

**FRASER RIVER
ACTION PLAN**



**COMPLIANCE
STATUS
SUMMARY REPORT
for the
FRASER RIVER
BASIN**

1993-1994



**CANADA'S GREEN PLAN
LE PLAN VERT DU CANADA**

Canada

DOE FRAP 1994-95 ⁰⁴



**Environment
Canada**

**Environnement
Canada**

**COMPLIANCE STATUS
SUMMARY REPORT**

for the

**FRASER RIVER BASIN
in
BRITISH COLUMBIA
Fiscal Year 1993-1994**

DOE FRAP 1994 - 05

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MAIA Publishing Ltd.**

for

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NOTICE - WARNING LETTERS

This report includes reference to the issuance of Warning Letters under both the *Canadian Environmental Protection Act* and the federal *Fisheries Act*. The criteria for the issuance of Warning Letters under CEPA are described in the *CEPA Enforcement and Compliance Policy* as follows.

Warning Letters

Inspectors may use warnings

- » when they have reasonable grounds to believe that a violation of the Act is continuing or has occurred
- » when the degree of harm or potential harm to the environment, human life or health appears to be minimal

When deciding whether to use warnings or more severe enforcement action, inspectors may also consider the following:

- » whether the individual, company, or government agency has a good history of compliance with the *Canadian Environmental Protection Act*, and with provincial regulations deemed by Order-in-Council to be equivalent to those under the federal Act; and
- » whether the individual, company, or government agency has made reasonable efforts to remedy or mitigate the consequences of the alleged offence or further alleged offences.

Warnings will always be given in writing. When absolutely necessary, however, inspectors may initially give a warning verbally. This is to be followed as soon as possible by a written warning.

The written warning will contain the following information:

- » the section of the Act or regulations involved
- » a description of the alleged offence
- » if appropriate, a time limit within which the person, company, or government agency must comply with the warning
- » the statement that if the warning is not heeded, enforcement officials will take further action

Warning Letters are not a conviction by a court of law.

EXECUTIVE SUMMARY

Canadians are expressing an increased commitment to environmental sustainability and to protecting our natural and human resources. Environmental legislation, regulations, and guidelines set out ways in which these goals can be achieved, while inspections, enforcement, compliance monitoring, and data auditing activities help to ensure that they are.

The Environmental Protection Branch (EP) of Environment Canada, Pacific Region, operates throughout British Columbia. EP has a specific focus on the Fraser River basin, Canada's fifth largest river basin. Nearly 65 percent of British Columbia's population lives and works in the Fraser River basin, where over 75 percent of the industrial activity of the province occurs. As well, the basin is a primary agricultural region for the province.

Pollution, habitat destruction, and urban development have already put the river and its watershed under stress. As the population continues to grow, demands on the river and competition for land and resources within the basin will continue to increase. These factors point out the need for coordinated programs to ensure compliance with environmental regulations.

Fraser River Action Plan

In June 1991, the Fraser River Action Plan (FRAP) was announced as an initiative of the federal departments of Environment and Fisheries and Oceans. The Plan was given six years to "protect, restore, and clean up the Fraser River and its vast basin" and to help maintain the basin's ecological balance for the health and benefit of present and future Canadians.

Initially, FRAP set two major objectives:

- » to reduce by 30 percent the discharge of environmentally disruptive pollutants entering the Fraser River basin by 1997, and
- » to significantly reduce the release of persistent toxic substances into the waters of the basin by the year 2000.

Today, the Plan has developed into a community-wide force for achieving the following objectives:

- » to arrest and reverse the existing environmental contamination and degradation of Fraser River ecosystems by developing targets and strategies to reduce pollution, and by significantly reducing the discharge of persistent toxic substances into the Fraser River;
- » to restore and enhance the environmental quality and natural productive capacity of the Fraser's ecosystems and to return salmon populations to historic levels of abundance;
- » to build partnerships with provincial and local governments, aboriginal and community groups, environmental organisations, industry and labour, and other stakeholders to develop a cooperative management program for the Fraser River basin based on the principles of sustainability.

Enforcement of laws and regulations is a key program of both Environmental Protection and the Fraser River Action Plan. Inspections, investigations, laboratory analyses, prosecutions, and public and agency compliance promotion activities are often jointly carried out by EP and FRAP.

Legislative Authority

The *Canadian Environmental Protection Act* (CEPA) and the federal *Fisheries Act* give legislative authority for the inspection and enforcement activities of the Environmental Protection Branch. The Inspections Section receives its mandate from these two pieces of federal legislation and associated regulations and guidelines.

The Inspections Section has a vital role in supporting the objectives of FRAP and has the responsibility to assess compliance with CEPA and the pollution provisions of the *Fisheries Act*. Inspections Section performs a number of activities to promote environmental protection, including:

- » developing and maintaining a number of databases for monitoring purposes
- » monitoring toxic and regulated substances
- » developing inspection checklists
- » performing site inspections and compliance assessments

- » examining suspected violations of regulations
- » initiating investigations
- » sponsoring compliance promotion, information workshops, and educational activities for the public and specific industrial sectors
- » publishing annual compliance status reports

Inspections Section has also initiated a number of cooperative programs with other federal agencies (e.g., Department of Fisheries and Oceans, Canada Customs, RCMP, Canadian Coast Guard), and with provincial agencies, notably the BC ministries of Environment; Agriculture, Fisheries and Food; and Health.

National Inspection Plan

In 1990-91, the National Inspection Plan (NIP) was introduced as an annual work plan to identify the quantity and types of inspections and monitoring activities to be carried out each year.

NIP began a target-oriented approach to make the best use of available resources. Priority regulations were identified at the national level and regional inspection plans were developed in the context of national priorities and regional issues.

Strategic Approach

The strategic approach taken by the Inspections Section for programs in the Fraser River basin, in concert with NIP and FRAP, is to focus on:

- » identification of priority substances and their regulation
- » development of regional inspection plans
- » identification of significant polluters and patterns of noncompliance
- » development of data and information management systems
- » setting laboratory requirements
- » determining specific training needs

Compliance Status Reporting

This *Compliance Status Summary Report for the Fraser River Basin 1993-94* provides an overview of the level of compliance with environmental statutes of the *Canadian Environmental Protection Act* and the *Fisheries Act*, and the various regulations and guidelines developed under these Acts.

The Report gives details of the enforcement actions taken as a result of inspections in the Fraser River basin during fiscal year 1993-94. It presents the compliance verification mechanisms used, the status of compliance and degree of implementation for the particular Act or regulation, and describes the enforcement actions that may have been employed. Not all facilities and sites are inspected. Monitoring and auditing company-submitted data are some of the methods used to assess compliance.

For fiscal year 1993-94, British Columbia and Yukon Region Inspections Section staff targeted 12 inspection programs and conducted 232 inspections under the Canadian Environmental Protection Act (CEPA). Inspections staff also carried out or jointly sponsored a number of compliance promotion activities, primarily on the proposed amendments to the *Chlorobiphenyls (PCB) Regulations* - sensitive sites programs (schools) and on the *Ozone-Depleting Substances Regulations*.

Nine inspection programs were targeted under the authority of the federal *Fisheries Act*, and a total of 90 inspections were conducted. Two major areas of focus were municipal sewage treatment systems and pulp and paper mills.

Summary of Inspection Programs

CEPA Programs

- » *Storage of PCB Material Regulations* - Six facilities in the Fraser River basin were inspected, representing 6 percent of the 93 sites registered in British Columbia. Half (50%) were found in compliance. One Warning Letter was issued, one pollution abatement order was issued, and one was under provincial permit and dealt with by the BC Ministry of Environment. In addition to the inspections, EP jointly sponsored an Environmental Management Workshop on PCBs and ozone-depleting substances for private industry and other government agencies.
- » *Chlorobiphenyls Regulations* - EP examined PCBs in paint pigments, inspected an alleged PCB spill, and focussed on schools in the Lower Mainland. Sixty schools in 12 school districts were inspected, including independent schools. Public schools were found 93 percent in compliance; no PCB equipment was found at the independent schools. Contingency planning, inventory management, and staff awareness were deemed

generally weak. Compliance promotion activities were carried out, with a high degree of attendance by school personnel.

- » *PCB Treatment and Destruction Regulations* - One decontamination project was inspected in the Fraser River basin: Neptune Bulk Terminals in North Vancouver. The audit sample result contained a PCB concentration of less than 2ppm (within the regulated limit).
- » *Ocean Dumping Regulations-CEPA Part VI* - EP focused its inspection program on verifying compliance with ocean disposal permits issued by Environment Canada to determine whether permitted activities were carried out as stipulated. Twenty-four, or nearly 50 percent of the projects approved, were inspected. The compliance rating was 96 percent.
- » *Pulp & Paper Mill Effluent Chlorinated Dioxins and Furans Regulations* - Four mills that use a chlorine bleaching process were identified in the Fraser basin. All were within the limits specified for dioxins; the total discharge of dioxins had decreased by 98 percent from 1990 to 31 March 1994. There were six exceedances of furans at one of the mills in 1993 (prior to the regulations coming into effect), and four exceedances in 1994. The total discharge of furans has decreased by 85 percent since 1990. The mills that continued to exceed the regulated limit after 31 December 1993 are currently being assessed for compliance, and any necessary enforcement action will be undertaken after completion of these assessments.
- » *Pulp & Paper Mill Defoamer and Woodchip Regulations* - Eight mills in the Fraser basin come under the regulations. All mills were in compliance and there was no enforcement action required.
- » *Ozone-Depleting Substances Regulations* - Three companies were inspected under ODS #1. Two were in compliance, for an overall rating of 67 percent. One company received a Warning Letter. Three bulk halon importers were inspected under ODS #2. One was found in violation of the regulations and was charged with five counts of illegal importation. ODS #2 had an overall compliance rating of 67 percent. Under ODS #3, 75 establishments in the lower mainland and Kelowna were inspected. Fifteen products for sale at 12

retail outlets were found to be in contravention of the regulation, for an overall compliance rating of 84 percent. Each company was sent a Warning Letter. There was no inspection program for ODS #4, which came into effect in August 1993.

- » *Secondary Lead Smelter Release Regulations* - The one facility in the Fraser basin was only intermittently operational during the reporting period and was not required to do emission testing this period.
- » *Contaminated Fuel Regulations* - Four facilities were inspected, of which one was in the Fraser basin. All were in compliance.
- » *Gasoline Regulations* - Only one facility was inspected in the Fraser basin. Compliance was 100 percent.
- » *Export and Import of Hazardous Wastes Regulations* - Four border inspections were conducted. Three were in compliance and one lacked documents, but these were obtained. Twenty-seven marine shipments were inspected and one was found out of compliance; action is pending. Twenty hazardous waste importers or exporters were inspected. All but one were found in compliance. Enforcement action is pending.
- » *Phosphorus Concentration Regulations* - Environmental Protection collected 65 laundry detergent samples at 22 establishments. Four exceeded the permissible concentration of phosphorus pentoxide, but two of these were within the margin of error. Overall compliance was 98 percent, but at least a dozen products need to be re-tested.

Fisheries Act Programs

- » *Municipal Sewage Treatment Plants* - This two-year study focused on ten municipalities in the Fraser basin. Forty inspections were carried out, of which 23 were in compliance, for an overall rating of 58 percent, although four sites were generally in high compliance. A number of municipalities were referred to the Fraser Pollution Abatement Office for assistance and follow-up.
- » *Antisapstain Facilities* - A Code of Good Practice was developed to provide recommendations for workers' health and safety, and for the storage, transportation, use, and disposal of chlorophenates. Two wet-weather inspections were

conducted, and samples of lumber leachates and yard stormwater runoff were collected for chemical and toxicity analyses. These have not yet been completed.

- » *Wood Preservation Facilities* - Six facilities in the Fraser basin were inspected during wet weather conditions. Water and sediment samples were collected, but the data has not yet been analysed.
- » *Wood Waste* - Four site inspections were carried out as part of the development of an inspection protocol. No samples were collected. An investigation from the previous reporting period that resulted in charges is currently before the courts.
- » *Metal Mining Liquid Effluent Regulations and Guidelines* - Seven metal mines are located in the Fraser basin. Five are regulated under the MMLER and two under the MMLEG. Four mines were inspected and three were non-operating during this reporting period. All were in compliance with either the MMLER or MMLEG.
- » *Petroleum Refinery Liquid Effluent Regulations and Petroleum Refinery Effluent Guidelines (PREG)* - There are four operating refineries in the Fraser River basin, and all are regulated by the PREG. All submitted process and stormwater effluent monitoring data. Excursions were noted in 5 percent of 1,014 analyses for process effluent, and in .6 percent of 742 analyses for stormwater effluent. Although review of refinery monitoring data showed noncompliance with some of the guidelines objectives, no enforcement actions were undertaken.

- » *Pulp & Paper Effluent Regulations* - There are ten pulp and paper mills in the Fraser River basin. Monitoring data submitted by the mills was reviewed by EP inspectors. Overall compliance rating to the technical and administrative requirements of the PPER ranged between 89 percent and 100 percent. A Warning Letter was issued to one mill for noncompliance with section 8.1 of the PPER. Acutely lethal effluent regulations were monitored, and two Fraser mills reported *Daphnia magna* failures. One of these also failed a rainbow trout toxicity test. There were 20 days of unauthorized discharge of ALE from Fraser mills. A Warning Letter was issued by the BC Ministry of Environment to the company having 15 days of ALE discharge. Continued reductions in the discharge of BOD and TSS are due to increased standards and the completion of effluent treatment systems at Fraser basin pulp and paper mills.

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**Appendix 5 was produced on microfiche and is
only available in hard copies**

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1.0 INTRODUCTION

1.1 Background

From its headwaters high in the Park Ranges of the Rocky Mountains to its mouth at the Strait of Georgia, the Fraser River flows a length of nearly 1,400 km. Throughout its journey, a tremendous network of lakes and tributaries -- including Stuart, Ootsa, Eutsuk, Quesnel, Chilko, Shuswap, and Harrison lakes, and McGregor, Nechako, Blackwater, Bowron, Chilcotin, Lillooet, Harrison, Chilliwack, and Coquitlam rivers, plus all the rivers and lakes in the Thompson system -- feeds the Fraser River and connects the life within its sphere of influence.

Throughout its reaches, 13 of the 14 major ecosystems and climatic zones of the province are represented. These numerous ecosystems and tributary watersheds together make up the Fraser River basin, a drainage that covers 25 percent of the province of British Columbia, is the fifth largest river basin entirely within Canada, and is one of our country's most extensive and productive biological systems.

After being compressed through the Fraser Canyon north of Hope, the river widens at the coastal plain as it passes through the fertile Fraser Valley to the sea. Here, the silt-laden fresh water meets the Strait of Georgia and forms an immense delta that pushes well past the margin of salt water.

The Fraser River flows through a mosaic of landscapes and habitats that support internationally significant populations of fish and wildlife, including migratory birds and waterfowl. At least 40 species of fish inhabit the Fraser, including all five species of Pacific salmon; cutthroat, steelhead, and rainbow trout; Dolly Varden char; and sturgeon, one of the world's oldest species of fish. The Fraser River system has historically produced more salmon than any other river system in the world.

This vast and diverse watershed is a focus for human settlement and industrial growth of the province, in which nearly two million people - about 65 percent of BC's population - live, work, and play, and where

over 75 percent of the industrial activity of the province occurs. The Fraser River basin supports 48 percent of BC's commercial forest area, 60 percent of its metal mining operations, and nearly 45 percent of its farmland. The lower portion of the basin is one of the most productive agricultural areas in Canada. Tourism and outdoor recreation are also significant contributors to the economy of the basin. The Fraser River basin accounts for 80 percent of the gross provincial product and 66 percent of total household income.

The river connects the land to the plants, animals, and people living in the Fraser River basin, but it also has the potential to transport any environmental contaminants that may be introduced into the basin. Over 50 percent of industrial discharge volumes in the watershed comes from pulp mills in its northern interior, and about 95 percent of municipal waste discharge volumes comes from the cities and towns in its lower reaches.

With growing populations and increasing demands on the resources within the Fraser River basin, the protection of its environmental integrity has become one of government's chief priorities. Protection of the environment depends on a number of things: knowledge and public education, effective legislation, and compliance and enforcement. Compliance and enforcement activities are important because they help promote environmental standards and industrial and commercial practices that lead to sustainable resource use.

1.2 Legislative Authority

1.2.1 Canadian Environmental Protection Act (CEPA)

The *Canadian Environmental Protection Act* [1] was proclaimed on June 30, 1988. It is jointly administered by Environment Canada and Health & Welfare Canada. The Act incorporates parts (or all) of earlier statutes, including the *Clean Air Act*, the *Ocean Dumping Control Act*, the *Environmental Contaminants Act*, and the nutrient provisions of the *Canada Water Act*.

After CEPA came into force, the existing regulations from these Acts were rolled over and re-issued as regulations under CEPA. The remainder of the *Canada Water Act* remains in force, while the other three Acts were repealed.

CEPA gives the federal government broad powers to protect Canadians and the natural environment. It is divided into six parts.

Part I enables the Minister of Environment and the Minister of Health to give long term direction to environmental protection activities through research, monitoring, and federal-provincial cooperation in the establishment of objectives, guidelines, and codes of practice.

Part II promotes control over toxic substances throughout their life cycles and enables the compilation, amendment, and publication of a number of lists of toxic substances, including the Priority Substances List and the Domestic Substances and Non-domestic Substances lists. This part of CEPA allows the ministers to gather information on substances, assess their toxicity, and issue regulations to control the substances determined to be toxic or capable of becoming toxic according to criteria established in the Act.

Part III allows for the development of regulations to control the concentration of nutrients in cleaning agents and water conditioners for the purposes of limiting or preventing the eutrophication of lakes and rivers.

Part IV applies to federal departments, agencies, Crown corporations, works, undertakings, and lands. It enables the development of guidelines or regulations to control pollution from federal operations.

Part V applies to international air pollution. It sets out the conditions under which the ministers can recommend regulations to control Canadian sources of air pollution that affect another country.

Part VI prohibits disposal at sea unless specifically permitted. Applications are required to obtain permits and a number of conditions must be met. Certain substances cannot be dumped at sea; others have restrictions attached to them, such as allowable concentrations. Locations of dump sites and disposal methods are also controlled.

1.2.2 *Fisheries Act*

The Department of Fisheries and Oceans (DFO) is responsible for Canadian fisheries; it relies largely on the *Fisheries Act* [2] to carry out its mandate.

Under an administrative agreement with DFO, Environment Canada has primary responsibility for the pollution prevention aspects of the *Fisheries Act*. These include subsection 36(3), which prohibits the deposit of substances deleterious to fish in waters frequented by fish; subsection 36(4), which permits the deposits authorised by a regulation; and subsection 36(5), which describes the types of regulations that can be drafted.

Under subsection 36(5), regulations can be enacted that prescribe deleterious substances authorised for deposit, waters where they may be deposited, the operations pertaining to the authorised deposits, the quantities or concentrations of deleterious substances authorised for deposit, other conditions, and the persons who may authorise deposits.

Other sections provide power to inspect, request plans and specifications, and develop interim orders with respect to operations depositing deleterious substances.

1.3 Program Mandate

Environmental Protection (EP) of the Pacific and Yukon Region has consolidated enforcement programs under the Enforcement and Emergencies Division in order to more effectively implement the region's enforcement efforts. The Inspections Section of this Division is responsible for conducting all compliance verification inspections under the *Canadian Environmental Protection Act* (CEPA) and the *Fisheries Act*.

Inspections under CEPA are carried out to verify compliance with the entire Act. This includes compliance with the Act, any regulations, inspectors' directions, warnings, injunctions, Ministerial or Court Orders, and Interim Orders under the Act.

Inspections under the *Fisheries Act* are carried out to verify compliance only with the pollution provisions of that Act. Regulations are also made to permit the deposit of certain substances, or certain quantities of deleterious substances under certain conditions. Inspectors inspect regulated and other facilities where they have reason to believe that deleterious

substances may be, or may have been, deposited in waters frequented by fish.

The Environmental Protection Branch in Environment Canada enforces CEPA according to the *Enforcement and Compliance Policy for CEPA* [3]. A similar draft policy is being prepared for the *Fisheries Act*. These policies provide guiding principles for enforcement officials to examine every suspected violation of which they have knowledge and to take appropriate action as necessary for the violator to achieve compliance with both Acts.

1.3.1 Fraser River Action Plan

In summer 1990, Canadians across the country met to discuss environmental concerns. Canada's Green Plan was formulated as a result of those public meetings. The Fraser River basin in British Columbia was identified as having significant environmental, social, and economic importance.

Subsequently, the Fraser River Action Plan (FRAP) was initiated as a program of the Green Plan in June 1991 to "clean up pollution, restore the productivity of the natural environment, and put in place a management program to ensure the basin's sustainability." The Fraser Pollution Abatement Office (FPAO) is part of this initiative.

In concert with FRAP and FPAO, Environmental Protection has focused geographically on the Fraser River basin through enhanced enforcement effort on facilities considered to be major dischargers to the river and its tributaries.

An overall goal of FRAP is to reduce by 30 percent the discharge of environmentally disruptive pollutants entering the basin by 1997, and to significantly reduce the release of persistent toxic substances into the basin's waters by the year 2000. The pollution abatement component of FRAP will rely on the inspection, compliance, and enforcement processes of the Inspections Section to help achieve its goals.

In fact, enforcement plays a vital supporting role to the objectives of FRAP. Enforcement backs up the pollution abatement and scientific inventory activities of this initiative with inspections in order to ensure compliance with the laws and regulations. One of FRAP's goals is to achieve 90 percent compliance with environmental legislative requirements through cooperative programs with provincial and other federal enforcement agencies.

In the first few years of FRAP, enforcement focused on measuring compliance and on determining sources of pollution from unregulated activities with a view to developing guidelines and codes of practice. DOE carried out close to 300 inspections in the Fraser River basin at municipal treatment plants, pulp and paper mills, metal mines, and wood preservation and treatment facilities, as well as at hazardous waste storage sites and vendors of fuel and ozone-depleting substances. In addition, dredging activities for materials destined for ocean dumping and ocean-dumping sites were inspected. The results were encouraging: an 82 percent compliance rate across the board. However, a number of inspections revealed significant violations.

During the second half of FRAP's mandate, activities will focus on pollution problems that are not specifically covered under regulations. Through the work of the Inspections Section, in concert with the Fraser Pollution Abatement Office and provincial and regional district agencies, there is increased information on these unregulated sources of discharge, such as the wood preservation and wood waste industries. Codes of practice, guidelines, and compliance checklists are either now in existence or will be shortly. Inspections will target the worst polluters with guidance from the pollution abatement and environmental quality programs.

In addition to this Fraser Basin Compliance Status Summary Report, Inspections Section has also published a *1993-94 Compliance Status Summary Report for British Columbia*.

1.3.2 Cooperative Programs

The Inspections Section has initiated a number of cooperative inspection programs with other agencies, including the Department of Fisheries and Oceans (DFO), the Canadian Coast Guard, Royal Canadian Mounted Police (RCMP), and Canada Customs, and operates a 24-hour On-Call Inspector System to respond to inspection needs.

The Section works closely with the Emergencies Section, the Investigations Section, and with the Pollution Abatement Division of Environment Canada, as well as with provincial agencies (e.g., BC Environment and the Ministry of Health) and regional district agencies (e.g., Greater Vancouver Regional District).

1.4 Strategic Direction

The strategic approach taken by the Section is to implement targeted inspections of significant polluters in the Fraser River basin. An important focus of the Section is the development of data and information management systems that will provide readily accessible data on source compliance status. These allow inspectors to look at patterns of non-compliance within or across environmental programs and assist in targeting geographic-, industry-, company-, facility-, or pollutant-specific sources based on compliance status, compliance history, or environmental risk profile.

1.4.1 National Inspection Plan

The National Inspection Plan (NIP) was introduced in 1990-91 as an annual work plan to identify the quantities and types of inspections and monitoring activities to be carried out each year.

In 1991, the National Inspection Plan was refocused to offer a target-oriented approach. Priority regulations were identified at the national level and regional inspection plans were developed in the context of national priorities and regional issues. A broad consultation process was developed to enable regional and headquarters officials to set priorities, determine laboratory requirements and specific training needs, and tailor individual regional inspection and compliance promotion programs.

1.5 1993-94 CEPA Inspections Program

In fiscal year 1993-94, Pacific and Yukon Region Inspections Section targeted 12 inspection programs and conducted 232 inspections under CEPA for the Fraser River basin. Inspections staff also carried out or jointly sponsored a number of compliance promotion activities, primarily on the *Ozone-Depleting Substances Regulations* and on the *Chlorobiphenyls (PCB) Regulations* at sensitive sites, including schools and health care facilities.

Figure 1.1 shows the level of effort of inspections conducted in the Fraser River basin under programs specific to CEPA and the regulations. Four additional CEPA inspection programs demonstrated no activity for the following reasons:

- » *Ozone-Depleting Substances Regulations #4* (*Tetrachloromethane [Carbon Tetrachloride]* and

1,1,1-trichloroethane [Methyl Chloroform]) (ODS#4): There were no inspections because there was no activity under this new regulation, which came into force in May 1993.

- » *New Substances Regulations #1*: This was in the Canada Gazette Part II on April 6, 1994, and was therefore not in effect for this reporting period.
- » The *PCB Waste Export Regulations* and the *Toxic Substances Export Notification Regulations* are both conducted on an as-required basis. Because there were no activities reported during this fiscal period, there were no inspections.

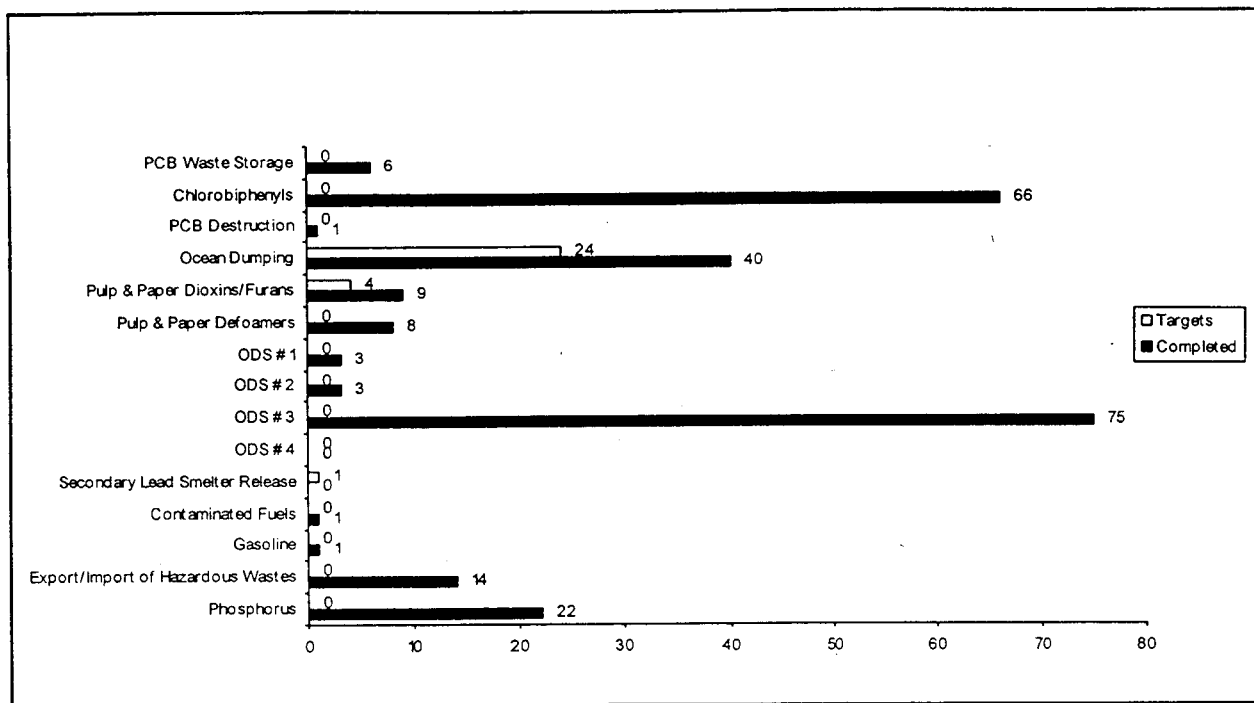
1.6 1993-94 Fisheries Act Inspections Program

For fiscal year 1993-94, Inspections Section staff targeted nine inspection programs and conducted 90 inspections within the Fraser River basin under authority of the *Fisheries Act*. In addition, various company-submitted data were reviewed and audited. Figure 1.2 shows the level of effort of inspections conducted under programs specific to subsections 36(3), (4), and (5), and the general pollution prohibitions of the federal *Fisheries Act*, including the regulations. Two of the major areas of focus within the Fraser River basin were municipal sewage treatment systems and pulp and paper mills.

Of the nine inspection programs conducted for the 1993-94 reporting period, three (municipal sewage treatment plants, wood preservation chemicals, and pulp & paper effluent) met or exceeded the NIP target levels.

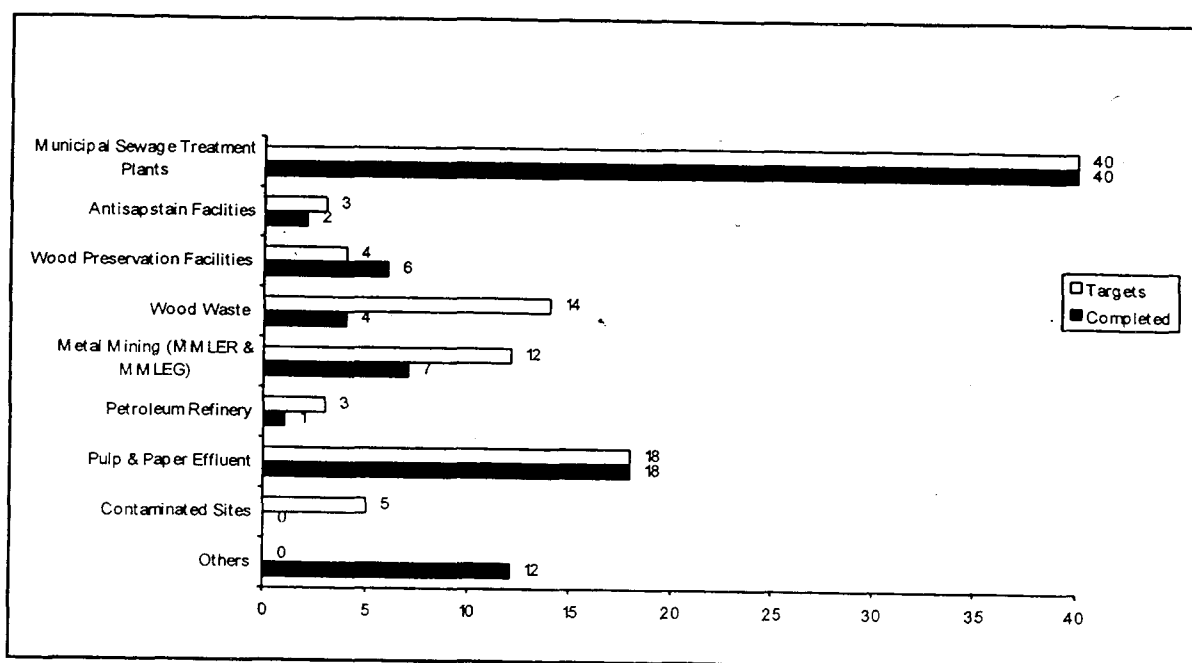
Inspections of contaminated sites is an unpredictable, ongoing program throughout the reporting period and, therefore, a target cannot be set. Likewise, "Others" (in Figure 1.2) refers to inspections done outside the NIP. These were conducted under subsection 36(3) of the *Fisheries Act* as the result of spills, complaints, tips, or reports of accidents. Because these latter two programs are unpredictable, they are unquantifiable for the National Inspection Plan targets.

