



PCB reduction plan for the Severn Sound area March 31, 2008

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FOREWORD

This Report was prepared for Environment Canada and provides information on ambient levels of PCBs and for the purpose of assessing the potential to virtually eliminate PCBs from the Severn Sound ecosystem. Although the report received technical review, this does not necessarily mean that the contents reflect the views and policies of Environment Canada or the Severn Sound Environmental Association.

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Introduction

Polychlorinated biphenyls (PCBs) are a class of chlorinated, aromatic compounds which have had widespread use because of their general stability, their low flammability and their electrical insulating properties. Due to their very slow degradation rates, PCBs are persistent in the environment. Their widespread uses included: dielectric fluids in capacitors and transformers; in hydraulic and lubricating oils; fire retardants, heat transfer equipment, plasticizers (adhesives, textiles, surface coatings, sealants, printing, copy paper). Because of evidence regarding the hazards associated with the use of PCBs, sales and uses were restricted starting in 1971. Production of PCBs was discontinued since the mid-1970s.

Despite the cessation of their manufacture, PCBs may be present in older (<1982) electrical equipment such as ballasts, capacitors and transformers that are in use today. The Great Lakes Bi-national Toxic Strategy (GLBTS) has identified PCBs as a Level I substance for virtual elimination. The Canadian Challenge has been to seek a 90% reduction of high-level PCBs (>1percent PCB content in the oils) that were once or are currently in service and accelerate the destruction of stored high-level PCB wastes which have the potential to enter the Great Lakes Basin. As of April 2004, approximately 88% of Ontario's high-level PCB wastes in storage had been destroyed compared to 1993(GLBTS 2004).

Many of the electrical service providers are undertaking programs to reduce PCBs in in-service equipment and to remove waste PCB oils and out-of-service equipment to temporary storage sites for ultimate destruction by licensed PCB contractors. There is, however, little incentive to remove in-service equipment that contains PCBs. The equipment is durable and has a service life of up to 50 years which can be extended up to 50% through retrofitting. Other potential sources of PCBs to the environment include landfill sites, old industrial sites where major electrical or cooling equipment was used prior to Regulations or atmospheric sources.

The purpose of this section is to bring together the background information on PCB use and ambient levels in the Severn Sound area in support of a PCB reduction strategy.

Legislation

Electrical Equipment

Canada has taken steps through the Canadian Environmental Protection Act (CEPA 1988, CEPA 1999, Chlorobiphenyls Regulations) to minimize exposure to and environmental releases of PCBs. These regulations prohibit the manufacture, sale, and import of PCBs, restrict their use to specified equipment that was manufactured and imported into Canada prior to 1977 and 1980, and specify requirements in relation to the storage of PCBs, and the federal destruction of PCB wastes. The current regulations do not include an obligation to end the use of PCBs that are currently in use, or to destroy those in storage.

The existing regulations deal with “high level” PCB equipment which has PCB concentrations greater than 500 mg/kg (ppm). In-service use of equipment containing PCBs represent a potential source of PCBs to the environment, especially in close proximity to locations where exposure to the population is highest risk such as schools, hospitals, surface water and sources of drinking water (termed “sensitive locations”).

A new federal regulation has been proposed to reduce risks posed by the use, storage and releases of polychlorinated biphenyls (PCBs) and to accelerate their elimination. The proposed legislation will continue to regulate manufacture, sale and import of PCBs and to restrict their use in equipment but will also include requirements to end the use of, and end the storage of PCBs in products (including electrical equipment) by specified deadlines. Stakeholder consultation on the revised PCB regulations, started in 2002. The revised regulations are pending. The potential end use deadlines for in-service equipment should result in a stepped reduction in PCB concentrations to less than 50 mg/kg by 2009 if Severn Sound is considered a “sensitive area” under the legislation. Removal to new product levels of less than 2 mg/kg would be required by 2025.

