justification for the proposed expansion and the viability of the expansion. The NRCB Decision Report for Application 9101 contains the results of the NRCB review, plus the detailed discussion of the justification and viability of the expansion.

In Decision 9101, the NRCB reviewed all of the information submitted with respect to the forecasted volumes of waste available to an expanded Treatment Centre. In Decision 9101, the NRCB concluded that for purposes of its assessment, some 25,000 tonnes of waste per year would be generated and available to the Treatment Centre on an ongoing basis and that 20,000 tonnes per year would be available from inventories over at least the 10 year period following expansion of the Treatment Centre. A total of some 45,000 tonnes per year would likely be available for treatment at the Treatment Centre. Understanding that waste not properly treated and disposed of represents a potential hazard and financial liability to the public, the Board agreed that an expansion of the Treatment Centre was warranted.

In considering the appropriate size of the expansion, the Board considered the following question: Do you proceed with an expansion that might be slightly over-sized, recognizing that its full capacity is not yet needed, or do you proceed with a smaller expansion, knowing that if it is not big enough a further expansion would be necessary requiring higher capital and operating expenditures?

The Board's economic analysis of the options contained in Decision 9101 suggested that the financial penalties of having to make a second future expansion were greater than those associated with an expansion larger than required at the time. Also, the Board believed that the projection of waste volume on which it based its analysis, a total of some 45,000 tonnes per year, was conservative at least for the period when waste stored throughout the province was being recovered and properly treated. For this reason, the Board believed there was adequate justification for the addition of a 40,000 tonnes per year incinerator.

In Application 9101, Chem-Security estimated that revenues during the initial 10 year operating period would meet all operating and other expenses, service the debt, and recover the invested capital. The estimate was based on Chem-Security's projected prices for treatment, a $60 million capital cost, estimated operating and maintenance costs, and its forecast of the

volume of waste available to the Treatment Centre. In Decision 9101, the Board recognized the uncertainties regarding the volumes of wastes that would be available to the Treatment Centre over 20 years. Notwithstanding the uncertainties, the Board assessed the economic analysis provided in the Application and at the hearing. The assessment suggested that considering the capital cost of the expansion, the range of waste volumes the Board expected might be delivered to the Treatment Centre, and the possible range of treatment prices given by Chem-Security, the project would be economically viable.

The Board recognized in Decision 9101 that the uncertainties associated with the future volumes of waste delivered to the Treatment Centre were such that, in certain possible circumstances, the proposed expansion would not generate sufficient revenue to pay for itself. In these circumstances, and in accordance with the policy of the Government, the resulting costs would be borne by the Alberta taxpayer. The Board concluded that that risk was, in effect, the cost to the public of ensuring the availability of safe and effective treatment facilities.

In Decision 9101, the NRCB noted that the policy of the Government of Alberta presupposed that a facility like the Alberta Special Waste Treatment Centre would not be expanded beyond a capacity that could be justified considering the expected waste volume, nor would it be operated in an unbusinesslike manner. The NRCB also noted that the terms of the Joint Venture Agreement were such that the Crown corporation, ASWMC, representing Albertans, would not be expected to allow an unwarranted expansion nor inefficient operation to take place.

Since Decision 9101 to approve the expansion on May 23, 1992, there have been two significant factors that have affected the economic viability of the ASWTC: the Alberta demand for the services for the ASWTC has proved to be less than the forecast provided during the NRCB review of the expansion, and the capital cost of the expansion increased from $60 million to $85 million.

6.2.3 Revised Market Forecasts and Excess Capacity

As a justification for the incinerator expansion proposed in 1991, Chem-Security presented market-related evidence based on historical demand, current inventory, knowledge of individual projects and client interviews. Chem-Security assumed that waste volumes available for treatment at the ASWTC, would increase from 29,000 tonnes, at a rate of five percent each year into the foreseeable future, as a result of pressures from "industrial growth, regulatory enforcement, and ever-increasing environmental awareness... despite waste minimizing initiatives." Chem-Security also made an estimate of the volume of waste which would be available to the Treatment Centre from waste produced in the past and stored at various locations throughout the province. Chem-Security estimated in 1991 that some 90,000 tonnes of waste were identified in storage, of which some 40,000 tonnes were expected to go to the Treatment Centre. This 1991 assessment was considered conservative for the following reasons:

- it was based only on customers who actively used the system;

- it included only those sources that had a high probability of requiring this specialized treatment;

- it assumed that all incinerators performed at their design/operational capacity; and,

- it had not taken into account the likely emergence of new waste sources as a result of new regulations.

Another market report prepared by an independent consultant for Chem-Security and presented in the Application 9101 hearing, was based upon an analysis of previously prepared reports and studies regarding waste volumes, interviews with waste management personnel working in the industrial sector and field related data. The report dealt with two categories of hazardous waste: waste produced from "ongoing" industrial operations, and waste from "inventory" stored at various locations throughout the province. This report was presented as being based upon conservative assumptions. The assumptions used were:

- no growth in the industrial sector over the next ten years;

- waste minimization would occur through a variety of source reduction and recycle, recovery, re-use technologies, thereby accounting for a 50 percent source reduction on a number of waste types and a 50 percent improvement in the 4R's technology;

- continuing reliance on deep well disposal of liquid residual waste; and,

- reclassification of all wastes from non-hazardous to hazardous occurring at a modest rate with some wastes being increased by 50 percent but others not being reclassified at all.

The report estimated that there would be approximately 47,500 tonnes per year of organic waste generated in Alberta on an ongoing basis and that approximately 32,000 tonnes of waste per year would be available for treatment at off-site waste management services such as those offered at the Alberta Special Waste Treatment Centre. In Decision 9101, the Board observed that combining the waste estimated to be available from ongoing operations and inventories would result in waste volumes of 79,890 tonnes per year in 1991 declining to 62,243 tonnes annually by the year 2002.

According to Chem-Security's current Application, the above waste volumes have not materialized because of changes since the Board considered Application 9101.

The current Application indicates that Alberta hazardous waste volumes available for treatment at the ASWTC are sensitive to changes in a variety of factors such as the availability of other technologies and approved treatment options, generator 4R waste reduction

strategies, pricing, generator policies and budgets, residual liabilities, regulations, and regulatory enforcement. Chem-Security concludes that all of these factors have combined to influence the Alberta waste market and affect the projected volume of waste available to the ASWTC. The current Application states that the hazardous waste regulations currently in force in Alberta are similar to those in effect during the NRCB review of Application 9101.

In presenting the current Application, Chem-Security provided further clarification for the changes in market forecasts. Chem-Security indicated that many industries are pursuing on-site waste minimization programs more aggressively than was previously anticipated and that has reduced the quantity of dilute wastes available to the system.

Another factor highlighted by Chem-Security was the general economic conditions in Alberta that have limited the financial resources available for off-site treatment. Generators are pursuing lower cost options for waste requiring immediate management, including waste minimization and on-site treatment or disposal, and seeking lower cost off-site options. Contaminated site clean-ups are being postponed.

A third factor highlighted by Chem-Security was the increase in the waste treatment options available for Alberta generators, including recycling and resource recovery options and out of province treatment and disposal options.

A fourth factor highlighted by Chem-Security was the regulation of hazardous wastes. Regulatory changes have resulted in fewer wastes being expected to be received by the system from the upstream oil and gas sector compared to what was predicted. Chem-Security specifically referred to additional options available to this industry which are not readily available to other industry sectors.

Chem-Security gave particular emphasis to the importance of the regulatory regime in accounting for the differences between the current market forecasts and those presented to the NRCB in 1991. Chem-Security's evidence was that the regulatory environment accounted for most of the change, with the general economic environment taking a secondary role. The 1991 forecast of market would be accurate today, according to Chem-Security, if oilfield waste regulations had come into effect as Chem-Security expected in 1991. The 1991 forecasts anticipated that volumes of wastes would increase since Chem-Security expected all wastes exhibiting hazardous waste characteristics to be regulated on the same basis with no exemption for any industrial sector. Oil and gas wastes were not subject to the *Hazardous Waste Regulations* in 1991, but proposed regulations indicated that the exemptions would be dropped and all oil and gas wastes exhibiting hazardous waste characteristics would become regulated under AEPEA. Chem-Security's 1991 forecasts did not anticipate any new sources as a result of new *Hazardous Waste Regulations*. A distinction was made by Chem-Security in presenting the current Application that the 1991 forecasts anticipated more volume from oil and gas sources, but since the ASWTC was already treating oil and gas wastes they would not become a new source as a result of the proposed regulations.

The market forecast presented to the NRCB in 1991 indicated that over 50 percent of the wastes expected to be available to the ASWTC would come from the oil and gas sector. Chem-Security indicated that in the current market forecast the percentage of wastes expected from the oil and gas sector has been reduced significantly. New waste treatment options have been provided specifically for oilfield wastes, including incineration and landfill. Due to regulatory uncertainty, the oil and gas industry is not shipping much waste. Chem-Security noted that over the last two to three years waste brokers have been providing waste-blended fuel to U.S. cement kilns and asphalt plants. The Board does not have evidence regarding the amount of oil and gas wastes generated in Alberta that might be suitable for fuel blending in cement kilns, but given the general nature of the oil and gas industry and the nature of their wastes, it may be significant.

The forecasted volumes presented in the current Application are based on Chem-Security's experience in the Alberta marketplace. No additional waste market surveys have been conducted by Chem-Security since Application 9101. The projected volumes represent Chem-Security's best current estimate for Alberta waste which it was using for internal financial planning purposes.

Chem-Security based its estimates on knowledge of existing generator requirements and needs based on regulatory direction and competing factors. Chem-Security views hazardous waste markets to be determined largely by external forces including regulatory requirements and enforcement, and availability and cost of approved options. Experience in the industry indicates to Chem-Security that it is difficult to project with certainty what treatment requirements will exist in the future, and the uncertainty increases with the length of the forecast period. Chem-Security said its estimates for the period 1994 to 1997 are accurate to within $\pm$ 15 percent. Beyond that period, Chem-Security estimated its volume projections could vary by $\pm$ 25 percent. Chem-Security now concludes that any forecast of volume is destined to be incorrect.

Chem-Security's estimate in Application 9101 of the hazardous wastes available annually for treatment at the ASWTC was 25,000 tonnes of organic waste and 3,000 tonnes of inorganic wastes from ongoing generation, and 40,000 tonnes of organic backlog. Ongoing generation was expected to increase at five percent per year. Application 9101 predicted ongoing organic wastes available to the ASWTC to be 28,941 tonnes in 1994. Application 9301 estimates the total volume available to the ASWTC in 1994 to be 16,500 tonnes from all Alberta sources including ongoing generation of organic and inorganic wastes and wastes from backlog or inventories. The revised estimates show a dramatic reduction in the expected Alberta hazardous wastes to be treated at the ASWTC. For example, the projected volumes of organic waste are approximately 50 percent lower.

Chem-Security included substantial volumes from backlogs or inventories of wastes in the 1991 forecast; of the expected 45,000 tonnes per year, 20,000 tonnes were expected from this source. In discussing the effects of the economic climate on the current forecast, Chem-Security indicated that generators have shown a willingness to delay the

treatment of wastes and hold on to inventories as they explore their available options. The oil and gas sector was a significant source of backlog waste volumes forecasted in 1991.

When the NRCB reviewed Application 9101, it expected Alberta needs to be at least 45,000 tonnes per year for 10 years based on ongoing waste generation and the reduction of inventories or backlog. Excess capacity was expected to be under 10,000 tonnes per year. In Application 9301, Chem-Security expects that 16,500 tonnes of Alberta generated hazardous wastes will be treated in 1994 at the ASWTC. Excess capacity of 38,500 tonnes is forecasted for 1994. Taking into account current market projections, Chem-Security expects the amount of Alberta waste requiring treatment at the ASWTC to increase from 16,500 tonnes in 1994 to 36,500 tonnes in 2003. Excess capacity beyond Alberta's needs would correspondingly decline from 38,500 tonnes to 18,500 tonnes in 2003.

6.2.4 Revised Capital Costs

Application 9101 to expand the ASWTC was based on Chem-Security's estimated capital cost of $60 million. The economic viability of the expansion was analyzed in Decision 9101 on the basis of this estimate of capital cost as of March 28, 1992 when the NRCB closed its public hearing into the expansion. The NRCB issued its approval of the expansion project in May, 1992.

The Board received information regarding the decision made by Chem-Security to proceed with the expansion after the NRCB issued its Decision. After the release of Decision 9101, the capital cost of the project increased by 40 percent from $60 million to $85 million. Chem-Security's decision to commence construction occurred following the receipt by Chem-Security of a permit to construct the expanded facilities from Alberta Environment on October 22, 1992. Chem-Security stated that it had done a lot of preliminary engineering with the contractor, and when the permit to construct was received, it immediately entered into a number of contracts and issued purchase orders for the major pieces of equipment. The site preparation work and construction of the new kiln commenced in the fall of 1992 and the mechanical completion of the expansion was accomplished in October, 1993.

6.2.5 Projected System Contributions by Alberta Taxpayers

In Application 9301, Chem-Security provided a forecast of the expected system contributions by Alberta taxpayers. The calculation of the system contribution is described in Section 5 of this Report. The amount of the system contribution is affected by a variety of factors. A major component of the calculation is the amount of capital invested in the ASWTC. The decision to invest in the expansion of the ASWTC has significantly increased the capital base that, under the terms of the JVA, affects the calculation and subsequently the amount of the system contribution.

The second major component of the calculation of the amount of the system contribution is the amount of any operating losses. Hazardous waste treatment facilities are

subject to economies of scale and are sensitive to the volumes of wastes treated. According to Chem-Security, the ASWTC is expected to treat between 16,500 and 36,500 tonnes of Alberta generated wastes over the forecast period. These volumes are significantly below the capacity of the system, and at the prices charged for these volumes, revenues are forecast by Chem-Security to be insufficient to recover all fixed and variable operating costs. Operating losses are expected by Chem-Security based on the expected volumes.

The combination of an increased capital base and ongoing operating losses results in Chem-Security's forecasted system contributions of $379 million. The annual amount ranges from a high of $65 million in 1995 to $21.5 million in 2003.

The Alberta taxpayer has provided $257 million to the end of the 1993/94 fiscal year to the ASWMC to cover its operations and subsidize the ASWMS. Total direct subsidies to Chem-Security for the investment and operation of the system have approximated $190 million. (See Table 6.1 showing Annual Subsidies of Swan Hills 1985 - 1994).

To reduce the amount of the forecasted $379 million system contribution, Chem-Security proposes to utilize the ASWTC capacity in excess of Alberta needs to serve other Canadian jurisdictions, thereby reducing the costs to Alberta taxpayers.

6.3 Economic Viability of the Application

The economic viability of the ASWMS in treating Alberta wastes is not at issue before the Board; it is the economic viability of the reviewable project that the Board must assess. The Board will address the viability of the project, having regard for the existing Treatment Centre and the current operating regime set forth in the Joint Venture Agreement.

An assessment of the operation of the Treatment Centre from an economic standpoint is necessary to allow the Board to determine whether there would be a financial benefit associated with the treatment of waste from other jurisdictions. In the event that the Board were to conclude that the marginal costs for treatment of this waste exceeded the revenue generated, it would be of the opinion that the project would not satisfy the public interest test.

The Board heard evidence regarding the appropriate economic framework for the analysis of the costs of the ASWTC to be incurred due to the Application.

Chem-Security takes the position that most of the costs of the Treatment Centre are sunk or fixed costs in economic terms. The ASWTC was built to exclusively serve the Alberta market. The capital investments were rationalized by Chem-Security on that basis, and are sunk since the labour and materials that were used are on the ground and in operation.

Operating costs are apportioned between fixed costs and variable costs. Chem-Security takes the position that the fixed costs of operating the Treatment Centre are required to meet the Alberta market and are therefore fixed in the sense that they would be incurred in

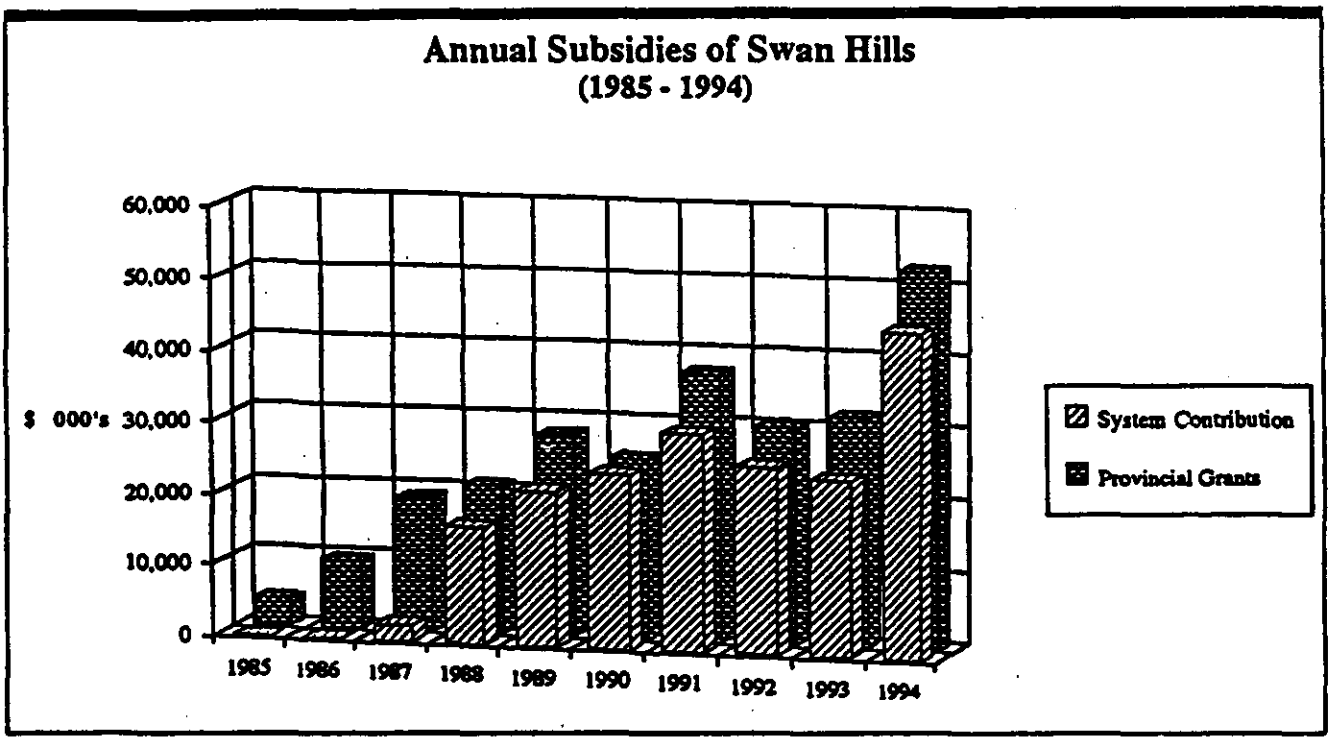


TABLE 6.1 - ANNUAL SUBSIDIES OF SWAN HILLS
Source: IAA/LSLIRC Submission

any event. Chem-Security will continue to operate the ASWTC to meet Alberta needs and according to Chem-Security, the fixed costs of operation are unavoidable as long as the ASWTC remains operating. Under the JVA, the ASWTC has an obligation to process Alberta waste and the JVA requires that no system contribution can be incurred to process out of province wastes. In examining costs and benefits, Chem-Security believes it has followed accepted cost-benefit methodology. Only incremental benefits and costs associated with a project are relevant; benefits and costs that have already been accrued or that will be accrued, regardless of whether or not the project proceeds, are not included in Chem-Security's analysis.

The Indian Association of Alberta/Lesser Slave Lake Indian Regional Council (IAA/LSLIRC) disagreed with Chem-Security regarding the magnitude of the sunk costs. It specifically challenged the assumption that all costs associated with the expansion are sunk and are either unrecoverable or unavoidable. The salvage value of the expansion is recoverable, and ongoing capital maintenance is avoidable in the IAA/LSLIRC view. A consultant acting on behalf of the IAA/LSLIRC agreed with Chem-Security that the past investment in the ASWTC is a sunk cost.

The IAA/LSLIRC disagreed with Chem-Security's approach to the allocation of costs for the treatment of hazardous wastes from other jurisdictions. In the IAA/LSLIRC analysis, costs incurred for treatment capacity in excess of Alberta's needs are allocated to the Application, including the costs of the expansion ($85 million) and the guaranteed rate of return defined by the JVA, and the fixed portion of ongoing operating expenses associated with the expansion ($14 million).

Other analysts (Engbloom, Nichols and Johnson) disagreed with this allocation as being an unusual and an inappropriate allocation of costs. Mr. Hugh Johnson of Stephen Johnson, Chartered Accountants, one of the Board Solicitor's Contract Consultants, concurred with Chem-Security that the capital costs of the expansion were incurred to meet Alberta requirements and that the fixed costs of operating the ASWTC were also necessarily incurred to meet Alberta needs.

In the Board's opinion, the capital to construct the expanded facilities has been invested or sunk. The Board believes that the amount of the sunk costs should take into account the residual value of the assets. Ongoing capital maintenance costs are not sunk, and are relevant to the consideration of the Application. As is typical of many capital assets, the Board believes the salvage or residual value of those facilities for other purposes is small. The fixed costs associated with the ASWTC were incurred to meet Alberta needs and the fixed costs must continue to be met as long as the Treatment Centre remains open. There is no indication in the evidence that there is any intention to close the ASWTC. The Board views the costs associated with the expansion as sunk costs and those costs are attributed to the Alberta market. The Board does not believe that it is reasonable to approach the current Application as though those costs have not already been incurred. The suggestion that the costs of the expansion can be assigned or apportioned to the current Application, which requires no new additional capital expenditures, is in the opinion of the Board, inappropriate and unsound.

The Board believes that its views on sunk costs are supported by the evidence provided regarding the National Energy Board cost-benefit methodology in the assessment of gas exports which states: "...only incremental benefits and costs associated with a project are relevant, benefits or costs that have already been incurred regardless of whether or not the project proceeds are not included in the analysis."

Chem-Security has indicated that it will charge open market prices for waste treatment and that prices quoted will include an additional charge to cover the cost of transporting the wastes to Alberta. Chem-Security's projected average price for the incineration of the received waste is $1,727/tonne.

Chem-Security has indicated in its economic analysis of the benefits and costs of the Application, that the average incremental operating cost of treating wastes from other Canadian jurisdictions is $187/tonne. The majority of operating costs are, in Chem-Security's view, fixed and do not vary with changes in waste quantities. The direct incremental operating expenditures associated with the Application include items such as fuel, electricity, chemicals, contract labour and laboratory costs.

Chem-Security calculates that with average revenues of $1,727 and average variable costs of $187 per tonne, the ASWTC will obtain a net benefit of $1,540 per tonne of waste received from other Canadian jurisdictions.

The IAA/LSLIRC provided its own analysis of the market for the ASWTC services in other Canadian jurisdictions. The IAA/LSLIRC utilized a range of prices for the treatment that were between twenty percent below Chem-Security's estimate, to five percent above Chem-Security's estimates of the weighted average of Chem-Security's prices for specific wastes. In 1994, the IAA/LSLIRC data indicated an average price per tonne used in their analysis would range from $1,177 to $1,447.06. The IAA/LSLIRC also provided its own analysis of the variable operating costs of the ASWTC, and for the purposes of its analysis, $272.64 was used as the variable operating costs of the ASWTC. Utilizing the IAA/LSLIRC data to derive a low estimate of prices at $1,177.00 per tonne and $272.64 variable operating costs, the ASWTC would expect a net benefit of $904.36 per tonne of waste.

Mr. Hugh Johnson of Stephen Johnson, Chartered Accountants examined the sensitivity of the ASWTC operations under various price, volume and cost assumptions, and concluded that even under extreme conditions the ASWTC would experience a net benefit from treating waste from other Canadian jurisdictions.

For its purposes in examining the economic viability of the Application, the Board notes that there would likely be a large margin between the revenues and costs associated with the treatment of extra-provincial wastes, and that this would make a positive economic contribution to the ASWTC. Since the revenues for treatment of extra-provincial wastes are expected to greatly exceed the costs incurred by receiving and treating those wastes, the Board is satisfied that the Application is economically viable. In the Board's opinion, the treatment

of even a single tonne of waste from another Canadian jurisdiction would contribute net revenues to the ASWTC. Each additional tonne would accordingly increase the net revenue to the ASWTC.

Since revenues are expected to greatly exceed costs in treating waste from other Canadian jurisdictions, the Board does not find it necessary to determine precisely the benefits associated with the Application to determine the economic viability of the Application. If the cost of treating an additional tonne of these wastes were expected to be much closer to the expected revenue, then the Board would find it necessary to examine more closely the costs and revenues. Precision surrounding the estimates of costs and revenues is not necessary in the current Application where costs are relatively well known and are expected to be significantly below revenues, even under low price conditions.

Before concluding its consideration regarding justification for the Application and its economic viability, the Board believes that it should have regard for the reasonable alternatives to the Application.

6.4 Reasonable Alternatives

The Application proposes that Chem-Security receive unconditional approval to receive hazardous wastes from other Canadian jurisdictions for treatment at the ASWTC. The Application contains no alternatives to reduce Chem-Security's forecasted requirement for a $379 million system contribution from Alberta taxpayers.

The Board believes that any responsible decision-making process compares alternatives, and the Board has examined practical alternatives to the courses of action proposed in previous reviews. The Board has considered the matter of alternatives regarding the Application by Chem-Security before the Board.

Several participants in the hearing suggested that alternatives to the proposed project had not been considered fully enough, and given the magnitude of the forecasted system contribution from taxpayers and the risks inherent in treating hazardous wastes from other Canadian jurisdictions, it might be desirable to consider alternatives to treating Canadian wastes. The proposed project is not the only way of resolving the problem associated with the excess capacity for Alberta requirements at the ASWTC and the related system contribution, some participants suggested.

The Board is fully aware that some of the alternatives identified by the participants are alternatives that the Lieutenant Governor in Council, the Minister of Environmental Protection, the Board of Directors of the Alberta Special Waste Management Corporation, or other responsible authorities may wish to consider, or may have already considered. In general, the Board believes that it should have regard for alternatives beyond the choice of All Canada waste or Alberta Only waste. For example, the IAA/LSLIRC identified the following options:

closure of the ASWTC, scale ASWMS operations to meet Alberta needs, buy out BOVAR, or privatize the ASWMS.

Any decision to close the ASWTC can only be made by the owners, BOVAR and the Alberta Special Waste Management Corporation, under the terms and conditions of the JVA. The Board has no jurisdiction to exercise any of the options available to the owners under the JVA. Scaling the ASWMS operations to meet Alberta needs and buying out BOVAR's interest in the ASWMS involve actions that can only be taken by the owners under the terms of the Joint Venture Agreement. The same is true with respect to the alternative to privatize the ASWMS.

The Board believes that the options and alternatives identified by the participants have raised some serious questions that pertain to the public interest that are beyond the jurisdiction of the Board. The Board does not intend to deal with such matters, but believes that other responsible authorities may wish to have regard for such matters in discharging their responsibilities, having considered the Board Decision regarding the Application. Participants identified these basic questions in addition to the matter before the Board:

1. Should the Alberta Special Waste Treatment Centre attract more Alberta generated hazardous wastes and increase its revenues?

2. Should the Alberta Special Waste Treatment Centre reduce its costs while maintaining safe treatment?

3. Should the Government of Alberta reduce or eliminate its financial participation in the Alberta Special Waste Treatment Centre?

The Board has had regard for the alternatives suggested by the participants to the Application to receive wastes from other Canadian jurisdictions to reduce the system contribution. Having regard for the Board's jurisdiction and the evidence, none of the alternatives would cause the Board to deny or defer consideration of the current Application so that alternative courses of action could be followed. However, the Board believes that the alternatives identified by the participants are important and may deserve attention by the appropriate authorities.

6.5 Board Views

Chem-Security's rationale for the need to receive hazardous wastes from other Canadian jurisdictions for treatment at the ASWTC is essentially financial and economic. Chem-Security takes the view that reducing the financial burden on Alberta taxpayers is the primary reason for accepting hazardous wastes from other jurisdictions.

According to Chem-Security's current evidence, the combined effect of the reduced market forecast and increased capital costs is now projected to result in Alberta taxpayers being required to spend approximately $379 million in system contributions.

The Board has considered the evidence regarding the volumes of Alberta hazardous wastes that can now be expected to be treated at the ASWTC in the foreseeable future. The Board notes the dramatic change in estimates of waste treatment volumes since the NRCB considered Application 9101. The Board accepts that the demand for the ASWTC services from Alberta generators would be less than previously predicted although the amount of hazardous wastes generated or stored in Alberta likely has not changed much over the past two or three years. The Board recognizes that the 4R's would affect waste volumes; however, these effects were anticipated in the previous review and therefore the Board accepts that there may be some small additional reduction in demand attributable to such practices. The Board also accepts that more hazardous wastes may be leaving Alberta than previously predicted. There has been strong competition from less costly disposal options available in jurisdictions outside Alberta that were prepared to accept options like long term storage in landfills, or other treatment methods that were not equivalent to treatment capability of the ASWTC, such as incineration in cement kilns. The Board also notes that oil and gas industry wastes would be subject to stringent regulatory controls currently being developed that would ensure that such wastes do not contaminate Alberta's environment. The Board believes that it would be premature to assume that those regulatory requirements would not mean treatment of some oil and gas industry wastes at the ASWTC, especially if the application of the 4R's to such wastes leads to the concentration of more difficult to treat residual wastes.

Having regard for the factors discussed above, the Board concludes that, especially in the short term, the ASWTC would experience excess capacity to Alberta requirements due to less than previously predicted demand for the ASWTC services from Alberta generators of hazardous wastes. The amount of excess capacity currently reflected in the various estimates before the Board varies, but the Board does not believe that the Alberta demand for the ASWTC services would be as low as predicted by Chem-Security over the forecast period in the Application.

The expansion has been completed. The question now before the NRCB is not whether the expansion was justified, but rather, whether the proposal to receive hazardous wastes from other Canadian jurisdictions by the ASWMS is in the public interest.

To reduce the amount of the total forecasted system contributions, Chem-Security proposes to utilize the capacity in excess of Alberta needs to service other Canadian jurisdictions, thereby reducing the cost to Alberta taxpayers. Given a potential reduction in the forecasted cost to taxpayers, the Board is prepared to consider the Application in detail and to determine the public interest, having regard for the related social, economic and environmental effects.

7.0 ECONOMIC EFFECTS

7.1 Introduction

During the hearing, the Board received evidence regarding the development of the Alberta Special Waste Management System. The Board summarized in Section 5 the historical information leading to the development of the Alberta Special Waste Management System and evidence leading up to Chem-Security's Application. The Board, in this section of the Report, will summarize the more significant evidence regarding economic impacts that would be associated with the project, if it were approved.

A concern of many hearing participants was that, in their opinion, Chem-Security's past market assessments have proven to be unreliable; consequently, it was the belief of some participants that Chem-Security's evidence regarding market forecasts should be given little weight in the Board's decision. The Board has discussed the reliability of Chem-Security's past forecasts in Section 6. As the ability to capture waste markets has a bearing on the financial and economic effects of Chem-Security's proposal, the Board will describe the views of participants concerning markets, potential effects on the system contribution and, more generally, potential economic effects associated with this Application.

7.2 Views of Chem-Security

7.2.1 Market Forecasts

As discussed in Section 6, Chem-Security's projected volume of Alberta wastes available to the Treatment Centre on a yearly basis, ranges between 16,500 tonnes in 1994 to 36,500 tonnes in 2003 (see Table 7.1). These waste volumes represent liquids, solids and sludges subject to a variety of treatment options provided by the ASWTC. The projections were based upon Chem-Security's experience in the marketplace, and the Board was advised that no additional waste market surveys were conducted. Chem-Security's Alberta market estimates were based on knowledge of existing generators' requirements and needs based on regulatory direction and competing factors. Chem-Security emphasized that it is difficult to project with certainty what treatment requirements will exist in the future and uncertainty would increase over the waste market forecast period. Therefore, the volumes projected for the period 1994 through 1997 were expected to be accurate to within $\pm$ 15 percent whereas Chem-Security thought the projections beyond that period might vary by as much as $\pm$ 25 percent.

If its Application is approved, Chem-Security anticipates that hazardous organic wastes would be available from outside Alberta for treatment at the Treatment Centre (see Table 7.1). These waste types include: organic sludges, halogenated solvents, non-halogenated solvents, oils and greases, oil/mineral water mixtures, paint and organic residues, pesticide and herbicide wastes, PCB wastes, soils and solids, and activated carbon.

PROJECTED ALBERTA WASTE VOLUMES
PROCESS SUMMARY (TONNES)

	INCINERATION							
YEAR	LIQUIDS	SOLIDS	SLUDGES	TRANSFORMERS	PHYS/CHEM	STABILIZATION	LABPACKS	TOTAL
1994	5400	4700	3000	1300	500	1400	200	16500
1995	3000	4300	1700	0	1100	6000	400	16500
1996	3700	5600	3000	0	1200	8600	400	22500
1997	4600	6900	3800	0	1300	10000	400	27000
1998	5600	8700	4900	0	1400	10000	400	31000
1999	5900	9100	5100	0	1500	10000	400	32000
2000	6200	9600	5300	0	1500	10000	400	33000
2001	6500	10100	5900	0	1600	10000	400	34500
2002	6800	10600	6000	0	1700	10000	400	35500
2003	7100	11100	6100	0	1800	10000	400	36500

PROJECTED EXTRA-PROVINCIAL WASTE VOLUMES
PROCESS SUMMARY (TONNES)

	INCINERATION							
YEAR	LIQUIDS	SOLIDS	SLUDGES	TRANSFORMERS	PHYS/CHEM	STABILIZATION	LABPACKS	TOTAL
1994	3000	5000	0	0	0	0	0	8000
1995	2000	8800	7700	3000	0	0	0	21500
1996	2600	9600	8800	3000	0	0	0	24000
1997	3300	8600	7600	3000	0	0	0	22500
1998	4200	7300	6000	3000	0	0	0	20500
1999	4400	6900	5700	3000	0	0	0	20000
2000	4600	6600	5300	3000	0	0	0	19500
2001	4900	6200	4900	3000	0	0	0	19000
2002	4900	5800	4300	3000	0	0	0	18000
2003	5000	5400	3600	3000	0	0	0	17000

TABLE 7.1 - PROJECTED ALBERTA AND EXTRA-PROVINCIAL WASTE VOLUMES
Source: Chem-Security Application 9301 Supplemental Information

In preparing its market information, Chem-Security had regard for Ontario market data made available by the Ontario Waste Management Corporation (OWMC) as well as data contained in a report prepared by the Manitoba Hazardous Waste Management Corporation (MHWMC). This information was presented to demonstrate that substantial volumes of waste would be available in other provinces for treatment at the ASWTC. Chem-Security provided its estimates of what wastes will be available in Alberta and what portion of the Treatment Centre's capacity would be taken up by that waste. The waste volumes expected from out of province were assumed to take up the excess capacity over time. On this basis, the total yearly organic waste volumes from extra-provincial sources were estimated to range from between 8,000 tonnes in 1994 to 17,000 tonnes in 2003. These volumes include approximately 10,000 tonnes of PCBs per year over a four-year period beginning in 1995, or approximately 25 percent of PCB wastes estimated to be in inventory in Canada. In terms of total treatment capacity, the combined waste volumes from all sources according to Chem-Security would equal approximately 53,500 tonnes by 2003. Chem-Security expressed a high degree of confidence in its projections, stating that it fully expects to steadily receive increased volumes, and by the year 2003 would be operating at or near capacity if the Application were to be approved.

In arriving at the projected waste volumes noted above, Chem-Security made several additional assumptions:

- the national target of waste minimization by 50 percent would occur in large part through on-site treatment that will increase the generation of difficult to treat residues;
- the Applicant would target as its primary market higher end "difficult to treat wastes" or "highly regulated" wastes such as PCBs;
- the status quo was assumed in relation to competitive pricing; and,
- no market effects were forecast to result from competitive facilities being proposed in Saskatchewan, Manitoba and Ontario.

Chem-Security said that the assumption regarding competition was based on several factors. Firstly, it stated that the MHWMC facility does not include treatment processes that would compete directly with a rotary kiln incinerator. It stated that the MHWMC facility would only be able to compete with Chem-Security for inorganic streams; heavy metal solutions, anion complexes, site inorganics, and sludges and inorganic residues. Additionally, it stated that the MHWMC facility would not treat PCB wastes as a matter of public policy. Secondly, Chem-Security stated that the proposed facility at Estevan, Saskatchewan was not considered to be a potential competitor because it was described as being in the early stages of planning and would have a very small capacity of approximately 1,000 t/a. Thirdly, Chem-Security did not view a facility currently being considered in Ontario as a potential competitor because it has been in the planning stages for over ten years and may never be approved. Lastly, with respect to other facilities and other waste treatment options available to waste generators, Chem-Security

acknowledged that in general there has been an increase in alternative waste management options in the past decade, characterized by treatment options such as fuel blending for cement kilns, bioremediation and other future potential forms of treatment. However, Chem-Security did not consider that these treatment options would pose a significant competitive threat to the ASWTC. Generally, Chem-Security expressed a high degree of confidence that it could capture the projected volumes of waste because of its increased marketing experience, the quality of the Treatment Centre and its relatively low variable operating costs (discussed in Section 6).

On the issue of pricing, Chem-Security made a distinction between prices it expects to charge out of province waste generators and to generators within the province. It stated that Alberta waste generators were charged a treatment fee which includes a uniform "postage stamp" price covering the cost of transportation throughout the province. The Board was advised that this policy was developed so that Alberta waste generators located some distance from the Treatment Centre would not be discouraged from using the facility. Waste generators outside of the province would be charged a fee which would include the cost of treatment plus an additional charge to cover the cost of transportation to the Treatment Centre. It was Chem-Security's position that the additional charge for transportation of waste to the ASWTC would not be a barrier to the utilization of the Treatment Centre by generators in other Canadian jurisdictions. Chem-Security believed that it would be able to capture its portion of the market share by charging open market prices.

Other factors that Chem-Security believed would enhance its ability to attract out of province waste generators included the targeting of "highly regulated" waste and using the treatment of these wastes as a magnet to attract other wastes. Also, Chem-Security stated that it intends to include, as part of a treatment contract with the generator, its acceptance of responsibility associated with the transportation of waste to the Treatment Centre from the generator's loading site. Chem-Security believed that this contractual relationship would increase the marketability of the services as this service is not generally provided within the industry.

7.2.2 Economic Effects

Based on its market assumptions, Chem-Security provided an economic impact assessment for the project over the period 1994 to the year 2008 (see Table 7.2 and 7.3). In its assessment of the project's economic impacts, Chem-Security assumed that fixed costs would be approximately the same whether or not its Application were approved. Chem-Security also assumed that the financial resources required to both construct the Treatment Centre and to expand its incinerator capacity following approval of Application 9101 were "sunk"; that is, expended without any significant opportunity for recovery. It was stated by Chem-Security that any salvage value from the sale of the assets would amount to less than ten percent of the cost of the invested capital. Chem-Security recognized that costs would have to be incurred in order to replace worn out equipment and to keep the Treatment Centre operational. It was estimated that these costs would be equal to approximately $5 million per year or $75 million over a 15-year period. Chem-Security stated that the only way the fixed costs associated with the

Treatment Centre could be recovered would be to increase the revenues available to the system. In this regard, Chem-Security stated that the most sensible business option was to pursue an expanded market in order to increase revenues before consideration was given to disposal of the Treatment Centre's assets. Lastly, Chem-Security estimated that variable costs associated with the treatment of any additional tonne of waste would, on average, equal approximately $187/tonne.

