TRANSFORMER MANAGEMENT PROGRAM

FOR

VOLUNTARY COMPLIANCE WITH

38 M.R.S.A. 419-B

VOLUNTARY REMOVAL OF PCB-CONTAINING TRANSFORMERS

September 2008

Prepared By
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Bangor Hydro
ELECTRIC COMPANY

January 15, 2009

Senator Seth A. Goodall
One Hundred and Twenty-Fourth Legislature
Committee on Natural Resources
3 State House Station
Augusta, Maine 04333-0100

RE: BANGOR HYDRO ELECTRIC COMPANY – PROGRESS REPORT ON THE REDUCTION OF TRANSFORMERS CONTAINING 50 PPM OR GREATER PCB

Senator Goodall, Representative Duchesne, and Members of the Committee on Natural Resources:

38 MRSA Section 419-B, Goals for Dates of Removal of Transformers Containing Polychlorinated Biphenyls requires that public utilities submit a progress report on the removal of PCB containing (50 ppm PCB or greater) transformers by January 15, 2009. Please consider this letter as Bangor Hydro's progress report as required by 38 MRSA Section 419-B. Bangor Hydro last reported information regarding PCBs to the Committee on Natural Resources (Committee) by letter dated January 22, 2007.

The goals established by 38 MRSA Section 419-B are (1) the removal of PCB containing transformers within 100 feet of surface waters or schools (target transformers) by October 1, 2005, and (2) the removal of all remaining PCB containing transformers by October 1, 2011. Specifically, the progress report should address the utility's progress toward the removal of PCB containing transformers and address the number of PCB containing transformers remaining in service.

Bangor Hydro's progress on the removal of PCB containing transformers is highlighted by the following:

- The continuance of a historical, aggressive removal and disposal program for PCB containing transformers from all areas.

- Continuation of a transformer labeling program to easily identify transformers that have been determined to contain PCB's less than 50 ppm.

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- Development of and training on a nameplate data collection tool for tracking nameplate data collected.

- Updates of Bangor Hydro's "Transformer Management Program for Voluntary Compliance with 38 MRSA 419-B – Voluntary Removal of PCB-Containing Transformers".

- Completion of target transformer nameplate PCB data collection and evaluation for PCB risk of approximately 4,000 transformers in all of our divisions service territories.

- Subsequent oil sampling of PCB high risk transformers to verify transformers > 50 ppm PCBs.

- The removal of all target transformers identified to date (157 transformers from Goal 1 of 38 MRSA Section 419B & 136 from Goal 2) as containing > 50 ppm PCBs.

Continuance of Historical Removal and Disposal Program

Since the late 1980's Bangor Hydro has been aggressively removing from service and disposing of transformers that may contain PCBs. A majority of this disposal program is done on a voluntary basis. Bangor Hydro's disposal program has continued and it is estimated that since March 9, 1999, we have removed 4,830 units (including transformers specifically removed as part of this program) manufactured before 1980. These transformers potentially contain PCBs 50 ppm or greater in concentration.

Project Planning for Voluntary Removal Goals

The October 1, 2005, goal of identifying and removing transformers containing PCBs >50 ppm that are within 100 feet of surface waters and schools has been completed. We identified 3,934 transformers with unidentified PCB concentrations near surface waters and schools which were inspected and only 157 of these were determined to be high risk for containing PCBs > 50 ppm and were subsequently removed.

Over the past two years, Bangor Hydro has collected and evaluated nameplate data from approximately 4,000 transformers identified through our GIS system as having unknown PCB concentrations. As the data from the transformers was collected, it was determined if the transformer was considered non-PCB based on manufacturer nameplate information or testing records, or whether the transformer was considered to be a low or high risk for containing PCB's based on statistical data. Any transformers determined to be high risk were then sampled to determine actual PCB concentration. If the transformer contained > 50 ppm PCBs, it was then removed from service. Only a small subset (136) of the approximately 4,000 transformers were identified as containing > 50 ppm PCBs.

