ENVIRONMENTAL SERVICES BRANCH
ENVIRONMENTAL PROTECTION SERVICE
PACIFIC AND YUKON REGION

# INVENTORY AND ASSESSMENT OF POLYCHLORINATED BIPHENYL (PCB) USE IN BRITISH COLUMBIA AND THE YUKON TERRITORY

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By

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## ABSTRACT

The Environmental Protection Service conducted an inventory and assessment of PCB use in British Columbia and the Yukon to determine the extent of use and quantities of PCBs requiring ultimate disposal. In 1977, a questionnaire survey of 49 industrial and institutional user categories provided information on the use, type, and quantities of PCBs located throughout B.C. and the Yukon. Four major industrial sectors including pulp and paper, mining and smelting, utilities, and sawmill and lumber operations accounted for 88 percent of the total PCB in use (1.20 million litres as of January, 1980). Electrical transformers accounted for 67 percent and electrical capacitors 32 percent of the total PCB in use. Smaller quantities of PCBs were also found to be in use in certain mechanical equipment including bridge bearings and tugboat couplings.

In 1980/81, the regional PCB inventory was updated to obtain a new measure of the amounts of PCBs in use, in storage for future use or disposal, and on the amounts actually disposed of during 1978 to 1980. As of July, 1981, 1.27 million litres of PCBs were in use in B.C. and the Yukon. A total of 21,500 litres were in storage for future disposal, 21,700 litres in storage for future use, and 49,000 litres disposed of (i.e. sent to secure storage) from 1978 to 1980.

A transformer inspection program was undertaken in 1978/79 to determine the potential for releases of PCBs from electrical equipment in large industries. Of the 95 industrial facilities inspected, 30 were considered normal, 14 had a slight risk for release of PCBs, and 28 facilities were assessed as being moderate risks. Remedial actions were taken on the slight and moderate risk transformers, and in cases of potential severe PCB contamination, the equipment was removed from service. The latter included use of PCB-filled electromagnets over food and feed conveyors, a transformer located on a railway bridge over Burrard Inlet, and transformers in an abandoned electric dredge in the Yukon.

In 1981/82, a federal interdepartmental PCB inspection program was initiated to investigate potential risks from the use of PCB-filled electrical equipment in food, feed, and grain handling facilities. A total of 118 plants did not contain PCB electrical equipment, 57 plants had PCB equipment located in areas with no potential for contamination of food or feed products, and 20 plants had PCB equipment located in areas with direct or indirect contamination potential. Remedial actions will be undertaken to either protect or remove "at risk" equipment in these plants.

## RÉSUMÉ

Le Service de la protection de l'environnement a procédé à une étude basée sur l'inventaire des biphényles polychlorés (BPC) employés en Colombie Britannique et au Yukon. L'inventaire avait pour objet de déterminer dans quelles proportions ce produit était employé et de quelles quantités de BPC il fallait se défaire. En 1977, au moyen d'une enquête faite sous forme de questionnaire envoyé à 49 sociétés industrielles et établissements reconnus on a pu obtenir un certain nombre de données portant sur la nature de l'emploi, le type et les quantités de BPC utilisées en Colombie-Britannique et au Yukon. Selon ces données, quatre grands secteurs industriels: l'industrie de la pâte à papier, les mines et fonderies, les services d'utilité publique et les industries forestières comptaient pour 88 pour cent de la quantité totale de BPC employé (1.20 million de litres selon un relevé de janvier 1980). Les transformateurs électriques comptaient pour 67 pour cent et les condensateurs électriques pour 32 pour cent des quantités totales employées.

En 1980-1981, on procéda à un nouvel inventaire régional afin de mettre les chiffres à jour en ce qui concerne les quantités de BPC effectivement employées, en dépôt en attendant leur emploi ou leur élimination et les quantités qui ont réellement été éliminées de 1978 à 1980. Selon les données obtenues en juillet 1981, la quantite de BPC employée en Colombie-Britannique et dans le Yukon s'élevait à 1.27 million de litres; 21 500 litres étaient en dépôt avant élimination, 21 700 litres attendaient leur utilisation et 49 000 litres avaient été éliminés (c'est-à-dire mis dans des dépôts présentant toute sécurité), entre 1978 et 1980.

En 1978-1979, on entreprit un programme d'inspection de transformateurs destiné à déterminer les quantités de BPC s'échappant éventuellement du matériel électrique employé dans les entreprises industrielles importantes. Sur les 95 installations industrielles

inspectées, 30 ont été trouvées normales, 14 présentaient un léger risque et 28 un risque modéré de fuites. Des mesures correctives ont été prises à l'égard des transformateurs présentant des risques légers ou modérés; quant aux pièces d'équipement qui présentaient un grave risque de contamination par les BPC, elles ont été mises hors services. Dans cette dernière catégorie figuraient des électro-aimants qui, bien que contenant du BPC, étaient installés au-dessous de convoyeurs de produits alimentaires destinés à l'homme ou aux animaux, un transformateur installé sur un pont de chemin de fer traversant Burrard Inlet et les transformateurs d'une drague électrique mise hors service dans le Yukon.

En 1981-1982 un programme fédéral interministérial d'inspection fut mis en place pour enquêter sur les risques pouvant résulter de l'emploi de matériel électrique contenant des BPC et équipant des installations de manutention d'aliments, de nourriture pour animaux et de grain. Cent dix-huit (118) des installations inspectées ne contenaient pas de matériel électrique employant des BPC; dans 57 autres, le matériel électrique contenant des BPC était installé à des endroits excluant toute contamination des produits alimentaires pour l'homme ou pour les animaux, tandis que dans 20 autres l'équipement contenant des PBC était situé dans des endroits où il présentait un risque de contamination directe ou indirecte. Des mesures correctives vont être prises dans ces dernières installations, soit pour assurer une protection efficace, soit pour enlever le matériel présentant des risques.

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## CONCLUSIONS

1. PCBs are widely used in electrical equipment, especially capacitors, but most use is concentrated in large industrial facilities in the region.

2. The Pacific and Yukon Region has approximately 12 percent of the total Canadian PCB inventory. This represents a substantial quantity of material that will eventually become (or is becoming) a hazardous waste. The establishment of facilities capable of destroying PCB wastes will be increasingly important if a phase out of PCBs is to be achieved within a reasonable time frame.

3. The availability of U.S. disposal facilities up to 1980 and the establishment of a secure storage facility for PCB wastes in Alberta has resulted in the removal of PCB equipment from 1978 to 1980. However, the quantity removed from B.C./Yukon facilities has been only a small fraction of the total quantities of PCBs in use. This would suggest a likely protracted phase out period based on a policy of attrition.

4. Inspections of electrical equipment for potential PCB releases indicated that relatively few pieces of equipment were leaking or could potentially contaminate the environment or food products. However, some of this equipment was considered a severe risk due to its location over food products or bodies of water, and had to be removed from service and replaced with non-PCB filled equipment.

# 1 INTRODUCTION

## 1.1 Use of PCBs* in Canada

PCBs are members of a class of chlorinated organic compounds noted for their thermal and biological stability, their low degree of flammability and their electrical insulating properties. These industrial chemicals are used almost exclusively as insulating and coolant fluids in electrical transformers and capacitors. Up until the early 1970's they were also used in certain hydraulic and heat transfer equipment, and in such products as plastics, resins, paints, adhesives, cutting oils, printing inks, caulking compounds, and lacquers and varnishes. All of the non-electrical uses have been phased out, but PCBs are still widely used in electrical equipment.

PCBs are extremely troublesome substances that are widely dispersed, highly persistent, and accumulative in the environment. They are toxic chemicals, can cause biological changes even at trace concentrations in the environment, and may be accumulated in biological tissues and passed through food chains. Because of these concerns, many countries have adopted legislation to control the use and release of PCBs into the environment.