Provincial Legislation for PCB Storage Sites in Ontario is administered under Ontario Regulations 362 (PCB waste management) and 347 (General Waste Management) of the Environmental Protection Act R.R.O. 1990. Historically, wastes stored at temporary storage sites operated by the utilities have been broadly classified as PCB wastes. In an effort to better manage these sites and in order to ultimately decommission and close these sites, wastes are being re-evaluated, with the operator of the site required to provide proper characterization (with representative sampling and testing) and tracking of permanent disposal of PCB wastes and non-hazardous wastes (OMOE, 2000).

In Ontario, a concerted effort was being made by electrical service providers to change out electrical capacitors and transformers containing high level PCBs (>500 mg/kg) and to replace the equipment with fluids containing (<50 mg/kg PCBs) in anticipation of changes in regulations. The effort to inventory the in-service equipment for PCBs has continued in the Severn Sound area by local service providers and Hydro One. The goal of most providers is to eliminate the use of equipment with fluids containing greater than 50 mg/kg PCBs through gradual replacement of older equipment or with concerted efforts as resources allow.

Old out-of-service equipment and waste PCB oils are being stored at licensed “Temporary Storage Facilities” (under Ontario Environmental Protection Act R.R.O. 1990, Reg. 362). In addition to decommissioned electrical equipment containing PCB oils, material from decommissioning of contaminated equipment such as soil, rocks, concrete/asphalt, wood, electrical cables, liquid/sludge materials, light ballasts and capacitors is removed to temporary storage sites for disposal and destruction. Detailed procedures for sampling are identified for various materials going into Temporary Storage Sites and the storage containers themselves has been detailed by OMOE (2000). The protocol for the decontamination of transformers containing PCB contaminated oils is provided in CCME (1995). The number of storage sites is decreasing as the stored

PCB wastes are transported for destruction and the sites are decommissioned through the Ontario Ministry of the Environment.

Brownfields

Other than the in-service use of older electrical equipment that may contain PCBs, the former widespread use of PCBs and their persistence has left a legacy of low-level PCB contamination at old industrial sites, rail and road corridors and old landfill sites. There are guidelines for soil levels of PCBs (CCME 2005) and procedures for assessing the risks involved in using sites that are found to contain elevated concentrations of PCBs.

Lands on which industrial or commercial activity took place in the past and that may need to be cleaned up before they can be redeveloped are termed “brownfields”. These sites may have had contaminant spills or residual buried materials and represent a potential source of contaminants (including PCBs) which may affect future use of the site or may leave the site via surface or groundwater. In order to redevelop an industrial site, especially if it is to be used for a more restrictive use, such as for residential property, the owner must assess the property to demonstrate that the site meets appropriate soil, sediment and groundwater standards. Protection from future environmental cleanup orders for property owners is contingent upon documentation known as a record of site condition (RSC) being filed in the Environmental Site Registry. The Record of Site Condition Regulation (O. Reg. 153/04) details requirements related to site assessment and clean up. The technical document referenced by this regulation provides applicable site condition standards (MOE 2004). PCB concentrations for background conditions of soil, ground water, and sediment for all types of property use are contained in the standards. The most restrictive standard is for sediment (0.07 ug/g) and reflects the sensitivity of PCB contamination of water. Records of site conditions that are within 30m of a water body (stream, river, pond or lake) must meet the standards for background quality (Table 1 of MOE 2004). This is to allow additional dispersion of ground water from a site prior to discharge to surface water. Other standards for soil in various land uses and for ground water are provided to guide the assessment of old industrial sites (MOE 2004). If the site does not meet these standards, a site specific risk assessment may be required, which will guide site cleanup.

Ambient levels of PCBs from various media in Severn Sound

The concentrations of persistent contaminants in aquatic biota and sediments are contributed by general (regional or global) sources and/or local sources. On the scale of the Severn Sound area, it is important to establish the presence of any active local sources of contaminants and to control them. If local sources of PCBs are present, they may bioaccumulate to elevated concentrations in fish and wildlife, causing direct effects on the wildlife or render the fish contaminated for human consumption. Localized biomonitoring and assessment of sediment concentrations to suggest the presence or location of active sources is a commonly used approach to determine active sources of PCBs that may be present in trace or undetectable amounts in water samples from

discharges. In the absence of any local sources, the concentrations of PCBs in the aquatic environment should reflect the general pattern for the regional populations. In order to determine the status of PCB contamination in Severn Sound, the trends in contaminant concentrations in sport fish, other organisms such as birds eggs, mussels, young-of-the-year fish and sediment were used.