Figure 1.1 CEPA Inspections Effort for the Fraser River Basin for FY 1993-94



CEPA Regulation	Target	Completed
PCB Waste Storage	0	6
Chlorobiphenyls	0	66
PCB Destruction	0	1
Ocean Dumping	40	24
Pulp & Paper Dioxins/Furans	4	9
Pulp & Paper Defoamers	0	8
ODS #1	0	3
ODS #2	0	3
ODS #3	0	75
ODS #4	0	0
Secondary Lead Smelter Release	1	0
Contaminated Fuels	0	1
Gasoline	0	1
Export/Import Hazardous Wastes	0	14
Phosphorus	0	22

Figure 1.2 Fisheries Act Inspections Effort for the Fraser River Basin for FY 1993-94



Fisheries Act/Regulations	Target	Completed
Municipal Sewage Treatment Plants	40	40
Antisapstain Facilities	3	2
Wood Preservation Facilities	4	6
Wood Waste	14	4
Metal Mining (MMLER & MMLEG)	12	7
Petroleum Refinery	3	1
Pulp & Paper Effluent	18	18
Contaminated Sites	5	0
Others	0	12

2.0 STORAGE OF PCB MATERIAL REGULATIONS - CEPA

Written/compiled by Emmanuel Mendoza, Inspections Section

2.1 Background

In an area as industrially developed and populated as the southern part of the Fraser River basin, the storage and handling of polychlorinated biphenyls (PCBs) is a priority issue. An Interim Order respecting the storage of PCB material was issued on September 16, 1988, following a fire in St. Basile-le-Grande, Quebec involving PCBs. This environmental emergency resulted in the evacuation of about 3,000 residents and the subsequent removal of contaminated soil. The two situations principally responsible for the fire were (1) uncontrolled access to a PCB-storage site, and (2) inappropriate storage of PCB-contaminated materials. The Interim Order was made to correct these two problems and put in place other measures to ensure secure and environmentally safe storage of PCB wastes.

On August 27, 1992, the Order was replaced by the *Storage of PCB Material Regulations* (SOR/92-507)[23]. These regulations have the same basic requirements as the Interim Order and are intended to ensure the continuation of adequate controls for PCB storage. Inspection activity for fiscal year 1993-94 focused on enforcement of the regulations at storage facilities within the Fraser River basin that had been in existence for quite some time.

2.2 Compliance Verification Mechanism

Enforcement of the regulations was carried out through site inspections at federal facilities on federal lands, at provincial facilities that store PCB materials, and at one private residence within the Fraser basin. Field activities included inspections for the following categories stated in the regulations: access to storage site, type of floor or surface at the site, types of containers, separation of PCB wastes from non-PCB wastes, storage practices and in-house inspections, maintenance of storage areas, fire protection and emergency procedures, existence of contingency plans, labelling requirements, maintenance of records, and reporting requirements.

2.3 Compliance Status

EP conducted inspections at six federally and/or provincially regulated facilities in the Fraser River basin. These represent 6 percent of the total sites registered (93) in the PCB inventory for British Columbia (Figure 2.1). Compliance status is limited to the facilities inspected. Of these six sites, three were found to be out of compliance for some of the criteria listed on the inspection checklist.

Figure 2.1 summarizes the total Fraser River basin PCB storage inspection activity for the 1993-94 reporting period. While 50 percent of inspections showed total compliance, for the remaining 50 percent, compliance ranged from 0 percent to 100 percent for the various criteria in this regulation, for an overall average of 74 percent.

Four of the sites were under provincial permit. One of these was found out of compliance (City of Vancouver Manitoba Works Yard). Also, a private residence in Cloverdale, had a rating of 0% and was issued a pollution abatement order by the BC Ministry of Environment.

The data acquired through these inspections demonstrated that certain requirements of the regulations were being met better than others. In particular, the highest noncompliance was observed in the labelling, maintenance, physical storage, reporting, and record-keeping requirements of the regulations.

All sites were in full compliance by the end of the reporting period.

2.4 Enforcement Action

One Warning Letter was issued to CBC Vancouver relating to labelling, maintenance, and records violations. It was the only federal facility inspected that initially showed noncompliance. Subsequent re-inspection of CBC showed compliance with the regulations.

Figure 2.1 Overall Compliance Status for PCB Waste Storage in the Fraser River Basin

Site Name	Compliance (Y/N)
Ainsworth Lumber Co. Ltd., Lillooet	Y
Cloverdale, Private Residence	N
Petro Canada - Kamloops Distribution Terminals	Y
Canadian Broadcasting Corporation (CBC), Vancouver	N
Arrow Transportation Systems Inc., Richmond	Y
City of Vancouver, Manitoba Yards (Joint Inspection/BCMOE)	N

Four joint provincial/federal inspections were carried out at sites for which the province issues permits, and at one private residence. The results of these inspections are as follows:

- a) A private residence in Cloverdale was jointly inspected with BC Environment inspectors for improper storage of fluorescent lamp ballasts. All categories of the regulations were in violation at this site (access to the storage site, storage requirements, emergency and contingency plan, maintenance, labelling, record-keeping, and reporting). This resulted in a pollution abatement order being issued to the owner of the property to clean up and store the wastes properly.
- b) The Manitoba Works Yard of the City of Vancouver was jointly inspected with BC Environment inspectors. Violations were found for improper labelling, storage of wastes in rusted drums, and for not reporting as per the requirement of the regulations. Noncompliance was handled by BC Environment through a special wastes permit.

These noncompliances were referred to regional BC Environment offices for further action:

The use of administrative mechanisms to address minor violations of the regulations proved to be effective enforcement tools in compelling regulated facilities to achieve compliance. Subsequent re-inspections of the same facilities demonstrated compliance with the regulations.

2.5 Compliance Promotion Activities

On March 19, 1994, Environmental Protection, along with Public Works Canada, sponsored an Environmental Management Workshop on PCBs and ozone-depleting substances for private industry and other government agencies and departments. Some of the topics presented included federal PCB regulations, BC Hydro PCB management, reclassifying and retrofitting PCB transformers, transportation of small quantities of PCBs, and low-level PCB oil decontamination.

As well, EP presented four information sessions to Transport Canada personnel (fire safety officers [April 1993], maintenance [April 1993], electricians [June 1993], and the aviation group [November 1993]) on the *Storage of PCB Material Regulations* and the proposed amendments to the PCB regulations.

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3.0 CHLOROBIPHENYLS REGULATIONS - CEPA

Written/compiled by Emmanuel Mendoza and Meegan Armstrong, Inspections Section

3.1 Background

The *Chlorobiphenyls Regulations* [5] were gazetted on March 13, 1991 (SOR/91-152). The purpose of the regulations is to restrict the use of polychlorinated biphenyls (PCBs) to existing electrical equipment by prohibiting:

- » the import or manufacture of any PCB-filled equipment,
- » the operation of PCB-filled electromagnets in the handling of food or feed, and
- » the use of PCBs as a new filling or make-up fluid in any equipment.

The regulations set a maximum concentration of 50 parts per million (ppm) by weight of PCBs that may be contained in electrical equipment at the time they are imported, manufactured, or offered for sale. They set a rate of 1 gram per day (1 g/d) as the maximum quantity of PCBs that may be released into the environment in the course of commercial, manufacturing, and processing activities involving specified equipment, and a concentration of 50 ppm by weight as a general release prohibition, except for road-oiling purposes, where the limit is 5 ppm.

These regulations are currently undergoing amendment that will place a 2 ppm limit on the concentration of PCBs that may be contained in any existing products, including abandoned underground cables, and any product newly manufactured in or imported into Canada. The phase-out of PCBs in sensitive locations (e.g., feed and food processing facilities, health care facilities, schools up to and including the secondary level, senior citizen homes, potable water treatment plants) will reflect the policy statement made by the Canadian Council of Ministers of the Environment (CCME) in 1989.

Proposed amendments include labelling and reporting requirements for PCB equipment, including Askarel (a PCB trade name). These requirements have been promoted on a voluntary basis until now. In order to have an accurate inventory of PCB equip-

ment (containing 500 g or more of PCBs) and a reliable tracking system, it was necessary to include the requirements in the regulations. The amended PCB regulations are scheduled to come into effect in 1994-95.

3.1.1 Scope of the Inspections

In anticipation of the amended regulations coming into force, EP directed its 1993-94 fiscal year compliance monitoring efforts within the Fraser River basin to the sensitive-site sector, focusing on three major areas and one PCB spill event. EP examined PCBs in paint pigments, inspected schools in the Lower Mainland up to and including the secondary level, and conducted compliance promotion activities with Lower Mainland school districts. EP also inspected other sites, such as lumber mills.

Site inspections focused both on compliance with the *Chlorobiphenyl Regulations* and on assessment of non-regulatory criteria related to PCB risk management, such as:

- » location and condition of equipment,
- » potential for PCB contamination, and
- » measures implemented by the facility for early detection and control of leaks.

3.1.2 Location of PCB Equipment

The rationale for the above criteria is due to concern about the lack of information on the level of use of PCB materials in schools, senior citizens' facilities, health care centres, and other sensitive sites, and is based on the fact that PCB equipment located in sensitive sites will be prohibited because they pose a potential risk to human health.

The inspection survey provided information on whether PCB equipment was located in any areas where any leakage could result in either direct or indirect risk to the users of the facilities.

3.1.3 Condition of PCB Equipment

The condition of PCB equipment was evaluated by inspecting for signs of leakage on outer metal surfaces, gauges, or valves; signs of leakage in catch basins or secondary containment areas; and for signs of physical damage to metal casings.

3.1.4 Degree of Implementation for Early Detection

The Fraser basin inspection program evaluated the measures implemented by the facility for early PCB leak detection and control methods. This included spill and fire contingency plans, employee awareness of PCB hazards, and maintenance of PCB equipment. The inspection survey examined the integrity of floors in the vicinity of PCB equipment, labelling of PCB equipment, security at PCB sites, frequency of inspections by company personnel to detect early signs of problems with PCBs, and secondary containment systems for capacitors and transformers.

3.2 Compliance Verification Mechanism

3.2.1 Paint Pigments

PCBs may be formed as a byproduct during the manufacture of certain types of paint pigments. Under the National Inspection Plan, each region is responsible for sampling five imported paint pigments per reporting period. Environment Canada Commercial Chemicals Branch headquarters supplied the regions with a list of paint pigment brands available across Canada that are most likely to contain PCBs.

Thirteen paint pigment samples collected from outlets located in the Fraser River basin (Cloverdale Paints, Tri-City Paints, Color Your World, Glidden Paints) were analysed by Environment Canada's Prairie and Northern Region Laboratory in Edmonton for PCB contamination. All of the samples registered below the detection limit of 0.1 µg/g.

3.2.2 Public and Independent Schools and School Districts in the Lower Mainland

The Fraser River basin schools inspection program focused on compliance with the *Chlorobiphenyls Regulations* and on non-regulatory criteria related to PCB risk management, such as presence and location of PCB equipment, the availability of a contingency

plan for dealing with PCB emergencies, and the management of PCBs in use and of a PCB waste inventory.

In the public school sector, inspections began by meeting with school district personnel in charge of electrical equipment in the schools. Documentation was requested on transformer oil test results for PCB concentrations for all transformers within the district and on a contingency plan for spill incidents involving in-service PCB equipment. In addition, evaluation of waste management practices for PCB lamp ballast in schools was conducted through interviews with school custodians. The custodians were evaluated on their awareness and degree of concern about PCBs, as well as on their knowledge of the school district's contingency plan, if one existed.

The compliance verification process then continued with site inspections of Lower Mainland schools. Locations within the schools, such as electrical rooms, boiler rooms, transformer vaults, fan rooms, and any other locations that may contain electrical equipment, were inspected. Observed or suspected PCB equipment was noted on the inspection sheet, along with any identifying markings, such as serial numbers and fluid types. If a piece of equipment was thought to be contaminated with PCBs, the school district was requested to provide documentation on the level of PCB concentration in the equipment.

The compliance verification process for independent schools varied somewhat from that held in the public schools. Independent schools do not have a managing body such as a district office, as do public schools, so any documentation requests were conducted at the individual school level. The inspections then proceeded as with the public school process.

3.3 Compliance Status

3.3.1 Paint Pigments

Under the proposed amendments to the PCB regulations, importation and manufacture of paint pigments with PCB concentrations over 25 mg/kg will be prohibited. Environmental Protection HQ in Ottawa had provided the region with a list of brands of paint pigments that are readily available in the Fraser River basin and that are most likely to contain PCBs. No PCBs were detected in any of the samples. The compliance status for this pigment sampling program was 100 percent.

3.3.2 Public and Independent Schools

EP inspected 60 schools covering 12 school districts in the Lower Mainland area of the Fraser River basin (Appendix A1.2). Figure 3.1 shows the number and type of schools with electrical equipment having a PCB concentration greater than 50 ppm. Electrical equipment with PCB concentrations greater than 50 ppm, such as transformers and capacitors, are required to be removed from sensitive sites.

The inspection results showed that the public schools inspected were 93 percent in compliance with the *proposed* amendments to the regulations. Three of the 42 public schools inspected contained 12 transformers with PCB concentrations above 50 ppm (Martha Currie, Surrey SD #36, three transformers; New Westminster Senior Secondary, New Westminster SD #40, six transformers; and Chilliwack Secondary School, Chilliwack SD #33, three transformers).

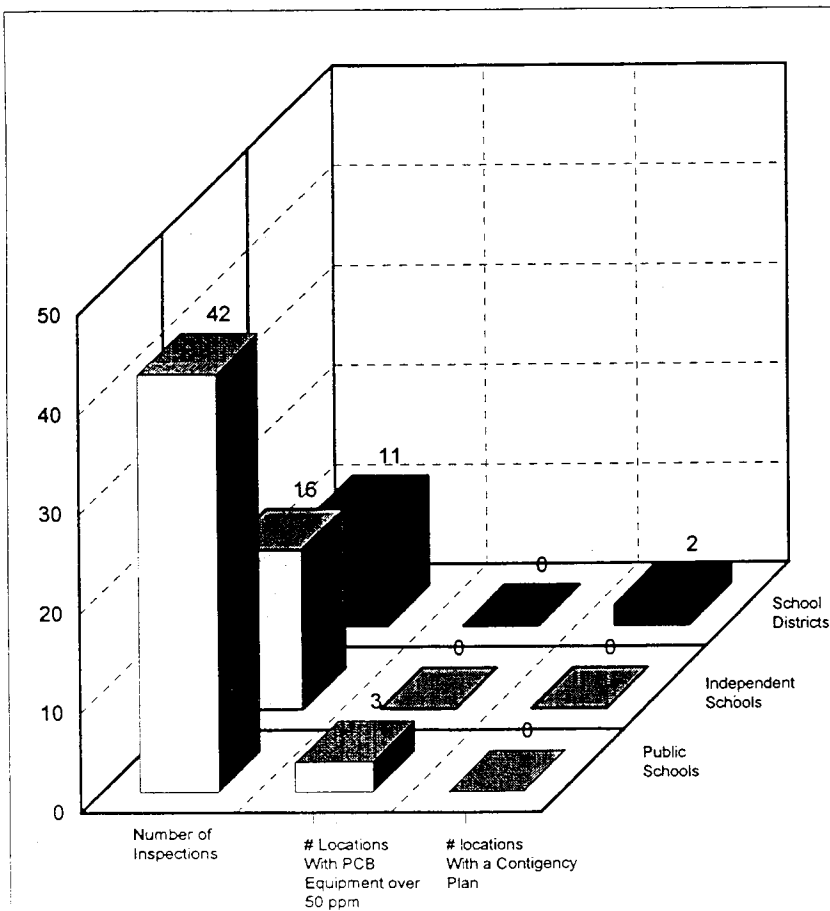
No PCB equipment was found in any of the independent schools.

Assessment of non-regulatory criteria suggested that both public and independent schools had a low degree of implementation in such areas as contingency planning for PCB emergencies, management of PCB waste, and PCB awareness. In the case of the public schools, only two of the 12 school districts (Surrey SD #36 and Mission SD #75) had written contingency plans for PCB incidents. However, inspections of schools within those two districts revealed that these plans had not been disseminated to the school custodian level.

There were no contingency plans found at the independent schools inspected.

PCB equipment inventory management is also deemed weak because the majority of school district contacts, including all independent school contacts, were not aware of the PCB concentrations of their transformers. Transformers found with PCB concentration over 50 ppm had not previously been reported to Environment Canada.

Figure 3.1 Compliance With PCB Regulations for Schools and School Districts



3.3.3 Other Sites

EP inspected two lumber mills in the Fraser basin for alleged PCB spills. At one of these, audit samples turned out to be very low level (below regulated amount) PCBs and were cleaned up to the satisfaction of EP and BC Environment. Two other mills were inspected for alleged illegal sale of PCB equipment. No PCB equipment was found offered for sale at the time of inspection.

3.4 Enforcement Action

Under the proposed amendments to the PCB regulations, the use of certain PCB equipment at sensitive locations will be prohibited. Currently, there are no regulations that require PCBs be taken out of service or destroyed. The Fraser basin sensitive-site inspection program focusing on public and

independent schools and the inspections on paint pigments did not observe any noncompliance with the *Chlorobiphenyls Regulations* and no enforcement action was required. The alleged PCB spill event was resolved and did not require enforcement action.

3.5 Compliance Promotion Activities

Environment Canada believes that promotion of compliance through information, education, and other activities is an effective method to help secure conformity with the law. Under the *CEPA Enforcement and Compliance Policy*, an information meeting was held on January 17, 1994, with lower mainland school districts to review the proposed PCB regulations; these will come into effect for the 1994/95 reporting period.

Nineteen school districts from around the Lower Mainland were invited to attend the meeting. Eleven school districts were represented at the meeting, with personnel ranging from school custodians to school district maintenance superintendents, as well as representatives from the Commercial Chemicals Division of EP and BC Environment (Appendix A1.1).

The information session primarily focused on how the proposed amendments will affect schools through the secondary level. Overviews of the inspection procedure and compliance verification mechanism were presented and discussed. An open question-and-answer period was held.

There seemed to be a general willingness towards compliance, but concerns were raised by some regarding transportation and storage of PCB equipment. Storage space is limited; as well, the availability of funding to deal with the high cost of transport by a certified carrier appears to be a major factor in achieving compliance.

Several individuals felt that before regulations are created or amended, the group to be affected should be consulted so they can suggest means by which they will best be able to comply. The meeting was informed that all new or amended regulations appear in the *Canada Gazette*, a freely available public document, and that the public or regulated sector may appeal new regulations or amendments during the prescribed time period.

Letters were sent to two associations involved with independent schools in the lower Fraser River basin: the Federation of Independent School Associations (FISA), and the Catholic Public Schools of Vancouver Archdiocese (CPSVA). FISA is affiliated with approximately 300 schools, and CPSVA is affiliated with approximately 44 schools. The letters requested their assistance in promoting compliance to the proposed amended regulations and outlined the amendments. It was distributed by both FISA and CPSVA to all their affiliated schools.

A third educational activity was held on March 18, 1994, at Simon Fraser University Downtown Campus. Environmental Protection and Public Works Canada jointly sponsored an Environmental Management Workshop on PCBs and ozone-depleting substances (ODS) for private industry, Crown corporations, and government departments. The workshop presented the proposed amendments to the *Chlorobiphenyls Regulations*, held a panel discussion and concurrent sessions on a range of information, including treatment of PCB-contaminated soil, PCB ballast and transformer reduction, transportation of small quantities of PCBs, low-level PCB oil decontamination, and retrofilling PCB transformers for reclassification.

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4.0 **PCB TREATMENT AND DESTRUCTION REGULATIONS - CEPA**

Written/compiled by Emmanuel Mendoza, Inspections Section

4.1 **Background**

Under the *Mobile PCB Treatment and Destruction Regulations* [16], federal institutions must ensure that an operator of a mobile treatment system or a mobile PCB destruction system under contract to them complies with the requirements of the regulations. These requirements include PCB release limits, ministerial authorisations, and testing of equipment.

The government, in accordance with the Canadian Council of Ministers of Environment (CCME), has directed federal departments to decontaminate stored PCB-contaminated mineral oil (PCB-CMO) as part of the overall national PCB phase-out plan.

For the 1993-94 inspection period, one decontamination project within the lower Fraser River basin was inspected at Neptune Bulk Terminals in North Vancouver. The company, PPM Canada Inc., which performs mobile PCB management, clean-up, and destruction, was to decontaminate 2,168 litres of PCB-CMO having a concentration of 1800 ppm. Based on a 60-day project report submitted by PPM Canada Inc. for this project, the original concentration (1800 ppm PCB) was decontaminated to less than 2 ppm. PPM Canada Inc. drained and flushed the transformer. Clean oil (477 gallons) was replaced in the transformer to allow continued operation.

4.2 **Compliance Verification Mechanism**

EP reviewed the operational data and proposed specific siting requirements to operate the mobile PCB treatment facility on the Port of Vancouver property. EP inspectors conducted site inspections to ensure the facility was operating in accordance with the regulations. This was achieved by verifying records pertaining to federal authorisations and provincial permit approvals on site, and by taking audit samples of the treated oil to analyse for PCBs. The one audit sample result contained a PCB concentration of less than 2 ppm.

4.3 **Compliance Status**

Based on the one inspection this reporting period, which was in compliance, the compliance status is 100 percent.

4.4 **Enforcement Action**

The decontamination operation was in compliance with the regulations, therefore, no enforcement action was required.

4.5 **Compliance Promotion Activities**

Environment Canada, jointly with Public Works Canada, sponsored an Environmental Management Workshop on PCBs and ozone-depleting substances for private industry and other government departments within the Fraser River basin. Topics discussed included treatment of PCB-contaminated soil, reclassifying and retrofitting PCB transformers, low-level PCB oil decontamination, PCB ballast and transformer reduction, and transportation of small quantities of PCBs.

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5.0 OCEAN DUMPING REGULATIONS - CEPA PART VI

Written/compiled by Emmanuel Mendoza, Inspections Section

5.1 Background

The Fraser River brings tons of sediment downriver annually. This sediment is deposited in the lower river and delta area and must be dredged from time to time. A lot of the sediment is sand, and much of it is used for construction purposes. Excess dredged materials that cannot be used must be disposed of. Disposal is often into the ocean at two designated sites west of the mouth of the Fraser River. However, the lower Fraser River basin is British Columbia's most populated and industrialized region and any sediments that have become contaminated, may be unsuitable for ocean disposal. The *Ocean Dumping Regulations* prohibit dumping of contaminated soil and dredge spoils.

The marine waters offshore of Vancouver were targeted for inspection under the *Ocean Dumping Regulations*. This area has the highest demand for disposal of excavation fill and dredge spoils, and those dredging activities that require ocean disposal must be closely regulated.

The federal government has the primary responsibility for the management and protection of marine waters from the effects of disposing wastes at sea. CEPA Part VI regulates the disposal of substances at sea by means of a permitting system that places controls on the loading and disposal operations with respect to timing, location, method of disposal, and other factors.

The *Ocean Dumping Regulations* (SOR/89-500, October 1989) [12] and *Amendment* (SOR/93-433, August 1993) [28], both under Part VI of CEPA, govern the information and format required on permit applications, reports to be completed in the event of emergency dumping, the quantities and concentrations of substances permitted for disposal, and stipulate the fees to be paid with respect to an application. The 1993 amendment reflects new priorities and policies that have evolved with international advances and improved knowledge of environmental effects of ocean disposal. The permit application

process is vital for the adequate protection of Canada's marine environment.

The Regulatory Impact Analysis Statement appended to the 1993 amendment states:

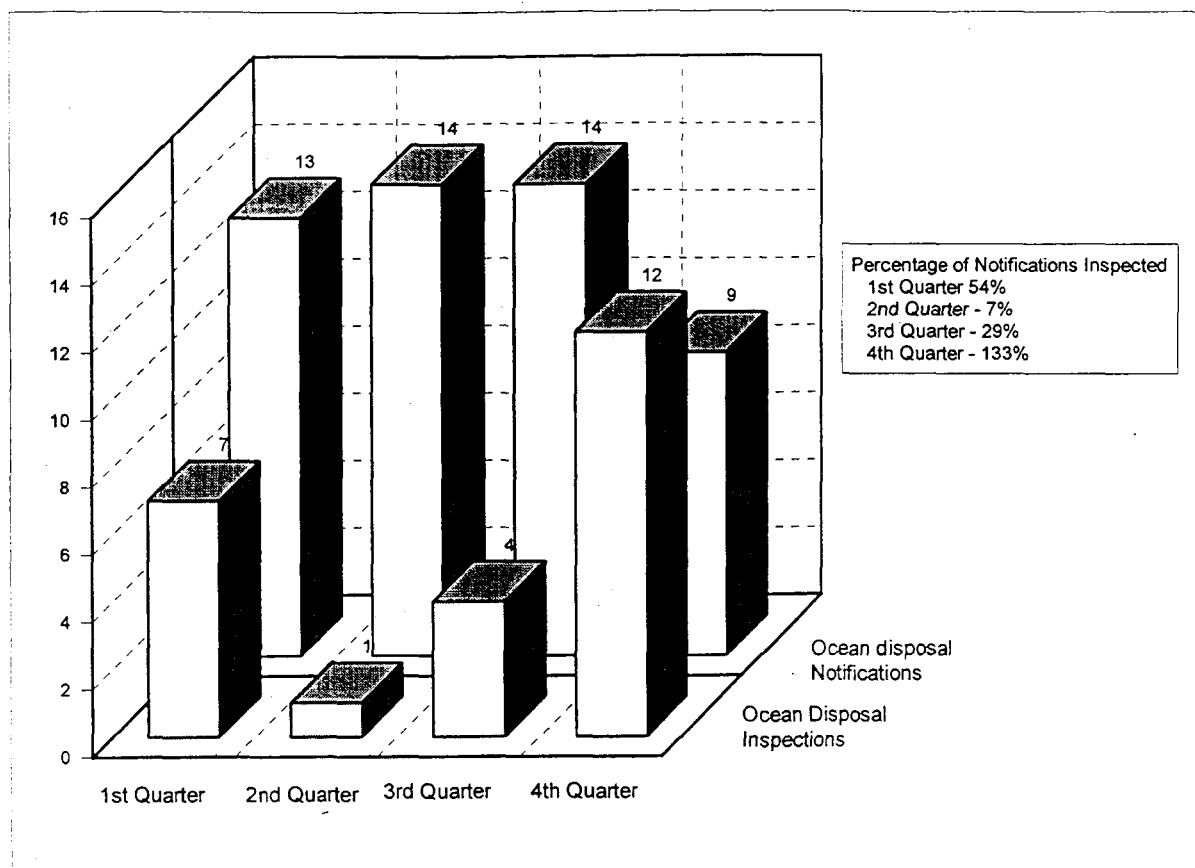
Despite current legislative controls, the practice of ocean disposal as a waste management option generates considerable adverse public reaction, and Environment Canada's Ocean Dumping Control Program is under increasing public scrutiny. The department must be able to justify its permitting decisions and provide assurance to the public that the program is not adversely affecting marine environmental quality. One of the Green Plan initiatives was to consult and participate with stakeholders, including other government agencies, industry proponents, [communities], and environmental groups, to amend the 1988 Ocean Dumping Regulations to reflect increased concerns.

The amendment promotes greater efficiency and soundness of regulatory decisions in permit application adjudication by improving the layout of questions, by requesting more targeted information, and by employing the "user pay" principle to a greater degree (the higher fees are intended to meet the costs of doing business, including carrying out environmental control measures). The amendments represent another step toward better protection of the marine environment. Approximately 200 ocean disposal permits are issued annually Canada-wide, of which about 80 are to government departments. Under the amendment, government departments are subject to the same fee as other applicants.

5.2 Compliance Verification Mechanism

The ocean disposal inspection program for the lower Fraser Basin focused its efforts to verify compliance with ocean disposal permits issued by Environment Canada. The inspections were required to determine whether permitted activities were proceeding as

Figure 5.1 Percentage of Approved Ocean Disposal Projects Inspected in the Fraser River Basin



stipulated in the terms and conditions of the permit. Twenty-four (24) inspections were carried out at sites in the lower Fraser River basin and immediately offshore of Vancouver.

Audit sampling of dredged materials are conducted during site inspections in circumstances where areas approved for dredging are in proximity to contaminated areas. In the past, compliance verification workloads have focused on the loading aspect of the ocean disposal activity. This year, Vessel Traffic Services (VTS) records were reviewed by CEPA inspectors to verify whether disposal operations were being conducted in accordance with vessel position-fixing procedures as required in the permit.

For the fiscal year 1993-94, the Fraser basin inspection program targeted a range of activities, including woodwaste dredging, excavations, and gravel spillage dredging (from cement terminals). Based on the Ocean Disposal Annual Report FY 93-94, this range of activities is representative of the

types of ocean disposal activity conducted in the region.

Figure 5.1 shows the ratio of approved projects inspected (24) to the number of project approvals within the lower Fraser area (50) referred for inspection by the Ocean Disposal Control Office on a quarterly basis. A number of ocean disposal notifications were received by the Inspection Section: 13 (first quarter), 14 (2nd quarter), 14 (3rd quarter), and 9 (4th quarter). During the same quarters, inspectors conducted the following number of inspections in the lower Fraser basin: 7 (1st quarter), 1 (2nd quarter), 4 (3rd quarter), and 12 (4th quarter). Nearly 50 percent of the projects approved by Environment Canada were inspected for compliance with permit conditions (24 out of 50). Projects lasting more than one week, where large amounts of materials destined for ocean disposal were involved, were inspected at increased frequency.

5.3 Compliance Status

An incident involving the loading of excavation materials for the purpose of ocean disposal was investigated. The excavation material that had originated from the 1188 Hornby St. (Vancouver) excavation site was not sampled prior to its being loaded at the Bel Construction ramp in False Creek. Samples were taken at the excavation site and from materials already in the barge. Bel Construction was instructed to proceed after the sample results were reviewed by EP.

The remaining 23 Fraser basin ocean disposal inspections for this period were in compliance (Figure 5.2), for a percentage of 96 percent. In general, ocean disposal activities demonstrated compliance with the requirements of *Ocean Dumping Regulations* and *Amendment*.

5.4 Enforcement Action

One Warning Letter was issued to Bel Construction for failing to meet the notification condition of their permit. Bel was investigated initially for illegal disposal of unsampled excavation material at the Point Grey disposal site.