All transformers identified as containing > 50 ppm PCBs (136) were then removed from our system.

Bangor Hydro estimates from inventory records that we currently have approximately 6,200 transformers which were purchased pre-1980 and, therefore, may contain PCBs. Bangor Hydro has made a reasonable assumption that most of these older transformers are located on poles older than 1980. At this time, we have approximately 14,000 more transformers on poles pre-1980 to inspect Based on Bangor Hydro system knowledge, we will also inspect all transformers on new poles for some high risk areas. Based on current data, we estimate that we have somewhere between 500-700 transformers left in our system which contain > 50 ppm PCBs.

If you have any questions or require additional information, I can be reached at 207-973-2542.

Sincerely,

Mona E. Spear

Mona E. Spear
Supervisor of Environmental Compliance

Enclosures

CC: Bob Hanf, Bangor Hydro
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EXECUTIVE SUMMARY

In order to voluntarily comply with Maine's Law (38 M.R.S.A. 419-B) – Voluntary Removal of PCB-Containing Transformers, Bangor Hydro has established the following program with the aim of making a reasonable effort to meet the goals of the legislation.

Maine's PCB-containing transformer removal program sets the following goals:

- Removal of all distribution transformers containing 50 ppm or greater PCB from areas located within 100 feet of a primary or secondary school, or a mapped stream, water body, or wetland by October 1, 2005 (Complete).

- Removal of all remaining distribution transformers that contain 50 ppm or greater PCB from all other areas by October 1, 2011.

In an effort to work towards meeting the established goals, Bangor Hydro is implementing, to the extent possible, the following best management practices and procedures in order to identify, track, and reduce the number of in-use transformers that have a "demonstrated risk" for containing PCBs 50 ppm or greater in concentration.

Note: Based on a review of Bangor Hydro's PCB testing data, and studies conducted by Northern Indiana Public Service Company and Central Maine Power, the following transformers have been found to pose a "demonstrated risk" of containing PCBs 50 ppm or greater in concentration (these transformers will be referred to as "high-risk" transformers and will be identified with an H in the GIS system):

General Electric transformers manufactured in Pittsfield, Massachusetts, during the years 1937-1969, and

Westinghouse transformers manufactured in Sharon, Pennsylvania, in 1957 or during the years 1965-1970.

HOW THE REMOVAL PROGRAM WILL WORK

1. GIS will query the system to identify the target transformers. Target transformers are defined as all transformers in GIS with unknown PCB status on poles older than 1979 or poles with unknown age. These transformers will carry a new "T" symbol inside the transformer triangle symbol.

2. GIS will produce maps for each circuit that identify the location of the target transformers.

3. Environmental Services will provide training to individuals working on the program (Both in-house employees and outside contractors) on the nameplate collection effort, categorizing the PCB status of the transformer, database entry, and sampling procedures.

4. All target transformers will be visited (either by in-house employees or contractors) to complete a visual inspection of the transformer from the ground using high powered, image stabilizing binoculars.

5. If the transformer can be determined to be either low-risk (all others except high risk identified on page 1) or less than 50 ppm PCBs from the ground inspection, then no further action will be taken.

6. If from the ground inspection the transformer is determined to be high-risk or the necessary data cannot be collected, then the transformer will be visited with a bucket truck for an aerial bucket inspection.

7. If the transformer is determined to be high-risk either from ground or bucket inspection, then an oil sample will be taken and analyzed to determine the actual PCB concentration.

8. All PCB information will be recorded in GIS.

9. The number of transformers containing PCBs 50 ppm or greater will be determined and will be planned for removal by December 31, 2011. It is the intent of BHE to remove transformers with greater than 50 ppm PCBs in the same calendar year as they are identified. This guideline has some flexibility to it in case a significantly large number of changeouts are required or a heavy regular work load precludes the work from being completed in the same year.