Based on the above assumptions, Chem-Security estimated the economic impacts associated with the Application by subtracting the net operating costs of the All Canada case from the net operating costs of the Alberta Only case after leakages in the form of transportation costs and federal taxes. It was further assumed that the portion of revenue attributable to transportation within Alberta is offset by the portion of incremental operating costs spent outside of Alberta. In this manner, Chem-Security concluded that the net economic benefit to the Province of Alberta of treating waste from other Canadian jurisdictions would equal approximately $240 million or $220 million discounted at eight and ten percent respectively. Also, Chem-Security concluded that the calculation of the Minimum Required Joint Venture Income would result in a system contribution of approximately $380 million under the Alberta Only case versus approximately $100 million under the All Canada case thereby representing a net reduction in the system contribution of approximately $280 million. During the hearing, the Applicant provided a sensitivity analysis based upon its assumed uncertainty levels of $\pm$ 15 percent and $\pm$ 25 percent as noted above. (See Table 7.4, 7.5, and 7.6). The result of this analysis showed that, having regard for the assumptions contained therein, for the Alberta Only case the total non-repayable system contribution may vary between approximately $200 million and $300 million; similarly, for the All Canada case, the required non-repayable system contribution potentially varied between approximately $85 million and $117 million.

In its economic assessment, Chem-Security assumed that secondary or indirect economic impacts would equal the primary impacts. Consequently, Chem-Security estimated combined direct and indirect provincial economic impacts resulting from the receipt of hazardous waste to equal approximately $860 million. Chem-Security stated that the local and regional impacts associated with the treatment of received waste would not likely be significant because of the small incremental effect of the cost of operating the Treatment Centre and the necessity of purchasing material outside of the region.

To highlight the magnitude of the effect that the receipt of extra-provincial waste would have on the Treatment Centre's cash flow, Chem-Security emphasized its receipt of greater than $17 million in revenues as a result of the incineration of waste during test burns of the new kiln. According to Chem-Security, these revenues "for the first time enabled Chem-Security to show an operating profit rather than being in receipt of a system contribution." Chem-Security stated that the waste received for the test burns was the best test of its market forecasts.

TABLE 7.2

ALBERTA ECONOMIC IMPACT, 1994 TO 2008

RECEIPT AND TREATMENT OF ADDITIONAL WASTE AT THE ASWTC

		Millions of 1994$
	Operating Cost	52
Plus:	Net Operating Revenue	423
Equals:	Gross Impact	475
Less:	Leakages from Alberta	45
Equals:	Total Direct Impact	430
Plus:	Total Indirect Impact	430
Equals:	Total Alberta Economic Impact	860

Source: Chem-Security Application 9301 - Appendices - March 15, 1994

TABLE 7.3

ALBERTA NET BENEFIT, 1994 TO 2008

RECEIPT AND TREATMENT OF ADDITIONAL WASTE AT THE ASWTC

		Discounted @:	
		8%	10%
		Millions of 1994$	
	Gross Project Benefits	262	239
Less:	Leakages from Alberta	20	17
Equals:	Net Alberta Benefit	242	222

Source: Chem-Security Application 9301 - Appendices - March 15, 1994

During the course of the hearing, Chem-Security recognized the uncertainty regarding its market projections and associated economic impacts by stating that "...there is no guarantee that the level of economic benefit projected in the Application will be realized." However, Chem-Security was satisfied that significant volumes exist and that the net economic benefit will be positive irrespective of the actual market share captured.

7.3 Views of the Indian Association of Alberta/Lesser Slave Lake Indian Regional Council (IAA/LSLIRC)

7.3.1 Market Forecasts

It was IAA/LSLIRC's position that Chem-Security's market forecasts did not meet adequate standards of traceability and replicability. IAA/LSLIRC believed that the market forecast approach employed in its own assessment was more valuable to the Board in providing an assessment of both provincial and extra-provincial waste markets. Although IAA/LSLIRC articulated greater confidence in the outcome of its waste market forecasts, it reflected a degree of common ground with Chem-Security in recognizing "...the inherent risk in any forecasting exercise and particularly so in one where the number of factors and the potential influence of individual factors are so great."

The IAA/LSLIRC was also dissatisfied with the approach taken by Chem-Security in assessing the merits of the Application. According to IAA/LSLIRC, Chem-Security should have evaluated other alternatives to allow the Board to gain an understanding of the opportunity costs associated with the potential approval of the Application and thereby make the best assessment as to whether or not the Application is in the public interest.

As a means of addressing its views of the issues surrounding the decision to be made by the Board, IAA/LSLIRC conducted its own market forecast for the Alberta Only case and for the All Canada case. The data presented by IAA/LSLIRC was based upon information contained in waste manifest records for Alberta and Ontario, the MHWMC document, and by interviewing various individuals familiar with hazardous waste management information and practices. In conducting waste market forecasts, the IAA/LSLIRC expert made a number of assumptions. The assumptions relate to factors such as market growth, prices, the effects of regulation and enforcement, and waste market growth within other jurisdictions such as Saskatchewan, Manitoba, Ontario, British Columbia and the Yukon/Northwest Territories. These factors varied according to what IAA/LSLIRC considered high, best and low market scenarios. The assumptions are outlined in Table 7.7.

ALL $ ARE IN 1994 DOLLARS

ASWMS - BUSINESS PLAN
BASE CASE ALBERTA WASTE ONLY

Year	Volume	Generator Revenue	Revenue per Ton	System Contribution	Total Revenue	Variable Operating Expenses	Fixed Operating Expenses	Total Operating Cost/Tonne	Net Income Before Amortization	Amortization	Net Income Before Tax	Tax@48%	Net Income	Capital Base	Repayable System Contribution	Non-Repayable System Contribution	Total System Contribution	Increase (Decrease) in ASWMC's Investment in Joint Venture	ASWMC's Contribution to Asset Replacement	Minimum Joint Venture Income attributable to ASWMC
1994	16,431	17,190	1,044	50,321	67,481	4,488	27,164	1,826	35,829	14,888	20,941	10,051	10,889	140,131	17,282	33,039	50,321	36,951	41,896	8,297
1995	16,721	18,998	1,136	61,885	80,893	3,116	29,759	1,966	48,018	21,967	26,051	12,505	13,547	124,722	15,872	46,023	61,885	(6,165)	3,845	10,581
1996	22,715	25,273	1,113	51,883	77,156	4,229	30,193	1,515	42,734	17,777	24,957	11,978	12,977	109,714	15,332	36,351	51,883	(4,200)	2,577	10,221
1997	27,231	30,271	1,112	44,022	74,293	5,073	30,706	1,314	38,514	18,344	23,170	11,122	12,049	95,293	14,180	29,842	44,022	(3,878)	2,171	9,453
1998	31,093	35,217	1,133	34,512	69,729	6,235	30,981	1,197	32,513	12,856	19,657	9,531	10,326	89,385	13,259	21,253	34,512	(3,216)	1,850	8,940
1999	32,113	36,500	1,137	30,693	67,193	5,974	30,931	1,149	30,288	12,713	17,575	8,436	9,139	70,872	10,658	20,034	30,693	(3,372)	1,655	7,106
2000	33,183	37,842	1,140	25,994	63,836	6,187	30,843	1,116	26,806	11,853	14,953	7,177	7,776	58,569	9,019	16,975	25,994	(3,171)	1,489	6,013
2001	34,303	39,250	1,144	21,870	61,220	6,394	30,773	1,063	24,053	11,509	12,544	6,021	6,523	49,071	7,310	14,460	21,870	(3,064)	1,443	5,007
2002	35,463	40,731	1,148	17,843	58,574	6,423	30,894	1,032	21,257	10,915	10,342	4,964	5,378	39,626	6,130	11,713	17,843	(2,844)	1,405	4,057
2003	36,722	42,286	1,152	13,861	56,147	6,647	30,846	1,021	18,654	10,319	8,335	4,001	4,334	31,015	4,880	8,981	13,861	(2,889)	1,300	3,253
2004	36,722	42,286	1,152	8,845	51,131	6,648	30,585	1,019	13,898	6,797	6,901	3,313	3,589	26,523	3,979	4,866	8,845	(1,206)	1,446	2,653
2005	36,722	42,286	1,152	4,825	47,111	6,634	30,558	1,018	9,719	3,398	6,321	3,034	3,287	25,757	3,002	1,823	4,825	199	1,441	2,414
2006	36,722	42,286	1,152	4,359	46,645	6,647	30,502	1,017	9,298	3,106	6,190	2,971	3,219	25,318	2,712	1,647	4,359	315	1,436	2,359
2007	36,722	42,287	1,152	4,088	46,375	6,604	30,507	1,016	9,064	2,964	6,100	2,928	3,172	25,048	2,343	1,545	4,088	374	1,431	2,326
2008	36,722	42,286	1,152	3,915	46,201	6,645	30,425	1,015	8,831	2,869	6,062	2,910	3,152	24,864	2,435	1,480	3,915	404	1,427	2,305
Total	469,803	534,939		379,026	913,965	89,344	455,287		360,374	150,075	210,299	100,943	109,355		128,793	250,233	379,026	4,636	66,650	84,915

ALL $ ARE IN 1994 DOLLARS

ASWMS - BUSINESS PLAN
ALL CANADA CASE

Year	Volume	Generator Revenue	Revenue per Ton	System Contribution	Total Revenue	Variable Operating Expenses	Fixed Operating Expenses	Total Operating Cost/Tonne	Net Income Before Amortization	Amortization	Net Income Before Tax	Tax@48%	Net Income	Capital Base	Repayable System Contribution	Non-Repayable System Contribution	Total System Contribution	Increase (Decrease) in ASWMC's Investment in Joint Venture	ASWMC's Contribution to Asset Replacement	Minimum Joint Venture Income attributable to ASWMC
1994	29,246	28,583	1,089	40,270	68,853	5,539	27,164	1,248	36,150	14,888	21,262	10,206	11,056	140,131		40,270	40,270	38,851	41,896	8,297
1995	38,315	58,199	1,519	27,408	85,607	7,273	29,759	987	48,575	21,967	26,608	12,772	13,836	132,753		27,408	27,408	(2,932)	3,865	10,902
1996	46,747	67,750	1,449	16,490	84,240	9,849	30,193	857	44,198	17,777	26,421	12,682	13,739	118,321		16,490	16,490	(3,774)	2,577	10,957
1997	48,852	68,536	1,400	10,674	80,210	9,477	30,706	809	40,027	18,344	24,683	11,848	12,835	103,435		10,674	10,674	(3,777)	2,171	10,300
1998	51,500	70,469	1,368	4,647	75,116	9,903	30,981	794	34,232	12,856	21,376	10,356	11,220	87,232		4,647	4,647	(3,407)	1,850	9,605
1999	52,014	70,745	1,360	1,630	72,375	9,991	30,931	787	31,453	12,713	18,740	8,995	9,745	77,972		1,630	1,630	(3,316)	1,655	7,771
2000	52,556	71,034	1,352	0	71,034	11,114	30,843	786	29,077	11,853	17,224	8,268	8,956	66,451	(265)	0	(265)	(3,123)	1,489	7,429
2001	53,122	71,337	1,343	0	71,337	10,246	30,773	772	30,318	11,509	18,807	9,027	9,780	55,724	(1,824)	0	(1,824)	(3,024)	1,443	9,822
2002	53,514	71,555	1,337	0	71,555	10,352	30,694	767	30,509	10,915	19,594	9,405	10,188	48,018	(2,967)	0	(2,967)	(2,822)	1,405	11,113
2003	53,924	71,782	1,331	0	71,782	10,429	30,646	762	30,707	10,319	20,388	9,786	10,602	37,130	(4,074)	0	(4,074)	(2,678)	1,300	12,529
2004	53,924	71,782	1,331	0	71,782	10,445	30,585	761	30,752	6,797	23,955	11,498	12,457	32,638	(7,963)	0	(7,963)	(1,069)	1,446	17,897
2005	53,924	71,782	1,331	0	71,782	10,428	30,558	760	30,796	3,398	27,398	13,151	14,247	31,873	(9,870)	0	(9,870)	315	1,441	21,332
2006	53,924	71,782	1,331	0	71,782	10,442	30,502	759	30,838	3,106	27,732	13,311	14,421	31,434	(10,204)	0	(10,204)	431	1,436	21,704
2007	53,924	71,783	1,331	0	71,783	10,437	30,507	759	30,839	2,964	27,875	13,380	14,495	31,162	(10,340)	0	(10,340)	490	1,431	21,920
2008	53,924	71,782	1,331	0	71,782	10,441	30,425	758	30,916	2,869	28,047	13,463	14,584	30,980	0	0		521	1,427	11,831
Total	747,210	1,009,901		101,118	1,111,020	148,366	455,287		506,365	150,075	350,310	168,149	182,161		(47,647)	101,118	53,472	8,747	66,650	193,810

NOTES:

1) Revenue $/Tonne depends on specific waste characteristics & treatment requirements i.e. incineration,phys/chem,stabilization etc.
2) These projections are based on economic and other assumptions and courses of action provided by third parties that represent plausible circumstances, however, there is a significant risk that actual results will vary, perhaps materially, from the results projected.
3) ASWMC's contribution to asset replacement after 1994 consists of capital maintenance only.

TABLE 7.4 - ASWMS BUSINESS PLAN
Source: Chem-Security Exhibit 119

ALL $ ARE IN 1994 DOLLARS

ASWMS - BUSINESS PLAN
BASE CASE ALBERTA WASTE ONLY - PLUS 15% (1994 - 1997)
- PLUS 25% (1998 - 2008)

Year	Volume	Generator Revenue	Revenue per Ton	System Contribution	Total Revenue	Variable Operating Expenses	Fixed Operating Expenses	Total Operating Cost/Tonne	Net Income Before Amortization	Amortization	Net Income Before Tax	Tax@48%	Net Income	Capital Base	Repayable System Contribution	Non-Repayable System Contribution	Total System Contribution	Increase (Decrease) in ASWMC's Investment in Joint Venture	ASWMC's Contribution to Asset Replacement	Minimum Joint Venture Income attributable to ASWMC
1994	18,896	19,734	1,044	42,773	62,307	5,162	27,164	1,711	30,181	14,886	15,293	7,341	7,952	140,131	14,880	28,093	42,773	34,951	41,896	8,297
1995	18,229	21,848	1,136	52,611	74,458	3,983	29,750	1,734	41,116	21,967	19,149	9,192	9,958	124,722	13,491	39,120	52,611	(6,165)	3,885	10,341
1996	25,122	29,064	1,113	44,101	73,165	4,864	30,193	1,342	36,108	17,777	20,331	9,758	10,572	109,714	13,032	31,069	44,101	(4,200)	2,377	10,221
1997	31,316	34,812	1,112	37,419	72,230	5,834	30,706	1,167	35,091	15,344	20,347	9,768	10,580	95,293	12,053	25,366	37,419	(3,878)	2,171	9,453
1998	38,866	44,021	1,133	25,864	69,905	7,794	30,981	998	31,131	12,656	18,475	8,868	9,607	80,365	9,944	15,940	25,884	(3,216)	1,850	8,840
1999	40,141	45,625	1,137	23,020	68,645	7,467	30,931	957	30,247	12,713	17,534	8,416	9,117	70,872	7,995	15,025	23,020	(3,372)	1,655	7,106
2000	41,470	47,303	1,140	19,496	66,799	7,734	30,843	930	28,221	11,853	16,368	7,857	8,512	59,569	6,764	12,731	19,496	(3,171)	1,488	6,813
2001	42,570	48,063	1,144	16,478	65,540	7,983	30,773	904	26,774	11,500	15,265	7,327	7,938	49,071	5,632	10,846	16,478	(3,064)	1,443	3,007
2002	44,354	50,914	1,148	13,342	64,296	8,270	30,694	879	25,323	10,915	14,408	6,916	7,492	38,626	4,586	8,785	13,382	(2,844)	1,405	4,067
2003	45,903	52,858	1,152	10,396	63,253	8,550	30,646	854	24,049	10,319	13,730	6,590	7,139	31,015	3,660	6,736	10,396	(2,649)	1,300	3,253
2004	45,903	52,858	1,152	8,634	58,491	8,360	30,385	853	20,346	6,797	13,549	6,504	7,045	26,523	2,984	3,849	6,834	(1,206)	1,446	2,653
2005	45,903	52,856	1,152	3,618	56,476	8,342	30,358	852	17,378	3,398	13,978	6,710	7,268	25,757	2,251	1,368	3,619	199	1,441	2,414
2006	45,903	52,856	1,152	3,269	56,127	8,359	30,302	851	17,865	3,106	13,950	6,701	7,250	25,318	2,034	1,230	3,269	315	1,436	2,350
2007	45,903	52,858	1,152	3,068	55,925	8,305	30,307	850	16,813	2,964	13,949	6,695	7,253	25,046	1,907	1,159	3,066	374	1,431	2,329
2008	45,903	52,856	1,152	2,936	55,794	8,357	30,425	849	16,812	2,869	13,943	6,693	7,250	24,864	1,827	1,110	2,936	404	1,427	2,305
Total	576,066	630,329		308,062	964,616	109,990	455,267		399,343	150,075	240,278	115,334	124,945		102,861	203,220	308,082	4,634	66,650	84,915

ALL $ ARE IN 1994 DOLLARS

ASWMS - BUSINESS PLAN
BASE CASE ALBERTA WASTE ONLY - MINUS 15% (1994 - 1997)
- MINUS 25% (1998 - 2008)

Year	Volume	Generator Revenue	Revenue per Ton	System Contribution	Total Revenue	Variable Operating Expenses	Fixed Operating Expenses	Total Operating Cost/Tonne	Net Income Before Amortization	Amortization	Net Income Before Tax	Tax@48%	Net Income	Capital Base	Repayable System Contribution	Non-Repayable System Contribution	Total System Contribution	Increase (Decrease) in ASWMC's Investment in Joint Venture	ASWMC's Contribution to Asset Replacement	Minimum Joint Venture Income attributable to ASWMC
1994	13,966	14,586	1,044	57,869	72,455	3,815	27,164	2,218	72,455	14,886	25,368	12,762	13,826	140,131	19,874	37,995	57,869	34,951	41,896	8,297
1995	14,213	16,148	1,136	71,179	87,326	2,849	29,730	2,260	87,328	21,967	32,953	15,817	17,136	124,722	18,252	52,927	71,179	(6,165)	3,885	10,381
1996	19,306	21,482	1,113	59,665	81,148	3,385	30,193	1,750	81,146	17,777	29,583	14,200	15,383	109,714	17,632	42,034	59,665	(4,200)	2,577	10,221
1997	23,146	25,730	1,112	50,625	76,356	4,312	30,706	1,513	76,356	15,344	25,994	12,477	13,517	95,293	16,307	34,318	50,625	(3,878)	2,171	9,453
1998	23,320	26,413	1,133	43,140	69,553	4,676	30,981	1,529	69,353	12,656	21,240	10,195	11,045	80,365	16,574	26,566	43,140	(3,216)	1,850	8,840
1999	24,065	27,375	1,137	38,366	65,741	4,400	30,931	1,470	65,741	12,713	17,617	8,456	9,161	70,872	13,324	25,042	38,366	(3,372)	1,655	7,106
2000	24,667	28,382	1,140	32,483	60,874	4,840	30,843	1,420	60,874	11,853	13,538	6,498	7,040	59,569	11,274	21,210	32,483	(3,171)	1,488	6,013
2001	25,727	29,438	1,144	27,463	56,900	4,794	30,773	1,383	56,900	11,500	9,822	4,715	5,108	49,071	9,387	18,075	27,463	(3,064)	1,443	5,007
2002	26,812	30,548	1,146	22,304	52,852	4,867	30,694	1,340	52,852	10,915	6,276	3,012	3,263	38,626	7,663	14,641	22,304	(2,844)	1,405	4,067
2003	27,542	31,715	1,152	17,326	49,041	5,135	30,646	1,298	49,041	10,319	2,941	1,412	1,529	31,015	6,100	11,227	17,326	(2,649)	1,300	3,253
2004	27,542	31,715	1,152	11,056	42,771	5,136	30,585	1,297	42,771	6,797	253	121	131	26,523	4,974	6,082	11,056	(1,206)	1,446	2,653
2005	27,542	31,715	1,152	6,031	37,746	5,125	30,858	1,296	37,746	3,388	(1,335)	(641)	(1,976)	25,757	3,752	2,279	6,031	199	1,441	2,414
2006	27,542	31,715	1,152	5,449	37,163	5,136	30,502	1,294	37,163	3,106	(1,580)	(759)	(2,330)	25,318	3,389	2,058	5,449	315	1,436	2,359
2007	27,542	31,715	1,152	5,110	36,825	5,103	30,507	1,293	36,825	2,964	(1,749)	(839)	(2,588)	25,046	3,179	1,931	5,110	374	1,431	2,329
2008	27,542	31,715	1,152	4,894	36,608	5,134	30,425	1,291	36,608	2,869	(1,820)	(874)	(2,693)	24,864	3,044	1,850	4,894	404	1,427	2,305
Total	360,514	410,369		452,970	863,360	68,690	455,267		663,360	150,075	180,319	86,553	87,341		154,725	298,245	452,970	4,636	66,650	84,915

NOTES:

1) Revenue $/Tonne depends on specific waste characteristics & treatment requirements i.e. incineration,phys/chem,stabilization etc.
2) These projections are based on economic and other assumptions and courses of action provided by third parties that represent plausible circumstances, however, there is a significant risk that actual results will vary, perhaps materially, from the results projected.
3) ASWMC's contribution to asset replacement after 1994 consists of capital maintenance only.

TABLE 7.5 - ALBERTA ONLY CASE - ± 15 PERCENT AND ± 25 PERCENT
Source: Chem-Security Exhibit 119

ASWMS - BUSINESS PLAN
ALL CANADA CASE - PLUS 15% (1994 - 1997)
- PLUS 25% (1998 - 2008)

ALL $ ARE IN 1994 DOLLARS

Year	Volume	Generator Revenue	Revenue per Ton	System Contribution	Total Revenue	Variable Operating Expenses	Fixed Operating Expenses	Total Operating Cost/Tonne	Net Income Before Amortization	Amortization	Net Income Before Tax	Tax@48%	Net Income	Capital Base	Repayable System Contribution	Non-Repayable System Contribution	Total System Contribution	Increase (Decrease) in ASWMC's Investment in Joint Venture	ASWMC's Contribution to Asset Replacement	Minimum Joint Venture Income attributable to ASWMC
1994	30,183	32,870	1,089	34,230	67,100	7,817	27,164	1,192	32,319	14,888	17,431	8,367	9,064	140,131		34,230	34,230	36,951	41,696	8,297
1995	44,062	66,929	1,519	23,297	90,226	8,211	29,750	862	52,256	21,967	30,289	14,539	15,750	132,753		23,297	23,297	(2,952)	3,885	10,902
1996	53,759	77,913	1,448	14,017	91,929	10,010	30,193	748	51,726	17,777	33,949	16,296	17,654	118,521		14,017	14,017	(3,774)	2,577	10,957
1997	57,100	79,966	1,400	9,073	89,039	10,637	30,706	724	47,697	15,344	32,353	15,529	16,823	103,435		9,073	9,073	(3,777)	2,171	10,300
1998	64,375	88,086	1,368	3,485	91,572	12,900	30,981	682	47,682	12,656	35,026	16,812	18,213	97,232		3,485	3,485	(3,407)	1,850	9,605
1999	65,018	88,431	1,360	1,223	89,654	12,086	30,931	662	46,628	12,713	33,916	16,279	17,636	77,972		1,223	1,223	(3,316)	1,659	7,771
2000	65,695	88,793	1,352	0	88,793	12,249	30,843	658	45,701	11,853	33,848	16,247	17,601	66,451	(357)		(357)	(3,123)	1,489	7,429
2001	66,403	89,171	1,343	0	89,171	12,378	30,773	650	46,021	11,509	34,512	16,566	17,946	55,724	(2,279)		(2,279)	(3,024)	1,443	9,622
2002	66,893	89,444	1,337	0	89,444	12,486	30,694	646	46,264	10,915	35,349	16,967	18,381	46,016	(3,734)		(3,734)	(2,822)	1,405	11,113
2003	67,405	89,726	1,331	0	89,726	12,566	30,646	641	46,514	10,319	36,195	17,374	18,821	37,130	(5,063)		(5,063)	(2,676)	1,300	12,529
2004	67,405	89,726	1,331	0	89,726	12,570	30,565	640	46,573	6,797	39,776	19,092	20,683	32,836	(9,953)		(9,953)	(1,089)	1,446	17,897
2005	67,405	89,726	1,331	0	89,726	12,543	30,558	639	46,626	3,396	43,226	20,750	22,479	31,873	(12,462)		(12,462)	315	1,441	21,332
2006	67,405	89,726	1,331	0	89,726	12,569	30,502	639	46,657	3,106	43,551	20,904	22,646	31,434	(12,755)		(12,755)	431	1,436	21,704
2007	67,406	89,729	1,331	0	89,729	12,489	30,507	638	46,733	2,964	43,769	21,009	22,760	31,162	(12,925)		(12,925)	490	1,431	21,920
2008	67,406	89,729	1,331	0	89,729	12,565	30,425	638	46,737	2,868	43,869	21,057	22,812	30,900	0		0	521	1,427	11,631
Total	917,917	1,236,960		85,323	1,325,293	173,893	435,267		696,133	159,073	537,058	257,786			(59,558)	85,323	25,765	8,747	66,850	193,810

ASWMS - BUSINESS PLAN
ALL CANADA CASE - MINUS 15% (1994 - 1997)
- MINUS 25% (1998 - 2008)

ALL $ ARE IN 1994 DOLLARS

Year	Volume	Generator Revenue	Revenue per Ton	System Contribution	Total Revenue	Variable Operating Expenses	Fixed Operating Expenses	Total Operating Cost/Tonne	Net Income Before Amortization	Amortization	Net Income Before Tax	Tax@48%	Net Income	Capital Base	Repayable System Contribution	Non-Repayable System Contribution	Total System Contribution	Increase (Decrease) in ASWMC's Investment in Joint Venture	ASWMC's Contribution to Asset Replacement	Minimum Joint Venture Income attributable to ASWMC
1994	22,308	24,296	1,089	46,311	70,606	5,630	27,164	1,470	37,812	14,888	22,924	11,004	11,921	140,131		46,311	46,311	36,951	41,696	8,297
1995	32,968	49,469	1,519	31,519	80,988	6,069	29,750	1,100	45,160	21,967	23,193	11,133	12,061	132,753		31,519	31,519	(2,952)	3,885	10,902
1996	39,735	57,588	1,449	18,964	76,551	7,396	30,193	946	38,960	17,777	21,183	10,168	11,015	118,521		18,964	18,964	(3,774)	2,577	10,957
1997	42,204	59,106	1,400	12,275	71,381	7,862	30,706	914	32,813	15,344	17,469	8,385	9,084	103,435		12,275	12,275	(3,777)	2,171	10,300
1998	38,625	52,852	1,368	5,809	58,661	7,745	30,981	1,003	19,934	12,656	7,278	3,494	3,785	97,232		5,809	5,809	(3,407)	1,850	9,605
1999	39,011	53,059	1,360	2,036	55,096	7,257	30,931	979	16,908	12,713	4,195	2,014	2,182	77,972		2,036	2,036	(3,316)	1,659	7,771
2000	39,417	53,276	1,352	0	53,276	7,349	30,843	969	15,083	11,853	3,230	1,551	1,680	66,451	(214)		(214)	(3,123)	1,489	7,429
2001	39,842	53,503	1,343	0	53,503	7,427	30,773	959	15,303	11,509	3,794	1,821	1,973	55,724	(1,368)		(1,368)	(3,024)	1,443	9,622
2002	40,138	53,666	1,337	0	53,666	7,492	30,694	951	15,481	10,915	4,566	2,192	2,374	46,016	(2,240)		(2,240)	(2,822)	1,405	11,113
2003	40,443	53,837	1,331	0	53,837	7,541	30,646	944	15,650	10,319	5,331	2,559	2,772	37,130	(3,056)		(3,056)	(2,676)	1,300	12,529
2004	40,443	53,837	1,331	0	53,837	7,342	30,565	943	15,710	6,797	8,913	4,278	4,635	32,636	(5,972)		(5,972)	(1,089)	1,446	17,897
2005	40,443	53,837	1,331	0	53,837	7,526	30,558	942	15,753	3,398	12,355	5,930	6,424	31,873	(7,477)		(7,477)	315	1,441	21,332
2006	40,443	53,837	1,331	0	53,837	7,541	30,502	941	15,793	3,106	12,687	6,090	6,597	31,434	(7,653)		(7,653)	431	1,436	21,704
2007	40,443	53,837	1,331	0	53,837	7,493	30,507	940	15,837	2,964	12,873	6,179	6,694	31,162	(7,755)		(7,755)	490	1,431	21,920
2008	40,443	53,837	1,331	0	53,837	7,539	30,425	939	15,872	2,869	13,003	6,242	6,762	30,900	0		0	521	1,427	11,631
Total	576,504	779,833		118,915	898,747	109,410	435,267		332,070	159,073	172,996	83,037	89,957		(35,736)	118,915	81,180	8,747	66,850	193,010

NOTES:

1) Revenue $/Tonne depends on specific waste characteristics & treatment requirements i.e. incineration,phys/chem,stabilization etc.
2) These projections are based on economic and other assumptions and courses of action provided by third parties that represent plausible circumstances, however, there is a significant risk that actual results will vary, perhaps materially, from the results projected.
3) ASWMC's contribution to asset replacement after 1994 consists of capital maintenance only.

TABLE 7.6 - ALL CANADA CASE - ± 15 PERCENT AND ± 25 PERCENT
Source: Chem-Security Exhibit 119

Summary of Factors Used to Develop Forecasts of Swan Hills Facility Market Share			
	SCENARIO		
FACTOR	High	Best	Low
Alberta Waste Generation Growth	- high economic forecast - 50% reduction to account for process change	- best economic forecast - 50% reduction to account for process change	- low economic forecast - 50% reduction to account for process change
Swan Hill Prices	- Low prices - 20% reduction from current prices - 10% increase in demand by provincial generators in the 50-100 t/a range - 10% increased capture of provincial organic waste currently being exported	- Current prices - No change in client mix	- High prices - 5% increase over current prices - 10% reduction of projected provincial waste quantities due to increased on-site waste management and export
Alberta Regulation / Enforcement	- 15% increase in non-PCB wastes due to more stringent regulation and enforcement	- No change in base waste quantities	- No change in base waste quantities
Other Provinces Waste Generation Growth	- Compounded 4%/a	- Compounded 2%/a	- No growth - aggressive 3Rs
Saskatchewan	- Estevan WMS Inc. not approved - CSAL captures 75% of available organic waste market plus 100% of PCB wastes in storage over 10 years	- Estevan WMS Inc. not approved - CSAL captures 25% of available organic waste market plus 100% of PCB wastes in storage over 10 years	- Estevan WMS Inc. approved and accepting waste by the end of 1995 - CSAL captures 5% of available organic waste market plus100% in 1995 and 25% thereafter of PCB wastes in storage over 10 years
Manitoba	- MHWMC facility construction delayed 1 year - CSAL captures 50% of market until 1997 and 20% thereafter plus 100% of PCB wastes in storage over 10 years	- MHWMC facility available on schedule by the end of 1995 - CSAL captures 50% of market until 1996 and 10% of organic market thereafter plus 100% of PCB wastes in storage over 10 years	- MHWMC facility available on schedule by the end of 1995 - CSAL captures 5% of organic market plus 50% of PCB wastes in storage over 10 years.
Ontario	- OWMC facility not approved - CSAL captures 10% of OWMC target market for organic sludges and solids plus 40% of PCB wastes in storage over 10 years	- OWMC facility approved and accepting waste by the end of 1997 - CSAL captures none of OWMC target market after 1997 and during 1995 and 1996 receives 5% of OWMC target organic sludges and solids market and 20% of PCB wastes in storage over 10 years	- OWMC facility approved and accepting waste by the end of 1996 - CSAL captures none of OWMC market after 1996 and during 1995 receives 1% of sludges and solids market and 10% of PCB wastes in storage over 10 years
British Columbia	- CSAL receives 50% of organic waste treatment demand plus 100% of PCB wastes in storage over 10 years	- CSAL receives 30% organic waste treatment demand plus 100% of PCB wastes in storage over 10 years	- CSAL receives 20% of organic waste treatment demand plus 100% of PCB wastes in storage over 10 years
Yukon / Northwest Territories	- CSAL receives 100% of organic waste shipped off-site plus 100% of PCB wastes in storage over 10 years	- CSAL receives 75% of organic waste treatment demand plus 100% of PCB wastes in storage over 10 years	- CSAL receives 50% of organic waste treatment demand plus 100% of PCB wastes in storage over 10 years

TABLE 7.7 - SUMMARY OF FACTORS
Source: IAA/LSLIRC Submission - Exhibit 40

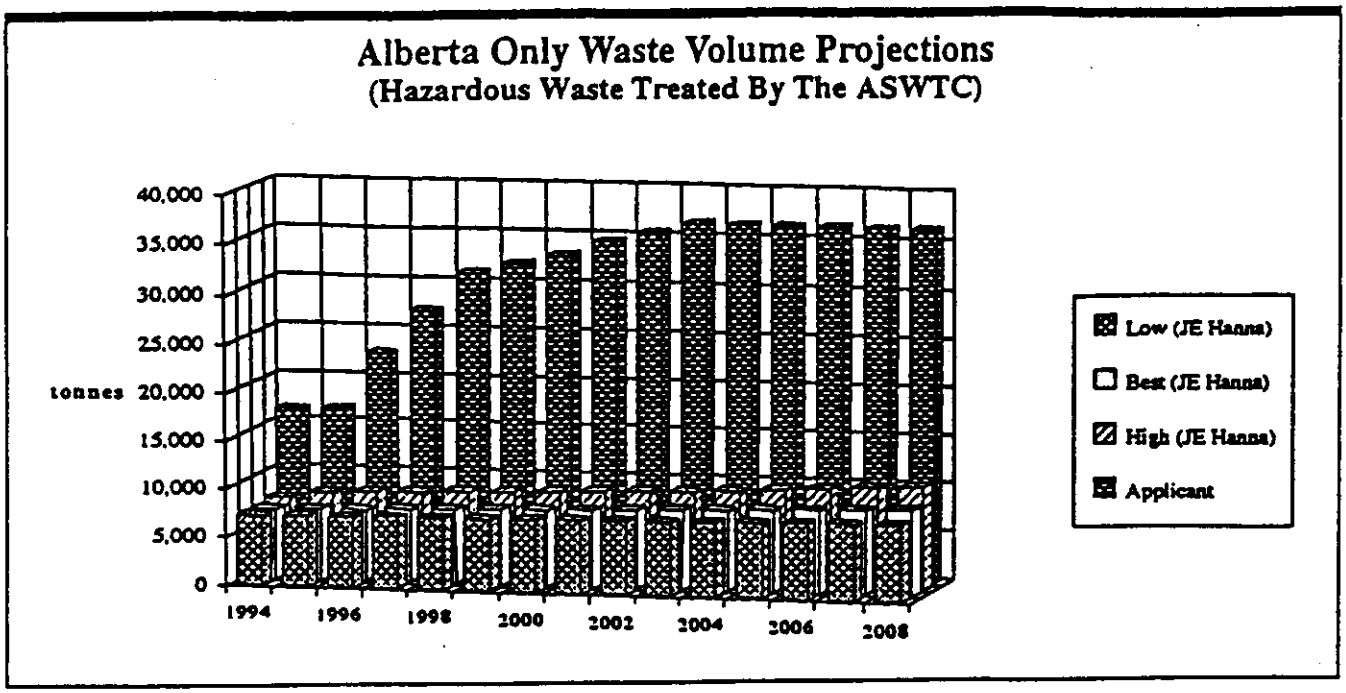
From the interpretation of data in its forecasting model, IAA/LSLIRC concluded that various amounts of waste would be available for treatment at the Treatment Centre. For the Alberta Only high case, it was estimated that in 1995 a total of 8,481 tonnes of waste would be received at the Treatment Centre increasing to 11,584 tonnes in 2008. The Alberta Only low case was estimated to range between 7,235 and 8,002 tonnes during the same period and for the Alberta Only best estimate, it was expected that the Treatment Centre would receive between 7,282 and 8,870 tonnes during the period of the forecast. (See Table 7.8). (Waste volumes shown in Table 7.8 and 7.9 do not account for reductions in volumes of PCB's subsequent to test burns).

Similarly, for the All Canada high scenario, IAA/LSLIRC estimated a total of 30,768 tonnes of waste would be received for treatment at the Treatment Centre in 1995 increasing to 44,248 tonnes in 2008. The All Canada low case was estimated to be 14,261 tonnes in 1995 decreasing to 12,529 tonnes in 2008 and for the All Canada best scenario, it was estimated that 19,779 tonnes of waste would be received for treatment at Swan Hills in 1995 decreasing to 16,212 tonnes in 2008. (See Table 7.8).

The IAA/LSLIRC recognized that the majority of the increase in future waste quantities would come from out of province if the Chem-Security Application was approved. According to its best estimate:

> "...by the year 1997, 12,700 tonnes of out of province waste will be received. Out of province waste will comprise approximately 63 percent of the total facility utilization. Ontario waste will comprise approximately 44 percent of the out of province shipments up to 1997. Once the OWMC facility is approved and constructed, the quantity of waste from out of province will drop. By the year 2003, however, imports still will comprise about 48 percent of the total facility utilization."

In its submission, IAA/LSLIRC stated that comparing its forecast with Chem-Security's makes "major discrepancies" evident, and that Chem-Security's forecast is outside the reasonable bounds of the IAA/LSLIRC forecast and appears highly optimistic. IAA/LSLIRC concluded in its market forecast that more detailed information regarding the basis for the Chem-Security forecast would be necessary to conduct a more detailed and thorough comparison between the forecasts.