In Canada, The Environmental Contaminants Act (ECA) was promulgated in 1976 and is administered by the Environmental Protection Service (EPS) of Environment Canada in cooperation with other Environment Canada Services and Health and Welfare Canada. This Act allows the federal government to gather information to determine whether a particular substance, or class of substances, pose a threat to human health or the environment. The Act may be further used to restrict or prohibit the use

*The term "PCBs" has been used in this report to refer to a fluid containing a significant proportion of polychlorinated biphenyls. Normally, the proportion of PCB used in electrical equipment ranges from 40 to 70% with the remainder consisting of a solvent such as tri and tetrachlorobenzene. These commercial mixtures are commonly referred to as "askarel".

of substances shown to be environmentally damaging, or a threat to human health. PCBs were the first class of substances regulated under the Environmental Contaminants Act.

## 1.2 Control of PCBs in Canada

Two approaches have been taken to control PCBs in Canada: development of regulations to ensure a phaseout of PCB-filled equipment, and development of guidelines on waste management and housekeeping practices for owners of this equipment.

Regulations were promulgated under the ECA in September, 1977 prohibiting most non-electrical uses of PCBs. These regulations were amended on July 1, 1980 to include controls on PCB use in electrical equipment. The amended regulations prohibit the import or manufacture of all PCB-filled equipment; prohibit the operation of PCB-filled electromagnets over food or feed, restrict PCB usage to existing electrical equipment and facilities intended to destroy PCBs, and prohibit the use of PCB as a new filling or make-up fluid in the servicing or maintenance of electrical transformers or electromagnets.

Two other PCB regulations are about to be promulgated. A release regulation will set limits on the amount of PCBs that may be released into the environment, and a product control regulation will prohibit the sale of all PCB-filled equipment.

Apart from the regulatory approach to control the use of PCB-filled equipment, the Environmental Protection Service has developed waste management guidelines for PCBs (EPS, 1978a and b), and also developed a code of good practice for the operation and maintenance of PCB-filled electrical equipment (EPS, 1981). The code of good practice (Handbook on PCBs in Electrical Equipment) was developed to provide information on the maintenance of PCB-filled equipment; PCB handling, storage, and disposal; information on equipment containment systems, clean-up and transportation procedures; and substitute chemicals for PCBs.

These regulations and guidelines are the core of the Environmental Protection Service PCB control and management program.

# 2 INVENTORY OF PCB USE

## 2.1 Inventory of PCBs in Canada

In order to define the extent of use and quantities of PCB requiring ultimate disposal, a notice was published in the January 8th, 1977 edition of the Canada Gazette Part I pursuant to paragraph 4(1)a of the Environmental Contaminants Act. The notice, commonly referred to as the PCB Notice, required that "any person engaged in any commercial, manufacturing, or processing activity involving any member of the class of substances polychlorinated biphenyls is required to notify the Minister of such involvement if, during the year 1976 the activity has involved more than one kilogram of polychlorinated biphenyls."

The PCB Notice also provided a list of the trade names of commercial PCB products, and a list of some of the major uses of PCBs. Reporting of usage was directed to the five regional offices of the Environmental Protection Service. Because of the widespread use of PCBs, the PCB Notice was published in the Chemistry in Canada journal in order to alert as many industries and institutions as possible to the reporting requirement. Also, since each regional office of EPS was responsible for as complete a reporting as possible, attempts were made in each region to identify all possible locations where PCBs and PCB-filled equipment could be used. These identified companies and institutions were then informed of the reporting requirement.

Although the PCB Notice would provide a qualitative inventory of users, quantitative data was required to adequately account for the numerical distribution of PCB-filled equipment in Canada, and for the quantities of PCB fluid contained in this equipment. It was then decided that the best manner in which to secure this information was through the use of a questionnaire.

A first draft of a PCB questionnaire was prepared by the Environmental Contaminants Division of EPS Ontario Region. The draft was reviewed with other regional offices, the Contaminants Control Branch in

Ottawa, and Statistics Canada. After suitable modifications, a final version was available by June, 1977. The questionnaire was designed to gather information from companies using PCBs in manufacturing or processing activities, and in their physical plant as an electrical equipment dielectic (transformers, capacitors, switchgear) or for other non-electrical applications (hydraulic, heat transfer equipment). Information sought included: the use, type and quantity of PCB at each location, past servicing and maintenance carried out on PCB-containing equipment, disposal practices used for PCB wastes, and an indication as to whether plans had been made to phase out of PCB use.

The PCB questionnaire was distributed throughout Canada by the five regional EPS offices. As noted in Section 2.2, a protracted reporting period occurred because of the numbers of potential users of PCBs, and because of the considerable follow up required to ensure completion of the questionnaire. By late 1979, approximately 14.6 million kilograms (9.7 million litres) were found to be in use in electrical equipment throughout Canada.

## 2.2 Inventory of PCBs in the Pacific and Yukon Region

It was recognized that the bulk of PCB usage would occur in electrical equipment used for power distribution and power factor correction in industrial and institutional facilities. In order to develop a list of potential PCB users, trade association and manufacturers' directories were reviewed as were institutional membership lists for boards of education, hospitals, universities, and institutes of technology. Lists for other potential PCB users, including department stores, dairies, bakeries, shopping centres, office buildings, warehouses, three levels of government, regional districts etc., were also obtained. A total of 49 categories of potential PCB users were developed (Appendix I). Once the company/institution address lists were completed under each category, a complete alphabetical index was established on a word processing system. This approach was used primarily for the British Columbia

inventory; the EPS Yukon District Office developed a limited list which included mines, hospitals, utilities, and Federal Government facilities where the bulk of PCB would be used.

An initial inventory of PCB-filled transformers was obtained by contacting the major suppliers and manufacturers of this equipment. Lists of nation wide transformer sales were provided by EPS Ontario Region who obtained this information from the major transformer manufacturers (Canadian General Electric Co. Ltd., Federal Pioneer Ltd., Ferranti-Packard Ltd., Moloney Electric Co. of Canada Ltd and Westinghouse Canada Ltd.). The major PCB importer (Monsanto Canada Ltd.) also provided a list of customers. These companies provided information for as far back as their records were available. Similarly, the sole transformer manufacturer in British Columbia, B.C. Transformer Co., provided a list of all their customers who purchased PCB-filled transformers.

The national transformer sales list provided detailed but somewhat limited information for British Columbia, although the B.C. Transformer listings were more complete. The total potential users in the 49 categories included approximately 1400 plant and/or company locations. The PCB Notice and Questionnaire were mailed to all these potential PCB users.

Responses to the PCB Notice and questionnaire fell into three categories: a definite PCB usage, no PCB usage, and no reply. Considerable follow-up was required to obtain responses from potential PCB users including reminder letters and many telephone calls. This resulted in a protracted reporting period that extended throughout 1978, 1979 and into 1980.

2.2.1 Use of PCBs in Chemical Products. The questionnaire responses indicated that PCBs were not used in the manufacture of chemicals, paints, caulking compounds, adhesives, plastics, cutting oils, carbon paper, lubricants, hydraulic fluids or printing inks. The only exception was a paint manufacturer who reported using 1,010 kg of Aroclor 1254 between 1960 and 1975. This use was discontinued in 1976.

2.2.2 Use of PCBs in Mechanical Equipment. The only use of PCBs in mechanical equipment occurred in certain bridge bearings and couplings on a tugboat.

PCBs were used as a lubricant in a total of 66 bearings in two City of Vancouver bridges. The lubricant was a mixture of 60% Polar 51, an extreme pressure oil, and 40% Aroclor 1248. The two bridges together contained 7,185 litres of this lubricant mixture with a further 150 litres held in storage. The other mechanical use involved 324 litres of Aroclor 1242 as a lubricant in four Mitsubishi tugboat couplings.

Contact was made with the British Columbia Ministry of Highways and with the three major railroads operating in the province to determine any possible further use of PCB bridge bearing lubricants. PCBs were not used in any other British Columbia bridges.