Note: A reasonable assumption has been made by Bangor Hydro that most transformers older than 1979 should be found on poles older than 1979. There are some cases where older transformers have been transferred on to newer poles and, for the most part, these units will not be targeted at this time. On select circuits (2400 voltage), transformers with unknown PCB information on all aged poles will be looked at. The reasoning for this is that it is believed that a majority of the transformers on these circuits are an older vintage regardless of pole age, as this is an older voltage that BHE is currently phasing out.

BEST TRANSFORMER MANAGEMENT PRACTICES

In order to facilitate the removal of PCB containing transformers in the most timely fashion possible, follow these best management practice guidelines:

1. Prior to installing new transformers, verify that the transformer has been labeled with a correct blue NON-PCB label (less than 50 ppm), or white NO PCBs label (less than 2 ppm). These labels make it easy to recognize from the ground that the transformer is NON-PCB (less than 50 ppm PCB).

2. Do not install any transformer that is not labeled as NON-PCB or NO PCB (unless required to do so in an emergency).

3. As part of routine work, when a NON-PCB or NO PCB transformer is encountered that is not labeled, label it with the correct blue or white label. Also update the transformer's PCB status in the GIS system to indicate that the transformer installation is "Ok-Less than 50 ppm".

4. When work involves transferring transformers, do not transfer transformers that have an unknown PCB status. Plan ahead of time to replace the transformers that are not NON-PCB.

5. When a transformer whose PCB concentration is unknown is taken down because of a transfer or returned to a division storage area for some other reason, return the transformer to Graham Station for PCB testing and evaluation. Do not store transformers whose PCB concentration is unknown for reuse. Bangor Hydro's transformer testing and repair facility at Graham Station will determine whether to repair, refurbish, or discard the transformer.

6. When a transformer installation is verified to be NON-PCB, or a transformer that has an unknown PCB status is removed from service and replaced with a NON-PCB transformer, update the transformer's PCB status in the GIS system to indicate that the transformer installation is "Ok-Less than 50 ppm".

7. Handle all transformers in accordance with Bangor Hydro's existing spill prevention and spill response procedures.

SECTION 1

PROJECT LAYOUT

Background:

In general, Bangor Hydro's PCB removal and disposal program has been driven by compliance with Environmental Protection Agency rules found in 40 CFR Part 761, and by historical voluntary reductions in the use of PCB or PCB-contaminated equipment. The federal Toxic Substance Control Act (TSCA) banned the manufacture of PCBs after January 1, 1979, and banned the distribution in commerce of PCBs after July 1, 1979. Federal regulations govern the use, use conditions, disposal, record keeping, and spill cleanup of PCBs. Bangor Hydro has complied with federal PCB use conditions by implementing programs to remove PCB capacitors from distribution applications, and to identify and remove PCB transformers posing risks to food and feed or commercial buildings. The federal program generally addresses the use of equipment containing 500 ppm or greater and the disposal of all PCBs greater than 50 ppm in concentration.

In order to facilitate an effective PCB removal program and compliance with applicable state and federal rules, Bangor Hydro has had a PCB Management Program in place since January 1990. The PCB Management Program documents how transformers and other electrical equipment will be stored, evaluated, tested for PCB concentration, and reused or disposed.

Bangor Hydro operates a transformer storage and maintenance shop at our Graham Station facility where electrical equipment requiring evaluation and repair are handled in accordance with the PCB Management Program. Since the late 1980's Bangor Hydro has voluntarily elected not to issue for reuse equipment containing 50 ppm or greater PCB that has been processed at the Graham Station facility. At the Graham Station location transformers are tested and, as appropriate, retrofilled in accordance with federal regulations to reduce PCB concentration to below 50 ppm.

At this time, Bangor Hydro believes that all PCB capacitors have been removed from the transmission and distribution system and properly disposed of. Also, most power transformers in substations contain PCBs less than 50 ppm, and we estimate that eighty five percent of distribution transformers that we own and operate were purchased after July 1, 1979, and, therefore, these transformers are assumed to be less than 50 ppm PCB.

