Fraser River
Action Plan

COMPLIANCE STATUS SUMMARY REPORT for the FRASER RIVER BASIN

CANADA'S GREEN PLAN
LE PLAN VERT DU CANADA

Canada

DOE FRAP 1994 - 03

Environment Canada — Environnement Canada

Environment Canada Environmental Protection

COMPLIANCE STATUS SUMMARY REPORT FOR THE FRASER RIVER BASIN BRITISH COLUMBIA

Fiscal Year 1992-1993

DOE FRAP 1994-03

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April 1994

ACKNOWLEDGEMENTS

Enforcement of environmental regulatory provisions is a demanding job. The results of inspection activities described in this report represent both substantial work effort and commitment by Environment Canada Pacific Region Inspections staff to improving environmental quality. The author wishes to thank the following individuals for providing their input to this report.

» Bruce Kay, Head, Inspections Section
» Peter Krahn, Senior Engineer, Fraser Basin Inspection Program
» John Holmes, Senior Enforcement Technologist
» Zaheer Manki, Senior Enforcement Technologist
» Gerry Mitchell, Senior Enforcement Technologist
» Keith Hebron, Senior Enforcement Technologist

Finally, the author wishes to expressly thank the following individuals who provided their professional skills in preparing the report:

» Gwen Nevens, Enforcement Support Clerk
» Jonathan Gee, Database Analyst
» Dick Boak, Graphics

Emmanuel C. Mendoza,
Senior Engineer, Lower Mainland Inspection Program
March 1994

Technical editing, layout and design by Maggie M. Paquet/MAIA Publishing Ltd., Vancouver, BC; 604-730-7861.

NOTICE

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 both Acts are described in the *CEPA Enforcement and Compliance Policy* as follows.

Warning Letters

Inspectors may use Warning Letters -

- 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

As we move into the 21st Century, Canadians have a growing commitment to environmental sustainability and to protecting the tremendous natural and human resources of our country. Canada is signatory to a number of international conventions and treaties dealing with specific environmental concerns, such as ozone depletion, global warming, and biodiversity. Environment Canada and Health and Welfare Canada jointly have overall responsibility to carry out the activities required to uphold these commitments.

The Environmental Protection Branch (EP) Pacific Region operates throughout British Columbia and has a specific focus on the Fraser River Basin, Canada's fifth largest river basin, in which over 65% of British Columbia's population lives and works.

In June 1991, the Fraser River Action Plan (FRAP) was announced as an initiative of the Green Plan. FRAP set two major objectives: to reduce by 30% the discharge of environmentally disruptive pollutants entering the Fraser Basin by 1997, and to significantly reduce the release of persistent toxic substances into the waters of the basin by the year 2000. The *Canadian Environmental Protection Act* (CEPA) and the *Fisheries Act* (FA) give legislative authority for the inspection and enforcement activities of the Environmental Protection Branch and the Fraser River Action Plan. The Inspections Section receives its mandate primarily 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 the provisions of CEPA with respect to pollution entering the environment under the mandate of the "Enforcement and Compliance Policy for CEPA." A similar policy for the *Fisheries Act* is in the draft stage. Inspections enforces the pollution provisions of the *Fisheries Act* with respect to deleterious substances entering fish habitat, and carries out inspections to verify compliance.

Under these policies, the Inspections Section performs a number of activities to promote environmental protection, including monitoring toxic substances, performing site inspections and compliance assessments (using checklists), examining suspected violations of regulations, and taking a range of actions to ensure compliance, including launching investigations where appropriate.

A number of cooperative programs have been initiated with other federal agencies, such as the Department of Fisheries and Oceans, Canada Customs, Royal Canadian Mounted Police, Canadian Coast Guard, and with provincial agencies, particularly the BC Ministry of Environment, Lands and Parks.

In 1990-91, the National Inspection Plan (NIP) was introduced as an annual work plan. The following year, NIP began a target-oriented approach to make the best use of available resources. The strategic approach taken by the Section, in concert with the National Inspection Plan and the Fraser River Action Plan, 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

Information management is important because it helps target pollution sources that may be specific to industries or geographic areas.

Some of the more active programs in the Fraser Basin reflect the use of and concern over toxic substances, e.g., the *Storage of PCB Wastes Interim Order, Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations, Metal Mining Liquid Effluent Regulations, Ozone Depleting Substances Regulations, Secondary Lead Smelter Release Regulations, Municipal Sewage Treatment Plants - Fisheries Act, Petroleum Refinery Liquid Effluent Regulations - Fisheries Act,* and the *Contaminated Fuels Regulations,* to name a few.

This *Compliance Status Summary Report for the Fraser River Basin* 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.

For the fiscal year 1992-93, Inspections Section staff conducted 168 CEPA inspections and 109 FA inspections in the Fraser River Basin. Inspections activity included sample collection and analysis, audits of data and company documents, plant and site inspections, and source emission and effluent testing. An average of 82% compliance was reported for all sectors inspected in the Fraser River Basin for this fiscal year. Inspections Section has targetted a 90% compliance for FY1993/94.

This Report gives details of the enforcement actions taken as a result of inspections in the Fraser River Basin. 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. For instance, not all facilities and sites are inspected. Auditing company-submitted data is one of the methods used to assess compliance.

Some requirements of regulations were found to be more in compliance than others. For example, for the *Storage of PCB Material Regulations,* maintenance of storage areas and labelling were found to be more in compliance than were adequate storage of PCBs or the development of emergency contingency plans. Under the *Antisapstain Chemical Waste Control Regulations,* wood protection facilities and antisapstain facilities are beginning to operate within a Recommended Code of Practice that will assist compliance with the pollution provisions of the *Fisheries Act* and will protect workers from harmful exposure to the chlorophenates used in antisapstains. The *Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations* are causing mills to upgrade their treatment facilities for effluents; as well, many are no longer using a chlorine bleaching process so they can more easily comply with the legislation and regulations.

Some prosecutions were undertaken, especially in cases of serious or repeated noncompliance. Many of the less serious cases of noncompliance were addressed with administrative and educational remedies, such as warning letters. Most facilities and practices showed improvement upon reinspection.

Year 1 of the program focussed on the larger regulated activities, such as small municipal treatment plants, pulp and paper mills, metal mines, and wood preservation and treatment facilities. The focus for Year 2 is on developing checklists and compliance to codes of practice, on data management, and more specifically on non-regulated sectors (those that have no associated FA regulations, such as the woodwaste industry). Subsequent years will see a focus on stormwater runoff, leachates, large sewage treatment plants (e.g., GVRD), and on polluters identified by the abatement programs under FRAP.

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1.0 INTRODUCTION

The Fraser River Basin is Canada's fifth largest river basin. It is the major salmon-producing river in the world. Because of the topography of British Columbia, the river basin contains an enormous diversity of ecosystems. From its source in the Rocky Mountains, the Fraser slices commandingly across the highlands and plateaus of the central interior and brings much-needed water to the dry southern interior grasslands. Major tributaries, such as the Thompson and Chilcotin, add greatly to its volume before it begins cutting through the Cascade Ranges. The Fraser then passes through the agricultural lands of the Fraser Valley and the urbanized Lower Mainland on its way to the sea to form a broad delta - a critical stopover for millions of migratory birds and waterfowl.

Over 65 percent of British Columbians live and work in the Fraser Basin, and urbanisation, agricultural activity, and industrialisation have taken their toll. The environmental condition of the Fraser and its basin has reached a critical stage. The Fraser River Action Plan (FRAP), an initiative of the federal Green Plan, has embarked on a partnership program with numerous government agencies - including the Inspections Section of Environment Canada - and the public, to repair and restore the river for future generations.

Cleaning up pollution is a major objective of FRAP; this includes pollution abatement, protecting water and environmental quality, and effecting compliance and enforcement. FRAP initiatives support the special focus Inspections Section has on the Fraser River Basin.

1.1 Legislative Authority

1.1.1 Canadian Environmental Protection Act (CEPA)

The *Canadian Environmental Protection Act* (CEPA)[1] was proclaimed on June 30, 1988. It is jointly administered by Environment Canada and Health and 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 under the *Canada Water Act*.

After CEPA came into force, 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 lifecycles. 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 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 pre-

venting 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 and 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 dumping methods are also controlled.

1.1.2 Fisheries Act

The Fraser River is the world's largest salmon-producing river. Thousands of British Columbians depend on this rich natural resource for their livelihoods. Many First Nations have built a large part of their cultures on this remarkable resource. Salmon and their habitat come under the jurisdiction of the federal Department of Fisheries and Oceans (DFO). In fact, DFO is responsible for Canadian fisheries; it relies largely on the *Fisheries Act* [7] 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 section 36(3), which prohibits the deposit of substances deleterious to fish in waters frequented by fish; section 36(4), which permits the deposits authorized by a regulation; and section 36(5), which describes the types of regulations that can be drafted.

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

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

1.2 Program Mandate

Environmental Protection in the Pacific 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 is responsible for conducting all compliance verification inspections under the *Canadian Environmental Protection Act* (CEPA) and *Fisheries Act* (FA).

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 the 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 (EP) in Environment Canada enforces CEPA according to the "Enforcement and Compliance Policy for CEPA"[2]. A similar draft policy has been prepared for the *Fisheries Act*, but has not yet been published. These

policies provide guiding principles for enforcement officials to examine every suspected violation of which they have knowledge, and to take appropriate action necessary for the violator to achieve compliance with both Acts.

EP has also focused, geographically, on the Fraser Basin through enhanced enforcement effort on facilities considered to be major dischargers to the river and its tributaries. In concert with the Fraser River Action Plan, the goal is to achieve 90% compliance with environmental legislative requirements through cooperative programs with provincial and other federal enforcement agencies.

1.2.1 Fraser River Action Plan (FRAP)

An overall goal of the Fraser River Action Plan (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.

In the first few years of FRAP, enforcement focused on measuring compliance. DOE carried out close to 300 inspections in the Fraser 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% compliance rate across the board. However, a number of inspections revealed significant violations.

In the second half of FRAP, activities will focus on pollution problems that are not specifically covered under regulations. There is little information on these unregulated sources of discharge, such as the wood preservation and wood waste industries, but inspections will target the worst polluters with guidance from the pollution abatement and environmental quality programs. FRAP plans include the development of new inspection criteria to check compliance with new industry codes of practice.

1.2.2 Cooperative Programs

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

Inspections Section works closely with the Investigations Section of Environment Canada and the pollution abatement programs of the Department and FRAP, as well as with provincial agencies, most notably the Ministry of Environment, Lands and Parks and the Ministry of Health.

1.3 Strategic Direction

The strategic approach being taken by the Section is to implement targeted inspections programs that will improve compliance with the significant polluters in the Region. 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. This will allow the capability of looking at patterns of noncompliance within or across environmental programs.

The data will assist in the targeting of geographic-, industry-, company-, facility-, or pollutant-specific sources based on compliance status, compliance history, or environmental risk profile.

1.3.1 National Inspection Plan (NIP)

The National Inspection Plan 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. Environment Canada soon recognized that the plan was too numbers-oriented and that it offered limited flexibility to respond to emerging issues during the fiscal year. Also, it was difficult to coordinate the activities of the inspectors and the investigators. To address these problems, the planning cycle took on new dimensions.

The 1991-92 National Inspection Plan offered 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. The mandate of FRAP has had a major influence on NIP within British Columbia. NIP encompasses a broad consultation process involving regional and headquarters officials in setting priorities, determining laboratory requirements, and developing specific training needs.

In fiscal year (FY) 1992-93, Inspections Section staff conducted 168 CEPA inspections and 108 *Fisheries Act* inspections in the Fraser River Basin.

Figure 1 shows the level of effort of inspections conducted under programs specific to CEPA regulations. Of the 11 inspection

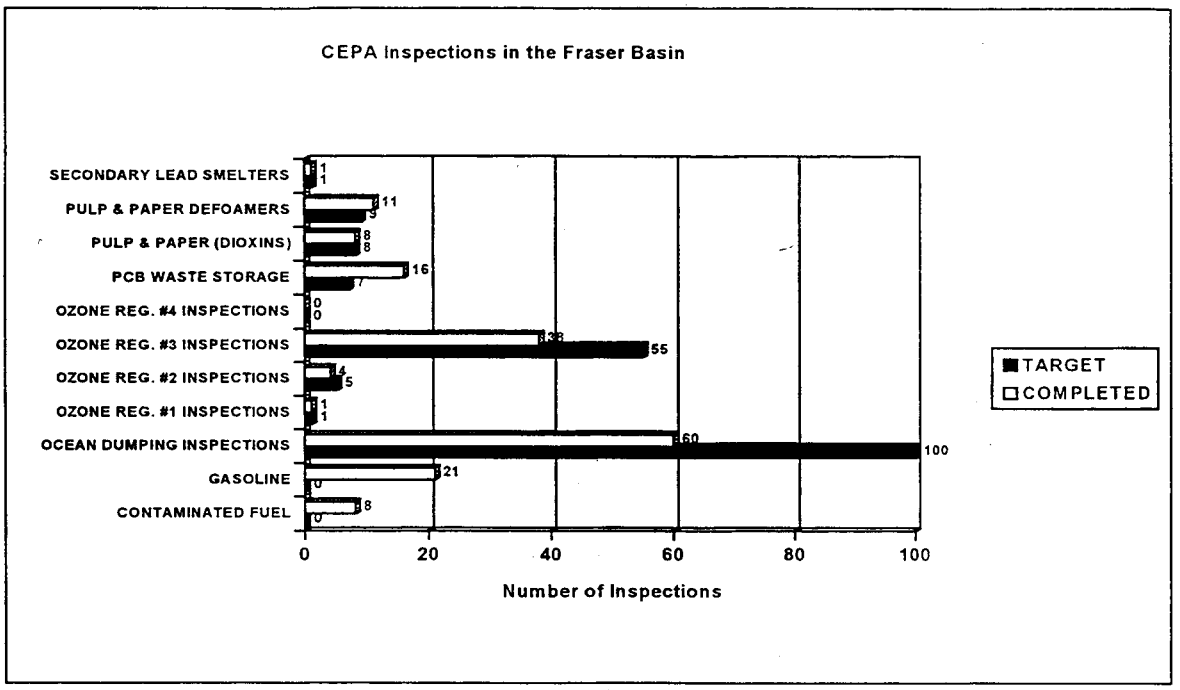


Figure 1 CEPA Inspections Efforts for the Fraser Basin FY1992-1993

programs conducted under CEPA in FY92/93, seven met or exceeded the NIP target levels, three did not meet the NIP target levels, and one demonstrated no reported activity. NIP targets for certain CEPA inspection programs were not met for the following reasons:

» The *Ozone Depleting Substances Regulations* #4 (ODS) did not come into force until May 19, 1993, therefore, no inspections were conducted during FY92/93.

Figure 2 shows the level of effort of inspections conducted under the general prohibitions of the *Fisheries Act,* including Regulations. Of the ten inspection programs conducted under the *Fisheries Act* this fiscal year, three have met or exceeded the NIP target levels and seven have not met the NIP target levels for the Fraser Basin. NIP targets for certain *Fisheries Act* inspection programs were not met for the following reasons:

» Inspections of antisapstain facilities were reduced as a result of target facilities switching to less toxic antisapstain chemicals and some facilities closing down.

» Inspections of wood waste sites were conducted on an as-required basis. The wood wastes inspection program responded to three wood waste-related complaints during FY92/93.

» As a result of inspections conducted mostly in the latter part of the summer spray season, the pesticides inspection program completed only nine site inspections for FY92/93.

» Frequency of inspections at regulated mines was reduced to only once a year during FY92/93.

» Inspection effort on meat and poultry facilities was reduced when initial inspections revealed discharges from these sites were not regulated under the *Fisheries Act.*

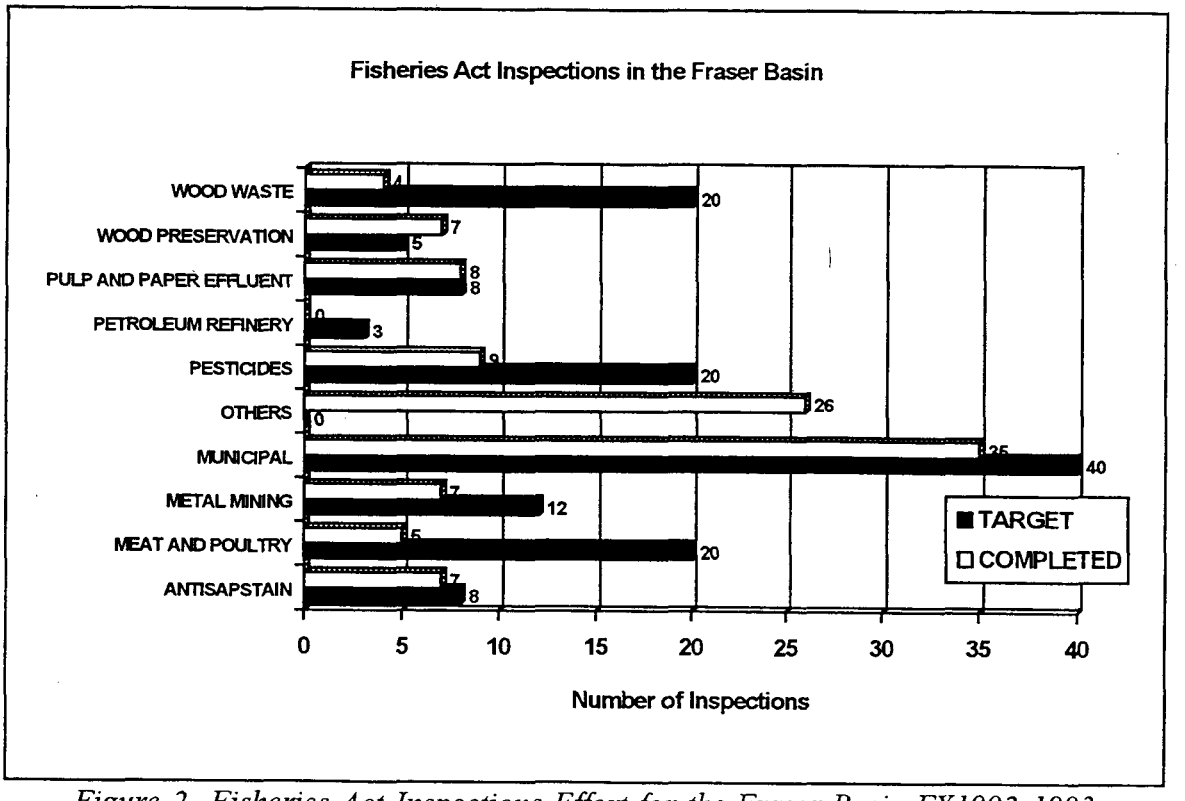


Figure 2 Fisheries Act Inspections Effort for the Fraser Basin FY1992-1993

» Inspections of petroleum refineries were limited to review of monitoring data submitted to Environment Canada by the refineries. No actual site inspections were conducted.

2.0 STORAGE OF PCB WASTES INTERIM ORDER/ STORAGE OF PCB MATERIAL REGULATIONS

In an area as populated as the southern part of the Fraser River Basin, the storage and handling of polychlorinated biphenyls (PCBs) is a critical issue. *Interim Order Respecting the Storage of Polychlorinated Biphenyls (PCB s)* [23] was issued on September 16, 1988 to provide immediate regulatory authority to deal with the storage of chlorobiphenyl (PCB) wastes in Canada following the St. Basile fire in Quebec. 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 site having no security 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* [22]. These Regulations have the same basic requirements as the Interim Order and are intended to ensure the continuation of adequate controls for PCB storage. The latter part of FY1992-93 focused on enforcement of the Regulations on newly established storage facilities.

2.1 Compliance Verification Mechanism

Enforcement of the Interim Order and Regulations was carried out through site inspections at federal departments, federal undertakings, and facilities on federal lands that store PCB materials. Higher inspection priorities were given to newly established storage facilities and sites with poor compliance histories.