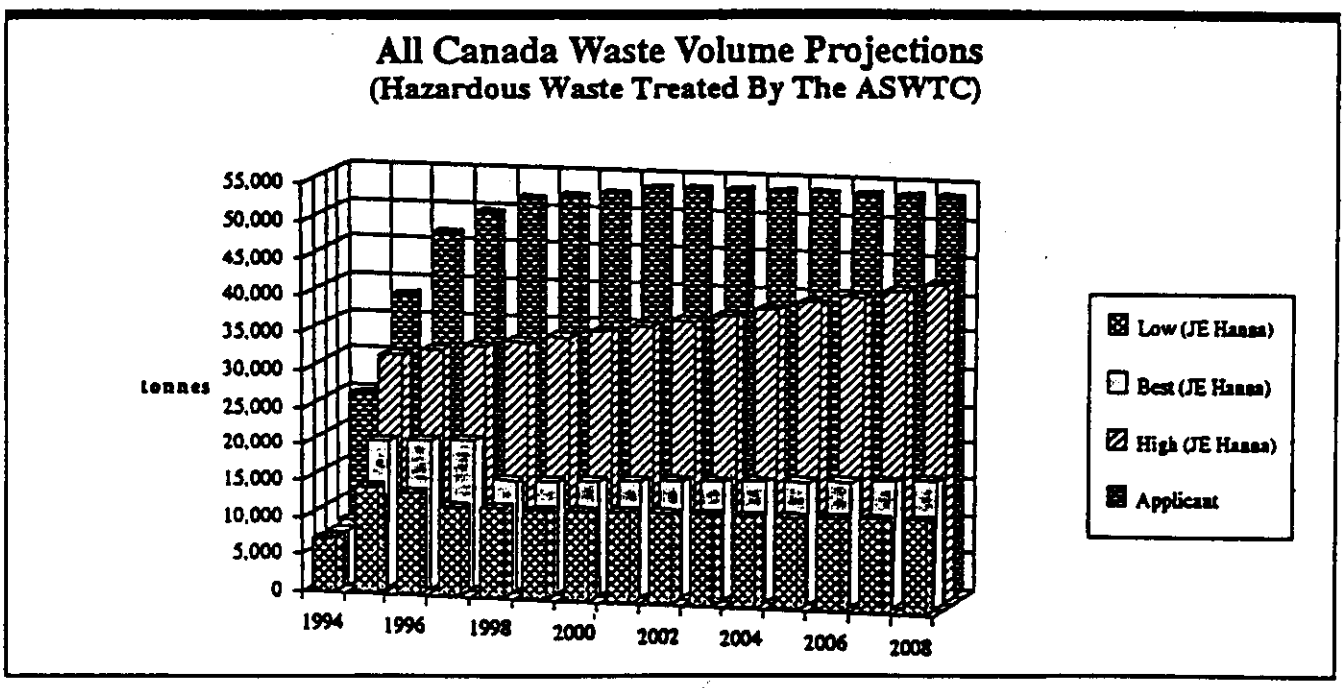
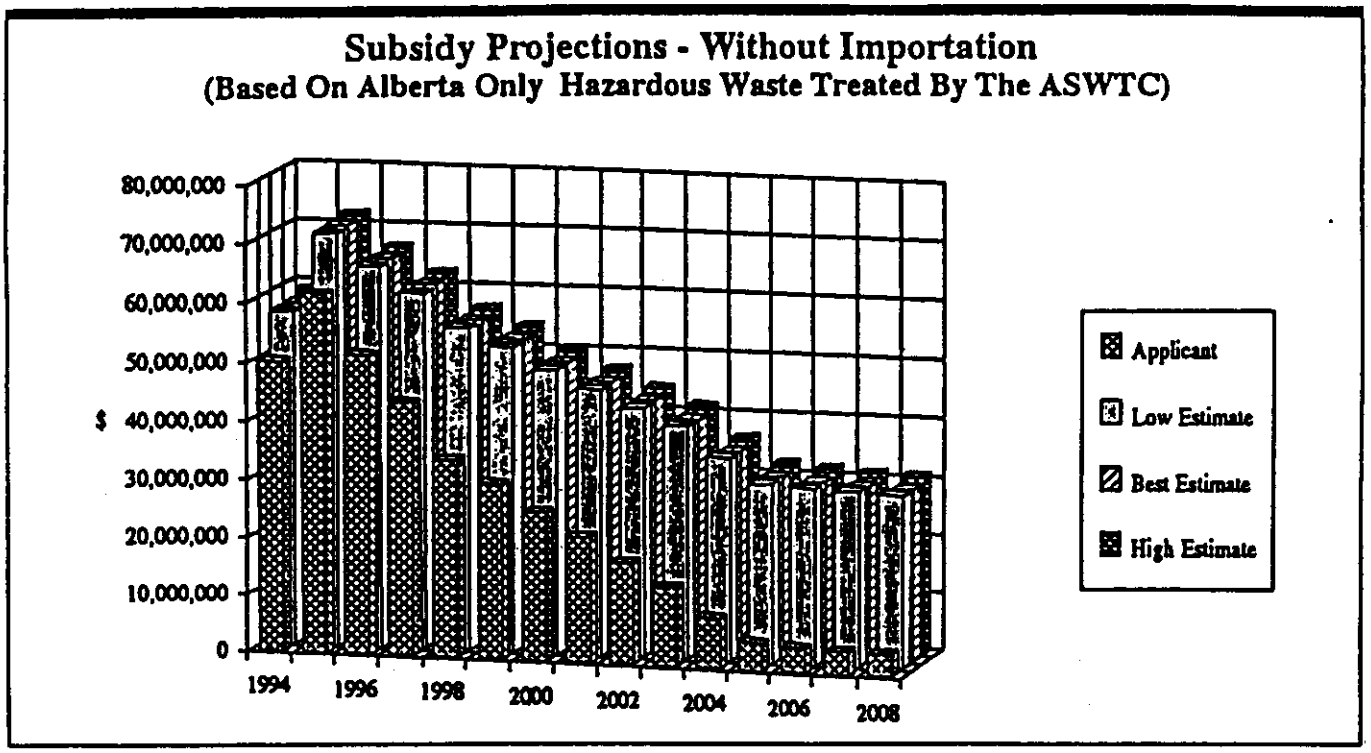


TABLE 7.8 - IAA/LSLIRC WASTE VOLUME PROJECTIONS
Source: IAA/LSLIRC Submission - Exhibit 40



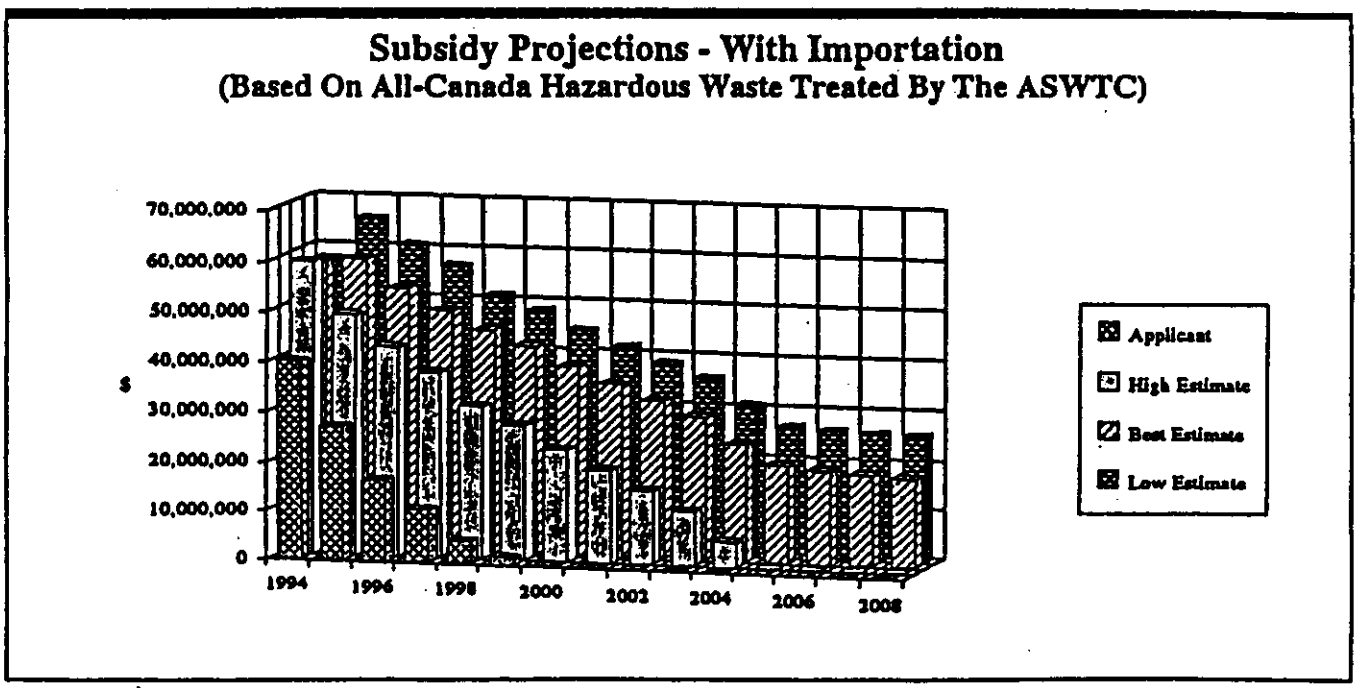


TABLE 7.9 - IAA/LSLIRC SUBSIDY PROJECTIONS
Source: IAA/LSLIRC Submission - Exhibit 40J

7.3.2 Economic Effects

The IAA/LSLIRC submitted an economic impact analysis based upon its own market forecast as described above. This analysis was presented in two parts, each part being prepared by a separate consultant. The first part might be described as a standard economic forecast based upon the volumes of waste forecasted by IAA/LSLIRC to be available to Chem-Security over the period 1994 to the year 2008. The analysis assumed variable operating costs to be approximately equal to $272.64 derived from an analysis of Chem-Security's information. Revenue projections, transportation costs and the Alberta Only subsidy calculations were all based upon information presented by Chem-Security. Based on these assumptions, IAA/LSLIRC recalculated the system contribution utilizing its consultant's forecasted waste input volumes for the Alberta Only and All Canada cases and for each of the best, high and low waste forecast scenarios. The full range of assumptions as well as the subsidy projections were submitted as evidence to the Board and are identified in Table 7.7 and Table 7.9 respectively.

Based upon the above, the IAA/LSLIRC estimated that, if the Application were approved, the "Best" scenario would result in total system contributions of approximately $540 million over the period from 1994 to 2008. The IAA/LSLIRC estimated the total "Best" Alberta Only subsidization would reach $702 million by the end of 2008. For a "Low" volume scenario, assuming approval of the Application, the total system contribution was estimated to equal approximately $635 million over the same period, an amount which is significantly higher than the approximately $100 million subsidy estimated by Chem-Security.

The IAA/LSLIRC submission states that a basic error in the economic impact analysis as presented by Chem-Security is that Chem-Security assumes that the portion of costs defined as fixed are unavoidable, and that no portion of the sunk costs can be recovered. This assumption is revisited in the IAA/LSLIRC's closing argument. IAA/LSLIRC maintains that many costs claimed by Chem-Security are not truly sunk costs and include costs such as future forecasted subsidies, the salvage value of current assets, future capitalized maintenance and future capital investments. Additionally, as a result of this assumption it was the view of IAA/LSLIRC that Chem-Security erroneously concluded that it was in the economic public interest of Alberta whether one tonne or 10,000 tonnes of imported waste were received by the ASWTC. In its opinion, it was in Chem-Security's financial interest to claim any further subsidies as being sunk costs. Alternatively, IAA/LSLIRC would have the Board conclude that it can not determine which portion of the fixed assets are sunk. The IAA/LSLIRC further submitted that Chem-Security's assumptions inflated and exaggerated any economic benefit that might be realized from receiving wastes from other Canadian jurisdictions.

In the second part of its analysis, the IAA/LSLIRC reviewed a number of different alternatives to the Application. Those alternatives included:

- unconditional approval to import hazardous waste;
- closure of the Alberta Special Waste Treatment Centre;
- scale the ASWTC to meet Alberta's needs;
- buy out BOVAR's ownership interest; and,
- privatize the Alberta Special Waste Management System.

The IAA/LSLIRC provided the Board with its views as to the implications of each alternative and an economic analysis associated with the various alternatives.

In its closing argument, the IAA/LSLIRC stated that the need to consider alternatives does not imply broadening the Board's jurisdiction as was argued by Chem-Security. It recognized the Board remained restricted by Order in Council 695/93 and that the Board must consider the obligations of the province under the Joint Venture Agreement. Additionally, the IAA/LSLIRC believed the Board needed to consider the province's policies and commitments with respect to waste management and pollution prevention. In support of this position, it was stated that through the allocation of the full cost of disposing of waste to waste generators, the 4R's would become a more attractive alternative and allow a reallocation of provincial revenues to other purposes such as alternative investment opportunities and waste reduction.

In summary, the IAA/LSLIRC concluded that the Application should be denied for a number of financial, economic and policy-related reasons, as well as the failure of Chem-Security's financial and economic analysis to meet evidentiary and methodological standards and also for the Applicant's failure to adequately consider likely outcomes associated with potential alternative proposals.

7.4 Views of Hugh Johnson from Stephen Johnson, Chartered Accountants

The firm of Stephen Johnson, Chartered Accountants reviewed the methods and conclusions with respect to the economic effects contained within the current Application.

In presenting his analysis, Mr. Hugh Johnson provided an overview of cost-benefit analysis as a method of evaluating the economic efficiency of a project from the perspective of society as a whole. It was noted that a cost-benefit analysis is similar to a profitability analysis undertaken by a private investor to determine the net income or return a project will generate. It was also noted that, whereas a private profitability analysis is concerned only with the revenues and expenditures facing the private investor, the cost-benefit analysis takes into account all of the revenues or benefits and all costs incurred within society. Further, it was Mr. Johnson's view that, in the circumstances of Chem-Security and the ASWMS, a private profitability analysis would yield different results since under the various agreements, BOVAR is essentially indifferent to the level of usage of the facility since their arrangements provide for a minimum required rate of return on their investment as well as the recovery of its investment.

Further, it was stated that the benefits, if any, from increased usage will tend to flow through the ASWMS to the province. Mr. Johnson continued:

> "The data supplied by Chem-Security indicates that the facility demonstrates certain characteristics of a natural monopoly, in that the fixed costs are relatively high as compared to the marginal costs and that the average costs decline as usage increases. This result is attributable to the consideration of the existing facilities, as well as the new incinerator, as sunk or fixed costs. In these circumstances, the variable cost can be considered similar to short-run marginal costs.
>
> To the extent that the revenue received exceeds the marginal cost, there is a net benefit from the processing of additional waste.
>
> Based upon Alberta Only waste, the forecast under-utilization of the new incinerator creates the opportunity for a significant increase in revenue relative to the increase in costs."

In order to test Chem-Security's conclusions regarding the benefits associated with the possible approval of its Application, Mr. Johnson first replicated Chem-Security's calculations using a number of assumptions identified in his report. The outcome of his replication derived a net benefit and ranges in subsidies and costs very similar to those shown by Chem-Security.

Based on the replication case, Mr. Johnson then created a number of additional cases (see Table 7.10) which tested the sensitivity of the data to various assumptions. For example, in Test Case A it was assumed that the volume of extra-provincial waste would be 50 percent of that forecast by Chem-Security. This case, it was stated, was prepared in order to test the sensitivity and the impact on the benefits if the volumes of extra-provincial waste were reduced substantially. The net benefit and economic impact was observed to be reduced by 50 percent. Similarly, Test Case D assumed that variable costs were $1,000 per tonne. This case was prepared in order to test the sensitivity of the benefit to a substantial increase in the variable costs associated with the additional waste volumes. It was noted that the $1,000 was over five times the variable cost used by Chem-Security. According to Mr. Johnson, this scenario provides an indication of the impact on the benefits if certain of the costs assumed by Chem-Security to be fixed were treated as long-run marginal costs. It also creates the lowest net benefit, approximately 47 percent of the benefit calculated by Chem-Security. As a consequence it was concluded that the economic impact was the same as in Chem-Security's base case since a positive economic impact accrues whether the revenue or increased operating costs are retained or spent in Alberta.

Summary of Tables Showing Sensitivities
TABLE 7.10

	TEST CASE T	TEST CASE A	TEST CASE D	TEST CASE E	TEST CASE F	TEST CASE G
Alberta Economic Impact in Millions of 1994 Dollars						
Operating Costs	52	26	275	52	52	52
Net Operating Revenue	423	212	200	316	424	335
Gross Impact	475	238	475	368	476	387
Leakages From Alberta	45	23	45	35	45	37
Total Direct Impact	430	215	430	333	431	350
Total Indirect Impact	430	215	430	333	431	350
Total Alberta Economic Impact	860	430	860	666	862	700
Alberta Net Benefits Discounted at 8% in Millions of 1994 Dollars						
Gross Project Benefits	262	131	124	196	263	210
Leakages from Alberta	20	10	9	15	20	16
Net Alberta Benefit	242	121	115	181	243	194

Source: Stephen Johnson - Exhibit 15 (Reproduced from original.)

Case	Test Function
T	Replication Case
A	Assess impacts if volumes of out-of-province waste were reduced by 50%.
D	Assess impacts if variable treatment costs of $1000.00 per tonne.
E	Assess impact on the benefit if out-of-province transportation costs could not be recovered as an add-on to the market price but rather were absorbed as part of the cost of treatment.
F	Assess impact in relation to waste source. Alberta generated waste is increased by 20% and the volume of out-of-province waste is decreased by 20% of the Alberta waste.
G	Assess impact of treatment price reduction on attracting additional Alberta generated waste. Assumes that a 10% reduction in the price for treatment would result in a 50% increase in the volume of Alberta waste treated.

Test Case E tested the impact on the benefit if extra-provincial transportation costs could not be recovered as an add-on to the market prices for incineration but had to be absorbed as an additional cost in order to obtain the additional revenue. According to Mr. Johnson, the outcome of the test showed that the benefit, although reduced by approximately 25 percent, was still very significant. Test Case F assumed that the volume of Alberta generated incineration type waste increased by 20 percent and the extra-provincial waste decreased by an amount equivalent to 20 percent of the Alberta waste. Test Case F, it was stated, was prepared in order to illustrate that the economic impact is volume sensitive and that the source of the waste is somewhat irrelevant in order to achieve the benefits. The benefits in Test Case F were shown to be virtually the same as the results of the base case presented by Chem-Security and the Test Case T.

As a result of the above sensitivity analysis, Mr. Johnson concluded that even in extreme cases where treatment volumes were reduced by 50 percent, or variable costs were increased from $180 per tonne to $1,000 per tonne, there remained a significant net economic benefit to the Province of Alberta, should the Application be approved.

7.5 Views of Other Participants and Chem-Security's Response

Several other participants in the hearing process shared all, or in part, the views expressed by IAA/LSLIRC regarding the economics associated with the receipt of hazardous waste. The concerns shared by other participants included:

- the unacceptability of public subsidization of the Treatment Centre;
- a belief that the original mandate of the Treatment Centre to clean up the Alberta PCB inventory has been fulfilled, making the continuation of the facility's operation and subsidization unjustifiable;
- a perceived lack of credibility of Chem-Security's waste volume forecasts and an accompanying belief that obtained volumes, particularly for PCBs, will be insufficient to significantly improve the financial position of the Treatment Centre thereby reducing the system contribution;
- a belief that the Board is obligated to look at a broader range of alternatives for the ASWTC; and,
- the belief that Chem-Security's pricing policies encourage the export of hazardous waste from Alberta for treatment elsewhere.

In its rebuttal, Chem-Security re-examined the nature of the ASWMS. The Board was advised that the ASWTC was developed with the primary purpose of ensuring access for the safe treatment of hazardous waste generated in the province in an environmentally acceptable manner. Chem-Security stated that the underlying basis for the development of the Treatment

Centre appears to have been the environmental and safety considerations, not commercial feasibility or economics. As a consequence, Chem-Security believed that economics was subsidiary to the social and environmental considerations in building the Treatment Centre.

As a result of the above consideration, Chem-Security believed that a number of trade-offs which had the effect of enhancing safety and the environment at the expense of higher capital and operating costs were incorporated into the Treatment Centre. As an example, Chem-Security referred to the siting of the Treatment Centre, the environmental monitoring that is in place and the various operating safeguards in place at the facility. Similarly, Chem-Security referred to the integrated nature of the Treatment Centre and its ability to process a variety of wastes, thereby creating implications in terms of cost and efficiency. Also, Chem-Security stated that, although there is sufficient capacity in the ASWMS to accommodate expected treatment requirements, its position was that ensuring the availability of adequate capacity carried with it potential financial penalties if sufficient demand did not materialize. It was also Chem-Security's position that these costs were deemed acceptable in the context of the objectives of the ASWMS: "So it was recognized that the Treatment Centre would bear costs that might not be recoverable from the generators themselves and that those unrecovered costs would be borne by the province as a whole, through system contributions or subsidies."

On the issue of pricing and the social cost related to the Treatment Centre, Chem-Security stated that it was always intended that the prices charged to Alberta waste generators should not discourage use of the system and should not prejudice the relative competitiveness of industry in Alberta. Chem-Security believed that the system contribution functioned so that high prices would not discourage Albertans from using the Treatment Centre but rather encourage the elimination of waste through proper treatment at the market price.

In considering the expansion of the facility's treatment capacity subsequent to Decision 9101, Chem-Security sought to reinforce the fact that the Treatment Centre was built exclusively to serve the Alberta market and, as such, the capital investments made were rationalized on the basis of Alberta needs alone. Consequently, Chem-Security believed the costs of expansion were incurred for the Alberta market and stated that the costs will exist whether or not the Application is allowed. Also, referring to the incinerator expansion, Chem-Security reiterated its view that the associated capital expenditures have been made and that the investment is a sunk investment with only a modest opportunity for recovery through salvage or resale. In Chem-Security's view, the operating characteristics of the Treatment Centre and similar facilities implied economies of scale with high fixed costs and low marginal operating costs: "This means that within the limits of the available capacity, additional quantities of waste can be treated at low marginal cost. It is on this basis that importation becomes so economically attractive."

In considering the economic benefits associated with the receipt of out of province hazardous wastes, Chem-Security presented a graphic review of the IAA/LSLIRC data, the Chem-Security data and the sensitivity analysis conducted by Stephen Johnson, Chartered Accountants (see Table 7.11 - Net Revenues from Importation). According to Chem-Security,

"the studies all show varying levels of positive net revenues" ranging between about $5 million to $35 million annually in 1994 dollars. Much of the net benefits, it was stated, will accrue directly to the provincial government. As to the distribution of economic benefits, it was stated most will accrue outside of the local and regional areas as a result of low incremental operating costs and the sourcing of materials outside of the area; hence, it was Chem-Security's view that a local or regional impact assessment would not have been useful.

In concluding its rebuttal, Chem-Security stated that the receipt of wastes for treatment in Alberta brings with it significant economic benefits with minimal economic and financial risks.

7.6 Views of the Board

The Board is required to consider the reviewable project, having regard for the economic effects of the project. The Board believes that one element in this regard is whether or not the expected revenues from the reviewable project are likely to recover all associated costs. To assist in this determination, the Board required Chem-Security to submit a cost-benefit analysis of its proposal to accept wastes from other Canadian jurisdictions. The analysis was intended to estimate all expected benefits and expected costs as a result of the reviewable project.

A social cost-benefit analysis is intended to evaluate a project from a public interest perspective, rather than from the perspective of Chem-Security. A social cost-benefit analysis uses a methodology that compares the present value of an expected stream of incremental revenues against the present value of an expected stream of incremental costs over the time period affected by the reviewable project. Incremental benefits and costs associated with the Application are relevant. Benefits or costs that will be increased regardless of whether or not the reviewable project proceeds, or costs or benefits that have already been accrued, are not included in the analysis. The key elements of the cost-benefit analysis of Chem-Security's Application are the incremental revenues from waste receipts at the ASWTC and the incremental transportation and treatment costs which must be incurred as a result of the proposed new waste receipts.

The revenue and cost streams must be discounted by an appropriate discount rate to obtain the net present values for each of the streams. The appropriate discount rate to use in a social cost-benefit analysis is one that reflects the social opportunity cost of capital.

Since a cost-benefit analysis is an incremental analysis, it is necessary to specify an Alberta Only base case against which to measure all incremental benefits and costs. The analysis involves forecasting prices and costs over time, the values for the relevant Alberta Only case must also be forecast in developing the base case.

Net Revenues From Importation

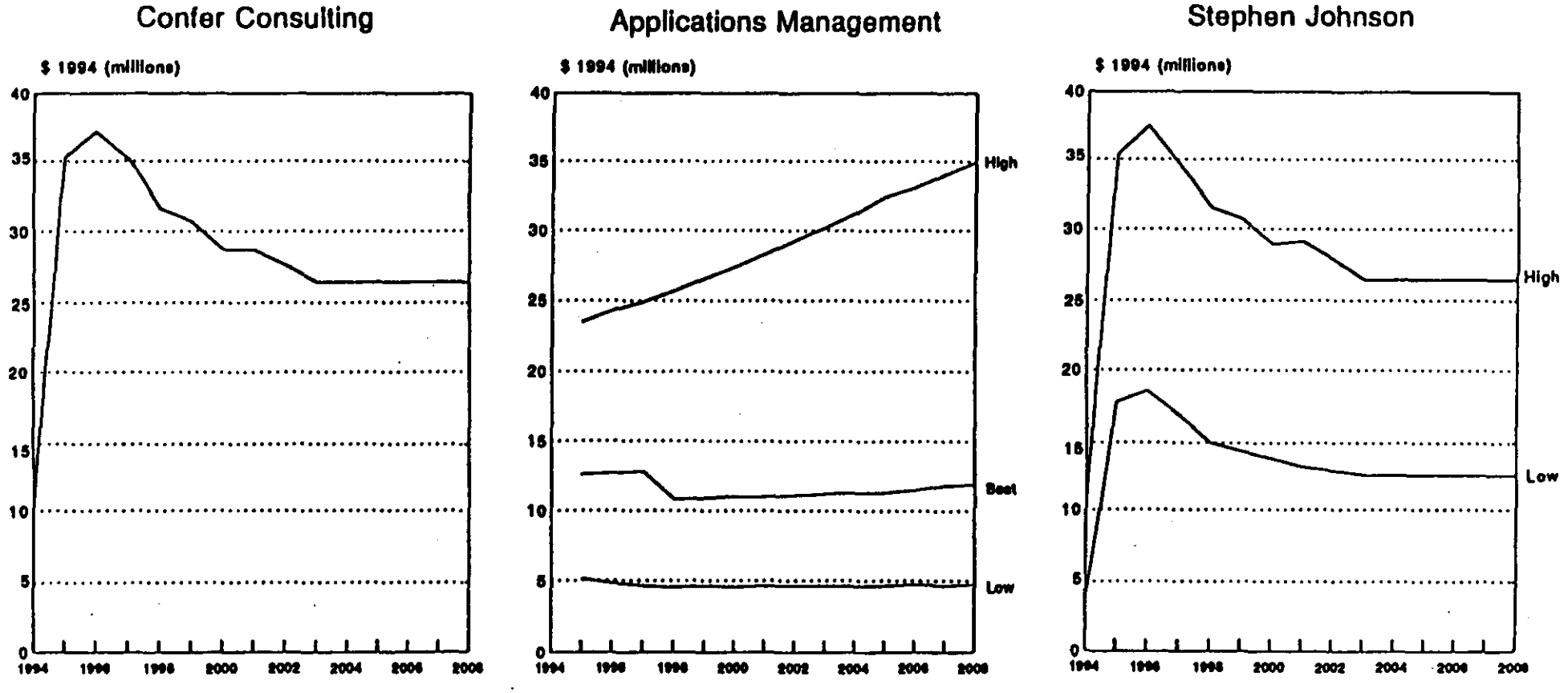


TABLE 7.11 - NET REVENUES FROM IMPORTATION
Source: Nichols Applied Management - Exhibit 122

The Board believes that a social cost-benefit analysis, carried out in the manner outlined above, is of assistance in considering the economic effects of the project. Therefore, the Board will consider the evidence before it regarding whether or not the expected revenues from the reviewable project are likely to recover all associated costs in Alberta.

In most applications that have come before the Board, the Board has had little interest in the nature of the economic return to the private owners of the project. However, in this reviewable project, the Government of Alberta through the Alberta Special Waste Management Corporation is a direct participant in the joint venture. Also, Chem-Security's primary justification for the Application is the reduction in the financial burden on Alberta taxpayers that is brought about by the participation of the ASWMC in the joint venture. Therefore, in this case, when having regard for the economic effects of the reviewable project, the Board must also consider the potential effects on Alberta taxpayers which result from the financial participation of the ASWMC in the Alberta Special Waste Management System.

In considering the economic effects of the reviewable project, the Board will first discuss the social cost-benefit to Alberta, then discuss the financial effects on Alberta taxpayers due to the ASWMC's participation in the joint venture.

7.6.1 Costs and Benefits to Alberta

Based on market assumptions, Chem-Security provided an economic impact assessment for the project over the period 1994 to 2008. In its assessment of the project's economic impacts, Chem-Security assumed that fixed costs would be approximately the same whether or not its Application were approved. It also assumed that the financial resources required both to construct the Treatment Centre and to expand its incinerator capacity following approval of Application 9101 were "sunk"; that is, expended without any significant opportunity for recovery. Chem-Security concluded that the net economic benefit to the Province of Alberta of treating waste from other Canadian jurisdictions would equal approximately $240 million or $220 million discounted at eight and ten percent respectively.

In its economic assessment (Table 7.2), Chem-Security assumed that secondary or indirect economic impacts would equal the primary impacts. As a consequence, Chem-Security estimated combined direct and indirect provincial economic impacts resulting from the receipt of out of province hazardous waste to equal approximately $860 million. Chem-Security stated that the local and regional impacts associated with the treatment of out of province waste would not likely be significant because of the small incremental effect on the cost of operating the Treatment Centre and the necessity of purchasing material and supplies outside the region. According to Chem-Security's economic consultant, much of the economic impact and net benefit accrues to the Alberta Government.

Chem-Security, on the basis of its cost-benefit analysis, concluded that the receipt and treatment of waste from Canadian jurisdictions at the ASWTC would have a substantial,

positive impact on the Alberta economy and represents the economically efficient use of Alberta resources.

In order to test Chem-Security's conclusions regarding the benefits associated with the possible approval of its Application, Mr. Hugh Johnson, of Stephen Johnson, Chartered Accountants, first replicated Chem-Security's calculations using a number of assumptions identified in his report. Based on the replication case, Mr. Johnson then created a number of additional cases which tested the sensitivity of the data to various assumptions. For example, in Test Case A (see Table 7.10) it was assumed that the volume of extra-provincial waste would be 50 percent of that forecast by Chem-Security.

As a result of the sensitivity analysis, Mr. Johnson concluded that even in extreme cases where treatment volumes were reduced by 50 percent or variable costs were increased from $180 per tonne to $1,000 per tonne, there remained a significant net economic benefit to the Province of Alberta.

The IAA/LSLIRC provided a substantial amount of evidence regarding the various factors and variables that provide the basis for calculating the social costs and benefits of the reviewable project. The IAA/LSLIRC provided information relevant to testing the sensitivity of Chem-Security's analysis. For example, its evidence regarding the estimation of the revenues for the Alberta Only case to the year 2008 range from $108 million to $116 million. Chem-Security's evidence was $410 million to $859 million. For the All Canada case, revenues up to the year 2008 were estimated to range from $221 million to $756 million by the IAA/LSLIRC; Chem-Security's estimate was $780 million to $1,239 million.

The IAA/LSLIRC estimated the variable costs of the ASWTC to be $272.64 compared to Chem-Security's evidence of $187/tonne.

The economic experts of the IAA/LSLIRC provided estimates of revenue that were significantly lower and cost estimates that were higher than Chem-Security's. While a specific calculation of the expected net benefits under various assumptions was not provided by the IAA/LSLIRC, lower expected revenues and increased costs would result in a calculation of a net benefit that would be less than Chem-Security's estimate.

The Board has considered the evidence of the participants regarding the market forecasts for the Alberta Only and the All Canada cases. The Board notes the substantial agreement among all participants that the prediction of hazardous waste markets is difficult due to the significant uncertainty surrounding the key market factors. Estimates of revenues were considered within a broad range. Chem-Security qualified its estimates by $\pm$ 15 percent for the first few years into the future and $\pm$ 25 percent for more future years. Mr. Johnson tested the Chem-Security estimate of net benefits by varying revenues by as much as 50 percent from Chem-Security's estimate. The IAA/LSLIRC estimates were also given within a broad range. Aside from differences in the treatment of certain costs the evidence indicated that there was less uncertainty concerning the costs of providing hazardous waste treatment services.

The Board has consistently taken the position in past reviews that when it encounters uncertainty in the evidence, it will make conservative assumptions. Given the degree of uncertainty in the estimates of the expected revenues to be available to the ASWTC in the future, the Board concludes that it would be prudent to assume that revenues would tend to be low.

However, even under the case where revenues are 50 percent less than predicted by Chem-Security, there would still be significant net benefits to Albertans from proceeding with the Application. From a social cost-benefit perspective, given the very low variable cost of treating an additional tonne of wastes, the Board expects that the receipt of wastes from other jurisdictions would continue to produce net benefits in even the most severe market conditions.

Overall, the Board concludes that the Application would result in a positive net economic benefit to Alberta and under conservative assumptions regarding future revenues the size of the net benefit would be significant but reduced from Chem-Security's base estimate of $242 million.

7.6.2 Financial Effects on Alberta Taxpayers

The Chem-Security Application requires the NRCB to give consideration to the potential financial effects on Alberta taxpayers due to the financial participation of the ASWMC in the joint venture.

The Board received a substantial amount of evidence that indicates that the receipt of wastes from other Canadian jurisdictions would reduce the forecasted system contribution. The extent to which the system contribution would be reduced was the subject of a range of views that essentially reflect differing market forecasts.

Chem-Security provided detailed evidence in its quantitative Business Plan regarding the forecasted system contribution to the year 2008. For the Alberta Only base case, Chem-Security predicts that the total system contribution would be $379 million. Taking into account market uncertainty, Chem-Security predicts that the total system contribution would range from $305 million to $453 million under an Alberta Only case.

For the All Canada base case, Chem-Security predicts that the total system contribution would be reduced from $379 million to $53.5 million. The predicted reduction would be $325.5 million should the Application proceed and projected markets become a reality.

The IAA/LSLIRC provided detailed evidence regarding its forecast of the system contribution to the year 2008. For the Alberta Only case the IAA/LSLIRC predicts that the system contribution would range between $700.9 million and $716.3 million. Its best estimate is $702.3 million.

For the All Canada case, the IAA/LSLIRC predicts that the system contribution to the year 2008 would range between $318.9 million and $635.8 million. Its best estimate is $540.9 million. Its predicted reduction in the system contribution for the best estimate is $161.9 million.

Using the IAA/LSLIRC data, assuming the highest system contribution in the Alberta Only case of $716.3 million and the lowest estimate of a reduced system contribution in the All Canada case of $635.9 million, the reduction would still be $80.4 million.

Mr. Johnson provided a replication of Chem-Security's analysis that tested the assumptions resulting in the Chem-Security prediction for the Alberta Only base case that the system contribution to the year 2008 would be $379 million.

Mr. Johnson examined the sensitivity of the system contribution under various assumptions regarding volumes, costs, and prices. The net reduction in the system contribution in the All Canada case under the various assumptions of his analysis ranged from $163 million to $259.2 million.

The Board notes that the evidence before it indicates that the effect of the reviewable project on the system contribution made by Alberta taxpayers is to reduce the financial burden. Estimates vary widely depending on various assumptions used in the analysis. However, regardless of which analysis was considered, the effect of the reviewable project would be significant and positive.

The range in estimates for the reduction in the system contribution to the year 2008 under the All Canada case would be $80.4 million to $325.5 million.

Given the nature of the existing situation involving excess capacity at the ASWTC, the terms of the JVA, the economic structure of the ASWTC involving high fixed costs and low variable costs, the expected margins between revenues and costs that lead to a predicted positive net benefit to Alberta, and the expected economic viability of the Application, the Board concludes that the Application would have a positive effect on reducing the forecasted system contribution from Alberta taxpayers.

7.6.3 Summary and Conclusions

The Board has considered the evidence before it regarding the economic effects of the Application. The Board finds that the economic effects are subject to a large degree of uncertainty, primarily due to the difficulty in predicting the market for the services of the ASWTC. Consequently, the evidence indicates that the economic effects would not be subject to precise estimates. However, under a variety of assumptions regarding prices, volumes, revenues and costs, the economic effects would be significant and positive to Alberta. The Application is economically viable since each tonne of waste from other Canadian jurisdictions is expected to bring revenues far above the costs of its treatment. The All Canada case, under

even the most severe assumptions regarding revenues and costs, is predicted to reduce the system contribution by Alberta taxpayers by at least $80.4 million. The net benefit to Alberta's economy would also be positive and significant under those various conditions.

Therefore, the Board concludes that the economic effects on the Alberta economy and Alberta taxpayers would also be positive and significant should the Application proceed.

8. ENVIRONMENTAL EFFECTS

8.1 Introduction

This section discusses the environmental effects of the Application including the overall approach to the assessment of incremental environmental effects, the effects on air quality, land and terrestrial effects and effects on water and aquatic resources.

8.1.1 Background to Application 9301

In Application 9101, the Board reviewed evidence concerning the potential environmental impact of the proposed expanded facility. The Board considered the composition and quantity of emissions from the incinerator stacks, emergency venting and fugitive sources, the dispersion and deposition of contaminants and their potential to accumulate in the environment, and associated health risks.

In July 1993, Chem-Security was granted permission to receive out of province Pentachlorophenol (PCP) and Polychlorinated Biphenyls (PCBs) for the purpose of conducting tests burns of the Ford, Bacon and Davis (FB&D) incinerator. The test burns are a regulatory requirement of the Standards and Approvals Division of Alberta Environmental Protection and are designed to demonstrate compliance with the projected performance criteria during the commissioning of the new incinerator. The total series of test burns was not complete at the time of the hearing of the current Application.

The Board notes changes to the waste storage, waste handling and waste treatment facilities at the ASWTC completed in 1993, some of which were not anticipated at the time of the expansion review. Chem-Security stated it has obtained the necessary permits and licenses to comply with the regulatory requirements to construct the new facilities at the Treatment Centre.

8.1.2 Chem-Security's Overall Position and Approach to the Assessment of Environmental Effects of the Application

Chem-Security took the position that the receipt of hazardous wastes from other Canadian jurisdictions would not result in any significant environmental or human health effects. In describing the environmental effects associated with the treatment of extra-provincial waste, Chem-Security relied upon the Environmental Impact Assessment (EIA) prepared in 1991, and updated the air quality modelling and reconfirmed the conclusions of the 1991 human health risk assessment. The reason given by Chem-Security for proceeding on the basis of the prior assessment was the inherent conservatism used when predicting potential environmental and health impacts. Maximum emission rate estimates were based on the assumption that the expanded Treatment Centre would operate at full capacity, 24 hours per day, 365 days per year and that each contaminant would be continuously emitted at its maximum rate based on Chem-Security's previous operating experience. Chem-Security took the position that if these overstated emission rates were acceptable to the Board, then the effects of normal operations would be less, and therefore acceptable.

With regard to the operational changes and physical modifications to the ASWTC that have occurred since Application 9101 (increased feed rate design capacity for PCBs, increased stack heights, decommissioning of the rocking kiln incinerators and cooling tower, and fugitive emission controls), Chem-Security revised its predicted maximum emission estimates for a suite of 67 contaminants and its estimates of ambient concentrations for those contaminants for which emissions would increase. The estimates presented in Table 8.1 represent the greatest emission rates Chem-Security anticipates for the two incinerators based on its experience with operating the rocking kilns and C.E. Raymond kiln. The ground-level concentrations associated with the new emission rate estimates were generally less than those previously identified (see Table 8.2). After summarizing the environmental impact projected for the 1991 expansion, Chem-Security concluded that no additional environmental impact would result from the approval of Application 9301 (see Tables 8.3, 8.4, 8.5, and 8.6). Chem-Security believed that the potential environmental impact of treating extra-provincial waste would be similar to that assessed during the expansion hearing and therefore the 1991 environmental assessment conclusions would still be valid. Chem-Security stated that it also re-examined the potential health risks associated with the predicted emissions, taking into consideration any recent changes in the scientific understanding of health risks. Again, Chem-Security concluded that, based on a reassessment of air quality impact associated with operation of the Treatment Centre at full capacity, the conclusions reached in 1991 remain valid and no adverse health effects are predicted from exposures to emissions associated with the current Application.