The Maine Legislation:

The Maine legislation requires Maine utilities to "voluntarily" remove all PCB-containing transformers (defined as >50 ppm) from service by October 1, 2011. Bangor Hydro-Electric Company is committed to making a reasonable effort to address the concerns of this legislation.

The first phase of the state program requires the removal of all PCB transformers that are within 100 feet of a mapped water/wetland resource or a school (elementary or secondary) by October 1, 2005 (Complete). The remainder must be removed by October 1, 2011.

A progress report must be submitted to the Legislature's Committee on Natural Resources biennially on January 15, 2001 through January 15, 2011.

A plan for removal of transformers containing 50 ppm or greater PCBs that are located in underground vaults must also be submitted to the legislature's committee on Natural Resources by January 15, 2001 (Complete).

The legislation does not require the removal of PCBs from transformers in substations. Bangor Hydro has 12 power transformers remaining in service whose PCB concentration is between 50 and 499 ppm.

Current Status and Operating Procedures:

All transformers purchased after July 1, 1979 may be considered PCB free.

All transformers that have been cycled through Graham Station for evaluation have either been disposed of or returned to storage areas for future use. Only transformers known, tested, or retrofilled as non-PCB transformers have been refurbished and made available for reuse. Transformers that have been confirmed non-PCB, that passed the evaluation process, and that are issued for reuse are identified with a "BHE" number tag.

Transformers in Use:

Bangor Hydro GIS data as of August 2008 shows 50,481 total transformers in use (pad mounts and pole mounts). GIS data shows 37,352 transformers with unknown PCB information and 16,895 transformers on poles 1979 and older with unknown PCB information.

Bangor Hydro plant accounting data shows that on average 1,536 transformers were purchased annually between 1980 and 2000 (32,247 transformers) and an additional 12,038 transformers were purchased from 2001 thru 2008. These transformers are assumed to be non-PCB because they were purchased after the federal ban on PCB manufacturing and distribution in commerce. Using these figures it is assumed that BHE has 6,196 [50,481-44,285 (the total purchased since 1980)] transformers left in the system that were purchased prior to the federal ban on PCB manufacturing and distribution in commerce.

The number of transformers (both pole and pad mount) currently in active service is as follows:

District	Unknown	Unknown on poles pre-1979	Padmount Transformers
Bangor	13,310	5,821	
Lincoln	5,957	2,971	
Hancock	12,137	5,562	
Machias	5,948	2,541	
Total	37,352	16,895	1138

The total for the group of target transformers would be 18,033. This is the group of transformers that would be subject to the voluntary removal date of October 1, 2011 (based on Bangor Hydro's plan), if they are not certified on the nameplate to be non-PCB, are determined to be a high risk for containing PCBs 50 ppm or greater, and lab analysis confirms that they actually contain PCBs 50 ppm or greater.

Based on GIS mapping data Bangor Hydro can identify the location of these transformers but we do not have the information available to determine the PCB content of the transformers at these locations. Each transformer nameplate will need to be reviewed either by ground inspection or bucket truck to determine which transformers may contain PCBs and those that do not contain PCBs or are a low risk for containing PCBs.

Program Outline

General

1. Inventory all transformers in stock in order to identify all units whose PCB concentration is unknown. Test any transformers in stock to assure that no units that may contain PCBs are placed in service. All units that are certified by the manufacturer or by testing to be non–PCB will be labeled with an appropriate non-PCB label (Complete).

2. Until test results are confirmed, all units of unknown PCB in oil content will be tagged with do not operate tags. Units that test under 50 PPM PCB will be black tagged by the Graham Station transformer service department. Under 50 ppm units may then have the do not operate tag removed and units tested over 50 ppm will be shipped to the Graham Station transformer service department for retro-filling or disposal, as determined by evaluation. All units that are certified by the manufacturer or by testing to be non–PCB will be labeled with an appropriate non-PCB label (Complete).