Various media have been sampled included open and tributary water, deposition sediment, biosolids, sport fish tissues (especially walleye for mercury and carp for organochlorine chemicals), young-of-the-year fish (including spottail shiners, blunt-nosed minnows or sand shiners) and other biomonitors (water bird eggs, mussels) (see SSRAP Stage 3 Report, Sherman, 2002).

PCB concentrations in sediment have been near or below the detection limit of the test for all Severn Sound deposition sediments (Table 6 from SSRAP Stage 2 Report, 1993). A reconnaissance survey was conducted in 2004 (Burniston et al. 2006) of sediment in tributaries of Lake Huron and Georgian Bay, including five sites within Severn Sound. PCB Arochlor 1254, 1258 were found in the more organic sediment in the Severn River in Little Lake (upstream of Lock 45) in concentrations just above the detection limit. At other locations (North River, Coldwater River, Hog Creek, Wye River) PCB concentrations were below the detection limit.

PCBs are found in some media sampled in Severn Sound. Values of PCBs have been monitored in Carp from Severn Sound on four occasions from 1982 to 1999, with reductions to the point where Severn Sound Carp are now unrestricted for consumption at any size (MOE data). Samples of YOY spottail shiners collected in 1987 indicated only one site of sixteen sampled (in Midland Harbour) had PCB concentrations greater than 100 ng/g wet weight. All other sites sampled for YOY fish in the nearshore throughout Severn Sound were near or below the detection limit of the test for PCBs (see Severn Sound RAP 1993).

PCBs have been found in eggs of Tree Swallows and Red-winged Blackbirds, Herring Gulls, Caspian and Common Terns (Martin et al. 1995; Bishop et al. 1995; Weseloh et al. 1997). Martin et al. (1995) indicated that the most sensitive indicators of local contamination in Severn Sound were Common Terns, Red-winged Blackbirds and Tree Swallows. Low or undetectable concentrations of PCBs were found in the meat of waterfowl from the Severn Sound area as part of a Canada-wide survey of residues in waterfowl and gamebirds (Braune et al. 1999). These investigations indicate that although there is organochlorine contamination in eggs of indicator species, the contamination is low and of a regional or basin wide nature.

The more recent guidelines for consumption of sport fish use a range of concentrations starting at 0.5 ug/g for PCBs to indicate the start of restrictions on consumption based on a risk assessment analysis and the relationship between length (or age of fish) and contaminant concentration (OMOE/OMNR 2005, 2006).

In the early 1980s, the sport fish consumption advisories for the Severn Sound area were similar to other areas of southern Georgian Bay. At that time, advisories based on mercury and polychlorinated biphenyls (PCBs) were in effect in the Severn Sound area (OMOE/OMNR 1987, 1988). The 2001- 2002 Guide to Eating Ontario Sport Fish (OMOE/OMNR, 2001) has been revised to include more recent data from Severn Sound and has recognized the statistical similarity of southern Georgian Bay (Guide area GB4), which includes Severn Sound. The trend for PCBs in Carp ranging in size classes from Severn Sound (Severn Sound RAP 2002) shows the decline in PCB levels, likely the response to general reduction in PCB sources with the discontinuation of manufacture and use of PCBs.

In summary, the ambient sampling of PCBs in the Severn Sound area suggests that there are no significant in-place (i.e. in the sediments) or active pollution sources of PCBs. The general nature of the ambient sampling would not be sufficient to pick up localized PCB contaminated areas that could become sources if not managed properly.