The fluid from the tugboat couplings was removed in early 1980 and sent to a storage facility in Nisku, Alberta for eventual disposal. PCB bearing lubricants held in storage by the City of Vancouver were disposed of in a similar manner.

Monsanto Canada Ltd. national PCB sales records indicated that one British Columbia mining company had purchased 1,633 kg of Therminol FR-1 in 1971. Therminol FR-1 is a PCB heat exchange fluid and correspondence from the company indicated that it had been used in a molybdenum dryer for approximately one month. At this time Monsanto Ltd. was promoting the phase out of all non-electrical uses of PCBs, and in March 1972 the Therminol FR-1 was replaced with Therminol 55, a non-PCB heat exchange fluid.

The Therminol conversion was done according to the procedure set out in the Monsanto Therminol Conversion Bulletin (Monsanto Ltd, 1971). The PCB-based heat transfer and flushing fluids were sent to the Monsanto incinerator in St. Louis Missouri, and the mining company has not used any heat exchange fluid containing PCBs since March, 1972.

Another B.C. mining company discovered approximately 159 litres of PCB-contaminated fluid also in an old molybdenum dryer heat exchanger.

This unit and its contents were shipped to a PCB storage facility in Nisku, Alberta in December, 1979.

2.2.3 Use of PCBs in Electrical Equipment. A summary of PCB use in electrical equipment as of January, 1980 is given in Table 1. The majority of PCB was contained in electrical transformers (67 percent) and electrical capacitors (32 percent). Four major industrial sectors including pulp and paper, mining and smelting, utilities, and sawmill and lumber operations accounted for 88 percent of the total PCB use. These four industrial sectors also accounted for 76 percent of the total numbers of transformers and 95 percent of the total numbers of capacitors. Utilities accounted for a very high proportion (77 percent) of the total numbers of capacitors in use.

Only limited quantities of PCBs (2,459 litres total) were found in the Yukon Territory. This amount was contained in ten transformers and 86 capacitors. Changes in the amounts of PCBs in use were reported in the PCB inventory update (see Section 2.2.4) but overall PCB use in the Yukon is small compared to British Columbia.

Of all the electrical equipment containing PCBs, electromagnets used to scavange foreign materials from food or animal feed represented the greatest threat to human health. Eleven of these units were found in three grain elevator facilities and one feed mill out of a total of five grain elevator and 22 feed mill facilities. The electromagnets contained a total of 3,101 litres of PCB fluid (Table 1).

Use of PCB-filled electromagnets in food or feed handling facilities is prohibited under Chlorobiphenyl Regulations No.1 amendments of July 1, 1980. Seven electromagnets were removed from service and sent for disposal in 1979 from two Vancouver-area grain elevators. In 1980, arrangements were made to remove the other four magnets in order to comply with the regulations. Two of these electromagnets were located in a lower mainland feed mill, and the other two were used in a grain elevator at Prince Rupert, B.C.

TABLE 1 INVENTORY OF PCB ELECTRICAL EQUIPMENT BY INDUSTRIAL SECTOR IN THE PACIFIC AND YUKON REGION JANUARY, 1980

| INDUSTRIAL SECTOR | TRANSFORMERS | | CAPACITORS | | OTHER ELECTRICAL EQUIPMENT[1c] | | Total Useage (Litres) | Percentage of Total PCB in Use | Top-Up Fluid[1d] in Storage (Litres) | Waste Askarel[1d] in Storage (Litres) |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. of Units | Quantity of PCB in Use (Litres) | No. of Units | Quantity of PCB in Use (Litres) | No. of Units | Quantity of PCB in Use (Litres) | | | | |
| 1 Pulp and Paper Manufacture | 224[1a] | 386,513 | 3,458[1b](1203)[2b] | 22,149[3b] | 4 | 410 | 408,072 | 33.95 | 5,247 | 5,906 |
| 2 Mining and Smelting | 214 | 153,974 | 2,791 (549) | 15,924 | 15 | 2,468 | 172,366 | 14.34 | 819 | |
| 3 Utilities | 104 | 65,091 | 56,638 (130) | 286,706 | 7 | 10,120 | 361,917 | 30.11 | | |
| 4 Sawmills and Lumber Mfg. | 69[2a] | 85,695 | 6,960 (4685) | 34,424 | 17 | 509 | 120,628 | 10.03 | 200 | |
| 5 Cement Manufacture | 51 | 32,640 | 108 (58) | 747 | | | 33,387 | 2.78 | 136 | |
| 6 Hospitals and Educational Facilities | 36 | 14,820 | 68 (50) | 344 | | | 15,164 | 1.26 | | |
| 7 Government Facilities | 23 | 7,369 | 801 (542) | 4,489 | | | 11,858 | 0.99 | | |
| 8 Metal Fabricating and Finishing | 21 | 2,337 | 570 (304) | 3,811 | | | 6,148 | 0.51 | | |
| 9 Grain Elevators | — | — | 266 (15) | 1,077 | 11[2c] | 3,101 | 4,178 | 0.35 | | |
| 10 Brewery and Distilleries | 8 | 7,754 | 140 (126) | 689 | | | 8,443 | 0.70 | | |
| 11 Bulk Loading Facilities | 5 | 3,836 | 119 (88) | 716 | | | 4,552 | 0.38 | | |
| 12 Telecommunications | 4 | 4,727 | 127 (125) | 638 | | | 5,365 | 0.45 | 23 | |
| 13 Food Processing and Dairy | 1 | 423 | 184 (148) | 922 | | | 1,345 | 0.11 | | |
| 14 Chemical and Paint Manufacture | 2 | 1,761 | 682 (148) | 3,653 | | | 5,414 | 0.45 | | |
| 15 Petroleum Refineries | 1 | 830 | 189 (101) | 884 | | | 1,714 | 0.14 | | |
| 16 Other (13 categories) | 32 | 37,556 | 570 (303) | 4,025 | — | — | 41,581 | 3.46 | — | — |
| TOTAL | 794[3a] | 804,326 | 75,671 (8575) | 381,198 | 54 | 16,608 | 1,202,132 | | 6,425 | 5,906 |

1a Two units contain a total of 5,887 liters of PCB contaminated mineral oil.
2a Three units contain a total of 954 liters of PCB contaminated mineral oil.
3a PCB content was not provided in four units. Total number of units identified as containing PCB is therefore 798.

1b Total number of units with known and unknown volumes.
2b Number of units of unknown volume.
3b Total of the known volumes and estimate for unknown volumes. The estimated volumes were calculated from the mean quantity per capacitor derived from all questionnaires where quantities were stated.

1c Other electrical equipment includes electromagnets, rectifiers on electrostatic precipitators, regulators, surge suppressors, and reduced voltage starters.
2c Electromagnets used in food and feed handling facilities.

1d Some of this material may have been disposed of prior to January, 1980.

2.2.4 Update on Use of PCBs in Electrical Equipment. In 1980, a new measure was taken to update the PCB inventory on the amounts in use, in storage for future use or disposal, and on the amounts actually disposed of during the 1978 to 1980 calender years. A PCB storage and disposal questionnaire was developed for the Pacific and Yukon Region and was patterned after an Ontario Region PCB Storage questionnaire sent out in late 1979. The questionnaire and appended computer printout of the original inventory were sent to each user of PCBs in July, 1980 with instructions to correct the computer inventory if required, and to provide information on the amounts of PCBs disposed of, or in storage for future use or disposal.

By July, 1981, 95 percent of the questionnaires had been received and 1.27 million litres were identified to be in use in the Pacific and Yukon Region. The amount of PCB in use in 1981 was somewhat higher than the amount found in the first survey (Table 1). The percentages of use for each industrial sector were similar to the first survey with 89 percent of total use occurring in pulp and paper, electric utility, mining and smelting, and sawmill, plywood, or other wood product industries.