3. All units that are at the Graham Station location awaiting reuse in the distribution system have been (or will be) tested in accordance with Bangor Hydro's PCB Management Plan and only those less than 50 ppm will be considered for reuse. All units that are certified by the manufacturer or by testing to be non–PCB will be labeled with an appropriate non-PCB label (Complete).

Phase One – Inventory and Replace Certain Target Transformers (Within 100 Feet of Water, Wetland Resources and Schools) (complete):

1. In GIS, change the symbology of all transformers within 140' (allowance for mapping error) of water, wetland, or school where the PCB concentration is unknown. This will be the symbol "T" for a target transformer. All other transformers will continue to be identified by the existing symbology (an existing transformer's PCB status is unknown). Establish other GIS symbology for data entry from item three below. Thus, there will be five different GIS transformer symbologies as listed below:

    a. Existing symbology (an existing transformer's PCB status is unknown)
    b. Target transformers (within 100 feet of water, wetland, or schools where PCB concentration is unknown)-Identified with a "T" in GIS.
    c. **Category One**, Non PCB transformer-Identified with an "O" (for Ok) in GIS.
    d. **Category Two** transformer, Low risk of PCB contamination-Identified with an "L" in GIS.
    e. **Category Three** transformer, High risk of PCB contamination-Identified with an "H" in GIS.

2. Construction Planning/GIS would make work order type print packages for doing a set number of target transformer checks and nameplate data gathering in each District.

3. Using transformer nameplate information collected from each target transformer, the transformer will be inventoried into one of the following categories:

    c. Non-PCB transformer category one (O).
    d. Transformer category two: Low risk of PCB contamination (L).
    e. Transformer category three: High risk of PCB contamination (H).

Note: the definition of category one, two, and three transformers are given below:

Transformer Evaluation Criteria:

For the purpose of reducing risk of PCB migration into the environment, Bangor Hydro is evaluating transformers and placing the units into one of three categories.

Category One: Non-PCB

These transformers will have either a manufacturer's nameplate specifying that the unit is a Non-PCB unit or the transformer will have a black and white tag applied by the Graham Station transformer repair shop. The Company "BHE" number tag provides a reference number to give the history of any service work performed on the transformer and the results of an oil test for PCB content. The only units that will have such a tag will be those that contain less than 50 parts per million PCB.

Category Two: Low Risk Units

Those transformers, based on statistical information related to manufacturer and serial number data, that pose the lowest risk of containing PCBs 50 ppm or greater. This category will include all transformers not identified as a high risk unit.

Category Three: High Risk Units

Those transformers, based on statistical information related to manufacturer and serial number data, that pose the highest risk of containing PCBs 50 ppm or greater. This category includes only:

General Electric transformers manufactured in Pittsfield, Massachusetts during the years 1937-1969, and

Westinghouse transformers manufactured in Sharon, Pennsylvania in 1957 or during the years 1965-1970.

4. Starting in 2001, work orders for data collection of target transformers will be produced and nameplate/risk evaluation work can begin.

5. As data is acquired, transformer replacement specifications, quantities and costs for replacement of Category three (high risk) units can be established. Removal planning can be conducted thereafter.

6. Transformers changed out or added during routine work in all areas would be entered in GIS to reflect its updated transformer symbology (e.g. from a (b) symbol to a (c) symbol).

Phase Two - Transformers that have not been part of Phase One:

1. In GIS, identify all transformers on poles older than 1979 with unknown PCB information and change the symbology to "T". The symbol "T" is for target transformer. All other transformers will continue to be identified by the existing symbology. The GIS symbology from phase I will continue to be used in phase II of the project and is outlined in the program outline for phase I.

2. Maps will be generated from GIS identifying all target transformers. The maps will then be distributed to either contractors or divisions for nameplate data gathering and PCB sampling. Transformer data collection will begin in 2008 reviewing approximately $1/4^{th}$ of the 18,033 (4,508) transformers that need to be identified.