Field activities included inspections of access to storage site, type of floor or surface of the site, types of containers, separation of PCB wastes from other non-PCB wastes, storage practices and inspection, fire protection and emergency procedures, labelling requirements, maintenance of records, and reporting requirements.

2.2 Compliance Status

EP conducted 16 inspections at federally regulated facilities in the Fraser River Basin. The number of Fraser Basin sites monitored in this program represents 17 percent of the total federal sites (93) registered in the PCB inventory for British Columbia. Compliance status is limited to these facilities.

Four facilities were found to be in noncompliance. Table 1 lists the facilities found out of compliance and the number of non-

compliance occurrences per category of the Interim Order.

Although the noncompliance list represents 4 out of 16 (25%) facilities inspected, Figure 3 demonstrates that certain requirements of the Order and Regulations are being met better than others. In particular, the survey indicated the highest noncompliance was observed in the storage, fire and spill emergency planning, and record-keeping requirements of the Interim Order and Regulations.

Noncompliance, for the most part, is reflected from sites identified as newly discovered and/or established facilities and sites found neglected through poor storage practices and record keeping as a result of changes in staff managing the storage sites.

2.3 Enforcement Actions

The initial inspections uncovered violations in various categories of the Order. With the exception of one unauthorized storage facility on the Kamloops Reserve, facilities found not in compliance with the Order and Regulations were issued Warning Letters.

EP issued four Warning Letters to facilities (Table 1) found in violation of the Order and Regulations. The use of administrative mechanisms to address minor violations discovered under the Order and Regulations proved to be effective enforcement tools in compelling regulated facilities to achieve compliance. Subsequent reinspections of the same facilities demonstrated compliance with the Order and Regulations.

Table 1. Interim Order NonCompliance Categories for the Fraser Basin

Site Name	A	S	E	M	L	RC	RP	Total
Correctional Service Matsqui	1	2		1	1	1		**6**
Transport Canada Quesnel Airport		2	4	4	1		1	**12**
Lakeside Timber Tappen Reserve	1		2	1		3	1	**8**
Ainsworth Lumber Lillooet Reserve		1		3		1	2	**7**
TOTALS	**2**	**5**	**6**	**9**	**2**	**5**	**4**	33

Where:

A Access to the Storage Site
S Storage Requirements
E Emergency and Contingency Plan
M Maintenance
L Labelling
RC Record Keeping
RP Reporting

On December 18, 1992, in Kamloops Provincial Court, Mr. Peter Finn pleaded guilty to five counts under the *Canadian Environmental Protection Act Part II, PCB Waste Interim Order.*

Finn was found conducting lamp ballast splitting operations in an unsafe manner and storing several PCB lamp ballasts on Kamloops Indian Reserve property in contravention of the Order. The Department of Indian and Northern Affairs has since taken the responsibility of establishing a PCB storage facility on site.

Mr. Finn was given a suspended sentence and ordered by the court to provide 150 hours of his time to community service.

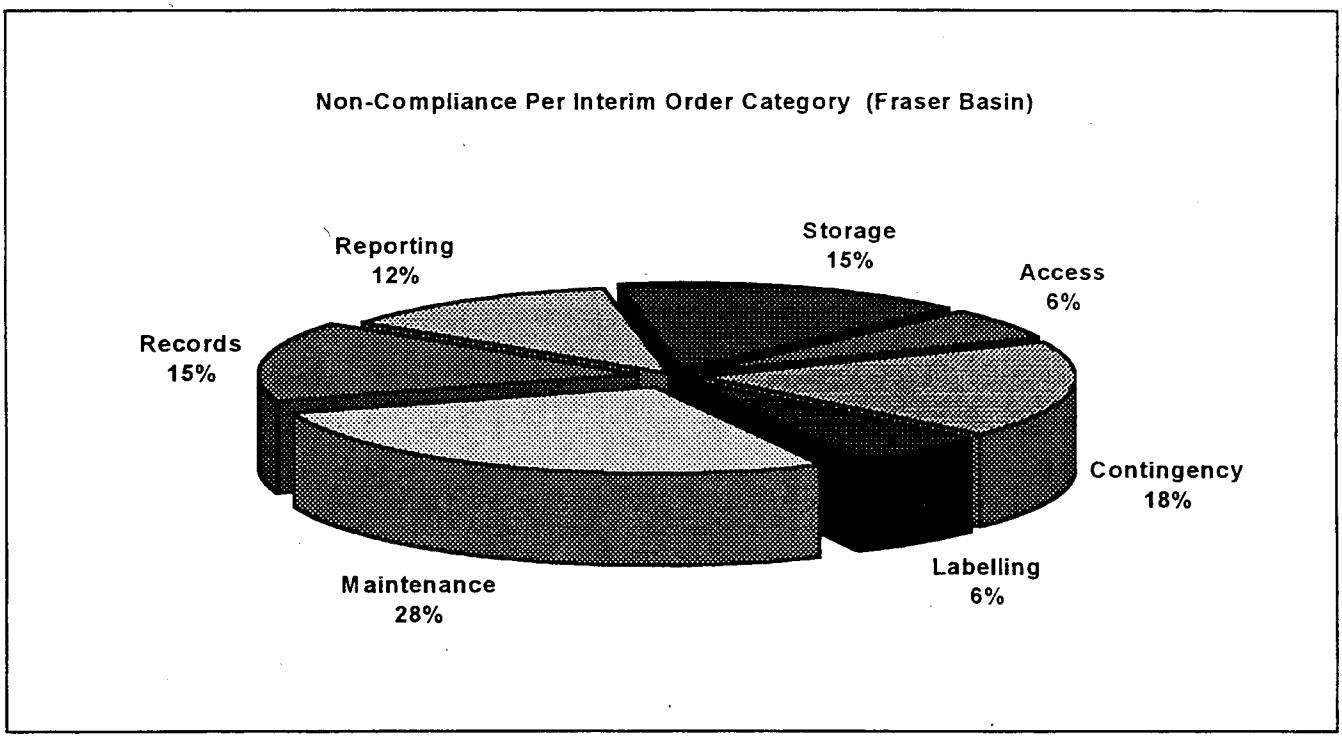


Figure 3 *Proportion of Non Compliance Per Interim Order Category for the Fraser Basin*

3.0 CEPA PART VI - OCEAN DISPOSAL

The Government of Canada has the primary responsibility for the management and protection of marine waters from the effects of disposing wastes at sea. Although by world standards the Canadian maritime environment is relatively uncontaminated, Canada's territorial waters have suffered some environmental damage, especially in harbours, estuaries, and other nearshore areas. Contaminated sediments in these areas may be unsuitable for ocean disposal. Dredging activities that require ocean disposal must be closely regulated.

Among measures in place to protect Canada's marine ecosystems and promote a comprehensive approach to waste management are controls on ocean disposal under Part VI of the *Canadian Environmental Protection Act* (CEPA) [3]. CEPA regulates the disposal of substances at sea by means of a permitting system. The permit ensures material disposed at sea meets the requirements of the *Ocean Dumping Regulations* [11] and places controls on the loading and disposal operations with respect to timing, location, method of disposal, and other factors.

3.1 Compliance Verification Mechanism

For the Fraser River Basin component of this activity, both the mouth of the Fraser and Burrard Inlet are considered. The ocean disposal inspection program has focussed its efforts to verify compliance with ocean disposal permits issued by Environment Canada. The inspections are required to determine whether permitted

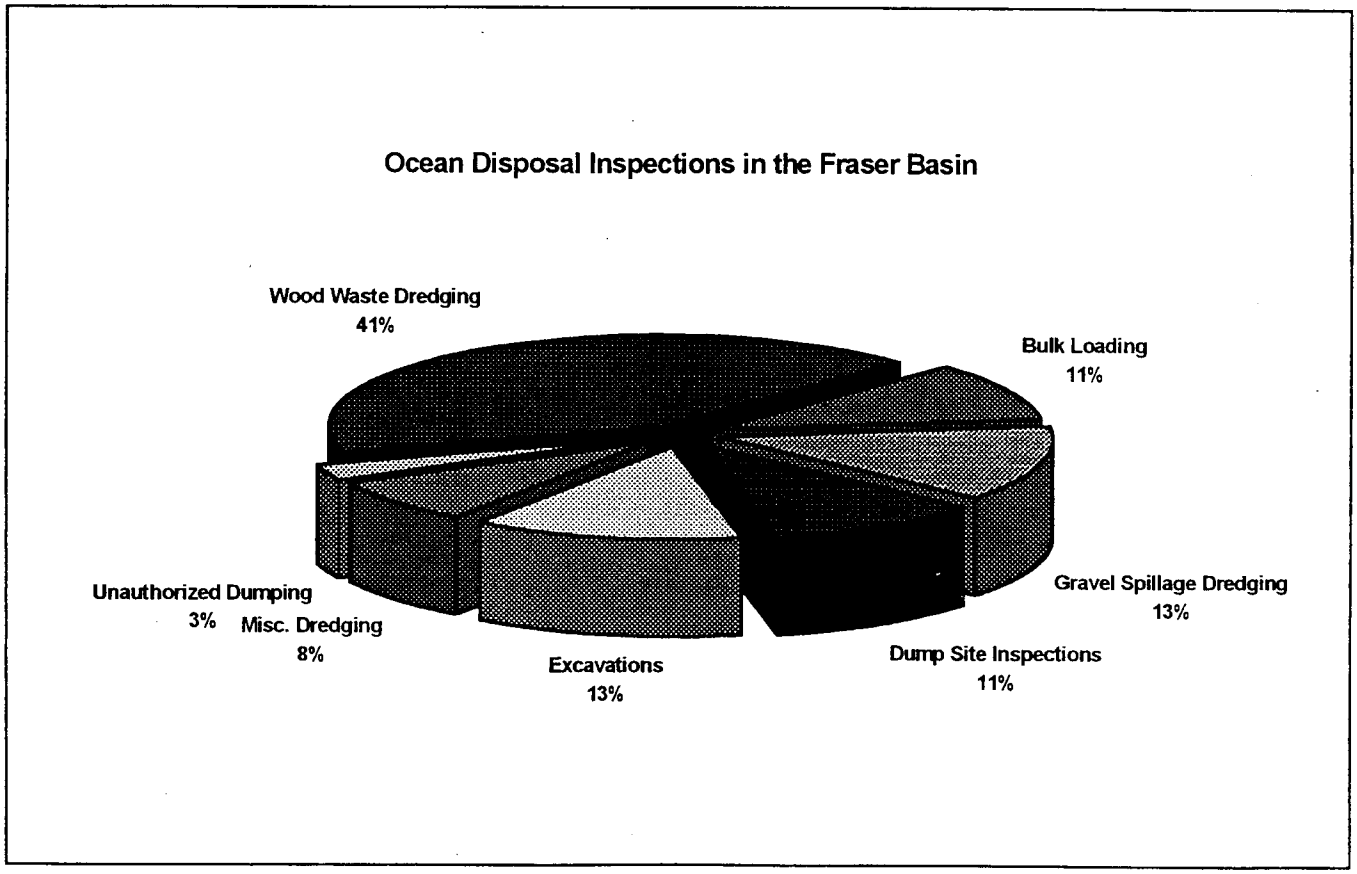


Figure 4 Ocean Disposal Activities Inspected for the Fraser Basin

activities are proceeding as stipulated in the terms and conditions of the permit.

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. While some disposal site inspections have been conducted, there is very little information about the level of compliance in the disposal aspect.

This year's inspection program targeted activities such as woodwaste dredging, gravel spillage dredging, bulk loading, excavation, vessel disposal, responding to referrals or complaints of unauthorized dumping, and other miscellaneous dredging activities.

Figure 4 shows the relative proportion of ocean disposal activities inspected in British Columbia for the FY 92/93. Based on the *Ocean Disposal Annual Report* FY 92/93 [10], these figures are representative of the proportion of each type of ocean disposal activity conducted in the province. EP conducted 38 inspections in the Fraser Basin (63 percent of total ocean disposal inspections for the province). Disposal sites inspections were undertaken jointly with other government agencies capable of monitoring ocean disposal activity at some of the disposal sites, such as the Canadian Coast Guard Vancouver Vessel Traffic Services.

Figure 5 shows the ratio of approved projects inspected to the number of approved projects referred for inspections by the Ocean Disposal Control Office on a quarterly basis [10]. Fifty-six percent of all pro-

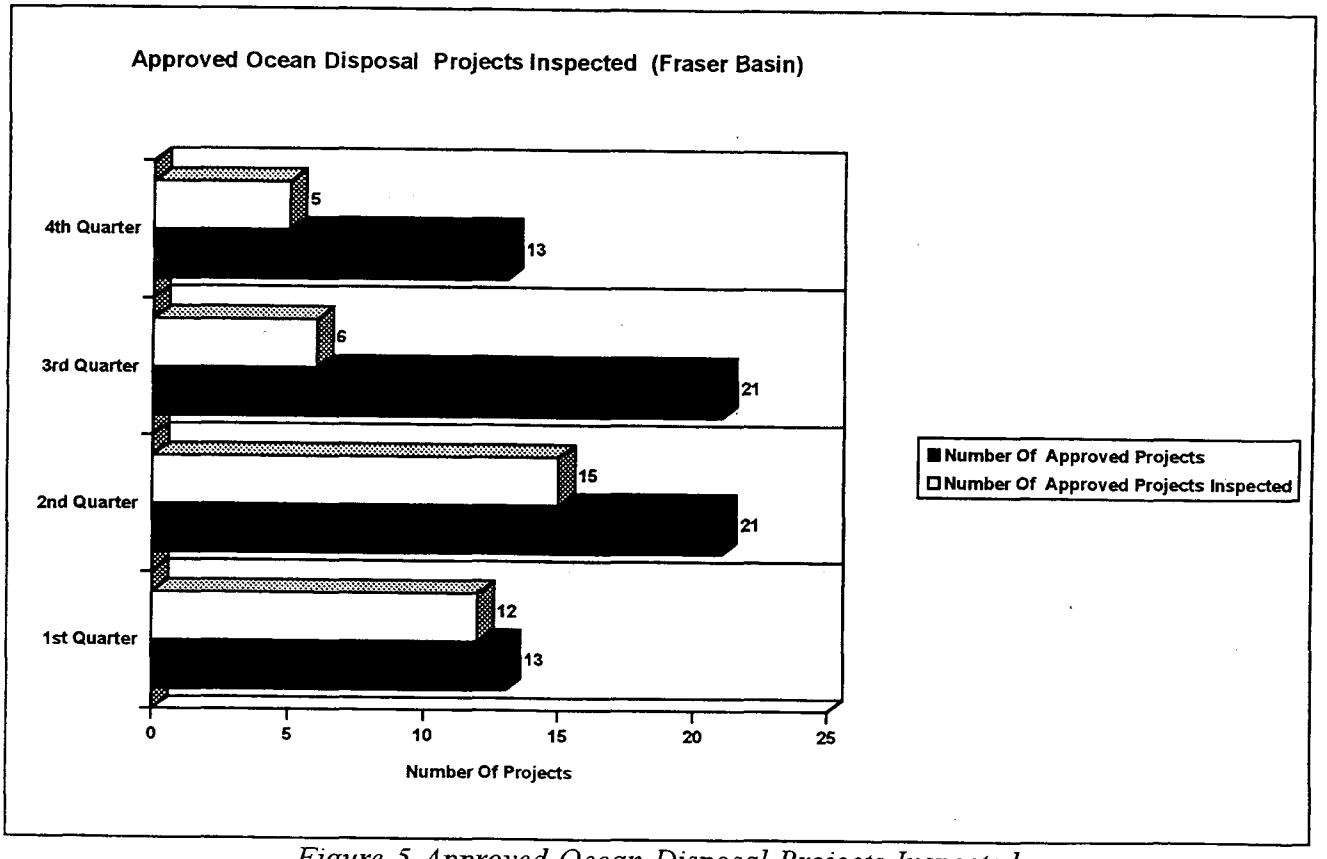


Figure 5 Approved Ocean Disposal Projects Inspected

jects approved by Environment Canada were inspected for compliance with permit conditions. Projects lasting more than one week, where large amounts of materials destined for ocean disposal were involved, were inspected at increased frequency.

3.2 Compliance Status

Environment Canada continues to recognize that it is far more efficient to prevent pollution problems through educational outreach and information before problems occur. The department has continued to seek fundamental change in the behaviour and understanding of regulatees about their responsibilities to the environment. To promote this change and achieve one of the goals of the department, enforcement and pollution abatement personnel coordinated important educational and outreach efforts to the dredging community.

With the exception of one noncompliance incident (New Westminster Gypsum), inspections of ocean disposal activities demonstrated compliance with requirements of ocean dumping permits. Any minor noncompliance or excursions from permit conditions noted during the inspections were corrected and complied with immediately. Compliance was at 97 percent for the period 1 April 1992 to March 31, 1993.

3.3 Enforcement Actions

After inspection review of the Department of Public Works Canada ocean disposal data, Environmental Protection found that department had been conducting ocean disposal operations without a valid ocean dumping permit. However, the nature of the violation was administrative and did not have direct impact on human health or the environment. The ensuing enforcement action was the result of a review of compliance data, not as a result of a site inspection, and the noncompliance was dealt with by a Warning Letter.

The conviction of Valley Towing Ltd. on March 8, 1993, for unlawfully dumping woodwastes at sea in violation of the ocean dumping provisions of CEPA, marked the first enforcement achievement by Environmental Protection under the new reorganized structure. While the actual noncompliance was reported in the previous investigation period, the successful conviction in the current reporting period was a milestone in the achievement of the Section's goals. As penalty for the violation, the company was fined $1,000 and ordered to pay $20,000 to support research on the ecological impact of disposal of wood debris.

On September 10, 1992, Island Sea Marine was charged (as part of the noncompliance report of New Westminster Gypsum) with unlawfully dumping gypsum wastes at sea and failing to report an emergency ocean disposal event. The successful investigation of this incident was made possible through the concerted efforts of Environmental Protection, Fisheries and Oceans, Vessel Traffic Services, and Vancouver Port Corporation.

4.0 PULP AND PAPER MILL EFFLUENT CHLORINATED DIOXINS AND FURANS REGULATIONS

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 the *Canada Gazette, Part I*, 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* [18]. These regulations are designed to protect the environment and humans from dioxin and furan releases. Owners of mills using chlorine 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 and report on concentrations of dioxins and furans. The frequency of sampling required will remain at once a month until December 31, 1994. In 1995, a mill may adopt quarterly sampling if it has had no measurable concentrations in its last three consecutive monthly samples. A mill may adopt annual sampling if it has had no measurable concentration in its last three consecutive quarterly samples. The regulations require a mill to revert back to monthly testing if either a quarterly test or an annual test detects dioxins and furans, until the mill again achieves nonmeasurable levels.

Seventy-five compounds make up the family of polychlorinated dibenzo-para-dioxins (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-tetrachlorodibenzo dioxin (2,3,7,8-TCDD) and 2,3,7,8-tetrachlorodibenzo 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.

These two 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.

4.1 Compliance Verification Mechanism

The inspection program identified four mills in the Fraser Basin that used a chlorine bleaching process in 1992-93, [24]: Prince George Pulp & Paper, Cariboo Pulp & Paper, Northwood Pulp Division, and Weyerhaeuser Pulp Mill.

A comprehensive checklist (Appendix 5) was used to verify compliance with the regulations. Audit samples of mill effluent were collected by inspectors and analysed for dioxins and furans. Monitoring data

submitted by the mills was reviewed throughout the reporting period.