In its evidence, Chem-Security stated that the ASWTC could effectively and safely process out of province hazardous waste, including PCBs, PCP, and other highly toxic and regulated wastes without significant risks to either human health or the environment.

8.1.3 Participants' Overall Position on the Assessment of Environmental Effects

The Board heard from participants regarding possible adverse environmental effects attributed to the existing system and to the receipt of hazardous waste from other Canadian jurisdictions. These concerns were expressed in submissions by individuals and groups such as the IAA/LSLIRC and the EFONES Coalition. Other participants stated that their concerns arose due to unfamiliarity with technical matters and uncertainty over the significance of potential risks. Various participants identified the need for better communication of environmental matters. The majority of participants, including the local authorities, the IAA/LSLIRC and the EFONES Coalition agreed that Chem-Security had not gone far enough in dealing with the concerned public. Expert evidence was submitted on the nature of additional information, such as monitoring and sampling, which might be useful in more accurately identifying the current and ongoing environmental effects of the Treatment Centre's operation.

The IAA/LSLIRC took exception to Chem-Security's approach of relying on the environmental assessment done in 1991. It questioned the data concerning air quality, groundwater, surface water, aquatic biota, soils and vegetation, and wildlife programs.

TABLE 8.1*
Maximum Contaminant Emission Rates**
Associated with future operation of the ASWTC
At Full Capacity (1994 Data)

Contaminant	Small Rotary Kiln	Large Rotary Kiln
Inorganics	(mg/s)	(mg/s)
Carbon dioxide	1 250 000	4 080 000
Carbon monoxide	590	1 039
Sulphur dioxide	2737	5 922
Hydrogen chloride	632	1367
Nitrogen oxides*	5907	5 922
Hydrogen fluoride	29.5	36
Hydrogen bromide	12.1	38.3
Phosphorous pentoxide	0.36	1.14
Particulates	295	364
Metals	(mg/s)	(mg/s)
Aluminum	62.1	63.0
Antimony	0.044	0.044
Arsenic	0	0.052
Beryllium	0.004	0.0041
Boron	37.3	37.9
Cadmium	0.99	1.01
Chromium	0.82	1.4
Cobalt	0.1	0.124
Lead	20.9	21.2
Mercury	0.073	0.074
Nickel	0.31	2.29
Silicon	45.2	45.8
Tin	1.48	1.5
Chlorinated Monocyclic Aromatics	(μg/s)	(μg/s)
Dichlorobenzene	4.55	192
Trichlorobenzene	27	5447
Tetrachlorobenzene	2.85	656

Contaminant	Small Rotary Kiln	Large Rotary Kiln
Hexachlorobenzene	1.38	11.26
Dichlorophenol	0.45	25.1
Trichlorophenol	0.46	62
Tetrachlorophenol	0.075	8.93
Pentachlorophenol	0.24	0.97
Chlorinated Polycyclic Aromatics	(μg/s)	(μg/s)
Total dioxins/furans	0.44	5.54
2,3,7,8 TCDD equivalent	0.079	0.009
PCB	164.[b]	739.[c]
Polynuclear aromatic hydrocarbons	(μg/s)	(μg/s)
Acenaphthylene	0.13	15.7
Anthracene	0.13	3.79
2-methyl-cholanthrene	0.22	0.68
Benzo(g,h,i)perylene	0.25	3.34
Benzo(a&e)pyrene	0.13	11.58
Benzo(a)anthracene	0.13	7.78
Benzo(a)fluorene	7.63	24.1
Benzo(b&k)fluoranthene	0.13	17.4
Benzo(b)chrysene	0.66	2.09
Benzo(b)fluorene	3.49	11.02
Benzo(g,h,i)fluoranthene	1.39	4.38
Chrysene	0.13	3.91
Dibenzo(a,h)anthracene	0.13	3.34
Fluoranthene	0.38	14.6
Fluorene	0.17	11.6
Indeno(1,2,3-c,d)pyrene	0.13	8.92
Naphthalene	7.16	92.2
Perylene	0.22	0.68
Phenanthrene	0.74	25.6
Pyrene	0.58	29.0

Contaminant	Small Rotary Kiln	Large Rotary Kiln
Volatile Organic Compounds	(μg/s)	(μg/s)
1,1,2,2-tetrachloroethane	6.59	20.8
Acetone	5633	17 777
Benzene	47.5	150
Bromodichloromethane	15.6	49
Bromoform	249	787
Carbon tetrachloride	17.8	56.0
Chloroethane	129	408
Chloroform	73.7	233
Chloromethane	2728	8608
Cis-1,3-dichloropropene	3.34	10.55
Methylene chloride	2496	7876
Tetrachloroethylene	11.6	133
Styrene	14.2	44.9
Trans-1,3-dichloropropene	15.9	50.3

[a] As NO_2 equivalent

[b] Based on a maximum PCB feed rate of 590 kg/h and a destruction and removal efficiency of 99.9999 %

[c] Based on a maximum PCB feed rate of 2660 kg/h and a destruction and removal efficiency of 99.9999 %

*Source: Chem-Security - Application 9301

** Maximum rates based on Chem-Security's previous operating experience with the small rotary kiln and the rocking kilns. Values for the large rotary kiln are estimates.

milligrams per second (mg/s)

micrograms per second (μg/s)

TABLE 8.2*

Comparison of Predicted Overall Maximum Ground-Level Concentrations After Expansion of the ASWTC

Contaminant	One Hour		24-Hour		Annual	
	1991[1]	1994[2]	1991[1]	1994[2]	1991[1]	1994[2]
CO (ppb)	26	15	15[a]	11[a]	1.7	0.19
SO_2 (ppb)	62	34	21	11	3.9	0.40
NO_x (ppb)	241	69	69	24	14	1.0
HCl (ppb)	24	14	7.2	4.7	1.5	0.17
HF (ppb)	1.5	0.86	0.54	0.29	0.32[b]	0.07[b]
Particulates ($\mu g/m^3$)	11.4	6.4	5.5	2.2	0.91	0.09
PCB (ng/m^3)	250	250	50	31	10	4.4

[a] 8-hour average
[b] 7-day average
[1] 1991 - results based on 1991 air quality assessment
[2] 1994 - revised air quality assessment based on existing sources

The air quality assessment serves as the basis for assessing environmental and public health impacts.

*Source: Chem-Security - Application 9301

TABLE 8.3*

AIR QUALITY
POTENTIAL IMPACTS, MITIGATIVE MEASURES
AND RESIDUAL IMPACT RATING
RESULTING FROM FULL OPERATION

Project Component	Potential Impact	Mitigative Measures	Residual Impacts Mag/Dir/Dur/Scope[1]
Incinerator (normal operations)	Increased ambient levels of inorganics, particulates, metals, chlorinated organics, PAH, VOC.	Pollution control equipment, trial burns.	Low/increase-decrease/long/regional
Incinerator (abnormal operations)	Increased emissions of PCB, HCl, NO_x.	Immediate termination of waste feed to kiln.	Low/increase/short/local
	Increased emissions of particulates.	Immediate termination of waste feed to kiln.	Medium/increase/short/local
Fugitives	Continuing ambient levels of PCB, chlorobenzenes, chlorophenols.	Fugitive control program.	Low/decrease/long/regional

[1]Mag - Magnitude
Dir - Direction
Dur - Duration
*Source: Chem-Security Application 9301

TABLE 8.4*

SURFACE WATER QUALITY
POTENTIAL IMPACTS, MITIGATIVE MEASURES
AND RESIDUAL IMPACT RATING

Project Activity	Potential Impact	Mitigative Measures	Residual Impacts Mag/Dir/Dur/Scope[1]
1. Waste storage	Contamination of surface waters through chemical spill or leak.	Internal drainage system directs runoff to retention pond. Maintain closed storage environment. Adhere to clean operating practices.	Negligible
2. Incineration	Contamination of surface waters through direct deposition of airborne emissions.	Waste incinerated to maximum destruction efficiency and efficient scrubbing system for stack gases. Major waterbodies outside area of highest anticipated fallout. Most emissions should be intercepted by vegetation and soil.	Low/decr/long/local
3. Slag and flyash disposal	Contamination of surface waters through spill or release of dust emissions.	Flyash and slag mixed with cement to produce inert solid. Landfill cells enclosed while being filled to prevent dust emissions.	Negligible
	Contamination of surface waters through release of leachate from landfill cells.	Landfill cells lined with high density liner to prevent leaching losses. Landfill sealed with clay once full.	Negligible

[1]Mag - Magnitude
Dir - Direction
Dur - Duration
*Source: Chem-Security Application 9301

TABLE 8.5*

GROUNDWATER QUALITY
POTENTIAL IMPACTS, MITIGATIVE MEASURES
AND RESIDUAL IMPACT RATING
RESULTING FROM FULL OPERATION

Project Activity	Potential Impact	Mitigative Measures	Residual Impacts Mag/Dir/Dur/Scope[1]
1. Waste storage	Contamination of groundwater through chemical spill or leak. Diversion of runoff may lower piezometric levels in shallow aquifers.	Maintain closed storage environment. Adhere to clean operating practices. Internal drainage system directs runoff to retention pond.	Low/decr/long/local
2. Incineration	Contamination of groundwater through deposition of airborne emissions.	Waste incinerated to maximum destruction efficiency and efficient scrubbing system for stack gases. Interception by soil and vegetation. Low recharge rates. Low hydraulic conductivity of till.	Negligible
3. Slag and flyash Disposal	Contamination of groundwater through spillage or release of airborne dust.	Flyash and slag mixed with cement to provide inert solids. Landfill cells enclosed while being filled to prevent fugitive dust emissions.	Negligible
	Contamination of groundwater through release of leachate from landfill cells.	Landfill cells lined with high density liner to prevent leaching losses. Landfill sealed with clay once full.	Negligible
4. Treatment Centre water supply	Water level drawdown in Wapiti Formation.	Proper facility design. Recycle process water.	Low/decr/long/local

[1]Mag - Magnitude
Dir - Direction
Dur - Duration
*Source: Chem-Security Application 9301

TABLE 8.6*

SOILS POTENTIAL IMPACTS, MITIGATIVE MEASURES AND RESIDUAL IMPACT RATING RESULTING FROM FULL OPERATION

Project Activity	Potential Impact	Mitigative Measures	Residual Impacts Mag/Dir/Dur/Scope[1]
1. Waste storage	Contamination of soils through chemical spillage or release of vapour emissions.	Maintain closed storage environment. Adhere to clean operating practices.	Low/decr/long/local
2. Incineration	Contamination of soil through emissions from incinerator operation.	Waste incinerated to maximum destruction efficiency and efficient scrubbing system for stack gases.	Low/decr/long/local
3. Slag and flyash stabilization	Contamination of soils from fugitive emissions of dust.	Maintain closed process environment. Flyash and slag transported while wet to reduce dust generation. Flyash and slag mixed with cement to eliminate dust.	Low/decr/long/local
4. Slag and flyash disposal	Contamination of soils from dust during transport to landfill cells.	Flyash and slag mixed with cement to provide inert solid. Landfill cells enclosed while being filled to prevent dust emissions.	Low/decr/long/local
	Contamination of soils by leachate from landfill cells.	Landfill cells lined with high density liner to prevent leaching losses. Landfill sealed with clay once full.	Low/decr/long/local

[1]Mag - Magnitude
Dir - Direction
Dur - Duration
*Source: Chem-Security Application 9301

The IAA/LSLIRC took the position that Chem-Security should be required to prepare a comprehensive environmental risk assessment of the incremental effects of receiving waste from other Canadian jurisdictions. In its view, this was a particularly important issue with respect to PCBs, dioxin and furan emissions. It also said that an assessment of the long-term cumulative effects of mass loadings of PCBs and other substances should be required. Specific inadequacies in the estimates of PCBs based on model predictions were put forward by the IAA/LSLIRC, as well as inadequacies in the prediction and monitoring of persistent concentrations of toxins in higher trophic level species.

The IAA/LSLIRC took the position that the 1991 health risk assessment is no longer applicable because of changes in technology at the ASWTC, changes in the profiles of wastes likely to be received from other Canadian jurisdictions, and changes in the objectives of Chem-Security for the operation of the ASWTC.

The IAA/LSLIRC said that operation of the ASWTC has caused, and will increasingly cause significant environmental contamination at the site and surrounding area, and given the dangerous nature of the emissions from the treatment of toxic waste, the receipt of hazardous waste carries with it a significant environmental risk. The IAA/LSLIRC was particularly concerned with fugitive PCB emissions and the fugitive emissions control program.

The EFONES Coalition said that receipt of waste from other Canadian jurisdictions would pose an additional risk to Albertans, contrary to the original purpose of the Treatment Centre, which was to reduce or eliminate hazards arising from such wastes in Alberta. It referred to Chem-Security's intention to incinerate 10,000 t/a of PCBs for four years beginning in 1995 and stated that during this period this would lead to a hundredfold increase in the volume of PCBs transported and treated, if receipt of waste from other Canadian jurisdictions were to be approved. It also stated that the ability of the new kiln to meet the Alberta Environmental Protection limit for dioxin and furan emissions has not been substantiated since only two of the six trial burns were successful in this regard. It also raised the concern of fugitive emissions and concluded that Chem-Security's claim of no harmful effects is open to question.

Local municipal authorities participating in the hearing included the Town of Swan Hills, Improvement District No. 125 (ID #125), and Municipal District No. 15. The Town of Swan Hills, although in favour of the Application, expressed concern over the measured presence of PCB contamination at the Treatment Centre and the need for ongoing improvements in the monitoring system, and concurred with other participants that there may be a need for better communication. The Town noted that it requires Chem-Security to notify it of operational upsets and that it critically reviews the environmental monitoring program using contracted experts from the University of Alberta Environmental Health Program. ID #125 expressed concern with respect to environmental and health effects and requested that the Board condition any approval with a provision of funding to allow it to undertake an on-going independent review for its citizens.

8.1.4 Views of the Board

The Board noted in its *Report on Pre-Hearing Conference*, that the current Application required an assessment of the environmental and human health effects of treating waste from other Canadian jurisdictions over and above the effects of processing Alberta wastes. In light of the degree of uncertainty as to what fraction of wastes might originate beyond Alberta and in keeping with the Board's past practice of making conservative assumptions when it encounters uncertainty, the Board will assess the situation in which all of the environmental and health risks associated with the Treatment Centre are due to the treatment of waste from other Canadian jurisdictions. If the environmental impacts and health risks of operating the ASWTC at full capacity involving the most difficult to treat waste from other Canadian jurisdictions were shown to be insignificant, the Board could conclude that the incremental effects of any foreseeable operating circumstance involving the receipt of extra-provincial wastes would also be insignificant. Should the Board reach such a conclusion it would then have to consider whether the social, economic and environmental effects considered as a whole are in the public interest.

The Board is prepared to accept Chem-Security's view that the evaluative framework for the assessment of the environmental effects of the ASWTC established during Application 9101 remains valid. The Board will examine this framework for assessment as it is applied to the current Application. Specifically, the Board will consider whether Chem-Security has taken into consideration changes in circumstances since 1991. In the Board's view, all significant changes in the facilities that could affect emissions must be identified and included in the analysis including the fugitive emissions control program, the change in stack heights, and the removal of the rocking kilns and the cooling tower. These changes necessitate a re-calculation of predicted emission rates. Additionally, environmental consequences must be re-assessed taking into consideration any new scientific information about the effects of the predicted emission rates.

The Board will also examine the health risk assessment and Chem-Security's evidence, particularly the predicted emission rates and the current scientific basis for the health risk analysis. The Board will determine whether the assumptions made to predict impacts and health risks in the 1991 health risk assessment and now updated based on new scientific data, can be relied upon in its review of Application 9301.

The Board recognizes that under Chem-Security's revised market forecast for Alberta waste treatment, the environmental effects from Alberta Only wastes would be reduced from the maximum predicted levels found acceptable in Application 9101. Similarly, the Board recognizes that these less than previously predicted effects could be increased if extra-provincial wastes were accepted for treatment at the Treatment Centre.

The Board will examine the evidence regarding the updated emission predictions with the changes to the Treatment Centre, the basis for the re-calculation of predicted emission rates, and the re-assessment of environmental effects taking into consideration any new scientific evidence brought forward. The Board will then examine the evidence regarding human health

effects. If the combined effects of treating Alberta and Canadian wastes are the same or less than previously predicted, and if those predicted effects are found insignificant within the current circumstances, the Board may then proceed to its assessment of the other aspects of the Alberta public interest.

8.2 Emission Sources at the Treatment Centre

The Board agrees with participants that emissions should be separated into three categories for the purpose of proper assessment. These categories are incinerator stack emissions, emergency ventings, and fugitive emissions. Stack emissions during normal operating conditions consist of the gaseous and aerosol products of the high temperature combustion of the waste stream, reduced by a sequence of pollution control equipment. Emissions during emergency ventings also consist of the products of incineration, but these bypass the pollution control equipment. The annual number and duration of emergency venting episodes is normally small. However, they may account for a substantial portion of the annual mass loadings of certain contaminants. Finally, fugitive emissions are ground-level releases of volatiles and aerosols associated with the storage and handling of waste.

8.2.1 Stack Emissions Under Normal Operating Conditions

In Application 9101, Chem-Security provided estimates of maximum stack emissions based on the conservative assumption that the Treatment Centre would operate continuously at maximum capacity. Maximum emission rates were calculated as the greater of the maximum levels observed and the mean plus three standard deviations.

In the present Application, Chem-Security revised its maximum emission estimates to reflect changes to the operations of the Treatment Centre (Section 1.6), particularly the decommissioning of the von Roll kilns and cooling tower and the 20 percent increase in the flue gas flow rate of the FB&D kiln compared to the original design. Chem-Security provided emission estimates of 67 contaminants for the C.E. Raymond and FB&D kilns. Estimated emissions for the Treatment Centre as a whole would be lower for 60 contaminants and greater than was estimated in Application 9101 for the remaining seven contaminants.

PCP was among the group of chemicals for which Chem-Security believed that overall emissions would not exceed the maximum estimates employed in the 1991 assessment. In the Board's view, however, Chem-Security's revision of its FB&D emission estimate by only 20 percent is not consistent with its stated intention to target PCP waste outside the province. The Board believes it is reasonable to anticipate that should the current Application be approved, PCP feed rates could exceed previous values. The Board therefore reviewed the overall stack emissions for PCP to determine whether treating PCP from beyond Alberta could result in emissions greater than the maxima employed in the previous assessment.

The Board's analysis is as follows. PCP emissions of 0.89 micrograms per second (μg/s) were measured during one test burn in which the PCP feed rate was 843.5 kilograms per hour (kg/hr). Chem-Security stated that correspondingly greater emissions were

possible if the PCP feed rate approached the limit imposed by the licence restriction on the total chlorine feed rate. The Board notes that greater emissions are also possible if the destruction and removal efficiency (DRE) of the system were closer to the licensed limit of 99.9999 percent.

The maximum PCP feed rate based on the FB&D chlorine feed rate design capacity of 1676 kg/hr and the PCP molecule's 66.6 percent chlorine content by weight is 2516 kg/hr. The Licence to Operate the FB&D kiln during the commissioning and test burn period refers to a slightly higher PCP design capacity of 2660 kg/hr. From these figures it can be seen that the feed rate in the test burn was about one third of the licensed maximum rate. If the Board were to assume that the destruction and removal efficiency (DRE) observed during this test was representative and further that the DRE of the system at capacity would be the same as that measured in the test, it would conclude that the maximum PCP emission rate for the FB&D kiln would be approximately 2.7 μg/s. This emission rate for the FB&D kiln is greater than Chem-Security's "maximum" estimate of 0.97 μg/s based on its operating experience (see Table 8.1). Under this scenario, however, the combined emissions of the FB&D and C.E. Raymond kilns would not likely exceed the previously accepted overall estimate of 3.82 μg/s in Application 9101.

However, the Board does not feel it would be appropriate to rely on the preliminary results from a single test burn prior to a thorough analysis of the data by Alberta Environmental Protection. In this context, the Board does not believe it would be appropriate to take the DRE reported for this test at face value.

The Board concludes that PCP emissions could exceed the values employed in Table 8.1. The potential for greater PCP emissions associated with the current Application illustrates the need for regulators to rely on comprehensive test results prior to licensing the treatment of PCP or any other waste stream beyond the range of composition previously encountered. If the Application were to be approved, the Board would therefore require Chem-Security to provide Alberta Environmental Protection with a revised assessment of the effects of maximum PCP emissions based on the design capacity of 2660 kg/hr and DRE performance data for the FB&D kiln and for the C.E. Raymond kiln if it will be used to incinerate PCP, to further confirm that the combined emissions would not likely exceed the overall estimate of 3.82 μg/s.

With regard to the remaining 59 contaminants for which overall stack emissions are expected to decline, the Board's assessment of the impact of receiving out of province waste is as follows. Even if it were assumed that all of the emissions from the Treatment Centre were due to the incineration of extra-provincial waste, the revised estimates of stack contributions to ambient concentrations for these contaminants would be lower than in 1991. Net reductions in emissions of these contaminants are anticipated because the discontinuation of emissions from the von Roll kilns and cooling tower more than compensate for the 20 percent increase in projected emissions from the new kiln. The Board is aware that risks to the environment and human health posed by stack emissions depend not only on the quantity (i.e. mass loadings) of emissions, but also on their physical dispersion in the environment. Greater dispersion of emissions as a consequence of the increased heights of both the C.E. Raymond and FB&D

incinerator stacks should further reduce ambient concentrations in the region near the ASWTC. In Application 9101, the Board found the environmental and health risks associated with the mass loadings and ambient concentrations of these contaminants to be acceptable. Both mass loadings and ambient concentrations of this group of contaminants under the current Application are expected to decline. No evidence indicated that the scientific understanding of the risks associated with any of these contaminants has changed. To the extent that actual incinerator emissions are less than the conservative maxima employed in the 1991 EIA and to the extent that extra-provincial wastes comprise less than 100 percent of the system capacity, the incremental effect of the incineration of materials bearing these contaminants would also be reduced.

The seven contaminants for which overall stack emissions were expected to exceed previous estimates were the metals arsenic and cadmium, trichlorinated benzenes, tri- and tetrachlorinated phenols, total dioxins/furans and PCBs. During the hearing however, Chem-Security indicated that the total dioxin/furan estimate provided in the Application did not reflect the more stringent regulatory standard that will be applied to dioxin emissions for the new FB&D kiln. With this revision, the anticipated maximum emission rate of total dioxins and furans would be lower than before, leaving six contaminants for which overall emission rates would increase.

Chem-Security stated that it had rerun dispersion model simulations for the contaminants for which emissions would increase to determine whether ground-level concentrations in the region would be adversely affected. It found that in all cases the contribution of stack emissions to ground-level concentrations would decrease due to the increased stack heights of the two incinerators. The Board accepts this evidence.

Therefore, the Board concludes that the contribution of stack emissions to ground-level concentrations of all measured contaminants with the possible exception of PCP can be expected to be less than previously predicted in Application 9101. The Board regards this reduction as a positive development.

The reduction will also reduce the potential exposure to stack contaminants of workers and the environment in the immediate vicinity of the Treatment Centre. The Board is aware, however, that ground-level ambient concentrations of contaminants on and near the ASWTC are predominantly determined by non-stack sources and it is within this context that the reduced impact of stack emissions on ground-level concentrations in the immediate vicinity of the ASWTC must be viewed. The Board is also concerned with mass loadings of certain contaminants that can accumulate or bioaccumulate irrespective of how well they may be dispersed in the environment. The Board's recommendations on this matter are discussed in Section 8.2.3.

The IAA/LSLIRC stated that Chem-Security's maximum emission estimates for the FB&D kiln were based on its previous experience with the other incinerators rather than actual emission measurements. It said that although the initial performance of the FB&D kiln appeared to be better than that of the C.E. Raymond kiln, the appropriateness of the Applicant's estimates could only be confirmed through measurements under typical operating conditions.

Both the IAA/LSLIRC and the EFONES Coalition were concerned that the test burns, which included incineration of a high proportion of liquids, did not represent typical operating conditions and could not be relied upon as proof that Chem-Security could operate within its licensed limits.

The Board's assessment of the impacts of stack emissions was based on the emission rate estimates provided by the Applicant. It is the Board's understanding that these estimates were based on Chem-Security's previous experience with incineration technology and the design capacity of the new FB&D kiln and that they were not based on test burn data. The Board agrees with the IAA/LSLIRC that the appropriateness of Chem-Security's estimates can only be confirmed through actual measurements under operating conditions. Such measurements were not available at the time of the hearing. However, the Board recommends that, should the project be approved, any discrepancies between the maximum estimates provided to the Board and the data obtained in compliance stack monitoring be reviewed by the Standards and Approvals Division of Alberta Environmental Protection.

The IAA/LSLIRC was also concerned that particulate emissions have not been fully analyzed to precisely determine their chemistry or size distribution. The Board believes that such an assessment is warranted and would require that Chem-Security undertake an analysis to characterize the nature of their particulate emissions under a range of normal operating conditions should the Application proceed. The analysis would include a determination of the distribution of polynuclear aromatic hydrocarbons (PAHs), metals and organochlorines with respect to particle size in the particulate emissions of the Treatment Centre.

8.2.2 Emergency Venting Episodes at the Treatment Centre

During normal operating conditions, process parameters such as temperatures, pressures and flow rates are monitored and maintained within the design limits of the system. Occasionally, however, a system failure may cause a process excursion. During such upset conditions, the operator may find it necessary to cease feeding waste and to bypass the pollution control equipment to prevent physical damage to the system. Gaseous emissions are then vented after the secondary combustion chamber through an emergency stack directly into the atmosphere. Such events are called emergency venting episodes.

Chem-Security provided information regarding the frequency, duration and environmental consequences of emergency ventings. In Application 9101, Chem-Security used an estimate of four to seven emergency venting episodes per year with an average duration of 20 minutes. It concluded at that time that emergency venting episodes were responsible for a significant portion of the annual mass loadings of certain contaminants emitted by the Treatment Centre despite their short total duration. Nine emergency venting episodes occurred from the C.E. Raymond kiln in 1993 and one such event occurred in 1994 prior to the hearing. There was one emergency venting during the test burns for the FB&D kiln.

Chem-Security stated that power failures have been the principle cause of emergency venting episodes at the Treatment Centre. Chem-Security is consequently pursuing

discussions with Alberta Power on improving the reliability of the power supply. Although the design of the new incinerator incorporates a more sophisticated control system to minimize the probability of venting episodes, Chem-Security indicated that the estimate in Application 9101 of seven episodes per year is still valid. The duration of those events is expected to be reduced from 20 to 10 minutes and the production of particulates is expected to be 52 times less on a per episode basis. No estimates of mass loadings of contaminants other than particulates were provided.

Chem-Security described the operational procedures it employs to limit emissions during emergency venting episodes. When an emergency bypass begins, the feeding of waste into the incinerator is stopped to limit the quantity of waste which must be combusted without pollution control equipment. Wastes in the incinerator remain subject to thermal destruction. High temperatures in both the primary and secondary combustion chambers are maintained and residency time in the secondary combustion chamber increases. Chem-Security also said it had investigated the technical and economic feasibility of applying some measure of pollution control to gases released during an emergency venting episode and concluded this was not feasible.

Participants questioned why Chem-Security had not measured the kind and amount of contaminants released during emergency venting episodes. This data, interveners said, would be essential baseline information for an assessment of human health risk. Participants were concerned that more organic material, particularly PAHs could adhere to particles during upset conditions rather than during normal operations and that PAH-bearing particles would be released to the environment directly from the emergency venting stack. Participants also maintained that Chem-Security should determine the size distribution of particulate emissions because particles smaller than 10 microns are directly respirable.

Chem-Security responded that sampling emissions during emergency venting was difficult. It disagreed with participants' suggestions that higher PAH emissions were possible under emergency venting conditions, explaining that residency times in the secondary combustion chamber climb to greater than 20 seconds when the induced draft fan shuts down. At the same time, the temperature in the secondary combustion chamber remains greater than 1100 degrees Celsius. According to Chem-Security, such long residency times at high temperatures should ensure the destruction of organic molecules. Chem-Security reports emergency venting events to the Town of Swan Hills. Some participants, concerned that the release of contaminants during emergency ventings might be hazardous to their health, requested that they also be notified when emergency releases occur.

Independent of the Application, emergency venting episodes are now expected to be reduced to 10 minutes from the previously predicted 20 minutes in Application 9101. The Board notes that thermal destruction of wastes in the incinerator continues during such events and the residency time in the secondary combustion chamber increases. The Board accepts that emergency venting would take place involving waste from other Canadian jurisdictions and there would be a corresponding emission from the vent stack. Emissions from emergency venting were examined in Application 9101 with the ASWTC operating at full capacity and were accepted in Decision 9101. If the current Application were to be approved, the Board notes that

the emergency venting emissions should be less than predicted in Application 9101, since the duration of such events would be reduced by 50 percent.

With respect to emergency ventings, the Board notes that the primary cause is due to intermittent power supply problems that can and should be addressed by Chem-Security and its power supplier to reduce the frequency of such events. Should the Application proceed, the Board would require Chem-Security to implement reasonable steps satisfactory to Alberta Environmental Protection that will further reduce emergency venting episodes, to a level of service more appropriate for a hazardous waste treatment facility processing Canadian wastes, due to power interruption controllable by Chem-Security.

8.2.3 Fugitive Emission Rates at the Treatment Centre

The detection in 1990 of elevated PCB concentrations in vegetation and small mammals sampled near the Treatment Centre suggested that one or more ground-level sources of PCB emissions were present on site. Chem-Security subsequently observed that other volatile organics including chlorophenols and chlorobenzenes were also escaping. These fugitive emissions were associated with the on-site handling and storage of organic wastes. In 1990, Chem-Security measured emission rates for six fugitive sources: the decant, transformer storage, heated storage and cold storage buildings, the transformer processing area and the organic tank farm. These data were then used as input to dispersion models (Section 8.3.2) to create estimates of ground-level concentrations. The modelled contaminant levels agreed substantially with measured levels, indicating that fugitive emissions from these sources were largely responsible for the elevated concentrations of these contaminants near the Treatment Centre.

In Application 9101, Chem-Security described a number of operational changes that had been implemented and engineering changes that would be undertaken to curtail the fugitive emissions of organochlorines. It estimated, at that time, that fugitive emissions of PCBs could be reduced by 91.5 percent, from 484.5 μg/s to 41.8 μg/s, despite the greater throughput of organic materials associated with the expansion. Corresponding fenceline ambient concentrations of 4.4 nanograms per cubic metre were expected based on dispersion modelling estimates.

Chem-Security stated that it implemented the fugitive control measures it had outlined to the Board in Application 9101. Activated carbon filtration systems were installed on the heated storage and decant buildings which together accounted for 77 percent of the fugitive emissions identified in the 1990 fugitive inventory. Additionally, the transformer processing area was decommissioned. Waste preparation activities were transferred from the transformer storage and cold storage buildings to other parts of the Treatment Centre. The only physical modification to previously identified fugitive sources which had not been completed by the end of 1992 was the work on the organic tank farm, responsible for 15 percent of the fugitive emissions. That work, which is expected to net a 60 percent reduction in emissions, began in August of 1992. Also, Chem-Security modified the feed system of the C.E. Raymond kiln, which had not previously been identified as a fugitive source, installed a carbon filter on the recently

constructed transformer furnace building and implemented operational measures to contain fugitives. The 1993 ambient data reflect the results of these efforts.

Chem-Security provided new data on PCB fugitive emission rates. The data show that fugitive emission rates at the decant and heated storage buildings were well below the 1991 target values Chem-Security had hoped to achieve. No emission rate data were provided for the other known sources of fugitive emissions. In estimating the potential effect on fugitive emission rates of the projected tenfold increase in PCB handling, storage and treatment that would result if its Application were approved, it was Chem-Security's position that the 1991 estimates were current. It stated:

> "We have not specifically provided any estimates on changes in fugitive emission levels. We feel that the levels of fugitive emissions specific to the sources that were identified in the Environmental Impact Assessment are accurate and will be achievable."

The issue of fugitive emissions was also addressed by participants. The IAA/LSLIRC contended that the PCB fugitive emission problem should not have arisen in the first place and attributed this to a deficiency in the ambient air monitoring program. The IAA/LSLIRC also proposed that a larger suite of parameters should be monitored to give warning of fugitive emission problems.

Dr. Ron Brecher, one of the Board Solicitor's Contract Consultants, indicated that it was not clear whether PCB fugitive emissions would increase if PCB handling was to increase should this Application be approved. He stated that he did not know the full capacity of the control system in use and whether it still had any reserve. Dr. Brecher stated in his report that the control of PCBs has been problematic in the past, is a relatively high concern and would still require verification within the context of this Application.

8.2.3.1 Ambient Monitoring of Fugitive Emissions at The Treatment Centre

In 1991, Chem-Security established what it referred to as a "fugitive emissions monitoring program" in compliance with a requirement under its operating license. Twenty-four hour average PCB concentrations were measured every six days at the air quality monitoring station and at five sites near fugitive sources using high volume samplers. An additional two sites were added in 1992. In the latter half of 1992, Chem-Security also began reporting 24 hour average concentrations of 13 volatile organic compounds which could arise from fugitive sources. In July 1993, the air quality monitoring station was relocated 600 metres southeast of its original site. However, Chem-Security still monitors total suspended particulates (TSPs) and PCBs at the original location. Chem-Security reports the results of its air quality and meteorological monitoring annually. Reports for 1991 through 1993 were tendered as an exhibit at the hearing.

The PCB monitoring data demonstrate an overall decline which reflects jointly the nature of the wastes processed during the monitoring and the measure of success in Chem-Security's attempts to control fugitive emissions. Levels at the air quality monitoring station have been reduced. The mean annual concentration of PCBs declined 78 percent at the Treatment Centre fenceline from 90 nanograms per cubic metre (ng/m^3) in 1990 to 20 ng/m^3 in 1993, the most recent year for which full data are available, and to 13 ng/m^3 in the early part of 1994.

Six of the eight sites monitored by Chem-Security are next to fugitive sources. Between 1991 and 1993, ambient concentrations declined at the heated storage building (77 percent) and decant building (55 percent) and the organic tank farm (30 percent). Ambient concentrations declined then partially rebounded at the transformer processing area but showed a net decline of 27 percent. Only two years of data were available for the transformer storage building and deep well injection sites where PCB levels increased by 115 percent and 59 percent respectively. The two remaining sampling sites are not near fugitive sources; they sample ambient concentrations at the northwest and southeast perimeters of the Treatment Centre. Mean annual PCB levels declined at the administration building parking lot (77 percent) and the air quality monitoring station (73 percent) between 1991 and 1993.

One of the sources identified in 1990, the transformer processing area, ceased operations in 1990 but the area apparently still is a source of fugitive PCBs, with only a 27 percent reduction in concentrations between 1991 and 1993. Transformer preparation has been moved from the transformer storage building to the transformer furnace building, yet ambient concentrations at the transformer storage area more than doubled between 1992 and 1993.

The monitor located near the deep well injection site had the greatest daily concentration in 1993. The mean ambient concentrations at this site increased by 59 percent between 1992 and 1993.

8.2.3.2 Modelling of Fugitive Emissions at the Treatment Centre

The predominant role of fugitive emissions in determining ground-level concentrations of PCBs and other contaminants at and near the ASWTC site was highlighted through a comparison of two dispersion model simulations conducted by Chem-Security that differed only in the emissions assumed for the FB&D incinerator. A difference in stack emissions of approximately 60 percent between the two simulations had very little effect on ground-level ambients at or near the ASWTC site. During the hearing, an expert for Chem-Security observed that:

> "... what the results really show is that the ground-level effects associated with PCB emissions are really controlled by fugitive emissions, not stack emissions."

The Board notes that ambient concentrations of PCBs have declined at the fenceline air quality monitoring site since 1991. The level of 20 ng/m^3 was recorded in 1993. The Board notes, however, that the observed value of 20 ng/m^3 is still substantially greater than Chem-Security's 1991 modelling estimate of 4.4 ng/m^3.

8.2.3.3 Board Views on Fugitive Emissions

The Board is concerned with fugitive emissions of PCBs at the Treatment Centre because it recognizes the potential cumulative effect of persistent PCB emissions through bioaccumulation in the tissues of animals and humans. The Board has therefore assessed the likelihood that Chem-Security will achieve its 1991 target of reducing the rate of PCB fugitive emissions by 91.5 percent from 484.5 μg/s to 41.8 μg/s.

The Board recognizes the difficulties inherent in any attempt to assess the effectiveness of individual fugitive control measures in relation to ambient concentration data. Specifically, the ambient concentrations at the monitoring sites are potentially influenced by simultaneous changes unrelated to fugitive control measures and reflect both emission rates and dispersion conditions. Nevertheless, certain conclusions may be drawn about the overall effectiveness of the fugitive emissions control program based on a comparison of the ambient data and the limited data available on emission rates. The Board notes that fugitive control measures at the decant and heated storage buildings have eliminated 77 percent of the emissions from all sources identified in the 1990 inventory. With respect to the amount of PCBs received at the ASWTC during 1992 and 1993, the Board notes that Chem-Security advised the Board that the ASWTC received 456.23 tonnes of drummed PCB contaminated liquids in 1992 and 280.02 tonnes in 1993; and 807.17 tonnes of PCB contaminated soils in 1992 and 385.44 in 1993.

The 78 percent decline in the fenceline concentrations of PCBs suggests either that the remaining initiatives have fallen short of their anticipated result or that such gains have been counterbalanced by increases in emissions from sources not accounted for in the 1990 fugitive sources inventory. The Board believes there is evidence to support both possibilities but also notes that it does not have specific information to link net emission rates to consequent ambient air concentrations at various sites. Table 8.7 indicates the various types of information available to the Board on fugitive emissions, monitoring and mitigation.