3. Nameplate data will be collected either from ground reads using high powered, image stabilizing binoculars or by buckets reads when the necessary information cannot be gathered from the ground.

4. The nameplate data will then be entered into an Access database (PCB Removal database) which will already contain the GIS information for all of the target transformers. The database will rank all target transformers into one of three categories.

    a. Category one: Non-PCB transformer (O)
    b. Category two: Low risk of PCB contamination (L)
    c. Category three: High risk of PCB contamination (H)

    Note: the definition of category one, two, and three transformers can be found in the program outline for phase one

5. All high risk transformers will then have an oil sample taken and analyzed for PCB concentration. The exception to this is high risk, cast iron transformers which cannot practically be sampled. Also BHE has found that certain models of transformers are too thick to sample using the BHE sampling procedure (found in Section 9). In the cases where these transformers are encountered and found to be high risk, they will not be sampled but will be changed out without sampling.

6. All transformers that are found to contain PCBs in a concentration of 50 ppm or greater will then have work orders generated to replace them. All transformers identified to be greater than 50 ppm PCBs in each calendar year will be scheduled for change out in the same calendar year. Some flexibility is required here depending on the number of greater than 50 ppm PCBs transformers identified and work loads. Due to these unknown variables some change outs may not occur until the following calendar year.

7. As transformers are identified, ranked, and changed out, the PCB information will be entered back into GIS to reflect the updated transformer PCB status. Upon the completion of this project, all high risk transformers will be changed to category one, Non-PCB, due to either change out or analytical data demonstrating PCB concentration to be less than 50 ppm PCBs.

SECTION 2

TRANSFORMER/ PCB LABELING PROGRAM

As part of the program to identify and remove transformers containing 50 ppm or greater PCBs from Bangor Hydro's system over the next 10 years, a transformer labeling program has been implemented. Appropriate identifying labels, as described below, will be applied to units in inventory or currently in service that contain less than (<) 50 ppm PCBs. Labeling of the transformers or other equipment will help to more easily identify non-PCB electrical equipment as the removal program progresses.

The company goal is to only place units back into service which are known to be < 50 ppm PCBs from either nameplate data or lab verification. Therefore, all units going back into service should have one of the following two labels on it indicating that it is < 50 ppm or < 2 ppm PCBs.

Label 1

Non-PCB label (dark blue) should be placed on equipment that is identified on the nameplate as "non-PCB," "< 50 ppm" or is determined to contain 2-49 ppm PCBs according to lab testing.

Label 2

No PCBs label (white label) should be placed on equipment that is identified on the nameplate as "less than 2 ppm," "< 1 ppm PCBs," "no PCBs," or is determined to contain < 2 ppm PCBs according to lab testing.

All transformers known to contain PCBs less than 50 ppm based on nameplate or testing data must be marked with one of the appropriate labels. This includes all transformers in storage, newly purchased transformers (new or refurbished), and all transformers tested, repaired, and released for reuse by the Graham Station transformer repair facility that are known to contain less than 50 ppm PCB. BHE now requires manufacturers to place either a blue or white PCB label on the transformers at the time of manufacturer.

Also, anytime an existing transformer is encountered in the field, the nameplate data should be reviewed by the service crew. Transformers whose nameplate provides a Non-PCB or No PCBs certification should be labeled with Label 1 or 2 based on the transformer's nameplate information.

These two labels are very similar in wording and color, but do represent two different PCB concentrations. Please read the directions for applying each type of label carefully and call Environmental Services if you have any questions.

Note that Bangor Hydro's Graham Station transformer repair facility applies a black and white or yellow and black BHE number tag to transformers that have been serviced. For any transformers tagged with a BHE number that have not been labeled with Label 1 or 2, the PCB results must be verified with Bangor Hydro's Electrical Department before applying labels to the equipment. The Electrical Department will have a lab analysis record for the transformer. Also, the Electrical Department is now applying the appropriate Label 1 or 2 prior to releasing transformers and equipment from the repair facility for reuse.