4.2 Compliance Status

Each of the four mills was inspected at least once during the inspection period September 1, 1992 to March 31, 1993. The compliance scores were based on three requirements:

1. The mills must conduct analyses of effluents according to a schedule in the regulations.

2. All mills must report the monitoring results according to a specific schedule.

3. 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 have requested and been granted temporary exemptions from the concentration limits specified. These limits are 15 parts per quadrillion (ppq) for TCDD and 50 ppq for TCDF. The temporary exemptions allow a specified time for mills to put in place implementation measures that will enable compliance with the regulations.

Three mills are already meeting section 4 requirements.

A review of company data submitted (Appendix 1) for May 1992 to March 31, 1993 reporting period determined that one mill discharged effluent with more than 50 ppq of TCDF.

Prior to January 1, 1994, mills may begin monthly monitoring of effluents. Fifteen mills throughout the province have applied for this accelerated sampling schedule.

4.3 Enforcement Action

All mills are in 100% compliance with the monitoring and reporting requirements of the regulations. The mills that reported TCDF exceedances were required to increase the frequency of effluent sampling. No enforcement action was considered necessary at this time.

5.0 PULP AND PAPER MILL DEFOAMER AND WOODCHIP REGULATIONS

Pulp and paper mills that employ a chlorine bleaching process use defoamer additives made from oils and polymers that may contain dibenzo-para-dioxins (DBDs) and dibenzo-furans (DBFs). DBDs and DBFs are subject to the regulations. They can react in the chlorine bleaching process to form dioxins and furans in the mill's products and effluent.

Polychlorinated phenols (PCPs) are used as fungicides to preserve and protect wood; these contain dioxins and furans as byproducts. 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* were introduced in May 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 of 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 determined to be 1 ppb.

5.1 Compliance Verification Mechanism

EP identified eight mills in the Fraser 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 5) was used to verify compliance with requirements specified in the Regulations. Monitoring data submitted by the mills was reviewed throughout the reporting period.

5.2 Compliance Status

Each of the eight mills was inspected at least once during the inspection period September 1, 1993 to March 31, 1993. 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 Chemical Limited 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 inspection program, the use of contaminated woodchips does not occur in pulp mills in the Fraser River Basin.

5.3 Enforcement Actions

No enforcement actions were required.

6.0 OZONE DEPLETING SUBSTANCES REGULATIONS

In recognition of the fact that chlorofluorocarbons (CFCs) and certain bromofluorocarbons (halons) deplete the ozone layer and have adverse impacts on global climate conditions, Canada and 24 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 at 1986 levels.

The *Ozone Depleting Substances Regulations #1 (Chlorofluorocarbons)* (ODS #1) [12] is the domestic legislation that meets the requirements of the Montreal Protocol. These Regulations apportioned future production or importation rights among producers manufacturing CFCs at their 1986 levels. In addition, permission for exports is required from Environment Canada.

The *Ozone Depleting Substances Regulations #2 (Certain Bromofluorocarbons)* (ODS #2) [13] is also domestic legislation that meets the requirements of the Montreal Protocol. Halons are all imported into Canada. These Regulations apportion importation authorisations among companies importing halons in 1986.

The *Ozone Depleting Substances Regulations No. 3 (Products)* [14] (ODS #3) prohibits the use of CFCs for specific lesser-essential (excluding medicinal) uses 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, 1993, no person shall manufacture, offer for sale, or sell any product in a pressurized container that contains 10 kg or less of any CFC where the product is:

(a) a release agent for molds used in the production of plastic and elastomeric materials;

(b) a cleaning solvent for commercial use on electrical or electronic equipment to be used by a person who manufactures, imports, offers for sale, or sells the equipment;

(c) a protective spray for application to photographs, or a lubricant for use in mining operations.

6.1 Compliance Verification Mechanism

6.1.1 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 (see Table 2).

6.1.2 Canada Customs Notification

Under a Memorandum of Understanding, Canada Customs entered into a new program to assist Environment Canada in monitoring the importation and exportation of CFCs and halons. Only those importers authorized by Environment Canada 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 importations 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.

6.2 Compliance Status

6.2.1 ODS #1

One CFC exporter in BC was inspected and found to have exported waste 1,1,2-trichloro-triflouro-ethane to the United States without an export permit. The substance 1,1,2-trichloro-trifluoro-ethane is

one of the five regulated CFCs. The Regulations require any export of bulk CFCs to be conducted in accordance with a permit issued by the Minister of Environment.

6.2.2 ODS #2

Four authorized importers of halons in British Columbia were identified by Environment Canada, three of which operate in the Fraser Basin.

All of those companies were given an allowable amount of halon that could be imported into Canada for the 1992-1993 control period. Of the four importers inspected, only two (one in the Fraser Basin) imported halons during the 1992-1993 control period. The type of halon imported was 1,2,1,1-bromo-chloro-trifluoro-methane. The other importer in the Fraser Basin reported no importation activity during the control period.

6.2.3 ODS #3

Most of the inspection effort was focused on sampling and monitoring commercial activities involving sales of pressurized

Table 2. CFC PRODUCT SAMPLING RESULTS

Manufacturer	Distributor/Retailer	Product Name	CFC Content
Chemtronics	Dasco	TF Plus	CFC 113
		Flux Off	CFC 113
Ideal Ajax	Westburn Electric	Switch & Contact cleaner	CFC 113
	Eecol Electric	Switch & Contact cleaner	CFC 113
Tech Spray	Main Electronics	Blue Stuff	CFC 12, 113
		FD Micromolecular cleaner	CFC 12, 113
Carlin Products	Acklands	CO Contact cleaner	CFC 113
	North Shore Auto Parts	Electrosonic cleaner	CFC 113
	Mainland Automotive	Electrosonic cleaner	CFC 113
GC Electronics	Electrosonic	Freon TF cleaner	CFC 113
	Active Components	Static Null	CFC 113
		Solvall	CFC 12
	RP Electronics	Contact Kleen	CFC 113
MG Chemicals	Intek Electronics	Freon TF cleaner	CFC 113
		Super Wash	CFC 113
		Electrosolve	CFC 113
		Chroma-Mist	CFC 113
		Magnetic head/disc cleaner	CFC 12, 113
	Syntrex Electronics	Super Wash	CFC 113
Not Available	Pollard Equipment	Tri-Flow Lubrication	CFC 113
Viatron	Friesen Electric	Spray Clean	CFC 113

CFC products. Environment Canada sampled 38 CFC-containing products from retail outlets in the Lower Mainland. Of the total samples collected, 88 percent were purchased from the electrical and electronics industry. Of these, 24 of the CFC products were sold in contravention of the sale provisions of the Regulations.

The products listed in Table 2 were sampled from various distributors and retailers, and were found to contain regulated CFCs. In all of the cases, the companies were found offering for sale or selling CFC-containing products for use different from that for which the exemption was granted under Section 3(3) of the Regulations.

The inspection program also discovered that some products listed had labels that stated the products contained no CFC propellant. While the analysis shows this was indeed the case, one company had failed to indicate that the products contained a regulated CFC solvent (CFC 113).

In most cases, the Material Safety Data Sheet (MSDS) obtained during the inspection did not accurately reflect the true constituents of the products.

6.2.4 Canada Customs Notification

Three importation notifications were received from Canada Customs. These shipments were temporarily detained for inspection of shipping documents by CEPA inspectors. In all cases, the products intended for import were found to be nonregulated CFC products. Follow-up inspections at the importer's facility were conducted for verification immediately after release of the shipment by Canada Customs.

6.3 Enforcement Action

6.3.1 ODS #1

Prism Electronics failed to comply with the export provisions of the Regulations as noted above. The circumstances surrounding the exportation were considered to have no direct impact on human health or the environment, and the violation was the result of an administrative failure to apply for an export permit. Prism received a Warning Letter for this alleged offence.

6.3.2 ODS #2

A record audit of importation documents conducted at each facility demonstrated compliance with the reporting requirements of the Regulations. The record inspections verified actual halon quantities imported matched the quantities reported to Environment Canada. Based on these findings, no enforcement action was required.

6.3.3 ODS #3

EP initiated a number of enforcement actions against retailers found in violation of the sale provisions of the Regulations. At the retail level, Warning Letters were given to 14 companies that sold pressurized CFC products to the public.

7.0 SECONDARY LEAD SMELTER RELEASE REGULATIONS

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) [21], made pursuant to subsection 34(1) of CEPA.

The main objective of the *Secondary Lead Smelter Release Regulations* 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.

7.1 Compliance Verification Mechanism

Plant inspections and source emission tests were used to verify compliance with the Regulations. In the Fraser Basin, only one industrial facility, Metalex in Richmond, is regulated under the SLSRR.

7.2 Compliance Status

Metalex Products was not required to do emissions testing in fiscal year 1992-93. Emission-testing data for the years 1981 to 1991 show this regulated source to be in compliance, with typical levels of lead emissions to be four orders of magnitude below the permitted level. The plant's process and pollution equipment were inspected in July 1992.

7.3 Enforcement Action

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

8.0 CONTAMINATED FUEL REGULATIONS

The *Contaminated Fuel Regulations* were introduced in 1991 to replace the *Interim Order Respecting the Import and Export Of Contaminated Fuel (1989)* [5]. The purpose of the Interim Order was to prohibit the import and export of fuels containing hazardous wastes (especially PCBs), except for the purposes of destroying, recycling, or disposing of the fuels at an approved facility.

The Interim Order responded to reports that hazardous wastes were being secretly mixed into fuels by companies in the United States for sale as legal fuel to Canadian importers. The *Contaminated Fuels Regulations* were intended to protect the Canadian public and environment from the potential of exposure to toxic substances generated by the combustion of hazardous wastes in fuels. The Regulations define contaminated fuels in terms of an

abnormal content of toxic substances as listed in Schedule 2 of the *Transportation of Dangerous Goods Act* [25]. Schedule 2 lists in excess of 3000 compounds, with emphasis placed on PCBs and metals.

8.1 Compliance Verification Mechanism

In recent years, EP inspectors enforced the Regulations through random inspection and sampling of all tanker traffic crossing the Canada-US border. Compliance was verified by site inspections. Samples of fuel were collected by inspectors and analysed for metals and PCBs. In the absence of any quantitative data on the normal levels of metals in fuels, each sample was compared against the group to identify abnormal levels of metals. Detectable levels for the heavy metals analysed, including lead, chromium, cadmium, nickel, vanadium, and zinc, ranged from 0.2 to 20 µg/g. The detection limit for PCBs in oil is 0.1 µg/g.

The inspection program did not focus on border tanker traffic this year, rather on facilities importing diesel fuel.

8.2 Compliance Status

Eight facilities importing diesel fuel from the United States were identified through Customs Canada data and subsequently sampled. All samples contained less than 0.1 µg/g of PCBs and all 20 metal concentrations were below the minimum detectable levels.

8.3 Enforcement Action

Throughout these inspections, no PCBs were found in any analysed samples. Therefore, there have been no reports of violations under the Regulations. No enforcement action was necessary.

9.0 GASOLINE REGULATIONS

Lead in most, if not all, of its chemical species and physical states is potentially toxic and hazardous to human health. The *Gasoline Regulations* [8] were issued in 1990 to respond to the Government of Canada's policy of reducing 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 *Leaded Gasoline Regulations.*

The 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 described above is 5 mg/L. Leaded gaso-

line used in aircraft, such as aviation fuel, is exempt from the Regulations.

9.1 Compliance Verification Mechanism

EP inspectors collected gasoline samples for lead content analysis. The monitoring program focused on retail gasoline stations importing US gasoline. The US currently allows retail sale of leaded gas and the opportunity existed, 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.

9.2 Compliance Status

Inspectors completed 36 site inspections in the Fraser River Basin, including 40 gasoline samples collected for analysis of lead content. None of the sampled gasoline contained lead in excess of the regulated limit. Five samples were taken from the Molson Indy supply, the remainder were from retail stations.

In addition to the site inspections, five companies were identified from Customs data as importing leaded gasoline. Two of these companies were found importing aviation gasoline, two were importing unleaded gasoline incorrectly reported as leaded, and one imported machinery parts incorrectly classified as gasoline.

Based on scrutiny of 41 companies, the compliance rate is 98 percent.

9.3 Enforcement Action

A special 48-hour border surveillance was conducted targetting racers entering Canada from the US and reportedly bringing leaded racing gasoline into the country. During the period of this operation, no violations were discovered in the Fraser Basin.

10.0 MUNICIPAL SEWAGE TREATMENT PLANTS - *FISHERIES ACT*

Ten sewage treatment plants discharging to freshwater within the Fraser River Basin were targeted to assess compliance with the general prohibitions of the *Fisheries Act*. The ten facilities were chosen based on their effluent quality, type of treatment operations, and volumes of effluent discharged.

10.1 Compliance Verification Mechanism

EP inspectors conducted quarterly inspections to cover seasonal impacts on treatment efficiency and effluent quality during different fishery conditions (spawning, rearing, and migration). Federal compliance criteria is based on measuring the effluent

toxicity using the 96HrLC$_{50}$ rainbow trout biosassay. Additional items, such as discharge volume, and tests for Total Suspended Solids (TSS) and Biochemical Oxygen Demand (BOD) were compared to the existing provincial permit levels for each facility.

10.2 Compliance Status

The program sampled 10 out of 33 sewage treatment plants in the Fraser Basin. Two municipalities (Northwest Langley and Enderby) from this year's inspection program demonstrated full compliance with the federal requirements of the *Fisheries Act* during the audit period (Table 3). The remaining eight municipalities demonstrated periodic acutely toxic discharges during the same audit period.

Compliance status is based on the ability of each site to achieve a minimum 50 percent survival of fish that are subjected to 100% final effluent concentration over a 96-hour period (96HrLC$_{50}$). Table 3 lists the LC$_{50}$ concentrations for 50 percent survival for each facility inspected during the 92/93 sampling period. In order to satisfy the requirements of the *Fisheries Act*, a concentration of 100 percent is required. Similar references to 96HrLC$_{50}$ data throughout this report are written as percentages. A series of chemical analyses were also conducted on the site samples, but are not reported here.

Table 3. Summary of 96HrLC$_{50}$ Results for the 1992-93 Fraser Basin Sewage Treatment Plant Inspection Plan

96HrLC$_{50}$	Summer 92	Fall 92	Winter 93	Spring 93	Average
Lytton	48.0	82.0	100	74.8	**72.0**
Lillooet	42.3	48.0	61.2	56.0	**51.0**
Prince George	100	64.8	50.0	67.2	**71.0**
Williams Lake	42.3	64.8	48.5	70.4	**57.0**
Kamloops	74.8	100	n/a	70.0	**82.0**
Enderby	100	100	100	100	**100**
Hope	62.0	69.0	100	74.8	**81.0**
Kent	62.0	100	100	100	**91.0**
NW Langley	100	100	100	100	**100**
Cache Creek	100	100	100	74.8	**94.0**
Seasonal Average	**74**	**83**	**84**	**79**	

10.3 Enforcement Action

The program identified eight facilities that did not meet the federal requirements of the *Fisheries Act*. Compliance data collected from this program was shared with the provincial government to support the requirement for a non-acutely lethal effluent in all wastewater effluent permits. No enforcement action was undertaken.

11.0 ANTISAPSTAIN FACILITIES - *FISHERIES ACT*

In order to respond to the environmental and health concerns related to the use of chlorophenates at facilities that apply wood protection chemicals, the Environmental Protection Service 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, forest industry companies, and labour unions. The Task Force was given the responsibility of investigating the use of chlorophenates at wood protection facilities in British Columbia and developing practical measures for environmental and health protection.

The task force conducted a technical review of wood protection practices in BC and developed a Code of Good Practice for the design and operations implemented at wood protection facilities. The Code [20] provides recommendations for workers' health and safety and for the storage, transportation and use of chlorophenates, disposal of chlorophenate liquids, contaminated water, and solid wastes.

Agriculture Canada deregistered chlorophenates for use in antisapstain applications and these chemicals have been replaced by the chemicals listed in Table 4. Table 5 correlates the generic and brand names with the chemicals used. Chlorophenol and its replacements are still regulated in stormwater runoff by the BC *Antisapstain Chemical Waste Control Regulations.*

Softwood lumber (other than cedar) is subject to attack by micro-organisms, such as fungi; these cause stains and blemishes that reduce the marketability of lumber. These organisms may also be the precursors to other organisms that 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 export.

Table 4. Antisapstain Agents in Use in the Pacific Region

Formulations in Use	Active Ingredients	Regulated Limits for BC
Busan 1030 and 30 WB	TCMTB	6 ppb
NP-1	DDAC and IPBC	120 ppb
Timbercote II/2000	DDAC	700 ppb
F2	DDAC and Borax	700 ppb
NYTEC GD	Cu-8	15 ppb
PQ-8	Cu-8	15 ppb
	Chlorophenols	6 ppb
Rodewood 200 EC	Azaconazole	not applicable

Table 5. Antisapstain Products and Names

Product Name	Other Names
Chlorophenates	PCP, Penta, tetrachlorophenol, pentachlorophenol, sodium pentachlorophenate, sodium tetrachlorophenate
Pentachlorophenol	PCP, Penta, NaPCP
Tetrachlorophenol	PCP, Tetra, NaTCP
Copper-8-quinolinolate	Quinolate, copper-8, Nytek GD, PQ-8, oxine copper, copper salt of 8-hydroxyquinoline
Didecyldimethyl ammonium chloride	DDAC, BARDAC 22 or 2280
3-iodo-2-propynyl butyl carbamate	IPBC, Troysan polyphase, Iodobarb
Mixture of DDAC and IPBC	NP-1
Borax (+ sodium carbonate)	Ecobrite, Ecobrite C, DFST, sodium borate
2-(thiocyanomethylthio) benzothiozole	TCMTB, Busan 30/1030/30WB
Boric Acid	BOA
Sodium Carbonate	SCB

The Code is intended to protect both the environment and workers from harmful exposure by making recommendations to minimize:

a) concentrations of antisapstain chemicals in effluents;

b) the toxicity of the effluent; and

c) 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 *Workers' Compensation Board Industrial Health and Safety Regulations*.

11.1 Inspection Mechanism

Compliance with the Code is voluntary. The degree of implementation with the Code is determined through inspections that provide environmental audits of the plants and outline deficiencies under the Code. The proportion of facilities inspected this year represents only 13 percent of the the total number of antisapstain treatment facilities in BC. Inspections were conducted mainly at sawmills and storage docks. Some site inspections were conducted at facilities on provincial lands.

The Code outlines several design parameters and recommended practices in handling antisapstain chemicals. These 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. Since most of the inspections were conducted during the dry summer months, no samples were collected. EP plans to conduct subsequent inspections during the wet winter months to facilitate sampling of yard runoff.

11.2 Status of Code Implementation

Table 6 shows all the facilities inspected in the Fraser Basin and the degree of implementation of the Code recommendations as shown by the percentage scores. This year's inspection survey shows an overall score of 77 percent for the degree of Code implementations for all mills inspected. There were not enough facilities inspected to make a statistical conclusion on the degree of implementation within the entire antisapstain industry for these recommendations.

Figure 6 shows degree of implementation of Code criteria by all the mills inspected. Almost half of the mills did not have their fire and spill contingency plans in place. Most facilities lacked proper covered areas to store the treated wood. Previous studies have shown that leaching of antisapstain chemicals from treated lumber was caused by rain. In the past, contaminated stormwater has contributed to the release of toxic substances into the aquatic environment. The survey also indicated low implementation of recommended sludge and waste-handling practices at some facilities.

Table 6. Code Implementation for Wood Preservation Facilities

Name of Operation	July-November 1992 % Code Implementation	May-September 1987 % Code Implementation
The Pas Lumber Company Prince George	62	no data available
Seaboard International North Vancouver	94	65.2
Primex Forest Industries Delta	89	41.3
Interfor, Fraser Mills Sawmill, Coquitlam	76	87.0
Interfor, Fraser Mills Planermill, Coquitlam	64	76.1
Fraser Surrey Docks, Surrey	67	no data available
Western Stevedoring North Vancouver	92	76.1

11.3 Enforcement Actions

EP ensured companies found not fully implementing the Code were notified of the deficiencies found during the inspections. No violations of Section 36(3) of the *Fisheries Act* were observed during the inspections.