The status of PCB use in the Severn Sound area

The Severn Sound area is part of a regional network of electrical transmission lines with transformer stations and distribution stations to “step down” electrical power for distribution to homes and businesses. These stations have larger equipment that requires cooling fluids that, in the past, contained high percentages of PCBs. Other equipment may contain PCBs including pole-top and ground transformers, capacitors and ballasts. The most common local equipment that may contain PCBs is the pole-top transformers.

The purpose of this section is to present the status of PCB use in the Severn Sound area and to assess any barriers to proceeding with a strategy of virtual elimination of PCBs.

A current example of the above process is the former CPR lands in the community of Port McNicoll. This area is currently completing the studies and land remediation necessary to obtain a Record of Site Condition from the MOE. The area within 30m of Severn Sound along the coast is still under investigation and the final analyses are pending. The RSC involved

PCB use in Severn Sound

There are a variety of corporations responsible for distributing electricity to homes in municipalities in the Severn Sound area (Figure 1). Hydro One owns and operates the largest proportion of the distribution system in the area and is responsible for regional distribution. Barrie Hydro, Orillia Power, Midland PUC and Tay Hydro also own and operate distribution systems to service local areas of Severn Sound.

Under Ontario Regulation 362, there are a small number of licensed Temporary PCB Storage Sites remaining in the Severn Sound Area Table 1. According to staff of

Midland Power Utilities Corporation (MPUC) all PCB-contaminated electrical equipment in temporary storage within the Town has been removed. The Town of Midland Site has been decommissioned as of 2006. Barrie Hydro does not have a Temporary PCB Storage Site within the Severn Sound area. The Temporary PCB Storage Site at the Tay Hydro Office in Port McNicoll has been decommissioned as of 2007. A small number of remaining PCB-contaminated equipment was shipped for destruction in 2007. Orillia Power operates one Temporary PCB Storage Site within the City of Orillia which is empty but will continue to be available beyond 2008. Hydro One is following a policy of reducing the number of PCB Storage Sites province-wide. One of the three remaining Hydro One Temporary PCB Storage Sites in the general Severn Sound area was decommissioned during 2006. One site in the Town of Penetanguishene remains in operation. The other operating site is located near Oro, outside of the Severn Sound area. One industrial Site (owned by Unimin, Midland) is scheduled for decommissioning in 2008. In summary, one active Temporary PCB Storage Site, operated by Hydro One, will remain in service after 2008 within the Severn Sound area.

In service PCB-contaminated electrical equipment requires inventory to confirm PCB concentrations. Larger transformers at the Hydro One Transformer Stations (TSs) and Distribution Stations (DSs) have been inventoried by Hydro One with programs to change out oils containing greater than 50 mg/kg PCBs (see Figure 1). Generally, these pieces of equipment have between 2 and 50 mg/kg PCBs.

Larger in-service electrical equipment that is owned by local industries or schools could contain PCB contaminated oils. These facilities and industries have been listed and the process of contacting them to determine the status of their equipment is ongoing.

Simcoe County-District School Board has completed an inventory on all PCB containing equipment and has completed decommissioning of a transformer at Midland Secondary School. To date, local industries indicate that equipment has been tested and changed out to meet a requirement of less than 50 mg/kg PCBs or the equipment has been removed and sent for destruction. Unimin, for example, had equipment containing PCBs at >50 mg/kg removed and sent for destruction and a transformer on site has had cooling fluid flushed and is showing < 2 mg/kg PCBs as of 2004.

The status of service providers with pole-top and pad-mount transformers is as follows:

1. Midland Power Utilities Corporation area (Town of Midland - in part)– all equipment inventoried and any equipment > 50 mg/kg removed for destruction. Older in-service equipment with less than 50 mg/kg PCBs is still in use. Inventory records are available.
2. Barrie Hydro (Town of Penetanguishene – in part) – all equipment inventoried and any equipment > 50 mg/kg removed for destruction. Older in-service equipment with less than 50 mg/kg PCBs is still in use. Inventory records are available.
3. Newmarket-Tay Hydro (Township of Tay – Port McNicoll, Victoria Harbour, Waubaushene) – all equipment inventoried and any equipment > 50 mg/kg