The 1992-93 Compliance Status Report made reference to charges laid on September 10, 1992, against Island Sea Marine for unlawfully dumping gypsum wastes and failing to report an emergency disposal event to an inspector. On November 22, 1993, Island Sea Marine pleaded guilty to three counts of ocean dumping. The president of the company was fined \$10,000 and prohibited from engaging in any ocean dumping activity for one year and placed on one year unsupervised probation. The successful investigation of this incident was made possible through the concerted efforts of EP, DFO, Vancouver Port Corporation, and CCG Vessel Traffic Services.

Figure 5.2 Compliance With Ocean Dumping Regulations in the Fraser River Basin

Site Name	Compliance
Bel Construction, 1188 Hornby Street	N
Construction Aggregates, Marpole	Y
Miller Contracting, False Creek Ramp	Y
M & B New West Division, FRPD	Y
Bel Construction, Barge Sampling at Kits Buoy	Y
Doman's Vancouver Sawmills	Y
Bel Construction, 1188 Howe Street	N
Bel Construction, False Creek	Y
Tilbury Cement, FRPD	Y
Scott Paper, FRPD	Y
Richmond Plywood, FRPD	Y
Michelangelo, 1055 W. Broadway	Y
Fraser Mills	Y
Bel Construction/Downtown Area	Y
Mill & Timber	Y
McKenzie Seizai, Valley Towing Ltd.	Y
Terminal Forest Products Ltd., FRPD	Y
Columbia Bitulithic, Valley Towing Ltd.	Y
234 E. 5th Avenue, Vancouver, Miller	Y
800 E. Broadway, Vancouver, Miller	Y
Doman's Forest Products, New West., FRPD	Y
Fraser Mills	Y
Fraser Mills	Y
False Creek	Y

6.0 PULP AND PAPER MILL EFFLUENT CHLORINATED DIOXINS AND FURANS REGULATIONS - CEPA

Written/compiled by Peter Krahn, Inspections Section

6.1 Background

Seventy-five compounds make up the family of polychlorinated dibenzo-paradioxins (PCDD), and 135 compounds make up the family of polychlorinated dibenzo-furans (PCDF). Their basic chemical structures look very similar. The number and relative positions of chlorine atoms to the carbon atoms in the substances determine their properties. One compound of each of these two families is regulated: 2,3,7,8-tetrachloro-dibenzo dioxin (2,3,7,8-TCDD) and 2,3,7,8-tetrachloro-dibenzo furan (2,3,7,8-TCDF). These compounds are produced when contaminants in process and feed material used in the production of pulp react with chlorine used in the bleaching process, or when woodwastes contaminated with salt water are burned in power boilers.

Chlorinated organic compounds are highly persistent and have a strong affinity for sediments and a high potential for accumulating in biological tissues (bioaccumulation). They have been found in all components of the biosphere, including air, water, soil, sediments, flesh of animals, and food.

Environment Canada and Health and Welfare Canada have determined that dioxins and furans are toxic substances as defined under CEPA and are capable of harming the environment and human health. A summary of the assessment report was published in Part I of the *Canada Gazette* on March 17, 1990, in which the Ministers of those departments announced they would recommend to the Governor General that:

- » these substances be added to the list of Toxic Substances in Schedule I of CEPA, and
- » the discharge of these substances from pulp and paper mills be regulated.

On May 7, 1992, under section 34 of CEPA, the government introduced the *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations* [19]. These regulations are designed to protect the

environment and humans from dioxin and furan releases. Owners of mills using chlorine or chlorine dioxide in bleaching must take measures to prevent the formation of dioxins and furans. They must also monitor and report the dioxin and furan concentrations in the final effluent.

The regulations require the mill operators to collect samples of their final effluent once a month and have them analysed according to a government-approved method, and report on concentrations of dioxins and furans. After 12 months, a mill may adopt quarterly sampling if it has less than 15 parts per quadrillion (ppq) of 2,3,7,8-TCDD and 50 ppq of 2,3,7,8-TCDF in its last three consecutive monthly samples. A mill may adopt annual sampling if the last three consecutive quarterly samples have been less than the regulated amounts of TCDD and TCDF. The regulations require a mill to revert back to monthly testing if either a quarterly test or an annual test detects 2,3,7,8-TCDD and 2,3,7,8-TCDF above the regulated concentrations.

6.2 Compliance Verification Mechanism

The inspection program identified four mills in the Fraser River basin that used a chlorine bleaching process: Prince George Pulp & Paper, Cariboo Pulp & Paper, Northwood Pulp Division, and Weyerhaeuser Pulp Mill.

A comprehensive checklist (Appendix A5.3) was used to verify compliance with the regulations. Audit samples of mill effluent were collected by inspectors and analyzed for dioxins and furans. Monitoring data submitted by the mills was reviewed throughout the reporting period.

6.3 Compliance Status

Each of the four mills was inspected at least once during the inspection period January 1, 1993 to March 31, 1994. The compliance scores were based on three requirements:

- » The mills must conduct analyses of effluents according to a schedule in the regulations.
- » All mills must report the monitoring results according to a specific schedule.
- » All mills must submit additional information, if required to do so by Ministerial request.

As provided for in section 4.2 of the regulations, all mills had requested and been granted temporary exemptions from the concentration limits (until January 1, 1994). These limits are 15 ppq for 2,3,7,8-TCDD and 50 ppq for 2,3,7,8-TCDF. The temporary exemptions allowed a specified time for mills to put in place measures to enable compliance with the regulations.

6.3.1 Compliance with 2,3,7,8-TCDD Limits

In 1993 and the first quarter of 1994, all four mills were within the limits specified for 2,3,7,8-TCDD (dioxins). From 1990 to March 31, 1994, the total discharge of dioxins had decreased by 98 percent in all four of the mills in the Fraser basin that use a chlorine bleaching process (Figure 6.1).

6.3.2 Compliance with 2,3,7,8-TCDF Limits

In 1993, prior to the regulations coming into effect, there were six exceedances of 2,3,7,8-TCDF (furans) limits at one of the four mills: Weyerhaeuser Pulp Mill Kamloops.

In the first quarter of 1994, there were four exceedances for 2,3,7,8-TCDF at the Weyerhaeuser Pulp Mill in Kamloops.

From 1990 to March 1, 1994, the total discharge of furans decreased by 85 percent in the Fraser basin mills that use a chlorine bleaching process (Figure 6.2).

The total loading to the BC environment is now 25 percent of the maximum quantities allowed by the regulations for 2,3,7,8-TCDF and 6 percent for 2,3,7,8-TCDD.

6.3.3 Compliance with Monitoring and Reporting Requirements

All four mills have been in compliance with the monitoring and reporting requirements of the regulations.

6.4 Enforcement Action

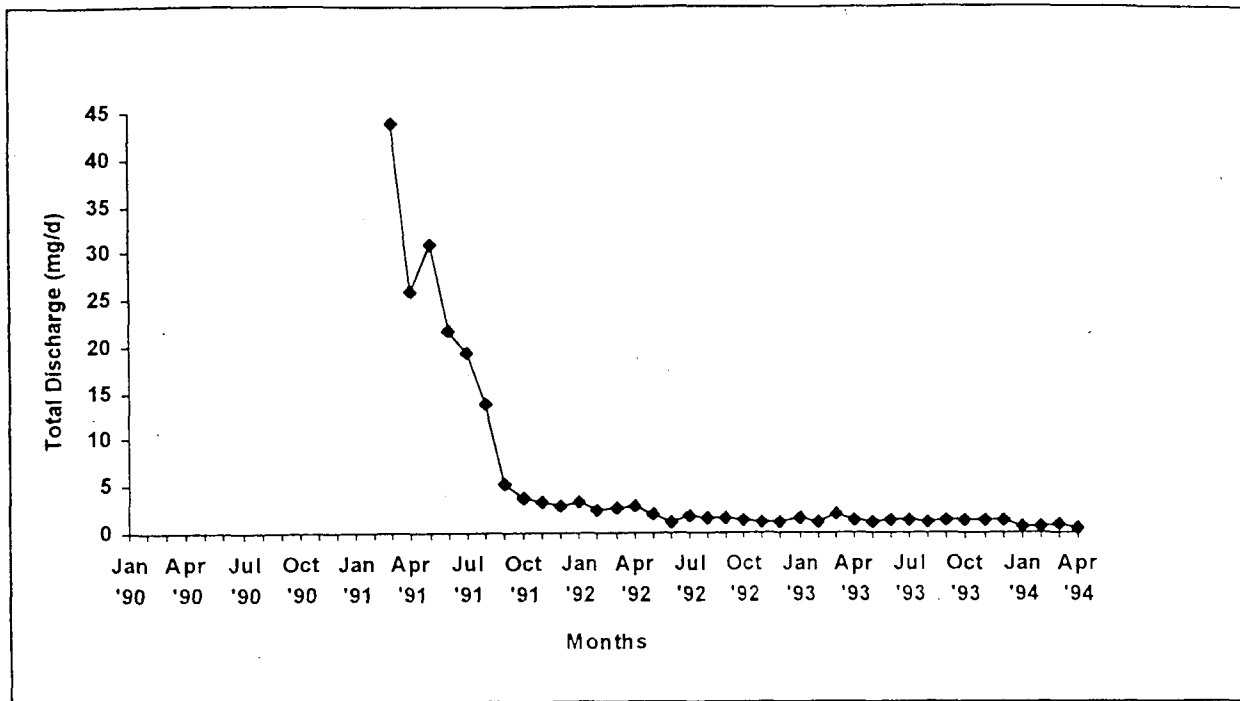
Most mills have made significant changes to the bleaching processes either by using oxygen extraction or by substituting chlorine with chlorine dioxide. These new practices by mills have demonstrated that the bleach plant is no longer a significant source of dioxins or furans. Some mills discharged effluent that contained more than 50 ppq 2,3,7,8-TCDF in 1993-94, however, the concentrations were decreasing.

Mills may create elevated dioxins and furans from contaminated hog fuel (bark and other wood debris), which is burned in their power boilers. The contaminated fly-ash captured from the power boiler flue gas treatment systems may enter the mill treatment systems and cause elevated concentrations of dioxins and furans in the final effluent. At some mills, residual contamination in biological solids that have settled in lagoons prior to conversion to alternate bleaching processes may be a source of dioxin or furan contamination.

The regulations do not make a distinction between what creates the dioxins and furans found in the final effluent, therefore, the mills must resolve all sources of contamination to achieve compliance. Those mills that continued to exceed the regulated limits after December 31, 1993 are currently being assessed for compliance. Appropriate enforcement action will be taken after the assessments are complete.

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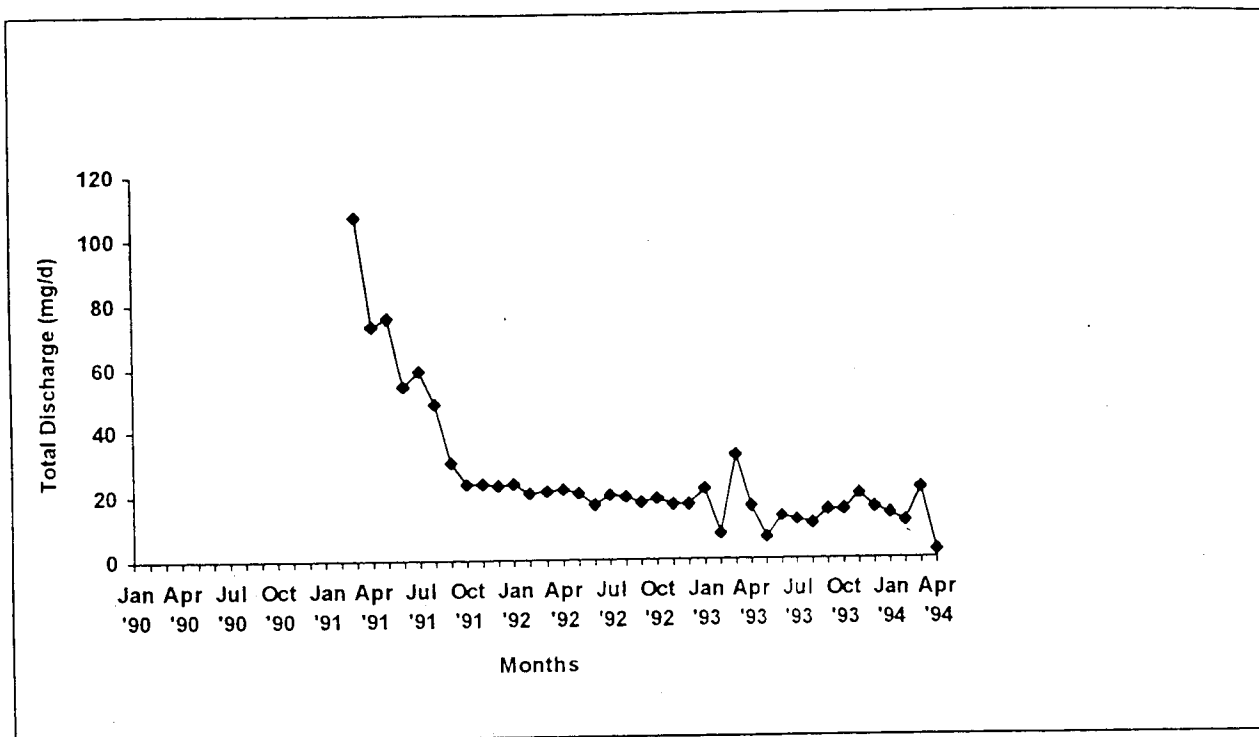
Figure 6.1 Average Monthly Discharge of Dioxins From Fraser Basin Pulp & Paper Mills, 1990-1994



Monthly Average for Daily 2,3,7,8-Dioxin Loadings in Fraser Basin Pulp & Paper Mills (mg/d)

1991	Dioxins	1992	Dioxins	1993	Dioxins	1994	Dioxins
Jan	/	Jan	3.3	Jan	1.6	Jan	0.6
Feb	/	Feb	2.4	Feb	1.2	Feb	0.6
Mar	43.9	Mar	2.7	Mar	2.0	Mar	0.9
Apr	25.9	Apr	2.8	Apr	1.3	Apr	/
May	31.0	May	1.9	May	1.2	May	/
Jun	21.8	Jun	1.2	Jun	1.3	Jun	/
Jul	19.4	Jul	1.7	Jul	1.4	Jul	/
Aug	13.8	Aug	1.6	Aug	1.2	Aug	/
Sep	5.2	Sep	1.6	Sep	1.3	Sep	/
Oct	3.8	Oct	1.3	Oct	1.6	Oct	/
Nov	3.2	Nov	1.0	Nov	1.4	Nov	/
Dec	2.8	Dec	1.0	Dec	1.4	Dec	/

**Figure 6.2 Average Monthly Discharge of Furans From Fraser Basin
Pulp & Paper Mills, 1990-1994**



Monthly Average for Daily 2,3,7,8-Furan Loadings in Fraser Basin Pulp & Paper Mills (mg/d)

1991	Furan	1992	Furan	1993	Furan	1994	Furan
Jan	/	Jan	24.0	Jan	22.1	Jan	14.1
Feb	/	Feb	20.5	Feb	8.1	Feb	11.6
Mar	107.4	Mar	21.3	Mar	32.3	Mar	21.7
Apr	73.3	Apr	22.1	Apr	16.2	Apr	/
May	75.6	May	20.8	May	6.6	May	/
Jun	54.1	Jun	16.9	Jun	13.1	Jun	/
Jul	58.8	Jul	20.1	Jul	12.3	Jul	/
Aug	48.8	Aug	19.3	Aug	11.1	Aug	/
Sep	30.6	Sep	17.8	Sep	15.5	Sep	/
Oct	23.9	Oct	18.9	Oct	15.2	Oct	/
Nov	24.0	Nov	16.9	Nov	20.2	Nov	/
Dec	23.1	Dec	17.2	Dec	15.7	Dec	/

7.0 PULP AND PAPER MILL DEFOAMER AND WOODCHIP REGULATIONS - CEPA

Written/compiled by Peter Krahn, Inspections Section

7.1 Background

Pulp and paper mills having a chlorine bleaching process using defoamer additives made from oils and polymers that may contain dibenzo-para-dioxins (DBDs) and dibenzo-furans (DBFs) are subject to these regulations. DBDs and DBFs can react in the chlorine bleaching process to form dioxins and furans in a mill's products and effluent. Polychlorinated phenols (PCPs) are used as fungicides to preserve and protect wood; these contain dioxins and furans as by-products. When chips from PCP-treated wood are used by any pulp and paper mill, dioxins and furans could be released in both final products and in effluents.

The *Pulp and Paper Mill Defoamer and Wood Chip Regulations* [18] were introduced in on May 20, 1992. These regulations limit the levels of DBDs and DBFs to 10 and 40 parts per billion (ppb), respectively, in defoamers manufactured, sold, or used in Canada for mills using the chlorine bleaching process. The regulations also prohibit the use of wood chips made from PCP-treated wood in any pulp and paper mill in Canada that uses the chlorine bleaching process.

Manufacturers, importers, and vendors of defoamers must submit quarterly reports for every batch of defoamer sent to mills. The reports must include the batch number, quantity of defoamer, and an analysis that shows concentrations of DBDs and DBFs. Pulp and paper mills using a chlorine bleaching process, as users of defoamers, must also submit a quarterly report. For every batch of defoamer, mill operators must report the batch number, quantity, name of manufacturer, importer or vendor, and they must submit a copy of the documentation indicating that the defoamer meets the regulation standards.

Any defoamer with non-detectable levels of DBDs and DBFs is not subject to these regulations. Non-detectable has been defined as 1 ppb.

7.2 Compliance Verification Mechanism

EP identified eight mills (Figure 7.1) in the Fraser River basin that come under the regulations. All of these facilities use woodchips and are, therefore, subject to Section 4(3) of the regulations. A comprehensive inspection checklist (Appendix A5.2) was used to verify compliance with requirements specified in the regulations. Monitoring data submitted by the mills was reviewed throughout the reporting period.

7.3 Compliance Status

Each of the eight mills was inspected at least once during the inspection period January 1, 1993 to March 31, 1994. The inspection program has shown the facilities met the requirements of the regulations. In some cases, the regulations did not apply to facilities not using defoamers and where concentrations of dioxins and furans in the effluent were found to be less than 1 ppb.

The provisions of the regulations also apply to the manufacturers and suppliers of defoamers. The inspection program has identified Hercules Canada Ltd as a supplier, and Diachem Industries Ltd. and Comcor Chemicals Ltd. as manufacturers of defoamers. A review of company-supplied data of DBD and DBF concentrations in the defoamer products showed that levels were below the allowable limit in the regulations.

Based on this year's inspections, there was no evidence of contaminated woodchip use in Fraser basin mills. A summary of the inspection results is given in Figure 7.1

7.4 Enforcement Action

No enforcement action was required.

**Figure 7.1 Defoamer Regulations: Checklist Summary for Fraser Basin Mills
(to 31 March 1994)**

Mill	Inspection Date	Notes/Comments
Newstech Recycling	Mar 1, Nov 24/93	*Inspections show that defoamers are water-based and that no chlorophenol-contaminated woodchips are used on site
Scott Paper	Mar 5, Aug 24, Dec 10/93	*No defoamers and no chlorophenol-contaminated woodchips are used on site
E.B. Eddy	Feb 5, Nov 30/93	*Inspections indicate no chlorophenol-contaminated chips are used
Prince George Pulp & Paper	Feb 17, Jul 28/93	*Inspections indicate that all defoamer concentrations are ND, according to manufacturer's certificate; *No chlorophenol-contaminated woodchips are used *Quarterly reports submitted for 1st quarter 1993 show all levels ND
Northwood (Prince George)	Feb 17, Jul 28/93	*Same as above *Quarterly reports submitted for 2nd and 3rd quarters of 1993 show all levels ND
Cariboo-Quesnel	Feb 18, Jul 29/93	*Quarterly information submitted for 1st, 3rd, and 4th quarters of 1993 show all levels ND
Quesnel River Pulp	Feb 18, July 29/93	*Inspections show that no chlorophenol-contaminated woodchips are used on site
Weyerhaeuser, Kamloops	Mar 8, June 21/93; Jan 11/94	*Inspections cite manufacturer's certificate that all levels are ND; *No chlorophenol-contaminated woodchips are used

8.0 OZONE-DEPLETING SUBSTANCES REGULATIONS - CEPA

Written/compiled by Emmanuel Mendoza, Inspections Section

8.1 Background

Chlorofluorocarbons (CFCs) and certain bromofluorocarbons (halons) deplete the ozone layer and have adverse impacts on the global climate. Canada and 23 other nations signed the *Montreal Protocol on Substances that Deplete the Ozone Layer* on September 16, 1987. This is an international treaty to prevent a global environmental and health problem before it reaches the critical stage. The "Montreal Protocol," which came into force on January 1, 1989, sets out the schedule for reducing consumption (defined as production plus import minus export) of CFCs and halons from 1986 base levels.

At the second meeting of the parties to the Montreal Protocol, held in London in June 1990, tetrachloromethane (carbon tetrachloride) and 1,1,1-trichloroethane (methyl chloroform) were added to the Protocol as substances that deplete the ozone layer, and the phase-out schedules for CFCs and halons were accelerated. At the time, the schedule set out called for elimination of carbon tetrachloride by the year 2000 and of methyl chloroform by 2005.

A fourth "Montreal Protocol" meeting was held in November 1992, at which the ozone-depleting substances phase-out schedule was again accelerated.

The *Ozone-Depleting Substances Regulations #1 (Chlorofluorocarbons)* (ODS #1) [13] is the regulatory instrument that meets the requirements of the Montreal Protocol. These regulations apportioned production rights among producers manufacturing CFCs in 1986. CFC imports will be controlled in a similar manner. In addition, CFC export permits are required from Environment Canada.

The *Ozone-Depleting Substances Regulations #2 (Certain Bromofluorocarbons)* (ODS #2) [14] is also a regulatory instrument that meets the requirements of the Montreal Protocol. Virgin (new) halons are prohibited from being imported into Canada. Used,

recovered, recycled, or reclaimed halons can still be imported providing a permit is obtained from Environment Canada. These regulations apportion production rights among producers manufacturing CFCs in 1986.

The *Ozone-Depleting Substances Regulations #3 (Products)* (ODS #3) [15] prohibits the use of CFCs in non-essential applications or where substitutes are available. The regulations contain the following prohibitions:

- » No person shall manufacture, import, offer for sale, or sell any packaging material or container for food or beverages that is made of plastic or foam in which CFC has been used as a foaming agent.
- » No person shall manufacture or import, and effective January 1, 1991, no person shall offer for sale or sell 10 kg or less of any CFC contained in a pressurized container, or any product in a pressurized container that contains 10 kg or less of any CFC. (Products that would be affected by this prohibition include aerosols, fog horns, and novelty products.)

Effective January 1, 1991, the manufacture, import, offer for sale, or sale of CFCs in pressurized containers containing less than 10 kg was prohibited.

The industrial use of CFCs in mold release agents, cleaning solvents for electrical equipment, protective sprays for photographs, and mining lubricants was exempted from this prohibition until January 1, 1993.

Human and animal health care products using pressurized CFCs (such as bronchial dilators, inhalable steroids, topical anaesthetics, and veterinary powder wound sprays) were considered essential uses and were exempted from the regulation.

The *Ozone-Depleting Substances Regulations #4 (Tetrachloromethane [Carbon Tetrachloride] and 1,1,1-trichloroethane [Methyl Chloroform])* (ODS #4)

[27] came into effect early in 1993. ODS Regulations #4 controls the consumption and limits the production of these two substances. Some of this regulation's restrictions and permissions are:

- » As of January 1993 and for certain control periods, Canadian consumption and production of methyl chloroform (MCF) are limited to the 1989 level; producers of methyl chloroform will receive in 1993 baseline consumption and production allowances equivalent to their 1989 levels; importers of MCF will receive in 1993 baseline consumption allowances equivalent to their 1989 levels.
- » As of January 1995 and for certain control periods, the consumption and production of virgin carbon tetrachloride (CCl₄) are prohibited, except for use in laboratories, as feedstock, in chlor-alkali plants as a diluent for nitrogen trichloride, or as an analytical standard.
- » As of January 1995 and for certain control periods, the consumption and production of MCF are reduced to 15% of the 1989 level.

8.2 Compliance Verification Mechanism

8.2.1 Product Sampling and Analysis at Retail Levels

The inspection strategy based on the regional inspection plan involves the systematic collection and analysis of aerosol products purchased at the retail level to determine whether CFCs are present in these samples.

8.2.2 Canada Customs Notification

Under a Memorandum of Understanding, Canada Customs entered into a new program to assist EP in monitoring the import and export of CFCs and halons. Only those importers authorized by EC to import CFCs and halons may do so, and only when the country of origin is a signatory to the Montreal Protocol. Except where otherwise exempted, all other imports of CFCs and halons are to be detained by Customs and referred to Environment Canada. A CEPA inspector will then advise Customs on the disposition of the shipment.

8.3 Compliance Status

8.3.1 ODS Regulations #1

There is no authorised importation of bulk CFCs in BC. Based on information provided by Canada

Customs, three companies in the Fraser basin suspected of importing bulk controlled CFCs were inspected. JL Enterprises was found importing Genetron 12 (CFC-12) without authorisation from the Minister of Environment in violation of ODS Regulations #1. Site inspections and records reviews conducted at the two other companies found these to be importing HCFC-22, a non-regulated CFC. Based on the three inspections carried out under this regulation, the compliance status is 67 percent (one noncompliance).

8.3.2 ODS Regulations #2

Three importers of bulk controlled halons (bromofluorocarbons) were inspected (Bella Coola Fisheries, Canadian Air Parts, GB Aviation) in the Fraser River basin. Bella Coola Fisheries was found importing bulk halon 1301 without authorisation from the Minister of Environment, in violation of the ODS #2 Regulations. Site inspections and records reviews conducted at Canadian Air Parts and at GB Aviation showed importation of halon 1301 in containers designed for use in aircraft. The containers as designed to hold the halon 1301 do not meet the definition of "bulk" halon and therefore the importations were exempt under the ODS #2 regulation. There was one non-compliance (Bella Coola Fisheries) for this regulation and two in compliance, for a compliance status of 67 percent.

8.3.3 ODS Regulations #3

Most of the Fraser River basin inspection effort for this regulation focused on sampling and monitoring commercial activities involving sales of pressurized CFC products. Environment Canada inspected 75 establishments in the Lower Mainland and in Kelowna, most of which were in the sporting goods, marine supply, plumbing, auto parts and supply, and photography businesses (see Figure 8.1).

Of the 75 site inspections carried out under ODS#3 regulations, 15 products for sale at 12 retail outlets were found to be in contravention of the sale provisions of the regulations, for a compliance rating of 84 percent.

Figure 8.1 Inspections of Retail and Supply Stores Under ODS Regulations #3

Site Name	Compliance (Y/N)	Site Name	Compliance (Y/N)
UAP/NAPA Auto Parts	Y	Tad's Sports Store	Y
Guildford Electronics Ltd.	Y	Radio Shack (Kingsgate)	Y
Value Computer Systems Ltd.	Y	White & Peters (Richmond)	Y
New Age Electronics	Y	Burnaby Auto Parts	Y
Mariner Distributors Inc.	Y	Mainland Auto Supplies (Burnaby)	Y
Seymour Cycle	Y	Friesen Electric (Clearbrook)	Y
Sooter Studios	Y	Syntrek Electric (Clearbrook)	Y
Photoland	Y	Prince Enterprises (Clearbrook)	Y
Action Vacuum	Y	Source For Sports (Clearbrook)	Y
HVL Service Centre	Y	Armstrong Multi-Service (Clearbrook)	Y
Stillwater Sports (Ladner)	Y	Main Electric	Y
MacLaurin Marine Outboard (Ladner)	Y	GC Autoparts	N
Massey's Marine Supplies (Ladner)	Y	Gough Electric	Y
AC Cycles (Ladner)	Y	Paul's Plumbing & Electrical Supplies	Y
International Janitors' Supplies	Y	V-Com Business Systems	Y
Bicycle Sports Pacific	N	Wolff Marine Supplies	Y
Tail Wind Cycles (Richmond)	Y	Salton Fabrication Ltd. (Surrey)	Y
CE Computer Outlet (Richmond)	Y	MG Chemicals	Y
Future Shop (Coquitlam)	Y	Ron-Sons Torch Repair/Sales (Surrey)	Y
Dunn and Rundle Photography	Y	Tidewater Industrial Supplies (Surrey)	N
Intec Electronics	Y	Martin Marine	N
Cap's Bicycles (New Westminster)	Y	Force/Perry Holdings	Y
Blight's Home Hardware	Y	Peacock Equipment	Y
Mountain/Beat Specialty Bikes	Y	Electrosonic	Y
West Point Cycles	Y	Steel's Industrial Products (Kelowna)	Y
Active Electronic Components	Y	Miller and Wyatt (Kelowna)	Y
UAP/NAPA Auto Parts (Kelowna)	Y	Brown's Repair Shop	Y
Marisol Marine	N	Motor Car Parts Kamloops Ltd.	Y
Kelowna Performance	Y	Cycle Logical	Y
North Shore Auto Parts	Y	The Powder Keg Shooter's Supply Inc.	Y
Popeye's Sailors' Exchange	N	Wytek Electronic Supply	N
Pollard's Equipment (Chilliwack)	Y	Norkam Cycles	N
Gerick Cycle and Sport (Kelowna)	Y	Hogarth's Sports & Ski	N
Lens & Shutter (Pacific Centre)	Y	Cap's Bicycles (Kerrisdale)	N
Black's (Oakridge)	Y	Sportsmen's Supplies	N
Cap's Bicycles (North Vancouver)	Y	North Star Cycles	Y
Field's Welding Supplies	N	Jubilee Cycles	Y
Dix Performance	Y		

The products listed in Figure 8.2 were sampled from the various retailers and were found to contain regulated CFCs. All of these retailers received Warning Letters. Products such as TriFlow batch #L3040 were found for sale mostly in bicycle and sporting goods stores. Although L & F (manufacturers and importers of TriFlow) has since reformulated this product to contain HCFC- 131 (a non-regulated substance), the inspection program showed that there are still products with this batch number being offered for sale in violation of the regulations.

Other products, such as Falcon Sound-Off batch #T013 and Mighty Sonic, both air horns, were bought from small marine supply stores. Most of the air horns found in larger marine supply outlets contain a non-regulated CFC (HCFC-22).

8.4 Enforcement Action

8.4.1 ODS Regulations #1

JL Enterprises received a Warning Letter for importation of bulk CFC 12 in contravention of these regulations.

8.4.2 ODS Regulations #2

Bella Coola Fisheries was charged with five counts of illegal importation of bulk halon 1301 in contravention of these regulations.

8.4.3 ODS Regulations #3

Warning Letters were sent to each company found out of compliance (listed in Figure 8.1).

8.4.4 ODS Regulations #4

Because ODS Regulation #4 only came into effect in August 1993, there was no inspection program or activity under for this reporting period.

8.4.5 Special Enforcement Operations/ Cooperative Inspection Programs

Seven suspected importers of bulk restricted CFCs and halons were identified in cooperation with Canada Customs and resulted in the discovery of one unauthorised bulk importer of CFC (JL Enterprises) and one unauthorised bulk importer of halons (Bella Coola Fisheries). In turn, EC inspectors notified BC Environment about constantly leaking halon refrigerant at the Bella Coola Fisheries site.