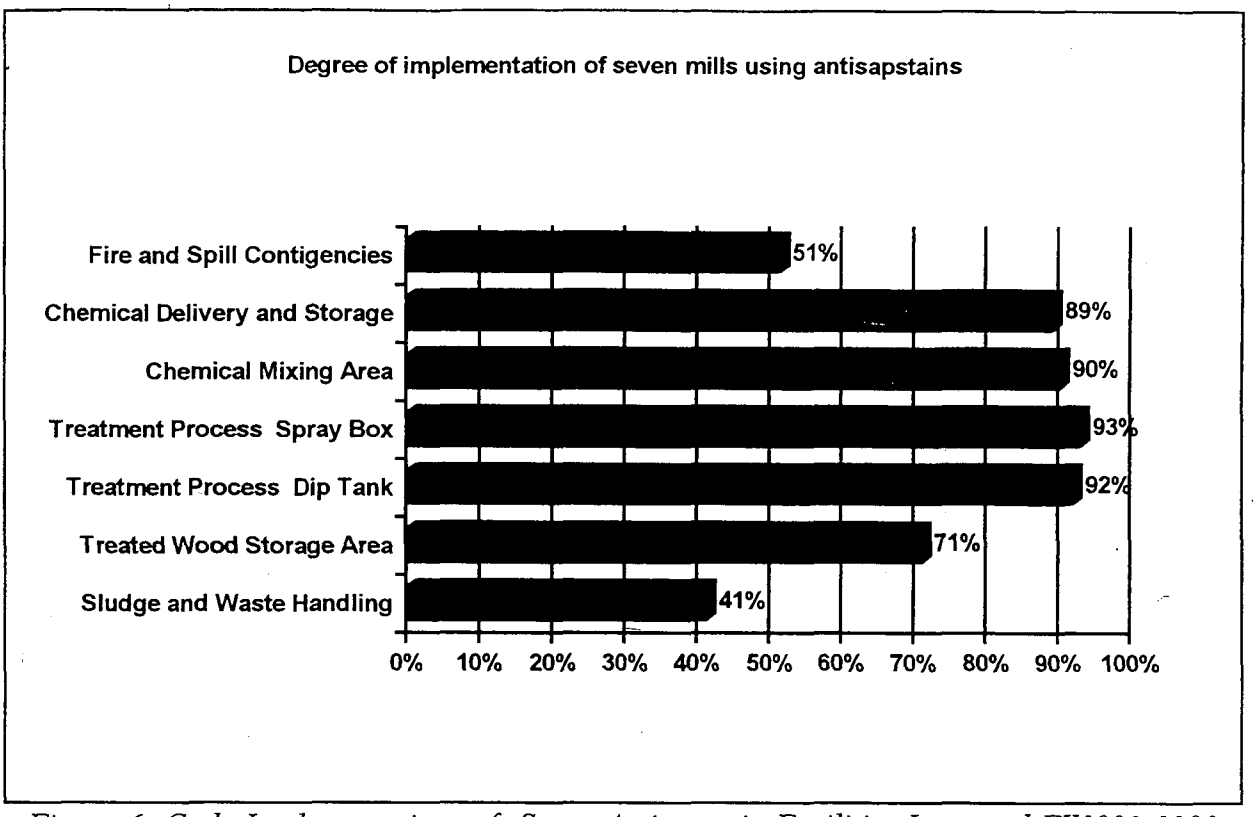


Figure 6 Code Implementation of Seven Antisapstain Facilities Inspected FY1992-1993

12.0 WOOD PRESERVATION FACILITIES - FISHERIES ACT

During 1983-1984, as part of a federal strategy to protect the environment and human health 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 labour unions. The primary objective of the TSC was to develop detailed technical recommendations for the design and operation of wood preservation 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 published a series of five documents under the general title, *Recommendations for the Design and Operation of Wood Preservation Facilities* [20]. The five documents in the series address the predominant wood preservation chemicals in use in Canada: chromated copper arsenate (CCA), ammoniacal copper arsenate (ACA), pentachlorophenol (PCP), thermal pentachlorophenol, and creosote.

Wood preservation processes consist of either pressure or thermal impregnation of chemicals into the wood to a depth of several centimeters. This provides an effective

long-term resistance to attack by fungi, insects, and marine borers.

Wood preservation chemicals were divided into two categories: oil-based (PCP, Creosote) and water-based (CCA, ACA).

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*.

12.1 Inspection Mechanism

Compliance with this recommended Code of Practice is voluntary. The degree of implementation is determined through compliance verification inspections that provide environmental audits of the plants and outline deficiencies under the recommended draft Code.

The Code outlines several design parameters and practices in handling wood preservation chemicals. These include chemical delivery areas, chemical storage areas, chemical mixing areas, treatment process systems, freshly treated wood storage areas, long-term storage, fire and spill contingency plan, personnel protection, and environmental monitoring.

Efforts were also made to collect surface water/yard runoff samples to assess the potential or degree of contamination to the receiving environment. However, since most inspections were conducted during dry summer months, no samples were available. EP plans to conduct subsequent inspections during wet winter months to facilitate sampling of yard runoff.

12.2 Status of Code Implementation

This year, EP inspected five treatment facilities that use water-based chemicals. Three of these sites also have oil-based treatment

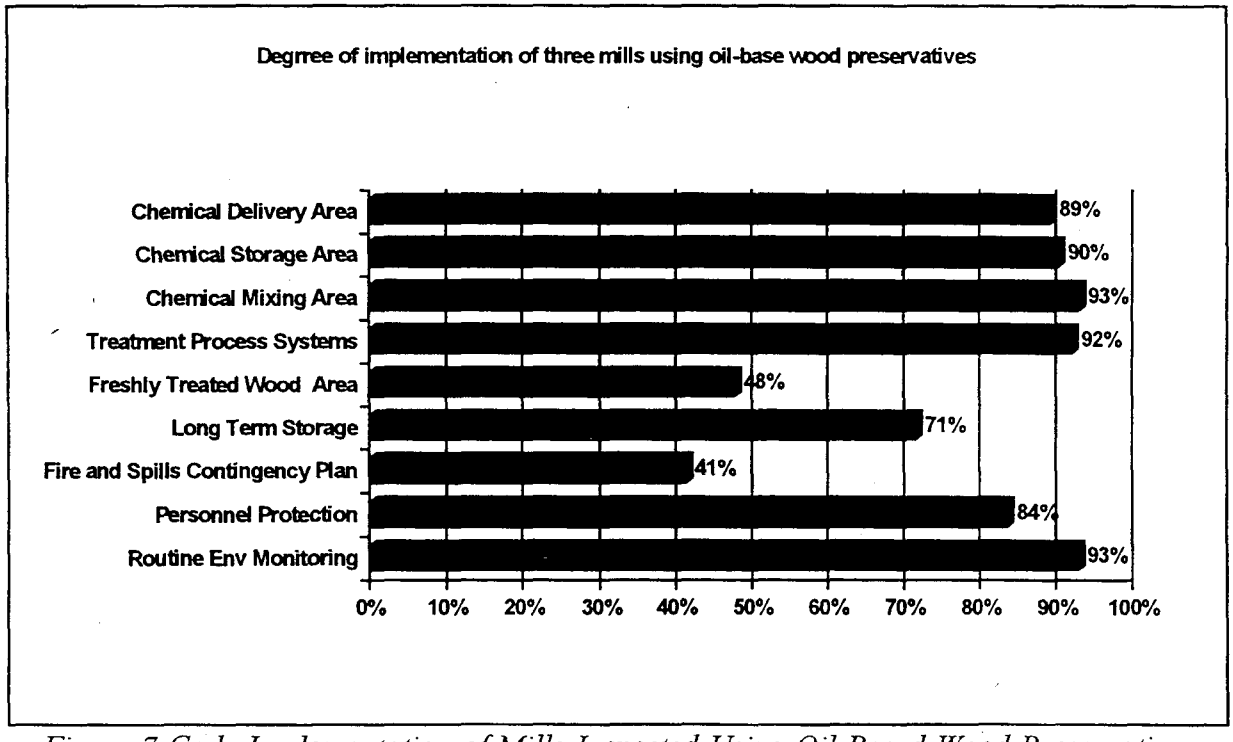


Figure 7 Code Implementation of Mills Inspected Using Oil Based Wood Preservatives

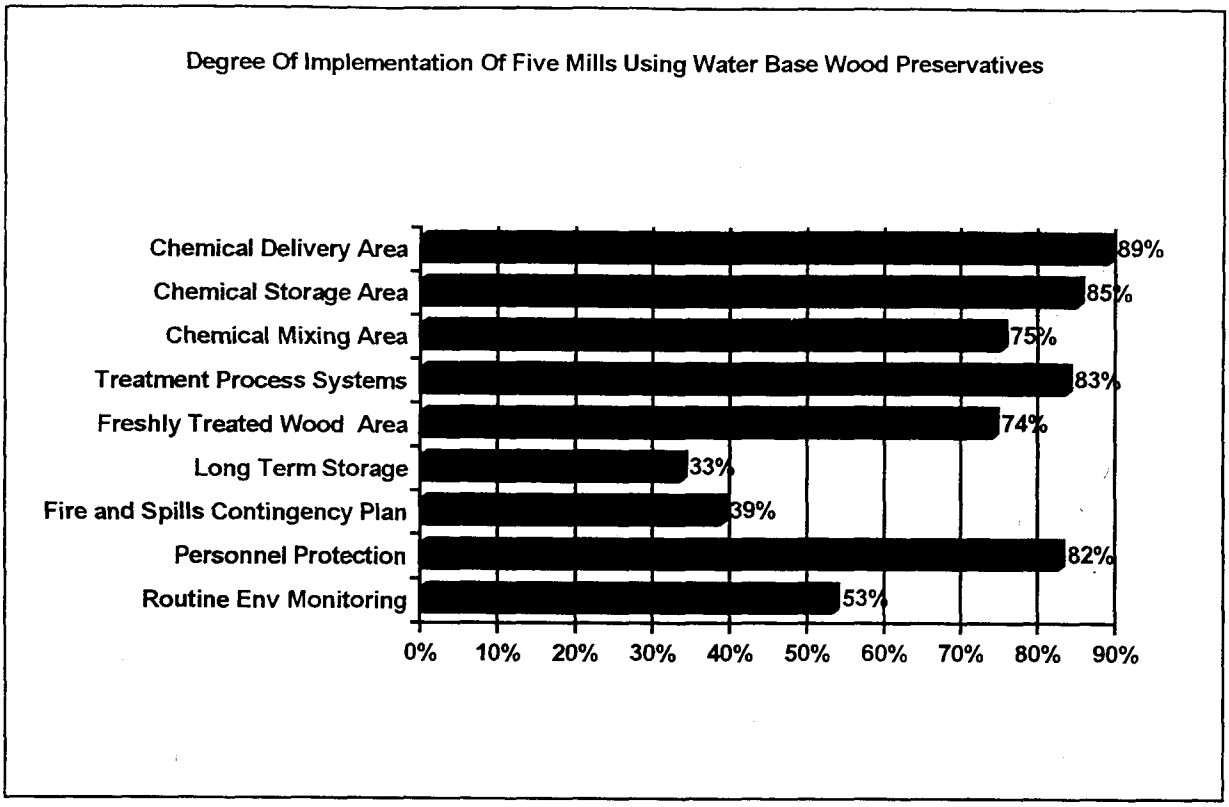


Figure 8 Code Implementation of Mills Using Water Based Wood Preservatives

facilities. The degree of Code implementation scores were based on the eight types of facility inspected. These are:

Oil Based:

» Domtar, Prince George (PCP)
» Domtar, NewWestminster (Creosote)
» Domtar, New Westminster (PCP)

Water Based:

» Domtar, Prince George (CCA)
» A&A Post and Rail, Kamloops (CCA)
» Western Wood Preservers, Aldergrove (CCA)
» North American Wood, Abbotsford (CCA)
» Domtar, New Westminster (CCA)

The proportion of sites inspected this year represents only 26 percent of the total number of wood preserving facilities in BC. (19). There were not enough facilities inspected to make a statistical conclusion on the degree of implementation for these recommendations to the entire wood preservation industry.

Figure 7 represents the degree of implementation by the oil-based wood preservation mills inspected. As indicated, there is high implementation for most of the criteria, but the audit program uncovered deficiencies for fire and spill contingency plans and covered protection for the freshly treated lumber storage areas.

Figure 8 shows the degree of Code implementation at the wood preservation mills inspected using water-based chemicals. Again, good implementation is indicated for most of the Code criteria, except fire and spill contingency planning, storage of freshly treated wood, and routine environmental monitoring.

12.3 Enforcement Action

Since compliance with the Code was voluntary, follow-up action was limited to advising the facilities of the deficiencies found during the audit program. No violations of Section 36(3) of the *Fisheries Act* were observed during inspections.

13.0 WOOD WASTE - *FISHERIES ACT*

There is currently no regulation or guideline for the use or disposal of wood waste in BC. However, toxic discharges to fish habitat from leachate may violate the habitat and pollution sections of the Fisheries Act. A code of practice for wood waste prepared by Environment Canada and Federal Fisheries and Oceans is in draft stage.

The main concern about wood waste in the environment is its impact on fish, fish habitat, and water quality. These impacts can be surface, subsurface (groundwater), and aesthetic. Wood waste originates from three principal sources: forest debris, mill residues, and demolition debris.

Hogfuel is defined as wood waste burned as fuel in energy production. It includes wood fibres, sawdust, bark, and wood fragments. The main areas of environmental concern are log dumps and booming grounds, and in its ubiquitous use as a fill material. Its composition is water and organics, including tannins and lignins, resin acids, and phenols. It may be contaminated with oils from forestry operations, preservatives (CCA), and antisapstain (antifungal) chemicals. On contact with water, it forms a chemical/organic leachate that can be acidic, high in BOD and COD, have a strong odour and colour, and contain dissolved metals and chemical contaminants. This leachate is one of the main environmental concerns about wood waste.

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.

13.1 Inspection Mechanism

The main mechanism to verify compliance is the site inspection, which includes physical observations to evaluate habitat destruction or loss, identification and sampling of leachate discharges, and the inspection of leachate treatment systems.

13.2 Compliance Status

This fiscal year, four inspections were carried out in the Fraser River Basin. One inspection on an Indian Reserve involved recent dumping of wood waste in a field that drained to the Fraser River. Leachate did not have time to form and there was no discharge.

The other three inspections were related to a property in Maple Ridge that drains to the Alouette River. The wood waste was used as a fill material for a horse corral. The leachate from the property was allegedly contaminating the neighbour's property, as well as affecting the river habitat. Sampling of leachate, surface water, and groundwater was carried out in conjunction with BC Environment.

Due to the medium priority rating under the NIP for wood waste, only a limited number of inspections were carried out in this fiscal period. Future inspection activities will be based on assessing the degree of implementation of the Code of Practice, which is expected in 1994.

13.3 Enforcement Action

The BC Ministry of Environment, Lands and Parks is continuing to investigate the site draining to the Alouette River.

14.0 PESTICIDES AND HERBICIDES - *FISHERIES ACT*

The past decades have seen growing awareness of the undesirable effects of pesticides in the environment. These effects include accidental spills, improper handling and application, and bioaccumulation of toxic pesticides in fish and fish habitat. The Fraser Basin is subject to considerable agricultural, forestry, and urban activity, and receives a comparatively large amount of pesticide and herbicide use.

There are currently three federal Acts and one provincial Act that help control the impacts of pesticides on the fisheries resource. The federal *Pest Control Products Act* (PCPA) [27], the *Fisheries Act* (FA), and the *Transportation of Dangerous Goods Act* (TDGA), along with the BC *Pesticide Control Act* (PCA) and Regulations [28], control either directly or indirectly, the use and impact of pesticides in the environment.

The PCPA requires every pesticide product to be registered by Agriculture Canada before it can be sold or used in Canada. Included in this are assessments by Fisheries and Oceans and Environment Canada that define pesticide fate and persistence in water and sediments, and toxicity to fish and other aquatic organisms.

Section 35 of the FA defines the general prohibition that makes it illegal to damage fish habitat. Section 36(3) prohibits the introduction of substances deleterious to fish that may result from improper or illegal pesticide use. The TDGA promotes the identification, documentation, and safe transport of pesticide products to prevent illegal or accidental releases to fish-bearing waters or fish habitat. The provincial PCA and Regulations control the sale, transportation, storage, preparation, application, and disposal of pesticides in BC.

Although there is no regulation under the FA for the use of pesticides, the requirements of sections 35 and 36 of the *Fisheries Act* are normally satisfied by the restrictions in the pesticide permits issued by the BC Ministry of Environment, Lands and Parks (MELP). These restrictions relate to the maintenance of buffer zones and pesticide-free zones near fisheries waters to prevent acute toxicity (fish kills) and bioaccumulation of pesticide residues. Approximately 500 provincial pesticide permits that may affect federal fish resources are issued each year by MELP. A code of practice for use and disposal of pesticides on federal land and at federal facilities is currently being developed.

14.1 Inspection Mechanism

To verify compliance with the FA general prohibition, provincial permit applications were reviewed. EP performed nine inspections of federal lands and facilities, and a number of provincial permits that pose a significant risk to the fisheries resource were also conducted. Audit samples of water and sediment to determine levels of pesticide residues and possible toxicity to fish and other aquatic organisms were not collected.

14.2 Status of Compliance

Pesticide inspections are carried out in the spring and summer "spray" season. For this fiscal year, nine inspections were completed, including six permits for the BC Ministry of Forests in the Harrison Lake area of the lower Fraser Valley, one at the Vancouver International Airport, and two foreshore areas at Steveston and Sturgeon Banks on the Fraser River delta. The Ministry of Forests pesticide application was for vegetation control for re-seeding clearcut areas near fisheries streams. The airport application was for runway vegetation con-

trol. The Steveston and Sturgeon Bank applications were for rat and mosquito control, respectively. Visual inspections indicated (audit samples not collected) compliance with the FA and with provincial permit restrictions.

15.0 MINING - *FISHERIES ACT*

The *Metal Mining Liquid Effluent Regulations (MMLER)* [9] were proclaimed on February 25, 1977, under sections 22 and 34 (now sections 35 and 36) of the *Fisheries Act*. The MMLER apply to new, expanded, and re-opened mines (after 1977), but do not apply to gold mines using cyanidation processes.

Under the MMLER, the definition of a mine includes metal mining and milling facilities, as well as associated smelters, pelletizing plants, sinter plants, refineries, acid plants, and any similar operations where the effluent is combined with effluents from mining and milling.

The regulatory objective of the MMLER was to ensure that all new and expanded base metal, uranium, and iron ore mines operating in Canada after February 1977 applied best practicable technology (BPT) to limit the discharge of deleterious substances (arsenic, copper, lead, nickel, zinc, total suspended matter, and radium^{226}) at national minimum standards. This was intended to provide an immediate level of protection for fish and other aquatic life. Mines that began operation before 1977 were not regulated by the MMLER, but voluntary compliance with the Metal Mining Liquid Effluent Guidelines (MMLEG) was promoted.

In accordance with section 10 of the MMLER, regulated mines are required to send a report to the Minister of Environment containing information about the concentrations of regulated deleterious substances in their effluents, the pH of effluents, and the volume of each undiluted effluent within 30 days of the end of each month.

In BC, 6 of 25 operating metal mines are regulated under the MMLER; two of these, Highland Valley Copper, and Samatosum, are in the Fraser Basin. Another nearby mine, Afton, would ordinarily be subject to MMLER, but it is currently not operating.

Two MMLEG, or "Guidelines," mines (those that predate the Regulations) in the Fraser Basin are Gibraltar and Endako.