The Board believes there is a likelihood that Chem-Security may achieve the emission rate reductions of greater than 90 percent targeted for in the 1991 EIA. However, the Board notes that Chem-Security has failed to achieve a corresponding similar reduction of ambient concentrations at the Treatment Centre fenceline during 1992 and 1993 when the volume of PCBs received at the ASWTC declined. As discussed above, the Board cannot be sure to what extent the higher than anticipated ambient PCB levels are due to a shortfall in the effectiveness of currently implemented control measures or to sources of fugitive emissions that were not accounted for in the 1990 fugitive sources inventory. Moreover, the Board is concerned that fugitive emissions of PCBs could increase if the incineration of greater quantities of PCBs were allowed to proceed without further assurance that the Applicant's fugitive control

Fugitive Sources (Emissions & Monitoring Stations)	Mitigation	9101 Observed Data*	9101 Estimate Future*	Percent Change Predicted	1994 Model Input*	Data Supplied to Expert Panel*	91 Monitor Data#	92 Monitor Data#	93 Monitor Data#	Percent Change
DECANT BUILDING	ACTIVATED CARBON	270	6.9	97.44	6.9	Less than 0.1	442	258	201	55% decrease (2 year)
TRANSFORMER STORAGE	ACTIVATED CARBON	7.2						131	281	115% increase (1 year)
HEATED STORAGE	ACTIVATED CARBON	106	6.9	93.49	6.9	Less than 0.1	147	41	34	77% decrease (2 year)
COLD STORAGE	WASTE PREP TRANSFERRED	8.3								
TRANSFORMER PROCESSING AREA	DECOMMISSIONED	22					238	134	174	27% decrease (2 year)
ORGANIC TANK FARM	ACTIVATED CARBON	71	28	60.56	28		491	455	343	30% decrease (2 year)
TOTAL OF ABOVE		484.5	41.8	91.17						
DEEPWELL INJECTION								134	213	59% increase (1 year)
FEED SYSTEM-C.E.RAYMOND KILN	MODIFIED									
TRANSFORMER FURNACE BUILDING	ACTIVATED CARBON					0.3				

* = micrograms per second for emission data
# = nanograms per cubic meter for monitoring sites

TABLE 8.7
INFORMATION ON FUGITIVE EMISSIONS

Source: CSAL (Exhibit 11 and 116)

program is capable of curtailing fugitives to an acceptable degree. The Board believes that the potential effects of fugitive emissions could be mitigated through appropriate fugitive emission controls. Therefore, in the event that the Application were to be approved, the Board would require Chem-Security to not incinerate PCP or PCBs from out of province, except for test purposes, until such time as it has, in a manner satisfactory to Alberta Environmental Protection, demonstrated that the fugitive emission control program at the ASWTC is capable of controlling potential fugitive emissions of PCBs and other volatiles that could arise from the receipt of wastes bearing these compounds from out of province, to acceptable levels as may be approved by Alberta Environmental Protection, based on a reassessment of the ASWTC fugitive sources inventory and a complete assessment of the effectiveness of existing fugitive emission controls.

In Application 9101, concern over fugitive emissions was not limited to PCBs. Chlorophenols and chlorobenzenes were also monitored and found to be escaping as fugitive emissions. Although the discussion of fugitive emissions in the present Application focused exclusively on PCBs, the Board believes that the fugitive control measures adopted for PCBs would result in comparable reductions in other organochlorine contaminants.

In the foregoing discussion, the Board concluded that the effects of contaminants emitted from the incinerator stacks on ground-level concentrations would be less than previously predicted and found acceptable in Decision 9101. If the current Application were to be approved, the Board expects that emergency venting emissions would be reduced from those examined in Application 9101, since the Board now expects the duration of such events to be reduced by 50 percent and to be less frequent if the power supply problems can be resolved. Fugitive emissions of PCBs continue to be observed at the ambient monitoring sites on the plant site. The Application would result in a significant increase in the PCBs treated at the ASWTC, and the Board concludes that should this occur, there may be a risk of an associated increase in the observed ambient concentrations of PCBs at the plant fenceline.

8.3 Air Quality

Atmospheric contaminants near the Treatment Centre and in the surrounding area arise from the three kinds of emissions discussed in Section 8.2 and from sources other than the ASWTC in the area. The Board heard that the characteristic chemical composition, dispersion pattern and degree of temporal variation associated with normal stack emissions, emergency venting emissions and fugitive emissions determine their relative importance in contributing to local and regional contaminant concentrations.

Normal stack emissions have a negligible effect on ground-level concentrations in the vicinity of the Treatment Centre (Section 8.3.2). Stack emissions under normal operating conditions (Section 8.2.1) are responsible for the greatest absolute quantity (i.e. annual mass loadings) of the majority of contaminants released to the environment. Normal stack emissions are essentially continuous and are released at great height to maximize their dispersion. Emissions from emergency ventings are also released from stacks. Their influence on ambient concentrations is intermittent, but dominant in the short term for certain contaminants. Emergency venting episodes may also contribute a substantial portion of the annual mass

loadings of certain contaminants (Section 8.2.2). Fugitive emissions currently account for only a minor portion of estimated annual mass loadings of volatile compounds. Nevertheless, they are the predominant source of ground-level concentrations at the Treatment Centre because they are released at ground-level (Section 8.2.3). The distinct dispersion patterns of stack and fugitive emissions implies that their impacts may be treated as separate issues. Accordingly, the Board proposes to deal with them separately.

No air quality monitoring data were collected beyond the Treatment Centre. Chem-Security provided two kinds of evidence concerning the levels of atmospheric contaminants: air quality monitoring data collected at the Treatment Centre and dispersion modelling based on emissions from all sources. The plant site monitoring data document changes in ground-level air quality at the Treatment Centre and may be compared with predictions based on the dispersion modelling.

As noted at the hearing, curtailing fugitive emissions reduces local PCB concentrations in the air and other environmental media in the immediate vicinity of the Treatment Centre. The Board is therefore of the opinion that data on concentrations of contaminants in general and of PCBs in particular, are of value in determining whether the ultimate purpose of fugitive controls has been achieved. They are, in effect, the means by which emissions from unsuspected sources may be detected. In contrast, emission rate data from specific sources are valuable in assessing the effectiveness of individual fugitive process control measures.

8.3.1 Ambient Air Quality Monitoring at the Treatment Centre Site

During the hearing, Chem-Security said it conducts continuous ambient monitoring to obtain one hour average concentrations of sulphur dioxide, hydrogen sulphide, nitrogen oxides, carbon monoxide and total hydrocarbons at a monitoring station at the east fenceline of the Treatment Centre. In addition, TSPs and PCBs are measured every six days using high volume samplers to obtain 24 hour averages. Chem-Security's air quality reports show that total suspended particulates met the Alberta Environmental Protection maximum permissible concentration of 100 $\mu g/m^3$ except on only one of the TSP measurement days between 1991 and 1993. Maximum levels of 13 volatile organic compounds (VOCs) measured by Chem-Security were well below the relevant ambient criteria.

The IAA/LSLIRC critiqued the scope of Chem-Security's air quality monitoring stating that Chem-Security should measure the size and chemical composition of particulates, which are currently measured only as TSPs. It suggested organic contaminants might adhere to particles smaller than 10 microns and be a potential health concern to Treatment Centre employees because they can be inhaled. The IAA/LSLIRC also said Chem-Security should conduct air quality monitoring within the framework of a regional biological effects monitoring program, rather than restrict its monitoring to the Treatment Centre site.

According to the IAA/LSLIRC, such a program should be broad in scope and provide for extensive participation by the First Nations people. It would include: a large area

along the shores of Lesser Slave Lake; a survey of contaminant concentrations already in the ecosystem and humans in the lakeshore communities; participation of First Nations people and other users of the region's natural resources to gather data; and monitoring of additional flora and fauna species throughout the region.

Chem-Security, in response to the IAA/LSLIRC, stated that it did not believe that regional monitoring was its responsibility. It pointed to the Board's conclusions on this matter stated in Decision 9101. It did not believe that circumstances had changed from that time.

The Board is aware that the predicted ground-level concentrations of contaminants are small. It is also aware of the possible influence of other sources in the region on air quality (see Figure 8.1). However, for most industrial facilities in Alberta, monitoring of air quality at the predicted point of ground-level impingement of specific contaminants is a normal requirement of operating licences. The ASWTC air monitoring program has been focused upon the site of the Treatment Centre where detectable concentrations may be more likely. The Board is concerned that data has not been collected in the past that would confirm predicted ground-level concentrations at the relevant points of impingement in the local area, nor has there been an opportunity to have the stack emissions, under normal operating conditions involving the new kiln, characterized to ensure that no unforeseen contaminants would be emitted. The Board believes that without such evidence confirming or refuting the predicted negligible effect, there could be an impression that effects could occur that would not be detected. Additionally, the Board believes that local area impingement monitoring programs are more likely to detect, at an early stage, potential problems that could arise from contaminants related to the ASWTC which could be corrected thus minimizing any regional effect. The Board would require, should the Application proceed, additional monitoring in the impingement area of the Treatment Centre to confirm or refute the proposition that the effects are, in fact, negligible as predicted. In reaching this conclusion, the Board is not prepared to make such a requirement to be so broad that it would become a general air quality monitoring program in the region. The Board intends the requirement to be specific to the emissions of most concern, as identified as coming from the Treatment Centre, such as dioxins, furans, PCBs and metals.

8.3.2 Air Quality Modelling

The potential effects of emissions from the Treatment Centre on nearby air quality were estimated using two dispersion models: the United States Environmental Protection Agency (USEPA) Industrial Source Complex Short Term (ISCST2) model, which can model the turbulent effects of building wakes but cannot model dispersion where the surrounding terrain exceeds the stack heights and COMPLEX-I, which can be used to assess circumstances in which the surrounding terrain exceeds stack height but cannot be used to study the effects of building wakes.

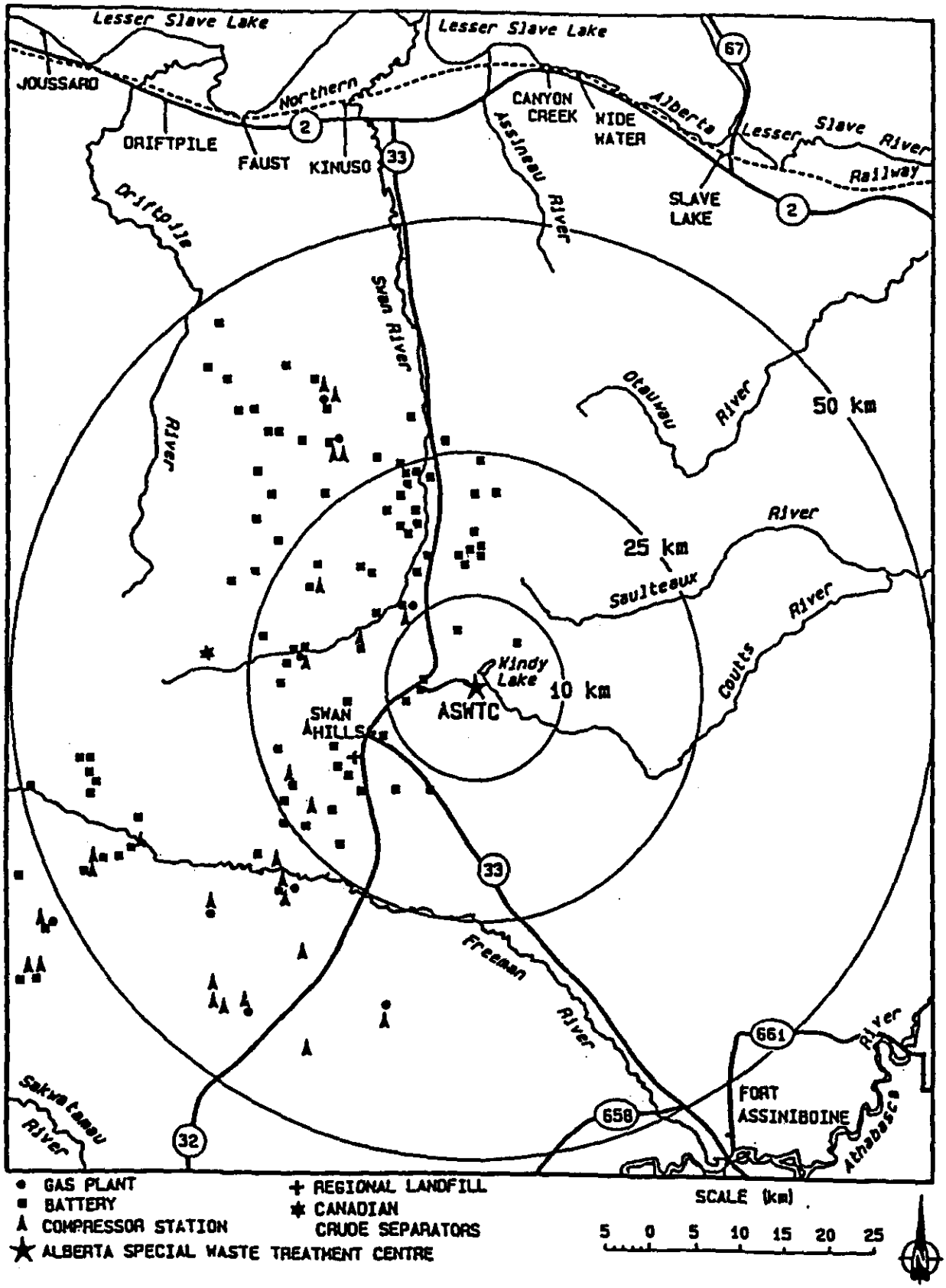


FIGURE 8.1 - LOCATION OF ATMOSPHERIC EMISSION SOURCES IN THE VICINITY OF THE ASWTC
Source: Chem-Security Exhibit 101

The current air quality model calculations predict that the regional ambient concentrations of contaminants would be reduced from those levels calculated in Application 9101 due to system changes incorporated since that time such as increased stack heights. Based on these results and its associated health assessment, Chem-Security stated that the environmental effects are acceptable since they are less than those examined by the Board in Decision 9101.

The issue of local ambient air concentrations is addressed in Section 8.2 under fugitive emission concerns.

8.4 Land and Terrestrial

Chem-Security stated that no additional environmental impacts (see Tables 8.4, 8.5, and 8.6) would result from the approval of the current Application and that the environmental monitoring program included soil, vegetation and wildlife. It also stated that the program would continue unchanged. It did, however, state that certain changes including minor alterations to the location of terrestrial monitoring sites have been made to the monitoring program in 1993 to reflect changes that have occurred at the Treatment Centre.

The IAA/LSLIRC critiqued the soil and vegetation monitoring program as well as the wildlife monitoring program. It considered that the soil monitoring program has been successful in detecting fugitive PCBs at the site. It was concerned that ambient PCB ground-level concentrations at the Treatment Centre site are still increasing. It stated that since the soil is acidic in nature, it will be more sensitive to the introduction of heavy metals and the potential for heavy metal accumulation would warrant close observation in the future.

The IAA/LSLIRC stated that the objectives of the wildlife monitoring program are largely focused on the detection of certain contaminants. It is its position that, if the Board was to approve this Application, the wildlife monitoring program should also provide an indication of the persistence of contaminants and their movement in the food chain. This would include the addition of other trophic levels such as carnivores and insectivores. It suggested that ermine would be an appropriate monitoring species due to its relative abundance in the area. It contended that this would also allow the aboriginal people and local trappers to participate actively in the monitoring program. Reference was made to the Northern River Basins Study as an example of successful native participation. It contended that initial chemical scans of specimens should be broad. The IAA/LSLIRC further proposed that a tissue bank be established for future analysis of parameters not yet apparent and also to permit subsequent fate and effect assessments if the Application were approved.

8.4.1 Views of the Board on Land and Terrestrial Environmental Effects

The Board accepts Chem-Security's evidence that no effects beyond those identified by Chem-Security in Application 9101 would occur on land and terrestrial environments as a result of the current Application (see Table 8.6). The Board notes that in Decision 9101, it was favourable to the concept of carnivore species monitoring, with due regard

to its practicality. The Board also included in its recommendations, direction with respect to the importance of heavy metal monitoring and ambient levels. The Board understands that currently Alberta Environmental Protection has included in its license requirements the reporting of heavy metals emission rates. The Board notes this may be the first step to the development of heavy metal emission standards.

The Board heard no evidence of adverse environmental effects with respect to continued landfill and deepwell operations at the ASWTC. The Board accepts Chem-Security's evidence regarding the environmental effects associated with the Application as it pertains to the landfill and deep well operations (see Table 8.4, 8.5 and 8.6).

The Board has reviewed the land and terrestrial environmental effects of the Application and has concluded that the Application would not result in any significant incremental environmental impacts. The Board believes that the observed land and terrestrial effects of the ASWTC have essentially been confined to the lands occupied and reserved for the ASWTC. The Board heard no compelling evidence that the Application would lead to any significant adverse land and terrestrial effects that would preclude or limit the use of land in the Swan Hills region.

The Board heard evidence that some users of land in the region believe that the ASWTC may be currently affecting lands and resources in the Swan Hills area. In the opinion of the Board, the evidence before it does not substantiate that any significant adverse land and terrestrial effects have occurred, or would occur as a result of the Application.

8.5 Water and Aquatic Resources

Although the current Application did not extensively comment on the aquatic aspects of environmental effects, it included tables summarizing environmental impacts projected for the 1991 expansion review (see Table 8.4 and 8.5) and stated that no additional environmental impacts would arise from the approval of Application 9301. The Applicant further stated that no changes were required due to the Application.

Chem-Security stated that the environmental monitoring program established in 1985 included the monitoring of groundwater, surface water and aquatic resources. The IAA/LSLIRC dealt with groundwater, surface water and aquatic resource issues in its submission. It examined current and past groundwater monitoring at the site and provided its critique and concerns. It does not believe that the current groundwater monitoring network is sufficient to detect plant-caused contamination, both because of inadequate placements of monitors and because the parameters being monitored are not sufficient or appropriate. It stated that general parameters such as total organic carbon and dissolved organic carbon have limited value for assessing the presence of organic contaminant compounds. It also pointed to the absence of results from leak detection monitoring in the 1992 and 1993 annual groundwater monitoring reports. The IAA/LSLIRC said that the *U.S. EPA Resource Conservation and Recovery Act, Groundwater Monitoring Technical Enforcement Guidance Document* (TEGD) issued in 1986, provides the state-of-the-art groundwater monitoring protocol and stated that the

monitoring program at the ASWTC does not meet the objectives of the TEGD. It stated that the ASWTC analytical program may be adequate from an Alberta regulatory perspective, but that from a scientific, technical and due diligence perspective, the program is questionable.

The IAA/LSLIRC stated that the Treatment Centre is located close to a watershed break where the topography divides into four watersheds. It therefore contended that to be assured of no effects, all four of these watersheds should be monitored. Chem-Security rebutted this argument and insisted that the Treatment Centre was located in the Coutts River watershed although it conceded that it was also close to other watersheds. It went on to state that the area of influence, giving consideration to plume dispersion, is within the Coutts River watershed.

The IAA/LSLIRC stated that the surface water monitoring program should be conducted using accepted protocols and that the monitoring program in Chrystina Lake should include more parameters. It proposed that additional testing should be done when positive analytical results are obtained and attempts should be made to identify the cause of the anomalous readings. It also proposed that the monitoring program should be reviewed every three years by an outside party to see if new circumstances warrant changes to the program. The IAA/LSLIRC submission went on to suggest an expanded and redesigned program for the monitoring of the aquatic ecosystem and the sediments.

The IAA/LSLIRC expressed concern with respect to the watershed and potential impact on their drinking water. The matter of spills and possible effects on drinking water was also mentioned in another submission. The Wild Rice Growers, part of the EFONES Coalition, expressed concern about water quality in their watershed. Similar concerns were expressed by the Fort Assiniboine Trappers Association who felt that a spill could cause the loss of its members' business. As support for these concerns, the EFONES Coalition referenced Chem-Security's Executive Summary which stated, "for releases into rivers the recovery of material is effectively impossible."

8.5.1 Board Views on Water and Aquatic Environmental Effects

The Board notes Chem-Security's evidence summarizing environmental impacts and its conclusion that no additional environmental impacts would arise from the current Application. The Board accepts Chem-Security's evidence that no additional water and aquatic resource impacts would result from the current Application should it proceed.

The Board notes that the IAA/LSLIRC and other participants have concerns with respect to the water and aquatic resources monitoring program. The Town of Swan Hills, which has been actively involved in the ongoing review of the monitoring program and its results, indicated its concern that the program be maintained at a high level and agreed with other interveners that it should be reviewed on an ongoing basis to maintain an adequate performance. The Town expressed its concern that the monitoring program not be negatively affected by budget considerations. The Board agrees that monitoring is a critical link in the continued assurance that the operation of the ASWMS does not constitute a threat to the environment and to human health.

The Board notes the statement by the IAA/LSLIRC that the current monitoring practices may well be within Chem-Security's regulatory requirements but may not be within the practices and regulatory standards in other jurisdictions such as those developed by the US EPA. The Board has had regard for its comments in Decision 9101, where it recognized these various elements and recommended that during the periodic reviews, Chem-Security and Alberta Environmental Protection (AEP) should examine regulatory standards, practices and operating experiences in other jurisdictions.

The Board also recommended in Decision 9101 that "efforts be made to ensure that all interested members of the public have an opportunity to appropriately participate in the ongoing public involvement program." The Board looks to the ASWMC and AEP as the parties responsible for ensuring the protection of the public interest on an ongoing basis. Consequently, the Board sees a more active role for the ASWMC in the operation of the Swan Hills Citizens Liaison Committee and its deliberations. The ASWMC should be instrumental in assuring that all interested parties have and would continue to have an opportunity to provide meaningful input to the monitoring program review process. This would require the ASWMC, as an advocate of the public interest, to advance concerns to AEP and, as part owner and the government's representative in the joint venture, to ensure that legitimate concerns are addressed by Chem-Security and that communication is maintained between the various parties. The Board believes that ASWMC could improve in this regard.

The Board is concerned with respect to the intervener claim that the monitoring program is not abiding by the guidelines of its documented protocol. The Board expects AEP to examine this claim and to ensure that if there is any merit to this concern, that the monitoring program be immediately rectified. The Board again wishes to emphasize the importance of ASWMC's role and responsibilities in this regard.

The Board heard no compelling evidence that the Application would lead to any significant adverse water or aquatic environmental effects that would preclude or limit the use of resources in the Swan Hills region.

8.6 Health Risk Assessment

For the health risk assessment requirement in the current Application, Chem-Security relied on Application 9101 in which estimates of the health risk associated with 67 compounds were derived in the form of exposure ratios referred to as "Relative Margin of Safety" (RMOS) values. Exposure ratios for plant operators, office workers and residents of Swan Hills were calculated by dividing their anticipated exposure rates by recommended exposure limits. Exposure rates were calculated based on the modelled ground-level ambient contaminant concentrations, and assumptions about direct and indirect exposures. Recommended exposure limits were based on a review of the toxicological literature. Chem-Security stated that it contracted BOVAR Environmental Services and Cantox Inc. to review the assessment with respect to the current Application.

Chem-Security provided a table in which the previously derived exposure ratios for plant workers, the most exposed target, were apportioned to either the Alberta Only case or the All Canada case. This was based on the assumption that risks are linearly related to the fraction of the waste stream attributed to provincial and extra-provincial wastes. For most contaminants, Chem-Security assumed that the Alberta portion would be 50 percent. Exceptions were carbon dioxide (CO_2) and nitrogen oxides (NO_x) where Alberta wastes were assumed to account for 75 percent of the risk and PCBs which were assumed to account for 10 percent of the risk. Chem-Security claimed on this basis that the incremental contribution to the human health risk resulting from the treatment of extra-provincial waste was small.

Participants questioned Chem-Security's health risk assessment. The IAA/LSLIRC stated in its final argument that Chem-Security did not provide a new, thorough health risk assessment, that the 1991 risk assessment was no longer applicable and that the incremental effects of receiving waste from other Canadian jurisdictions could not be properly determined. It pointed to the difference in the nature of projected All Canada waste streams versus projected Alberta Only waste streams (such as PCBs), changes in technology at the ASWTC and changes in the objectives of Chem-Security for the operation of the ASWTC. It also argued that the current health risk estimates are not based on actual operation of the FB&D kiln. The IAA/LSLIRC pursued an extensive critique of Chem-Security's monitoring programs and stated that there were deficiencies which would also affect the conclusions of a health risk assessment. Concerns were expressed by the IAA/LSLIRC with respect to the safety of its water supply, reluctance to use herbs from the area for their traditional medicines and the impact on wildlife used by the native population. The IAA/LSLIRC believed they would be subjected to all of the adverse health effects with no participation in any benefits flowing from the project.

The EFONES Coalition advanced, through an expert witness, concerns regarding the potential negative health effects of levels of dioxins that have in the past been regarded as below the health effect level. It stated that these and similar compounds can affect the immune, reproductive and endocrine systems. The concern regarding biomagnification was also addressed. The EFONES Coalition expert stated that the incremental effect of releases of dioxins by facilities such as the ASWTC must be assessed in relation to background concentrations. It said dioxin levels are already close to the levels at which health effects are expected. The EFONES Coalition expert also did not agree with the "safe threshold" concept for dioxins, and said that the "one molecule, one response" concept was more appropriate. It was also the expert's belief that a higher safety factor would be adopted in Canada in response to current scientific knowledge. This expert, however, did not make any comment on the level of emissions arising from the current Application and how this should be judged within the broader context. The expert also stated that he considered Dr. Steve Hrudey's program at the University of Alberta as being one of the best in North America but expressed caution in the use of risk assessments. The EFONES Coalition also stated that Chem-Security had not been very specific in its assessment of the ratio of exposure by direct route inhalation relative to indirect means such as eating contaminated foodstuffs. According to EFONES, documents showed indirect exposures account for between 90 and 99 percent of the total. The EFONES Coalition

also mentioned concern for the health of its members living in proximity to the dangerous goods routes.

Dr. Ron Brecher, one of the Board Solicitor's Contract Consultants, indicated a number of concerns relating to risk assessment and health risks. The issue of PCB emissions was sufficiently important in his view that the Board should examine the current emissions. It was stated the risk assessment should reflect the status of the Treatment Centre and the waste streams relevant to the All Canada case as compared to the Alberta Only case. The expert agreed with Chem-Security, that the Board could also assume as an extreme approximation that all the effects were due to out of province wastes. In his view, the Board would then have to determine if any potential direct negative health effects are anticipated.

Most other participants expressed health concerns in a general way, including local municipal jurisdictions, ID #125 and MD #15. The Town of Swan Hills felt that it had a good knowledge of the risks and indicated that the monitoring program was needed and should continue.

8.6.1 Views of the Board on Human Health Risks

Chem-Security's evidence shows that the projected amount, kind and dispersion of Treatment Centre emissions have changed since 1991, implying that human exposures and health risks have also changed. Under these circumstances, the Board believes it would be reasonable to rely on revised risk estimates. Moreover, in keeping with its conservative approach to the assessment of environmental and human health risks (Section 8.1.4), the Board believes it is appropriate to err on the side of caution by assuming that all health risks associated with the full operations of the Treatment Centre would be due to the treatment of extra-provincial waste. It has therefore endeavoured to determine the level of risk to human health associated with the Treatment Centre operating at full capacity with wastes from other Canadian jurisdictions having regard for Chem-Security's revised emission estimates.

The Board notes that exposure ratios used to assess risks to human health are the ratios of predicted exposures to levels of exposure deemed acceptable based on toxicological evidence. Chem-Security's expert indicated that he had reviewed the toxicological literature to determine whether recent findings would warrant altering the values employed in 1991 and had concluded that no such changes were warranted. The Board is prepared to accept Chem-Security's evidence on this matter, with the exception of dioxins, since none of the other participants provided contradictory evidence except with respect to dioxins. The Board's views on the health risks associated with dioxins are treated separately below.

The Board heard that the contribution of stack emissions to ground-level concentrations in the vicinity of the Treatment Centre would be reduced with the potential exception of PCP (Section 8.2.1) and that emissions from emergency venting could also be reduced (Section 8.2.2). In the event that the Application were approved the Board would condition the approval to ensure that PCP emissions would not pose a significant risk (see Section 8.2.1). Thus, the exposure to humans in the vicinity of the Treatment Centre to

contaminants from stack emissions would be reduced. As discussed in the foregoing sections, however, fugitive emissions are responsible for the greater part of ground level concentrations of certain volatile and aerosol contaminants near the Treatment Centre and could therefore have a greater effect on exposure. The Board has indicated its concern that fugitive emissions of PCBs and PCP could increase if wastes bearing these compounds from outside Alberta are treated. To assess the likelihood that potential increases in exposures to these compounds might elevate health risks to a level of concern, the Board reviewed the evidence brought before the Board in the current review from Application 9101. The exposure ratios for long term exposure to PCBs and chlorophenols as a group were not greater than 0.0012 and 0.00050 respectively for any of the four target receptors described in the 1991 EIA. This implies that exposures would have to increase roughly 800 to 2000 times for PCBs and chlorophenols respectively to approach the level at which the exposure ratio would exceed unity thereby prompting concern. The Board heard no evidence to suggest that increases of this magnitude are likely. The Board therefore concludes that the exposure ratios and health risks would remain within acceptable limits if the Application were to be approved.

The Board understands that the greater dispersion of stack emissions afforded by the increased stack heights could result in deposition of contaminants at low concentrations over a greater area. The Board has reviewed Chem-Security's dispersion modelling results and concluded that the concentrations involved would be sufficiently low so as to pose no real threat to human health at a distance from the Treatment Centre.

The Board notes its previous observation that the anticipated emission rates of total dioxins and furans would be lower than previously predicted in Application 9101. The Board notes that it has before it no new evidence from relevant Canadian health authorities that indicates that there has been or will be a change in the Canadian regulatory requirements regarding dioxins and chlorinated organics with dioxin-like properties (furans and PCBs). The relevant Canadian regulatory standard recently adopted by CCME and currently applied to the ASWTC by AEP is 0.5 ng/s which is generally considered to be a very stringent limit that is intended to minimize health risks to acceptable levels. Regarding dioxins and chlorinated organics with dioxin-like properties (the furans and PCBs), the Board notes that the US EPA dioxin report is likely to remain in the draft stage for some time. The Board does not believe it can adequately assess, on a onetime basis, the ongoing changes in the scientific understanding of dioxins. The Board believes that new understandings must be addressed in an ongoing fashion by the relevant Canadian health authorities. The Board therefore recommends that AEP review any forthcoming Canadian health authority position regarding the US EPA dioxin report when it becomes available in final form with a view to its application to the protection of public health in Alberta. The Board recommends that AEP communicate these reviews to the various interested parties and thereby increase the public confidence in the responsible operation of the Treatment Centre.

8.7 Summary and Conclusions Respecting Environmental Effects

In this section, the Board has reviewed the evidence regarding the environmental and human health effects of treating wastes from other Canadian jurisdictions in addition to Alberta wastes. Given the market uncertainty regarding the nature and extent of wastes that would be treated at the ASWTC if the Application were to be approved, the Board has used a conservative approach to estimating the effects of the Application by examining the effects that would occur if the ASWTC were to process only wastes from other jurisdictions. The Board adopted this approach since, in the opinion of the Board, if the environmental impacts and health risks of operating the ASWTC at full capacity involving the most difficult to treat wastes from other Canadian jurisdictions are insignificant, the Board would be able to conclude that the incremental effects of any foreseeable operating circumstance involving the receipt of extra-provincial waste would also be insignificant.

The Board's review of the evidence indicated that the principle environmental effects of the Application would be associated with air emissions from the incineration of wastes from outside Alberta. Consequently, the Board has concentrated its review on the effects of the Application on air quality. Three principle sources of air emissions were considered: stack emissions from the incinerator, emergency stack emissions during process upsets, and fugitive emissions from sources associated with the handling and preparation of wastes for treatment.

The Board notes that its review of stack emissions in Application 9101 found the environmental and health risks associated with the mass loadings and ambient concentrations of all contaminants emitted by the ASWTC acceptable. The current Application indicates that both the mass loadings and ambient concentrations of 59 of 67 measured contaminants are expected to decline from previous estimates. The Board accepts this evidence and agrees that the scientific understanding of the risks associated with these contaminants has not materially changed since Application 9101. Emissions of the 59 contaminants are now expected to be less than previously predicted levels.

Emissions of dioxins and furans are expected to be lower than previously predicted, due to technical changes in incineration and associated reduced stack emissions, and additional pollution control processes to meet more stringent regulatory limits. Improved stack dispersion would reduce ground-level concentrations.

Arsenic, cadmium, trichlorobenzenes, chlorophenols with varying levels of chlorine substitution, and PCB mass loadings are expected to increase. Due to increased dispersion associated with increased stack heights, the predicted ground-level concentrations would decline from previously predicted levels. If the Application were to proceed, the Board would require Chem-Security to provide Alberta Environmental Protection with a revised assessment of the effects of maximum PCP emissions based on the design capacity of 2660 kg/hr and DRE performance data for the FB&D kiln and for the C.E. Raymond kiln if it will be used to incinerate PCP, to further confirm that the combined emissions would not likely exceed the overall estimate of 3.82 μg/s.

With respect to the incremental environmental effects from stack emissions under normal operating conditions, the Board has been able to reach a number of conclusions regarding the treatment of hazardous wastes from other Canadian jurisdictions. The Board concludes that hazardous wastes received from other Canadian jurisdictions for incineration at the ASWTC would undergo thermal destruction to such a degree that the residual stack emissions, after passing through the emission controls and being dispersed through the incinerator stacks, would not create significant risks to either human health or the environment. The Board concludes that if the ASWTC were operated at full capacity under the most severe loading conditions involving the most difficult to treat hazardous wastes from other Canadian jurisdictions, the environmental and human health effects of stack emissions under normal operating conditions would not be significant.

With respect to emergency venting episodes, the Board concludes that the Application would not result in a change in the expected frequency of such events. Emissions during future episodes would be greater than would be the case without the Application due to the increased volume of wastes incinerated. The expected environmental effects from such episodes would be less than previously predicted despite the potential for increased waste volumes since the duration of events will be reduced from 20 to 10 minutes, and the Board would require, if the Application were to proceed, that Chem-Security realize improvements in the reliability of the power supply.

With respect to fugitive emissions, the Board notes Chem-Security's fugitive emission control program has been implemented and physical modifications have now been made to all the major fugitive emission sources identified in the 1990 inventory, as well as the transformer furnace building and the new kiln. However, PCBs continue to be observed at the ambient monitoring sites on the plant site. The Application would result in a significant increase in the PCBs treated at the ASWTC, and the Board believes that should this occur, there may be the risk of an associated increase in the observed ambient concentrations of PCBs. The Board recognizes the potential cumulative effect of persistent PCB emissions through bioaccumulation in the tissues of animals and humans. The Board also notes that the observed levels are quite low in relation to the CCME standard of 50 parts per million (ppm) in soils on industrial plant sites. However, the ASWTC was developed to destroy hazardous waste using processes that should not in themselves become sources of hazardous contaminants. Therefore, even small increases in ambient concentrations of PCBs on the plant site are a source of concern to the Board.

A monitoring program detected the fugitive emissions problem. Chem-Security has made engineering and facility improvements since 1992 to curtail the fugitive problem. These changes include the removal of the rocking kilns and cooling tower from service, the installation of a new waste receiving centre, the closure of the hot-solvent transformer processor and the installation of venting controls within the plant buildings.

The Board is concerned, however, that if the Application is approved and the receipt of highly regulated PCB waste is allowed, concentrations of PCBs in the environment due to fugitive emissions could increase. Chem-Security has not demonstrated to the Board's

satisfaction that fugitive emissions might not increase. In fact, from 1992 to 1993, Chem-Security's submissions indicate a 115 percent increase in ambient PCB concentrations at the transformer storage site, and a 59 percent increase at the deepwell injection site. On examination of Table 8.7, Chem-Security appears to have demonstrated a significant decrease in PCB emissions at two sites - the decant building and the heated storage building. However, no PCB emission estimates were supplied for the other sites - the transformer storage, the cold storage building, the organic tank farm, the deepwell injection area and the modified C.E. Raymond kiln. The transformer processing area is now decommissioned. The Board, therefore, believes that the continued close vigilance of Chem-Security's fugitive emissions is required. It is important to note that increases in PCB handling volumes are anticipated.

Therefore, in the event that the Application were to be approved, the Board would require Chem-Security to not incinerate PCP or PCBs from out of province, except for test purposes, until such time as it has, in a manner satisfactory to Alberta Environmental Protection, demonstrated that the fugitive emission control program at the ASWTC is capable of controlling potential fugitive emissions of PCBs and other volatiles that could arise from the receipt of wastes bearing these compounds from out of province. It must control those emissions to acceptable levels as approved by Alberta Environmental Protection based on a reassessment of the ASWTC fugitive sources inventory and a complete assessment of the effectiveness of existing fugitive emission controls.

Chem-Security has undertaken test burns to reassess predictions of emissions as required by Alberta Environmental Protection. The test burn data currently available, although of a preliminary nature, appear to demonstrate an ability to achieve removal efficiency exceeding the regulated DRE for both PCBs and PCP and to achieve dioxin emission levels of less than the regulated limit of 0.5 ng/s. The results are not necessarily conclusive as to what future continuous incineration results might be. The Board understands that Alberta Environmental Protection would carefully assess the completed test burn results, the actual emissions and their potential effects, and establish operating requirements for the new kiln within acceptable standards and regulatory limits.

Finally, the Board notes that the only stack emission contaminants likely to exceed Chem-Security's previous mass loading estimates are the heavy metals arsenic and cadmium, trichlorobenzenes, chlorophenols with varying levels of chlorine substitution and PCBs. The Board understands that Chem-Security is currently reporting heavy metals emission readings to Alberta Environmental Protection. However, Chem-Security advised that there are no maximum limits imposed on these emissions. If and when Alberta Environmental Protection establishes heavy metal emission standards for various industrial emission sources in Alberta, the Board would anticipate that the ASWTC would also be regulated to meet such standards.

The Board is concerned that air quality monitoring data has not been collected in the past which would confirm predicted ground-level concentrations at the relevant points of impingement in the local area around the Treatment Centre, nor have the stack emissions from the new kiln been characterized at this time on the basis of ongoing normal operations to ensure that no unforeseen contaminants would be emitted. The Board believes the absence of such

evidence confirming or refuting the predicted negligible effects could leave the impression that impacts could occur that have yet to be detected.

The Board notes Chem-Security's information on the nature and concentration of contaminants determined during its past operating experience such as that presented in Table 8.1. The Board also notes evidence with respect to the changing nature of the waste streams handled at the ASWTC, including Chem-Security's evidence that it intends to pursue the receipt of highly regulated wastes from the Canadian market and that generators are putting greater effort into waste reduction options leading to more difficult to treat waste streams. The Board also has regard for the fact that the primary incinerator on site, the FB&D incinerator, has yet to operate in other than a test burn mode. Therefore, in the event that the Application were to be approved, the Board would require Chem-Security to undertake in a manner satisfactory to Alberta Environmental Protection a broad spectrum analysis of stack emissions, under normal operating conditions reflecting a cross-section of loadings that the incinerator system would normally experience, in treating wastes from other Canadian jurisdictions, to determine whether the suite of 67 contaminants it currently measures is appropriate or should be expanded. The Board would require a broad analytical scan for contaminants in stack samples collected under typical operating circumstances that would include, but not be limited to, those constituents presently identified by Chem-Security, as presented in its evidence. For example, the Board would require an analysis to characterize the nature of particulate emissions under a range of normal operating conditions to determine, among other constituents, the distribution of PAHs, metals and organochlorines with respect to particle size in the particulate emissions. The number of samples required would reflect the cross-section of loadings that the incineration system would normally experience. The Board would require that this information be submitted to AEP. If any detected constituents additional to those already identified were determined by Alberta Environmental Protection to be significant, they could be added by AEP to the suite of parameters currently addressed in the Applicant's analytical procedures.

Based on the results of the above determinations, should the Application proceed, Chem-Security would, in consultation with AEP, assess which constituents would be the best representatives for confirming the ASWTC's impact on the air shed. Chem-Security would further be required to establish a plan, acceptable to Alberta Environmental Protection, to sample and analyze for these constituents at those locations identified in the dispersion models as the points of impingement of the plume with ground-level resulting in the highest ground-level concentrations. The Board would require that the results of this analysis be submitted to AEP for its determination as to the requirement for and the nature of additional effects monitoring if such is warranted. In the case of constituents which accumulate in the environment, such as metals, a longer term strategy involving soil monitoring might be indicated.