The questionnaires indicated that approximately 21,500 litres of PCBs were in storage for future disposal, 21,700 litres in storage for future use, and 49,000 litres disposed of during 1978 to 1980 (Table 2). Of the amount disposed, electric utilities accounted for 35 percent, forest products industries 27 percent, and 19 percent each for mining and smelting operations and other users of PCBs. Fifty percent of the 49,000 litres disposed of was sent to a secure storage facility at Nisku, Alberta operated by Kinetic Ecological Resource Group Ltd. Forty-eight percent of the same amount was sent to the United States for disposal at a facility in eastern Oregon operated by Chem-Security Systems, Inc. All of the waste shipments to the United States occurred before early 1980 because with the closure of the U.S. border on May 1, 1980 to PCB shipments, this source of disposal was lost.

TABLE 2 INVENTORY OF PCB EQUIPMENT IN STORAGE OR DISPOSED OF FROM 1978 TO 1980 (Pacific and Yukon Region)

| INDUSTRIAL SECTOR | EQUIPMENT NUMBERS | | | | | | | | | PCB QUANTITIES (Litres) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Capacitors | | | Transformers | | | Other[4] | | | | | |
| | SD[1] | SU[2] | D[3] | SD[1] | SU[2] | D[3] | SD[1] | SU[2] | D[3] | SD[1] | SU[2] | D[3] |
| Electric Utilities | 1499 | 227 | 3337 | 1 | | 9 | | | 16 | 6038 | 1089 | 17183 |
| Forest Products | 214 | 213 | 339 | 4 | 6 | 6 | 9 | | 10 | 8791 | 13610 | 13154 |
| Mining and Smelting | 77 | 30 | 71 | 10 | 7 | 32 | 1 | 2 | 2 | 3529 | 3864 | 9448 |
| Other | 140 | 29 | 66 | 9 | 2 | 9 | 1 | | 15 | 3188 | 3123 | 9444 |
| TOTAL | 1930 | 499 | 3813 | 24 | 15 | 56 | 11 | 2 | 43 | 21546 | 21686 | 49229 |

1 Storage for future disposal.

2 Storage for future use.

3 Disposed of during the calendar years 1978 to 1980.

4 Other electrical equipment (eg. electromagnets) and bulk fluids.

Only limited information was available on disposal of PCB equipment during 1981 and 1982 since a disposal questionnaire was not sent to PCB user companies during those years. However, some information on waste PCB equipment shipped from B.C. to Alberta storage facilities was obtained from the EPS Western and Northern Regional Headquarters office. This information showed that waste PCB equipment was still being shipped during 1981 and 1982 to the Kinetics facility, and to a new storage facility operated by D & D Disposal Ltd. at Nisku, Alberta.

As a result of the update questionnaire and additional information received in 1981 and 1982, PCB-filled electrical equipment was identified that was not included in the January, 1980 inventory. For example, the federal interdepartmental inspection program for PCBs in food and feed facilities (see Section 3) identified additional PCB-filled capacitors in the food processing industry. Also, some companies that were not previously contacted by EPS were voluntarily providing information on their use of PCBs. By June, 1982, 1.29 million litres of PCBs were identified to be in use in the Pacific and Yukon Region. Throughout this time, PCB-filled electrical equipment was also being shipped to the Kinetics storage facility in Alberta. Therefore, the new additions tended to offset the removal of equipment to storage so that the PCB inventory has increased somewhat since the original survey.

In the Yukon, transformers were removed from a hospital, mining company, and electric utility (approx. 30 capacitors are still in use at the utility). Four transformers and 20 capacitors (plus seven in storage) are presently in use at one mining company, and an additional four transformers in storage at another. Fourteen electric dredges which operated in the Klondike gold fields were abandoned in 1966. Four PCB-filled transformers were found on one abandoned dredge, but not on the other 11 dredges (two could not be inspected because they were submerged in water.)

As of June, 1982, 89 percent of all PCBs in use were still located in the pulp and paper, electric utility, mining and smelting, and sawmill, plywood, or other wood products industries. The 1.29 million litres was contained in 814 transformers (865,860 litres), 73,412

capacitors (413,293 litres), and 46 bridge bearings containing approximately 6,730 litres. In 1981, the Canadian total of PCBs in use was 15.6 million kilograms (10.4 million litres).

## 2.3 Labelling of Electrical Equipment Containing PCBs

In order to verify the inventory and properly identify electrical equipment containing PCBs, the Environmental Protection Service undertook a major national labelling program of all equipment in the regional inventories. Special black and white labels* were supplied to equipment owners; large 15 x 15 cm labels for application to transformers or drums of PCB liquid, and small 7.5 x 7.5 cm labels for application to small items such as capacitors. Labels are available with and without serial numbers. Those with serial numbers were placed on equipment as described above, and those without were used for placement on entrance ways to electrical rooms, transformer vaults, chain linked areas or storage compounds containing PCB-filled electrical equipment.

The standard national labels were used in the B.C. labelling program. For transformers, each serialized label was cross-referenced with the serial number of the equipment to which it was applied. Computer lists containing information on locations, owners, label and serial numbers, and the quantity of PCB were prepared in order to provide immediate information during emergencies such as building fires or transport accidents (see Appendix II). These lists are also being maintained and updated by the Environmental Protection Service in order to monitor the movement or retirement of equipment from service, and to provide an up-to-date record of PCB use in the region.

*Examples of national PCB identification and warning labels are shown in the Handbook on PCBs in Electrical Equipment.

# 3 ASSESSMENT OF PCB USE

## 3.1 EPS Transformer Inspection Program

In 1978, EPS, Pacific and Yukon Region, received contract money to evaluate and monitor the use of PCBs in electrical equipment in the region. The contract was awarded to Stothert Engineering Ltd. who were to determine the potential for releases of PCBs from electrical equipment in large industries, develop an education program to assist industry in locating and identifying potential hazards, and develop housekeeping procedures for users of PCB-filled electrical equipment.

In order to determine the potential for PCB releases from electrical equipment, an inspection program was devised by the consultant based on information in the EPS PCB inventory questionnaires, and the concentrations of heavy industry in British Columbia. Three major regions in the province were selected for inspection: the Vancouver/lower mainland/Vancouver Island area; Prince George and vicinity; and the Kamloops/south eastern B.C. regions. The major industrial categories inspected included the pulp and paper, sawmill and lumber, mining and smelting, oil and chemical, and cement industries.

Since the inspection program was primarily of a preventative nature, support for these inspections was sought from the various industrial asociations and the provincial government. Contact was made with the Council of Forest Industries of B.C., the Mining Association of B.C., the electric utilities, the Waste Management Branch of the B.C. Ministry of Environment, and the electrical inspector of mines. In general, good cooperation was obtained from industry and the provincial government.

Transformers were assessed according to criteria outlined on a PCB inspection checklist (Appendix III). This visual inspection form was used for each transformer starting with its identity, i.e., the serial number, KVA rating, quantity of PCB, location, and manufacturer. This was done to verify the information contained in the EPS questionnaire. Other

aspects of the transformer condition were then reviewed including: the presence of corrosion on the tank or radiator fins, the presence of structural damage, any leaks or weep of fluid, the presence of alarm systems, the atmospheric condition to which the unit was exposed, the probability of its sustaining mechanical damage due to its location, whether there was an electrical overload problem, and whether a regular inspection program was in place. The use of containment systems, such as dykes around transformers, and storage methods for PCB liquids and wastes were also evaluated.

Transformers were rated according to five degrees of risk of environmental contamination:

i) none - where there was no transformers containing PCB, no storage of PCB, and only small amounts in sealed capacitors that were well protected from mechanical damage.

ii) normal - where all PCB-filled transformers were operating normally, had good containment systems and were properly labelled.

iii) slight - where PCB-filled transformers were not inspected at regular intervals, where a transformer was showing signs of rust, or where stored PCB equipment or wastes were not well identified.

iv) moderate - where defective situations were found that required remedial action. For example where no catch basins had been provided for a transformer and a sudden failure of the tank of the transformer would release large amounts of PCBs.

v) severe - where a transformer was found to be leaking, the leak was not controlled and environmental contamination would result.