All of the above mines have BC Ministry of Environment, Lands and Parks Waste Management Permits. The permits require comprehensive controls of mine process and effluent discharge quality, quantity, monitoring, and reporting. Environment Canada operates through a "one window" approach by attempting to ensure that the MMLER/MMLEG requirements are reflected in the provincial permits.

15.1 Compliance Verification Mechanism

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

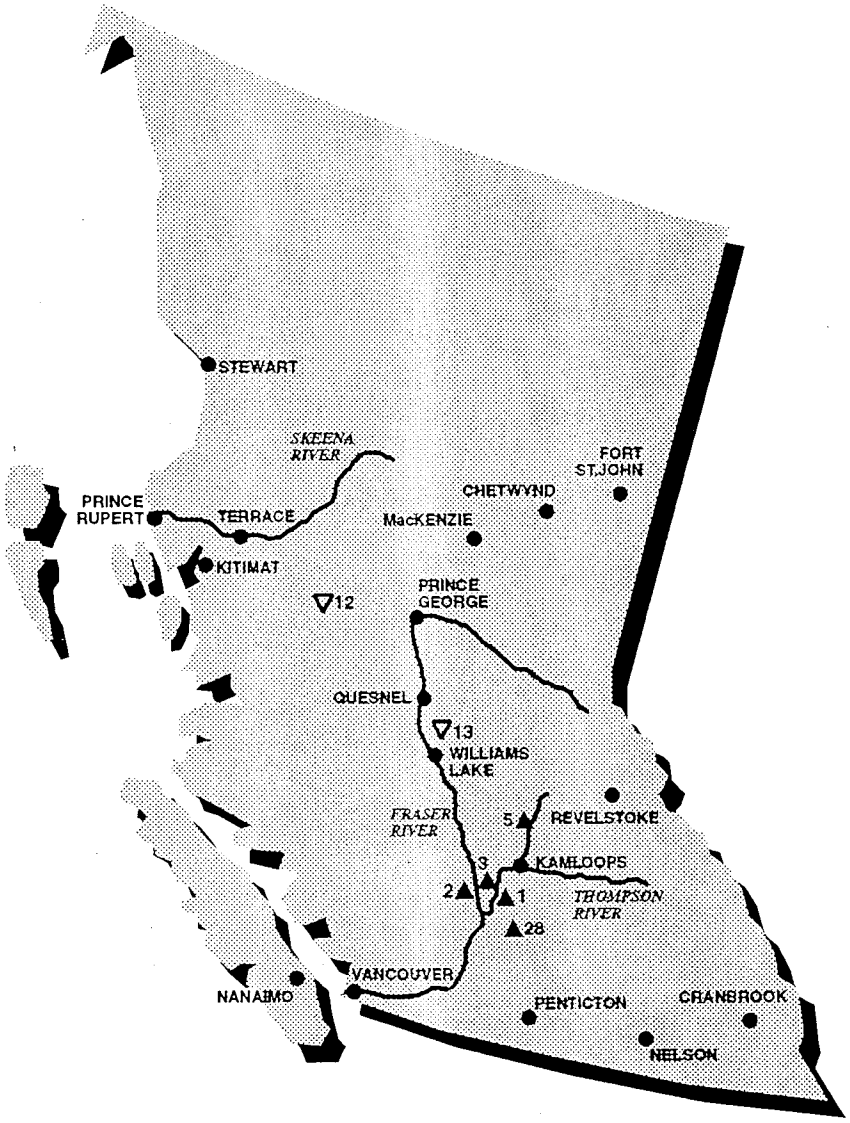
15.1.1 Site Inspections

Site inspections for metal, coal, and gold mines are conducted to verify mine effluent discharge points, obtain audit samples,

FIGURE 9

FRASER RIVER BASIN

MINES LOCATIONS



MINE INDEX

▲MMLER

▽MMLEG

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

verify effluent flows, determine drainage patterns, and inspect effluent collection and containment systems. Inspectors discuss with mine personnel operations plans, problems, and operations upsets that may affect effluent discharges. Site inspections are planned to coincide with periods of effluent discharge and periods of high surface and groundwater flow, in order to better detect leakage. Inspections are carried out on a priority basis.

15.1.2 Review of Industry Monitoring Data

MMLER mines submit copies of monitoring data on a monthly basis. MMLEG mines and discharging gold mines, if not submitting data on a regular basis, have submitted data when requested. Coal mines and non-discharging mines generally do not submit data.

From the information submitted by the mines, final discharge data is extracted and entered into the mines database. The database computes monthly means and loading, counts samples points, compares sample data to MMLER/MMLEG limits, calculates compliance statistics, and generates compliance reports.

Six mines in the Fraser River Basin were inspected in 1992. One of the mines was inspected twice (Endako), for a total of seven inspections. The inspections included audit sampling of final effluent discharges to the receiving environment.

15.2 Compliance Status

15.2.1 Regulated Mines

Only two metal mines regulated by the MMLER occur in the Fraser Basin: Samatosum, just north of Kamloops, and Highland Valley Copper at Kamloops. Figure 9 shows the locations of these mines.

Analytical results for chemistry samples collected from regulated mines demonstrated compliance with the MMLER. Under the MMLER, Samatosum reported discharges in 1992.

Highland Valley is not required to report monitoring data because it has no discharge (effluent is either recirculated to processing or goes into a containment pond). The tailings pond was inspected for leakage and nearby watercourses were tested for toxicity and metals.

15.2.2 Guidelines Mines

Endako (inspected twice) and Gibraltar are the only operating mines in the Fraser Basin subject to the MMLEG. Analytical results for chemistry samples collected demonstrated compliance with the Guidelines. Gibraltar was inspected, but there was no discharge, so wasn't required to submit monitoring data

15.2.3 Other Mines

Afton, a non-operating mine located near Kamloops, was inspected under the general provisions of the *Fisheries Act.*

Mines found discharging were sampled, and all effluents were non-acutely lethal, in compliance with the *Fisheries Act.*

15.2.4 Compliance Summary

The mines do not report some of the parameters required by the regulations and guidelines if a specific contaminant is considered unlikely to be present at that mine. For example, none of the mines inspected this year reported radium^{226} (Ra^{226}) data. Samatosum was the only mine in the Fraser Basin that reported nickel (Ni) data.

The compliance status of the mines during the reporting period represents an evaluation based on limited inspection activity and mine-reported effluent quality data. The compliance rating of Regulations mines based on company-submitted industry monitoring and audit data, with respect

to maximum authorized concentrations for grab samples, was 98 percent. Administrative compliance, such as timely submission of monitoring data and completeness of reports, was not verified and will require further assessment before a compliance rating can be given.

15.3 Enforcement Action

The mines inspected in the Fraser Basin are considered generally in compliance with their respective MMLER and MMLEG limits. There were no enforcement actions for regulated mines in the Fraser River Basin for FY 1992-93.

16.0 PETROLEUM REFINERY LIQUID EFFLUENT REGULATIONS - *FISHERIES ACT*

The *Petroleum Refinery Liquid Effluent Regulations* [27] 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 effluent. The Regulations also specify pH limits for effluent.

Guidelines were developed that apply to pre-1973 refineries and specify the same parameters, but less stringently. 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 the analyses are to be reported monthly.

16.1 Compliance Verification Mechanism

In 1992, there were five refineries operating in the Fraser Basin: Chevron (Burnaby), Petro-Canada (Port Moody), Shell (Burnaby), Esso (Port Moody), and Husky Oil (Prince George). All operate under the *Petroleum Refinery Effluent Guidelines* (PREG). All except Husky Oil in Prince George deposit their process effluents to municipal sewers and come under the jurisdiction of the Greater Vancouver Regional District. 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, three levels of objectives are prescribed 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 prescribed only the NTBE objective for stormwater. NTBE, ODAM, 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 did not conduct audit sampling at the refineries during this year's inspection program.

16.2 Compliance Status

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 four refineries is discharged to municipal sewer systems, where it undergoes further treatment before discharge to the environment.

Appendix 4 lists a summary of the 1992 monitoring data, which outlines the process effluent and stormwater quality for each of the five refineries that reported data.

Table 7. Refinery Process Effluent Excursions (1992)

Refineries	Number of tests	MADD	ODAM	NTBE
Chevron (Burnaby)	292	21	7	39
Husky Oil (Prince George)	271	3	0	4
Petro-Canada (Port Moody	312	4	0	7
Shell Canada (Burnaby)	226	0	0	0
Esso (Port Moody)	287	0	0	0

Table 8. Refinery Stormwater Effluent Excursions (1992)

Refineries	Number of Tests	MADD	ODAM	NTBE
Chevron (Burnaby	142	n/a	n/a	0
Husky Oil (Prince George)	0	n/a	n/a	0
Petro-Canada (Port Moody)	198	n/a	n/a	0
Shell Canada (Burnaby)	259	n/a	n/a	0
Esso (Port Moody)	402	n/a	n/a	0

16.2.1 Process Effluent

Table 7 summarizes the parameters and lists the numbers and results of tests for process effluent. A total of 1388 analyses were reported by the five refineries. Eighty-five, or approximately 6 percent of the total data (MADD, ODAM, NTBE) submitted exceeded the Guidelines objectives for process effluent. In particular, 67 out of 292 (33%) data submitted by Chevron; 7 out of 271 (2.5%) data submitted by Husky Oil; and 11 out of 312 (3.5%) data submitted by Petro-Canada exceeded the objective of the guidelines. Shell and Esso did not have any reportable excursions during the 1992 reporting period.

16.2.2 Stormwater Effluent

Table 8 summarizes the parameters and tests by the refineries for stormwater effluent. A total of 1001 analyses were reported by four refineries (Husky Oil in Prince George has combined stormwater and process effluents, which are, in turn, combined with effluents from other industrial sources). The four refineries subject to testing stormwater effluent quality had no reportable excursions.

16.2.3 Frequency of Measurements

The PREG specify measurement of effluent quality three times a week. The refineries in the Pacific Region report only one measurement per week by following provincial permit requirements.

Husky Oil did not test for average TSS in its process effluent in the month of August. Shell Canada recorded no effluent flow rate for October 1992, therefore, no data was available for that month (Appendix 4).

16.3 Enforcement Action

Petro-Canada and Shell Canada have since shut down their operations in the Lower Mainland. It is expected that by 1995 only Chevron and Husky Oil refineries will remain in operation.

Although review of refinery monitoring data showed noncompliance with the Guidelines objectives, no violations were recorded under the regulations. No enforcement action was undertaken.

17.0 PULP AND PAPER EFFLUENT REGULATIONS - *FISHERIES ACT*

There are 26 pulp and paper mills in the Pacific Region and all are located in British Columbia (Figure 10); of these, nine are located within the Fraser River Basin. The new *Pulp and Paper Effluent Regulations* (PPER) [19] replaced the *Pulp and Paper Effluent Regulations* CRC, c.830, and apply to all mills in Canada. They became effective May 7, 1992. The administrative portions of the Regulations became effective on May 15, 1992, and the technical effluent quality requirements became effective on December 1, 1992.

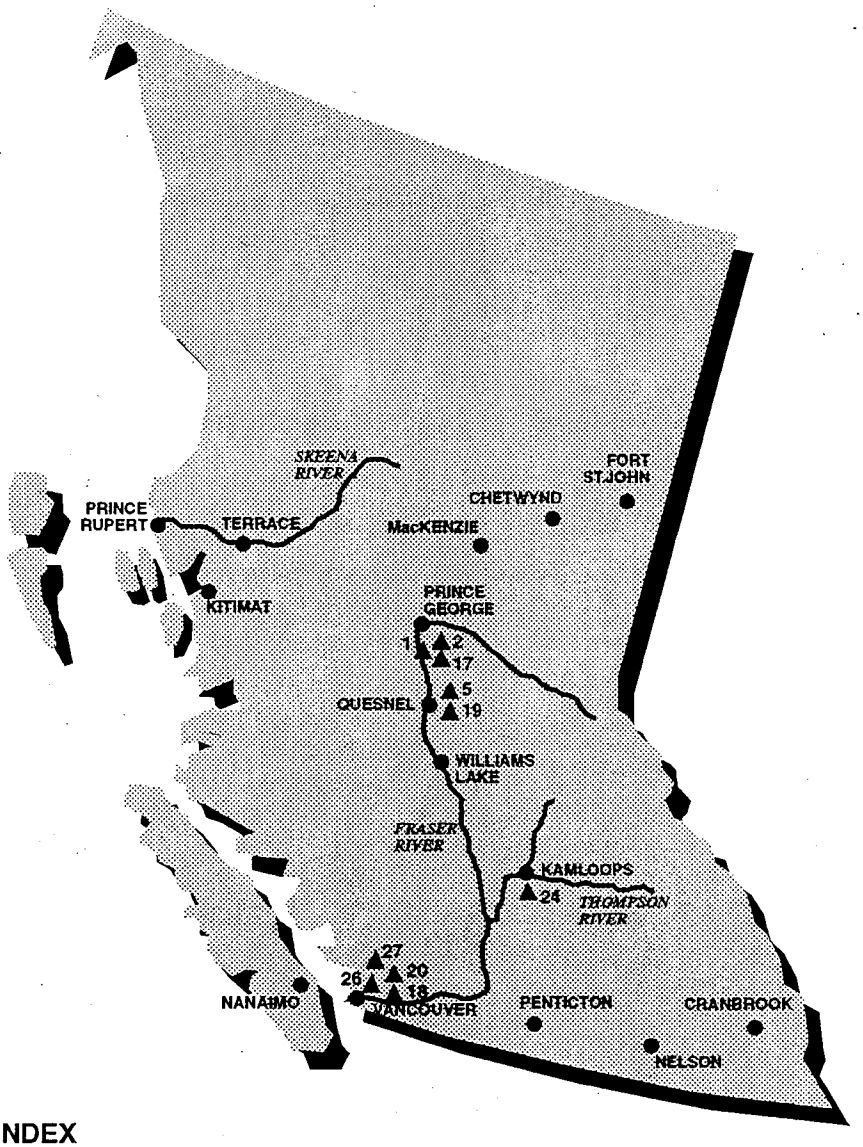
17.1 Compliance Verification Mechanism

The nine pulp or paper mills in the Fraser Basin are Scott Paper, Weyerhaeuser Pulp, Quesnel Pulp, Burnaby Paperboard Division, Northwood Pulp Division, Cariboo Pulp & Paper, Prince George Pulp & Paper, Newstech Recycling, and Island Paper Mills. Each was inspected at least once during the inspection period December 1, 1992 to March 31, 1993. A comprehensive inspection checklist (Appendix 5) was

FIGURE 10

FRASER RIVER BASIN

PULP AND/OR PAPER MILL LOCATIONS



▲ MILL INDEX

1. PRINCE GEORGE & INTERCONTINENTAL PULP & PAPER MILL #1
2. PRINCE GEORGE & INTERCONTINENTAL PULP & PAPER MILL #2
5. CARIBOO PULP AND PAPER
17. NORTHWOOD PULP
18. BURNABY PAPERBOARD DIVISION
19. QUESNEL PULP
20. SCOTT PAPER WESTERN MFG. DIVISION
24. WEYERHAEUSER PULP MILL
26. ISLAND PAPER MILLS CO.
27. NEWSTECH RECYCLING

used to verify compliance with approximately 80 criteria specified in the regulations. Audit samples of mill effluent were collected by inspectors and analysed at an Environment Canada lab for biochemical oxygen demand (BOD), total suspended solids (TSS), and acute lethality (96-hr LT_{50}).

Monitoring data submitted by the mills were 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, and investigations. There were no data for Island Paper and Newstech Recycling

Environmental effects monitoring (EEM) was not included because these requirements will not take effect until the next review period of April 1, 1993 to March 31, 1994. Non-registered outfalls are not included in the compliance status calculations.

17.2 Compliance Status

The compliance status of the mills inspected during this reporting period represents a preliminary evaluation based on limited inspection activity and mill-reported effluent quality data. Consequently, it is not appropriate to discuss overall compliance ratings until additional inspection activities have been undertaken. In particular, preliminary evidence of unreported outfalls, unreported spills/upsets, and other deficiencies require further assessment before a compliance rating is given.

For the purpose of assessing compliance, this report divides the PPER into two general categories: Technical/Effluent Limits Requirements and Administrative Requirements.

17.2.1 Compliance with Technical and Effluent Sections of the PPER

A brief description of the sections of the Regulations included in this category, together with a consolidated summary of inspection findings for all mills inspected is given below.

A key concept in these regulations is that of the "Authority to Deposit" effluent containing deleterious substances. The *Fisheries Act* prohibits the deposit of such effluent, except as permitted by regulation; that is, there are conditions governing such deposits. Provided these certain conditions are met, the regulations provide four ways in which a permission is granted:

Table 9. Enforcement Responses to Potential Violations of PPER - December 1992 to March 31, 1993

Authority to Deposit	Company	Non-Compliance Section	# of Infractions	Action
Section 14	Weyerhaeuser Pulp, Kamloops	FA 36(3) - Toxicity	14	Warning letter
Section 14	Cariboo Pulp & Paper, Quesnel	PPER 8.1 Sched11 - Mon. Equip	1	Warning letter
Section 14	Quesnel River Pulp, Quesnel	PPER 11.3 - Emerg. Response Plan	1	Resolved

» a general authority (s.14)

» an authorisation (s.15)

» a transitional authorisation (s.20)

» a transitional authorisation extension (s.25).

Section 6, Authority to Deposit Deleterious Substances

The authority to deposit acutely lethal effluent is controlled by this section. There were 14 violations of toxicity limits by Weyerhaeuser Pulp (Table 9). This mill was subject to cold weather effects on the pulp feed stock and effluent treatment systems.

There were two principal effects of the cold weather. One was the inability of the chips to age properly. This resulted in abnormally high concentrations of naturally occurring resin acids, which remained in the chips prior to pulping. The second principal effect was due to the high resin acids being discharged into treatment ponds that were also below normal temperature due to the cold weather. The biological organisms in the treatment ponds reduced their activity at the colder temperatures and were unable to digest the resin acids. Higher concentrations of resin acids were discharged from the treatment plant outfalls to the receiving waters at toxic concentrations. The frequency of mill effluent failures is expected to drop over the next reporting period because it will occur during warm weather months.

Section 6 also describes under what conditions a mill or off-site treatment facility may deposit BOD and TSS within the limits specified in section 14, i.e., under an Authorisation or Transitional Authorisation.

Section 14 Maximum BOD and Maximum Quantity of Suspended Solids Authorized for Mills

Mills that do not have Authorisations ("As"), Transitional Authorisations ("TAs"), or Transitional Authorisation Extensions ("TAEs"), must meet the requirements of this section for BOD and TSS. These mills are not permitted to discharge an acutely toxic effluent. All mills in the Fraser Basin were subject to section 14 during the inspection period (Appendix 3).

There were no TSS or BOD exceedances noted during the inspection period from Fraser Basin mills.

Section 15 Authorisations

"A's" are only available for mills that commenced operations prior to November 3, 1971, and allow the mill to temporarily exceed the section 14 allowances for discharge of BOD and suspended solids. Authorisations were not issued in the Fraser Basin.

Section 20 Transitional Authorisations

"TAs" are available to mills that cannot meet the limits for BOD and TSS set in section 14 or that have a toxic effluent. None of the Fraser Basin mills were subject to TAs (Appendix 3).

Only mills in operation before November 2, 1971, would be permitted to have a toxic effluent discharge provision in their TA, which would expire on or before December 31, 1993.

Section 25 Transitional Authorisation Extension

"TAEs" allow a mill with a TA to apply for an extension, which may be granted by the Minister of Environment and the Minister of Fisheries and Oceans under very extenuating circumstances, such as technical or financial constraints over which the mill has little or no control. The extension would expire on or before December 31, 1995. No mills in the Fraser Basin applied for an extension.