Figure 8.2 CFC Product Inspection Results - ODS Regulations #3

Manufacturer	Retailer	Product Name	CFC Content
Lehn & Fink	Bicycle Sports Pacific	TriFlow L3040	CFC 113
Carlin Products	GC Auto Parts	CRC Electric Cleaner 75014	CFC 113
SprayOn	Tidewater Industrial Supply	HiTech 02002 (B0982/TW) SprayOn TFE Dry Lube (B2839RL)	CFC 113 CFC 113
Falcon Safety Products Inc.	Martin Marine	Falcon SoundOff T013 LPS Electronic Cleaner 7E0	CFC 12 CFC 113
Unknown	Field's Welding	HiPerformance Rocol	CFC 12/113
Falcon Safety Products Inc.	Marisol Marine	Falcon SoundOff T013	CFC 12
Falcon Safety Products Inc. Signal-tone	Popeye's Sailors' Exchange	Falcon SoundOff SH2R Mighty Sonic	CFC 12 CFC 12
GC Electronics	Wytek Electronic Supply	Static Null	CFC 113
Lehn & Fink	Norkam Cycles	TriFlow L3040	CFC 113
Lehn & Fink	Hogarth's Sports	TriFlow L3040	CFC 113
Lehn & Fink	Cap's Bicycles (Kerrisdale)	TriFlow L3040	CFC 113
Lehn & Fink	Sportsmen's Supplies	TriFlow L3040	CFC 113

Similarly, inspection of 13 retailers of CFC products identified through third-party complaints resulted in the discovery of five retailers found selling controlled CFC products in contravention of ODS Regulations #3 (Wytek Electronic Supply - Static Free CFC-113; Norkam Cycles, Hogarth's Sports, Cap's Bicycles [Kerrisdale]), Sportsmen's Supplies - TriFlow Lubricant CFC-113).

8.5 Compliance Promotion Activities

On March 18, 1994, EP, along with Public Works Canada, sponsored an Environmental Management Workshop on PCBs and ozone-depleting substances, for private industry and other government departments. The workshop was jointly developed by EC, PWC, and Government Services Canada.

The target audience was federal facility managers who are responsible for the management, maintenance, and operation of ODS and PCB equipment. However, any federal facility staff (including federal government, agency, and Crown corporation employees) who were interested in these issues were invited to attend.

The goal of the workshop was to provide guidance on the management of ODS and PCBs. Topics included Federal ODS Regulations, Federal ODS Initiatives and Halon Bank, BC ODS Regulations and Initiatives, BC & Yukon Federal Facility ODS Inventory, Department of Defence ODS Management Plan, Public Works ODS Management Plan, and five technical sessions: Refrigerant Phase-out, Refrigerant Air-Conditioning, Halon Case Study, Halon Bank, Solvent Substitution.

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9.0 **SECONDARY LEAD SMELTER RELEASE REGULATIONS - CEPA**

Written/compiled by John Holmes, Inspections Section

9.1 **Background**

Regulations prescribing national emission standards for secondary lead smelters were first issued in 1976 under the *Clean Air Act*. In February 1991, these regulations were revoked and replaced by the *Secondary Lead Smelter Release Regulations* (SLSRR) [22], made pursuant to subsection 34(1) of CEPA.

The primary objective of the SLSRR is to limit the concentration of lead-containing particulate matter emitted into the ambient air from defined sources within a secondary lead smelting facility. The regulations also contain provisions for plant malfunctions, emissions testing, and reporting.

Reporting under the regulations is at the discretion of the Minister of Environment. The regulations provide for the submission of release measurement reports (emissions testing) and malfunction or breakdown reports.

9.2 **Compliance Verification Mechanism**

Plant inspections, source emission tests, and audits of company-submitted data are used to verify compliance with the regulations. In the Fraser River basin, there is only one industrial facility, Metalex in Richmond, that is regulated under the SLSRR.

9.3 **Compliance Status**

Metalex was intermittently operational during the current reporting period and was not required to do emission testing. Test data for the ten-year period prior to the regulations coming into effect (1981-1991) showed it to be in compliance, having typical levels of lead emissions four orders of magnitude below the permitted level. The plant was inspected in 1994.

9.4 **Enforcement Action**

The inspection program found no violations under the regulations. No enforcement action was necessary.

Ω

10.0 CONTAMINATED FUEL REGULATIONS - CEPA

Written/compiled by Emmanuel Mendoza, Inspections Section

10.1 Background

Under an amendment to Schedule 1 of CEPA, the *Contaminated Fuel Regulations* were enacted in August 1991 (SOR/91-485) [6]. This regulation controls the export and import of fuel to which dangerous substances have been added or are present in concentrations above general industrial standards. Potential contaminants in fuel are: chlorinated hydrocarbons, including PCBs; heavy metals, including lead, chromium, cadmium, nickel, vanadium, and zinc; and sulphurs and phosphates.

10.2 Compliance Verification Mechanism

The *Enforcement and Compliance Policy* and the National Inspection Plan of Environment Canada outline measures to promote compliance, including information and education, promotion of technology development, and consultation on regulation development. Inspectors inspect and sample fuel shipments entering Canada with a frequency that varies with the amount of traffic. Inspectors also inspect sites where imported fuel is stored.

This 1993/94 fiscal year, the Inspections Section of the Pacific and Yukon Region inspected four facilities,

of which one was in the Fraser Basin (Co-op Gas in Aldergrove). Four audit samples were taken from each site inspection. All samples were screened for the presence of PCBs. Results from the screening program showed non-detectable levels of PCBs.

10.3 Compliance Status

Based on the inspections this fiscal year, compliance with the regulations was 100 percent.

10.4 Enforcement Action

There were no detectable levels of PCBs in any of the audit samples, therefore no enforcement action was required.

Ω

11.0 GASOLINE REGULATIONS - CEPA

Written/compiled by Emmanuel Mendoza, Inspections Section

11.1 Background

Lead, in most, if not all, of its chemical species and physical states is potentially toxic and hazardous to the environment and the health of humans. The *Gasoline Regulations* [9] were issued in 1990 to respond to the federal government's policy to reduce blood lead concentrations to the lowest possible level. Essentially, the regulations eliminated the use of leaded gasoline in Canada. The *Gasoline Regulations* were introduced to replace the *Lead-Free Gasoline Regulations* and the *Leaded Gasoline Regulations*.

The *Gasoline Regulations* prescribe an average lead concentration for leaded gasoline used in engines that require a small amount of lead to avoid premature failure. They also prescribe a maximum concentration of lead in unleaded gasoline that may become contaminated through the distribution system. Moreover, since phosphorus poisons motor vehicle catalytic converters, the regulations also prescribe a maximum concentration of phosphorus in unleaded gasoline.

The *Gasoline Regulations* set a maximum concentration of 26 mg/L of lead in leaded gasoline imported for use in boats, heavy duty trucks, and farm machinery. The maximum concentration of lead in gasoline produced in Canada, imported, sold, or offered for sale for any purpose other than those described above is 5 mg/L. Leaded gasoline used in aircraft, such as aviation fuel, is exempt from the regulations.

11.2 Compliance Verification Mechanism

EP inspectors collect gasoline samples for lead content analysis. The monitoring program focused on retail gasoline stations importing US gasoline. The US currently allows retail sales of leaded gas and the opportunity exists, therefore, for the inadvertent contamination of unleaded product.

Producers and importers of leaded gasoline must report quarterly on the quantity of gasoline, the

quantity of lead added to the gasoline, and the average lead concentration. Records of importation of leaded gasoline originating from Canada Customs were reviewed by EP inspectors. Follow-up inspections and discussions with the importers were conducted to verify whether or not the intended use of the leaded product was in compliance with the regulations.

11.3 Compliance Status

Inspectors conducted nine site inspections in BC, of which only one was in the Fraser River basin at Aldergrove (Co-op Gasoline). Audit samples were taken from this retail site and screened for lead content. Results showed levels of lead to be less than 2 mg/L.

There is a requirement for importers of leaded gasoline to report to the Minister of Environment. The Aldergrove company had reported no importation of leaded gasoline. Based on the findings of the inspection program, the compliance status is 100 percent.

11.4 Enforcement Action

All audit samples were in compliance. No enforcement action was required.

Ω

12.0 EXPORT AND IMPORT OF HAZARDOUS WASTES REGULATIONS - CEPA

Written/compiled by Maureen Christofferson, Inspections Section

12.1 Background

Pursuant to subsections 43 to 45 of CEPA and enacted November 26, 1992 (SOR/92-637), the *Export and Import of Hazardous Wastes Regulations* (EIHWR) [7] govern the export, import, and transit through Canada (including Canadian territorial waters) of hazardous waste shipments. The major concern about these wastes is their export from industrialized nations for cheap disposal in developing countries, which may lack proper disposal sites and facilities. These regulations serve to implement the provisions of three international agreements promoting the tracking and environmentally sound disposal and recycling of hazardous waste: the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal*, which Canada ratified in August 1992; the March 1992 *Decision of the Organization for Economic Cooperation and Development* (OECD) concerning the control of trans-frontier movements of wastes destined for recovery operations; and the *Canada-US Agreement on the Transboundary Movement of Hazardous Wastes*, effective October 1986.

In Canada, the EIHWR are in place to ensure that shipments of hazardous wastes entering into, leaving, or passing through Canada can be monitored and controlled by Environment Canada. The main goals of the regulations include:

- a) promoting environmental responsibility among waste generators and those concerned with transporting hazardous wastes internationally from generation sites to final disposal or recycling sites;
- b) allowing the countries of export, import, or transit to control which wastes enter or leave their countries by requiring that shipments be consented to by these countries prior to shipment;

- c) ensuring proper clean-up of transportation accidents involving transboundary shipments of hazardous wastes by requiring environmental liability insurance coverage; and,

- d) when the waste cannot be disposed of or recycled in the manner stated in the notice, ensuring that alternate arrangements for disposal or recycling are made with the consent of the appropriate authorities in the countries involved or, if no arrangements can be made, that the exporter be required to re-import the waste.

These regulations replaced Transport Canada's (TC) *Transportation of Dangerous Goods Regulations* (TDGR)[26] for notification of transboundary shipments of hazardous wastes, with transboundary shipments being defined as exports out of Canada, imports into Canada, and the transit from another country through Canada to a destination outside of Canada.

The EIHWR require that advance notice of a proposed shipment be given to the Canadian authority (the Office of Waste Management, Ottawa). If the hazardous waste shipment complies with the regulations for the protection of human health and the environment, and authorities in the other countries or provinces concerned do not object to the shipment, written confirmation is sent from Environment Canada to the applicant authorising the shipment to occur.

The regulations also cite TDGR requirements for appropriate packaging, placarding, and labelling of hazardous waste shipments. Manifests must be used for all waste shipments, and copies of the manifest, the notice, and the written confirmation must accompany the waste during shipment and be deposited at Canada Customs.

12.2 Compliance Verification Mechanism

The transboundary movement of hazardous waste is closely monitored, in part by a computerized tracking system compiled from data in notifications and manifests. Compliance is verified through inspections.

12.2.1 Carrier Inspections

Carrier inspections occur in three categories: road transport, marine transport, and rail transport. There are four road-crossings into the United States from the Lower Mainland (Point Roberts, Pacific Highway [Blaine], Aldergrove, and Huntingdon) at which there are Canada Customs stations. Marine transport from the lower Fraser Basin is largely out of the Port of Vancouver and from Roberts Bank in the Fraser River delta. There is one railroad line that crosses the international border just south of White Rock, BC, at Blaine, Washington. Materials passing through these Lower Mainland border crossings may not have originated within Canada.

(a) **Road Transport:** EP inspectors were informed of transboundary shipments of hazardous waste by Canada Customs personnel or, in the case of transit shipments from Alaska to the lower United States, by EP inspectors or Canada Customs personnel in the Yukon. Additional shipments were reported by the carriers or were identified by EP inspectors stationed at border crossings. Compliance verification of transboundary road shipments involved inspection of required documentation accompanying the shipment, as well as inspection of the carrier's vehicle and the load. Shipments transiting Canada from Alaska to the lower US were inspected at both the Yukon and BC borders. A transit inspection form (see Appendix A5.8.1) was developed as a checklist to monitor compliance with the regulations; no samples of the hazardous waste loads were collected for analysis.

(b) **Marine Transport:** Marine shipments travelling through Canadian waters from Alaska to the lower US were monitored by verifying documentation, including the transit notice, letter of confirmation, and waste manifests, prior to shipping. Movement of these shipments through Canadian waters was monitored by Canadian Coast Guard Radar Vessel Traffic System (VTS).

(c) **Rail Transport:** No inspections of hazardous waste shipments by rail were conducted in the 1993-94 fiscal year.

12.2.2 Facility Inspections

Facilities that export or import hazardous wastes were identified by reviewing notification documentation submitted to the Office of Waste Management, Hazardous Wastes Division in Hull. Information included in the notices was used to prioritise facilities for site inspections. This information includes:

- » the type of operation (exporter or importer)
- » the type and volume of waste generated or received
- » the estimated number of transboundary shipments
- » (and in the case of importers) the process used to recycle hazardous waste materials.

A facility inspection form (Appendix A5.8.2) was developed and used as a guide for conducting site inspections. No sampling of hazardous waste materials found on site was conducted.

12.3 Compliance Status

12.3.1 Carriers - Road Transport

Four border inspections were conducted under EIHWR for road transport vehicles. Three involved transit shipments from Alaska en route to the lower US. Environment Canada was notified of these shipments by the carrier and inspections of the vehicles and loads were carried out at the Huntingdon (two shipments) and at the Pacific Highway (one shipment) border crossings. The remaining inspection, an import shipment entering Canada at the Paterson border crossing, was the result of a random border inspection by EP inspectors.

All three transit shipments were found to be in compliance. The import shipment did not originally have proper documentation accompanying the shipment, but was granted entry when these documents were received at the Canada Customs office.

12.3.2 Carriers - Marine Transport

The Enforcement and Emergencies office received documentation for 27 marine shipments of hazardous wastes travelling through Canadian waters from Alaska to the lower US. Document reviews by EP inspectors identified one shipment to be out of compliance with EHW regulations when waste types identified on the manifests were not included in the written confirmation sent to Environment Canada by the consignor, the US Coast Guard.

12.3.3 Facilities

Twenty facilities in the Fraser River basin were identified as hazardous waste importers or exporters, according to the notices submitted to the Office of Waste Management in Hull during the 1993 calendar year. Two of these facilities were found to be no longer operating. Of the remaining 18, one was an importer (recyclers), 15 were exporters (either generators or waste process/bulking facilities), and four had received letters of confirmation to both import and export hazardous wastes. Site inspections were conducted under EIHWR regulations at 10 (56%) of these facilities, including the one importer, five (of the 15) exporters, and the four operations identified as both exporters and importers (Figure 12.1).

All inspected facilities but one, BFI Medical Wastes, were found to be in compliance with the regulations, indicating a compliance rate of 90 percent among the sites inspected. BFI Medical Wastes was found to have sent several shipments of biomedical wastes to Bellingham for incineration prior to obtaining written confirmation from Headquarters.

12.4 Enforcement Actions

Enforcement actions against the US Coast Guard and BFI Medical Waste Systems for noncompliance with the *Export and Import of Hazardous Wastes Regulations* are pending.

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Figure 12.1 Fraser Basin Facilities Regulated by EIHWR

Facility	Location	Compliance/Inspected
Importing Facilities		
¹ Mohawk Lubricants	North Vancouver	In Compliance
Exporting Facilities		
Albright and Wilson	North Vancouver	Not Inspected
General Chemical Canada Ltd.	Burnaby	Not Inspected
¹ Indalex, Div. of Indal	Port Coquitlam	In Compliance
¹ Kennametal Inc.	Port Coquitlam	In Compliance
Moli Energy Ltd.	Maple Ridge	Not Inspected
¹ West Coast Recycle (formerly Progressive Oil Ltd.)	Abbotsford	In Compliance
Safety-Kleen Corp. (4 sites)	Langley ¹ , Duncan, Prince George, (Vernon - not in Fraser Basin))	In Compliance
Shell Canada Products Ltd.	Burnaby	Not Inspected
*Syn-Lube Environmental Services	Surrey	Not Inspected
*The Glidden Company	Burnaby	Not Inspected
Tree Island Industries Ltd.	New Westminster	Not Inspected
TriWaste Treatment Services Inc.	Prince George	Not Inspected
¹ UniFirst Canada Ltd.	Langley	In Compliance
West Coast Energy Inc.	Prince George	Not Inspected
Exporting and Importing Facilities		
¹ BFI Medical Waste Systems	Port Coquitlam	Not In Compliance
¹ Laidlaw Environmental Services	Delta	In Compliance
¹ Philip Enterprises Inc. (Ticor)	Burnaby	In Compliance
¹ Philip Environmental Services	Delta	In Compliance
¹ Inspected	*Facilities no longer operating	

13.0 PHOSPHORUS CONCENTRATION REGULATIONS - CEPA

Written/compiled by Emmanuel Mendoza, Inspections Section

13.1 Background

The general purpose of the *Canadian Environmental Protection Act* (CEPA) is to protect human health and the environment. It is intended, pursuant to CEPA Part III, to allow the government to regulate nutrients that can interfere with the use of waters by humans, animals, fish, or plants. Based on this authority, the Governor-General-in-Council enacted the *Phosphorus Concentration Regulations* on 19 October, 1989 (SOR/89-501) [29].

The provisions found in Part III of CEPA and in the *Phosphorus Concentration Regulations* outline the government's intention to control the amount of nutrients, specifically phosphorus, in cleaning agents or water conditioners, specifically laundry detergents. CEPA provides a prohibition insofar as nutrients are concerned. Subsection 50(1) of the Act clearly states: *No person shall manufacture for use or sale in Canada or import any cleaning agent or water conditioner that contains a prescribed nutrient in a concentration that is greater than the prescribed permissible concentration of that nutrient in that cleaning agent or water conditioner.* Currently, the only cleaning agents regulated are laundry detergents.

The regulations specify that the concentration of phosphorus in any laundry detergent is not to exceed 5 percent by weight expressed as phosphorus pentoxide (P_2O_5), or 2.2 percent by weight expressed as elemental phosphorus (P).

13.2 Compliance Verification Mechanism

Compliance monitoring is based on requirements established by the National Inspection Plan (NIP), which, for this reporting period, required the collection and analysis of 14 laundry detergents. The Inspections Section of Environmental Protection Pacific Region was responsible for the nation-wide inspection program for the *Phosphorus Concentration Regulations* nationally.

The inspection strategy involves the systematic collection and chemical analysis of detergent products purchased at the retail level or manufactured in the province. This year, 22 facilities located in the Lower Mainland were inspected. Three facilities were identified as manufacturers. Stores offering for sale and selling foreign brands of laundry detergents were also targeted. Environmental Protection collected 65 samples of laundry detergents from these 22 sites (Figure 13.1).

Samples were analyzed by the Western and Northern Region Conservation and Protection Laboratory in Edmonton, Alberta. The analytical results are shown in Figure 13.2.

13.3 Compliance Status

The concentration of phosphorus pentoxide (P_2O_5) in the samples collected are shown as percent weight of P_2O_5 (Figure 13.2). Of the 65 laundry detergent samples analyzed, four products exceeded the prescribed permissible concentration of 5 percent phosphorus pentoxide. These products were identified as: Calgon (16.6 percent), Forever New (22.5 percent), Laundry 240 000 - Chemtech (5.8 percent), and Laundry 242 000 - Chemtech (6 percent). Calgon is a water softener and is not subject to the regulations. The two Chemtech products exceeded the analytical margin of error (5 plus or minus 0.2%), so the site was re-inspected and the company was informed of the alleged violation. The company had stopped manufacturing and had reformulated these products. Samples of the product Forever New are currently undergoing further analytical tests.

The overall compliance status for the 65 samples tested was 98 percent. However, at least a dozen products need to be re-inspected by EP inspectors and retested, or are not subject to the regulation, and this percentage may decrease.

The inspection survey also demonstrated that a number of major brand products have a phosphorus pentoxide concentration at or just below the 5 percent concentration limit. These products were identified as: Ultra Tide with Bleach (5.0 percent), Ultra Tide Unscented (4.7 percent), Ultra Cheer with Colorguard (4.4 percent), Ultra ABC (4.5 percent), President's Choice White Unscented (4.8 percent), Savolite BC17 (4.6 percent), and Savolite Tally (4.6 percent). Because these concentrations are within the margin of error for the analysis methods, no further action is being considered.

The inspection program also surveyed and sampled various carpet cleaning detergents. These products were found to contain less than the 5 percent phosphorus limit even though they are not regulated.

13.4 Enforcement Action

The initial survey and collection of samples was conducted by students under the direction of a CEPA inspector. In the past, there has been a high rate of compliance under this regulation and EP did not expect to find violations. CEPA inspectors conducted follow-up inspections at facilities where laundry detergents were found that exceeded the concentration specified in the regulations. Enforcement actions are currently under review for incidents of noncompliance.

Calgon was identified as a water softener and is not subject to the regulations, therefore, no enforcement action was required.

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Figure 13.1 1993-94 Inspections Under the Phosphorus Concentration Regulations

Site Name	Compliance (Y/N)
London Drugs (Kingsway)	Y
Safeway (Kingway)	Y
Woolco (Middlegate Mall)	Y
Shoppers Drug Mart (Middlegate Mall)	Y
SuperValu (Middlegate Mall)	Y
Buy-Low Foods (Royal Oak & Rumble)	Y
Superstore (Metrotown)	Y
Save-On Foods (Metrotown)	Y
IGA (Kingsway)	Y
KMart (Coquitlam Centre)	Y
Bi-Way (Coquitlam Centre)	Y
Canary Island (Brentwood Mall)	N
Sun Wah (Chinatown)	Y
Punjab Supermarket (Main & 49th)	Y
Diversey Inc. (Annacis Island)	Y
Watkins (Brentwood Mall)	Y
Trans-Chemicals (Burnaby)	Y
Savolite (Annacis Island)	Y
YaoHan (Richmond)	Y
Chemtech (South Richmond)	Y
Army and Navy (Vancouver)	Y
Amway (Home Delivered)	Y

Figure 13.2 Laundry Detergent Inspection Program (Phosphorus Concentration Regulations)

Brand Name	Sector Type	%P ₂ O ₅	Brand Name	Sector Type	%P ₂ O ₅
Ultra Tide Free	Retail	0.2	Ultra Tide Free With Bleach	Retail	5.0
Ultra Tide Scented	Retail	4.7	Sunlight Unscented	Retail	<0.1
Tide With Bleach	Retail	<0.1	Ultra Cheer/Colorguard	Retail	4.4
Ultra Cheer/Colorguard/Bleach	Retail	3.9	Ultra ABC	Retail	4.5
Wisk	Retail	<0.1	London Drugs Ultra Detergent	Retail	<0.1
Ivory Snow	Retail	<0.1	VIP	Retail	<0.1
ALL	Retail	<0.1	*Calgon	Retail	16.6
Ultra Oxydol with Bleach	Retail	4.3	Ultra Bold/Fabric Softener	Retail	4.2
Ultra Arctic Power	Retail	4.6	Sunlight-PO ₄ Free Regular	Retail	<0.1
Amaze	Retail	<0.1	No-Name Laundry	Retail	<0.1
Down to Earth Liquid Laundry	Retail	<0.1	Woolco Natural Lemon Scent	Retail	0.1
Woolco Ultra Laundry Detergent	Retail	<0.1	Arm & Hammer Det. w/o PO ₄	Retail	<0.1
Life Brand Nat. Lemon Scent	Retail	1.3	Life Ultra Laundry Detergent	Retail	0.3
No-Name Lemon Fresh	Retail	0.2	No-Name Lemon Fresh Ultra	Retail	0.2
Pres. Choice Ex. White Scented	Retail	4.8	Pres. Ch. Ex. White Unscented	Retail	0.2
Zero	Retail	0.2	Woolite	Retail	0.2
Easy-Off Carpet Cleaner	Retail	<0.1	Easy-Off Carpet Shampoo	Retail	<0.1
Treasure Washing Detergent	Retail	<0.1	Right Now Washing Liquid	Retail	<0.1
Industrial Tide	Retail	3.3	Value Price Laundry Detergent	Retail	1.4
IGA Ultra Detergent	Retail	<0.1	IGA Detergent	Retail	<0.1
KMart Ultra Brite/Bleach	Retail	<0.1	Twice As Fresh	Retail	<0.1
Ultra Purex	Retail	<0.1	*Forever New	Retail	22.5
Attack	Retail	0.3	Supreme Club	Retail	<0.1
Neutral Liquid Softener	Manfctr	<0.1	Divertex Softener	Manfctr	<0.1
Divertex Sour Soft	Manfactr	<0.1	EM-323	Manfctr	<0.1
Haida Detergent	Manfactr	<0.1	Haida Distributor's Powder	Manfctr	4.2
Watkins Generation 3	Distribr	<0.1	(TransC) Carpet Cleaning Fluid	Distribr	3.6
Savolite BC700	Manfctr	4.6	Savolite BC17	Manfctr	4.6
Savolite Tally	Manfctr	3.7	Honors Carpet Cleaner	Manfctr	0.2
Lion High Top	Retail	<0.1	*Laundry 240 000-Chemtech	Manfctr	5.8
Laundry 240777-Chemtech	Manfctr	0.8	*Laundry 242 000-Chemtech	Manfctr	6.0
Amway SA+8	Distribr	3.8	Amway SA8	Distribr	<0.1
New Look Carpet/Upholstery	Distribr	0.1			

FISHERIES ACT INSPECTIONS

Introduction

The federal government has a responsibility and the jurisdiction to protect and conserve Canada's fisheries resource under the *British North America Act* (now the *Constitution Act*, 1982). As early as 1868, the Parliament of Canada enacted the *Fisheries Act* to enable it to carry out this responsibility. The *Fisheries Act* has specific sections that pertain directly to the protection of fish and fish habitat, and management of the fisheries resource. Under agreement with the Department of Fisheries and Oceans (DFO), Environment Canada enforces subsection 36(3) of the Act, commonly referred to in this report as the "general or pollution provisions of the *Fisheries Act*."

Subsection 36(3) prohibits the deposit of substances that are deleterious to fish into a place where the substance may enter or does enter waters that are frequented by fish. It is, essentially, a "zero discharge" statute that prohibits any quantity of a "deleterious substance" from being discharged, unless there is a regulation that permits the discharge. Subsection 36(4) of the *Fisheries Act* provides for regulations to be written that allow the discharge of "deleterious substances" in limited quantities or under certain conditions.

In order to determine compliance, it must first be determined whether or not a substance is "deleterious." A "biological toxicity test method" is used to make this determination. The two most common tests are the 96-hr LT₅₀ and the 96-hr LC₅₀ fish bioassays.

The 96-hr LT₅₀ Test

The 96-hr LT₅₀ Lethal Toxicity test for 50% survival is the test commonly used to determine compliance with the general provisions of the *Fisheries Act*. This test exposes the test fish (rainbow trout, coho salmon, or Atlantic salmon) to undiluted (i.e., 100% concentration) effluent for a period up to 96 hours. To pass this test, at least 50%, or five out of ten, of the test fish must survive after 96 hours of exposure. If five or more test fish survive, the effluent is said to be "non-acutely lethal." If more than five test fish die, the effluent is said to be "acutely lethal" and the sample fails or may be out of compliance with the stipulated criteria of a regulation.

The 96-hr LC₅₀ Test

The "LC₅₀" test is the median (of several tanks of different concentrations of effluent) Lethal Concentration (the concentration of the effluent [in water] that is lethal to 50% of the test organisms). The LC₅₀ limits are derived by statistical analysis of mortalities in several test concentrations after a fixed period of exposure. The duration of exposure must be specified. The most common organisms for regulatory purposes are rainbow trout (*Oncorhynchus mykiss*), coho salmon (*Oncorhynchus kisutch*), or Atlantic salmon (*Salmo salar*). The most common time of exposure for regulatory purposes is 96 hours.

Summary

The 96-hr LT₅₀ determines whether or not an effluent is acutely lethal. The 96-hr LC₅₀ helps to determine how toxic the effluent is and what dilution would be required to make it non-acutely lethal. If there is no regulation in place, the 96-hr LT₅₀ is used as the compliance test. Where there is a regulation (to allow the discharge of a deleterious substance) in place, either test may be specified as the compliance criteria.

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14.0 MUNICIPAL SEWAGE TREATMENT PLANTS - FISHERIES ACT

Written/compiled by Peter Krahn and Keith Hebron, Inspections Section

14.1 Background

This is the second year of a two-year study in determining the compliance history of ten municipal domestic sewage discharges to the Fraser River basin. The authority to inspect these facilities is subsection 36(3) of the *Fisheries Act*.

14.2 Compliance Verification Mechanism

The inspection program sampled ten out of 33 sewage treatment plants in the Fraser River basin. The ten sites in this study represent different volumes of effluent discharges and varying levels of effluent treatment, as well as different abilities to achieve compliance with existing provincial permits. They are: Kent and Mountain Institutions in Agassiz, Hope, Prince George, Williams Lake, Kamloops, Lytton, Chilliwack, Salmon Arm, Aldergrove, and Merritt.

EP inspectors conducted quarterly inspections to cover seasonal impacts on treatment efficiency and effluent quality during different fishery conditions (spawning and migration). Federal compliance criteria is based on measuring the effluent toxicity using the 96-hr LC₅₀ rainbow trout bioassay. The

facility is considered to have a passing effluent when the 96-hr LC₅₀ is equal to 100% (i.e., at least 50% of the fish survive in a sample concentration of 100%). When 96-hr LC₅₀ results were reported as values less than 100%, this indicated that the effluent required some dilution before it could be rated as non-acutely toxic. Effluent samples were collected for ammonia, nitrite, nitrate, total phosphates, total suspended solids, and biochemical oxygen demand.

14.3 Compliance Status

Of 40 inspections, 23 were found in compliance, for an overall rating of 58%. The Merritt sewage treatment plant demonstrated full compliance with the requirements of the *Fisheries Act* during the audit period. The remaining nine municipalities showed periodic acutely toxic discharges during the same audit period.

Compliance status is based on the ability of each site to pass the 96-hr LC₅₀ acute lethality test in the majority (3 of 4) of audits. Figure 14.1 lists the percentage of compliance for each site and season.

Figure 14.1 96-hr LC₅₀ (Rainbow Trout) Test Results for 1993-94 Inspection Program

Location	Spring 93	Summer 93	Fall 93	Winter 94
Kent Inst. (Agassiz)	100%	100%	100%	70%
Hope	74.8%	100%	100%	100%
Prince George	67.2%	100%	74.8%	100%
Williams Lake	70.4%	74.8%	74.8%	70.2%
Kamloops	70%	79.6%	100%	91.3%
Lytton	74.8%	74.8%	74.8%	47%
Chilliwack	70%	100%	100%	79.4%
Salmon Arm	100%	100%	100%	89.3%
Aldergrove	75.6%	74.8%	100%	75.6%
Merritt	100%	100%	100%	100%

Analytical results for the other parameters are presented in individual tables per site. The compliance data collected from this program was shared with the BC Environment ministry to support the requirement for a non-acutely lethal effluent in all wastewater permits.