As previously indicated, most of the predicted environmental and health effects of the Application would be associated with air emissions from the incinerators and waste handling and preparation areas. Air emissions can affect terrestrial or aquatic systems. The Board has considered the effects of the Application on terrestrial and aquatic systems and has accepted the Applicant's evidence that no incremental effects to those systems would be expected in addition to those previously predicted in the EIA which supported Application 9101. The

Board also notes its requirement, should the Application proceed, for additional monitoring to further characterize emissions and the potential impingement on terrestrial and aquatic systems. This requirement would involve changes in the air quality monitoring to confirm or refute previous predictions of negligible effects on these systems from the ASWTC.

The Board has also examined the potential incremental health risks associated with the Application, particularly those risks which are associated with predicted changes in emission rates and ambient ground-level concentrations of contaminants. The Board accepts Chem-Security's overall conclusion that the current Application would not result in incremental health risks that would indicate any cause for concern.

The Board believes that Chem-Security's monitoring and the observance of the Board's recommendations and conditions would continue to minimize environmental effects on the Swan Hills ecosystem, should the Application proceed. The Board, however, looks to the ASWMC to perform a more active role in the monitoring program review process. This would require ASWMC to collaborate with Alberta Environmental Protection to a greater extent, and as part owner and the Government's representative in the JVA, to ensure environmental conditions are adequately addressed by Chem-Security so that receipt of waste from other Canadian jurisdictions, should it be approved, would not result in any significant environmental effects. The Board would recommend that ASWMC become duly diligent in this regard.

Should the Application proceed, the Board, through the terms and conditions of its approval, would ensure that the ASWTC would remain an environmentally sound treatment centre. The Board relies upon the role played by Alberta Environmental Protection in various environmental regulatory matters and believes that the efforts and expertise of Alberta Environmental Protection would ensure that the Board's intent would be accomplished and looks to their assistance in the implementation of the Board's conditions, should the Application proceed.

Overall, the Board concludes that from an environmental perspective, the Alberta Special Waste Treatment Centre is a first class hazardous waste treatment facility that could effectively manage all types of hazardous wastes regardless of source. Given the experience of the operator and the capability of the recently expanded facilities, the Board does not expect that the treatment of hazardous wastes at the Alberta Special Waste Treatment Centre from other Canadian jurisdictions would result in any significant adverse impact to the environment in Alberta.

9. TRANSPORTATION OF WASTES TO THE ASWTC

9.1 Introduction

The transportation component of the management of hazardous waste is important and requires examination in assessing the effects of the receipt of wastes from across Canada. The Board heard that in the Alberta Only case, Chem-Security manages the transportation system which collects hazardous waste directly from the generator or from transfer stations to which smaller generators have delivered their hazardous waste. The hazardous waste is then transported in special trucks mainly over provincial highways to the ASWTC. Hazardous wastes represent a very small proportion (0.3 percent according to Applicant) of the transport of dangerous goods under the *Transportation of Dangerous Goods Act*, which in turn is a small proportion of the regulated commercial trucking industry.

The evidence indicates that the transportation system can be divided into three phases: pre-transit, in transit and post-transit; and the consignor (shipper), carrier (trucker) and consignee (receiver) have responsibilities and liabilities in each of the three phases. Responsibilities may include, but are not limited to, the following elements: collection contracts, pre-storage, transfer station procedures, waste characterization, packaging, documentation, manifests, vehicle design, route identification, carrier contracts, loading, dispatching, risk assessment, liability, penalties, compensation, insurance, load security, driver ability, vehicle condition, weather, communication, traffic controls, highway conditions, accidents, reporting protocols, emergency response, cleanup, waste acceptance, receiving procedures, unloading, final disposition, public safety, inspection powers, enforcement and economic matters. A large number of these elements are regulated. The Board heard that at full capacity, the ASWTC would require an average annual daily rate of hazardous waste shipments of approximately 10 truck loads.

Transportation concerns dealt with individual, societal and environmental risks and included but were not limited to road accident risks, releases of toxic substances, emergency response plans, driver training and fatigue, adherence to acts and regulations, cleanup costs, security of loads, 24 hour seven days per week operation, response capability for contract carriers, and transportation costs.

The Board recognizes that it is examining a change to an existing hazardous waste transportation system. This has enabled the Board to conduct a more realistic review than would have been possible for a completely new transportation system. The Board believes it has sufficient information to proceed with its review.

Issues are discussed under the following headings: routes, modes and volumes; acts, regulations and agreements; Chem-Security (Alberta) Ltd.'s policies and procedures; risk assessment; transportation incidents; and, transportation costs.

9.2 Routes, Modes, and Volumes of Transport

The transportation mode chosen by Chem-Security is exclusively by truck. For Alberta hazardous wastes, all provincial highways are designated routes. The Application designated specific provincial highway routes that would accommodate the carriers of hazardous waste to Alberta. Annual tonnage and truck volumes have been projected to the year 2000 and were provided by Chem-Security. A comparison of routes, modes and volumes for both the Alberta Only case and the All Canada case, based on Chem-Security's information and participants' comments, is discussed below.

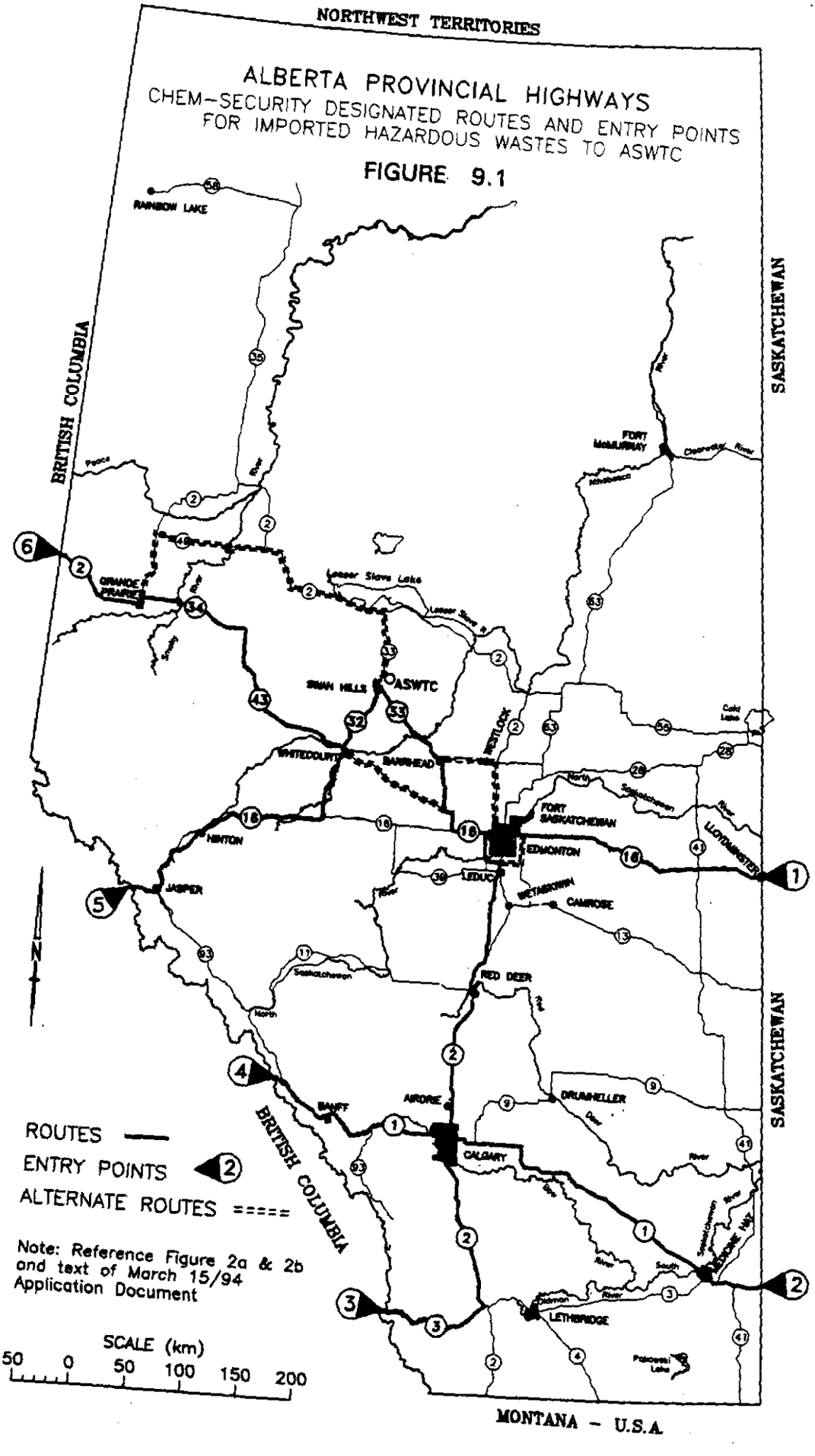
9.2.1 Routes

The Applicant stated that all Alberta provincial highways are designated as dangerous goods routes and therefore can accommodate the transport of hazardous wastes. The Applicant also stated that there were no restrictions on the movement of dangerous goods on municipal roads with the exception of the larger urban areas where bylaws designate dangerous goods routes and permissible days and hours of operation. Entry points at the Alberta border for the transportation of hazardous wastes identified by Chem-Security were:

- Highway 16 via Lloydminster west bound;
- Highway 1 via Medicine Hat west bound;
- Highway 3 via Crowsnest Pass east bound;
- Highway 1 via Canmore east bound;
- Highway 16 via Jasper east bound; and
- Highway 2 via Grande Prairie east bound.

Trucks carrying hazardous wastes using these entry points would be required to follow the most direct route to the ASWTC as shown in Figure 9.1. Alternative routing was identified for use on an intermittent basis in redirecting carriers travelling on Highway 16 east of Edmonton to the Nisku storage facilities. A carrier travelling on Highway 16 west bound would turn south onto Highway 21 then west onto Secondary Highway 625 to Nisku. Alternative routes (as shown on Figure 9.1) may be necessary on a temporary basis to avoid construction or localized adverse weather conditions. Chem-Security stated that its policy is to utilize primary highways as much as possible.

The Town of Swan Hills acknowledged the risk in transporting hazardous material through their community via Highway 33 but believed the incremental risk relating to the receipt of out of province wastes was small as there have been no truck accidents to date. All trucks go past the Town of Swan Hills except those coming from the north which are south bound on Highway 33. The EFONES Coalition expressed concern with the routing of trucks transporting hazardous wastes through small urban areas such as the Town of Barrhead, and the Hamlet of Rich Valley, in the event of a toxic release as the result of an accident. Concern was also expressed regarding the need for additional maintenance, monitoring and enforcement on roads to the ASWTC. Concerns were expressed regarding Highway 2 which goes through several


NORTHWEST TERRITORIES
ALBERTA PROVINCIAL HIGHWAYS
CHEM-SECURITY DESIGNATED ROUTES AND ENTRY POINTS
FOR IMPORTED HAZARDOUS WASTES TO ASWTC
FIGURE 9.1
BRITISH COLUMBIA
SASKATCHEWAN
SASKATCHEWAN
BRITISH COLUMBIA
MONTANA - U.S.A.
RAINBOW LAKE
FORT McMURRAY
GRANDE PRAIRIE
Lesser Slave Lake
SWAN HILLS
ASWTC
WHITECOURT
BARRHEAD
FORT SASKATCHEWAN
EDMONTON
HINTON
JASPER
LEDUC
WETASKIWIN
CAMROSE
RED DEER
BANFF
AIRDRIE
DRUMHELLER
CALGARY
LETHBRIDGE
ROUTES
ENTRY POINTS
ALTERNATE ROUTES
Note: Reference Figure 2a & 2b and text of March 15/94 Application Document
SCALE (km)
50 0 50 100 150 200

Indian Reserves along the shore of Lesser Slave Lake, as well as transportation through Alberta's National Parks under the All Canada case.

Secondary Highway 625 was highlighted by some participants as a concern due to its narrow shoulders and frequency of access points. However, Chem-Security's consultants noted that the instances where trucks were routed through small urban areas and on Secondary Highway 625 were few relative to the overall transportation system, and the occurrence of an incident would be statistically negligible. Chem-Security indicated that the use of Secondary Highway 625 as an alternative route would be limited. Chem-Security stated that wastes would be shipped directly to the Treatment Centre for immediate treatment and disposal based on available capacity and that existing storage facilities would not be expanded.

9.2.2 Modes

Chem-Security proposes to transport Canadian hazardous wastes to the Treatment Centre exclusively by truck. Various types of trucks would be used including tankers, intermodal tankers, vans and vacuum units. Trucks are predominantly single semi-trailers with tractors. Evidence provided by Chem-Security indicated some thought had been given to the use of rail for transporting hazardous wastes from distant origins, however, no serious proposals had been developed.

Chem-Security stated that there is a possibility that hazardous wastes could be received from Vancouver Island, the Maritimes, Newfoundland and Quebec. This possibility could involve shipping of hazardous wastes over water from Newfoundland, Prince Edward Island, Quebec and Ontario (St. Lawrence Seaway and Great Lakes), or Vancouver Island. Dangerous goods, including hazardous waste, shipped in vessels are regulated under the *Canada Shipping Act*, 1985, C.S-9.

The Board heard evidence regarding the mode of transport, but there were no submissions to the Board that other modes were preferable to truck transport or that any other mode of transport would be more cost effective, efficient, or necessarily safer. Chem-Security's present forecast is that truck carriers will continue to be used.

9.2.3 Volumes

The total estimated market volume of wastes provided by Chem-Security for the year 2000 is 52,500 t/a including 33,000 tonnes from the Alberta market, and 19,500 tonnes from other Canadian jurisdictions (excluding Northwest Territories). The estimated volume of Canadian waste is based on the estimated excess capacity available at the ASWTC, and includes approximately 30 percent from the western provinces and 70 percent from Ontario. In the case of Ontario, the volume of PCB liquids and solids comprises approximately 53 percent of waste quantities available. Most participants expressed concerns with regard to the validity of waste volume projections as discussed in Sections 6 and 7 of this Report.

Chem-Security projected the number of additional trucks travelling on Alberta highways, should the Application be approved. It estimated 109 loads per month (1,308 per year) for the year 2000. The total number of loaded trucks anticipated at the ASWTC for the year 2000 would be approximately 310 per month (3,720 per year) which would include 201 loaded trucks from within Alberta. Using the Applicant's volumes of hazardous waste and number of loaded trucks for the year 2000, the average payload is 14.1 tonnes. The 109 loaded trucks which would enter Alberta per month would be distributed as follows: 85 percent via Lloydminster; 11 percent via Jasper; and the remaining four percent via Banff, Medicine Hat, Crowsnest Pass and Grande Prairie. The distribution of trucks on the Alberta highway network is indicated in Figure 9.2.

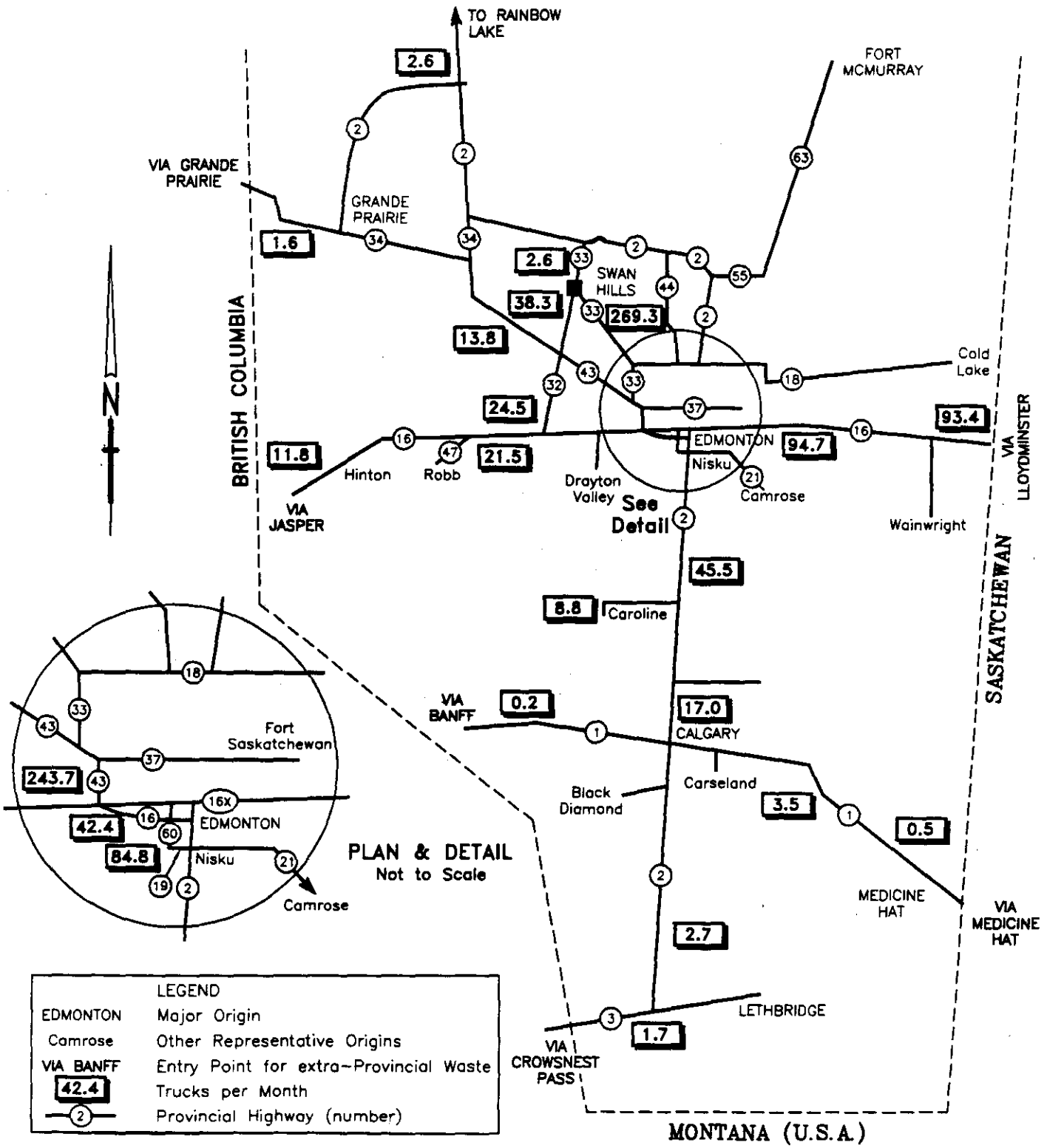
Chem-Security stated that the current volume from the Northwest Territories of less than 250 tonnes per year, or approximately 1.4 trucks per month, would be insignificant and was not included in its estimate. The number of trucks travelling on Highway 35 (shown on Figure 9.1 and 9.2) would be increased from 2.6 to 4 loaded trucks per month if the Northwest Territories figures were included.

The total loaded trucks which would transport hazardous wastes to the ASWTC would be distributed as follows: 87 percent via Highway 33 south of Swan Hills; 12 percent via Highway 32 north of Whitecourt; and 1 percent via Highway 33 north of the Treatment Centre. Further evidence provided by Chem-Security indicated that there may be a tendency towards larger payloads and fewer trucks as a result of the longer distances involved for waste received from outside Alberta. There would be, however, limitations on the type of trucks that could be used for some classes of waste.

9.2.4 The Alberta Only Case and the All Canada Case

The year 2000 was selected by the Board to compare volumes and truck loads of hazardous wastes for both the Alberta Only and the All Canada cases as it coincided with the risk assessment data provided by Chem-Security. The All Canada volumes of hazardous wastes projected for the year 2000 were higher than some volumes of the previous years and also higher than the 10 year average for the time period provided in the Application. Additionally, using Chem-Security's estimated volumes in the year 2000, the ASWTC would be approaching full capacity which would require a greater number of carriers to be on the road and thus increased risk. In these estimates, the highest volume of extra-provincial hazardous waste occurs in 1996 but the total volume including provincial waste is less. This would require fewer carriers on the road and thus reduce total risk. The Alberta Only case could contribute a volume of 33,000 tonnes to the ASWTC in year 2000 as compared to 52,500 tonnes for the All Canada case.

Figure 9.2 – Estimated Year 2000 Market of Loaded Trucks Per Month For Selected Road Sections (Reference: Figure 6 and text – Appendix B Application)



The loaded truck numbers for the Alberta Only case was estimated at 201 units per month for the year 2000. This translates into an average annual daily rate of approximately 6.5 loaded trucks. In the All Canada case, the number of loaded trucks was 310 per month which translates into an average annual daily rate of approximately 10 loaded trucks. Chem-Security estimated that the additional trucks which could be attributed to the All Canada case in the year 2000 travelling within Alberta via designated routes as shown in Figure 9.1 to be approximately 3.5 units per day.

Participants also stated that the total number of trucks transporting hazardous wastes in Alberta for the All Canada case represent about 0.3 percent of the dangerous goods transported under the *Transportation of Dangerous Goods Act*. In relative terms, the number of trucks transporting hazardous wastes in Alberta would be low when compared to total commercial truck traffic and even lower when compared to the total traffic volume, or the average annual daily traffic on Alberta highways. Evidence from Transport Canada indicated that the highway carrying capacity in Alberta in all cases would be in excess of what the highways are presently carrying. A large portion of the overall route network consists of multi-laned divided standards, (i.e. Highways 1, 2 and 16) and the remaining primary highways are of good standard, 2-lane, and paved.

Participants expressed concerns related to increased truck traffic as a result of the receipt of waste from other Canadian jurisdictions and, particularly regarding Highway 33 from the north to the ASWTC. With the inclusion of the wastes from the Northwest Territories, the trucks travelling Highway 2 and Highway 33 south to the ASWTC for the Alberta Only case total four loaded trucks per month. For the All Canada case there would be no change. If it was necessary to use the designated alternate route from Grande Prairie, however, the truck rate could temporarily increase to approximately 5.6 per month. Participants also expressed concern about Highway 33 south of the Treatment Centre because of the concentration of 87 percent of hazardous waste trucks, other commercial traffic (including logging trucks) and wildlife on that road.

Truck loads of hazardous waste which arrive at the ASWTC in both the Alberta Only case and the All Canada case use the provincial highway systems. They converge onto the Treatment Centre access road which connects to Highway 33 a few kilometres north of the Town of Swan Hills. In the Alberta Only case, the number of trucks arriving at the ASWTC in the year 2000 was forecast to be about two-thirds of the All Canada case. The largest increase in loaded trucks, should the Application be approved, would occur on Highway 16 via Lloydminster. Highway 1 via Medicine Hat, Highway 3 via Crowsnest Pass, Highway 1 via Canmore, Highway 16 via Jasper, and Highway 2 via Grande Prairie would all have a small increase. In the All Canada case, the evidence indicates that Highway 33 north of the Treatment Centre access road would not have any increase.

9.2.5 Board Views

The Board notes that Chem-Security has designated the Alberta provincial highway system as the appropriate route to accommodate the carriers of hazardous waste within Alberta. It also notes that Chem-Security has designated six Alberta entry points and corresponding direct highway routes (with alternates) to the ASWTC. The Board heard that all Alberta provincial highways are designated as dangerous goods routes and that hazardous wastes are a subset of dangerous goods. Should the Application be approved, the Board believes that the designated entry points and routes would be satisfactory.

The Board notes that to date the transportation of hazardous waste to the ASWTC has been exclusively by truck. The Board accepts that trucking is the mode of transport in the Alberta Only case and would be in the All Canada case.

The Board notes that the number of hazardous waste trucks required to supply the ASWTC is small when compared to the large number of other trucks carrying dangerous goods, the number transporting non-dangerous goods, and the total highway traffic. The Board also heard that the present total of all types of traffic on Alberta highways is well below carrying capacity and the highways are of good standard. The Board heard no evidence to indicate a need to single out trucks carrying hazardous waste to the ASWTC for extra charges, special monitoring, road maintenance, enforcement or other similar items. The Board believes that this would apply in both the Alberta Only case and the All Canada case, if approval is granted.

The Board believes that volumes of hazardous wastes will continue to be produced and will require transportation (by whatever mode) to safe disposal or treatment facilities rather than be left to contaminate the landscape. The Board believes the transportation of hazardous wastes is essential and that a "no transportation of hazardous wastes option" is unrealistic and unacceptable.

9.3 Acts, Regulations and Agreements

The Board heard that the transportation of hazardous wastes to the ASWTC takes place under a number of acts, regulations and agreements. These include municipal, provincial and federal regulatory jurisdictions. The Board understands that the basic purpose of these acts, regulations and agreements is to provide for public safety, the protection of human health and the environment, and interjurisdictional consistency, as well as uniformity and co-operation in the transportation of dangerous goods and hazardous waste. A brief listing of the relevant acts, regulations and agreements is provided in Section 5.

Although the federal acts and regulations apply within the provinces, the transport of hazardous wastes for the Alberta Only case is controlled largely through provincial acts and regulations which are consistent with federal legislation on significant issues. Five acts essentially govern transportation of hazardous goods within Alberta, (i) *Transportation of*

Dangerous Goods Control Act, (ii) *Alberta Environmental Protection and Enhancement Act*, (iii) *Motor Transport Act*, (iv) *Highway Traffic Act*, and (v) *Public Safety Services Act*.

In the All Canada case with the inter-provincial movement of hazardous wastes, federal acts such as the *Transportation of Dangerous Goods Act*, the *Canadian Environmental Protection Act* and the *Canada Shipping Act* apply. The regulations for transporting hazardous goods by highway have been adopted from the federal legislation by Alberta in its *Transportation of Dangerous Goods Control Act*. Other provinces have adopted similar regulations governing the highway transport of hazardous wastes and are responsible for enforcement. Similarly through the *Federal Transport Act*, a National Safety Code has been adopted by all the provinces. In the case of Alberta, it is enforced through the *Motor Transport Act* which governs the operation of all commercial motor vehicles. In the event of using rail for the Alberta Only case, and rail or water mode for the All Canada case, the *Transportation of Dangerous Goods Act* and the *Canada Shipping Act* would apply. Greater variation may be expected in the municipal regulation and bylaws affecting the movement of hazardous goods in the All Canada case than the Alberta Only case, particularly if several provinces are involved in the routing.

The *Transportation of Dangerous Goods Act* governs the handling of "dangerous goods". These are defined in Table 9.1 and consist of nine separate classes of products and substances.

TABLE 9.1 CLASSES OF PRODUCTS AND SUBSTANCES

SCHEDULE*
(Sections 2 and 27)

Class 1	-	Explosives, including explosives within the meaning of the *Explosives Act*
Class 2	-	Gases: compressed, deeply refrigerated, liquefied or dissolved under pressure
Class 3	-	Flammable and combustible liquids
Class 4	-	Flammable solids; substances liable to spontaneous combustion; substances that on contact with water emit flammable gases
Class 5	-	Oxidizing substances; organic peroxides
Class 6	-	Poisonous (toxic) and infectious substances
Class 7	-	Radioactive materials and radioactive prescribed substances within the meaning of the *Atomic Energy Control Act*
Class 8	-	Corrosives
Class 9	-	Miscellaneous products, substances or organisms considered by the Governor in Council to be dangerous to life, health, property or the environment when handled, offered for transport or transported and prescribed to be included in this class.

*Source: *Transportation of Dangerous Goods Act Regulations*, Page 1.

Transport Canada, the agency responsible for administering the *Transportation of Dangerous Goods Act*, provided evidence pertaining to the purpose and application of the Act and the coordination between federal and provincial legislation. The federal government is responsible for compliance and enforcement for rail and marine transport modes and the provinces are responsible for compliance and enforcement on the highways.

Participants expressed concerns with respect to receiving assistance with the preparation of emergency response plans and receiving compensation for carrying out the required response pursuant to the *Alberta Public Safety Services Act* and regulations in the event of a spill.

9.3.1 Views of the Board

The Board believes that all significant aspects of transportation and management of hazardous waste are dealt with in detail at the international, national and provincial levels. The Board notes that the consignor (shipper, generator, etc.), the carrier (trucker, transporter) and consignee (receiver, treatment or disposal entity, etc.) each have legislated responsibilities and liabilities in each of the three main transportation phases; the pre-transit or preparation phase, the in-transit or on the road phase and the post-transit or final handling and disposition phase.

The Board believes that the regulatory regime governing the transportation of dangerous goods and hazardous wastes is comprehensive, monitored, coordinated and harmonized across Canada. The Board notes that the regulatory regime within Alberta in some respects goes further than the federal counterpart. The Board concludes that with respect to the transportation of hazardous waste to the ASWTC, the Alberta public is well protected by the existing regulatory regimes, and that this conclusion would apply in both the Alberta Only case and the All Canada case.

The Board heard that the average annual daily rate of loaded trucks which would be carrying hazardous waste to the ASWTC would be approximately 10; that to date, Chem-Security's record is satisfactory, and that the management of the transportation aspect of its operation may be above that required in the regulations. As long as the existing situation continues, the Board concludes that it would be impractical and counter-productive to require that the transportation of hazardous waste to the ASWTC become the subject of extra-ordinary monitoring, enforcement, or financial penalties. This would apply equally in the Alberta Only case and the All Canada case.

The Board heard concerns regarding emergency response plans to deal with a disaster, such as an accident causing a release and a pool fire or a release of a dangerous goods into a water course. Again, the Board notes that the existing regulation calls for emergency response plans to be in place. These deal with disasters such as those arising from the transportation of dangerous goods, natural phenomena or any human-caused incidents.

The Board heard that emergency response plans are in place for the larger urban municipalities. However, for small rural municipalities, emergency response plans may be minimal or dependent on other parties, particularly for highway-related incidents. Considering the number of trucks, the nature of the hazardous waste, the remote possibility of an incident, and Chem-Security's existing response capability, the Board concludes that isolating or separating the transportation of hazardous waste to the ASWTC to receive extraordinary treatment or to require additional emergency response measures would not be warranted and could be counterproductive. It further concludes that this would apply to both the Alberta Only case and the All Canada case. For those communities or municipalities that expressed concern about their emergency response plans, the Board would recommend that they take the steps necessary to ensure that they have been diligent in ensuring that their citizens would benefit from an emergency response plan should it be needed. Chem-Security has indicated that it would cooperate in this regard.

The Board recognizes that in the Alberta Only case Chem-Security is responsible for the management, supervision, control and co-ordination of the pre-transit, in-transit and post-transit phases of the transportation system serving the ASWTC. Chem-Security indicated that, should the Application be approved, it would continue its management role in the transportation system. Considering the regulatory regime, Chem-Security's record and its familiarity with each phase of the transportation system, the Board believes that it would be necessary should the Application proceed, to place a condition in any Approval from the Board that would require Chem-Security, as the operator of ASWTC, to continue its management role in the transportation system in the All Canada case. The Board also believes that in the All Canada case, the transportation management aspect could and should be made a source of Alberta revenue. The ASWMC has an obligation to act and be accountable as an ongoing guardian of the public interest in Alberta. The Board recommends that the ASWMC be required to make a public quarterly report on transportation matters.

The Board notes that according to Order in Council 695/93 the reviewable project is for any hazardous wastes "properly consigned" to the ASWMS from other Canadian jurisdictions. The Board believes this is an important part of the pre-transit phase of the transportation system. Consignment is referred or alluded to in the international, national and provincial acts, regulations and agreements. The Board believes that it is of primary importance that hazardous waste only be consigned to a facility or facilities that will carry out on-site treatment and disposal in a manner that will protect the health and safety of the public and the environment and that the consignee be willing to accept the shipment on that basis. Additionally, the Board believes it is incumbent upon each consignor (generator, shipper) to fulfill their other requirements (documentation, manifests, loading, containment, permits, licensing, load security, emergency response, insurance, etc.) according to the regulations governing the transportation of dangerous goods. The Board further notes that in the Alberta Only case, Chem-Security has a management role in each of the three transportation phases and to a certain extent carries on activities as a consignor, shipper and consignee. The Board believes this provides coordination throughout the transportation system. Chem-Security indicated that, should the Application be approved, it would continue its management role in the

transportation system. The Board believes that if the Application was approved, having hazardous waste from other Canadian jurisdictions "properly consigned" to the ASWMS would not be a significant problem, if the operator, Chem-Security was to play a continuing role in the management of the transportation system.

9.4 Chem-Security (Alberta) Ltd. Policies and Procedures

Chem-Security stated that it would continue its transportation operations by essentially employing the policies and procedures used successfully in the past. These are designed to promote safety in the collection and transport of hazardous wastes and to minimize the consequences of any accidents that may occur. The extended hours and days of truck operations and the exclusive use of contract carriers for wastes received from other Canadian jurisdictions, if the Application was to be approved, might result in a slight variation of existing policies and procedures.

9.4.1 Alberta Only Case

The system currently transports wastes in trucks and mostly during daylight hours. Chem-Security stated that approximately 75 percent of the hazardous waste transported to the ASWTC from within Alberta is with its own fleet of trucks. The remainder of the wastes are transported by independent contract carriers and the contents usually consist of contaminated soils carried in truck trailers or dump trucks. Contract carriers are only used during periods of peak demand.

Chem-Security currently uses three kinds of trucks. Bulk solids are carried in either combined 3-pivot or 2-pivot trailers, bulk liquids are carried in tanker semi trailers and materials in drums are carried in specially designed combination trucks. Some of its equipment is specially designed, incorporating 3/8 inch steel rather than 3/16 inch steel for typical gasoline tanker trucks. It also has half-high intermodal containers on a container chassis with a crane in between which are stronger and heavier than normal equipment. Further evidence provided by Chem-Security indicated that only one tanker out of the two that it owns has the thicker shell. The 3/16 inch steel meets regulatory requirements. Evidence also indicated that Chem-Security went to a 24 hour operation about one year ago for longer hours of operation during the winter months.

Chem-Security identified the distribution of wastes in accordance with the dangerous goods classes (Table 9.1). Explosives, gases, biomedical wastes and radioactive materials are not included in wastes shipped to the ASWTC.

Chem-Security identified a number of additional policies and procedures to ensure safety. These included supervision of waste loading and unloading, driver training to ensure familiarity with Chem-Security's transportation requirements, vehicle inspections prior to and during shipment (drivers must inspect their vehicle every 200 km or two hours while en route), suspension of transport during bad weather, and a system of communication with its vehicles

through cellular phones. Chem-Security also said it would maintain an emergency response plan. The Applicant maintains standby emergency response teams located in Calgary, Nisku and at the Treatment Centre in Swan Hills.

The current waste collection and transportation system operated by Chem-Security includes two waste storage and transfer stations at Nisku and Calgary. Small loads of hazardous wastes may be hauled to the transfer stations.

When utilizing contract carriers Chem-Security stated that carriers would be audited and approved by Chem-Security to ensure regulatory and performance standards are met.

Chem-Security stated that the above operating regulations and maintenance procedures exceed the normal standards and result in reduced risks. Chem-Security estimated that its trucks would have 63 percent of normal trucking risk and 86 percent of the risk of other carriers of dangerous goods. As a result, Chem-Security indicated that its safety record was better than the majority of other carriers and the overall trucking industry.

9.4.2 The Applicant's Evidence for the All Canada Case

In the All Canada case, Chem-Security stated that it proposes to use contract carriers for transporting all hazardous wastes received from other provinces and that carriers be controlled through agreements. The agreements would detail the requirements the contract carrier must comply with to transport hazardous wastes as well as their obligations with respect to vehicle equipment, insurance requirements, emergency response capabilities and operating requirements. All potential contract carriers would be subjected to an operational audit by Chem-Security prior to being selected. This formal audit would review their experience, capability to safely transport hazardous wastes, insurance coverage, driver management, training, hiring practices, operational practices, vehicle maintenance practices, incident reporting and emergency response plans. Chem-Security would also monitor a contract carrier's performance during ongoing operations by conducting random loading site inspections and random performance audits on vehicles as they arrive at the Treatment Centre. Chem-Security's Contract Carriers' Agreement has a clause giving it the authority to review the driving and training record of a driver and reject the driver if the record is found unsatisfactory. Chem-Security believes that the extensive dangerous goods trucking industry would provide a good source of experienced contract carriers with the proper equipment, and particularly the larger carriers which also have safe terminals for overnight parking.

Chem-Security indicated that it may also authorize generators and collectors of hazardous wastes to arrange for their own transportation if they should desire. This arrangement would allow the generators and collectors access to the Treatment Centre utilizing their own transportation fleet, if they have one. Authorized generators and collectors would be subject to the same requirements and audit procedures as other contract carriers.

Chem-Security would schedule, coordinate, and monitor all vehicles transporting hazardous wastes to the ASWTC, as is current practice, and would identify the routes vehicles from outside the province must use to transport hazardous wastes to the Treatment Centre. During the winter months road conditions would be monitored and contact maintained with the drivers and generators, so that drivers may be directed to re-route or stop driving in adverse weather conditions. Chem-Security stated that it requires contract carriers to carry additional documentation with the waste shipment to assist emergency response personnel. Contract carriers are also required to demonstrate an emergency response capability similar to that provided by Chem-Security. It was stated that the insurance coverage Chem-Security has for its own vehicles and that which would be required by contract carriers would be set at levels to cover any potential liability which may arise from a transportation incident. Contract carriers would generally employ standard truck/trailer equipment to transport hazardous wastes. Occasionally there may be a need to transport oversize loads such as large transformers, but there are specific regulatory requirements for the transportation of oversize loads. Contract carriers would be using the standard 3/16 inch thick tank shell which meets all safety requirements of regulatory agencies.

For the All Canada case, Chem-Security proposes to adopt 24 hour operations seven days a week year round instead of winter only. The Board heard that the Alberta Only system mostly transports wastes during daylight hours only, five days a week. With the increased distances which would be involved in transporting All Canada waste and the need to reach terminals for overnight parking, Chem-Security believes the "daylight hours only" policy for loaded trucks would be too restrictive considering that there are fewer daylight hours in winter. There would be no additional storage facilities or transfer stations planned in the All Canada case. Chem-Security indicated that it would accept Canadian wastes when excess treatment capacity exists at the Treatment Centre. Inventory management would minimize the requirement for storage at the ASWTC.

9.4.3 Alberta Only Case versus All Canada Case

The major changes to Chem-Security's policies for the All Canada case as compared to the Alberta Only case would be a change in the hours and days of operation and the utilization of contract carriers.

Chem-Security clarified its policy with respect to hours and days of operation. For the current Alberta Only case, the daylight only policy applies to loaded trucks only, thus resulting in an overall 5:95 night/day ratio. In the All Canada case, Chem-Security stated that the general intent would be to minimize night time driving. Getting carriers to safe terminals for overnight parking would serve the interest of safety and would minimize transportation costs for long distance hauling. For some periods during the winter months there are only about seven hours of daylight, which is restrictive for the carriers even in the Alberta Only case. Chem-Security estimated that the night/day ratio would be in the order of 25:75 for the All Canada case.

Chem-Security also provided information on its policy of allowing seven days per week trucking operations for the All Canada case as compared to the five days per week for the Alberta Only case. There would be a natural drop in weekend truck traffic as generators would not normally be loading hazardous wastes. Also, Chem-Security would look at reducing traffic on weekends where a situation warranted it.