Section 8 Monitoring Equipment

This section requires the installation of monitoring equipment to:

» allow collection of samples for BOD, TSS, and toxicity

» measure flow, pH, and conductivity

The compliance for this section was high for reported outfalls. One mill (Cariboo Pulp and Paper) was issued a Warning Letter for failure to install monitoring equipment. As noted previously, further evaluation of unreported outfalls may affect the compliance rating for this section of the regulation.

Section 9 Reporting Monitoring Results

This section requires the results to be reported within 30 days after the month in which the samples were collected. There were no instances of late reporting for registered outfalls.

Section 12 Reference Production Rate

RPR is the highest 90th percentile of the previous three years annual production rates, where such records exist. If they do not exist, it is estimated. Allowable discharges of BOD and TSS are dependent on the RPR. All mills provided their RPR by August 31, 1992, as required by the Regulations.

Section 36 Reporting Deposits Out of the Normal Course of Events

This section requires that mills **report** events that result in the deposit of a substance deleterious to fish into waters frequented by fish, or to a place where it may enter waters frequented by fish. Such events include but are not limited to:

- spills
- leaks
- explosions
- accidents involving equipment, vehicles, buildings, or other structures
- natural occurrences, such as wind, rain, flood, snow, earthquake, extreme heat or cold
- equipment, treatment facility failure
- human error

The compliance criteria for this section is "reporting the event." Due to lack of resources, there was no detailed review of effluent discharge data (continuous pH and conductivity) or other parameters to attempt to evaluate the completeness of mill reporting activities in the Fraser Basin.

17.2.2 Compliance with the Administrative Sections of the PPER

This category deals with sections of the Regulations that pertain to the provision of information not directly related to effluent quality or deposit reporting.

Section 10 Ownership Information

This section specifies that information is required about the owners of the mill or offsite treatment facility. This is necessary to establish legal responsibility for the operations that are carried out by the mill. Compliance with the submission of ownership information was high.

Section 11 Emergency Response Plans

This section specifies that an emergency response plan must be submitted to an Authorisation Officer by August 31, 1992. The content of the plan is not specified in the Regulations and must be addressed on a site-specific basis to account for individual characterisitics of a mill. Environment Canada is developing a recommended list of requirements; however, it is the mill operator's responsibility to develop and implement the final plan.

The major compliance deficiency in the Administrative section was related to lateness or non-submission of emergency response plans.

Section 27 Information on Effluent Outfalls

A general description of each effluent outfall, including plans and specifications, location, design, and maintenance information was required by August 31, 1992. This information is critical in assessing compliance with the allowable limits of deleterious substances permitted to be de-

posited under the regulations. All mills submitted information on process outfalls within the required time period. However, as noted previously, preliminary evidence indicates some outfalls were not properly declared as required in s.27.

Section 28 Environmental Effects Monitoring Studies

EEMs require mills to conduct studies of their effluent discharges on the surrounding environment. The mills must make a report by April 1, 1996. EEMs were not assessed in the first round of inspections because the study requirements have just been issued and there is insufficient data to assess at this time.

17.3 Enforcement Actions

Of the nine mills in the Fraser Basin, three were subject to enforcement actions. Weyerhaeuser Pulp received a Warning Letter for 14 acute toxicity failures under section 36(3) of the *Fisheries Act*. Cariboo Pulp & Paper received a Warning Letter for failure to install the required monitoring equipment (electrical conductivity meter) under section 8.1 of the PPER. Quesnel Pulp was late with reporting its emergency response plan, under section 11.3 of the PPER; this was resolved and no enforcement action was taken.

18.0 BIBLIOGRAPHY

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[2] CEPA Enforcement and Compliance Policy (May 1988)

[3] *Canadian Environmental Protection Act*, Part VI OCEAN DUMPING (1988) (SOR/93-433)

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[5] Contaminated Fuel Regulations (SOR/91-486, August 14, 1991)

[6] Export and Import of Hazardous Wastes Regulations (SOR/92-637, November 26, 1992)

[7] *Fisheries Act* (RSC 1985, c. F14, June 18, 1992)

[8] Gasoline Regulations (SOR/90-247, May 9, 1990)

[9] Metal Mining Liquid Effluent Regulations (SOR/77-178, February 25, 1977)

[10] Ocean Disposal Annual Report FY1992/1993 (Unpublished)

[11] Ocean Dumping Regulations (SOR/89-500, 1989)

[12] Ozone-Depleting Substances Regulations #1 (SOR/89-351, June 29, 1989)

[13] Ozone-Depleting Substances Regulations #2 (SOR/90-583, August 28, 1990)

[14] Ozone-Depleting Substances Regulations #3 (SOR/90-584, August 28, 1990)

[15] Federal Mobile PCB Treatment and Destruction Regulations (SOR/90-5, September 9, 1992)

[16] Petroleum Refinery Liquid Effluent Regulations (SOR/73-670, Nov. 1, 1973)

[17] Pulp and Paper Mill Defoamer and WoodChip Regulations (SOR/92-268, November 12, 1992)

[18] Pulp and Paper Mill Effluent Chlorinated Dioxins and Furans Regulations (SOR/92-267, May 7, 1992)

[19] Pulp and Paper Effluent Regulations (SOR/92-269, May 1992)

[20] Chlorophenate Wood Protection, Recommendation for Design and Operation (C84-092027-X, 1983)

[21] Secondary Lead Smelter Release Regulations (SOR/91-155, March 13, 1991)

[22] Storage of PCB Materials Regulations (SOR/92-507, September 9, 1992)

[23] Interim Order Respecting the Storage of Polychlorinated Biphenyls (PCBs)

[24] BC Pulp and Paper Mills Quick Reference Spreadsheet (Unpublished)

[25] *Transportation of Dangerous Goods Act*, RSC 1985, c. T-19

[26] Transportation of Dangerous Goods Regulations, 1993

[27] *Pest Control Products Act*, RSC 1970, c. P-10, s.1

[28] British Columbia *Pesticide Control Act*, RSBC 1979, Ch 322

APPENDIX 1

Dioxin and Furan Monitoring and Audit Data for the Fraser Basin

	DIOXIN AND FURANS MONITORING AND AUDIT DATA FOR MAY 1992 TO MARCH 1993 IN THE FRASER BASIN													REGU LA-TED
		MAY 92	JUNE 92	JULY 92	AUG 92	SEPT 92	OCT 92	NOV 92	DEC 92	JAN 93	FEB 93	MAR 93	AUDIT	LIMITS
Prince George Pulp & Paper	TCDD (pq/L)	ND (3.5)	n/a	6.2	5.5	ND (2.0)	ND (2.1)	NDR (2.8)	ND (2.0)	ND (2.0)	NDR (2.3)	NDR (2.1)	7	15
	TCDF (pq/L)	12	n/a	24.0	16.0	9.2	9.2	9.7	7.8	NDR (3.7)	6.4	8.6	15	50
Cariboo Pulp & Paper	TCDD (pq/L)	4.7	4.0	2.1	ND (2.5)	NDR (2.4)	2.1	2.4	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	4	15
	TCDF (pq/L)	13.0	12.0	8.9	8.2	8.5	8.4	10.0	14.0	NDR (3.6)	9.9	10.0	13	50
Northwood Pulp Division	TCDD (pq/L)		n/a	3.2	n/a	n/a	ND (2.0)	n/a	n/a	ND (2.0)	n/a	n/a	ND	15
	TCDF (pq/L)		n/a	22.0	n/a	n/a	13.0	n/a	n/a	15.0	n/a	n/a	9	50
Burnaby Paperboard Division	TCDD (pq/L)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	15
	TCDF (pq/L)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	50
Quesnel Pulp	TCDD (pq/L)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	15
	TCDF (pq/L)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	50

	DIOXIN AND FURANS MONITORING AND AUDIT DATA FOR MAY 1992 TO MARCH 1993 IN THE FRASER BASIN													REGU LA-TED
		MAY 92	JUNE 92	JULY 92	AUG 92	SEPT 92	OCT 92	NOV 92	DEC 92	JAN 93	FEB 93	MAR 93	AUDIT	LIMITS
Scott Paper	TCDD (pq/L)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	15
	TCDF (pq/L)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	50
Weyerhaeuser Pulp Mill	TCDD (pq/L)	ND (3.0)	n/a	ND (1.0)	n/a	ND (4.0)	n/a	n/a	n/a	NDR (4.4)	ND (2.0)	7.4	ND	15
	TCDF (pq/L)	270.0*	n/a	71.0*	n/a	48.0	n/a	n/a	n/a	130.0*	36.0	200.0*	82	50
Island Paper Mill	TCDD (pq/L)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	15
	TCDF (pq/L)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	50
NewsTech Recycling	TCDD (pq/L)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	15
	TCDF (pq/L)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	50

* Exceeds maximum allowable limits

APPENDIX 2

Metal Mining Monitoring and Compliance Data for the Fraser Basin

APPENDIX 2

Metal Mining Compliance Data for the Fraser Basin

MMLER (Regulated) Mines	pH	As	Cu	Pb	Ni	Zn	Ra	SS
Samatosum								
# of Samples Reported	23	7	21	21	7	20	0	2
# of Samples in Violation	0	0	0	0	0	0	0	0
Highland Valley Copper (Not required to report because no discharge from mine)								
MMLEG (Unregulated) Mines								
Endako								
# of Samples Reported	152	0	0	0	0	0	0	96
# of Samples in Violation	0	0	0	0	0	0	0	0
Gibraltar (Not required to report because no discharge from mine)								

APPENDIX 3

Pulp and Paper Effluent Regulations Monitoring and Audit Data for the Fraser Basin

Appendix 3 - Pulp and Paper Effluent Regulations Monitoring and Audit Data for the Fraser River Basin, 1992-93

Facility	Test	Dec 92	Jan 93	Feb 93	Mar 93	Audit	TA Limits	Regulated Limits
Prince George Pulp & Paper	BOD5 (kg/d)	5430	5940	8180	3100	9760	n/a	19,875
	TSS (kg/d)	8410	8820	12,590	5470	18,126	n/a	29,813
Effluent	Toxicity (%)**	100	100	100	100	100	n/a	100
Cariboo Pulp & Paper	BOD5 (kg/d)	1672	1637	1791	1839	2093	n/a	13,181
	TSS (kg/d)	5168	3841	5104	4838	5979	n/a	19,781
Effluent	Toxicity (%)**	100	100	100	100	100	n/a	100
Northwood Pulp & Paper	BOD5 (kg/d)	6998	7609	6703	7056	3486	n/a	31,328
	TSS (kg/d)	11,245	11,527	10,452	10,171	6640	n/a	31,238
Effluent	Toxicity (%)**	100	100	100	100	100	n/a	100
Burnaby Paperboard	BOD5 (kg/d)	1675	1717	1609	1456	1534	n/a	7213
	TSS (kg/d)	3345	2787	3557	3006	3470	n/a	10,819
Effluent	Toxicity (%)**	100	100	100	100	100	n/a	100
Quesnel Pulp	BOD5 (kg/d)	3001	3856	2347	2621	2128	n/a	11,563
	TSS (kg/d)	8593	10,224	8231	8786	5319	n/a	17,344
Effluent	Toxicity (%)**	100	100	100	100	100	n/a	100
Scott Paper	BOD5 (kg/d)	1308	1038	1144	1361	719	n/a	3838
	TSS (kg/d)	1295	1359	1468	1599	1263	n/a	5756
Effluent	Toxicity (%)**	100	100	100	100	100	n/a	100

Appendix 3 continued

Facility	Test	Dec 92	Jan 93	Feb 93	Mar 93	Audit	TA Limits	Regulated Limits
Weyerhaeuser Pulp	**BOD5 (kg/d)**	6700	10200	4500	5813	3062	n/a	18,050
	TSS (kg/d)	10400	7500	7200	7687	6124	n/a	27,075
Effluent	**Toxicity (%)****	100	18	100	90	100	n/a	100
Island Paper Mills (no data available)	**Effluent discharges to GVRD sewer system considered to be off-site treatment facility - 1 report/year BOD & TSS**							
Newstech Recycling (no data available)	**Effluent discharges to GVRD sewer system considered to be off-site treatment facility - 1 report/year BOD & TSS**							
****Toxicity: Values of less than 100% indicate acutely lethal effluent**								

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 : 1992

INITIAL RCR : 3.82 (Mm3/d)

REPORTED EXCURSIONS		OIL/GREASE		T.S.S.		PHENOLS		SULPHIDE		NITROGEN		pH	
		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 EXCUR	# of	REQ. (%v/v)	# of EXCUR
January													
Monthly Average of Daily Deposits	(MADD)	84.658	1	203.179	0	8.467	0	2.830	1	77.619	0		
One Day a Month	(ODAM)	155.174	0	338.634	0	16.595	0	8.467	0	123.798	0		
Never to be Exceeded	(NTBE)	211.646	1	423.264	1	21.165	0	14.105	0	155.200	0	6.0-9.5	2	33.3	1
February													
Monthly Average of Daily Deposits	(MADD)	84.658	0	203.179	0	8.467	0	2.830	1	77.619	0		
One Day a Month	(ODAM)	155.174	0	338.634	0	16.595	0	8.467	0	123.798	0		
Never to be Exceeded	(NTBE)	211.646	0	423.264	0	21.165	0	14.105	0	155.200	0	6.0-9.5	4	33.3	0
March													
Monthly Average of Daily Deposits	(MADD)	84.658	0	203.179	0	8.467	0	2.830	0	77.619	0		
One Day a Month	(ODAM)	155.174	0	338.634	0	16.595	0	8.467	0	123.798	0		
Never to be Exceeded	(NTBE)	211.646	0	423.264	0	21.165	0	14.105	0	155.200	0	6.0-9.5	1	33.3	0
April													
Monthly Average of Daily Deposits	(MADD)	84.658	0	203.179	1	8.467	0	2.830	1	77.619	0		
One Day a Month	(ODAM)	155.174	0	338.634	0	16.595	0	8.467	0	123.798	0		
Never to be Exceeded	(NTBE)	211.646	1	423.264	1	21.165	0	14.105	0	155.200	0	6.0-9.5	0	33.3	0
May													
Monthly Average of Daily Deposits	(MADD)	92.534	0	222.076	0	9.258	1	3.097	0	87.067	0		
One Day a Month	(ODAM)	169.609	0	370.134	0	17.067	0	9.258	0	138.755	0		
Never to be Exceeded	(NTBE)	231.334	0	462.630	0	23.133	1	16.420	0	174.096	0	6.0-9.5	1	33.3	0
June													
Monthly Average of Daily Deposits	(MADD)	92.534	1	222.076	0	9.258	0	3.097	0	87.067	0		
One Day a Month	(ODAM)	169.609	0	370.134	0	17.067	0	9.258	0	138.755	0		
Never to be Exceeded	(NTBE)	231.334	0	462.630	0	23.133	0	16.420	0	174.096	0	6.0-9.5	1	33.3	0
July													
Monthly Average of Daily Deposits	(MADD)	92.534	0	222.076	0	9.258	0	3.097	0	87.067	0		
One Day a Month	(ODAM)	169.609	0	370.134	0	17.067	0	9.258	0	138.755	0		
Never to be Exceeded	(NTBE)	231.334	0	462.630	0	23.133	0	16.420	0	174.096	0	6.0-9.5	0	33.3	0
August													
Monthly Average of Daily Deposits	(MADD)	92.534	0	222.076	0	9.258	1	3.097	0	87.067	0		
One Day a Month	(ODAM)	169.609	0	370.134	0	17.067	0	9.258	0	138.755	0		
Never to be Exceeded	(NTBE)	231.334	0	462.630	0	23.133	1	16.420	0	174.096	0	6.0-9.5	3	33.3	0
September													
Monthly Average of Daily Deposits	(MADD)	92.534	1	222.076	1	9.258	1	3.097	1	87.067	0		
One Day a Month	(ODAM)	169.609	0	370.134	0	17.067	0	9.258	0	138.755	0		
Never to be Exceeded	(NTBE)	231.334	1	462.630	1	23.133	1	16.420	1	174.096	0	6.0-9.5	3	33.3	0
October													
Monthly Average of Daily Deposits	(MADD)	92.534	1	222.076	1	9.258	1	3.097	1	87.067	0		
One Day a Month	(ODAM)	169.609	2	370.134	2	17.067	2	9.258	0	138.755	0		
Never to be Exceeded	(NTBE)	231.334	2	462.630	3	23.133	3	16.420	1	174.096	0	6.0-9.5	0	33.3	0
November													
Monthly Average of Daily Deposits	(MADD)	92.534	0	222.076	1	9.258	0	3.097	1	87.067	0		
One Day a Month	(ODAM)	169.609	0	370.134	1	17.067	0	9.258	0	138.755	0		
Never to be Exceeded	(NTBE)	231.334	0	462.630	1	23.133	0	16.420	1	174.096	0	6.0-9.5	1	33.3	0
December													
Monthly Average of Daily Deposits	(MADD)	92.534	1	222.076	1	9.258	0	3.097	1	87.067	0		
One Day a Month	(ODAM)	169.609	0	370.134	0	17.067	0	9.258	0	138.755	0		
Never to be Exceeded	(NTBE)	231.334	1	462.630	0	23.133	0	16.420	0	174.096	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 : 1992

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 (%v/v)	% CONC.	# of TESTS
JANUARY	90%	6.07	2341.4	5	101.314	5	170.988	5	2.192	5	4.752	5	10.439	5	3.4-9.8	5	96LC50	24	1
FEBRUARY	103%	6.07	2591.5	4	51.035	4	136.176	4	0.895	4	2.858	4	6.806	4	3.2-9.6	4	96LC50		0
MARCH	113%	6.07	2182.8	4	43.845	4	141.633	4	1.553	4	1.515	4	6.102	4	5.1-6.7	4	96LC50		0
APRIL	116%	6.07	1847.5	4	84.252	4	299.853	4	0.779	4	2.862	4	5.648	4	6.2-7.5	5	96LC50	79	1
MAY	106%	6.99	2428.3	4	24.030	4	147.363	4	9.280	4	2.463	4	7.776	4	5.5-6.9	4	96LC50		0
JUNE	93%	6.99	2836.8	4	93.282	4	173.380	4	0.874	4	2.402	4	4.655	4	5.9-6.9	4	96LC50		0
JULY	99%	6.99	2828.8	4	49.153	4	137.973	4	2.284	4	1.142	4	5.333	4	6.6-6.8	4	96LC50	40	1
AUGUST	93%	6.99	2330.0	4	52.170	4	131.820	4	19.673	4	0.605	4	4.313	4	5.7-11.2	4	96LC50		0
SEPTEMBER	100%	6.99	2637.8	5	324.678	5	776.706	5	9.634	5	9.464	5	0.881	2	3.7-6.9	5	96LC50		0
OCTOBER	98%	6.99	2272.8	4	278.539	4	1705.027	4	42.233	4	6.279	4	18.660	1	6.0-6.6	4	96LC50		0
NOVEMBER	93%	6.99	2534.5	4	24.805	4	260.780	4	2.513	4	12.923	4	24.516	1	4.7-9.4	4	96LC50		0
DECEMBER	80%	6.99	2543.0	4	133.230	4	283.428	4	1.560	4	6.573	4	31.401	1	6.6-7.0	4	96LC50		0
YEARLY AVERAGE			2439.6	50	109.346	50	368.063	50	7.715	50	4.591	50	7.607	38	3.2-11.2	51		24-79	3

REPORTED EXCURSIONS	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR
Monthly Average of Daily Deposits (MADD)	6	5	4	7	0		
One Day a Month (ODAM)	2	3	2	0	0		
Never to be Exceeded (NTBE)	6	7	6	3	0	16	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 SUMMARY REPORT (PROCESS EFFLUENT)