Kent and Mountain Institutions - Agassiz: These federal prisons are in the District of Kent, at Agassiz in the Fraser Valley. The wastewater facilities are an oxidation ditch, clarifier, and sludge recovery unit. A new clarifier has been built and is expected to come on-stream by April 1994. Provincial permit levels are 3,300 m³/d discharge, TSS - 60 mg/L, and BOD - 45 mg/L. The flow is directly to the Fraser River.

Enforcement Action: Exceedances of BOD and TSS were noted. The facility has passed the compliance audit for two years in a row. No enforcement action was required.

Hope: This primary treatment facility consists of two aeration lagoons that discharge directly to the Fraser River. Permitted discharge is 136 m³/d, with TSS and BOD each at 100 mg/L.

The facility at Hope did not pass last year's audit. This year, discharge volumes were lower and may account for its apparent improvement in performance. Modifications to the plant to increase treatment capacity may be required to achieve compliance with the *Fisheries Act*.

Enforcement Action: Exceedances of BOD were noted. This facility has been referred to the Fraser Pollution Abatement Office for follow-up action.

Figure 14.2 Analytical Results for Kent and Mountain Sewage Treatment System

Kent (Agassiz)	Spring 1993	Summer 1993	Fall 1993	Winter 1994
96-hr LC ₅₀	100%	100%	100%	70%
NH ₃ (mg/L)	12.7	nd	12.8	24.9
Nitrite (mg/L)	.005	nd	.066	.3
Nitrate (mg/L)	.023	1.83	.024	.3
BOD (mg/L)	13	28	85*	32
Total Phos. (mg/L)	.847	1.57	6	3.5
TSS (mg/L)	19	27	240*	30

Figure 14.3 Analytical Results for the Hope Sewage Treatment System

Hope	Spring 1993	Summer 1993	Fall 1993	Winter 1994
96-hr LC ₅₀	74.8%	100%	100%	100%
NH ₃ (mg/L)	21.3	20	23.2	23.1
Nitrite (mg/L)	.02	6.47	.6	.4
Nitrate (mg/L)	.007	9.96	4.91	.4
BOD (mg/L)	33	139*	92	24
Total Phos. (mg/L)	4.81	4.07	5.45	4.3
TSS (mg/L)	30	58	42	30

nd = not detectable

*Above Permit Level

Prince George: The wastewater treatment facilities consists of an activated sludge process and chlorination and dechlorination. Provincial permits allow a discharge of 1,375 m³/d, with TSS at 60 mg/L and BOD at 45 mg/L. The discharge is directly to the Fraser River.

This plant continues to have periods of high ammonia levels. Treatment capacity upgrades have not materialized and this will continue to be of major concern to compliance authorities.

Enforcement Action: No enforcement action is indicated at this time. The Fraser Pollution Abatement Office of Environment Canada is working cooperatively with the City of Prince George to resolve the technical deficiencies.

Williams Lake: Permitted discharge rates for this moderate-sized city are 8,000 m³/d, BOD at 45 mg/L and TSS at 60 mg/L. New polishing and process water cells have been added recently to the aerobic and anaerobic lagoons.

This site has consistently failed the acute toxicity test. The additional cell components should have reflected an improvement in the water quality, but this has not happened. Recent amendments to the provincial permit include the 96-hr LT₅₀ test as a water quality standard.

Enforcement Action: No enforcement action is indicated at this time. The facility has been referred to the Fraser Pollution Abatement Office for follow-up action.

Figure 14.4 Analytical Results for the Prince George Sewage Treatment Plant

Prince George	Spring 1993	Summer 1993	Fall 1993	Winter 1994
96-hr LC ₅₀	67.2%	100%	74.8%	100%
NH ₃ (mg/L)	34.9	.122	32.9	17.8
Nitrite (mg/L)	.006	.46	.002	.3
Nitrate (mg/L)	.008	1.69	.017	.3
BOD (mg/L)	13	25	27.1	16
Total Phos. (mg/L)	4.6	5	7.78	2.6
TSS (mg/L)	10	50	40	20

Figure 14.5 Analytical Results for the Williams Lake Sewage Treatment Plant

Williams Lake	Spring 1993	Summer 1993	Fall 1993	Winter 1994
96-hr LC ₅₀	70.4%	74.8%	74.8%	70.2%
NH ₃ (mg/L)	12.6	16.9	17.8	21.9
Nitrite (mg/L)	.65	6.15	.003	.3
Nitrate (mg/L)	.021	6.43	.036	.3
BOD (mg/L)	30	29	19.4	14
TSS (mg/L)	40	39	14	10

Kamloops: Authorised works for Kamloops consist of anaerobic and aerated lagoons, phosphorus precipitation, and infiltration and chlorination/dechlorination facilities. Permits are for discharges of 15,700 m³/d to infiltration basins and 6,000 m³/d by irrigation, 60 mg/L TSS, and 45 mg/L BOD. Recent amendments to the provincial permit now allow the works to discharge to the Thompson River on a year-round basis. The 96-hr LC₅₀ acute lethality test is also part of the standards of the provincial permit. The bioassay results suggest that the treatment plant performance is improving. Ammonia appears to be the leading factor in the failed bioassay results. Plant operators are continuing work on solving this problem.

Enforcement Action: No enforcement action is indicated at this time. The facility has been referred to the Fraser Pollution Abatement Office for follow-up. The provincial permit requirement for non-acutely lethal effluent will continue to be enforced by the BC Environment ministry.

Lytton: The authorised works of Lytton's sewage treatment system consists of a spirogester (primary clarifier with sludge removal) with direct discharge to the Fraser River. Permits are for 365 m³/d discharge, BOD and TSS at 100 mg/L.

This plant continues to operate well within the provincial permit, which currently does not include the 96-hr LC₅₀ test. High ammonia concentrations are likely the principal cause for effluent toxicity.

Enforcement Action: No enforcement action is indicated at this time. The facility has been referred to the Fraser Pollution Abatement Office for follow-up.

Figure 14.6 Analytical Results for the Kamloops Sewage Treatment Plant

Kamloops	Spring 1993	Summer 1993	Fall 1993	Winter 1994
96-hr LC ₅₀	70%	79.6%	100%	91.3%
NH ₃ (mg/L)	18.9	3.55	4.74	19
Nitrite (mg/L)	.018	.04	.005	.04
Nitrate (mg/L)	.062	18	7.87	1.01
BOD (mg/L)	10	30	9	8.5
Total Phos. (mg/L)	.2	1.41	.83	.73
TSS (mg/L)	10	22	10	10

Figure 14.7 Analytical Results for the Lytton Sewage Treatment Plant

Lytton	Spring 1993	Summer 1993	Fall 1993	Winter 1994
96-hr LC ₅₀	73.8%	74.8%	74.8%	47%
NH ₃ (mg/L)	20.8	17.7	29.2	19.3
Nitrite (mg/L)	.018	.04	.005	.04
Nitrate (mg/L)	.007	.006	.033	.033
BOD (mg/L)	84	54	57	79
Total Phos. (mg/L)	3.83	2.5	4.21	3.9
TSS (mg/L)	55	50	50	40

Chilliwack: This facility has a permitted discharge of 45,000 m³/d, with BOD at 45 mg/L and TSS at 60 mg/L. The authorised works consist of sedimentation tanks, secondary treatment facilities consisting of a trickling filter, clarifiers, anaerobic sludge digesters, belt filter press, and chlorination/ dechlorination plant.

High levels of ammonia appear to be coincidental in the two bioassay failures, and plant workers are attempting to determine the cause.

Enforcement Action: Remedial action to deal with the ammonia problem is anticipated soon. No enforcement action is required at this time.

Salmon Arm: Authorised works at Salmon Arm include a fixed/suspended-growth secondary treatment plant with biological phosphorus removal, chlorination/dechlorination facilities, and an auto-thermophilic aerobic digester. Permitted discharge rates are 5,680 m³/d to Shuswap Lake (part of Thompson River system, major tributary of the Fraser River), and 30 mg/L BOD and 40 mg/L TSS.

This plant continues to operate within acceptable standards, but there will be pressure on it in the near future because the community is growing at a very fast rate. Two exceedances of BOD were noted.

Enforcement Action: This facility has a high compliance rate with respect to the *Fisheries Act*; no enforcement action is required at this time.

Figure 14.8 Analytical Results for the Chilliwack Sewage Treatment Plant

Chilliwack	Spring 1993	Summer 1993	Fall 1993	Winter 1994
96-hr LC ₅₀	70%	100%	100%	79.4%
NH ₃ (mg/L)	25.2	2.36	13.2	23.3
Nitrite (mg/L)	.003	.243	1.2	.009
Nitrate (mg/L)	.008	10.8	10.2	4.44
BOD (mg/L)	40	19	31.8	28
Total Phos. (mg/L)	4.62	4.55	5.34	5.64
TSS (mg/L)	32	<9	<9	10

Figure 14.9 Analytical Results for the Salmon Arm Sewage Treatment Plant

Salmon Arm	Spring 1993	Summer 1993	Fall 1993	Winter 1994
96-hr LC ₅₀	100%	100%	100%	89.3%
NH ₃ (mg/L)	12.4	.056	15.8	16.2
Nitrite (mg/L)	.854	.234	.2	.14
Nitrate (mg/L)	8.13	14.6	.147	.113
BOD (mg/L)	45*	27	55*	31
Total Phos. (mg/L)	.584	1.49	5.42	2
TSS (mg/L)	10	12	20	16

*Above Permit Level

Aldergrove: The authorised works for this facility are a bar screen, two aerated lagoons, with chlorination and sludge-handling facilities. The permitted discharge is part of the 7,500 m³/d discharge allowed for the Township of Langley, with BOD at 45 mg/L and TSS at 60 mg/L.

The treatment capacity of this facility is being exceeded consistently, which is coincident with the high ammonia concentrations and frequent failures of the 96-hr LC₅₀ bioassay. There is a possibility that it will be decommissioned and all effluent will be routed through other plants.

Enforcement Action: Periodic exceedances of BOD were noted. No enforcement action is indicated at this time. The facility has been referred to the Fraser Pollution Abatement Office for follow-up.

Merritt: Authorised works for the Merritt sewage treatment plant include an activated sludge secondary treatment plant with phosphorus reduction facilities, mechanical sludge-dewatering equipment, influent equalisation basins, settling basin, and a rapid infiltration basin when required. The plant is permitted to discharge 4,200 m³/d to the Coldwater River, with BOD permitted at 30 mg/L and TSS at 40 mg/L.

While periodic exceedances of BOD and TSS were noted, Merritt has one of the best overall performance records of any facility inspected in this compliance monitoring program.

Enforcement Action: No enforcement action is required.

Figure 14.10 Analytical Results for the Aldergrove Sewage Treatment Plant				
Aldergrove	Spring 1993	Summer 1993	Fall 1993	Winter 1994
96-hr LC ₅₀	75%	74.8%	100%	75.6%
NH ₃ (mg/L)	26.1	30.8	20.1	30.7
Nitrite (mg/L)	.097	1.33	4.2	.024
Nitrate (mg/L)	.152	2.0	9.61	.62
BOD (mg/L)	35	84*	62.5*	57*
Total Phos. (mg/L)	6.7	5.94	8.75	7.5
TSS (mg/L)	30	21	45	30

Figure 14.11 Analytical Results for the Merritt Sewage Treatment Plant				
Merritt	Spring 1993	Summer 1993	Fall 1993	Winter 1994
96-hr LC ₅₀	100%	100%	100%	100%
NH ₃ (mg/L)	16.3	14	8.31	4.74
Nitrite (mg/L)	.055	.79	.024	.006
Nitrate (mg/L)	.128	2.2	8.42	2.42
BOD (mg/L)	26	55*	46*	19
Total Phos. (mg/L)	1.4	2.47	3.07	2.5
TSS (mg/L)	20	90*	40	31
*Above Permit Level				

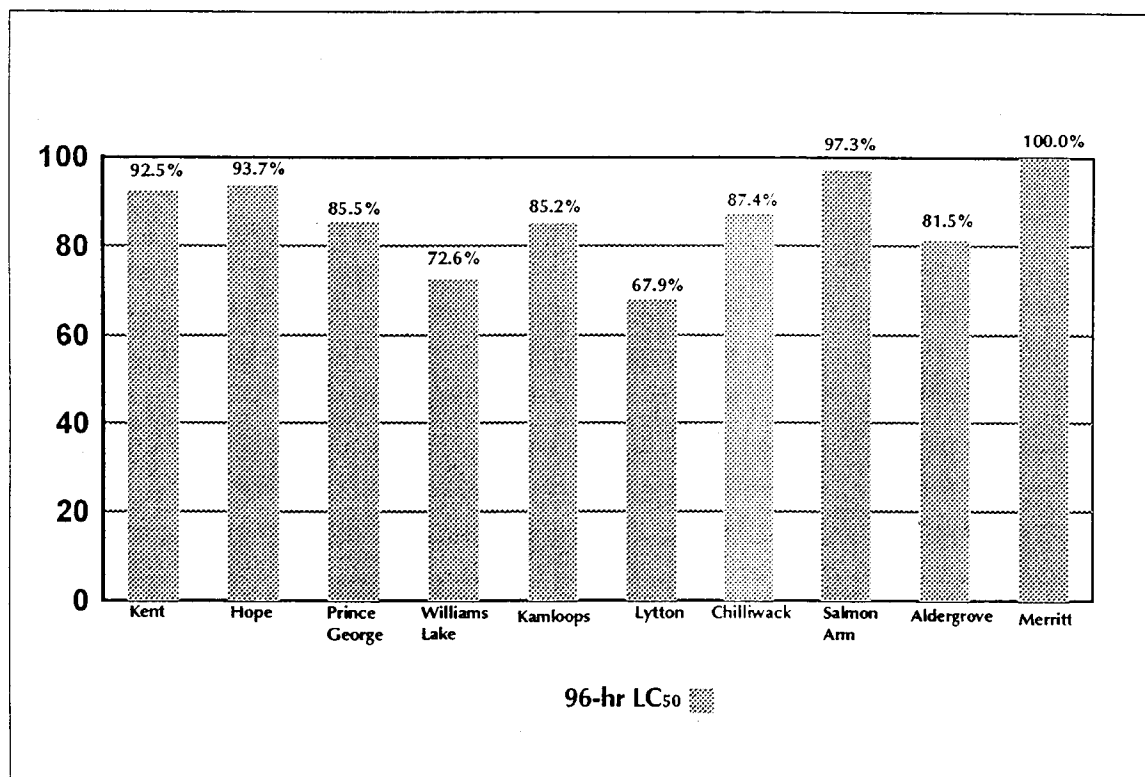
14.4 Results of Inspection Program

The 1993-94 sewage treatment plant inspection program has found four out of ten sites (Kent, Hope, Salmon Arm, and Merritt) generally in compliance with the pollution provisions of the *Fisheries Act*. Six of the ten sites in the audit were carried over from the previous year's Fraser Basin Inspection Program and two of these six showed enough improvement to be in compliance (Kent and Hope). Of the four new sites chosen to audit, only two were in compliance (Merritt and Salmon Arm).

Minor improvements over the 1992-93 inspection program occurred at the larger sewage treatment plants, such as Prince George, Williams Lake, and Kamloops. The facilities showing poor compliance will have to make modifications to improve their performances. Additional inspections will be required to verify that these facilities are progressing towards full compliance. Figure 14.12 shows the overall compliance for acute lethality in the 1993-94 inspection program.

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Figure 14.12 Overall Compliance (Acute Lethality) for the 1993-94 Municipal Sewage Treatment Plant Inspection Program



15.0 ANTISAPSTAIN FACILITIES - *FISHERIES ACT*

Written/compiled by Peter Krahn, Inspections Section

15.1 Background

Freshly cut softwood lumber (other than cedar) is subject to attack by microorganisms, such as fungi and mould. These cause stains and blemishes that reduce the wood's marketability and are termed "sapstaining fungi." These organisms may also create conditions that enable other organisms to attack the structural integrity of the wood.

To protect freshly cut lumber, it is usually treated with antisapstain chemicals at sawmills and lumber export terminals prior to shipping. The antisapstain treatment is a light surface coating designed to protect the lumber for about one year. Pentachlorophenol (PCP) and tetrachlorophenol (TTCP) were the products used for almost 40 years, until they were de-registered on December 31, 1990. The replacement chemicals and the regulated limits in stormwater runoff are listed in Figure 15.1. Chlorophenates are still regulated in stormwater run-off by the *BC Antisapstain Chemical Waste Control Regulation*.

In order to respond to the environmental and health concerns related to the use of antisapstains at facilities that apply wood protection chemicals, the Environmental Protection Directorate of Environment Canada proposed in 1981 the establishment of the British Columbia Chlorophenate Wood Protection Task Force. The members of the task force included representatives from federal and provincial government agencies, the forest industry, WCB, and labour unions. The task force was given the responsibility of investigating the use of chlorophenates at wood protection facilities in BC and to develop practical measures for environmental and health protection.

A technical review of wood protection practices in BC was performed by the task force, which developed a Code of Good Practice for the design and operation of wood protection facilities [21]. The Code provides recommendations for workers' health and safety and for the storage, transportation, and use of chlorophenates; and the disposal of chlorophenate liquids, contaminated water, and solid wastes.

The Code has been revised to include the new chemicals. It is intended to protect the environment and workers from harmful exposure by making recommendations to minimize:

- » concentrations of antisapstain chemicals in stormwater runoff,
- » the toxicity of the stormwater runoff, and
- » the rate of antisapstain chemical emissions to the air from antisapstain chemical spray booths.

The Code is not part of any environmental legislation, rather, it reflects practices that should be implemented to achieve compliance with the *Fisheries Act*, the *BC Waste Management Act*, and the *BC Workers' Compensation Board Industrial Health and Safety Regulation*.

15.2 Inspection Mechanism/Status of Code Implementation

The Code outlines design parameters and recommended practices in handling antisapstain chemicals. These practices include fire and spill contingency plan, chemical delivery and storage area, chemical mixing area, treatment process spray box, treatment process dip tank, treated wood storage area, and sludge and waste handling.

Inspections conducted during dry weather would determine if these criteria were being implemented. The Inspections program for the Fraser River basin did not focus on these types of facilities for this reporting period, and dry-weather inspections were not conducted for 1993-94. Two wet-weather inspections were conducted, however, and samples of lumber leachates and yard stormwater runoff were collected for chemical and toxicity analyses. These analyses are not yet completed.

As of the end of the previous reporting period, seven antisapstain facilities in the Fraser River basin (13 percent of all such facilities in BC) had been inspected. At that time, not all companies were found

in compliance with the Code (overall rate of 77 percent compliance among facilities inspected). While compliance is voluntary, all facilities are still regulated by pollution provisions of the *federal Fisheries Act*.

15.3 Enforcement Action

The appropriate enforcement actions will be taken, if necessary, after the analytical data from the two wet weather inspections has been evaluated.

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Figure 15.1 Antisapstain Agents in Use in the Fraser River Basin		
Formulations in Use (Trade Names)	Active Ingredient*	Regulated Limit in Stormwater Runoff (for BC) in ppb**
Busan 1030 and 30 WB	TCMTB	6 ppb
NP-1	DDAC and IPBC	700 ppb 120 ppb
Timbercote II	DDAC	700 ppb
Timbercote 2000	DDAC	700 ppb
F2	DDAC and Borax	700 ppb not specified
NYTEC GD	Cu-8	15 ppb
PQ-8	Cu-8	15 ppb
Rodewood 200 EC	Azoconazole	not specified
Ecobrite	SC and Borax	not specified not specified
Woodbrite 24***	PCP and TTCP	6 ppb 6 ppb
Diatox***	PCP and TTCP	6 ppb 6 ppb
Woodsheath***	PCP and TTCP	6 ppb 6 ppb
Alchem 4135***	PCP and TTCP	6 ppb 6 ppb
Chapco Cl***	PCP and TTCP	6 ppb 6 ppb
*TCMTB = 2-(thiocyanomethylthio) benzothiazole *DDAC = Didecyldimethyl ammonium chloride *IPBC = 3-iodo-2-propynyl butyl carbamate *Cu-8 = Copper-8-Quinolinolate *PCP = Pentachlorophenate *TTCP = Tetrachlorophenate *SC = Sodium Chloride **ppb = parts per billion *** = De-registered on December 31, 1990		

16.0 WOOD PRESERVATION FACILITIES - FISHERIES ACT

Written/compiled by Peter Krahn, Inspections Section

16.1 Background

Wood preservation processes consist of either pressure or thermal impregnation of chemicals into wood to a depth of several centimetres, and can protect the wood for decades. This treatment provides an effective long-term resistance to attack by fungi, insects, and marine borers. Wood preservation chemicals are divided into two categories: pentachlorophenol (PCP) or creosote in oil solutions; and mixtures of copper-chromium-arsenic (CCA), or ammoniacal copper arsenate (ACA) dissolved in water solutions.

There are 19 wood preservation facilities in BC, which use an estimated 4500 T of wood preservation chemicals annually. These sites were known to have significant effects on the environment.

During 1983-84, as part of a federal strategy to protect human health and the environment from toxic chemicals, Environment Canada conducted an evaluation of the use of chemicals and operational practices in the Canadian wood preservation industry. Subsequently, the department established a Technical Steering Committee (TSC) composed of representatives from government agencies, the wood preservation industry, and forestry labour unions, and workers compensation boards. The primary objective of the TSC was to develop detailed technical recommendations for the design and operation of plants that would reduce or eliminate the release of wood preservation chemicals into the environment and minimize worker exposure.

The TSC submitted its draft recommendations to Environment Canada and, in 1988, published a series of five documents under the general title: *Recommendations for the Design and Operation of Wood Preservation Facilities* [21]. These publications address the predominant wood preservation chemicals in use in Canada.

The recommendations are not part of any environmental legislation, rather, they reflect practices that should be implemented to achieve compliance with

the *Fisheries Act*, the *BC Waste Management Act*, and the *Workers' Compensation Board Industrial Health and Safety Regulations*. Compliance with the recommended Code of Practice is voluntary.

16.2 Inspection Verification Mechanism

The degree to which mills implement Code recommendations is determined through compliance verification inspections of the plants.

The Code outlines several design parameters and practices in handling wood preservation chemicals, including chemical delivery areas, chemical storage areas, chemical mixing areas, treatment process systems, freshly treated wood storage areas, long term storage, fire and spill contingency plans, personnel protection, and environmental monitoring. Inspections conducted during dry weather would determine if these criteria were being implemented. Wet-weather inspections are done to collect surface water/yard runoff samples in order to assess the potential for or degree of contamination to the receiving environment.

16.3 Status of Code Implementation

This reporting period, six wood preservation facilities in the Fraser River basin were inspected during wet weather conditions. Water and sediment samples were collected to determine the impact of wood preservation chemicals leached from treated wood at each site. Because the data has not been analysed at the time of publication of this report, no statements can be made regarding the status of code implementation or the status of compliance with the *Fisheries Act*.

16.4 Enforcement Action

The fish toxicity and soil samples are being analysed and assessed for compliance with the *Fisheries Act*. Appropriate enforcement actions will be taken based on the analytical results.

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17.0 WOOD WASTE - FISHERIES ACT

Written/compiled by Peter Krahn, Inspections Section

17.1 Background

Wood waste originates from three principal sources: forest debris, mill residues, and demolition debris. The improper use or disposal of wood waste can result in air pollution, destruction of habitat, and the discharge of leachates and effluents that are toxic to plants, fish, and other aquatic life. Guidelines to prevent damage to fish and fish habitat from the transportation, storage, use, and disposal of wood waste are targeted for publication and general distribution in 1994-95. While these guidelines are designed to provide preventive advice and are not legally enforceable, their recommended practices will contribute to compliance of the pollution provisions of the *Fisheries Act*.

The discharge of wood waste solids or leachates may violate subsection 35(1) of the *Fisheries Act* by harmfully altering or disrupting fish habitat. The most common form of damage is caused by smothering spawning or rearing areas with wood solids. The discharge of leachates may violate subsection 36(3) of the *Fisheries Act* by being acutely toxic to fish or fish eggs.

The primary sources of wood waste solids and leachates are log dumps and booming grounds, and in the ubiquitous use of wood wastes as a fill material. Leachates from these sources contain water and organics, including tannins and lignins, resin acids, and phenols. Wood waste may be contaminated with oil from forestry operations, and heavy metals or organic wood preservatives from wood treating (wood preservation and antisapstain) facilities. These leachates can be acidic, high in biochemical oxygen demand (BOD) and chemical oxygen demand (COD), have a strong odour, dark colour, and contain dissolved metals.

Wood waste also presents a physical barrier to fish, fish habitat, fish eggs, and other aquatic organisms. Acute and sub-acute toxicity to fish and other aquatic organisms have been well documented.

17.2 Inspection Verification Mechanism

Site inspections are the primary mechanism for verifying compliance to the *Fisheries Act* and degree of implementation of the guidelines. These inspections include physical observations to evaluate habitat destruction or loss, identification and sampling of leachate discharges, and inspection of leachate treatment or containment systems.

17.3 Compliance Status

This fiscal year, four inspections were carried out as part of the development of an inspection protocol. No samples were collected at these four sites. Further inspection activities will be based on assessing the degree of implementation of the guidelines, which are expected to be published later in 1994.

17.4 Enforcement Action

One investigation has been completed at a lower Fraser basin property in Maple Ridge that drains into the Alouette River, a tributary of the Fraser River. The wood waste was buried as fill material for a horse corral. The leachate from the property was allegedly contaminating a neighbour's property, as well as affecting the river habitat. Sampling of leachate, surface water, and groundwater was carried out in conjunction with the BC Ministry of Environment, Lands and Parks. The property owner was charged with three counts under the *BC Waste Management Act* and eight counts under the *Fisheries Act*. The matter is before the courts and no further details can be provided until after the case is heard.

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18.0 MINING - FISHERIES ACT

Written/compiled by Gerry Mitchell and John Holmes, Inspections Section

18.1 Background

The *Metal Mining Liquid Effluent Regulations* (MMLER, SOR/77-178) [10] were promulgated in 1977 under the federal *Fisheries Act*. The regulatory intent is to control pH levels and discharges of liquid effluents containing deleterious substances from base metal, uranium, and iron ore mines in order to provide minimum standards to protect fish and aquatic life. In specific locations where they fail to protect the fishery resources, more stringent requirements may be imposed by the federal government through an order-in-council. Where provincial requirements are more stringent than the federal regulations, the more stringent requirements prevail. The federal regulations apply to metal mines that were opened, expanded, or re-opened after 1977; they do not generally apply to gold mines where gold is recovered by cyanidation. The MMLER are currently under review.

The substances prescribed as deleterious are: arsenic, copper, lead, nickel, zinc, total suspended solids, and dissolved radium 226. The regulations also include stipulations on effluent pH, frequency of sampling, and reporting requirements for flow measurements and analytical results.

Mines operating before 1977 are covered by the *Metal Mining Liquid Effluent Guidelines* (MMLEG, also under review). The guidelines mirror the regulations and have a requirement for monitoring under the *Fisheries Act* to determine that the undiluted mine effluent be non-toxic as determined by the rainbow trout 96-hr LT₅₀ lethal toxicity test. As with the regulations, gold mines using cyanidation leaching processes are exempt. All mines are subject to the general pollution provisions of the *Fisheries Act*.

In addition to the MMLER and MMLEG, there is a voluntary Environmental Code of Practice for Mines.

Of the 26 metal mines in British Columbia, seven are in the Fraser River drainage (Figure 18.1):

- » Five are regulated under the MMLER: Highland Valley Copper, Samatsum, Blackdome,

Craigmont, and Afton. Afton is currently not operating.

- » Two MMLEG, or "guidelines" mines (those that predate the regulations) occur in the Fraser basin: Gibraltar and Endako.

All mines in BC have BC Ministry of Environment, Lands and Parks waste management permits. The permits require comprehensive controls of mine process and effluent discharge quality and quantity, monitoring, and reporting. Environment Canada's input ensures that the MMLER/MMLEG requirements are reflected in the permit.

18.2 Compliance Verification Mechanism

Two mechanisms are used to verify compliance: site inspections and reviews of company-submitted monitoring data.

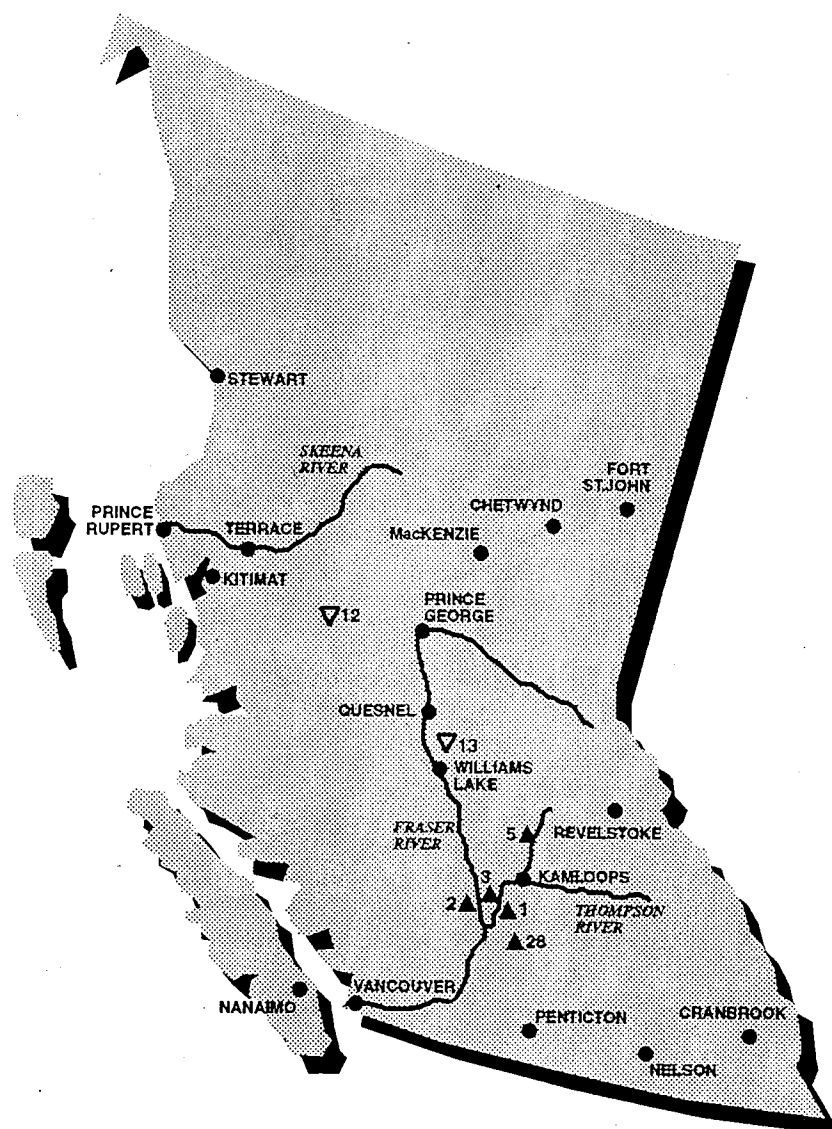
18.2.1 Site Inspections

Inspections are done to verify mine effluent discharge points, obtain audit samples, verify effluent flows, determine drainage patterns, and inspect effluent collection and containment systems. Inspectors discuss operations plans, problems, and operations upsets that may affect effluent discharges with mine personnel. Site inspections are planned to coincide with periods of effluent discharge and with periods of high surface water and groundwater flows. Inspections are carried out on a priority basis. The highest priority is given to mines regulated by the MMLER and to mines with a poor compliance history. Second priority is given to MMLEG mines, gold mines, coal mines, and non-operating mines to assess compliance with the general pollution provisions in subsection 36(3) of the federal *Fisheries Act*.