Transport Canada stated that differences in risk for day versus night truck operations depended largely on where drivers were and what they were carrying. With respect to weekday versus weekend operations, there are no differences in risk. Another participant involved in transporting wastes in Alberta advised that it was operating on a 24 hour schedule and indicated that the standards required under the *Transportation of Dangerous Goods Act* are very high.

Hazardous waste received from other Canadian jurisdictions would be transported by contract carriers in the All Canada case. Chem-Security advised that it would have complete control over approval of contract carriers through an audit process and would also have control of their operation once the hazardous waste is loaded onto their trucks. Generators would be allowed to use their own fleets, subject to the same audit procedures as others. Contract carriers would not be selected by a "bid" system but hired through an agreement on the basis of their experience, equipment quality, driver qualification and other factors. The penalty for non-compliance would be the loss of contract business. Chem-Security further stated that it would make the contract carrier use common standards and operating procedures to attain the same safety level as its own trucks. Chem-Security indicated that there are sufficient carriers with experience in the transportation of dangerous goods to comply with Chem-Security's standards and procedures. However, Chem-Security stated that economics may govern in some situations, making it difficult to maintain standards beyond that required by regulation. Chem-Security also indicated that the alternative of expanding its fleet for transporting the extra-provincial wastes was possible but there would be logistical problems acquiring access to terminals, interprovincial licensing, financing, and other factors. These concerns could be avoided through the use of large contract carriers.

Participants identified several concerns with the proposed changes in operating hours and use of contract carriers for the All Canada case. Most of the concerns related to increased risks, the insured liability of Chem-Security and the contract carriers, the responsibility and capability for emergency response and the impact of transportation costs. These concerns are addressed under Sections 9.5 Risk Assessment, 9.6 Transportation Incidents and 9.7 Transportation Costs.

9.4.4 Board Views

The Board notes Chem-Security's favourable record with respect to its transportation system, and accepts that the existing policies and procedures for the handling and transportation of hazardous wastes to the ASWTC in the Alberta Only case are satisfactory. Considering the number of trucks (Section 9.2) and the existence of the regulatory regime

(Section 9.3), the Board concludes that if the Application were approved, Chem-Security's experience, knowledge and existing policies and procedures for the transportation of hazardous wastes would provide additional measures and safeguards in regard to public health and safety, and protection of the environment.

The Board heard the concerns from participants regarding the use of contract carriers for the transportation of extra-provincial hazardous wastes to the ASWTC in the All Canada case. Contract carriers must comply with the requirements of the regulatory regime and in particular with the *Transportation of Dangerous Goods Act*. Contract carriers would be largely drawn from the larger carrier companies with safe overnight parking areas and experience in handling and transporting dangerous goods, and would be supervised and audited by Chem-Security based on several years of experience in the use of contract carriers in Alberta. The contract carriers would be required to adopt the policies and procedures that have been developed by Chem-Security and would be required to carry their own insurance in addition to that carried by Chem-Security. Although there would be a small number of trucks, there could be negative financial implications if Chem-Security were required to expand its fleet to accommodate the All Canada case.

The Board believes that there would be little, if any, significant difference to the health and safety of the public or protection of the environment through the use of contract carriers as compared to a totally Chem-Security owned fleet, and additionally the Board believes that there could be a financial advantage to using contract carriers. The Board believes that should the Application be approved, it would be necessary that the operator, Chem-Security, continue to exercise control over the contract carriers.

Taking into consideration both regulations and Chem-Security's policies, the Board believes that the management of the transportation system is an important element in the handling and final disposal of hazardous waste. The evidence indicates that Chem-Security, as operator of the ASWMS, has gained considerable knowledge and experience as well as a favourable record in the management of the transportation system. Chem-Security indicated it would continue its management role in the transportation system in the All Canada Case. The Board believes that should the Application be approved, that the operator of the ASWMS (currently Chem-Security) should be required to manage the transportation of the extra-provincial hazardous waste to the ASWTC.

The Board heard concerns from participants regarding the proposed change to 24 hour, seven days per week operations for the All Canada case. The regulatory regime permits 24 hour, seven days per week operations subject to municipal bylaws or regulations which might limit a class or classes of motor vehicles from using a highway for certain periods of time and to designated truck routes. The number of trucks would be a very small part (0.3 percent) of the number of trucks carrying dangerous goods on the highways. There would be a need to reach terminals for overnight parking. The Board concludes the change to 24 hour, seven days per week operations for the All Canada case could occur without any significant adverse effect on the health and safety of the public or on the environment.

The Board heard from several municipalities that they "had no objection to the Application provided the ASWMS continues to maintain the high level of vigilance towards transportation and plant safety". Some municipalities and jurisdictions, such as Parks Canada and ID 125, requested that Chem-Security provide for extraordinary emergency response capability, road maintenance, truck monitoring, enforcement, consultation or notice. Having considered the existing situation, the relatively small number of trucks, the regulatory regime, the classes of dangerous goods, Chem-Security's policies and procedures and its favourable record in regard to the transportation system, the Board concludes that should the Application be approved, it would be impractical and counter-productive to require that the transportation of hazardous waste to the ASWTC be submitted to any further extraordinary monitoring, enforcement, consultations or financial penalties. Chem-Security may wish, however, in certain special cases where it considers it appropriate, to advise certain parties of particulars regarding the transport of hazardous wastes.

9.5 Risk Assessment

A risk assessment conducted for the Applicant by the Institute for Risk Research (IRR) addressed both accident frequency and consequences of spills associated with waste transportation (IRR Report). A change in the source of wastes results in a redistribution of traffic patterns in Alberta with potential changes in transportation risks. The basic comparison that was done by IRR was between a market plan that they called the Environmental Impact Assessment Market Plan (EIA Market Plan) and the proposed Year 2000 Plan, which is the All Canada case. For comparison purposes, results were also prepared for the Alberta Only case projected to the year 2000.

The EIA Market Plan could be considered the maximum case scenario for Alberta Only wastes as approved in Application 9101, which is based on utilization of full plant capacity. The Alberta Only Year 2000 Plan would be considered the base case for evaluating transportation risk resulting from the Application. The Alberta Only case would have a lower degree of risk but the same degree of uncertainty would exist, thus providing considerable overlap between scenarios. Specific safety programs implemented by Chem-Security have been designed to minimize both the likelihood and consequence of accidents and spills.

Chem-Security stated that the IRR Report was carried out according to accepted Canadian risk analysis standards and guidelines. The contract between Chem-Security and the IRR stipulated that the IRR retains ownership of copyright and can publish the final results with or without Chem-Security's approval, and that the final IRR Report be reviewed by a panel of three expert members of the IRR. The following section addresses the risk assessment as provided by Chem-Security including risk assessment methods and results. Evidence provided by participants is also included.

9.5.1 Risk Assessment Methods

Chem-Security provided the IRR Report to meet NRCB Application requirements. The IRR Report began with estimated origin and quantities of wastes with a number of trucks and estimated content assigned to each road section on a route. There is an estimated number of accidents for each specific road section and for every accident there is a probability of loss through injuries, fatalities, property damage, disruption to traffic and emergency response losses. Also, for every accident there is potential for losses due to a release of wastes that may have associated environmental and health impacts and cleanup costs. Accident losses and release losses for all road sections are combined to provide an assessment of total risk. Chem-Security's experts indicated that the requirements of *CSA Standard Q 634 Risk Analysis Requirements and Guidelines* were met in most cases.

The nature and degree of uncertainty in risk assessment depends on the nature of the risk being addressed. Uncertainty in the quantification of risk can take several forms such as measurement error, uncertainty in cause and effect, uncertainty regarding human error, uncertainty in predicting the future, estimating the likelihood of rare events and others. The IRR Report used what is referred to as the "Cautious Best Estimate" as well as an estimate of the likely range of risk.

The waste origins, volumes, truck routes and truck volumes depends on future market forecasts. For purposes of the IRR Report, the market was estimated from the existing observed market and considered changes in market demand. The latest market estimate of hazardous waste for the Year 2000 Plan would be 52,500 tonnes per annum. The estimated number of waste trucks would be 310 per month or 3,720 per year. The IRR Report provided a matrix categorized into 15 transport risk classes of hazardous wastes which were distributed according to three types of transport: drums in containers, tanker tractor trailer and bulk tractor trailers. Descriptive examples of waste loads in each category and percentage in tonnes based on random sampling of the current waste stream were provided in the matrix.

Accident rates are known to vary according to roadway standards, truck types, load status, traffic volumes, weather conditions and driver characteristics. Truck accident rates were developed using observed accident data from Alberta, Ontario and California in a four step procedure. First, a basic accident rate was established using an average of the rates for Alberta, Ontario and California. Second, a range of basic truck accident rates was established to reflect the uncertainty in truck accident rates. Third, road section rates were estimated from a weighted average of the basic accident rate and the observed rate for the road system and finally, the truck accident rate was adjusted to reflect the extra safety due to Chem-Security's policies and procedures.

The probability of a release of a waste in an accident is dependent on the type of truck, the design of the truck and the nature of the accident. For example, the release probability for gasoline trucks involved in an accident in Alberta is 29 percent (Alberta Public Safety Services 1990-93 Data), whereas the release probability for liquid petroleum gas is

estimated at 10 percent. Estimated release probabilities were established in the study for Chem-Security's trucks and other carriers based on judgements anchored by estimates in the literature and Alberta's release rate for gasoline tankers. A "best, low and high" value for each type of truck for both Chem-Security and the other carriers was established. The application of these values to the frequency (number) of accidents by truck type and operator provided an estimate of releases by IRR risk class for each road section.

The harm to people and the environment is mainly determined by the characteristics of the waste released and the location. Ninety five percent of transport related health risks are due to the accidents and five percent of the health risks are due to the release of wastes as a result of an accident. Chronic or long term effects were considered at the same time as other risks. The most hazardous risk class for people is flammable wastes in a tanker and flammable wastes in drums. The released waste may ignite and burn, causing injury or fatalities.

In evaluating the risks to people and the environment from waste released to land and water, the IRR Report stated that risk exists but is very small (one in a million chance of occurring), with only a small chance of injury to people for all waste except flammable wastes transported in tankers and drums. There is also a chronic effect to the environment in the case of PCB releases in water. Chem-Security's panel stated that the IRR Report assumed no chronic exposure in releases to land as all spills would be cleaned up. The effect of releases into rivers has been calculated to indicate the region of the river influenced by hazardous levels of concentration. The recovery of the material released into rivers would be effectively impossible.

Pool fires constitute the major health risk for releases on land. Releases in areas with high traffic volumes were evaluated because of the higher probability of a collision where car occupants could be involved in a pool fire. The IRR Report stated that population density along a route was not a major concern since pool fires seldom extend beyond the highway right-of-way. For toxics and poisons, in calculating the highest level of vulnerability, it was assumed that the emergency response procedures would protect the integrity of any downstream water supply systems. According to the IRR Report in comparing the relative vulnerability of the movement of hazardous wastes to movements of other trucks on the road system, there is a net risk reduction of 10 to 32 percent due to a higher level of training and other safety controls for waste transport carriers.

Evidence was provided by various experts on the appropriateness of methods used in the IRR Report. One expert who reviewed the IRR Report stated it conformed with the approach, requirements and guidelines set out in the *CSA Standard Q 634* except for the absence of a sensitivity analysis. The expert stated that the IRR Report was high quality, clear, marked by a great deal of openness, characterized by a high amount of verifiability and had been researched in great depth. The treatment of uncertainty and the adjustments to observed accidents were said to be very well done. As a whole, the conclusions of the IRR Report were considered valid. Weaknesses in the IRR Report were said to be the lack of a sensitivity analysis and the lack of discussion of release rates. Other minor points raised regarding the

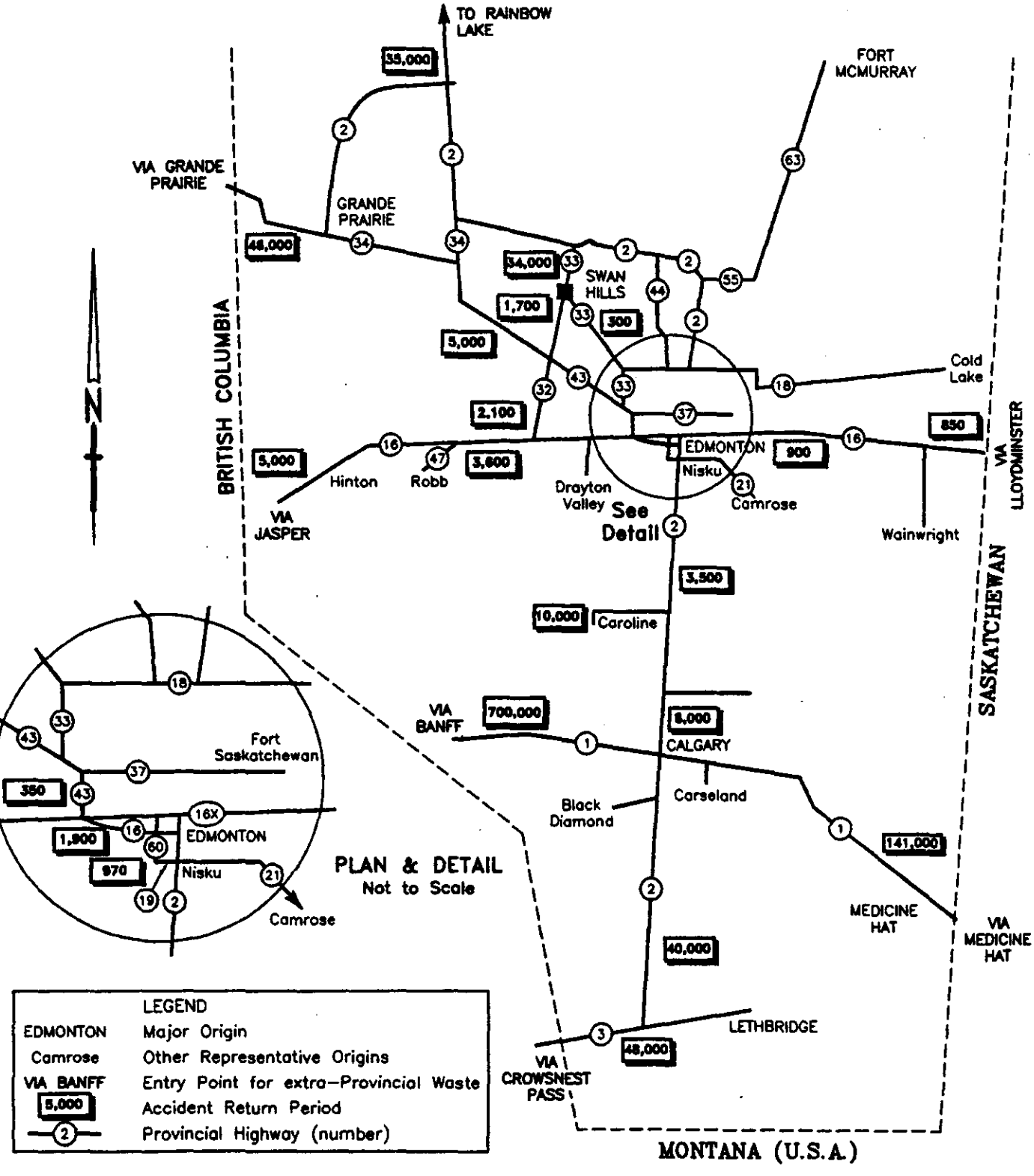
methodology included: the limited sources of accident data; the selection of the tonnage distribution of the vehicles; and, the use of a two kilometre section of highway to communicate the meaning of return period as it affects individual risk. The accident return period is the estimated number of years between accidents for loaded and unloaded trucks.

It was stated a sensitivity analysis should be required as part of a risk analysis as it would provide information of the impact on risk outcomes when some of the values of the basic estimated parameters are higher or lower. It was believed the lack of a sensitivity analysis did not affect the results of the IRR Report but would have aided in preparing a better risk management plan. The sensitivity of allowing operation during daylight hours only or restricting transportation to specific waste types with respect to risk could have been assessed. The estimate of release rates was based on very small numbers thus making it very difficult from a statistical point of view to provide meaningful results. In any event, the expert stated that the estimates used are conservative and the author would have erred on the side of safety.

Transport Canada's expert expressed reservations with the IRR Report methodology. Transport Canada believed that the focus of the assessment should have been more on the risk involved in moving the waste rather than the traffic accidents, important as they are. The three essential questions that should have been addressed to examine the risk involved in moving waste according to Transport Canada were: a) are we going to have a release of the waste; b) if we have a release, is it a release that can be corrected (cleaned up) and can compensation be provided to whomever gets affected; and, c) if it cannot be corrected and cannot be compensated are the problems tolerable or acceptable given the payoff (benefits) of the whole project. Transport Canada concluded that in its opinion the wrong questions were asked to examine the risk involved in moving waste and the IRR Report prepared by the Institute for Risk Research should not be used for approving or denying the Application based on Transport Canada's question regarding the examination of the risk involved in moving waste. Transport Canada however, did not address the public concern regarding accidents that was the focus of the IRR Report. Transport Canada indicated that the national *Transportation of Dangerous Goods Programme* ensures that, through its regulatory requirements any non-correctable damage occurring would be minor in comparison with transportation benefits and that transportation of hazardous wastes can be conducted safely under the *Transportation of Dangerous Goods Act,* if compliance is achieved.

A second concern Transport Canada had with the IRR Report was the comparing of two hypothetical situations, the EIA Market Plan with the Year 2000 Plan, rather than comparing real situations. It was stated the other questionable assumption was having different standards for contract carrier operations. There were other Transport Canada concerns related to the accuracy of tonnage figures and their distribution into the IRR classes, the computation and accuracy of truck volumes, and the validity of accident rates.

Figure 9.3–Best Estimate of Truck Accident Return Period for a 2–kilometer Road Section for Selected Road Sections on the Network (loaded and unloaded trucks) (Reference: Figure 6 and text – Appendix B Application)



Risk Component	Low Estimate of Annual Risk			Best Estimate of Annual Risk			High Estimate of Annual Risk		
	EIA	Year 2000	Y2000 Internal	EIA	Year 2000	Y2000 Internal	EIA	Year 2000	Y2000 Internal
Road Accidents									
Number of Accidents	0.82	1.00	0.50	1.43	1.66	0.86	2.34	2.55	1.38
Number of Fatalities	0.01	0.012	0.006	0.039	0.046	0.024	0.10	0.11	0.059
Number of Major Injuries	0.033	0.04	0.02	0.14	0.16	0.083	0.36	0.393	0.213
Costs ($)									
Cost of Accidents	12,000	15,000	7,500	30,000	35,000	18,100	69,000	75,000	41,400
Costs of Clean-up of Spilled Wastes	5,100	7,200	3,200	21,500	33,800	15,200	105,000	136,400	63,200
Release of Wastes									
Number of Fatalities	0.00018	0.00046	0.00028	0.00076	0.0022	0.0013	0.0023	0.0068	0.0041
Number of Major Injuries	0.0006	0.0015	0.00091	0.0027	0.0078	0.0047	0.008	0.024	0.015
Number of Release Events	0.061	0.086	0.038	0.128	0.201	0.090	0.313	0.406	0.188

TABLE 9.2 - SUMMARY OF RISKS OF TRANSPORTING WASTES TO SWAN HILLS
Source: Exhibit 72 and Text of Application 9301

9.5.2 Risk Assessment Results

The results of the IRR Report for the movement of wastes for three market plans are shown in Table 9.2 taken from data provided by Chem-Security and are reviewed in this Section. A range of values are shown using a "low, high, and best" estimate for annual risks.

For the year 2000, the expected or "best" estimate for the number of road accidents per annum is 0.86 for the Alberta Only case and 1.66 for the All Canada case. The projected increase in traffic volume would result in almost a two-fold increase in accidents. Due to different sources of uncertainty between the different market plans, it is not possible to assume that the variations in the estimates are correlated. With respect to losses due to accidents, both Ontario and Alberta data were analyzed in the IRR Report to determine the number of injuries per truck involved in an accident. The "best" estimates for the number of injuries per annum (p/a) are 0.083 for the Alberta Only case and 0.16 for the All Canada case. Similarly, the number of fatalities p/a is 0.024 for the Alberta Only case as compared to 0.046 for the All Canada case. The IRR Report concludes that the "best" estimate of the cost per year for truck accidents is $18,100 for the Alberta Only case as compared to $35,000 for the All Canada case.

The IRR Report states that with respect to the probability of waste release events p/a anywhere in Alberta, the "best" estimate for the Alberta Only case is 0.090 as compared to 0.201 for the All Canada case. The consequences of waste releases generally involve clean up costs, costs of emergency response and traffic delay, and harm caused to people or permanent damage to the environment, the latter being treated independently in the IRR Report. The costs of clean up of a released waste have been established using a cost model for dangerous goods developed by Transport Canada, based on observed data. The study used a "best" estimate of $168,000 per release based on averaging for different magnitudes of spills, (i.e. large and small). Based upon a probability of release as identified in the IRR Report, the Applicant estimated that this value translates to a "best" estimate for clean up costs of $15,200 per year for the Alberta Only case and $33,800 for the All Canada case.

In the consequence analysis done by Environmental Research Ltd., flammable waste loads were analyzed, based on six assumptions, to provide estimates of the annual number of flammable pool fires. The estimated number of fires for the Year 2000 is approximately three times higher for the All Canada case than the EIA Market Plan. This can be attributed to the higher estimate of flammable waste volume, increased travel distances for external wastes and higher release rates for contract carrier trucks.

The "best" estimate based on Transport Canada's dangerous goods data base for the probability of a death from a pool fire is 0.04 when the occupants of vehicles in an accident are unable to escape the vehicle. The "best" estimate for annual fatalities due to release of wastes is 0.0013 p/a for the Alberta Only case and 0.0022 for the All Canada case. Similarly, for major injuries the numbers are 0.0047 and 0.0078 p/a respectively.

The "best" estimate of the truck accident return period (years) for a two kilometre length for selected road sections on the Alberta road network for the year 2000 is shown on Figure 9.3. As previously stated, the accident return period is the estimated number of years between accidents for loaded and unloaded trucks. Chem-Security stated that the two kilometre length was used to provide consistency in preparing estimates of individual risk and to reflect a length of roadway that could be seen in both directions from a farmstead while standing at one point near the road. It is noted on Figure 9.2 that for any 2 kilometre section of Highway 33 south of Swan Hills an accident could be expected for the All Canada case involving a waste truck every 300 years either loaded or unloaded. Using the same analysis, a 2 kilometre section of Highway 2 north of Red Deer would have an estimated 3,500 year return period as a "best" estimate.

Some participants expressed concern as to the interpretation and meaning of the values and results of the IRR Report. The definition of risk, the meaning of 1.66 accidents per annum for the All Canada case, the return period expressed in number of years, the meaning of small numbers and the term "de minimis", and the comparison of daylight versus night time accident rates using ratios were some of the areas that were questioned. Several concerns were expressed regarding the increase in transportation risks associated with the change to 24 hour operations and the use of independent contract carriers in the All Canada case.

Transport Canada had concern with specific results provided in the IRR Report. Although there is good documentation for loss of life costs, the costs for injuries and fatalities were not included in the IRR Report summaries. In Transport Canada's opinion, the costs for clean up were based on too many broad assumptions. There was also concern with the distribution of the assessed tonnage into IRR classes since this affects the results through increasing the number of trucks transporting hazardous wastes.

The comparison of transportation risk between the truck and rail mode for transporting hazardous waste was addressed by Chem-Security's transportation experts and Transport Canada.

Chem-Security's expert stated that there has not been any significant documented difference between the two modes and opinions vary widely. Risk depends significantly on the type of exposure (i.e. nearness of modal routes to populated areas), and the type of dangerous goods being transported. Chlorine, for example, is transported mainly by rail. The economics of bulk shipments also play a role in choosing rail versus truck; the break even point for rail transport is in the range of approximately 2,500 - 3,500 kilometres. As noted, the frequency of spills may be much less for rail, but the consequences of a spill are greater because of the volumes involved. Releases are higher during transfer, but this increased risk means that increased precautions are taken.

Transport Canada also stated that considerable analysis was done over the past years to try to resolve which was the safer: road or rail. Transport Canada has concluded that safety and risk depend on the route; in general it was not possible to discriminate between the

two modes of transportation. Transport Canada stated the same conclusion was valid for European countries.

In summary, Chem-Security submitted that its report demonstrated that the risks in Alberta associated with the transportation of wastes from other Canadian jurisdictions would be very low. Furthermore, it stated that the majority of the risk, approximately 95 percent, would be associated with the risk of an accident and not the release of hazardous material. Chem-Security stated that the risk associated with the All Canada case from a transportation perspective would be similar to the level of risk reviewed for similar volumes of wastes assessed in Application 9101, and would be relatively low compared to other economic activities involving trucking. Chem-Security also concluded from the IRR Report that there would not be a significant difference between the Alberta Only case and the All Canada case.

9.5.3 Board Views

The Board has considered the evidence regarding the risks associated with the transportation of hazardous wastes to the ASWTC. The risk analysis followed the *Canadian Standards Association (CSA) Risk Analysis Requirements and Guidelines*. The Board believes the IRR Report conducted by the Institute for Risk Research was well tested and is reliable. The risk assessment results dealt with individual risks, societal risks and environmental risks, and although the Board does not necessarily accept all of the evidence of Chem-Security or the participants, it believes it has sufficient reliable evidence to assess the transportation risks. The Board believes that the additional risk assessment information that would have been available if the IRR Report would have also addressed the question raised by Transport Canada would have also been useful to the Board, but not essential to reaching a conclusion regarding transportation risk.

The Board recognizes that there are risks associated with the transportation of dangerous goods and hazardous wastes. The Board believes this recognition is universal as is exemplified by the number of acts, regulations and agreements that have been enacted at the local, provincial, national and international levels of government.

The Board also recognizes that an incident involving the transportation of hazardous waste could lead to serious consequences including fatalities, acute or chronic injuries and significant irreversible environmental damage.

The Board concludes that with the existing regulatory regime, and the policies and procedures employed by Chem-Security, that reasonable steps have been taken to minimize the individual, societal and environmental risks associated with the transportation of hazardous wastes to the ASWTC and this would apply in both the Alberta Only case and the All Canada case.

The Board does not believe that a "no risk option" would be realistic or applicable for this project. The Board concurs with an analogy made by a participant regarding the

transportation of hazardous waste through their jurisdiction, as long as it was being carried out according to the regulations:

> "If we shut down the transportation of waste dangerous goods, the logic would follow that we'd shut down the transportation of dangerous goods as well, which would virtually shut down all the provinces west of Saskatchewan. ...look at the number of shipments every day that go through Saskatchewan of material that gets used in all of the provinces and the Territories, it's just normal commerce. ...the number of shipments of waste is rather insignificant compared to the number of shipments of everyday dangerous goods."

The Board believes that individual risks are illustrated in Figure 9.3 which provides a "best estimate" of the truck accident return period for a two kilometre stretch of highway. On Highway 33 south of Swan Hills, which carries the highest number of hazardous waste trucks bound for the ASWTC, the return period is 300 years.

The Board believes societal risks are illustrated in Table 9.2 which provides a range of annual risks for road accidents, fatalities and injuries in Alberta involving trucks carrying hazardous waste to the ASWTC. The number of accidents per annum would be 0.86 for the Alberta Only case and 1.66 for the All Canada case. The Board also notes that these accident rates involve both loaded and unloaded trucks. Most accidents do not result in a release or spill. The number of release events per annum would be 0.090 for the Alberta Only case and 0.201 for the All Canada case. Considering the policies and procedures of Chem-Security, a non-accident release or spill would be small in volume and unlikely to occur.

The Board believes the most serious environmental risk would be an accident at a specific highway location causing a substantial spill into a large waterway such as the Highway 33 crossing of the Athabasca river. The IRR Report noted that there is risk but it is extremely small and well below a risk level of one in a million for the occurrence of an event. The Board notes that the volume (number of loaded trucks) of hazardous waste used in the risk assessment would be such that the ASWTC would be operating at full capacity. Additionally, the Board notes the very small number (0.3 percent) of trucks carrying hazardous waste when compared to the number of trucks carrying dangerous goods. In many instances, tankers carrying gasoline and highly toxic industrial chemicals would, in the Board's view, impose much greater individual, societal and environmental levels of risk than most of the substances being transported to the ASWTC.

The Board recognizes that there is a difference in the level of risk in the Alberta Only case and the All Canada case. However, in each case the risks would be minimal and so low as to make the difference insignificant. The Board is also aware that the consequences of a significant toxic spill into a major water course such as the Athabasca River could be serious but believes that the probability of such an incident would be extremely remote. The Board

concludes that the levels of individual, societal and environmental risks associated with the Application would not be significant in both the Alberta Only case or the All Canada case.

9.6 Transportation Incidents

The transportation of hazardous wastes involves two types of incidents, highway vehicle accidents and less frequently, waste releases as the result of an accident. In the case of vehicular accidents, the accidents involve private liability. Hazardous waste spills are more complex and may involve a need for an emergency response to prevent or minimize the negative impacts and therefore require additional insurance to cover public and environmental liability should a release occur. The following sections deal with emergency response capabilities and financial costs of incidents.

9.6.1 Emergency Response Capabilities

Chem-Security stated that its system has an emergency response capability with teams located in Swan Hills, Nisku and Calgary. It was stated that these teams would be available to supplement the carriers' emergency response capabilities and assist the appropriate municipal authority. Chem-Security stated that it requires contract carriers to demonstrate their emergency response capability by submitting a formal emergency response plan and having an administrative system in place to support the plan. Chem-Security stated that the carrier would be required to provide trained personnel and equipment to respond to and assist in the cleanup of an incident. It also stated that if a transporter/carrier could not directly provide adequate emergency response capability, a private company specializing in emergency response would be contracted to provide the service. Chem-Security indicated that existing emergency response capability would be extended to provide 24 hour a day, seven days per week coverage when wastes are being transported. The Board was advised that Chem-Security's emergency response equipment included a trailer, a pick-up truck, generator lights, pumps, protective clothing, two-way radios, neutralizing chemicals, and other items. A total of 22 trained staff are available on a 24 hour basis. Chem-Security advised that a communication plan is also in place to activate an emergency response.

Chem-Security indicated that each municipality is required to have a disaster services agency to co-ordinate emergency response activities. In the event of an incident declared to be an emergency, it is the local authority that has jurisdiction over the spill site and any remedial activities that may take place. Municipalities can enter into joint agreements to combine capabilities if additional assistance is required. Alberta Public Safety Services and Alberta Environmental Protection also have emergency response capability that is available to the local authority to provide direction and assistance.

Chem-Security further stated that with respect to contract carriers' response capabilities, most companies that handle dangerous goods have an emergency response plan that is coordinated through Alberta Public Safety Services network on a 24 hour basis. The response to a hazardous waste truck accident is included in the overall response plan for dangerous goods.

Consequently, in some cases there is a parallel emergency response, i.e. Chem-Security and Alberta Public Safety Services for hazardous wastes whereas for a dangerous good, there is only one source of response.

Participants expressed particular concern with emergency response capabilities in the smaller municipal jurisdictions. Concerns included the lack of standard emergency response plans within all municipal jurisdictions; the training of emergency response teams; clear definition of responsibility in the event of a spill of hazardous wastes and responsibility for costs incurred in emergency response activities.

For example, the IAA/LSLIRC stated that of 13 First Nations in Alberta, only four had an emergency response plan and none had staff trained to respond to accidents involving hazardous materials. It was stated the few emergency response plans that are in place do not provide information on how to deal with an accident involving hazardous materials or a spill. They provide a list of contacts with phone numbers and organizational charts which outline who should be called for each type of accident. The cost of required equipment is estimated at approximately $500,000 and none of the First Nations or municipal jurisdictions, such as the Towns of Slave Lake or High Prairie, have such equipment. Due to the relationship between the federal Department of Indian and Northern Affairs, which is responsible for Reserves, and Alberta Public Safety Services, which assists by providing a format for developing emergency response plans, it was stated there are jurisdictional problems in declaring a disaster situation within a Reserve; consequently, there is no defined mechanism for funding cleanup costs. It was stated the Improvement Districts surrounding the Reserves in the Lesser Slave Lake area do not feel responsible to assist the Indian Bands with emergency response plans as the Bands are not contributing to their tax base. A main transportation related concern for the IAA/LSLIRC is that all First Nations should have emergency response plans in place with fully trained workers capable of responding immediately to a spill situation. In its view, it would be better than waiting several hours for a response team to arrive during which time considerable damage could occur on Indian lands. The IAA/LSLIRC stated that no hazardous wastes should be transported through the Reserves and communities along Lesser Slave Lake until emergency response plans are in place for all potentially affected First Nations.

Chem-Security emphasized that the *Public Safety Services Act* requires the local authority to be responsible for emergency response. In Chem-Security's view, the responsibility for the spill site lies with the municipality within which the spill occurs. Chem-Security stated that the municipality has control over the site and can direct activities as required. Chem-Security stated it would respond to an incident within Alberta at the invitation of the local authority and assist in whatever action the local authority deems necessary. This would be most likely in the case of a small municipality where response capabilities were lacking. According to Chem-Security, costs associated with an emergency response (i.e. a spill) would be borne by the local municipality. It was Chem-Security's view that compensation for those costs would likely be handled through an insurance claim with the carrier.

9.6.2 Financial Costs of Incidents

The risks associated with the transport of hazardous wastes involve potential costs to individuals, the public and the environment. Chem-Security stated that it accepts ownership of material at the point of transfer of the waste materials from the generator to Chem-Security's trucks or to other independent contract carriers. Chem-Security advised that it is essentially in the risk reduction business and its policy is designed to provide a market incentive to attract waste for treatment when negotiating contracts with waste generators. It was stated that the same conditions apply in the Alberta Only case as in the All Canada case. Chem-Security stated that the components of the transportation system and its operation are directed towards the safe handling and secure containment of waste in transport so as to minimize risk and liability.

Several participants expressed concerns as to who would assume financial responsibility for transportation incidents in the All Canada case; what amounts of insurance coverage would be required; how municipalities would be compensated for emergency response costs in the event of a spill; and, whether the Government of Alberta would have any responsibility.

Chem-Security provided information about the insurance coverage limits related to the transport of hazardous wastes under its management and control. In the event of a spill, the carrier's insurance would cover damages up to their insurance limit. Chem-Security advised that it carries insurance coverage for the transport of material in its custody to address any anticipated costs associated with an event. Chem-Security stated that it meets the same requirements as other carriers of dangerous goods and maintains comprehensive general liability insurance and environmental impairment liability insurance. The Board was informed that the insurance that Chem-Security carries is reviewed by both owners. It was stated that the same liability conditions would apply in both the Alberta Only case and the All Canada case.

Although Chem-Security stated that details of insurance coverage are a confidential matter between the parties involved, some coverage limits were provided. Currently under the *Transportation of Dangerous Goods Regulation*, a carrier of dangerous goods is required to carry $2 million of liability insurance. Also, Chem-Security requires contract carriers to carry additional insurance for environmental impairment liability. Chem-Security advised that in cases where a contract carrier's insurance would be exceeded through a claim, Chem-Security's insurance may be available. Chem-Security stated that the Alberta Special Waste Management Corporation could be involved in setting the terms of liability. Chem-Security also stated that its risk assessment indicated that any potential spill involving hazardous waste materials and the costs associated with the event would be very small compared to its insurance coverage. Chem-Security believes that very little risk would likely be assumed under its own or the ASWMC insurance policies.

Under the *Transportation of Dangerous Goods Act*, Transport Canada advised the Board that the immediate responsibility is placed on the person who at the time has charge, management and control of the dangerous goods, especially the person who is transporting it.

The question of the cost of a cleanup is not within Transport Canada's jurisdiction as its objectives are to prevent, stop, or stabilize a release or the effect of a release. Cleanup costs would be resolved within the jurisdiction where the release occurred. If a violation occurs, a court order declaring the person or party found guilty can require that party to pay up to $1 million to rectify any environmental damage.

Chem-Security stated that, in addition to the discussion of accident liability in a generic sense, the responsibility for liability would be established through the courts. It could involve the owner of the product, the consignor, the carrier, or the vehicle that collided with the carrier. There are a number of different ways in which legal liability could typically arise in any situation including civil, contractual, and statutory liability.

9.6.3 Board Views

The Board believes an important part of the transportation system for all dangerous goods and hazardous waste is the minimization and mitigation of negative impacts. It also believes major factors in the minimization or mitigation of negative impacts of any incident include the transporter's policies and procedures, emergency response capability, insurance and municipal emergency response measures. The Board heard that the regulatory regime, and in particular the *Transportation of Dangerous Goods Act,* has a significant role in overseeing some 27 million yearly shipments of dangerous goods throughout Canada including shipments of hazardous waste to the ASWTC. It also heard that in Alberta the ASWTC, should it ever reach full capacity, would require some 3,000 to 4,000 yearly shipments of hazardous waste managed according to the policy and procedures of Chem-Security and in compliance with several additional Alberta statutes and regulations. The Board notes the measures required for compliance with the regulatory regimes, and the measures contained in Chem-Security's policy and procedures regarding emergency response and insurance. The Board concludes that these measures are satisfactory and would be effective in minimizing and mitigating both the number of accidents and the negative impacts resulting from an accident, thus reducing the individual, societal and environmental risks and costs potentially associated with the Application. This conclusion would apply in both the Alberta Only case and the All Canada case.

The Board notes that liability for a transportation incident causing negative impacts is a legal matter that would depend upon the factors or circumstances surrounding the incident. It recognizes that under some circumstances the determination of legal liability could result in a long, complicated and expensive litigation process involving several parties in addition to the carrier. The Board believes there may be a remote potential for the Alberta taxpayer to have some exposure to liability for a transportation incident through the ASWMC.

The Board notes that in the All Canada case, contract carriers would be used exclusively to transport waste from other provinces. They would be required to comply with Chem-Security's policies and procedures and to the various regulatory regimes both of which require that carriers of hazardous wastes have emergency response capabilities and insurance. The Board agrees that there is no need to expand or extend the Applicant's existing emergency

response capabilities. The Board believes the existing activities can be adjusted and spread out to provide 24 hour a day, seven days per week coverage in Alberta only. Chem-Security stated that it carries insurance in addition to the insurance of the contract carriers. With Chem-Security playing a role in the management of the transportation system, the Board agrees Chem-Security should also carry insurance.

The Board heard concerns from participants, in particular First Nations and the communities along the south shore of Lesser Slave Lake with regard to emergency response plans and associated costs. It heard that in some cases emergency response plans may not exist. The Board notes the requirements under various regulatory regimes that communities have a responsibility to have emergency response plans in place to deal with the transportation of dangerous goods, disasters from natural phenomenon and other disasters. The Board has already stated that it believes Chem-Security's emergency response plans and liability coverage are adequate. However, the Board is concerned that there may be communities without emergency response plans and strongly recommends that appropriate federal and provincial authorities take action to remedy the matter. Chem-Security has indicated that it would be willing to assist with this process.

9.7 Transportation Costs

9.7.1 Alberta Only Case versus the All Canada Case

In the Alberta Only case, Chem-Security stated that the cost of transportation is included in the price of treatment whereas in the All Canada case, the charge for treatment would be the same as in Alberta but the cost of transportation would be extra. Chem-Security also stated that the transportation charge would be from point of origin to the Treatment Centre. Transportation costs would depend on the characteristics of wastes, the size of load and the origin of the load.