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

YEAR : 1992

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. (%v/v)	# of TESTS
JANUARY	94%	1.68	214.4	8	1.272	5	12.250	1	0.068	5	0.068	5	2.807	5	7.0-7.2	8	96LC50	100	1
FEBRUARY	89%	1.68	188.5	4	1.233	4	14.504	1	0.067	3	0.024	3	1.340	4	6.8-9.8	4	96LC50	100	1
MARCH	88%	1.68	116.3	4	2.205	4	11.655	1	0.021	3	0.028	3	0.692	4	6.8-7.0	4	96LC50	100	1
APRIL	87%	1.68	138.6	5	0.591	5	10.640	1	0.025	5	0.008	4	1.183	5	6.9-7.2	5	96LC50	100	1
MAY	91%	1.68	108.3	4	0.709	4	1.430	2	0.012	3	0.012	4	0.568	4	6.9-7.0	4	96LC50	100	1
JUNE	84%	1.68	64.0	5	1.192	5	0.270	1	0.010	1	0.823	3	4.785	4	5.7-7.1	5	96LC50	100	1
JULY	96%	1.68	179.3	4	2.235	4	10.608	1	0.186	4	0.022	4	5.334	4	7.0-8.1	4	96LC50	100	1
AUGUST	104%	1.68	246.8	4	21.245	4		0	0.015	4	0.077	4	1.396	4	6.4-6.9	4	96LC50	100	1
SEPTEMBER	96%	1.68	178.2	5	3.872	5	232.780	1	0.013	3	0.065	2	1.077	5	6.3-7.4	5	96LC50	100	1
OCTOBER	82%	1.68	192.5	4	3.360	4	7.260	1	0.027	3	0.040	3	5.789	4	6.9-7.5	4	96LC50	100	1
NOVEMBER	94%	1.68	235.3	4	2.463	4	12.462	1	0.015	3	0.017	4	2.007	4	6.5-8.0	4	96LC50	100	1
DECEMBER	92%	1.68	234.6	5	2.011	5	17.220	1	0.215	5	0.032	5	31.915	5	6.8-8.1	5	96LC50	42	1
YEARLY AVERAGE			176.1	56	3.366	53	27.701	12	0.067	42	0.089	44	6.241	52	5.7-9.8	56		42-100	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	1	1		
One Day a Month	(ODAM)	0	0	0	0	0		
Never to be Exceeded	(NTBE)	0	1	0	0	1	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 COMPLIANCE REPORT (PROCESS EFFLUENT)

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

PERIOD : 1992

INITIAL RCR : 1.19 (Mm3/d)

	REPORTED EXCURSIONS		OIL/GREASE ALLOW. DEP. (Kg/d)	OIL/GREASE # of EXCUR	T.S.S. ALLOW. DEP. (Kg/d)	T.S.S. # of EXCUR	PHENOLS ALLOW. DEP. (Kg/d)	PHENOLS # of EXCUR	SULPHIDE ALLOW. DEP. (Kg/d)	SULPHIDE # of EXCUR	NITROGEN ALLOW. RANGE	NITROGEN # of EXCUR	pH REQ. (%v/v)	pH # 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	36.136	0		
	Never to be Exceeded	(NTBE)	61.418	0	122.824	0	6.142	0	4.092	0	44.016	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	36.136	0		
	Never to be Exceeded	(NTBE)	61.418	0	122.824	0	6.142	0	4.092	0	44.016	0	6.0-9.5	1	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	36.136	0		
	Never to be Exceeded	(NTBE)	61.418	0	122.824	0	6.142	0	4.092	0	44.016	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	36.136	0		
	Never to be Exceeded	(NTBE)	61.418	0	122.824	0	6.142	0	4.092	0	44.016	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	36.136	0		
	Never to be Exceeded	(NTBE)	61.418	0	122.824	0	6.142	0	4.092	0	44.016	0	6.0-9.5	0	33.3	0
June	Monthly Average of Daily Deposits	(MADD)	24.567	0	58.962	0	2.456	0	0.820	1	22.014	0		
	One Day a Month	(ODAM)	45.030	0	98.269	0	4.521	0	2.456	0	36.136	0		
	Never to be Exceeded	(NTBE)	61.418	0	122.824	0	6.142	0	4.092	0	44.016	0	6.0-9.5	1	33.3	0
July	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	36.136	0		
	Never to be Exceeded	(NTBE)	61.418	0	122.824	0	6.142	0	4.092	0	44.016	0	6.0-9.5	0	33.3	0
August	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	36.136	0		
	Never to be Exceeded	(NTBE)	61.418	0	122.824	0	6.142	0	4.092	0	44.016	0	6.0-9.5	0	33.3	0
September	Monthly Average of Daily Deposits	(MADD)	24.567	0	58.962	1	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	36.136	0		
	Never to be Exceeded	(NTBE)	61.418	0	122.824	1	6.142	0	4.092	0	44.016	0	6.0-9.5	0	33.3	0
October	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	36.136	0		
	Never to be Exceeded	(NTBE)	61.418	0	122.824	0	6.142	0	4.092	0	44.016	0	6.0-9.5	0	33.3	0
November	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	36.136	0		
	Never to be Exceeded	(NTBE)	61.418	0	122.824	0	6.142	0	4.092	0	44.016	0	6.0-9.5	0	33.3	0
December	Monthly Average of Daily Deposits	(MADD)	24.567	0	58.962	0	2.456	0	0.820	0	22.014	1		
	One Day a Month	(ODAM)	45.030	0	98.269	0	4.521	0	2.456	0	36.136	0		
	Never to be Exceeded	(NTBE)	61.418	0	122.824	0	6.142	0	4.092	0	44.016	1	6.0-9.5	0	33.3	0

PETROLEUM REFINERY ANNUAL SUMMARY REPORT (PROCESS EFFLUENT)

COMPANY : Petro-Canada Products
REFINERY : Petro-Canada Products,Port Moody, B.C.

YEAR : 1992

INITIAL RCR : 6.50 (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%	4.37	2634.8	5	12.821	5	46.766	5	6.124	5	0.053	5	4.707	5	6.6-7.0	5	96LC50		0
FEBRUARY	107%	4.37	2483.3	4	8.310	4	32.116	4	4.862	4	0.314	4	5.665	4	6.2-7.1	4	96LC50		0
MARCH	101%	4.37	2414.5	4	4.737	4	55.020	4	3.875	4	5.810	4	7.579	4	7.0-9.5	4	96LC50		0
APRIL	114%	4.37	2662.4	5	14.665	5	72.888	5	1.116	5	1.569	5	10.279	5	6.3-9.4	5	96LC50		0
MAY	94%	4.37	2684.3	4	7.416	4	38.398	4	1.545	4	0.054	4	11.018	4	6.0-8.5	4	96LC50		0
JUNE	119%	4.37	2650.8	4	4.496	4	82.995	4	4.538	4	0.053	4	9.737	4	6.2-7.7	4	96LC50		0
JULY	120%	4.37	3152.2	5	60.727	5	108.030	5	1.445	5	0.736	5	12.020	5	6.3-6.6	5	96LC50		0
AUGUST	91%	5.23	3066.5	4	14.060	4	103.190	4	4.647	4	13.366	4	18.150	4	5.7-6.8	4	96LC50		0
SEPTEMBER	80%	5.23	2672.2	5	8.626	5	49.560	5	0.686	5	0.054	5	14.849	5	5.8-6.6	5	96LC50		0
OCTOBER	92%	5.23	2864.3	4	53.928	4	64.338	4	4.638	4	11.416	4	11.046	4	6.0-9.4	4	96LC50		0
NOVEMBER	92%	5.23	2799.0	4	58.680	4	78.116	4	2.843	4	0.058	4	6.893	4	7.0-8.0	4	96LC50		0
DECEMBER	92%	5.23	2762.8	4	76.068	4	59.068	4	13.465	4	0.058	4	4.086	4	6.4-8.7	4	96LC50		0
YEARLY AVERAGE			2739.8	52	26.826	52	66.273	52	4.010	52	2.625	52	9.731	52	5.7-9.5	52			0

REPORTED EXCURSIONS	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR	# of EXCUR
Monthly Average of Daily Deposits (MADD)	0	0	1	3	0		
One Day a Month (ODAM)	0	0	0	0	0		
Never to be Exceeded (NTBE)	0	0	1	3	0	3	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 : Petro-Canada Products
REFINERY : Petro-Canada Products,Port Moody, B.C.

PERIOD : 1992

INITIAL RCR : 6.50 (Mm3/d)

REPORTED EXCURSIONS			OIL/GREASE		T.S.S.		PHENOLS		SULPHIDE		NITROGEN		pH	
			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 EXCUR	# of	REQ. (%v/v)	# of EXCUR
January														
	Monthly Average of Daily Deposits	(MADD)	74.814	0	179.563	0	7.473	0	2.491	0	62.360	0		
	One Day a Month	(ODAM)	137.131	0	299.268	0	13.722	0	7.473	0	99.767	0		
	Never to be Exceeded	(NTBE)	187.036	0	374.028	0	18.704	0	12.455	0	124.676	0	6.0-9.5	0	33.3	0
February														
	Monthly Average of Daily Deposits	(MADD)	74.814	0	179.563	0	7.473	0	2.491	0	62.360	0		
	One Day a Month	(ODAM)	137.131	0	299.268	0	13.722	0	7.473	0	99.767	0		
	Never to be Exceeded	(NTBE)	187.036	0	374.028	0	18.704	0	12.455	0	124.676	0	6.0-9.5	0	33.3	0
March														
	Monthly Average of Daily Deposits	(MADD)	74.814	0	179.563	0	7.473	0	2.491	1	62.360	0		
	One Day a Month	(ODAM)	137.131	0	299.268	0	13.722	0	7.473	0	99.767	0		
	Never to be Exceeded	(NTBE)	187.036	0	374.028	0	18.704	0	12.455	1	124.676	0	6.0-9.5	0	33.3	0
April														
	Monthly Average of Daily Deposits	(MADD)	74.814	0	179.563	0	7.473	0	2.491	0	62.360	0		
	One Day a Month	(ODAM)	137.131	0	299.268	0	13.722	0	7.473	0	99.767	0		
	Never to be Exceeded	(NTBE)	187.036	0	374.028	0	18.704	0	12.455	0	124.676	0	6.0-9.5	0	33.3	0
May														
	Monthly Average of Daily Deposits	(MADD)	74.814	0	179.563	0	7.473	0	2.491	0	62.360	0		
	One Day a Month	(ODAM)	137.131	0	299.268	0	13.722	0	7.473	0	99.767	0		
	Never to be Exceeded	(NTBE)	187.036	0	374.028	0	18.704	0	12.455	0	124.676	0	6.0-9.5	0	33.3	0
June														
	Monthly Average of Daily Deposits	(MADD)	74.814	0	179.563	0	7.473	0	2.491	0	62.360	0		
	One Day a Month	(ODAM)	137.131	0	299.268	0	13.722	0	7.473	0	99.767	0		
	Never to be Exceeded	(NTBE)	187.036	0	374.028	0	18.704	0	12.455	0	124.676	0	6.0-9.5	0	33.3	0
July														
	Monthly Average of Daily Deposits	(MADD)	74.814	0	179.563	0	7.473	0	2.491	0	62.360	0		
	One Day a Month	(ODAM)	137.131	0	299.268	0	13.722	0	7.473	0	99.767	0		
	Never to be Exceeded	(NTBE)	187.036	0	374.028	0	18.704	0	12.455	0	124.676	0	6.0-9.5	0	33.3	0
August														
	Monthly Average of Daily Deposits	(MADD)	89.638	0	214.901	0	8.943	0	2.981	1	74.632	0		
	One Day a Month	(ODAM)	164.117	0	358.150	0	16.422	0	8.943	0	119.401	0		
	Never to be Exceeded	(NTBE)	223.844	0	447.636	0	22.384	0	14.906	1	149.212	0	6.0-9.5	2	33.3	0
September														
	Monthly Average of Daily Deposits	(MADD)	89.638	0	214.901	0	8.943	0	2.981	0	74.632	0		
	One Day a Month	(ODAM)	164.117	0	358.150	0	16.422	0	8.943	0	119.401	0		
	Never to be Exceeded	(NTBE)	223.844	0	447.636	0	22.384	0	14.906	0	149.212	0	6.0-9.5	1	33.3	0
October														
	Monthly Average of Daily Deposits	(MADD)	89.638	0	214.901	0	8.943	0	2.981	1	74.632	0		
	One Day a Month	(ODAM)	164.117	0	358.150	0	16.422	0	8.943	0	119.401	0		
	Never to be Exceeded	(NTBE)	223.844	0	447.636	0	22.384	0	14.906	1	149.212	0	6.0-9.5	0	33.3	0
November														
	Monthly Average of Daily Deposits	(MADD)	89.638	0	214.901	0	8.943	0	2.981	0	74.632	0		
	One Day a Month	(ODAM)	164.117	0	358.150	0	16.422	0	8.943	0	119.401	0		
	Never to be Exceeded	(NTBE)	223.844	0	447.636	0	22.384	0	14.906	0	149.212	0	6.0-9.5	0	33.3	0
December														
	Monthly Average of Daily Deposits	(MADD)	89.638	0	214.901	0	8.943	1	2.981	0	74.632	0		
	One Day a Month	(ODAM)	164.117	0	358.150	0	16.422	0	8.943	0	119.401	0		
	Never to be Exceeded	(NTBE)	223.844	0	447.636	0	22.384	1	14.906	0	149.212	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 : 1992

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	116%	2.92	1935.0	4	19.080	4	65.790	4	0.651	4		0	12.429	3	6.6-7.1	4	96LC50		0
FEBRUARY	116%	2.92	2969.0	4	19.818	4	68.287	4	0.245	4		0	20.783	4	6.7-6.9	4	96LC50		0
MARCH	100%	3.37	1935.0	5	14.629	5	23.220	5	0.561	5		0	14.665	5	6.2-6.8	5	96LC50		0
APRIL	100%	3.37	2000.0	4	17.550	4	35.000	4	1.905	4		0	30.058	4	6.8-8.1	4	96LC50		0
MAY	100%	3.37	1697.0	4	23.164	4	44.122	4	0.238	4		0	9.049	4	6.8-7.0	4	96LC50		0
JUNE	100%	3.37	2246.0	5	21.337	5	56.589	5	0.216	5		0	12.631	4	6.7-7.1	5	96LC50		0
JULY	100%	3.37	2174.0	4	22.229	4	60.872	4	0.196	4		0	20.141	2	6.7-7.1	4	96LC50		0
AUGUST	100%	3.37	1659.0	4	9.120	4	35.867	4	0.035	4		0	10.624	4	7.1-7.6	4	96LC50		0
SEPTEMBER	100%	3.37	1965.0	4	22.843	4	62.880	4	0.079	3		0	15.643	3	6.8-7.1	4	96LC50	83	1
OCTOBER	100%	3.37		0		0		0		0		0		0	7.0-7.5	4	96LC50		0
NOVEMBER	100%	3.37	2605.0	3	19.972	3	104.200	3	0.035	3	0.860	3	22.597	3	7.0-7.8	5	96LC50		0
DECEMBER	100%	3.37	1825.0	3	28.531	3	48.058	3	0.041	3	0.237	2	7.636	3	6.6-7.8	3	96LC50		0
YEARLY AVERAGE			2077.1	44	19.656	44	63.343	44	0.398	43	0.611	5	15.903	39	6.2-8.1	50		83	1

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		
One Day a Month	(ODAM)	0	0	0	0	0		
Never to be Exceeded	(NTBE)	0	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 : Shell Canada Products Ltd.
REFINERY : Shell Canada Products Ltd.,Burnaby, B.C.

PERIOD : 1992

INITIAL RCR : 3.74 (Mm3/d)

REPORTED EXCURSIONS		OIL/GREASE		T.S.S.		PHENOLS		SULPHIDE		NITROGEN		pH	
		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)	49.990	0	119.983	0	4.993	0	1.664	0	41.668	0				
One Day a Month	(ODAM)	91.630	0	199.962	0	9.169	0	4.993	0	66.664	0				
Never to be Exceeded	(NTBE)	124.976	0	249.923	0	12.498	0	8.322	0	83.308	0	6.0-9.5	0	33.3	0
February															
Monthly Average of Daily Deposits	(MADD)	49.990	0	119.983	0	4.993	0	1.664	0	41.668	0				
One Day a Month	(ODAM)	91.630	0	199.962	0	9.169	0	4.993	0	66.664	0				
Never to be Exceeded	(NTBE)	124.976	0	249.923	0	12.498	0	8.322	0	83.308	0	6.0-9.5	0	33.3	0
March															
Monthly Average of Daily Deposits	(MADD)	67.694	0	138.473	0	5.763	0	1.921	0	48.090	0				
One Day a Month	(ODAM)	105.761	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)	67.694	0	138.473	0	5.763	0	1.921	0	48.090	0				
One Day a Month	(ODAM)	105.761	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
May															
Monthly Average of Daily Deposits	(MADD)	67.694	0	138.473	0	5.763	0	1.921	0	48.090	0				
One Day a Month	(ODAM)	105.761	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
June															
Monthly Average of Daily Deposits	(MADD)	67.694	0	138.473	0	5.763	0	1.921	0	48.090	0				
One Day a Month	(ODAM)	105.761	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
July															
Monthly Average of Daily Deposits	(MADD)	67.694	0	138.473	0	5.763	0	1.921	0	48.090	0				
One Day a Month	(ODAM)	105.761	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
August															
Monthly Average of Daily Deposits	(MADD)	67.694	0	138.473	0	5.763	0	1.921	0	48.090	0				
One Day a Month	(ODAM)	105.761	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
September															
Monthly Average of Daily Deposits	(MADD)	67.694	0	138.473	0	5.763	0	1.921	0	48.090	0				
One Day a Month	(ODAM)	105.761	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
October															
Monthly Average of Daily Deposits	(MADD)	67.694	0	138.473	0	5.763	0	1.921	0	48.090	0				
One Day a Month	(ODAM)	105.761	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
November															
Monthly Average of Daily Deposits	(MADD)	67.694	0	138.473	0	5.763	0	1.921	0	48.090	0				
One Day a Month	(ODAM)	105.761	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
December															
Monthly Average of Daily Deposits	(MADD)	67.694	0	138.473	0	5.763	0	1.921	0	48.090	0				
One Day a Month	(ODAM)	105.761	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 : Esso Petroleum Canada
REFINERY : Esso Petroleum Canada,Port Moody, B.C.

YEAR : 1992

INITIAL RCR : 6.99 (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	101%	6.17	1891.8	4	11.908	4	82.300	4	0.098	4	0.498	4	8.526	4	8.0-8.4	4	96LC50		0
FEBRUARY	114%	6.17	1542.6	4	5.630	4	21.098	4	0.060	4	0.178	4	1.081	4	7.0-7.7	4	96LC50		0
MARCH	242%	6.17	1676.4	4	3.637	3	18.163	3	0.065	4	0.113	4	0.362	4	7.4-8.0	3	96LC50		0
APRIL	363%	10.98	1733.8	5	4.486	5	54.784	5	0.078	5	0.274	5	0.769	5	6.3-7.8	5	96LC50		0
MAY	153%	25.61	1684.5	5	6.282	5	41.640	5	0.054	5	0.394	5	18.920	5	6.6-8.0	5	96LC50		0
JUNE	93%	39.49	1408.8	3	3.300	3	13.993	3	0.010	3	0.150	3	0.044	3	6.8-7.4	3	96LC50		0
JULY	6%	39.49	1506.5	4	3.823	4	36.050	4	0.023	4	0.040	3	0.111	4	7.0-7.3	4	96LC50		0
AUGUST	10%	16.83	1341.3	4	1.888	4	18.833	4	0.028	4	0.103	3	0.049	4	7.0-8.1	4	96LC50		0
SEPTEMBER	91%	1.76	1359.2	5	3.803	4	20.082	5	0.033	4	0.648	4	0.113	4	7.4-8.0	5	96LC50		0
OCTOBER	106%	1.76	1281.7	4	2.937	3	32.495	4	0.043	3	0.057	3	0.494	3	7.3-8.2	4	96LC50		0
NOVEMBER	101%	1.76	1726.8	4	1.725	4	23.203	4	0.032	4	0.175	4	0.260	4	7.7-8.7	4	96LC50		0
DECEMBER	78%	1.76	1711.3	4	4.918	4	28.075	4	0.028	4	0.298	4	3.708	4	6.9-7.8	4	96LC50		0
YEARLY AVERAGE			1566.5	50	4.637	47	33.698	49	0.047	48	0.261	46	3.269	48	6.3-9.4	49			0

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		
One Day a Month (ODAM)	0	0	0	0	0		
Never to be Exceeded (NTBE)	0	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 : Esso Petroleum Canada
REFINERY : Esso Petroleum Canada,Port Moody, B.C.