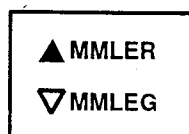
18.2.2 Review of Company-Submitted Monitoring Data

In accordance with section 10 of the MMLER, regulated mines are required to submit copies of monitoring data on a monthly basis. MMLEG mines and discharging gold mines, if not submitting on a

Figure 18.1 Locations of Mines in the Fraser River Basin



MINE INDEX



1. AFTON
2. BLACKDOME
3. HIGHLAND VALLEY COPPER
5. SAMATOSUM
12. ENDAKO
13. GIBRALTAR
28. CRAIGMONT

regular basis, have submitted data when requested. Coal mines and non-discharging mines generally do not submit data. From the data submitted by the mines, final discharge data is extracted and entered into the Mines Database. The database computes monthly means and loading, counts sample data and compares it to MMLER/MMLEG limits, calculates compliance statistics, and generates compliance reports.

18.3 Compliance Status

Endako, Highland Valley Copper, Samatosum, and Gibraltar mines were inspected in this reporting period. Afton, Blackdome, and Craigmont were non-operating during this period. Samatosum closed down during the reporting period and Gibraltar closed temporarily in November 1993.

18.3.1 Audit Sampling

Mines are generally in compliance with their respective MMLER and MMLEG limits, with a low incidence of violations with respect to suspended matter, zinc, and lead. Levels of other metals are one or two orders of magnitude below the MMLER/MMLEG limits. The inspections included audit sampling of any final effluent discharges to the receiving environment.

All the MMLER mines were in compliance with the regulations, and all the MMLEG mines complied with the guidelines.

18.3.2 Review of Monitoring Data

The table in Appendix 2 summarizes the compliance status for monthly means for all reporting mines. Eight mines in BC reported discharges in 1993. One of these in the Fraser River basin was Endako, an MMLEG mine. No audit samples were found in violation of the guidelines.

The compliance rate for both MMLER and MMLEG mines in the Fraser River basin was 100 percent.

18.4 Enforcement Action

No enforcement action was required.

Ω

19.0 PETROLEUM REFINERY LIQUID EFFLUENT REGULATIONS - FISHERIES ACT

Written/compiled by John Holmes, Inspections Section

19.1 Background

The *Petroleum Refinery Liquid Effluent Regulations* [17] were introduced under the authority of the *Fisheries Act* to control the discharge of petroleum refinery effluents into watercourses populated by fish.

The regulations apply to refineries started on or after November 1, 1973. They set limits on the amounts of oil and grease, phenols, sulphide, ammonia nitrogen, and total suspended matter that can be contained in refinery effluents. The regulations also specify pH limits for effluent.

Guidelines were developed that apply to pre-1973 refineries and specify the same parameters. In addition, the guidelines specify an acute fish toxicity for all refineries. The regulations set a national standard that requires the application of the best practicable technology at the time they became effective.

Each refinery is required to test its effluent for each of the five regulated substances (oil and grease, phenols, sulphides, ammonia nitrogen, total suspended matter) three times per week and to record the amount of each discharged on those days. In addition, pH level of the effluent must be measured daily.

Refineries that are subject to the regulations must report the results of the tests. The test method for analysing each parameter is specified by the regulations. All refineries are requested by the guidelines to perform one fish toxicity test each month. The results of all these analyses are to be reported monthly.

19.2 Compliance Verification Mechanism

For the 1993-94 fiscal year, there were four operating refineries in the Pacific Region, all within the Fraser River basin: Chevron (Burnaby), Shell (Burnaby), Esso (Port Moody), and Husky Oil (Prince George). All operate under the *Petroleum Refinery Effluent*

Guidelines (PREG). With the exception of Husky Oil, all process effluents are deposited to municipal sewers. Husky Oil deposits its treated effluent to treatment lagoons at Prince George Pulp & Paper.

The guidelines stipulate objectives for stormwater (oil and grease, total suspended solids, phenols, and acute toxicity) and process water (oil and grease, total suspended solids, phenols, sulphide, ammonia nitrogen, pH, and acute toxicity) quality for petroleum effluent.

With the exception of pH and acute toxicity, the regulations prescribe three levels of objectives for process water effluent: monthly average of daily deposits (MADD), one-day-a-month (ODAM), and never-to-be-exceeded (NTBE). In contrast, the guidelines prescribe only the NTBE objective for stormwater.

NTBE, ODA, and MADD levels are calculated based on refinery crude run rate; pH is stipulated in terms of a range of values, and acute toxicity is a lethal concentration calculation based on crude throughput.

Conformity with the guidelines was verified through review of monitoring data submitted by the refineries. Environment Canada conducted audit sampling at the refineries during this year's inspection program.

The refinery (company-submitted) data is based on a calendar year (1 January to 31 December, 1993; inspections (Environment Canada) data is based on the fiscal year 1 April 1993 to 31 March 1994.

19.3 Compliance Status

With the exception of Husky Oil in Prince George, all of the refineries listed above submitted process effluent and stormwater monitoring data. Husky Oil has combined stormwater with its process effluent. Process effluent from the other three refineries is

discharged to municipal sewer systems where it undergoes further treatment before discharge to the environment.

Appendix 4 lists a summary of the 1993 monitoring data, which outlines the process effluent and stormwater quality for each of the four refineries that reported data.

19.3.1 Process Effluent

Figure 19.1 summarizes the parameters and the numbers tested by the refineries for process effluent. A total of 1,014 analyses (7 parameters) were reported by the four refineries. Of these, 52 excursions (5 percent) of the guidelines objectives were reported in the data submitted. In particular, 23 out of 314 (7 percent) data submitted by Chevron, and 2 out of 269 (0.7 percent) data submitted by Husky Oil exceeded the NTBE objective of the guidelines. Shell had no reportable NTBE excursions, and Esso had two out of 322 (0.6 percent) reportable NTBE excursions during the 1993-94 reporting period.

19.3.2 Stormwater Effluent

Figure 19.2 summarizes the parameters and numbers tested by the refineries for stormwater effluent. A total of 742 analyses were reported by three refineries (Husky Oil doesn't report on this because its stormwater effluent is combined with its process effluent in treatment lagoons at Prince George Pulp & Paper). One of the refineries subject to testing stormwater effluent quality (Shell) had no reportable NTBE excursions. Chevron Canada exceeded the NTBE guidelines four out of 298 tests (1.3 percent), and Esso exceeded one out of 380 tests (0.3 percent).

19.3.3 Frequency of Measurements

The PREG specify measurement of effluent quality three times a week. Because they are subject to guidelines, not regulations, the refineries in the Pacific and Yukon Region report only one measurement per week by following the requirements of Greater Vancouver Regional District sewer use permits and BC Environment stormwater runoff permits.

Figure 19.1 Refinery Process Effluent Excursions (1993)				
Refinery/Location	Number of Tests	MADD*	ODAM*	NTBE*
Chevron Canada Ltd., Burnaby	314	19	4	23
Shell Canada Products Ltd., Burnaby	109	2	0	0
Esso Petroleum Canada, Port Moody	322	0	0	2
Husky Oil Operations Ltd., Pr. George	269	1	0	2

Figure 19.2 Refinery Stormwater Effluent - Monthly Deposits Exceeding Guideline Limits (1993)		
Refinery/Location	Number of Tests	NTBE*
Chevron Canada Ltd., Burnaby	298	4
Shell Canada Products Ltd., Burnaby	64	0
Esso Petroleum Canada, Port Moody	380	1
Husky Oil Operations Ltd., Prince George	n/a	n/a

*MADD = Monthly Average of Daily Deposits

*ODAM = One Day A Month

*NTBE = Never To Be Exceeded

Husky Oil tested for average TSS in its process effluent only once a month, while the other three refineries tested for TSS in process effluent four to six times each month. Refer to Appendix 4 for the details of all tests for each refinery.

19.4 Enforcement Action

Shell Canada is expected to shut down its operations in the Lower Mainland. It is expected that by 1995, only Chevron and Husky Oil refineries will remain in operation in British Columbia.

Although review of refinery monitoring data showed noncompliance with some of the guidelines objectives, no enforcement actions were undertaken.

Ω

20.0 PULP AND PAPER EFFLUENT REGULATIONS - FISHERIES ACT

Written/compiled by Peter Krahn, Inspections Section

20.1 Background

The *Pulp and Paper Effluent Regulations* (SOR/92-269, 7 May 1992) [20] are pursuant to subsections 34(2), 36(5), 37(3), and 38(9), and paragraphs 43(g.1) and (g.2) of S.C. 1991, c.1, s.12(2) of the *Fisheries Act*. These regulations ...*prescribe certain deleterious substances related to the effluent from pulp and paper mills and off-site treatment facilities and authorize the deposit of limited quantities of those deleterious substances in certain circumstances...* Compliance with the federal *Pulp and Paper Mill Effluent Regulations* is mandatory in Canada.

There are ten pulp and paper mills in the Fraser River (see map, Figure 20.1). Three of the Fraser basin mills (Island Paper, Newstech Recycling, and Scott Paper) discharge their effluent to the Greater Vancouver Regional District (GVRD) sewer system and, therefore, do not require monthly reporting or have effluent limits set by the regulations; the GVRD stipulates the limits for these mills. Also, two of the Prince George mills (Prince George Pulp & Paper and Intercontinental Pulp) combine their effluent discharges.

The *Pulp and Paper Effluent Regulations* (PPER) apply to all the mills in the Fraser basin. These regulations replaced the *Fisheries Act Pulp and Paper Effluent Regulations* (CRC c.830) on May 7, 1992. The effluent criteria came into full effect on December 1, 1992.

This report summarizes effluent data from January 1990 and inspection data for the period January 1, 1993 to March 31, 1994.

20.2 Compliance Verification Mechanism

Federal inspectors verify compliance of all the pulp and paper mills in BC by the following methods:

- » conducting on-site inspections using a comprehensive inspection checklist (Appendix

A5.4) that verifies compliance with approximately 80 criteria specified in the regulations

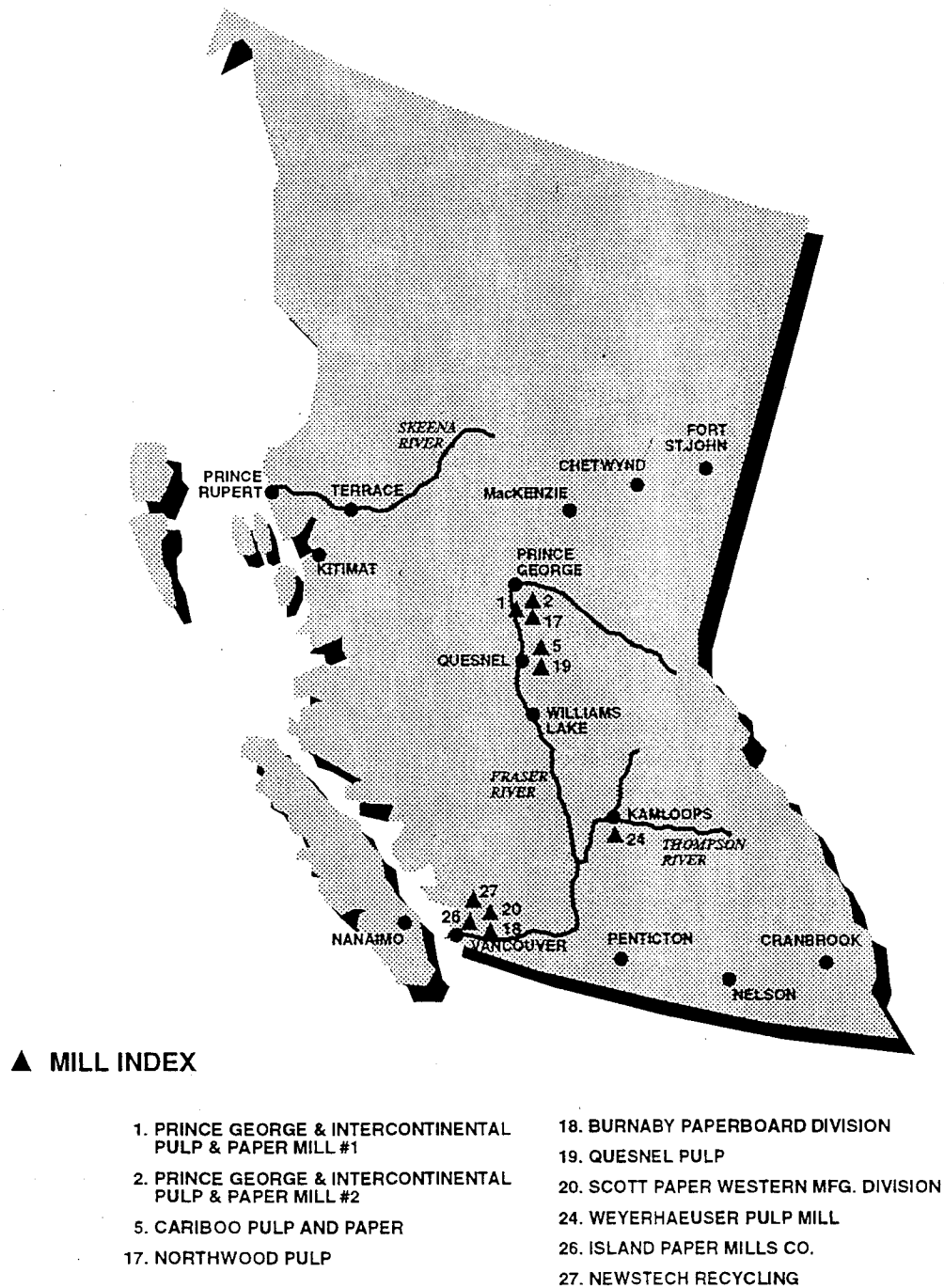
- » collecting independent audit samples
- » reviewing company-submitted data.

Section 27 of the regulations requires that all mills are to declare each outfall that would be discharging effluent. The declaration includes a general description and the plans and specifications of the outfall. The 1993-94 inspections focused on outfalls declared by the companies and considered discharges, such as leachates and other runoff, at selected sites known to be problems. The audit samples of effluent were analyzed for biochemical oxygen demand (BOD), total suspended solids (TSS), and acutely lethal effluent (ALE). Environmental Effects Monitoring (EEM) reports, a requirement as of April 1, 1993, are due by April 1, 1996, therefore, no assessments were made during the current reporting period. However, all Fraser basin mills have begun collecting information for this requirement. The 1994-95 inspection program will consider leachates and runoff at all mill sites.

20.3 Compliance with Technical and Administrative Sections of the PPER

The authority to deposit deleterious substances (BOD, TSS, ALE) is conditional upon the mills complying with technical and administrative requirements in the regulations (Figure 20.2). If a mill complies with these requirements, it is authorized to deposit these substances within the limits specified in Section 14 or 19 of the regulations. Failure to comply with these requirements can result in the withdrawal of the authority to deposit or in enforcement responses that include Warning Letters, investigations, prosecutions, Ministerial Orders, and injunctions.

**Figure 20.1 Locations of Pulp & Paper Mills
in the Fraser River Basin**



20.4 Enforcement Responses to Administrative Violations of the PPER

Monitoring data submitted by the mills was reviewed throughout the reporting period and actions were taken in response to any alleged violations. The actions included one or more of the following:

- » contacting the mills for verification of incident information
- » re-inspection
- » investigation

Figure 20.2 includes data for all BC mills and shows that overall compliance with the technical and administrative requirements of the PPER was consistently high for each section. There was only one enforcement response to administrative infractions in the Fraser basin in 1993. A Warning Letter was issued to Cariboo Pulp & Paper for the Quesnel River Pulp Mill noncompliance with section 8.1 of the PPER (Calibration).

20.5 Compliance With the Effluent Requirements of the PPER

All mills must comply with the acutely lethal effluent (ALE), BOD, and TSS limits specified in sections 6 and 14 of the PPER unless they have been granted one of three types of exemption: an "Authorisation (section 15)," a "Transitional Authorisation" (TA, section 20), or a "Transitional Authorisation Extension" (TAE, section 25).

Sections 15, 20, and 25 of the PPER allow mills to apply for an authorisation to discharge deleterious substances in excess of the normal limits specified in section 14. The authorisations provide additional time to complete effluent treatment systems and allow the mills to come into complete compliance with the PPER.

In 1993, none of the Fraser River basin mills operated under TAs.

Figure 20.2 Technical and Administrative Requirements of the PPER and Percentage of Mills in Full Compliance with Technical Requirements of the PPER in 1993*

PPER Section	Criteria	Rating
8	Install and calibrate monitoring equipment	89%
9	Reporting monitoring results within 30 days	89%
10	Submit ownership information	100%
11	Submit emergency response plans	100%
12	Submit reference production rates	100%
27	Supply information on effluent outfalls	100%
28	Conduct Environmental Effects Monitoring (EEM Reports, due 1 April 1996)	n/a
36	Report Out-of-the-Normal Course of Events	100%
*Does not include un-registered outfalls or leachates		

20.5.1 Compliance with Acutely Lethal Effluent Regulations

Acutely lethal effluent (ALE) is measured by exposing *Daphnia magna* (water flea) or rainbow trout to undiluted mill effluent under controlled conditions for 48 or 96 hours, respectively. The regulations require that at least 50 percent of the test organisms must survive after the required exposure time. This test is called the 48- or 96-hr LT₅₀. The regulations require that *Daphnia magna* tests must be carried out at least once per week and that rainbow trout tests must be

conducted at least once per month. If a *Daphnia magna* test fails, a rainbow trout test must be carried out immediately.

Figure 20.3 shows the data for all BC mills and gives total exceedances of regulated limits for Fraser basin mills. There were two reported *Daphnia magna* failures in 1993 at two mills in the Fraser basin (Scott Paper and Quesnel River Pulp). Scott Paper also failed two rainbow trout LT₅₀ tests. Where a rainbow trout test fails, the frequency of testing must increase to at least once per week.

Figure 20.3 Exceedances of Regulated Limits for BOD, TSS, and ALE for All Pulp Mills in 1993-94 (Days of Discharge)

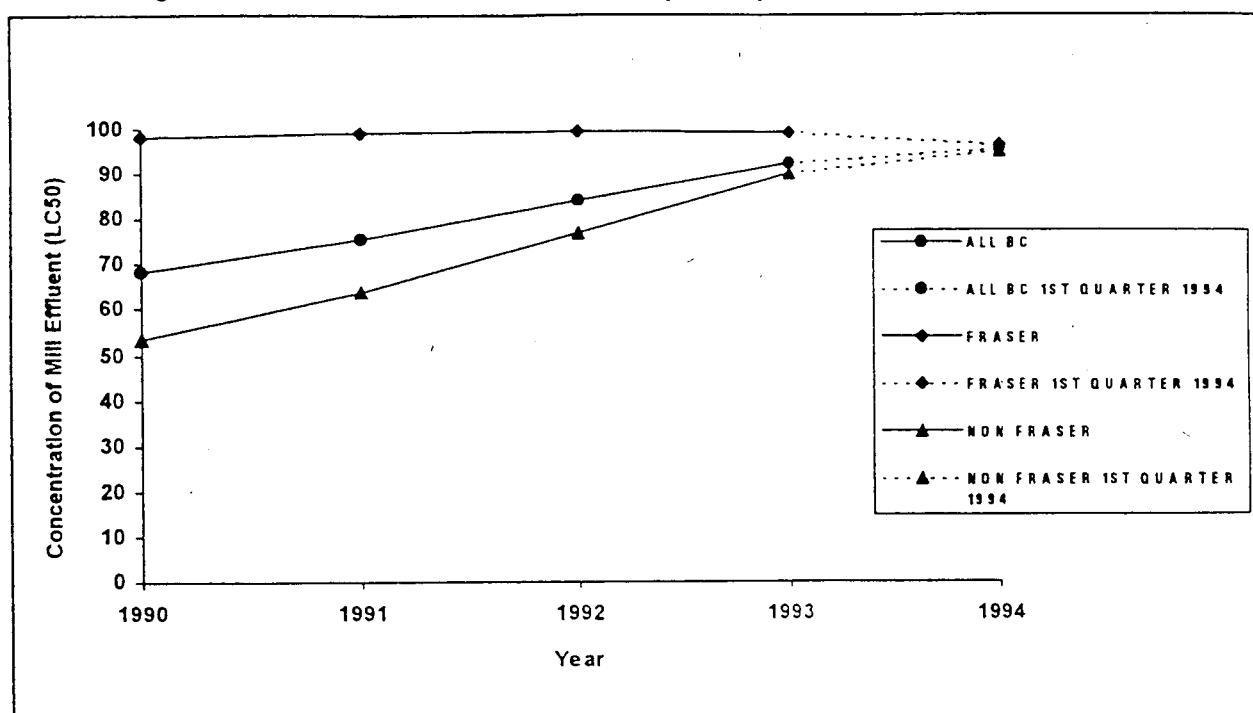
Mill and Location (F = Fraser)	BOD Daily	BOD Monthly	TSS Daily	TSS Monthly	<i>Daphnia</i> Toxicity**	Rainbow Trout Toxicity
Skeena Cellulose, Prince Rupert	--	--	9	--	2	--
Western Pulp Inc., Port Alice Operations	--	--	--	--	--	--
Avenor, Gold River	--	--	2	--	1	2
Fletcher-Challenge, Elk Falls	--	--	--	--	--	--
Macmillan Bloedel, Powell River	--	--	--	--	--	--
Western Pulp, Squamish	--	--	--	--	--	--
Macmillan Bloedel, Port Alberni	--	--	1	--	1	--
Macmillan Bloedel, Harmac	--	--	--	--	--	1
Howe Sound Pulp & Paper	--	--	--	--	11	6
*Newstech Recycling, New Westminster (F)	--	--	--	--	--	--
*Scott Paper, New Westminster (F)	--	--	--	--	1	2
*Island Paper, New Westminster (F)	--	--	--	--	--	--
Paperboard Industries, Burnaby (F)	--	--	--	--	--	2
Fletcher-Challenge, Crofton	--	--	--	--	--	--
Fibreco, Taylor	--	--	--	--	3	--
Louisiana Pacific, Chetwynd	--	--	--	--	--	--
Finlay Forest Products, Mackenzie	--	--	1	--	--	--
Fletcher-Challenge, Mackenzie	--	--	--	--	--	--
Prince George & Intercontinental Pulp & Paper (F)	--	--	--	--	--	1
Northwood Pulp & Timber, Prince George (F)	--	--	--	--	--	--
Cariboo Pulp, Quesnel (F)	--	--	--	--	--	--
Quesnel River Mill, Quesnel (F)	--	--	--	--	1	--
Weyerhaeuser, Kamloops (F)	--	--	--	--	--	15
Crestbrook Forest Industries, Skookumchuck	14	2	--	--	2	5
Celgar Pulp Company, Castlegar	--	--	--	--	--	4
Totals all mills:	1	2	13	0	22	38
Totals Fraser mills (F):	0	0	0	0	2	20
*Discharge to GVRD Sewer System; GVRD sets limits						
** <i>Daphnia</i> toxicity is a trigger to take extra rainbow trout samples.						

Mills within the Fraser River basin had completed secondary treatment systems prior to 1990 and were discharging effluent with an average LC₅₀ of 98.3 percent to 99.4 percent from 1990 to 1993 (Figure 20.4). These mills are expected to have non-acutely lethal effluent in 1994 (i.e., LC₅₀ = 100 percent). The effluent discharged has become progressively less toxic because of the standards that have been required by both federal and provincial regulations and guidelines over the past five years. By December 31, 1995, the number of days for which ALE is discharged should approach zero.

20.5.2 Enforcement Responses to Discharges of ALE

In 1993-94, there were 20 days of unauthorized discharge of ALE from Fraser basin pulp and paper mills (Figure 20.3). Extreme cold weather, which affected woodchip feed stocks and effluent treatment lagoon performance, was the cause of failures at two of the mills. One Warning Letter was issued by the BC Ministry of Environment in response to the most significant incident (Weyerhaeuser Canada Ltd., Kamloops).

Figure 20.4 Rainbow Trout Survival Upon Exposure to Mill Effluent (ALE)



Average LC ₅₀ Toxicity of All BC Pulp & Paper Mills (% Effluent Concentration)				
Year	Fraser Mills	Non-Fraser Mills	All BC Mills	Minimum Allowable Effluent Concentration
1990	98.3	53.6	68.4	n/a
1991	99.3	64.0	75.7	n/a
1992	99.4	77.1	84.2	**100% (Dec. 1, 1992)
1993	99.0	89.9	92.3	**100%
1994	*96.6	*95.2	*95.7	***100%

*First quarter 1994 data

**Five mills with TAs that expired on December 31, 1993

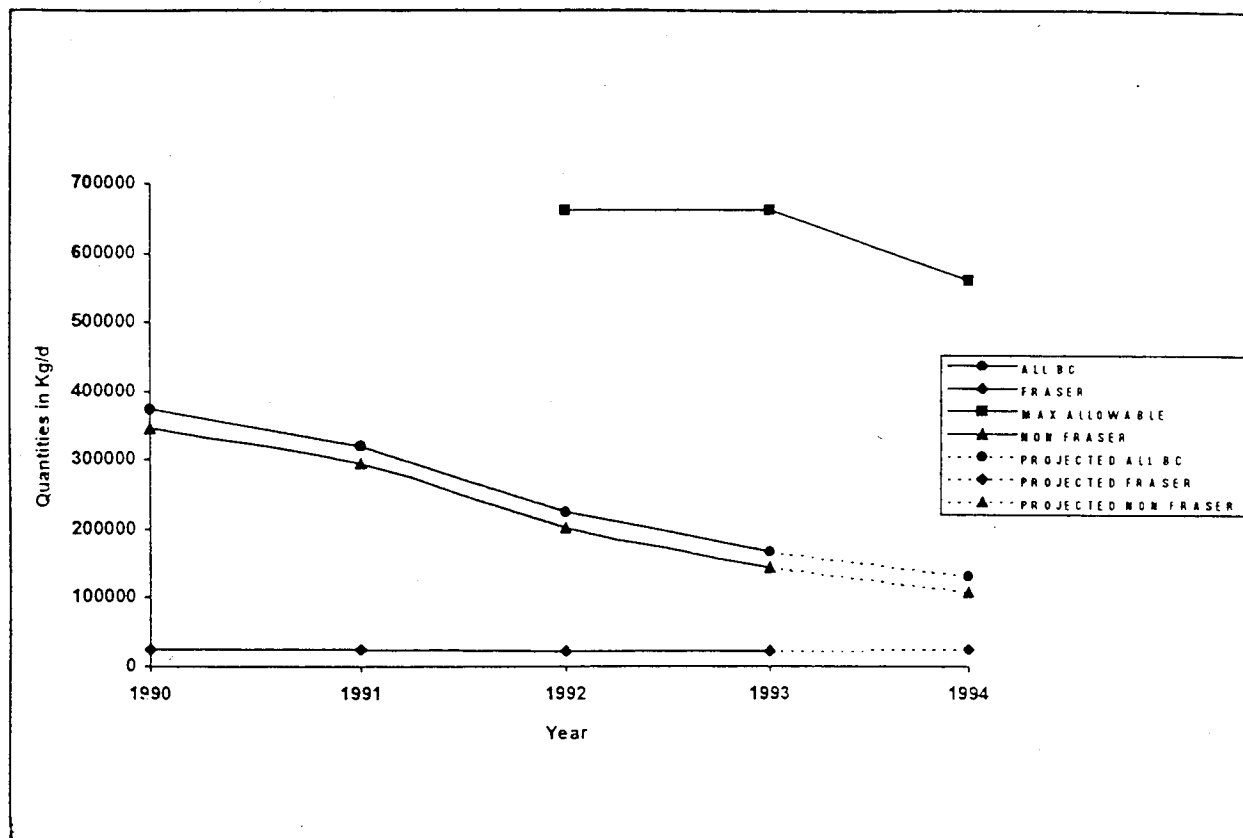
***One mill (Western Pulp Inc.-Port Alice Operations) with a TAE that expires on December 31, 1995

20.5.3 Compliance with Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) Requirements

The trends in the quantities of BOD and TSS discharged from Fraser River basin pulp and paper mills are very similar. Reductions in BOD and TSS discharges were due to the completion of effluent

treatment systems at Fraser River basin pulp and paper mills (Figures 20.5 and 20.6). There was virtually no change in the discharge from Fraser basin mills from 1990 to 1993 because these mills had been required by the province of British Columbia to have secondary treatment systems installed prior to 1990.

Figure 20.5 Average Daily BOD Loadings of All BC Pulp & Paper Mills (kg/d) From 1990 Through 31 March 1994

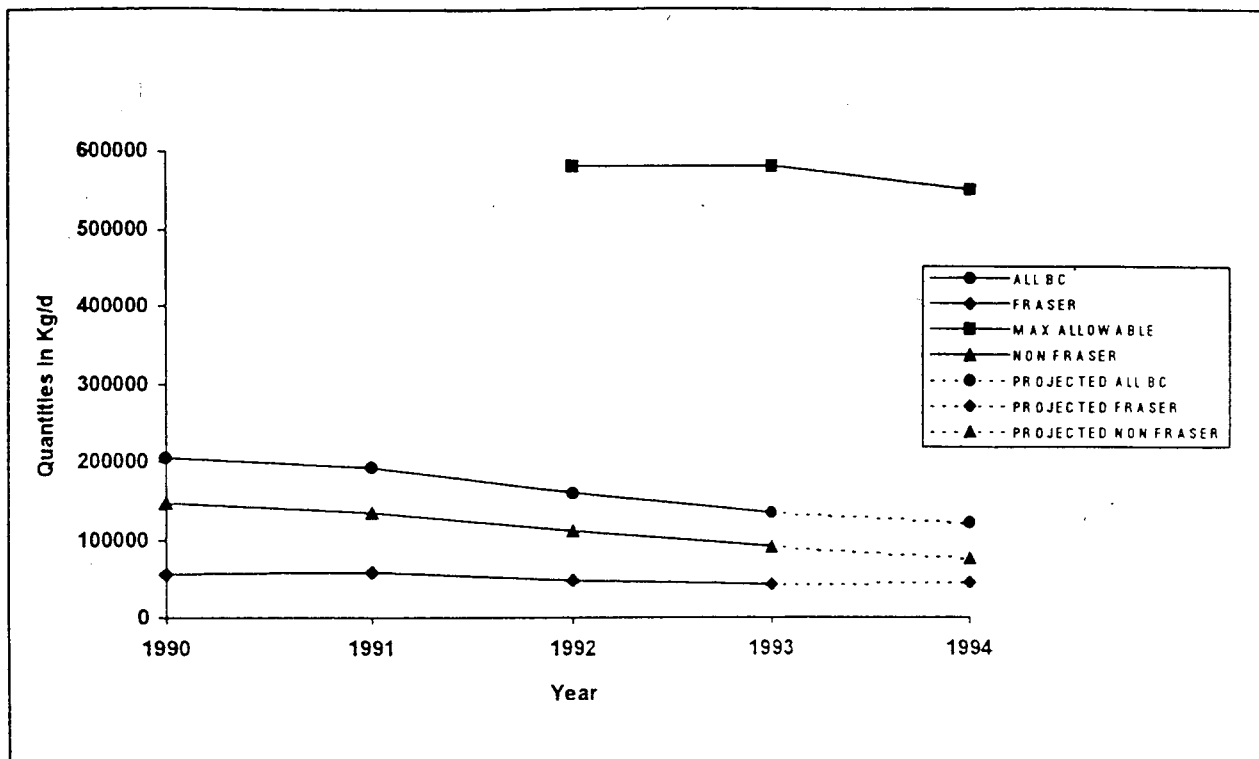


Average Daily BOD Loadings of BC Pulp & Paper Mills (kg/d)

Year	Fraser Mills	Non-Fraser Mills	All BC Mills	Max. Allowable
1990	26175	346719	372894	n/a
1991	24143	296896	321039	n/a
1992	22134	202119	224252	662800
1993	23005	143035	166040	662800
1994	*24008	*107651	*131659	561351

*Based on first quarter results

**Figure 20.6 Average Daily TSS Loadings of All BC Pulp & Paper Mills (kg/d)
From 1990 Through 31 March 1994**



Average Daily TSS Loadings of BC Pulp & Paper Mills (kg/d)

Year	Fraser Mills	Non-Fraser Mills	All BC Mills	Max. Allowable
1990	55912	148026	203938	n/a
1991	57407	134825	192232	n/a
1992	48174	112103	160277	580000
1993	43323	91556	134879	580000
1994	*46256	*76481	*122737	580000

*Based on first quarter results

The total quantities of BOD and TSS discharged in 1994 are not expected to decline significantly over the 1993 amounts.