Chem-Security's forecast for transportation costs from Ontario to the ASWTC was estimated to be in the order of $400.00 per tonne. The use of transfer stations in Alberta is not considered likely at this time but in the event that a transfer station has to be used, the generator would still be responsible for all transportation costs incurred in transporting the waste material to the ASWTC. It was stated that contract carriers generally negotiate rates on the basis of a running cost per kilometre per tonne. This cost includes costs such as insurance, licensing, and loading and unloading.

Several participants expressed concern with Chem-Security's policies on allocation of transportation costs for the All Canada case. Concerns mostly related to the pricing structure and market analysis which is discussed in Section 7 of this Report.

9.7.2 Board Views

Transportation in the All Canada case would be an extra charge to be paid by the generator (consignor, shipper). The Board understands that this means, if the Application is approved, that the transportation of hazardous waste to Alberta would not be a financial burden on the citizens of Alberta.

The Board heard that Chem-Security would maintain control over transportation of hazardous waste in the All Canada case. The Board understands that these controls would be in regard to contract carriers, and in some instances, the generator's carrier. It would include the selection, auditing, and inspection of the carriers for compliance with the various provincial and federal regulatory regimes and with Chem-Security's own policies and procedures. The Board believes that all out of province managerial costs should be charged to the extra-provincial generators (consignors, shippers) either through a managerial fee or included in the transportation charges mentioned above.

The Board heard that in the All Canada case Chem-Security would carry insurance in addition to the insurance of the contract carriers transporting hazardous waste to the ASWTC. The insurance carried would be reviewed by the Risk Management Division of the Alberta Treasury. The Board recommends the cost of the insurance for carrying hazardous waste to the ASWTC should be an extra charge paid by the extra-provincial generator (consignor, shipper) and not a burden on the citizens of Alberta.

The Board recommends that a proportionate share of the cost of Chem-Security's Alberta emergency response capabilities should be charged to the extra-provincial generators (consignors, shippers) that have hazardous wastes transported to the ASWTC for handling and final disposal.

The Board notes that Chem-Security is the operator-manager of existing hazardous waste transportation facilities (emergency response capability, transfer stations, carriers and supporting equipment) which represents a past capital expenditure by the owners. The Board has reviewed the existing system and the use of carriers from the private sector. The Board recommends no further capital expenditures be allowed on the transportation system without first making an examination of contracting private sector services.

9.8 Overall Board Views on Transportation of Hazardous Wastes to ASWTC

The transportation of hazardous wastes to the ASWTC was an important issue to the participants at the hearing. Concerns of participants related to the health and safety of the public and protection of the environment. The Board believes that the transportation system is essential and an important part of the hazardous waste management system, and that the evidence dealt with all the significant elements in the pre-transit, in-transit and post-transit phases of the transportation system for both the Alberta Only case and the All Canada case. The Board

concludes it has sufficient evidence to consider transportation matters. The Board's findings on transportation matters related to the Application are:

- the existing regulatory regime is extensive and sufficient to protect the public in the transportation of hazardous wastes in Canada and particularly in Alberta;

- the number of trucks transporting hazardous wastes to the ASWTC would be very low in both the Alberta Only case and the All Canada case;

- the entry points and direct highway routes to the ASWTC selected by the Applicant for receipt of waste from other Canadian jurisdictions under the All Canada case would be satisfactory;

- the Applicant's policies and procedures in regard to transportation of hazardous wastes are satisfactory and the Board would require, should the Application be approved, that the Applicant take reasonable steps to ensure that the transportation of hazardous wastes to the Treatment Centre from Canadian jurisdictions is to a standard that would be equivalent to those adopted by the Applicant for the transportation of hazardous wastes in Alberta thereby providing further protection to the public;

- the operational time frame of 24 hour, seven days per week and the use of contract carriers would be satisfactory in the All Canada case, recognizing the existing regulatory regime and Chem-Security's continuing management role in the transportation system;

- the level of individual, societal and environmental risks associated with transportation in Alberta would not be significant in the All Canada case;

- the existing regulatory requirements for emergency response plans and insurance, as well as Chem-Security's emergency response capabilities, would be effective in minimizing or mitigating any potential negative impacts in the All Canada case; and,

- that trucks would be a satisfactory mode of transport for hazardous waste to the ASWTC and that this segment of the trucking industry is specifically highly regulated and well established.

The Board believes there would be little or no material differences in the associated risk between the Alberta Only case and the All Canada case in the matter of the transportation of hazardous waste to the ASWTC. It also believes that the transportation system is an important part of the overall hazardous waste management system and that ongoing constant vigilance and supervision would be necessary. The Board finds, in regard to the

Application, that the transportation of hazardous waste for treatment at the ASWTC could occur without any significant positive or negative impact.

11. SUMMARY OF OVERALL CONCLUSIONS AND DECISION REGARDING THE PUBLIC INTEREST

11.1 Overall Conclusions

The Alberta Special Waste Treatment Centre has a nominal treatment capacity of 55,000 tonnes per annum and has operated under an "Alberta Only" policy since its inception. Chem-Security seeks approval to receive hazardous wastes from other Canadian jurisdictions for treatment at the Treatment Centre due to excess capacity. By Order in Council 695/93 dated November 18, 1993, the receipt of hazardous wastes from other Canadian jurisdictions by the ASWMS for treatment at the Alberta Special Waste Treatment Centre was prescribed as a reviewable project pursuant to Section 4(f) of the *Natural Resources Conservation Board Act*. The Application and supporting information were briefly reviewed in Section 2 of this Report.

The Natural Resources Conservation Board (Board) received the information it required to consider the Application in March, 1994 and held a public hearing in Swan Hills, Calgary and Edmonton. Submissions to the Board touched on all facets of the proposed project and contained a wide range of views and supporting information. The participants and their positions regarding the Application were summarized in Section 3.

The Board notes that most hearing participants were opposed to the Application. Some were opposed to previously established policies of the Government of Alberta regarding hazardous waste management. Some objected to one or more of the following: the establishment of an off-site integrated hazardous waste treatment facility; the location of the facility near the Town of Swan Hills; the investment of any public funds in hazardous waste treatment facilities; the payment of public funds to subsidize the costs of hazardous waste treatment; the involvement of the private sector in the ownership and operation of the ASWTC, and the specific terms and conditions of the Joint Venture Agreement between the ASWMC and BOVAR. For those who disagreed with the current policies of the Alberta Government, the extension of such policies through the continued operation of the ASWTC was of concern, as was the Application to bring hazardous wastes to Alberta for treatment. The Board believes that it is not within its jurisdiction to review existing government hazardous waste policies for the treatment of Alberta wastes.

Some participants opposed the Application for reasons that pertain to the incremental social, environmental, and economic effects. The Board believes that public concerns regarding the incremental effects of the Application are relevant to the Board's determination of the public interest.

The Application to receive hazardous wastes from other Canadian jurisdictions falls within a broad framework of existing public policies. The reviewable project would be influenced by the policies of the Government of Alberta, the Federal Government, various other provincial governments, and local jurisdictions. Where appropriate, the Board has had regard for these policies as they relate to the public interest. The regulation of the transportation of dangerous goods, including hazardous wastes, is an example of the type of policies that may affect the reviewable project.

The Alberta Only policy was adopted in the 1980s to ensure that Alberta wastes would be treated and safely disposed of through the development of appropriate waste treatment facilities. Developing treatment capability at public expense was based on reducing the environmental risk of hazardous waste contamination from improper storage and disposal in Alberta. By adopting best available treatment technologies to meet stringent environmental standards, environmental risks associated with transport and treatment were expected to be negligible when compared to the environmental risks of no treatment and improper storage and disposal. The Alberta Only policy reduced the amount of initial public investment required to develop a treatment capability sized to meet Alberta needs alone, and confined the subsidization of operating losses to treating Alberta wastes. By adopting an Alberta Only policy when the ASWTC was first developed, Albertans were not required to invest in treatment facilities in excess of Alberta's needs and were not required to accept any potential environmental risks associated with the transportation and treatment of hazardous wastes from other jurisdictions that had no offsetting reduction of environmental risks in Alberta.

The Board notes that an essential component of the Application is to replace the Alberta Only policy with an Alberta First policy. The Alberta First policy is premised on the existence of excess capacity above the needs of the Alberta Only hazardous waste market. Chem-Security would continue to respond to requests from Alberta generators on a priority basis. Alberta waste would be accepted and treated on a priority basis, but an Alberta First policy does not imply that all Alberta waste would be treated immediately upon receipt. Chem-Security would utilize existing storage facilities within the system to optimize the treatment of all wastes. It would ensure that Alberta generators' needs would be met and yet would schedule deliveries of extra-provincial waste when capacity exists. The Board agrees that, should the Application proceed, the implementation of an Alberta First policy by Chem-Security would be necessary to protect the Alberta public interest.

Since the Alberta Only policy was first adopted as a basic principle for the operation of the ASWTC, there have been changes within and outside of Alberta. Based on its review of the evidence the Board accepts that the ASWMS has demonstrated that Alberta hazardous wastes can be effectively and safely transported, treated and disposed of, thereby reducing the risks of hazardous waste contamination from improper storage and disposal in Alberta. At the same time, Alberta industry has become much more sophisticated in its approach to the management of hazardous wastes, and has made steady progress in applying reduction, re-use, recycling and recovery technologies. This has reduced the demand for off-site waste treatment facilities. Alberta industry has also become more knowledgeable about the characteristics of their wastes and the various treatment options available. Although Alberta continues to generate substantial volumes of hazardous wastes that require off-site treatment, significant volumes of these wastes are being transported out of the province to take advantage of lower cost treatment and disposal options available in other jurisdictions. Alberta industry has also sought pre-treatment and alternative treatment services and options within Alberta that are appropriate to the characteristics of their wastes.

The Board is encouraged by the attention devoted to the reduction, re-use, recycling and recovery of hazardous wastes by various governments. These initiatives have had an effect on the need for hazardous waste treatment services such as those offered by Chem-Security at the Alberta Special Waste Treatment Centre. However, in the Board's opinion, more concentrated and difficult to treat residual hazardous wastes would continue to be generated and would require treatment at the ASWTC.

The Board has also taken note of the current harmonization priority of the Canadian Council of Ministers of the Environment (CCME) and the current trends toward making policies compatible between jurisdictions. The Board believes the principles adopted in the *Basel Convention* are particularly relevant to the public interest in the Application. Each jurisdiction endeavours to treat wastes within its borders as a first priority. Waste requiring specialized treatment services that may involve economies of scale could involve transborder shipments where the receiving jurisdiction has environmentally acceptable treatment capability, and agrees to the receipt of such wastes. Alberta is the only Canadian jurisdiction to exclude the receipt of hazardous wastes from other Canadian jurisdictions for treatment even though Alberta has the most effective destruction facility available anywhere in Canada.

Significant volumes of Alberta hazardous wastes are shipped to jurisdictions outside Alberta for long term storage in landfills, for treatment at facilities that may not be as effective as the ASWTC, or for recycling, reduction, re-use and recovery. The short term costs of such options may be low when they do not involve sophisticated treatment facilities. In the long term, such practices may have environmental, social and economic costs. Alberta hazardous waste generators are choosing low cost alternatives outside Alberta because other jurisdictions permit transborder waste shipments to low cost facilities. While from an Alberta waste generators' perspective such behaviour may be rational, it may not be consistent with the principles of the *Basel Convention* that are intended to prevent transborder shipments of hazardous waste to low cost storage and treatment options in another jurisdiction that are not equivalent to the requirements in the source jurisdiction.

The Board notes the current harmonization priority of CCME, the acceptance by Canada of the principles of the *Basel Convention*, and the current situation restricting access by other Canadian jurisdictions to the ASWTC while Alberta generators take advantage of low cost options outside of Alberta. If all Canadian jurisdictions were to harmonize the requirement to treat wastes in an equivalent manner, the current imbalance would be removed and Canadians would be giving effect to the principles of the *Basel Convention* throughout Canada.

The Board believes that the harmonization of hazardous waste treatment and management should be a high priority in Canada. To ensure that hazardous wastes are properly managed throughout Canada there is a need to ensure that all hazardous wastes are defined and classified in an equivalent manner in each jurisdiction across Canada. The CCME has established *National Guidelines for Hazardous Waste Incineration Facilities* and *Operating and Emission Guidelines for Municipal Solid Waste Incinerators. Guidelines for the Use of Hazardous and Non-Hazardous Wastes as Supplementary Fuels in Cement Kilns* are in preparation. These initiatives reflect the intention to harmonize technical aspects of the management of hazardous waste treatment options. The Board is not aware of any intention

regarding the acceptability of landfilling hazardous wastes which remains a common practice throughout Canadian jurisdictions.

CCME has not developed a national strategy regarding the need for and kind of specialized hazardous waste treatment capability required to meet Canadian needs. The Board believes from the evidence that the ASWTC, as the only integrated and fully operational hazardous wastes treatment centre in Canada, could play a key role in such a strategy if the Application were approved. The Board recommends, therefore, that the Government of Alberta initiate further discussions at CCME to bring about a national strategy for the harmonization of hazardous waste treatment and management in Canada to complement the harmonization already at work in the transportation of dangerous goods.

The Board also believes, should the Application proceed, that the Government of Alberta should pursue discussions with western provinces regarding regional approaches to hazardous wastes management that would recognize the pivotal role that could be played by the ASWTC.

The Board has considered the information before it for the purposes of determining whether or not the information required to reach a reasoned decision is available and has concluded it has sufficient evidence before it to make a decision regarding the public interest in the matter.

The Board has considered the justification, need, and economic viability of the Application, and the reasonable alternatives to the proposed course of action contained in the Application. The Board accepts that the Alberta Special Waste Treatment Centre has excess capacity above the requirements of the Alberta hazardous waste market. The Board also believes that Alberta taxpayers would be required to make very substantial financial commitments in the future in meeting the system contribution to the Alberta Special Waste Treatment System required under the Joint Venture Agreement in the Alberta Only case. To reduce the amount of the forecasted system contribution, Chem-Security proposes to utilize the excess capacity of the expanded Alberta Special Waste Treatment Centre to service other Canadian jurisdictions, thereby reducing the cost to Alberta taxpayers. The Board views the costs of the treatment for extra-provincial wastes to be greatly exceeded by the revenues.

The Board acknowledges that there may be other courses of action available to address the forecasted system contributions from taxpayers. The Board believes that the alternatives identified by the participants have raised some serious questions that pertain to the public interest that are beyond the jurisdiction of the Board. The Board believes that other responsible authorities may wish to have regard for such matters when discharging their responsibilities or when considering the Board decision regarding the Application.

Participants identified three basic questions:

1. Should the Alberta Special Waste Treatment Centre attract more Alberta generated hazardous wastes and increase its revenues?

2. Should the Alberta Special Waste Treatment Centre reduce its costs while maintaining safe treatment?

3. Should the Government of Alberta reduce or eliminate its financial participation in the Alberta Special Waste Treatment Centre?

The Board believes that the alternatives identified by the participants may deserve attention by the appropriate authorities. These matters are beyond the jurisdiction of the Board.

Given the anticipated reduction in the forecasted cost to taxpayers, the Board has considered the Application in detail to determine the public interest having regard for the related social, economic, and environmental effects.

The Board finds that the economic effects of the Application are subject to a large degree of uncertainty, primarily due to the difficulty in predicting the market for the services of the Alberta Special Waste Treatment Centre. However, under a variety of assumptions regarding prices, volumes, revenues and costs, the economic effects are significant and positive to Alberta. The Board believes that the Application is economically viable since each tonne of waste from other Canadian jurisdictions is expected to bring revenues far above the costs of treatment. The All Canada case, even considering the most severe assumptions regarding revenues and costs, is predicted to reduce the costs of the Alberta Special Waste Treatment Centre to Alberta taxpayers by at least $80.4 million. The net benefit to Alberta's economy is positive under foreseeable circumstances.

The Board notes that the primary economic benefits of the Application flow through to the Government of Alberta, particularly through reduced system contributions. BOVAR would also benefit from the Application through its 100 percent ownership of Chem-Security. The Board notes that under the various agreements between Chem-Security and the owners, Chem-Security would be eligible to charge management fees related to the receipt of waste from other jurisdictions based upon the level of expenditure incurred. BOVAR would also benefit from the Application if it were to result in the joint venture becoming profitable particularly after the repayable portion of the system contribution was repaid.

The Board notes the financial situation of the Province of Alberta and the effects of expenditure controls. The anticipated reduction in the system contribution, should it be realized, could provide an opportunity to further reduce hazardous waste management expenditures or redirect the planned expenditures to other priority areas. This is a major benefit of the Application.

The Board notes the positive economic effects on the Alberta economy and Alberta taxpayers should the Application be approved and recognizes the reduction to the financial burden on Alberta taxpayers from the All Canada case. The extent to which such reductions would occur depends on Chem-Security's actual success in a competitive market outside Alberta. The Board has adopted the conservative view that the reductions in system contributions would be substantially less than Chem-Security predicts.

Therefore, the Board states with considerable caution that Alberta taxpayers may continue to be exposed to significant financial costs associated with the Alberta Special Waste Treatment Centre even if the Application proceeds and Chem-Security is relatively successful in the markets outside Alberta.

With respect to environmental effects, the Board is satisfied should the Application proceed, that the wastes received from other Canadian jurisdictions would be effectively destroyed by incineration and that in treating such waste the operation of the incinerator would produce emissions that do not present a significant risk to the environment or human health. The Board would require Chem-Security to provide Alberta Environmental Protection with a revised assessment of the effects of maximum PCP emissions, based on the design capacity of 2660 kg/hr and DRE performance data for the FB&D kiln and for the C.E. Raymond kiln if it were to be used to incinerate PCP, to further confirm that the combined emissions would not likely exceed the overall estimates of 3.82 μg/s.

With respect to emergency venting episodes, the Board concludes that the expected environmental effects from such episodes would be less than previously predicted despite the potential for increased waste volumes since the duration of events will be reduced by 50 percent, and the Board would require, if the Application were to proceed, Chem-Security to implement reasonable steps satisfactory to Alberta Environmental Protection that will further reduce emergency venting episodes to a level of service more appropriate for a hazardous waste treatment facility processing Canadian wastes, due to power interruptions controllable by Chem-Security.

The Board finds that the control of fugitive PCB emissions associated with the storage and handling of volatile organic wastes prior to incineration is of concern. The release of fugitive emissions has been the subject of an intensive control program that has affected most of the Alberta Special Waste Treatment Centre operations. While there have been reductions of emissions at known sources of fugitive emissions, the evidence indicates that the problem has not been successfully resolved and fugitive emissions are continuing to be observed on and around the plant site. The levels are relatively low in the context of the current 50 ppm standard for PCBs on plant sites. However, the Alberta Special Waste Treatment Centre is a destruction facility that operates under strict regulation to ensure that the plant itself is not a source of hazardous waste contamination. The Board believes that the potential effects of fugitive emissions could be mitigated through appropriate fugitive emission controls. The Board has concluded that should the Application proceed, Chem-Security must be required to ensure the control of fugitive emissions at the site before the routine incineration of out of province PCB and PCP waste commences.

Therefore, in the event that the Application were to be approved, the Board would require Chem-Security to not incinerate PCP or PCBs from out of province, except for test purposes, until such time as it has, in a manner satisfactory to Alberta Environmental Protection, demonstrated that the fugitive emission control program at the ASWTC is capable of controlling potential fugitive emissions of PCBs and other volatiles that could arise from the receipt of wastes bearing these compounds from out of province to acceptable levels as may be approved

by Alberta Environmental Protection, based on a reassessment of the ASWTC fugitive sources inventory and a complete assessment of the effectiveness of existing fugitive emission controls.

The Board is concerned that air quality monitoring data has not been adequate to confirm predicted ground-level concentrations at the relevant points of impingement in the local area surrounding the Treatment Centre, nor have the stack emissions for the new incinerator been fully characterized to ensure that no unforeseen contaminants would be emitted. The Board believes the absence of such evidence confirming or refuting the predicted negligible effects may have left the impression that impacts could occur that would be undetected. The Board would require, should the Application proceed, additional monitoring of the stack emissions and in the impingement area of the Treatment Centre to confirm or refute that the effects are in fact negligible as predicted. The Board intends the requirement to be specific to the stack emissions of most concern from the Treatment Centre.

Most of the predicted environmental and health effects of the Application are associated with air emissions from incinerators and waste handling and preparation. Air emissions can affect terrestrial and aquatic systems. The Board has considered the effects of the Application on terrestrial and aquatic systems and has concluded that no incremental effects to those systems can be expected in addition to those previously predicted. The Board also notes its requirement, should the Application proceed, for additional monitoring to further characterize emissions and the potential impingement on terrestrial and aquatic systems. This requirement would involve changes in air quality monitoring to confirm or refute previous predictions of negligible effects on these systems from air emissions from the ASWTC.

The Board has also examined the potential incremental health risks associated with the Application, particularly those risks which are associated with predicted changes in emission rates and ambient ground-level concentrations of contaminants. The Board's conclusion is that Application 9301 would not result in incremental health risks that would indicate any cause for concern.

Should the Application proceed, the Board believes that through the terms and conditions of its approval it would ensure that the ASWTC would remain an environmentally sound treatment centre. The Board relies upon the role played by Alberta Environmental Protection on various regulatory matters and believes that the efforts and expertise of Alberta Environmental Protection would ensure that the Board's intent would be accomplished and looks to their assistance in the implementation of the Board's conditions should the Application proceed.

Overall, the Board concludes that from an environmental perspective, the Alberta Special Waste Treatment Centre is a first class hazardous waste treatment facility that could effectively manage all types of hazardous wastes regardless of source. Given the experience of the operator and the capability of the recently expanded facilities, the Board does not expect that the acceptance of hazardous wastes by the ASWMS for treatment at the Alberta Special Waste Treatment Centre from other Canadian jurisdictions would result in any significant impact to the environment in Alberta.

The Board has considered the special case of the transportation effects of the project, and concluded that the existing regulatory regime is extensive and sufficient to protect the public in the transportation of hazardous wastes in Canada and particularly in Alberta. The number of trucks transporting hazardous wastes to the Alberta Special Waste Treatment Centre would be very low in both the Alberta Only and the All Canada case. The entry points and routes selected by Chem-Security would be satisfactory. Chem-Security's transportation policies and procedures would also be satisfactory and, should the Application proceed, the Board would require their extension by the operator, Chem-Security, outside Alberta in the All Canada case thereby providing a further degree of protection to the public. The risks associated with the transportation of hazardous wastes would be minimal and so low that there would be little or no material differences between the Alberta Only and the All Canada case.

Given the actual nature of the Alberta Special Waste Management System operations and the existing regulation of the transportation of hazardous wastes, the Board concludes that transportation would have few direct effects on Albertans. However, in the unlikely event of a serious accident, the effects could be serious to those directly affected. Overall, the Board believes that the transportation of hazardous wastes from other Canadian jurisdictions for treatment at the Alberta Special Waste Treatment Centre could occur without any significant positive or negative impact on the public.

With respect to social effects, the Board concludes that the Application, should it proceed, would have both positive and negative social effects that could occur without any significant impact throughout Alberta.

The Board concludes that an adverse social effect of the Application is the apprehension of some Albertans who believe that the transportation and treatment of hazardous wastes would be inherently dangerous and pose a serious threat to the environment and the health and safety of those exposed to such activities. The concerns expressed to the Board about the potential health, safety and environmental effects of hazardous waste transportation and treatment are both important and serious to those who presented them. The Board agrees with participants that there could be serious potential risks associated with hazardous waste management; but the Board's consideration of the evidence regarding the nature of those risks leads it to conclude that the risks would be managed in such a fashion that the likelihood of a serious effect occurring would be significantly reduced to a level that the Board believes would be acceptable.

However, the existing operations remain a source of concern to many Albertans living in the region surrounding the Alberta Special Waste Treatment Centre. Should the Application proceed, the Board would require that Chem-Security improve its communications with regional residents so that they become well informed about Chem-Security's operations based on an expanded monitoring program.

The Board notes that Chem-Security has stated that its goal is to achieve profitability through the receipt of wastes from other jurisdictions. The Board believes this goal should be secondary to the primary goal of ensuring safe transport and treatment of hazardous wastes.

The Board also acknowledges that several of its conditions, should the Application proceed, would result in additional costs to Alberta taxpayers. The Board is concerned that the JVA does not provide incentives to control costs. Therefore the Board must rely upon AEP and the ASWMC to ensure that costs of the required actions would be closely controlled and that only necessary expenditures would be made to fulfill any Board requirements.

The Board notes that under the JVA, reference is made to the receipt of wastes from outside Alberta in the event that the Alberta Only policy were changed. The JVA indicated the clear intention of the parties that system contributions or payments would only apply to the treatment and disposal of Alberta generated or controlled wastes. Should the Application proceed, the Board would require, consistent with Section 1107 of the JVA, that Chem-Security establish within its accounting procedures a means of ensuring that system contributions are not, and do not become associated with the treatment of wastes from other Canadian jurisdictions. Further, the Board would also require that revenues and costs associated with the collection, transportation, treatment and disposal of waste from other Canadian jurisdictions including the relevant portion of management fees charged by the Applicant under the various agreements with the owners, be accounted for separately and reported clearly and accurately by Chem-Security to the ASWMC in a manner that would be of assistance to the Auditor General in reviewing the expenditures of the ASWMC.

The Board is well aware of the high value assigned by society to the proper transportation and treatment of hazardous wastes as evidenced by the enormous efforts invested in the regulation and control of hazardous wastes within and outside Alberta and Canada. The public has considerable interest in the effective management of hazardous wastes. The Board notes in the evidence that there has been a tendency to accept the objective that hazardous wastes should be effectively managed. Attention is then focussed on the best way to accomplish the management of wastes and who should pay for such management and how much it should cost. The Board believes that proper treatment of hazardous wastes should remain a primary objective and would be concerned if cost controls could lead to the situation where hazardous wastes would be no longer properly treated. The Board does not believe that the Application would be in the public interest if the ASWTC were unable to effectively treat hazardous wastes and render them safe for disposal due to changes in the operation in order to achieve reduced costs.

In considering the public interest, the Board must have regard for the social and economic effects of the Application and the effects on the environment. The Board notes that in the review of Application 9101 the reduction of environmental risks from improper storage or disposal was considered along with the environmental risks of transportation and treatment of hazardous wastes and the social and economic effects of such activities. In the context of the present Application, the reduction of risks of improper storage or disposal in other jurisdictions may not be a benefit to Alberta. There may also be some risks in Alberta associated with the transportation and treatment of wastes from other jurisdictions. The Board must, therefore, consider those risks in relation to the social and economic effects of the Application.

The Board concludes that the All Canada case presented in the Application is, on balance, preferable to the continuation of the Alberta Only policy. Proceeding with the Application would not result in any further capital expenditures and would be an economic use of the resources invested in the Alberta Special Waste Treatment Centre that were in excess of Alberta's requirements. The Application would be economically viable since the revenues are expected to far exceed the costs of treating each tonne of wastes received from other Canadian jurisdictions. The Application would bring new revenues to Alberta and the economic benefits would be positive and significant to the Alberta economy. Alberta taxpayers would be required to make a reduced contribution to the ASWMS under the All Canada case presented in the Application and there would be some prospect that the need for the system contribution could be eliminated if the Alberta Special Waste Treatment Centre attracts sufficient revenues from outside Alberta. The Board believes that the All Canada case would not result in any significant adverse environmental impacts in Alberta due to the effective treatment facilities at the Alberta Special Waste Treatment Centre. The Board believes that the operations at the Alberta Special Waste Treatment Centre would be similar under the All Canada case and that there would be few if any new social effects in the region. There would be no new construction, no new employment, and a small increase in the goods and services required to process the additional wastes received from other Canadian jurisdictions, most of which would be purchased outside the Swan Hills region. Social effects, both positive and negative, could occur without any significant impact throughout Alberta. Also, the risks associated with the transportation of hazardous wastes would be minimal and so low that there would be little or no material difference between the Alberta Only and the All Canada case. Overall, the All Canada case would be clearly preferable to the Alberta Only case.

11.2 Decision

In the opinion of the Board, having regard for all the evidence before it, the proposed project, subject to conditions, is in the public interest having regard to the social and economic effects of the project and the effects of the project on the environment.

Subject to the necessary authorization of the Lieutenant Governor in Council, the Board is prepared to make an order granting an approval for the project, with the conditions identified in the form of approval contained in Appendix B.

Dated at Edmonton, Alberta on November 3, 1994.

Ken Smith
Chairman

Charles H. Weir
Acting Vice-Chairman

David M. Derworiz
Acting Board Member

APPENDIX A
LIST OF HEARING PARTICIPANTS

APPLICATION NO. 9301 - May 16, 1994 & June 27 - July 19, 1994

Participants (Abbreviations Used in Report)	*Witnesses*
Chem-Security (Alberta) Ltd. (The Applicant or Chem-Security)	
Francis Saville Richard Neufeld	Art Mathes Graham Latonas Peter Cutts All from Chem-Security (Alberta) Ltd. Gordon Engbloom, Confer Consulting Ltd. Mike Schroeder, Jacques Whitford Environment Ltd. Dr. Bob Willes, CanTox Consultants Inc. Dr. Stephen Ramsay, University of Western Ontario John Shortreed, University of Waterloo Peter Nichols, Nichols Advanced Technologies Inc. M. Deirdre Treissman, CanTox Consultants Inc.
Edmonton Friends of the North Environmental Society Ad Hoc Coalition (EFONES Coalition)	
Mitch Bronaugh Robert Wilde Jim Darwish	Mitch Bronaugh Robert Wilde Dr. David Schindler
Environmental Resource Centre	
Brian Staszenski Ron Kruhlak	
Dennis Fenske (self)	Dennis Fenske
John Ogilvie (self)	John Ogilvie

Participants (Abbreviations Used in Report)	*Witnesses*
Indian Association of Alberta/ Lesser Slave Lake Indian Regional Council (IAA/LSLIRC)	
Richard Secord Karin Buss Chief Jim Badger	Chief Jim Badger Chief Clifford Freeman Lawrence Willier Harvey Giroux John Testawits Joe Willier Bertha Chalifour Rose Laboucan Dr. Alan Legge, Biosphere Solutions Darryl Howery, Applications Management Consulting Ltd. Dr. A. Kubursi, Econometric Research Ltd. Ed Hanna, J.E. Hanna Associated Inc.
Counsel for Interveners	
Adrian Currie	
TriWaste Reduction Services Inc.	
	Rodney LeLand
Green Alternatives Institute of Alberta (Calgary)	
	Peter Ambramowiz
Toxics Watch Society of Alberta	
Myles Kitagawa	Myles Kitagawa
Environment Canada	
Steve Faulknor	John Vollmershausen Dr. John Hilborn Tony Dionne All of Environment Canada Dr. John Read Transport Canada
Barbara Collier (self)	Barbara Collier

Participants (Abbreviations Used in Report)	*Witnesses*
Saskatchewan Environment & Resource Management, Government of Saskatchewan	
	Robert Sentis, Saskatchewan Environment & Resource Management Bob Schutzman IPSCO Inc.
Tooker Gomberg (self)	Tooker Gomberg
EcoCity Society of Edmonton (EcoCity Society)	
	Randy Lawrence
Marianne Lightfoot (self)	Marianne Lightfoot
Lee Morin (self)	
Canadians for Responsible Northern Development, The Green Alternatives Institute of Alberta (Edmonton) and The Green Party of Canada (Alberta Bioregions)	
	Dr. Harry Garfinkle
Board Solicitor's Contract Consultants	
Grant Sprague	Dr. Ronald Brecher, GlobalTox International Consultants Ltd. Hugh Johnson, Stephen Johnson, Chartered Accountants Dr. Marc Maes, University of Calgary Blair Birch, Associated Engineering Alberta Ltd.

Participants (Abbreviations Used in Report)	*Witnesses*
Town of Swan Hills	
Dr. Steve Hrudey	Mayor Harold Junck Brad Watson Dr. Steve Hrudey
Municipal District of Woodlands No.15	
	Richard Tipton,Councillor
Improvement District of Big Lakes No. 125	
	Alvin Billings, Chairman Ethel Ruecker, Councillor John Eriksson, ID Manager
County of Beaver Environmental Protection Association	
	Dennis Fenske
Fort Assiniboine Local Trappers & Alberta Trappers Association	
	Richard Aarsen, President, Fort Assiniboine Local Carolyn Aarsen, Member Fort Assiniboine Local Ed Grahams, Zone Director Alberta Trappers Association

Written Submissions Only:

Northern Light
Avrum Wright
Environmental Law Students Society
Fort Assiniboine District Environmental Action Association
Native Council of Canada (Alberta)
British Columbia Hydro & Power

Participants (Abbreviations Used in Report)	*Witnesses*

Written Submissions (continued)

Ed Hanson
Lorraine Vetsch
Smith Environmental Association
City of St. Albert
Environmental Services Association of Alberta
Rural and Improvement Districts Association of Alberta
Municipal District of Sturgeon No. 90
Ivor Edwards
Vorteck International
Canadian Heritage, Government of Canada, Rocky Mountain District
County of Leduc No. 25
Strathcona County
Dr. H. A. Scott
Motor Vehicle Manufacturers' Association
City of Fort Saskatchewan
Joussard Area Development Association
Miller Boatworks - Joussard
Lesser Slave Lake North Country Community Association
Bearclaw Holdings Ltd. - Swan Hills

Natural Resources Conservation Board

Dr. Albert van Roodselaar
Patrick Cleary
Joyce Ingram
William Kennedy
James W. McKee
Dr. Robert Powell

George Marrinier, Board consultant

4. The Operator shall not incinerate pentachlorophenol or polychlorinated biphenyls from out of province, except for test purposes, until such time as it has, in a manner satisfactory to Alberta Environmental Protection, demonstrated that the fugitive emission control program at the Alberta Special Waste Treatment Centre is capable of controlling potential fugitive emissions of polychlorinated biphenyls and other volatiles that could arise from the receipt of wastes bearing these compounds from out of province to acceptable levels as may be approved by Alberta Environmental Protection, based on a reassessment of the Alberta Special Waste Treatment Centre fugitive sources inventory and a complete assessment of the effectiveness of existing fugitive emission controls.

5. The Operator shall undertake and report in a manner satisfactory to Alberta Environmental Protection a broad spectrum analysis of stack emissions, under normal operating conditions reflecting a cross-section of loadings that the incineration system would normally experience in treating wastes from other Canadian jurisdictions, to determine whether the suite of 67 contaminants it currently measures is appropriate or should be expanded; the analysis shall include, but not be limited to the characterization of particulate emissions to determine, among other constituents, the distribution of polynuclear aromatic hydrocarbons, metals, and organochlorines with respect to particle size in the emissions.

6. The Operator shall, in consultation with regional residents including First Nations peoples, local trappers and municipal governments and in a manner satisfactory to Alberta Environmental Protection:

a) initiate a program taking into consideration the results of the broad spectrum analysis of stack emissions as required in condition 5, to confirm or refute the predictions of dispersion modelling by monitoring ground-level concentrations of contaminants at those locations identified in dispersion modelling as the points of impingement of the plume resulting in the highest predicted ground-level concentrations, and

b) submit the results to Alberta Environmental Protection for its determination as to the requirement for and the nature of any changes to the effects monitoring.

7. The Operator shall establish in a manner satisfactory to Alberta Environmental Protection an ongoing program of consultation with the residents living in the region of the Alberta Special Waste Treatment Centre, including the residents of the Indian Reserves along the south shore of Lesser Slave Lake and communities within the Improvement District of Big Lakes No. 125 and the Municipal District of Woodlands No. 15, to bring about an understanding of the operations of the Centre to regional residents concerned about the Application.

8. The Operator shall implement reasonable steps satisfactory to Alberta Environmental Protection that will further reduce emergency venting episodes, to a level of service more appropriate for a hazardous waste treatment facility, due to power interruptions controllable by the Operator.

9. The Operator shall take reasonable steps to ensure that the transportation of hazardous wastes to the Treatment Centre from Canadian jurisdictions is to a standard that would be equivalent to those adopted by the Operator for transportation of Alberta hazardous wastes.

10. The Operator shall establish within its accounting procedures, in a manner acceptable to the Alberta Special Waste Management Corporation as authorized in a new bylaw of the Corporation approved by the Lieutenant Governor in Council, a means of ensuring that system contributions are not, and do not become associated with the treatment of wastes from other Canadian jurisdictions.

11. The Operator shall, in a manner acceptable to the Alberta Special Waste Management Corporation as authorized in a new bylaw of the Corporation approved by the Lieutenant Governor in Council:

a) separately account for the revenues and costs associated with the collection, transportation, treatment and disposal of wastes from other Canadian jurisdictions including the respective portions of management fees charged by it under the various agreements with the owners, and

b) report clearly and accurately such revenues and costs to the Corporation in a manner that would be of assistance to the Auditor General in reviewing the expenditures of the Corporation.

12. The Operator shall comply with all approvals required pursuant to the *Alberta Environmental Protection and Enhancement Act* issued by Alberta Environmental Protection, and with all other applicable regulations and standards of the Province of Alberta.

Made at the City of Edmonton, in the Province of Alberta, this day of , 1994.

NATURAL RESOURCES CONSERVATION BOARD

APPENDIX B
FORM OF APPROVAL

IN THE MATTER of an Application by Chem-Security (Alberta) Ltd. for the receipt by the Alberta Special Waste Management System of any hazardous wastes properly consigned to it from other Canadian jurisdictions for treatment at the Alberta Special Waste Treatment Centre

APPROVAL NO. 6

WHEREAS the receipt by the Alberta Special Waste Management System of any hazardous wastes properly consigned to it from other Canadian jurisdictions for treatment at the Alberta Special Waste Treatment Centre is a reviewable project under S. 4(f) of the *Natural Resources Conservation Board Act* being chapter N-5.5 of the Statutes of Alberta, 1990; and

WHEREAS the Natural Resources Conservation Board is prepared to grant the Application by Chem-Security (Alberta) Ltd. for the reviewable project, subject to the conditions herein contained and the Lieutenant Governor in Council has given authorization, hereto attached.

THEREFORE, the Natural Resources Conservation Board hereby orders as follows:

1. The reviewable project for the receipt by the Alberta Special Waste Management System of any hazardous wastes properly consigned to it from other Canadian jurisdictions for treatment at the Alberta Special Waste Treatment Centre as described in Application 9301 dated March 15, 1994 and descriptive material supporting the Application marked as exhibits at the hearing by the Board on May 16, 1994 and from June 27, 1994 to July 19, 1994, including undertakings of Chem-Security (Alberta) Ltd. as the current operator of the Alberta Special Waste Management System, hereinafter called "The Operator", is approved subject to the terms and conditions herein contained.

2. The Operator shall place a priority on the treatment of Alberta hazardous wastes through adoption of an Alberta First policy acceptable to Alberta Special Waste Management Corporation as authorized in a new bylaw of the Alberta Special Waste Management Corporation approved by the Lieutenant Governor in Council.

3. The Operator shall provide to the satisfaction of Alberta Environmental Protection a revised assessment of the effects of maximum pentachlorophenol emissions based on the design capacity of 2660 kg/hr and Destruction and Removal Efficiency performance data for the FB&D kiln and for the C.E. Raymond kiln if it will be used to incinerate pentachlorophenol.