3.1.1 Transformer Inspection Results. During 1978-79, Stothert Engineering Ltd. inspected 89 industrial plants which had reported the use of PCB-filled transformers. Twenty-two (22) of these facilities contained transformers that were rated as moderate risks where some form of remedial action was required. After the final inspection report was submitted by Stothert, EPS prepared a plan to inspect the 22 moderate risk facilities and added a few more to the list. During 1979 and early 1980, EPS inspected 25 priority facilities and 17 of these were advised to make improvements. Table 3 shows the numbers and types of facilities inspected by Stothert Engineering Ltd. and EPS. Of the 95 facilities inspected, 23 facilities who reported use of PCB-filled transformers actually had mineral oil units, and therefore were not at risk. Thirty (30) facilities were normal, 14 had a slight risk assessment, and 28 were assessed as being moderate risks. However, in no case was a severe situation found where PCB was actually leaking into the environment or into a sewer system.

In those facilities that were rated as normal or a slight risk, the users of PCB-filled equipment were generally aware of their responsibility for the proper management of this type of equipment. Most had taken some form of containment precautions, such as the placement of metal or concrete catch basins around transformers. Others had constructed a metal tray around a transformer with a pipe leading any spilled liquid to a secure storage tank. Most containment systems were found to be unpainted and both Stothert and EPS recommended that exposed concrete and metal surfaces be painted with epoxy or urethane paint to make clean-up easier. Application of a PCB resistant paint would also prevent rusting of metal surfaces and penetration of PCBs into concrete. Spare transformers containing PCBs were generally not as well protected as energized units. They were also more likely to be subject to atmospheric corrosion and infrequently inspected. Storage of contaminated materials or liquid PCBs was not found to be a problem. These materials were stored in separate locked buildings. Finally, labels issued by EPS had been

TABLE 3 TYPES OF INDUSTRIAL AND COMMERCIAL FACILITIES INCLUDED IN THE PCB TRANSFORMER INSPECTION PROGRAM (1978 to 1980)

| TYPE OF FACILITY | TOTAL NUMBER INSPECTED |
|---|---|
| Sawmill and Lumber Operations | 28 |
| Pulp and Paper Mills | 12 |
| Mining and Smelting Operations | 21 |
| Cement Plants | 4 |
| Food Processing Plants | 4 |
| Institutions (Schools, Hospitals) | 11 |
| Office Complexes | 3 |
| Hydroelectric Facilities | 1 |
| Petroleum Refineries and Chemical Plants | 2 |
| Miscellaneous (Electrical, Metal Fabricators, etc.) | 9 |
| TOTAL | 95 |

effectively applied to transformers. Some of the larger companies had also applied their own large notices with instructions on clean-up of fluid leaks from transformers. Although capacitors were not included in the inspection program, the consultant did note during his inspections that capacitors were well protected mechanically (except on mining shovels) and some had containment systems - particularly where a large number of capacitors were grouped in one location.

A list of remedial actions that were required on moderate and slight risk PCB-filled transformers is shown in Table 4. Provision of containment around transformers was the single largest problem requiring remedial action. The most critical installation in the moderate category was a transformer located over the swing portion of the CNR railway bridge over Second Narrows, Burrard Inlet. The transformer was an old oil filled unit which apparently had been retrofilled with PCBs. The transformer was rusted and unprotected from the weather, had no containment, and sat directly over Burrard Inlet. There was also evidence of weeping, but no actual leaks from the tank or radiator fins. The transformer was removed in March, 1980 and shipped to the Kinetic Ecological Resource Group facility in Nisku, Alberta. For the other moderate risk transformers, specific recommendations were forwarded in writing to individual plant or institutional managers. These recommendations were generally complied with and remedial actions were undertaken.

The Yukon District Office of EPS also conducted inspections of PCB-filled electrical equipment. In 1979, three mining operations (two in the Yukon and one in northern B.C.) were inspected. Remedial actions that were recommended included provision of concrete dykes around transformer pads, sealing of concrete surfaces with a PCB resistant paint, containment provisions under capacitor banks, and storage of spare capacitors in such a manner so as to prevent accidental physical damage. The general hospital in Whitehorse was also advised during 1979 to construct concrete dykes around transformer pads and seal the concrete surfaces with a PCB resistant paint.

TABLE 4 LIST OF REMEDIAL ACTIONS REQUIRED ON MODERATE AND SLIGHT RISK PCB-FILLED TRANSFORMERS

| TYPE OF REMEDIAL ACTION REQUIRED | NUMBER OF PLANTS WHERE PROBLEM WAS FOUND[1] |
|---|---|
| Labelling of transformers | 9 |
| Containment around transformers | 30 |
| Protection of transformers from corrosion, rust | 4 |
| More secure storage for equipment, wastes | 6 |
| Install concrete floors in transformer rooms and paint | 3 |
| Paint concrete floors in transformer rooms | 9 |
| Install alarm systems on transformers | 1 |
| Seal-off transformer area from plant (eg. door curbs in transformer rooms) | 12 |
| Physical protection of transformers | 2 |
| Disposal of top-up fluid | 3 |
| Repair transformer leaks | 7 |
| Remove transformer from an environmentally sensitive area | 1 |

[1] Many plants had more than one type of problem. Therefore, number of incidences is greater than the total number of plants in the moderate and slight risk categories.

Recent (1982) investigations at one Yukon mining company indicated that four PCB-filled transformers identified in 1979 were still being stored on an open concrete pad with no safety berm and exposed to the weather. The pad is adjacent to a roadway and unprotected from straying vehicles. Klondike dredges were also inspected during 1982 and on a dredge where four PCB-filled transformers were found (vide. p.11), three had been covered in ice. The fourth transformer was in a steel housing on the boat deck. A small quantity of PCB oil had leaked out and puddled on the steel floor, but was contained in the housing by a raised steel lip. The Yukon District Office of EPS made arrangements with the owner during August, 1982 for removal of the PCB transformers from the abandoned dredge.

## 3.2 Federal Interdepartmental PCB Inspection Program

In early 1981, an agreement was reached among Assistant Deputy Ministers in Health and Welfare, Agriculture, Fisheries and Oceans, and Environment Canada to participate in a federal interdepartmental program designed to investigate potential hazards from the use of PCB-equipment in food, feed, and grain handling facilities. In recent years there have been several cases throughout the world where food or feed had become contaminated from accidentally discharged and inadequately contained PCB fluids. It was therefore decided that all food and feed processing plants and grain handling facilities in Canada which are subject to federal inspection would be investigated.

The Environmental Protection Service (EPS) of Environment Canada was given the responsibility for developing the inspection program, and for providing instruction to federal inspectors in Health and Welfare, Agriculture, and Fisheries and Oceans Canada who may not be familar with the PCB problem. Since all inspections were to be conducted by these federal inspectors as part of their normal activities, it was first necessary to conduct a training program. A simple inspection form and a set of guidelines for conducting a PCB equipment inspection, and

instructions for completing the inspection form were developed by the Contaminants Control Branch, EPS, Ottawa.

In late 1981, training seminars were held at various centres across Canada for the regional inspectors. These seminars were meant to familarize the federal inspectors with PCB-filled electrical equipment, and to evaluate the condition of the equipment, its maintenance, and measures that may be in place for early detection and control of leaks. In the Pacific and Yukon Region, a target date of June, 1982 was set to complete an initial PCB equipment inventory and evaluation in plants inspected by the regional Agriculture, Fisheries, and Health and Welfare inspectors. Inspections continued, however, into late 1982.