There were two exceedances of *Daphnia* toxicity at Fraser Basin mills (Scott Paper and Quesnel River Pulp Mill), and 20 exceedances of rainbow trout toxicity (Scott Paper-2, Paperboard Industries-2,

Canfor at Prince George-1, and Weyerhaeuser in Kamloops-15).

Appendix 3 provides a summary of the monthly averages for toxicity, BOD, and TSS for the Fraser basin mills.

Ω

21.0 BIBLIOGRAPHY

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- [3] *Enforcement and Compliance Policy for CEPA*, DOE (May 1988)
- [4] *Canadian Environmental Protection Act*, Part VI-Ocean Dumping (1988) SOR/93-94
- [5] *Chlorobiphenyls Regulations* (SOR/91-152, February 21, 1991)
- [6] *Contaminated Fuel Regulations* (SOR/91-486, August 14, 1991)
- [7] *Export and Import of Hazardous Wastes Regulations* (SOR/92-637, November 26, 1992)
- [8] *Fisheries Act* (R.S.C., 1985, c. F14) June 18, 1992
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- [13] *Ozone-Depleting Substances Regulations #1* (SOR/89-351, June 29, 1989)
- [14] *Ozone-Depleting Substances Regulations #2* (SOR/90-583, August 28, 1990)
- [15] *Ozone-Depleting Substances Regulations #3* (SOR/90-584, August 28, 1990)
- [16] *Federal Mobile PCB Treatment and Destruction Regulations* (SOR/905, September 9, 1992)
- [17] *Petroleum Refinery Liquid Effluent Regulations* (SOR/73670, Nov. 1, 1973)
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- [19] *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations* (SOR/92-267, May 7, 1992)
- [20] *Pulp and Paper Effluent Regulations* (SOR/92-269, May 1992)
- [21] *Chlorophenate Wood Protection, Recommendation for Design and Operation* (C84092-027X, 1983)
- [22] *Secondary Lead Smelter Release Regulations* (SOR/91-155, March 13, 1991)
- [23] *Storage of PCB Materials Regulations* (SOR/92-507, September 9, 1992)
- [24] *BC Pulp and Paper Mills Quick Reference Spreadsheet* (Unpublished)
- [25] *Transportation of Dangerous Goods Act*, R.S.C. 1985 c. T19
- [26] *Transportation of Dangerous Goods Regulations*, 1993
- [27] *Ozone-Depleting Substances Regulations #4* (SOR/93-214, April 1993)
- [28] *Ocean Dumping Regulations Amendment* (SOR/93-433, August 1993)
- [29] *Phosphorus Concentration Regulations* (SOR/89-501, 19 October, 1989)
- [30] *PCB Waste Export Regulations* (SOR/90-453, 27 July 1990)

APPENDIX 1

Compliance Promotion Activities for Proposed Amendments to the *Chlorobiphenyls Regulations* (Sensitive Sites Inspection Program)

- A1.1 List of Government and School District Personnel Who Attended the
January 17, 1994 Compliance Promotion Meeting in the Lower Mainland**
- A1.2 List of Schools Inspected in Lower Mainland (12 School Districts)**

A1.1 List of Government and School District Personnel Who Attended the January 17, 1994 Compliance Promotion Meeting in the Lower Mainland

School district representatives and government staff who attended the January 17, 1994 information meeting on the proposed PCB Regulations at the School Inspection Program.

<u>School District</u>	<u>Contact</u>
North Vancouver SD #44	Lee Schellenberg Ed Downing
West Vancouver SD #45	Michael Mann
Vancouver SD #39	Bryan Miller John Bonnet (contact)
Coquitlam SD #43	Rolph Gravenhorst
New Westminster SD #40	Larry Bryce
Maple Ridge/Pitt Meadows #42	Don Osbourne
Mission SD #75	Sai Wong
Abbotsford SD #34	John Molnar John McQuade
Chilliwack SD #33	Bill Nelson Doug Templeton
Surrey SD #36	Tom Miller
Langley SD #35	Tom Scott

Government Personnel

Emmanuel Mendoza	Environment Canada, Inspections Division
Daniel Bidal	Environment Canada, Commercial Chemicals
Doug Wilson	Environment Canada, Commercial Chemicals
Meegan Armstrong	Environment Canada, Inspections Division
Rob Beleutz	BC Environment, Special Wastes Section

A1.2 List of Schools Inspected in Lower Mainland (12 School Districts), Including Independent Schools

Public Schools	
West Vancouver School District #45	Hillside Middle School Sentinel Secondary
Coquitlam School District #43	Mary Hill Senior Secondary
Vancouver School District #39	Britannia Secondary
Maple Ridge/Pitt Meadows School District #42	Garibaldi Secondary Maple Ridge Senior Secondary Mount Crescent Elementary Whonnock Elementary Westview Secondary Pitt Meadows Secondary
Surrey School District #36	Lord Tweedsmuir Secondary Martha Currie Cloverdale Elementary Princess Margaret Secondary Frank Hurt Secondary William Beagle Junior Secondary Earl Mariot School Newton Junior Semiahmoo Secondary North Surrey Johnston Heights Secondary Crofton House Notre Dame Regional Secondary School
Mission School District #75	Mission Secondary Cherry Hill Dewdney Elementary
Chilliwack School District #33	Chilliwack Senior Secondary Rosedale Junior Sardis Senior
New Westminster School District #40	New Westminster Senior Secondary
North Vancouver School District #44	Argyle Secondary Balmoral Junior Secondary Handsworth Secondary
Abbotsford School District #34	Abbotsford Senior Secondary Abbotsford Junior Secondary Godson Elementary Philip Sheffield
Langley School District #35	Mountain Senior Secondary Fort Langley Fine Arts Langley Senior Secondary
Delta School District #37	Gibson Elementary Delview Junior Secondary North Delta Senior Secondary Brook Elementary Holly Elementary

**A1.2 List of Schools Inspected in Lower Mainland (12 School Districts),
Including Independent Schools /...continued**

Independent Schools

Lower Mainland Area Independent Schools

Vancouver College
 St. George's
 York House
 Blessed Sacrament
 St. Mary's
 Our Lady of Perpetual Help
 Mennonite Educational Institute
 Timothy Christian School
 St. Helen School
 St. Edmunds School
 Holy Cross Elementary
 Corpus Christi
 St. Andrew
 St. Francis of Assisi
 St. Patrick's School

APPENDIX 2

Metal Mining Monitoring Data

- A2.1 Summary of Individual Samples for Reporting Mines in the Fraser River Basin for 1993**
- A2.2 Summary of Compliance of Monthly Means for Reporting Mines in the Fraser River Basin for 1993**

Table A2.1 Summary of Individual Samples For All Reporting Mines in the Fraser River Basin for 1993

MMLEG (Guidelines) Mines	pH	As	Cu	Pb	Ni	Zn	TSS
Endako							
# of Samples Reported	67	0	0	0	0	0	64
# of Samples in Violation	0	0	0	0	0	0	0
% Samples in Violation	0%	0%	0%	0%	0%	0%	0%

Table A2.2 Summary of Compliance of Monthly Means for all Reporting Mines for 1993

Endako Mine	pH	As	Cu	Pb	Zn	TSS
Sample Point A: #2 Pond East Dam						
January 1993	7.455	0.000	0.000	0.000	0.000	7.000
March	7.760	0.000	0.000	0.000	0.000	2.000
April	7.270	0.000	0.000	0.000	0.000	7.000
May	7.980	0.000	0.000	0.000	0.000	4.000
June	7.900	0.000	0.000	0.000	0.000	4.000
July	7.940	0.000	0.000	0.000	0.000	7.000
August	7.840	0.000	0.000	0.000	0.000	2.000
September	7.710	0.000	0.000	0.000	0.000	6.000
October	7.310	0.000	0.000	0.000	0.000	5.000
November	7.680	0.000	0.000	0.000	0.000	3.000
December	7.560	0.000	0.000	0.000	0.000	4.000
Sample Point B: #2 Pond Saddle Dam						
July 1993	7.360	0.000	0.000	0.000	0.000	0.000
Sample Point C: #2 Pond South Dam						
January 1993	7.230	0.000	0.000	0.000	0.000	1.000
Sample Point D: South Dam East						
January 1993	7.430	0.000	0.000	0.000	0.000	10.000
February	7.110	0.000	0.000	0.000	0.000	9.000
March	7.350	0.000	0.000	0.000	0.000	7.000
June	7.280	0.000	0.000	0.000	0.000	13.000
July	7.340	0.000	0.000	0.000	0.000	13.000
August	7.490	0.000	0.000	0.000	0.000	15.000
September (continued..)	7.460	0.000	0.000	0.000	0.000	9.000

Table A2.1 Summary of Individual Samples For All Reporting Mines in the Fraser River Basin for 1993 /....continued

October	7.540	0.000	0.000	0.000	0.000	5.000
November	7.440	0.000	0.000	0.000	0.000	1.000
December	7.320	0.000	0.000	0.000	0.000	4.000
Sample Point K: New (1993) East Dam						
August	7.600	0.000	0.000	0.000	0.000	0.000
September	7.550	0.000	0.000	0.000	0.000	3.000
October	7.560	0.000	0.000	0.000	0.000	3.000
November	7.560	0.000	0.000	0.000	0.000	1.000
December	7.670	0.000	0.000	0.000	0.000	1.000
Sample Point L: #1 Pond 1A Dam						
April	7.230	0.000	0.000	0.000	0.000	0.000
May	6.967	0.000	0.000	0.000	0.000	1.000
June	7.090	0.000	0.000	0.000	0.000	0.000
July	7.270	0.000	0.000	0.000	0.000	3.000
August	7.380	0.000	0.000	0.000	0.000	2.000
September	7.290	0.000	0.000	0.000	0.000	2.500
October	7.480	0.000	0.000	0.000	0.000	2.000
November	7.337	0.000	0.000	0.000	0.000	2.667
December	7.240	0.000	0.000	0.000	0.000	1.000
Sample Point F: #1 Pond North Dam						
January 1993	7.510	0.000	0.000	0.000	0.000	1.000
July	7.660	0.000	0.000	0.000	0.000	3.000
October	7.830	0.000	0.000	0.000	0.000	5.000
December	7.120	0.000	0.000	0.000	0.000	1.000
Sample Point I: W-2 mine water discharge						
January 1993	7.900	0.000	0.000	0.000	0.000	5.000
February	7.430	0.000	0.000	0.000	0.000	1.000
March	7.710	0.000	0.000	0.000	0.000	2.000
April	7.560	0.000	0.000	0.000	0.000	0.000
May	7.690	0.000	0.000	0.000	0.000	5.000
June	7.790	0.000	0.000	0.000	0.000	3.000
July	7.740	0.000	0.000	0.000	0.000	3.000
August	7.750	0.000	0.000	0.000	0.000	2.000
September (continued..)	7.900	0.000	0.000	0.000	0.000	0.000

Table A2.1 Summary of Individual Samples For All Reporting Mines in the Fraser River Basin for 1993 /...continued

October	8.010	0.000	0.000	0.000	0.000	4.000
November	7.560	0.000	0.000	0.000	0.000	0.000
December	7.370	0.000	0.000	0.000	0.000	1.000
Sample Point J: #2 Pond South Dam West						
January	7.410	0.000	0.000	0.000	0.000	5.000
February	7.570	0.000	0.000	0.000	0.000	5.000
March	7.540	0.000	0.000	0.000	0.000	7.000
April	6.970	0.000	0.000	0.000	0.000	5.000
May	7.420	0.000	0.000	0.000	0.000	5.000

APPENDIX 3

Pulp and Paper Effluent Regulations **Monitoring Data**

**A3.1 Effluent Monitoring Data For Fraser Basin Pulp & Paper Mills,
Monthly Averages 1990-1993**

**A3.2 Effluent Monitoring Data For All BC Pulp & Paper Mills,
Monthly Averages 1990-1993**

A3.1 Effluent Monitoring Data for Fraser Basin Pulp & Paper Mills, Monthly Averages 1990-1993

	BOD (kg/d)	TSS (kg/d)	Toxicity 96-hr LC50
1990			
January	32252	61491	100.0
February	29666	54113	93.4
March	29100	56314	99.8
April	31125	65520	97.8
May	22004	58804	100.0
June	25373	61075	99.7
July	20976	63355	98.4
August	28238	64444	98.9
September	20474	40526	100.0
October	23823	38475	99.8
November	26762	48341	92.8
December	24306	58488	98.9
1990 Avg.	26175	55912	98.3
1991			
January	32724	57768	98.2
February	24853	63195	100.0
March	26327	68465	100.0
April	26349	62216	100.0
May	21866	63348	100.0
June	22838	59762	97.1
July	23588	59446	100.0
August	22089	51289	100.0
September	16804	46675	100.0
October	21706	53678	100.0
November	26612	51771	96.6
December	23965	51275	99.4
1991 Avg.	24143	57407	99.3
1992			
January	23434	52477	100.0
February	23873	52169	100.0
March	24224	54533	98.5
April	22063	52901	99.0
May	21934	48894	100.0
June	18243	39774	100.0
July	12484	30109	95.2
August	22864	46880	100.0
September	20960	47497	100.0
October	23626	52804	100.0
November	25113	51589	100.0
December	26784	48456	100.0
1992 Avg.	22134	48174	99.4

1993			
January	31997	46058	89.7
February	26274	48602	100.0
March	23246	41557	98.8
April	22460	44623	100.0
May	18539	39705	100.0
June	20403	46600	100.0
July	27279	48272	100.0
August	20033	38855	100.0
September	19898	40303	100.0
October	20425	38360	100.0
November	22743	45006	100.0
December	22763	41938	100.0
1993 Avg.	23005	43323	99.0

A3.2 Effluent Monitoring Data For All BC Pulp & Paper Mills, Monthly Averages 1990-1993

	BOD kg/d	TSS kg/d	Toxicity 96-hr LC ₅₀
1990			
January	378625	219486	61.2
February	384117	208073	60.8
March	363737	203553	67.2
April	392885	211311	66.9
May	413512	207292	66.5
June	349308	198200	71.0
July	368867	211959	66.8
August	330291	209737	74.9
September	361687	180891	73.2
October	378325	185821	69.6
November	362252	207171	70.1
December	391116	203762	72.5
1990 Avg.	372894	203938	68.4
1991			
January	385425	246143	71.4
February	418420	217696	69.3
March	411240	232598	69.0
April	362053	213796	71.3
May	311824	195875	74.5
June	337657	201118	75.9
July	273180	185786	77.4
August	296984	166387	79.3
September	255253	154068	80.3
October	268201	162582	81.3
November	280565	165646	76.4
December	251667	165094	82.3
1991 Avg.	321039	192232	75.7
1992			
January	253763	175039	79.7
February	233013	178168	85.0
March	243022	167837	83.9
April	214173	156604	85.4
May	243847	168744	85.0
June	198254	121066	84.4
July	183208	120253	87.0
August	206859	159494	81.0
September	219787	171816	85.2
October	239752	168341	84.9
November	222417	164256	84.4
December	232931	171700	84.0
1992 Avg.	224252	160277	84.2

1993			
January	226361	169189	75.8
February	212983	170271	88.1
March	185987	138987	91.2
April	178918	133733	93.8
May	150958	128872	93.7
June	152477	130846	93.7
July	159378	134366	94.2
August	139651	121307	93.3
September	144454	116427	94.0
October	137559	111863	97.1
November	150988	133892	97.0
December	152770	128801	96.3
1993 Avg.	166040	134879	92.3

APPENDIX 4

Petroleum Refinery Liquid Effluent Regulations **Monitoring Data**

A4.1 Process Effluents

A4.2 Stormwater Effluents

PETROLEUM REFINERY ANNUAL COMPLIANCE REPORT (PROCESS EFFLUENT)

COMPANY : Chevron Canada Limited
 REFINERY : Chevron Refinery (Burnaby), Burnaby, B.C.

PERIOD : 1993

INITIAL RCR : 3.82 (Mn3/d)

REPORTED EXCURSIONS			OIL/GREASE		T.S.S.		PHENOLS		SULPHIDE		NITROGEN		pH		TOXICITY	
			ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. RANGE	# of EXCUR	REQ. (kv/v)	# of EXCUR
January	Monthly Average of Daily Deposits (MADD)		89.709	1	215.297	1	8.975	1	3.001	1	83.678	0				
	One Day a Month (ODAM)		164.431	1	358.835	0	16.539	0	8.975	0	133.389	0				
	Never to be Exceeded (NTBE)		224.272	1	448.506	1	22.427	1	14.948	0	167.318	0	6.0-9.5	0	33.3	0
February	Monthly Average of Daily Deposits (MADD)		89.709	0	215.297	1	8.975	1	3.001	1	83.678	1				
	One Day a Month (ODAM)		164.431	0	358.835	0	16.539	0	8.975	0	133.389	0				
	Never to be Exceeded (NTBE)		224.272	0	448.506	1	22.427	1	14.948	0	167.318	1	6.0-9.5	0	33.3	0
March	Monthly Average of Daily Deposits (MADD)		89.709	0	215.297	0	8.975	0	3.001	0	83.678	0				
	One Day a Month (ODAM)		164.431	0	358.835	0	16.539	0	8.975	0	133.389	0				
	Never to be Exceeded (NTBE)		224.272	0	448.506	1	22.427	0	14.948	0	167.318	0	6.0-9.5	1	33.3	0
April	Monthly Average of Daily Deposits (MADD)		89.709	0	215.297	0	8.975	0	3.001	0	83.678	0				
	One Day a Month (ODAM)		164.431	0	358.835	0	16.539	0	8.975	0	133.389	0				
	Never to be Exceeded (NTBE)		224.272	0	448.506	0	22.427	0	14.948	0	167.318	0	6.0-9.5	1	33.3	1
May	Monthly Average of Daily Deposits (MADD)		89.709	0	215.297	0	8.975	0	3.001	1	83.678	0				
	One Day a Month (ODAM)		164.431	0	358.835	0	16.539	0	8.975	1	133.389	0				
	Never to be Exceeded (NTBE)		224.272	0	448.506	0	22.427	0	14.948	0	167.318	0	6.0-9.5	0	33.3	0
June	Monthly Average of Daily Deposits (MADD)		89.709	0	215.297	0	8.975	0	3.001	1	83.678	0				
	One Day a Month (ODAM)		164.431	0	358.835	0	16.539	0	8.975	0	133.389	0				
	Never to be Exceeded (NTBE)		224.272	0	448.506	0	22.427	0	14.948	0	167.318	0	6.0-9.5	0	33.3	0
July	Monthly Average of Daily Deposits (MADD)		89.709	1	215.297	0	8.975	0	3.001	0	83.678	0				
	One Day a Month (ODAM)		164.431	0	358.835	0	16.539	0	8.975	0	133.389	0				
	Never to be Exceeded (NTBE)		224.272	1	448.506	0	22.427	0	14.948	0	167.318	0	6.0-9.5	1	33.3	1
August	Monthly Average of Daily Deposits (MADD)		89.709	0	215.297	0	8.975	1	3.001	1	83.678	0				
	One Day a Month (ODAM)		164.431	0	358.835	0	16.539	0	8.975	0	133.389	0				
	Never to be Exceeded (NTBE)		224.272	0	448.506	0	22.427	1	14.948	0	167.318	0	6.0-9.5	1	33.3	0
September	Monthly Average of Daily Deposits (MADD)		89.709	0	215.297	0	8.975	0	3.001	0	83.678	0				
	One Day a Month (ODAM)		164.431	0	358.835	0	16.539	0	8.975	0	133.389	0				
	Never to be Exceeded (NTBE)		224.272	0	448.506	0	22.427	1	14.948	0	167.318	0	6.0-9.5	0	33.3	0
October	Monthly Average of Daily Deposits (MADD)		89.709	0	215.297	0	8.975	0	3.001	0	83.678	0				
	One Day a Month (ODAM)		164.431	0	358.835	0	16.539	0	8.975	0	133.389	0				
	Never to be Exceeded (NTBE)		224.272	0	448.506	0	22.427	0	14.948	0	167.318	0	6.0-9.5	2	33.3	1
November	Monthly Average of Daily Deposits (MADD)		89.709	0	215.297	1	8.975	1	3.001	1	83.678	0				
	One Day a Month (ODAM)		164.431	0	358.835	0	16.539	1	8.975	0	133.389	0				
	Never to be Exceeded (NTBE)		224.272	0	448.506	1	22.427	2	14.948	0	167.318	0	6.0-9.5	0	33.3	0
December	Monthly Average of Daily Deposits (MADD)		89.709	0	215.297	1	8.975	1	3.001	1	83.678	0				
	One Day a Month (ODAM)		164.431	0	358.835	0	16.539	1	8.975	0	133.389	0				
	Never to be Exceeded (NTBE)		224.272	0	448.506	0	22.427	1	14.948	0	167.318	0	6.0-9.5	0	33.3	0

PETROLEUM REFINERY ANNUAL SUMMARY REPORT (PROCESS EFFLUENT)

COMPANY : Chevron Canada Limited
 REFINERY : Chevron Refinery (Burnaby), Burnaby, B.C.

YEAR : 1993

INITIAL RCR : 3.82 (Mm3/d)

MONTH	AVERAGE CRUDE RATE (% of R)	CURRENT REF. CRUDE RATE (R) (Mm3/d)	EFFLUENT FLOW AVERAGE (m3/d)	# of DAYS	OIL/GREASE AVERAGE (Kg/d)	# of TESTS	T.S.S. AVERAGE (Kg/d)	# of TESTS	PHENOLS AVERAGE (Kg/d)	# of TESTS	SULPHIDE AVERAGE (Kg/d)	# of TESTS	NITROGEN AVERAGE (Kg/d)	# of TESTS	pH RANGE	# of TESTS	TOXICITY TEST TYPE	% CONC. (%v/v)	# of TESTS
JANUARY	107%	6.66	2649.0	4	168.455	4	221.680	4	32.878	4	5.098	4	51.478	4	6.4-8.8	4	96LC50		0
FEBRUARY	102%	6.66	2101.3	4	66.078	4	264.328	4	11.465	4	5.795	4	87.513	4	6.8-8.3	4	96LC50		0
MARCH	89%	6.66	1988.2	5	15.784	5	157.298	5	2.996	5	1.136	5	20.792	5	7.9-9.9	5	96LC50	47	1
APRIL	104%	6.66	2403.8	4	35.763	4	128.378	4	1.310	4	2.620	4	5.938	4	6.4-10.2	4	96LC50	26	1
MAY	109%	6.66	2354.5	4	27.503	4	80.215	4	2.803	4	6.908	4	5.050	4	6.4-9.3	4	96LC50		0
JUNE	112%	6.66	2665.0	4	32.585	4	85.925	4	0.700	4	6.115	4	1.974	4	7.3-9.3	4	96LC50		0
JULY	116%	6.66	2661.8	5	108.098	5	212.778	5	8.962	5	2.766	5	3.330	5	6.1-10.8	5	96LC50	14	1
AUGUST	104%	6.66	2632.3	4	14.418	4	151.120	4	24.815	4	3.090	4	0.803	4	6.3-11.4	4	96LC50		0
SEPTEMBER	115%	6.66	2548.4	5	13.418	5	79.842	5	6.200	5	1.536	5	1.209	5	6.4-8.2	5	96LC50		0
OCTOBER	113%	6.66	2657.3	4	14.783	4	127.158	4	5.160	4	2.775	2	7.749	4	5.8-9.7	4	96LC50	21	1
NOVEMBER	110%	6.66	2537.8	5	59.482	5	257.470	5	20.318	5	3.162	5	15.625	5	6.6-9.5	5	96LC50		0
DECEMBER	107%	6.66	2109.3	4	80.995	4	268.450	4	13.205	4	4.403	4	4.554	4	6.1-9.5	4	96LC50		0
YEARLY AVERAGE			2441.7	52	52.812	52	170.114	52	10.802	52	3.693	50	16.635	52	5.8-11.4	52		14-47	4

REPORTED EXCURSIONS	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR
Monthly Average of Daily Deposits (MADD)	2	4	5	7	1	
One Day a Month (ODAM)	1	0	2	1	0	
Never to be Exceeded (NTBE)	2	4	7	0	1	6
						3

EP SURVEY DATA

DATE ()	===OIL/GREASE== (Kg/d)	===T.S.S.=== (Kg/d)	===PHENOLS=== (Kg/d)	===SULPHIDE=== (Kg/d)	===NITROGEN=== (Kg/d)	===== pH =====
Actual Deposits						
Federal NTBE Limits						
Provincial Permit Limits						

PETROLEUM REFINERY ANNUAL COMPLIANCE REPORT (PROCESS EFFLUENT)

COMPANY : Esso Petroleum Canada
 REFINERY : Esso Petroleum Canada, Port Moody, B.C.

PERIOD : 1993

INITIAL RCR : 5.99 (Mn/d)

REPORTED EXCURSIONS	---OIL/GREASE---		---T.S.S.---		---PHENOLS---		---SULPHIDE---		---NITROGEN---		---PH---		---TOXICITY---	
	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. RANGE	# of EXCUR	REQ. (µg/v)	# of EXCUR
January														
Monthly Average of Daily Deposits (MADD)	105.630	0	253.525	0	10.551	0	3.517	0	88.046	0				
One Day a Month (ODAM)	193.615	0	422.522	0	19.374	0	10.551	0	140.861	0				
Never to be Exceeded (NTBE)	264.076	0	528.090	0	26.408	0	17.585	0	176.030	0	6.0-9.5	0	33.3	0
February														
Monthly Average of Daily Deposits (MADD)	105.630	0	253.525	0	10.551	0	3.517	0	88.046	0				
One Day a Month (ODAM)	193.615	0	422.522	0	19.374	0	10.551	0	140.861	0				
Never to be Exceeded (NTBE)	264.076	0	528.090	0	26.408	0	17.585	0	176.030	0	6.0-9.5	0	33.3	0
March														
Monthly Average of Daily Deposits (MADD)	105.630	0	253.525	0	10.551	0	3.517	0	88.046	0				
One Day a Month (ODAM)	193.615	0	422.522	0	19.374	0	10.551	0	140.861	0				
Never to be Exceeded (NTBE)	264.076	0	528.090	0	26.408	0	17.585	0	176.030	0	6.0-9.5	0	33.3	0
April														
Monthly Average of Daily Deposits (MADD)	105.630	0	253.525	0	10.551	0	3.517	0	88.046	0				
One Day a Month (ODAM)	193.615	0	422.522	0	19.374	0	10.551	0	140.861	0				
Never to be Exceeded (NTBE)	264.076	0	528.090	0	26.408	0	17.585	0	176.030	0	6.0-9.5	0	33.3	0
May														
Monthly Average of Daily Deposits (MADD)	105.630	0	253.525	0	10.551	0	3.517	0	88.046	0				
One Day a Month (ODAM)	193.615	0	422.522	0	19.374	0	10.551	0	140.861	0				
Never to be Exceeded (NTBE)	264.076	0	528.090	0	26.408	0	17.585	0	176.030	0	6.0-9.5	0	33.3	0
June														
Monthly Average of Daily Deposits (MADD)	105.630	0	253.525	0	10.551	0	3.517	0	88.046	0				
One Day a Month (ODAM)	193.615	0	422.522	0	19.374	0	10.551	0	140.861	0				
Never to be Exceeded (NTBE)	264.076	0	528.090	0	26.408	0	17.585	0	176.030	0	6.0-9.5	0	33.3	0
July														
Monthly Average of Daily Deposits (MADD)	105.630	0	253.525	0	10.551	0	3.517	0	88.046	0				
One Day a Month (ODAM)	193.615	0	422.522	0	19.374	0	10.551	0	140.861	0				
Never to be Exceeded (NTBE)	264.076	0	528.090	0	26.408	0	17.585	0	176.030	0	6.0-9.5	0	33.3	0
August														
Monthly Average of Daily Deposits (MADD)	105.630	0	253.525	0	10.551	0	3.517	0	88.046	0				
One Day a Month (ODAM)	193.615	0	422.522	0	19.374	0	10.551	0	140.861	0				
Never to be Exceeded (NTBE)	264.076	0	528.090	0	26.408	0	17.585	0	176.030	0	6.0-9.5	0	33.3	0
September														
Monthly Average of Daily Deposits (MADD)	105.630	0	253.525	0	10.551	0	3.517	0	88.046	0				
One Day a Month (ODAM)	193.615	0	422.522	0	19.374	0	10.551	0	140.861	0				
Never to be Exceeded (NTBE)	264.076	0	528.090	0	26.408	0	17.585	0	176.030	0	6.0-9.5	0	33.3	1
October														
Monthly Average of Daily Deposits (MADD)	105.630	0	253.525	0	10.551	0	3.517	0	88.046	0				
One Day a Month (ODAM)	193.615	0	422.522	0	19.374	0	10.551	0	140.861	0				
Never to be Exceeded (NTBE)	264.076	0	528.090	0	26.408	0	17.585	0	176.030	0	6.0-9.5	0	33.3	0
November														
Monthly Average of Daily Deposits (MADD)	105.630	0	253.525	0	10.551	0	3.517	0	88.046	0				
One Day a Month (ODAM)	193.615	0	422.522	0	19.374	0	10.551	0	140.861	0				
Never to be Exceeded (NTBE)	264.076	0	528.090	0	26.408	0	17.585	0	176.030	0	6.0-9.5	0	33.3	0
December														
Monthly Average of Daily Deposits (MADD)	105.630	0	253.525	0	10.551	0	3.517	0	88.046	0				
One Day a Month (ODAM)	193.615	0	422.522	0	19.374	0	10.551	0	140.861	0				
Never to be Exceeded (NTBE)	264.076	0	528.090	0	26.408	0	17.585	0	176.030	0	6.0-9.5	1	33.3	0

PETROLEUM REFINERY ANNUAL SUMMARY REPORT (PROCESS EFFLUENT)

COMPANY : Esso Petroleum Canada
REFINERY : Esso Petroleum Canada, Port Moody, B.C.