PERIOD : 1992

INITIAL RCR : 5.99 (Mm3/d)

REPORTED EXCURSIONS

		OIL/GREASE		T.S.S.		PHENOLS		SULPHIDE		NITROGEN		pH	
		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 EXCUR	# of	REQ. (%v/v)	# of EXCUR
January													
Monthly Average of Daily Deposits	(MADD)	106.630	0	253.526	0	10.561	0	3.617	0	88.046	0		
One Day a Month	(ODAM)	193.615	0	422.522	0	19.374	0	10.561	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)	106.630	0	253.526	0	10.561	0	3.617	0	88.046	0		
One Day a Month	(ODAM)	193.615	0	422.522	0	19.374	0	10.561	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)	106.630	0	253.526	0	10.561	0	3.617	0	88.046	0		
One Day a Month	(ODAM)	193.615	0	422.522	0	19.374	0	10.561	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)	145.263	0	348.624	0	14.534	0	4.861	0	136.725	0		
One Day a Month	(ODAM)	266.259	0	581.053	0	26.793	0	14.534	0	217.889	0		
Never to be Exceeded	(NTBE)	363.158	0	726.266	0	36.316	0	24.207	0	273.389	0	6.0-9.5	0	33.3	0
May													
Monthly Average of Daily Deposits	(MADD)	270.496	0	649.124	0	27.116	0	9.104	0	286.975	0		
One Day a Month	(ODAM)	495.804	0	1081.984	0	50.201	0	27.116	0	466.773	0		
Never to be Exceeded	(NTBE)	676.240	0	1352.420	0	67.624	0	46.128	0	573.890	0	6.0-9.5	0	33.3	0
June													
Monthly Average of Daily Deposits	(MADD)	389.309	0	934.219	0	39.053	0	13.129	0	429.522	0		
One Day a Month	(ODAM)	713.581	0	1557.236	0	72.409	0	39.053	0	681.462	0		
Never to be Exceeded	(NTBE)	973.272	0	1946.484	0	97.327	0	64.977	0	858.985	0	6.0-9.5	0	33.3	0
July													
Monthly Average of Daily Deposits	(MADD)	389.309	0	934.219	0	39.053	0	13.129	0	429.522	0		
One Day a Month	(ODAM)	713.581	0	1557.236	0	72.409	0	39.053	0	681.462	0		
Never to be Exceeded	(NTBE)	973.272	0	1946.484	0	97.327	0	64.977	0	858.985	0	6.0-9.5	0	33.3	0
August													
Monthly Average of Daily Deposits	(MADD)	195.339	0	468.783	0	19.565	0	6.558	0	196.804	0		
One Day a Month	(ODAM)	358.046	0	781.357	0	36.153	0	19.565	0	313.010	0		
Never to be Exceeded	(NTBE)	488.348	0	976.636	0	48.835	0	32.573	0	393.648	0	6.0-9.5	0	33.3	0
September													
Monthly Average of Daily Deposits	(MADD)	29.960	0	71.908	0	2.993	0	0.997	0	24.973	0		
One Day a Month	(ODAM)	54.915	0	119.840	0	5.495	0	2.993	0	39.953	0		
Never to be Exceeded	(NTBE)	74.900	0	149.783	0	7.490	0	4.988	0	49.928	0	6.0-9.5	0	33.3	0
October													
Monthly Average of Daily Deposits	(MADD)	29.960	0	71.908	0	2.993	0	0.997	0	24.973	0		
One Day a Month	(ODAM)	54.915	0	119.840	0	5.495	0	2.993	0	39.953	0		
Never to be Exceeded	(NTBE)	74.900	0	149.783	0	7.490	0	4.988	0	49.928	0	6.0-9.5	0	33.3	0
November													
Monthly Average of Daily Deposits	(MADD)	29.960	0	71.908	0	2.993	0	0.997	0	24.973	0		
One Day a Month	(ODAM)	54.915	0	119.840	0	5.495	0	2.993	0	39.953	0		
Never to be Exceeded	(NTBE)	74.900	0	149.783	0	7.490	0	4.988	0	49.928	0	6.0-9.5	0	33.3	0
December													
Monthly Average of Daily Deposits	(MADD)	29.960	0	71.908	0	2.993	0	0.997	0	24.973	0		
One Day a Month	(ODAM)	54.915	0	119.840	0	5.495	0	2.993	0	39.953	0		
Never to be Exceeded	(NTBE)	74.900	0	149.783	0	7.490	0	4.988	0	49.928	0	6.0-9.5	0	33.3	0

PETROLEUM REFINERY ANNUAL SUMMARY REPORT (STORMWATER)

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

YEAR : 1992

INITIAL RCR : 3.82 (Mm3/d)

MONTH	AVERAGE CRUDE RATE (% of R)	CURRENT REF. CRUDE RATE (R) (Mm3/d)	EFFLUENT FLOW TOTAL (m3/mon.)	# of DAYS	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	90%	6.07	57311.3	4	323.315	4	274.552	4	1.316	4	6.0-7.3	4
FEBRUARY	103%	6.07	63960.8	4	309.166	4	240.287	4	2.589	1	6.7-7.2	4
MARCH	113%	6.07	25143.0	3	73.235	3	116.744	3	2.538	3	6.3-7.6	3
APRIL	116%	6.07	36363.0	1	67.363	2	1404.750	2	2.098	2	6.3-8.1	6
MAY	108%	6.99	38690.0	3	252.600	3	128.250	3	1.831	3	6.6-7.2	3
JUNE	95%	6.99	30628.0	4	152.164	4	87.218	4	1.343	4	6.2-7.7	6
JULY	99%	6.99				0		0		0	6.6-7.0	3
AUGUST	93%	6.99				0		0		0	6.4-7.2	4
SEPTEMBER	100%	6.99				0		0		0	6.7-7.5	4
OCTOBER	98%	6.99	34065.0	4	69.247	4	184.590	4	11.221	4	6.7-7.3	4
NOVEMBER	93%	6.99	83483.0	4	269.576	4	395.963	4	11.857	4	6.8-7.4	4
DECEMBER	80%	6.99	83287.5	4	293.798	4	229.080	4	1.583	4	6.6-7.5	4
YEARLY AVERAGE			62796.5	31	211.227	32	285.428	32	4.464	29	6.0-8.1	49

REPORTED EXCURSIONS

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

EP SURVEY DATA

Date ( )

OIL/GREASE	T.S.S.	PHENOLS	pH	TOXICITY (LT50)

Federal Allowable (mg/l)
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 : 1992

INITIAL RCR : 3.82 (Mm3/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 6.07 Mm3/d) Never to be Exceeded	(NTBE)	705.464	0	2116.300	0	70.564	0	6.0-9.5	0
February	(RCR 6.07 Mm3/d) Never to be Exceeded	(NTBE)	705.464	0	2116.300	0	70.564	0	6.0-9.5	0
March	(RCR 6.07 Mm3/d) Never to be Exceeded	(NTBE)	705.464	0	2116.300	0	70.564	0	6.0-9.5	0
April	(RCR 6.07 Mm3/d) Never to be Exceeded	(NTBE)	705.464	0	2116.300	0	70.564	0	6.0-9.5	0
May	(RCR 6.99 Mm3/d) Never to be Exceeded	(NTBE)	771.077	0	2313.162	0	77.114	0	6.0-9.5	0
June	(RCR 6.99 Mm3/d) Never to be Exceeded	(NTBE)	771.077	0	2313.162	0	77.114	0	6.0-9.5	0
July	(RCR 6.99 Mm3/d) Never to be Exceeded	(NTBE)	771.077	0	2313.162	0	77.114	0	6.0-9.5	0
August	(RCR 6.99 Mm3/d) Never to be Exceeded	(NTBE)	771.077	0	2313.162	0	77.114	0	6.0-9.5	0
September	(RCR 6.99 Mm3/d) Never to be Exceeded	(NTBE)	771.077	0	2313.162	0	77.114	0	6.0-9.5	0
October	(RCR 6.99 Mm3/d) Never to be Exceeded	(NTBE)	771.077	0	2313.162	0	77.114	0	6.0-9.5	0
November	(RCR 6.99 Mm3/d) Never to be Exceeded	(NTBE)	771.077	0	2313.162	0	77.114	0	6.0-9.5	0
December	(RCR 6.99 Mm3/d) Never to be Exceeded	(NTBE)	771.077	0	2313.162	0	77.114	0	6.0-9.5	0

PETROLEUM REFINERY ANNUAL SUMMARY REPORT (STORMWATER)

COMPANY : Petro-Canada Products
REFINERY : Petro-Canada Products,Port Moody, B.C.

YEAR : 1992

INITIAL RCR : 6.50 (Mm3/d)

MONTH	AVERAGE CRUDE RATE (% of R)	CURRENT REF. CRUDE RATE (R) (Mm3/d)	EFFLUENT FLOW TOTAL (m3/mon.)	# of DAYS	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%	4.37	100703.5	4	55.778	4	655.368	4	0.337	4	6.9-7.0	4
FEBRUARY	107%	4.37	77918.5	4	34.542	4	136.470	4	0.546	4	6.7-7.4	4
MARCH	101%	4.37	13601.0	4	4.147	4	57.704	4	0.028	4	6.5-7.7	4
APRIL	114%	4.37	48589.4	5	47.205	5	474.078	5	0.099	5	6.6-7.3	5
MAY	94%	4.37	1710.0	4	1.260	1	5.040	4	0.015	1	6.6-7.3	4
JUNE	119%	4.37	1937.5	4	2.695	4	10.820	4	0.005	4	6.5-7.7	4
JULY	120%	4.37	26280.0	5	15.648	5	207.881	5	0.053	5	6.1-6.8	5
AUGUST	91%	5.23	1643.0	4	0.476	4	12.625	4	0.003	4	6.8-7.2	4
SEPTEMBER	80%	5.23	1705.0	4	0.820	4	7.669	4	0.003	4	6.3-6.9	4
OCTOBER	92%	5.23	19410.0	5	12.365	5	131.130	5	0.041	5	6.1-6.4	5
NOVEMBER	92%	5.23	100602.8	4	54.687	4	704.504	4	0.811	4	6.3-7.0	4
DECEMBER	92%	5.23	146055.0	4	65.757	4	2353.610	4	1.131	4	6.2-6.9	4
YEARLY AVERAGE			44100.0	51	25.982	48	390.214	51	0.259	48	6.1-7.7	51

REPORTED EXCURSIONS

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

EP SURVEY DATA

Date ( )

OIL/GREASE	T.S.S.	PHENOLS	pH	TOXICITY (LT50)

Federal Allowable (mg/l)
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 : Petro-Canada Products
REFINERY : Petro-Canada Products,Port Moody, B.C.

PERIOD : 1992

INITIAL RCR : 6.50 (Mm3/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 4.37 Mm3/d) Never to be Exceeded	(NTBE)	623.424	0	1870.229	0	62.360	0	6.0-9.5	0
February	(RCR 4.37 Mm3/d) Never to be Exceeded	(NTBE)	623.424	0	1870.229	0	62.360	0	6.0-9.5	0
March	(RCR 4.37 Mm3/d) Never to be Exceeded	(NTBE)	623.424	0	1870.229	0	62.360	0	6.0-9.5	0
April	(RCR 4.37 Mm3/d) Never to be Exceeded	(NTBE)	623.424	0	1870.229	0	62.360	0	6.0-9.5	0
May	(RCR 4.37 Mm3/d) Never to be Exceeded	(NTBE)	623.424	0	1870.229	0	62.360	0	6.0-9.5	0
June	(RCR 4.37 Mm3/d) Never to be Exceeded	(NTBE)	623.424	0	1870.229	0	62.360	0	6.0-9.5	0
July	(RCR 4.37 Mm3/d) Never to be Exceeded	(NTBE)	623.424	0	1870.229	0	62.360	0	6.0-9.5	0
August	(RCR 5.23 Mm3/d) Never to be Exceeded	(NTBE)	746.112	0	2238.283	0	74.632	0	6.0-9.5	0
September	(RCR 5.23 Mm3/d) Never to be Exceeded	(NTBE)	746.112	0	2238.283	0	74.632	0	6.0-9.5	0
October	(RCR 5.23 Mm3/d) Never to be Exceeded	(NTBE)	746.112	0	2238.283	0	74.632	0	6.0-9.5	0
November	(RCR 5.23 Mm3/d) Never to be Exceeded	(NTBE)	746.112	0	2238.283	0	74.632	0	6.0-9.5	0
December	(RCR 5.23 Mm3/d) Never to be Exceeded	(NTBE)	746.112	0	2238.283	0	74.632	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 : 1992

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 DAYS	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	115%	2.92	53702.0	11	185.540	11	436.010	11	6.330	11	6.1-7.3	11
FEBRUARY	115%	2.92	5195.0	1	9.870	1	51.950	1	0.520	1	6.6-6.6	1
MARCH	96%	3.37	4822.0	1	16.390	1	57.860	1	0.480	1	6.4-6.4	1
APRIL	100%	3.37	45008.0	10	137.400	10	327.340	10	4.970	10	6.1-6.9	10
MAY	100%	3.37	22158.0	5	83.330	5	196.870	5	2.220	5	6.3-7.2	5
JUNE	100%	3.37	13231.0	3	35.680	3	445.400	3	1.770	2	6.0-6.4	3
JULY	100%	3.37		0		0		0		0	6.5-6.6	4
AUGUST	100%	3.37	824.0	1	2.470	1	1.650	1	0.010	1	7.0-7.7	4
SEPTEMBER	100%	3.37	5090.0	1	40.210	1	61.080	1	0.150	1	7.0-7.4	4
OCTOBER	100%	3.37	34065.0	7	128.140	7	135.880	7	0.500	7	6.8-8.1	7
NOVEMBER	100%	3.37	54722.0	15	108.417	15	852.878	15	0.549	15	6.8-7.9	15
DECEMBER	100%	3.37	28917.0	7	59.930	7	519.110	7	0.490	7	7.4-7.6	9
YEARLY AVERAGE			22311.2	62	67.281	62	257.169	62	1.499	61	6.0-8.1	74

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

EP SURVEY DATA

Date ( )

		=OIL & GREASE=	==T.S.S.==	==PHENOLS==	=== pH ===	==TOXICITY (LT50)==
	Federal Allowable (mg/l)					
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 : 1992

INITIAL RCR : 3.74 (Mm3/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 2.92 Mm3/d) Never to be Exceeded	(NTBE)	416.667	0	1249.672	0	41.668	0	6.0-9.5	0
February	(RCR 2.92 Mm3/d) Never to be Exceeded	(NTBE)	416.567	0	1249.672	0	41.668	0	6.0-9.5	0
March	(RCR 3.37 Mm3/d) Never to be Exceeded	(NTBE)	480.764	0	1442.259	0	48.090	0	6.0-9.5	0
April	(RCR 3.37 Mm3/d) Never to be Exceeded	(NTBE)	480.764	0	1442.259	0	48.090	0	6.0-9.5	0
May	(RCR 3.37 Mm3/d) Never to be Exceeded	(NTBE)	480.764	0	1442.259	0	48.090	0	6.0-9.5	0
June	(RCR 3.37 Mm3/d) Never to be Exceeded	(NTBE)	480.764	0	1442.259	0	48.090	0	6.0-9.5	0
July	(RCR 3.37 Mm3/d) Never to be Exceeded	(NTBE)	480.764	0	1442.259	0	48.090	0	6.0-9.5	0
August	(RCR 3.37 Mm3/d) Never to be Exceeded	(NTBE)	480.764	0	1442.259	0	48.090	0	6.0-9.5	0
September	(RCR 3.37 Mm3/d) Never to be Exceeded	(NTBE)	480.764	0	1442.259	0	48.090	0	6.0-9.5	0
October	(RCR 3.37 Mm3/d) Never to be Exceeded	(NTBE)	480.764	0	1442.259	0	48.090	0	6.0-9.5	0
November	(RCR 3.37 Mm3/d) Never to be Exceeded	(NTBE)	480.764	0	1442.259	0	48.090	0	6.0-9.5	0
December	(RCR 3.37 Mm3/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 (TOTAL STORMWATER)

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

YEAR : 1992

INITIAL RCR : 5.99 (Mm3/d)

MONTH	AVERAGE CRUDE RATE (% of R)	CURRENT REF. CRUDE RATE (R) (Mm3/d)	==EFFLUENT FLOW== TOTAL (m3/mon.)	# of TESTS	===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	117%	6.17	303769.0	8	443.610	7	1238.187	7	10.413	7	6.9-7.6	7
February	111%	6.17	203050.0	8	555.215	8	1088.100	8	19.373	8	6.2-7.3	8
March	97%	6.17	115226.7	7	222.693	7	514.003	7	3.243	7	6.5-8.3	7
April	103%	6.17	184987.3	11	750.157	11	1883.878	11	7.905	11	6.6-7.7	11
May	106%	6.17	164250.0	8	362.700	7	1374.750	7	2.425	7	6.7-7.4	7
June	93%	6.17	105245.0	8	458.800	8	795.698	8	2.020	8	6.6-7.4	8
July	110%	6.17	118440.0	9	298.910	9	1117.920	9	3.770	9	6.4-7.5	9
August	106%	6.17	106392.0	10	221.832	10	936.200	10	1.610	10	6.8-7.2	10
September	99%	6.17	128815.3	8	473.947	8	1981.623	8	2.007	8	7.0-7.6	9
October	113%	6.17	164175.0	8	349.650	8	1348.350	8	3.750	8	6.7-7.9	8
November	111%	6.17	519792.5	8	631.085	8	2120.800	8	22.090	8	6.1-8.0	6
December	95%	6.17	212700.0	10	552.450	9	1790.700	10	10.980	10	6.2-7.8	10
MONTHLLY AVERAGE VALUES			192303.3	103	451.140	100	1349.184	101	7.414	101	6.6-7.6	100

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

EP SURVEY DATA

Date ( )		=OIL & GREASE=	==T.S.S.==	==PHENOLS==	=== pH ===	==TOXICITY (LC50)==
	Federal Allowable (mg/l)					
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 (Mm3/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 Mm3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
February	(RCR 6.17 Mm3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
March	(RCR 6.17 Mm3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
April	(RCR 6.17 Mm3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
May	(RCR 6.17 Mm3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
June	(RCR 6.17 Mm3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
July	(RCR 6.17 Mm3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
August	(RCR 6.17 Mm3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
September	(RCR 6.17 Mm3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
October	(RCR 6.17 Mm3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
November	(RCR 6.17 Mm3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0
December	(RCR 6.17 Mm3/d) Never to be Exceeded	(NTBE)	880.212	0	2640.575	0	88.046	0	6.0-9.5	0

APPENDIX 5

Checklists - on Microfiche

A5.1 Storage of PCB Materials Regulations Checklist
A5.2 Pulp and Paper Mill Defoamer and Woodchip Regulations Checklist
A5.3 Pulp and Paper Mill Effluents Chlorinated Dioxins and Furans Regulations Checklist
A5.4 Pulp and 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 Inspections Checklist

Because these checklists are lengthy, they are on the microfiche placed in the pocket on the inside back cover of this report.

Over 50% recycled paper including 10% post consumer fibre
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