A plant evaluation form, shown in Appendix IV, was completed for each food and feed facility inspected. The inspector evaluated the numbers and type of equipment found to contain PCBs and provided an appraisal of the hazard potential of the PCB equipment. The assessment of hazard included an assessment of the conditions of the equipment, i.e. checking for physical damage and any leakage or weeping of PCBs, an assessment for the potential for contamination, i.e. checking whether any leakage would result in either direct or indirect contamination of a company's product, and an assessment of measures implemented by the company for early detection and control of leaks. The latter includes regular company inspection of equipment and preventative measures such as installation of drip trays or catch basins under capacitors.

3.2.1 Electrical Equipment Inspection Results. Tables 5 and 6 summarize the inspection results received from the federal inspectors as of December 1, 1982. Four hundred and ninety-three capacitors and four transformers were identified in 65 food and feed plants. Nearly all of this equipment was reported to be in good physical and operating condition. A total of 118 plants did not contain PCB equipment. Of the 65 pland containing PCB equipment, 57 plants had PCB equipment located in areas with no potential for contamination of food or feed products, and 20 plants had PCB equipment located in areas with either direct or indirect

TABLE 5 SUMMARY OF PLANT INSPECTIONS FOR PCB EQUIPMENT WITH NO POTENTIAL FOR CONTAMINATION OF FOOD OR FEED PRODUCTS[1]

| NO. OF PLANTS | | EQUIPMENT NUMBERS | LOCATIONS IN PLANTS | CONTROL MEASURES | |
|---|---|---|---|---|---|
| No PCB Equipment | PCB Equipment Present | | | No. of Plants | Description |
| 118 | 57[4] | 443(c)[2] | boiler room, engine room | 24 | none |
| | | 4(T)[3] | transformer room, compressor room | 24 | visual inspections |
| | | | evaporator plant, labelling warehouse, acidulation plant, rice mill, electrical vault, motor control centre, electrical substation, main power room, switchroom, powerhouse, block room, distribution room, storage room, millwright's room, warehouse | 9 | drip trays/ catch basins |

1 Information received as of December 1, 1982.

2 Capacitors

3 Transformers

4 Some plants also had equipment with indirect or direct contamination potential.

TABLE 6 SUMMARY OF PLANT INSPECTIONS FOR PCB EQUIPMENT WITH EITHER DIRECT OR INDIRECT POTENTIAL FOR CONTAMINTION OF FOOD OR FEED PRODUCTS[1]

| NO. OF PLANTS | EQUIPMENT NUMBERS | LOCATIONS IN PLANTS | CONTROL MEASURES | |
|---|---|---|---|---|
| | | | No. of Plants | Description |
| 20[3] | 50(c)[2] | - wall mounted in food processing area | 8 | none |
| | | - floor mounted in food processing area | 7 | visual inspections |
| | | - on ceiling of fish kitchen | 5 | drip trays/catch basins |
| | | - floor mounted above shipping area | | |
| | | - outside yellow drier room | | |
| | | - room over area of herring carcass reduction | | |
| | | - in tally room | | |
| | | - passageway near food processing area | | |
| | | - in room with porous wall, wooden floor over food processing area | | |
| | | - adjacent to flour mix packaging equipment | | |
| | | - in wiener line smokehouse | | |
| | | - electrical room adjacent to feed premixes and vitamin additives | | |
| | | - wall mounted in egg grading area | | |
| | | - wall mounted near plant packing material | | |
| | | - leakage in storage room would contaminate containers used for plants products | | |
| | | - near product loading dock | | |
| | | - in hall adjacent to food processing area | | |

1 Information received as of December 1, 1982
2 Capacitors
3 Some plants also had equipment with no contamination potential

contamination potential. (Note: some plants had more than one type of contamination potential. Therefore, the total number of incidences of contamination potential is greater than the number of plants containing PCB equipment).

Plants with no potential for contamination of food or feed products typically had their PCB equipment located in transformer rooms, boiler and engine rooms, electrical substations, motor control centres, or storage rooms (Table 5). These facilities were well removed from food processing areas and fortunately accounted for the majority of plants and PCB-filled equipment. Only nine of the 57 plants had taken preventative measures for control of PCB leaks such as installation of drip trays or catchbasins under capacitors.

Relatively few facilities were found to be at risk from PCB contamination. However, plants with either direct or indirect potential for contamination of food or feed products typically had capacitors mounted in or near food processing areas, adjacent to packaging or grading areas, or located in storage rooms where leakage could contaminate food products or their containers (Table 6). A meeting was convened in November, 1982 with the supervisors of the federal inspectors to discuss remedial actions that should be taken at these plants. It was concluded that a further evaluation of "at risk" equipment would be required, and that follow-up inspections by an EPS inspector would better determine which pieces of equipment would require attention. It appeared that "at risk" equipment would either have to be relocated within the plant and drip trays or catch basins installed for further protection, or the PCB capacitors would have to be removed and replaced with non-PCB filled equipment also with appropriate protection to contain leaks.

The Environmental Protection Service will be conducting the follow-up inspections in late 1982 and early 1983 to ensure that proper remedial measures are undertaken for "at risk" equipment. Only five of the 20 plants with problem equipment had taken any preventative measures for control of PCB leaks, so further measures such as those outlined previously appear to be required.

3.3 Other Inspection Programs

A number of provincial government Ministries and the Workers' Compensation Board are also involved in inspecting or otherwise managing PCB equipment in British Columbia.

3.3.1 Ministry of Environment. The Waste Management Branch of the Ministry of Environment has been actively involved in the investigation of PCB spills at industrial facilities throughout the province. They have also been involved with disposal of PCB wastes from B.C. industry by ensuring these wastes are containerized and properly transported to disposal facilities.

A hazardous waste list, designating hazardous concentrations and amounts of numerous chemicals including PCBs, has been prepared in connection with the new Waste Management Act. This Act will require a manifest for off-site disposal of designated hazardous wastes, and in this respect will conform with the Federal Transportation of Dangerous Goods Act Regulations.

3.3.2 Ministry of Energy, Mines, and Petroleum Resources. Mines Inspectors in the Inspection and Engineering Branch, Mineral Resources Division of the Ministry of Energy, Mines, and Petroleum Resources regularly inspect PCB equipment at mining operations in their District. The installation or re-installation of equipment containing PCBs is controlled by the approval system of this Branch which requires notification of all electrical installations by mines and quarries operating in the province.

In the event of a PCB spill at a minesite in the province, the operation has been instructed to notify the District Inspector of Mines who would immediately notify the Waste Management Branch regional office in the area and co-ordinate any clean-up operations.

3.3.3 Ministry of Labour. New occupational environment regulations governing the labelling of hazardous industrial and

institutional chemicals are under development by the Occupational Environment Branch of the Ministry of Labour. These regulations are being developed in cooperation with the federal department af Consumer and Corporate Affairs through a federal/provincial task force. This labelling program may result in additional information, of a personal precautionary nature, being provided in addition to the present national label used on PCB-filled electrical equipment.

The Electrical Safety Branch of the Safety Engineering Services Division of the Ministry of Labour administers the Regulations under the Electrical Energy Inspection Act. These Regulations prohibit the installation of uncertified or unapproved equipment. As there is now no newly certified or approved electrical equipment containing PCBs in Canada, the enforcement of these regulations prevents the installation of new PCB-filled electrical equipment in the Province of British Columbia.

A major fraction of the existing electrical PCB equipment is presently in use in large industrial complexes such as pulp and paper mills, sawmills, mines and smelters. With the exception of the mines, which are inspected regularly by the Electrical Inspection Branch of the Ministry of Mines, nearly all of these large complexes carry an Annual Electrical Permit, which provides for ongoing maintenance and a limited expansion of the electrical system. Each site is visited at least once a year by an inspector of the Electrical Safety Branch, who during that visit, inspects PCB-filled equipment.

3.3.4 Workers' Compensation Board of B.C. The Workers' Compensation Board is presently enforcing regulations on worker exposure to PCBs pursuant to sections 12 and 13 of their Industrial Health and Safety Regulations. An Administrative Instruction has been issued to their inspectors which deals with the hazards of PCBs, and the handling and containment procedures required to prevent worker exposure.