- removed for destruction. Older in-service equipment with less than 50 mg/kg PCBs remains in use. Inventory records are available.
4. Orillia Power (City of Orillia) – all equipment inventoried and any equipment >50 mg/kg has been removed for destruction. Older in-service equipment with less than 50 mg/kg PCBs is still in use. Inventory records are available.
 5. Hydro One represents the majority of end-user service area in Severn Sound (Figure 1). Replacement of pole-top and pad-mount transformers containing PCBs >50 mg/kg has been pursued as change outs occur through damage to poles or equipment. However, the content of some in-service assets still remains unknown. Due to transfer of miscellaneous areas for local service (e.g. Tay Point area) current inventories may be incomplete. Older in-service equipment with less than 50 mg/kg PCBs is still in use. Systematic inventory and destruction of PCB contaminated equipment is a province-wide initiative in response to the proposed new federal regulation. Hydro One database of PCB test results for pole-top and pad-mount transformers is linked to the asset serial number and not by geographic location. During 2008/09, Hydro One plans to test pad-mount transformers for PCB content in the Severn Sound area. After this testing is completed they plan to test pole-top transformers. In the interim, equipment with >50 mg/kg PCBs will be changed out when replaced as part of normal maintenance, or as a result of equipment failure, following PCB testing. Unless special priority is placed on the Severn Sound area, removal of contaminated equipment with subsequent decommissioning of Temporary PCB Storage Site in Penetanguishene will not be possible by 2008.

The new federal legislation has end-of-use dates for in-service electrical equipment containing greater than 50 mg/kg PCBs of December 31, 2009 in sensitive areas. The legislation also calls for in-service equipment to be at new equipment levels (less than 2 mg/kg PCBs) by 2025. This will require a new round of testing, inventory and removal of some in-service equipment.

A list of local industries that may have electrical equipment containing PCBs is included in Table 2. Confirmation of the status of PCB-containing equipment still in service in industries within the Severn Sound area is complete. Inquiries to date concerning electrical equipment suggest that local industries have conducted inventories, have determined the status of their equipment and generally have acted to remove equipment and send it for destruction.

The PCB-reduction strategy in Severn Sound

There is local interest in having Severn Sound declared “PCB-free”. However, the operational concentrations for PCB-containing electrical equipment of less than 50 mg/kg PCB and the public perception of considering an area to be “PCB free” will create confusion. New pole-top and pad-mount transformers are no longer manufactured with PCBs in cooling fluids. Older, in-service equipment that may contain cooling fluids that have residual PCB content, will have concentrations ranging from <2 to 50 mg/kg, assuming that any higher-level PCB equipment is taken out of service and sent for destruction. The end-of-use dates for the proposed federal legislation will require reduction by 2009, while some service providers have already reached the targets as of 2008. Over the long-term (by 2025), a further reduction in PCB-contaminated equipment to less than 2 mg/kg PCBs will be achieved through the application of the legislation.

The process of contacting the Utilities and Industries in the Severn Sound area in a non-regulatory manner has been generally well received within the community. We expect that an approach of recognition of achievement in reducing PCBs will generate corporate participation where economically feasible. Since the proposed legislative requirements and schedule are looming, many corporations are taking care of their PCB-contaminated equipment anyways. The delay in promulgating the proposed regulation and the slow participation by Hydro One, will not allow a 2007 date for recognition of the area as meeting PCB-reduction targets throughout. However, some celebration can proceed for those who are the harbingers.

There is no formal policy for handling PCB-containing ballasts and other equipment found in municipal buildings in Severn Sound. The operational practice is to ensure that contractors removing equipment containing PCBs dispose of the equipment in an appropriate manner. Renovations of municipal buildings are an ongoing process and in few cases the buildings are old enough to have PCB-containing equipment in service. Any other oils or materials contaminated with PCBs would be considered PCB wastes and fall under provincial legislation.

The PCB reduction strategy for Severn Sound could take the following path forward.