YEAR : 1993

INITIAL RCR : 5.99 (Mm3/d)

MONTH	AVERAGE CRUDE RATE (% of R)	CURRENT REF. CRUDE RATE (R) (Mm3/d)	EFFLUENT FLOW AVERAGE (m3/d)	# of DAYS	OIL/GREASE AVERAGE (Kg/d)	# of TESTS	T.S.S. AVERAGE (Kg/d)	# of TESTS	PHENOLS AVERAGE (Kg/d)	# of TESTS	SULPHIDE AVERAGE (Kg/d)	# of TESTS	NITROGEN AVERAGE (Kg/d)	# of TESTS	pH RANGE	# of TESTS	TOXICITY TEST TYPE	% CONC. (v/v)	# of TESTS
JANUARY	95%	6.17	2038.8	4	10.194	4	45.010	4	0.035	4	0.208	4	0.129	4	7.2-8.0	4	96LC50		0
FEBRUARY	108%	6.17	1811.0	4	9.055	4	39.585	4	0.022	4	0.092	3	0.123	4	7.6-8.3	4	96LC50	100	1
MARCH	113%	6.17	2030.2	5	10.883	5	18.203	5	0.025	5	0.085	5	0.946	5	7.5-7.9	5	96LC50	100	1
APRIL	111%	6.17	1821.0	4	3.543	4	66.283	4	0.093	4	0.170	4	8.608	4	7.2-7.7	4	96LC50		0
MAY	109%	6.17	1853.5	4	2.088	4	14.100	4	0.020	4	0.020	4	2.536	4	7.9-8.1	4	96LC50		0
JUNE	113%	6.17	1892.8	5	1.746	5	43.042	5	0.034	5	0.020	5	0.336	5	7.8-8.1	5	96LC50		0
JULY	113%	6.17	1321.3	4	2.333	4	35.768	4	0.033	4	0.023	4	0.185	4	7.3-8.3	4	96LC50	100	1
AUGUST	111%	6.17	1271.3	4	0.598	4	28.275	4	0.010	3	0.013	4	0.021	4	7.5-8.0	4	96LC50	88	1
SEPTEMBER	108%	6.17	1335.8	5	0.848	5	24.808	5	0.022	5	0.032	5	0.143	5	6.4-7.5	5	96LC50	13	1
OCTOBER	104%	6.17	1349.5	4	0.674	4	48.442	4	0.032	4	0.029	4	1.243	4	7.1-8.1	4	96LC50	100	1
NOVEMBER	96%	6.17	1448.3	4	3.977	4	24.213	4	0.040	4	0.028	4	12.416	4	7.8-8.3	4	96LC50	100	1
DECEMBER	80%	6.17	1573.0	5	3.400	5	27.102	5	0.018	5	0.040	5	0.649	5	7.5-9.8	5	96LC50	100	1
YEARLY AVERAGE			1650.3	52	4.120	52	34.086	52	0.032	51	0.061	51	2.143	52	6.4-9.8	52		13-100	8

REPORTED EXCURSIONS		# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR
Monthly Average of Daily Deposits (MADD)		0	0	0	0	0	0	0
One Day a Month (ODAM)		0	0	0	0	0	0	0
Never to be Exceeded (NTBE)		0	0	0	0	0	0	1

EP SURVEY DATA

DATE ()	===OIL/GREASE=== (Kg/d)	===T.S.S.=== (Kg/d)	===PHENOLS=== (Kg/d)	===SULPHIDE=== (Kg/d)	===NITROGEN=== (Kg/d)	===== pH =====
Actual Deposits						
Federal NTBE Limits						
Provincial Permit Limits						

PETROLEUM REFINERY ANNUAL COMPLIANCE REPORT (PROCESS EFFLUENT)

COMPANY : Shell Canada Products Ltd.
 REFINERY : Shell Canada Products Ltd., Burnaby, B.C.

PERIOD : 1993

INITIAL RCR : 3.74 (Mm3/d)

REPORTED EXCURSIONS	OIL/GREASE		T.S.S.		PHENOLS		SULPHIDE		NITROGEN		pH		TOXICITY	
	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. RANGE	# of EXCUR	REQ. (%v/v)	# of EXCUR
January														
Monthly Average of Daily Deposits (MADD)	57.694	0	138.473	0	5.763	0	1.921	0	48.090	0				
One Day a Month (ODAM)	105.751	0	230.778	0	10.582	0	5.763	0	76.937	0				
Never to be Exceeded (NTBE)	144.236	0	288.438	0	14.424	0	9.605	0	96.146	0	6.0-9.5	0	33.3	0
February														
Monthly Average of Daily Deposits (MADD)	57.694	1	138.473	0	5.763	0	1.921	0	48.090	0				
One Day a Month (ODAM)	105.751	0	230.778	0	10.582	0	5.763	0	76.937	0				
Never to be Exceeded (NTBE)	144.236	0	288.438	0	14.424	0	9.605	0	96.146	0	6.0-9.5	0	33.3	0
March														
Monthly Average of Daily Deposits (MADD)	57.694	0	138.473	0	5.763	0	1.921	0	48.090	0				
One Day a Month (ODAM)	105.751	0	230.778	0	10.582	0	5.763	0	76.937	0				
Never to be Exceeded (NTBE)	144.236	0	288.438	0	14.424	0	9.605	0	96.146	0	6.0-9.5	0	33.3	0
April														
Monthly Average of Daily Deposits (MADD)	57.694	0	138.473	0	5.763	0	1.921	1	48.090	0				
One Day a Month (ODAM)	105.751	0	230.778	0	10.582	0	5.763	0	76.937	0				
Never to be Exceeded (NTBE)	144.236	0	288.438	0	14.424	0	9.605	0	96.146	0	6.0-9.5	0	33.3	0

PETROLEUM REFINERY ANNUAL SUMMARY REPORT (PROCESS EFFLUENT)

COMPANY : Shell Canada Products Ltd.
 REFINERY : Shell Canada Products Ltd., Burnaby, B.C.

YEAR : 1993

INITIAL RCR : 3.74 (Mm3/d)

MONTH	AVERAGE CRUDE RATE (% of R)	CURRENT REF. CRUDE RATE (R) (Mm3/d)	EFFLUENT FLOW AVERAGE (m3/d)	# of DAYS	OIL/GREASE AVERAGE (Kg/d)	# of TESTS	T.S.S. AVERAGE (Kg/d)	# of TESTS	PHENOLS AVERAGE (Kg/d)	# of TESTS	SULPHIDE AVERAGE (Kg/d)	# of TESTS	NITROGEN AVERAGE (Kg/d)	# of TESTS	pH RANGE	# of TESTS	TOXICITY TEST TYPE	% CONC. (%v/v)	# of TESTS
JANUARY	87%	3.37	3038.4	4	25.320	4	90.605	4	0.638	4	0.198	4	19.204	4	6.7-7.0	4	96LC50	100	1
FEBRUARY	102%	3.37	4068.0	4	74.268	4	85.825	4	0.340	4	0.557	4	29.999	4	6.7-6.9	4	96LC50	45-100	2
MARCH	117%	3.37	3640.3	5	35.322	5	57.664	5	1.010	4	1.152	5	19.282	5	6.5-7.6	5	96LC50	100	1
APRIL	85%	3.37	3412.8	4	18.493	4	77.427	4	3.973	4	2.838	4	39.836	4	6.3-7.0	7	96LC50	100	1
YEAR-TO-DATE			3545.8	17	38.172	17	76.691	17	1.490	16	1.184	17	26.621	17	6.3-7.6	20		45-100	5

REPORTED EXCURSIONS				# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR
Monthly Average of Daily Deposits (MADD)				1	0	0	1	0	
One Day a Month (ODAM)				0	0	0	0	0	
Never to be Exceeded (NTBE)				0	0	0	0	0	0

EP SURVEY DATA

DATE ()	===OIL/GREASE== (Kg/d)	====T.S.S.==== (Kg/d)	===PHENOLS=== (Kg/d)	===SULPHIDE=== (Kg/d)	===NITROGEN=== (Kg/d)	===== pH =====
Actual Deposits						
Federal NTBE Limits						
Provincial Permit Limits						

PETROLEUM REFINERY ANNUAL COMPLIANCE REPORT (PROCESS EFFLUENT)

COMPANY : Husky Oil Operations Ltd.
REFINERY : Husky Oil Operations Ltd., Prince George, B.C.

PERIOD : 1993

INITIAL RCR : 1.19 (Mn/d)

REPORTED EXCURSIONS			OIL/GREASE		T.S.S.		PHENOLS		SULPHIDE		NITROGEN		PH		TOXICITY	
			ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. DEP. (Kg/d)	# of EXCUR	ALLOW. RANGE	# of EXCUR	REQ. (#v/v)	# of EXCUR
January	Monthly Average of Daily Deposits (MADD)		24.567	0	58.962	0	2.456	0	0.820	0	22.014	0				
	One Day a Month (ODAM)		45.030	0	98.269	0	4.521	0	2.456	0	35.135	0				
	Never to be Exceeded (NTBE)		61.418	0	122.824	0	6.142	0	4.092	0	44.015	0	6.0-9.5	0	33.3	0
February	Monthly Average of Daily Deposits (MADD)		24.567	0	58.962	0	2.456	0	0.820	0	22.014	0				
	One Day a Month (ODAM)		45.030	0	98.269	0	4.521	0	2.456	0	35.135	0				
	Never to be Exceeded (NTBE)		61.418	0	122.824	0	6.142	0	4.092	0	44.015	0	6.0-9.5	0	33.3	0
March	Monthly Average of Daily Deposits (MADD)		24.567	0	58.962	0	2.456	0	0.820	0	22.014	0				
	One Day a Month (ODAM)		45.030	0	98.269	0	4.521	0	2.456	0	35.135	0				
	Never to be Exceeded (NTBE)		61.418	0	122.824	0	6.142	0	4.092	0	44.015	0	6.0-9.5	0	33.3	0
April	Monthly Average of Daily Deposits (MADD)		24.567	0	58.962	0	2.456	0	0.820	0	22.014	0				
	One Day a Month (ODAM)		45.030	0	98.269	0	4.521	0	2.456	0	35.135	0				
	Never to be Exceeded (NTBE)		61.418	0	122.824	0	6.142	0	4.092	0	44.015	0	6.0-9.5	0	33.3	0
May	Monthly Average of Daily Deposits (MADD)		24.567	0	58.962	0	2.456	0	0.820	0	22.014	0				
	One Day a Month (ODAM)		45.030	0	98.269	0	4.521	0	2.456	0	35.135	0				
	Never to be Exceeded (NTBE)		61.418	0	122.824	0	6.142	0	4.092	0	44.015	0	6.0-9.5	1	33.3	0
June	Monthly Average of Daily Deposits (MADD)		23.112	0	55.472	0	2.309	0	0.770	0	19.265	0				
	One Day a Month (ODAM)		42.363	0	92.448	0	4.239	0	2.309	0	30.821	0				
	Never to be Exceeded (NTBE)		57.780	0	115.547	0	5.778	0	3.848	0	38.516	0	6.0-9.5	0	33.3	0
July	Monthly Average of Daily Deposits (MADD)		23.112	0	55.472	0	2.309	0	0.770	0	19.265	0				
	One Day a Month (ODAM)		42.363	0	92.448	0	4.239	0	2.309	0	30.821	0				
	Never to be Exceeded (NTBE)		57.780	0	115.547	0	5.778	0	3.848	0	38.516	0	6.0-9.5	0	33.3	0
August	Monthly Average of Daily Deposits (MADD)		24.482	0	58.756	0	2.448	0	0.817	0	21.911	0				
	One Day a Month (ODAM)		44.873	0	97.926	0	4.505	0	2.448	0	34.973	0				
	Never to be Exceeded (NTBE)		61.204	0	122.396	0	6.120	0	4.078	0	43.810	0	6.0-9.5	0	33.3	0
September	Monthly Average of Daily Deposits (MADD)		24.482	0	58.756	0	2.448	0	0.817	0	21.911	0				
	One Day a Month (ODAM)		44.873	0	97.926	0	4.505	0	2.448	0	34.973	0				
	Never to be Exceeded (NTBE)		61.204	0	122.396	0	6.120	0	4.078	0	43.810	0	6.0-9.5	0	33.3	0
October	Monthly Average of Daily Deposits (MADD)		24.482	0	58.756	1	2.448	0	0.817	0	21.911	0				
	One Day a Month (ODAM)		44.873	0	97.926	0	4.505	0	2.448	0	34.973	0				
	Never to be Exceeded (NTBE)		61.204	0	122.396	0	6.120	0	4.078	0	43.810	0	6.0-9.5	0	33.3	0
November	Monthly Average of Daily Deposits (MADD)		24.482	0	58.756	0	2.448	0	0.817	0	21.911	0				
	One Day a Month (ODAM)		44.873	0	97.926	0	4.505	0	2.448	0	34.973	0				
	Never to be Exceeded (NTBE)		61.204	0	122.396	0	6.120	0	4.078	0	43.810	0	6.0-9.5	1	33.3	0
December	Monthly Average of Daily Deposits (MADD)		24.482	0	58.756	0	2.448	0	0.817	0	21.911	0				
	One Day a Month (ODAM)		44.873	0	97.926	0	4.505	0	2.448	0	34.973	0				
	Never to be Exceeded (NTBE)		61.204	0	122.396	0	6.120	0	4.078	0	43.810	0	6.0-9.5	0	33.3	0

PETROLEUM REFINERY ANNUAL SUMMARY REPORT (PROCESS EFFLUENT)

COMPANY : Husky Oil Operations Ltd.
REFINERY : Husky Oil Operations Ltd., Prince George, B.C.

YEAR : 1993

INITIAL RCR : 1.19 (Mm3/d)

MONTH	AVERAGE CRUDE RATE (% of R)	CURRENT REF. CRUDE RATE (R) (Mm3/d)	EFFLUENT FLOW AVERAGE (m3/d)	# of DAYS	OIL/GREASE AVERAGE (Kg/d)	# of TESTS	T.S.S. AVERAGE (Kg/d)	# of TESTS	PHENOLS AVERAGE (Kg/d)	# of TESTS	SULPHIDE AVERAGE (Kg/d)	# of TESTS	NITROGEN AVERAGE (Kg/d)	# of TESTS	pH RANGE	# of TESTS	TOXICITY TEST TYPE	% CONC. (w/v)	# of TESTS
JANUARY	97%	1.68	146.0	4	1.650	4	6.213	1	0.139	4	0.073	4	0.885	4	6.5-7.5	4	96LC50	100	1
FEBRUARY	88%	1.68	178.8	4	3.208	4	10.900	1	0.010	3	0.010	4	0.294	4	6.1-6.9	4	96LC50	100	1
MARCH	98%	1.68	201.8	5	1.842	5	9.550	1	0.013	4	0.010	4	2.013	5	6.2-6.8	5	96LC50	100	1
APRIL	94%	1.68	175.8	4	7.010	4	31.460	1	0.018	4	0.030	4	6.187	4	6.8-9.1	4	96LC50	100	1
MAY	74%	1.68	139.0	4	4.798	4	5.180	1	0.020	1	0.010	2	5.145	4	6.9-9.9	4	96LC50	75	1
JUNE	121%	1.35	189.0	5	10.376	5	9.980	1	0.052	5	0.016	5	1.412	5	7.2-7.7	5	96LC50	75	1
JULY	126%	1.35	193.5	4	3.738	4	20.280	1	0.290	4	0.010	3	0.099	4	6.6-7.5	4	96LC50	100	1
AUGUST	94%	1.67	160.8	5	4.438	5	24.590	1	0.017	3	0.018	5	0.914	5	6.3-7.2	5	96LC50	100	1
SEPTEMBER	101%	1.67	190.5	4	12.175	4	34.010	1	0.013	3	0.013	4	0.702	4	6.5-6.7	4	96LC50	100	1
OCTOBER	101%	1.67	207.3	4	10.803	4	64.210	1	0.017	3	0.030	4	3.125	4	6.3-6.8	4	96LC50	100	1
NOVEMBER	93%	1.67	215.8	4	12.710	4	41.260	1	0.017	3	0.015	4	8.375	4	5.6-7.2	4	96LC50	100	1
DECEMBER	97%	1.67	236.2	5	11.314	5	48.390	1	0.020	4	0.034	5	2.909	5	6.7-7.1	5	96LC50	100	1
YEARLY AVERAGE			187.0	52	7.004	52	25.502	12	0.059	41	0.023	48	2.605	52	5.6-9.9	52		75-100	12

REPORTED EXCURSIONS				# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR
Monthly Average of Daily Deposits (MADD)				0	1	0	0	0	0	0
One Day a Month (ODAM)				0	0	0	0	0	0	0
Never to be Exceeded (NTBE)				0	0	0	0	0	2	0

EP SURVEY DATA

DATE ()	===OIL/GREASE=== (Kg/d)	===T.S.S.=== (Kg/d)	===PHENOLS=== (Kg/d)	===SULPHIDE=== (Kg/d)	===NITROGEN=== (Kg/d)	===== pH =====
Actual Deposits						
Federal NTBE Limits						
Provincial Permit Limits						

PETROLEUM REFINERY ANNUAL SUMMARY REPORT (STORMWATER)

COMPANY : Chevron Canada Limited
 REFINERY : Chevron Refinery (Burnaby), Burnaby, B.C.

YEAR : 1993

INITIAL RCR : 3.82 (Mn3/d)

MONTH	AVERAGE CRUDE RATE (% of R)	CURRENT REF. CRUDE RATE (R) (Mn3/d)	EFFLUENT FLOW TOTAL (m3/mon.)	# of MEAS	OIL/GREASE TOTAL (Kg/mon.)	# of TESTS	T.S.S. TOTAL (Kg/mon.)	# of TESTS	PHENOLS TOTAL (Kg/mon.)	# of TESTS	pH RANGE	# of TESTS
JANUARY	107%	6.66	112607.5	6	927.520	6	257.197	6	0.620	3	6.6-7.5	7
FEBRUARY	102%	6.66	113928.9	8	177.824	8	401.450	8	1.008	4	6.3-7.0	8
MARCH	89%	6.66	56493.6	8	113.266	8	338.299	7	1.550	5	6.3-8.3	8
APRIL	104%	6.66	93759.5	8	262.028	8	464.535	8	3.100	4	6.2-7.5	8
MAY	109%	6.66	58568.6	7	115.586	7	231.729	7	1.050	4	6.4-6.9	7
JUNE	112%	6.66	43159.8	8	79.227	7	290.263	6	1.085	4	4.9-8.0	8
JULY	116%	6.66	21446.3	8	70.912	8	119.550	6	1.320	5	6.2-6.8	7
AUGUST	104%	6.66	34761.3	6	40.042	6	265.484	5	1.395	4	6.1-7.2	6
SEPTEMBER	115%	6.66	23799.1	7	55.534	7	283.805	6	2.852	5	4.1-7.2	7
OCTOBER	113%	6.66	40065.0	6	62.250	6	142.550	6	1.125	4	5.6-8.7	7
NOVEMBER	110%	6.66	53134.0	5	79.670	5	494.016	5	1.736	5	6.3-7.2	5
DECEMBER	107%	6.66	103605.9	8	170.616	8	679.830	8	23.715	4	6.4-7.2	7
YEARLY AVERAGE			62950.3	85	172.234	84	337.387	78	3.262	51	4.1-8.7	85

REPORTED EXCURSIONS

	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR
Never to be Exceeded (NTBE)	1	0	0	3

EP SURVEY DATA

Date ()	Federal Allowable (mg/l)	=OIL/GREASE=	=T.S.S.=	=PHENOLS=	== pH ==	=TOXICITY (LT50)=
Outfall: Foreshore Basin	Audit Result (mg/l)					
Outfall: East Storm Pond	Audit Result (mg/l)					
Outfall: Area II Impounding Basin	Audit Result (mg/l)					

PETROLEUM REFINERY ANNUAL COMPLIANCE REPORT (TOTAL STORMWATER)

COMPANY : Esso Petroleum Canada
 REFINERY : Esso Petroleum Canada, Port Moody, B.C.
 PERIOD : 1992
 INITIAL RCR : 5.99 (Mn3/d)

REPORTED EXCURSIONS =====			====OIL/GREASE====		=====T.S.S.=====		=====PHENOLS=====		===== pH =====	
			ALLOW. DEP. (Kg/mon)	# of EXCUR	ALLOW. DEP. (Kg/mon)	# of EXCUR	ALLOW. DEP. (Kg/mon)	# of EXCUR	ALLOW. RANGE	# of EXCUR
January	(RCR 6.17 Mn3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
February	(RCR 6.17 Mn3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
March	(RCR 6.17 Mn3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
April	(RCR 6.17 Mn3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
May	(RCR 6.17 Mn3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
June	(RCR 6.17 Mn3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
July	(RCR 6.17 Mn3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
August	(RCR 6.17 Mn3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
September	(RCR 6.17 Mn3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
October	(RCR 6.17 Mn3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
November	(RCR 6.17 Mn3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
December	(RCR 6.17 Mn3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0

PETROLEUM REFINERY ANNUAL SUMMARY REPORT (STORMWATER)

COMPANY : Esso Petroleum Canada
 REFINERY : Esso Petroleum Canada, Port Moody, B.C.

YEAR : 1993

INITIAL RCR : 5.99 (Mn3/d)

MONTH	AVERAGE CRUDE RATE (% of R)	CURRENT REF. CRUDE RATE (R) (Mn3/d)	EFFLUENT FLOW TOTAL (m3/mon.)	# of MEAS	OIL/GREASE TOTAL (Kg/mon.)	# of TESTS	T.S.S. TOTAL (Kg/mon.)	# of TESTS	PHENOLS TOTAL (Kg/mon.)	# of TESTS	pH RANGE	# of TESTS
JANUARY	95%	6.17	225757.5	8	780.580	4	1242.170	8	13.301	6	6.7-7.8	8
FEBRUARY	108%	6.17	104315.0	8	344.255	2	731.329	8	8.149	7	6.0-7.8	8
MARCH	113%	6.17	100766.7	9	775.125	4	815.833	9	8.500	9	6.4-7.4	9
APRIL	111%	6.17	139112.5	8	670.762	8	850.175	8	9.147	8	6.6-7.0	8
MAY	109%	6.17	130125.0	8	287.250	8	831.000	8	2.656	8	6.7-7.4	8
JUNE	113%	6.17	121933.3	9	394.389	9	866.967	9	4.199	9	6.8-7.7	9
JULY	113%	6.17	126428.6	7	348.857	7	1228.714	7	1.832	7	7.2-8.0	7
AUGUST	111%	6.17	183675.0	4	360.375	4	734.700	4	2.266	4	6.8-7.8	5
SEPTEMBER	108%	6.17	83700.0	8	234.050	8	630.075	8	15.276	8	6.9-7.7	8
OCTOBER	104%	6.17	111375.0	8	457.875	8	727.500	8	14.245	8	7.0-7.6	8
NOVEMBER	96%	6.17	172437.5	8	871.488	8	1037.338	8	9.049	8	6.8-7.3	8
DECEMBER	80%	6.17	151500.0	10	915.900	10	1053.600	10	10.090	10	6.5-7.5	10
YEARLY AVERAGE			134765.0	95	544.109	80	897.689	95	8.401	92	6.0-8.0	96

REPORTED EXCURSIONS

	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR
Never to be Exceeded (NTBE)	0	0	0	0

EP SURVEY DATA

Date ()	Federal Allowable (mg/l)	==OIL/GREASE==	==T.S.S.==	==PHENOLS==	=== pH ===	==TOXICITY (LT50)==
Outfall: Foreshore Basin	Audit Result (mg/l)					
Outfall: East Storm Pond	Audit Result (mg/l)					
Outfall: Area II Impounding Basin	Audit Result (mg/l)					

PETROLEUM REFINERY ANNUAL COMPLIANCE REPORT (STORMWATER)

COMPANY : Shell Canada Products Ltd.
REFINERY : Shell Canada Products Ltd., Burnaby, B.C.

PERIOD : 1993

INITIAL RCR : 3.74 (Mn3/d)

REPORTED EXCURSIONS =====			OIL/GREASE ALLOW. DEP. (Kg/mon)		# of EXCUR	T.S.S. ALLOW. DEP. (Kg/mon)		# of EXCUR	PHENOLS ALLOW. DEP. (Kg/mon)		# of EXCUR	pH ALLOW. RANGE		# of EXCUR
January	(RCR 3.37 Mn3/d) Never to be Exceeded	(NTBE)	480.764	0		1442.259	0		48.090	0		6.0-9.5	0	
February	(RCR 3.37 Mn3/d) Never to be Exceeded	(NTBE)	480.764	0		1442.259	0		48.090	0		6.0-9.5	0	
March	(RCR 3.37 Mn3/d) Never to be Exceeded	(NTBE)	480.764	0		1442.259	0		48.090	0		6.0-9.5	0	
April	(RCR 3.37 Mn3/d) Never to be Exceeded	(NTBE)	480.764	0		1442.259	0		48.090	0		6.0-9.5	0	

PETROLEUM REFINERY ANNUAL SUMMARY REPORT (STORMWATER)

COMPANY : Shell Canada Products Ltd.
 REFINERY : Shell Canada Products Ltd., Burnaby, B.C.

YEAR : 1993

INITIAL RCR : 3.74 (Mm3/d)

MONTH	AVERAGE CRUDE RATE (% of R)	CURRENT REF. CRUDE RATE (R) (Mm3/d)	EFFLUENT FLOW TOTAL (m3/mon.)	# of MEAS	OIL/GREASE TOTAL (Kg/mon.)	# of TESTS	T.S.S. TOTAL (Kg/mon.)	# of TESTS	PHENOLS TOTAL (Kg/mon.)	# of TESTS	pH RANGE	# of TESTS
JANUARY	87%	3.37	146854.8	4	484.143	4	1027.650	4	0.827	3	6.9-7.5	4
FEBRUARY	102%	3.37	132548.3	4	435.937	4	863.505	4	0.698	4	6.5-7.4	4
MARCH	117%	3.37	98704.4	5	310.126	5	424.618	5	0.580	3	6.8-7.2	5
APRIL	85%	3.37	163881.5	4	681.225	4	2744.740	4	1.033	3	6.5-7.2	4
YEAR-TO-DATE AVG.			132788.4	17	465.357	17	1201.262	17	0.772	13	6.5-7.5	17

REPORTED EXCURSIONS

	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR
Never to be Exceeded (NTBE)	1	0	0	0

EP SURVEY DATA

Date ()	Federal Allowable (mg/l)	=OIL/GREASE=	=T.S.S.=	=PHENOLS=	= pH =	=TOXICITY (LT50)=
Outfall: Foreshore Basin	Audit Result (mg/l)					
Outfall: East Storm Pond	Audit Result (mg/l)					
Outfall: Area II Impounding Basin	Audit Result (mg/l)					

PETROLEUM REFINERY ANNUAL COMPLIANCE REPORT (STORMWATER)

COMPANY : Chevron Canada Limited
 REFINERY : Chevron Refinery (Burnaby), Burnaby, B.C.
 PERIOD : 1993
 INITIAL RCR : 3.82 (Mn3/d)

REPORTED EXCURSIONS =====			OIL/GREASE ALLOW. DEP. (Kg/mon)	# of EXCUR	T.S.S. ALLOW. DEP. (Kg/mon)	# of EXCUR	PHENOLS ALLOW. DEP. (Kg/mon)	# of EXCUR	pH ALLOW. RANGE	# of EXCUR
January	(RCR 6.66 Mn3/d) Never to be Exceeded	(NTBE)	747.538	1	2242.549	0	74.761	0	6.0-9.5	0
February	(RCR 6.66 Mn3/d) Never to be Exceeded	(NTBE)	747.538	0	2242.549	0	74.761	0	6.0-9.5	0
March	(RCR 6.66 Mn3/d) Never to be Exceeded	(NTBE)	747.538	0	2242.549	0	74.761	0	6.0-9.5	0
April	(RCR 6.66 Mn3/d) Never to be Exceeded	(NTBE)	747.538	0	2242.549	0	74.761	0	6.0-9.5	0
May	(RCR 6.66 Mn3/d) Never to be Exceeded	(NTBE)	747.538	0	2242.549	0	74.761	0	6.0-9.5	0
June	(RCR 6.66 Mn3/d) Never to be Exceeded	(NTBE)	747.538	0	2242.549	0	74.761	0	6.0-9.5	1
July	(RCR 6.66 Mn3/d) Never to be Exceeded	(NTBE)	747.538	0	2242.549	0	74.761	0	6.0-9.5	0
August	(RCR 6.66 Mn3/d) Never to be Exceeded	(NTBE)	747.538	0	2242.549	0	74.761	0	6.0-9.5	0
September	(RCR 6.66 Mn3/d) Never to be Exceeded	(NTBE)	747.538	0	2242.549	0	74.761	0	6.0-9.5	1
October	(RCR 6.66 Mn3/d) Never to be Exceeded	(NTBE)	747.538	0	2242.549	0	74.761	0	6.0-9.5	1
November	(RCR 6.66 Mn3/d) Never to be Exceeded	(NTBE)	747.538	0	2242.549	0	74.761	0	6.0-9.5	0
December	(RCR 6.66 Mn3/d) Never to be Exceeded	(NTBE)	747.538	0	2242.549	0	74.761	0	6.0-9.5	0

APPENDIX 5

Checklists on Microfiche

(in pocket on inside back cover)

- A5.1** *Storage of PCB Materials Regulations Checklist*
- A5.2** *Pulp & Paper Mill Defoamer and Woodchip Regulations Checklist*
- A5.3** *Pulp & Paper Mill Effluents Chlorinated Dioxins and Furans Regulations Checklist*
- A5.4** *Pulp & Paper Effluent Regulations Checklist*
- A5.5** *Antisapstain Facility Assessment Report Checklist*
- A5.6** **Wood Preservation Checklists:**
 - A5.6.1** **ACA Wood Preservation Facilities Assessment Inspection Form**
 - A5.6.2** **CCA Wood Preservation Facilities Assessment Inspection Form**
 - A5.6.3** **Creosote Wood Preservation Facilities Assessment Inspection Form**
 - A5.6.4** **Pentachlorophenol Wood Preservation Facilities Assessment Inspection Form**
 - A5.6.5** **Pentachlorophenol Thermal Wood Preservation Facilities Assessment Inspection Form**
- A5.7** *Municipal Sewage Treatment Plant Inspection Checklist*
- A5.8** *Export and Import of Hazardous Wastes Regulations Checklists*
 - A5.8.1** **Carrier Inspection Checklist**
 - A5.8.2** **Facility Inspection Checklist**



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