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# APPENDICES

APPENDIX I RECIPIENTS OF CANADA GAZETTE NOTICE ON PCBs AND PCB QUESTIONNAIRE

| | USER CATEGORY |
|---|---|
| 1 | Airlines |
| 2 | Breweries/Distilleries/Soft Drink Manufacturers |
| 3 | Bulk Loading Facilities/Docks |
| 4 | Bakeries |
| 5 | Cold Storage Facilities |
| 6 | Cement/Concrete/Rock Products Manufacturers |
| 7 | Chemical/Paint Manufacturers |
| 8 | Caulking, Adhesives, Plastics, Cutting Oil Distributors |
| 9 | Carbon Paper Distributors |
| 10 | Construction Co. and Materials |
| 11 | Department Stores |
| 12 | Dairies |
| 13 | Door Manufacturers |
| 14 | Electrical Servicing and Manufacturing Companies |
| 15 | Electrical Contractors |
| 16 | Food Processing and Distribution Companies |
| 17 | Fish Packers |
| 18 | Furniture Manufacturers |
| 19 | Grain Elevators |
| 20 | Glass Manufacturers |
| 21 | Heat Exchange Equipment Distribution |
| 22 | Heavy Equipment Dealers and Manufacturers |
| 23 | Hospitals |
| 24 | Lubricant and Hydraulic Equipment Distributors |
| 25 | Meat Packers |

| | USER CATEGORY |
|---|---|
| 26 | Mining Companies |
| 27 | Municipal, Provincial, Federal Gov'ts |
| 28 | Office Buildings |
| 29 | Pulp and Paper Companies |
| 30 | Petroleum Refineries |
| 31 | Platers |
| 32 | Printing Ink Users and Producers |
| 33 | Railways |
| 34 | Resorts |
| 35 | Smelters and Foundries |
| 36 | Schools, Universities, Institutes |
| 37 | Shopping Centres |
| 38 | Sawmills and Lumber manufacturers |
| 39 | Steel and Can Fabricators and other Metal Producers |
| 40 | Shipyards |
| 41 | Spring Manufacturers |
| 42 | Telephone, Telecommunications, Radio, TV Companies |
| 43 | Tug and Barge Operators |
| 44 | Transmission (Oil and Gas Pipelines) Companies |
| 45 | Utilities |
| 46 | Waste Oil and Scrap Metal Dealers |
| 47 | Vacuum Pumps Distributors and Manufacturers |
| 48 | Wire Manufacturers |
| 49 | Warehouses |

APPENDIX II EXAMPLE OF COMPUTER PRINTOUT OF THE PCB INVENTORY

Company : Address : City : Date : 9/11/81

Chemical : Chlorinated Hydrocarbons - PCB

| Equipment | Number | Volume (liters) | Location | Serial Numbers | | Label Numbers | |
|---|---|---|---|---|---|---|---|
| transformer | 1 | 1142.0 | LAGOON SWITCH ROOM | 287111 | - | 20854 | - |
| transformer | 1 | 1142.0 | PUMPHOUSE | 287231 | - | 20853 | - |
| transformer | 1 | 1812.0 | STEAM PLANT | 287260 | - | 20833 | - |
| transformer | 1 | 1142.0 | STEAM PLANT | 287259 | - | 20834 | - |
| transformer | 1 | 1142.0 | CAUSTIC PLANT | 287258 | - | 20832 | - |
| transformer | 1 | 1812.0 | WOODMILL | 287262 | - | 20857 | - |
| transformer | 1 | 2492.0 | WOODMILL | 287113 | - | 20856 | - |
| transformer | 1 | 1812.0 | WOODMILL | 287190 | - | 20855 | - |
| transformer | 1 | 1812.0 | PULP MILL | 287112 | - | 20835 | - |
| transformer | 1 | 1812.0 | PULP MILL | 287265 | - | 20836 | - |
| transformer | 1 | 2129.0 | PULP MILL | 287268 | - | 20837 | - |
| transformer | 1 | 1812.0 | PULP MILL | 287949 | - | 20838 | - |
| transformer | 1 | 1812.0 | STOCK PREP | 287263 | - | 20839 | - |
| transformer | 1 | 2129.0 | STOCK PREP | 287269 | - | 20840 | - |
| transformer | 1 | 2129.0 | STOCK PREP | 287270 | - | 20841 | - |
| transformer | 1 | 2129.0 | STOCK PREP | 287734 | - | 20842 | - |
| transformer | 1 | 1450.0 | PAPER MILL | 287271 | - | 20843 | - |
| transformer | 1 | 1450.0 | PAPER MILL | 287272 | - | 20844 | - |
| transformer | 1 | 1812.0 | PAPER MILL | 287264 | - | 20846 | - |
| transformer | 1 | 1540.0 | PAPER MILL | 287266 | - | 20845 | - |
| transformer | 1 | 1450.0 | PAPER MILL | 287274 | - | 20848 | - |
| transformer | 1 | 1450.0 | PAPER MILL | 287273 | - | 20847 | - |
| transformer | 1 | 1812.0 | PAPER MILL | 287371 | - | 20849 | - |
| transformer | 1 | 1540.0 | PAPER MILL | 287267 | - | 20850 | - |
| transformer | 1 | 1142.0 | CHIP SCREENING | 287948 | - | 20851 | - |
| transformer | 1 | 1142.0 | WATER TREATMENT | 288005 | - | 20852 | - |
| transformer | 1 | 1812.0 | LOW DENSITY BLDG. | 287261 | - | 20860 | - |
| transformer | 1 | 2129.0 | LOW DENSITY BLDG. | 287372 | - | 20858 | - |
| transformer | 1 | 1450.0 | LOW DENSITY BLDG. | 287373 | - | 20859 | - |
| transformer | 1 | 93.2 | CAPACITOR BANK | 5271/1 | - | 5636 | - |
| capacitor | 135 | 1224.0 | CAPACITOR BANK | | - | 5599 | - 5733 |
| capacitor | 3 | 45.0 | #3 STORES | | - | 5734 | - 5736 |
| other | 1 | 410.0 | MAKE-UP FLUID | | - | | - |
| | | 50211.2 | | | | | |