1. Once the CEPA PCB Regulation has been promulgated, confirm that Utilities and those industries using PCB-contaminated electrical equipment have reached, or will reach, the stage of having equipment tested, inventoried and maintaining in-service equipment with less than 50 mg/kg PCBs.
2. The remaining Temporary Storage Sites in Severn Sound should be decommissioned by 2009 pending legislation. The schedule for the remaining site within the Severn Sound area should be declared. Currently Hydro One continues to operate one temporary PCB Storage Site within Severn Sound and intends to continue using it until legislation clarifies the end of use date.
3. The first Utilities to have decommissioned their Temporary Storage Site and have completed their inventory of PCB-contaminated equipment should be recognized

with a public award (possibly from the federal and provincial governments). Midland PUC and Tay-Newmarket Hydro are in this situation as of 2007. The awards could be presented at the SSEA Annual Reception in spring of 2008.

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Table 1 Status of Temporary Storage Sites with PCB materials in the Severn Sound area

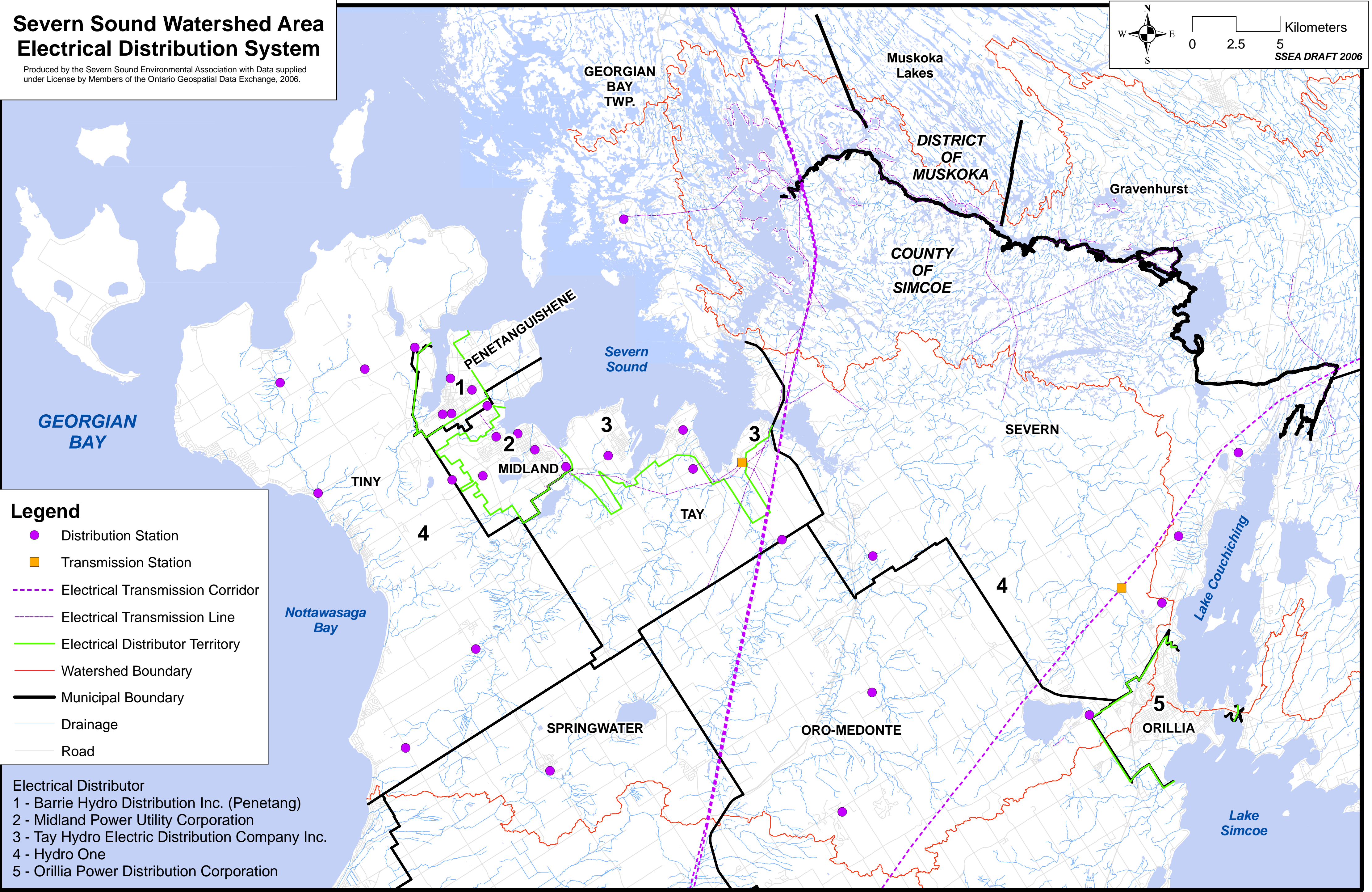
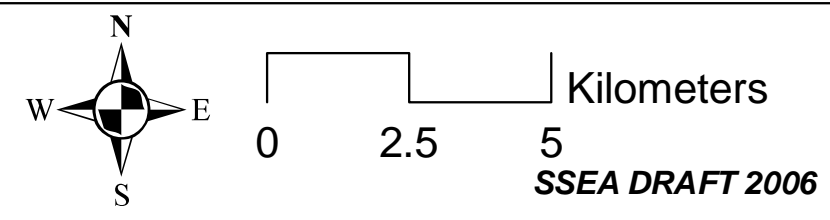
Owner	Address	Location (Zone 17)		Schedule for decommissioning
		Easting	Northing	
Unamin	420 Bayshore Drive	588234	4956408	to be decommissioned 2007
Midland Power Utility Corporation	16984 Hwy 12 Midland, ON	588363	4952888	decommissioned 2006
Tay Hydro	489 Findlayson St Port McNicholl, ON	594190	4955135	to be decommissioned 2007
Orillia Power Distribution Corporation	360 West Street S, Orillia, ON	626074	4939780	may be decommissioned 2007, in Lake Simcoe watershed
Hydro One	Penetanguishene Service Centre 7 O.L. Dubeau Drive	584536	4957391	Operating
Hydro One	Oro Service Centre, 16 Small Cres., Oro- Medonte Township	622248	4933311	Operating, in Lake Simcoe watershed
Hydro One	Orillia Service Centre, 333 Forest Ave. S, Orillia, ON	627179	4940324	decommissioned 2006, in Lake Simcoe watershed