APPENDIX III PCB TRANSFORMER INSPECTION CHECKLIST



# PCB INSPECTION CHECKLIST

DATE _____

COMPANY NAME _____

ADDRESS _____

_____

_____

PRINCIPLE BUSINESS _____

PERSON CONTACTED _____ PHONE NO. _____

AND TITLE _____

1. CHECKLIST SUMMARY:

1.1 EPS questionnaire was completed accurately. None _____ Yes _____ No _____

1.2 Immediate attention required:

- Transformer Condition Yes _____ No _____

- Contingency Plans Yes _____ No _____

- PCB Storage Yes _____ No _____

- PCB Escape Routes Yes _____ No _____

APPENDIX III CONTINUED

PAGE _____

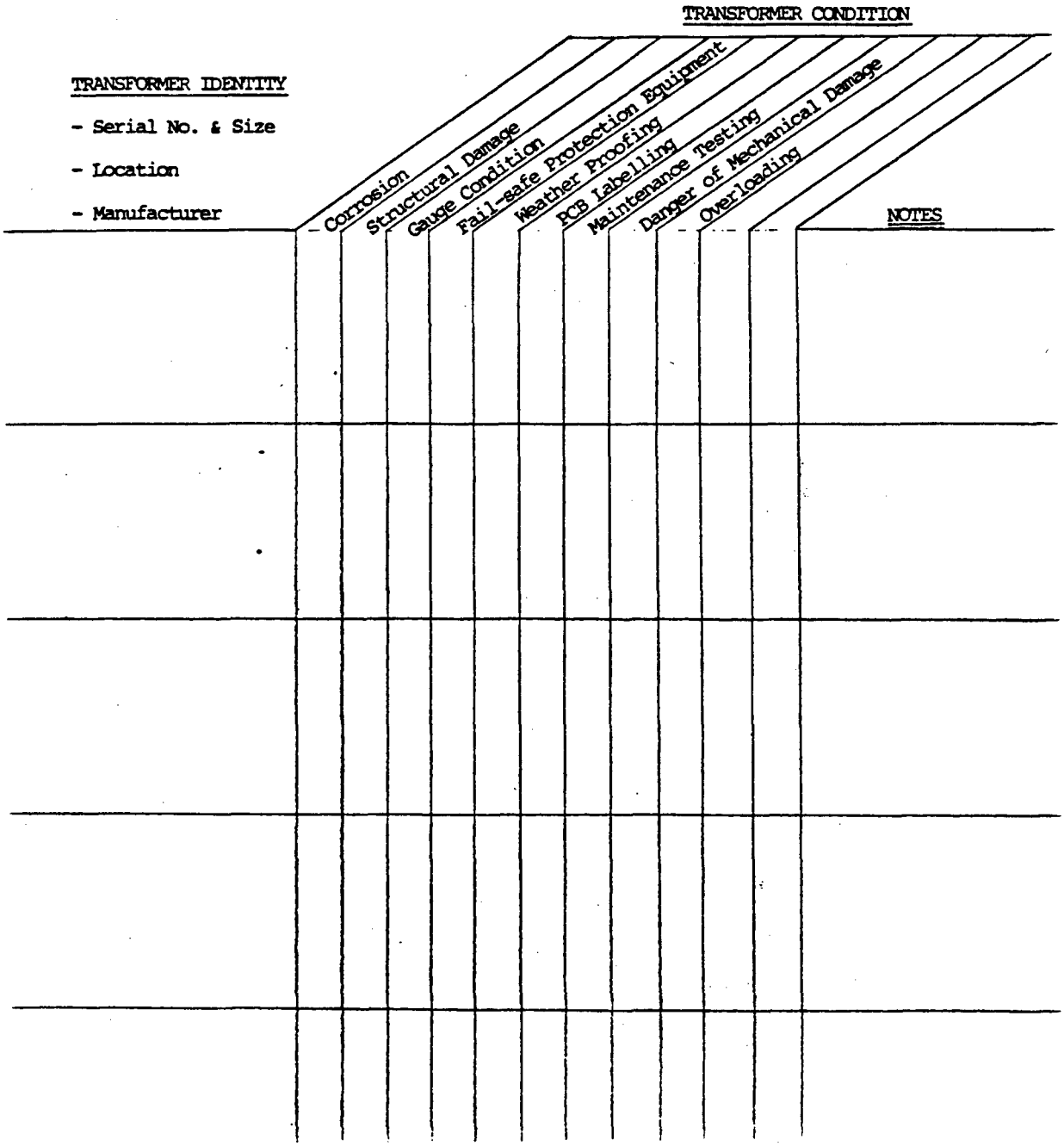
2. VISUAL INSPECTION - TRANSFORMER CONDITION

Degree of Hazards:
(Write appropriate number in column to indicate degree of hazard)

1 - Minimal (if any)

2 - Potential Hazard (Attention Required Soon)

3 - Serious Hazard (Attention Required Immediately)



APPENDIX III CONTINUED

PAGE _____

3. VISUAL INSPECTION - CONTINGENCY PLANS

Suitability of Method: (Circle one in each case)

0 - Not Used
1 - Suitable
2 - Marginal
3 - Not Acceptable

| METHOD | SUITABILITY OF METHOD | | | | NOTES |
|---|---|---|---|---|---|
| Catch Basins | 0 | 1 | 2 | 3 | |
| Concrete Dikes | 0 | 1 | 2 | 3 | |
| Sandbag Dikes | 0 | 1 | 2 | 3 | |
| Splash Walls | 0 | 1 | 2 | 3 | |
| Drain Plugs | 0 | 1 | 2 | 3 | |
| Alarm Systems | 0 | 1 | 2 | 3 | |
| Scheduled Inspections | 0 | 1 | 2 | 3 | |

POSSIBLE REASONS FOR UNSUITABILITY OF ANY OF THE ABOVE METHODS

Place appropriate letter in Notes column.

A Container materials will react with PCB.

B Container system in need of repair.

C Container system undersized.

D Grouting insufficient to prevent leaks.

E Inspections too infrequent or inadequate.

APPENDIX III CONTINUED

PAGE _____

4. VISUAL INSPECTION - STORAGE METHODS

Suitability of Method: (Circle one in each case)
0 - None Stored
1 - Suitable
2 - Marginal
3 - Not Acceptable

| PCB MATERIAL (DETAIL) | SUITABILITY OF METHOD | | | | NOTES |
|---|---|---|---|---|---|
| Topping-Up Liquid | 0 | 1 | 2 | 3 | |
| Liquid Wastes | 0 | 1 | 2 | 3 | |
| Solid Wastes | 0 | 1 | 2 | 3 | |
| Spare Equipment | 0 | 1 | 2 | 3 | |

POSSIBLE REASONS FOR UNSUITABILITY OF ANY OF THE ABOVE METHODS

Place appropriate letter in Notes column.

A Clean-up materials and solvents not handy.
B Containers not appropriate.
C Handling is careless.
D Inspections inadequate.
E Labelling inadequate.
F Location poor - mechanical damage possible.
G Location poor - PCB escape routes nearby.
H Security to area poor.
I Weather protection inadequate- danger of water runoff.

APPENDIX III CONTINUED

PAGE _____

5. VISUAL INSPECTION - PCB ESCAPE ROUTES

Detail most likely escape routes of PCB into water systems, sewers (or atmosphere) from equipment in service or in storage.
Detail the quantities of PCB involved.

EQUIPMENT IDENTITY

- Serial No. & Size
- Location
- Manufacturer

ESCAPE ROUTES

# APPENDIX IV PLANT EVALUATION FORM FOR PCBs

Environment Canada / Environnement Canada
Environmental Protection / Protection de l'environnement

**PLANT EVALUATION FOR PCBs**
**EVALUATION D'USINE POUR LES PCB**

Company - Compagnie | Address - Adresse | Plant manager - Directeur d'usine | Tel. No. - N° de tél.

1. Type of equipment found to contain PCBs (If none, please check) ☐
   Type d'équipement contenant des PCB (S'il n'y en a pas, cocher ici)

| Type | Manufacturer Fabricant | Serial number N° de série | Type of fluid Type de liquide | Location of equipment Endroit où se trouve l'équipement | EPS label number N° d'étiquette SPE |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

2. Appraisal of the hazard potential of PCB equipment – Evaluation des risques présentés par l'équipement contenant des PCB
   a. Condition of equipment - Etat de l'équipement
   b. Potential for contamination - Possibilité de contamination (fuite)
   c. Measures implemented by the company for early detection and control of leaks - Mesures prises par la compagnie pour déceler rapidement et arrêter les fuites

3. Discussion with management following inspection – Discussion avec la direction après l'inspection
   a. Has the company identified an official who is responsible for responding to PCB problems? Yes ☐ No ☐ Name:
      La société a-t-elle chargé un cadre de s'occuper des problèmes de PCB, s'il s'en présente? Oui ☐ Non ☐ Nom:
   b. Does the company have a prepared plan of action for responding to PCB emergencies? Yes ☐ No ☐
      La société dispose-t-elle d'un plan pour faire face aux urgences mettant en jeu des PCB? Oui ☐ Non ☐
   c. Awareness of and degree of concern toward PCBs
      Perception et degré de préoccupation à l'égard de PCB

4. Was EPS notified by telephone of any unsatisfactory condition noted? Yes ☐ No ☐ Name:
   A-t-on signalé au SPE toute situation non satisfaisante? Oui ☐ Non ☐ Nom:

Inspector - Inspecteur | Agency - Organisme | Location - Région | Date of inspection - Inspection faite le

04-1145 (06/81)

EPS/SPE