Table 2 Status of area industries that may have electrical equipment containing PCBs

Name of Industry	Equipment status	Comment
ADM Mills	no equipment >50mg/kg on site	
Baytech Plastic Inc	no equipment >50mg/kg on site	
CCL Container Aerosol Division	no equipment >50mg/kg on site	
Day Specialties Corporation	no equipment >50mg/kg on site	
ELCAN Optical Technologies	no response	
General Mills Canada Corporation	no equipment >50mg/kg on site	
Kindred-Franke Industries Ltd.	no equipment >50mg/kg on site	
Kubota Metal Corporation	no equipment >50mg/kg on site	
NEBS Business Forms	no equipment >50mg/kg on site	
Techform Products Ltd.	no equipment >50mg/kg on site	
TRW Canada Ltd.	no equipment >50mg/kg on site	
Unimin Canada Ltd	no equipment >50mg/kg on site	intends decommissioning storage site 2008
Weber Manufacturing Ltd	no equipment >50mg/kg on site	

Severn Sound Watershed Area Electrical Distribution System

Produced by the Severn Sound Environmental Association with Data supplied
under License by Members of the Ontario Geospatial Data Exchange, 2006.



Legend

- Distribution Station
- Transmission Station
- - - Electrical Transmission Corridor
- - - Electrical Transmission Line
- Electrical Distributor Territory
- Watershed Boundary
- Municipal Boundary
- Drainage
- Road

- Electrical Distributor
- 1 - Barrie Hydro Distribution Inc. (Penetang)
 - 2 - Midland Power Utility Corporation
 - 3 - Tay Hydro Electric Distribution Company Inc.
 - 4 - Hydro One
 - 5 - Orillia Power Distribution Corporation