After determining which label should be applied, please follow these instructions:

1) Mark on the label when the unit has been classified by gas chromatography (if lab tested) by punching out the appropriate square.

2) For transformers being labeled based on laboratory analysis and certification only, mark on the label the month and year the PCB lab determination has been made by punching out the appropriate month number and the square next to the appropriate year.

3) Place the label on the side of the unit near the bottom.

Remember that these labels can only be placed on equipment if we have PCB data on the nameplate or a lab certification that indicates the unit contains < 50 ppm PCBs. Do not use these labels for any other purpose or apply the labels when the PCB concentration of the equipment is not known. Keep these procedures for future reference for use by the stock clerks/personnel.

SECTION 3

GIS TRANSFORMER IDENTIFICATION, PCB STATUS, AND SYMBOLOGY

General

In an effort to assist with voluntarily compliance with Maine's Law (38 M.R.S.A. 419-B) – Voluntary Removal of PCB-Containing Transformers, Bangor Hydro has developed procedures for documenting the PCB status of in-use transformers. Use of the GIS system is critical to the ability to track the location and PCB status of transformer installations.

Maine's PCB-containing transformer removal program sets the following goals:

- Removal of all distribution transformers containing 50 ppm or greater PCB from areas located within 100 feet of a primary or secondary school, or a mapped stream, water body, or wetland by October 1, 2005. (The location of these transformers has been queried by GIS and will be referred to as the target group of transformers). (complete)

- Removal of all remaining distribution transformers that contain 50 ppm or greater PCB from all other areas by October 1, 2011.

Bangor Hydro is committed to making a good faith effort to address the concerns of this legislation. In general, the approach by Bangor Hydro to identify the location of PCB containing transformers will be by using GIS system maps and attaching a PCB status to that transformer installation in GIS. Bangor Hydro or designated contractors will collect nameplate data from the target group of transformers and using the PCB Removal program software, attached "instructions for categorizing transformers for PCB risk" and attached "transformer serial number tables" will determine the PCB status for these transformers. All transformers ranked as high risk will either be sampled to determine the actual PCB concentration or removed from service with out sampling. All high risk transformers that are actually greater than 50 ppm PCBs from lab analysis will then be removed from service. All target transformers will then be ranked in GIS as either "O" or "L" (see definitions below).

CHANGES TO GIS

Effective August 29, 2001, the existing symbols for polemount and padmount transformer banks will continue to be used. In addition, there will be four new transformer symbols utilized to identify the transformer's PCB status. The four new symbols used will be a combination of the existing transformer bank symbols with either the letter "O", "L", "H", or "T" located inside the existing transformer bank triangle symbol. (See the GIS transformer symbols table).

DEFINITIONS OF THE SYMBOLS

Existing Symbols (with no letters)

Existing transformer symbols will be used for all existing transformers whose PCB status is unknown, or, in a rare case where a transformer is placed and its PCB concentration is unknown.

Transformer Symbol with the Letter "O"

The letter "O" used in the transformer symbol will signify that the transformer is "OK", i.e. its PCB status is less than 50 ppm (as noted by the manufacturer's nameplate, by the existence of a blue or white "No PCB or Non-PCB" label, or by Company records). These transformers can continue to be utilized throughout the Company and are not subject to any removal requirements.

Transformer Symbol with the Letter "L"

The letter "L" used in the transformer symbol will signify that Bangor Hydro has retrieved nameplate data from the transformer, and, based on the serial number, manufacturer data, and historical sampling results, the transformer has been determined to be a low risk for containing PCBs greater than 50 ppm. These transformers will not be subject to the removal requirements.

Transformer Symbol with the Letter "H"

The letter "H" used in the transformer symbol will signify that Bangor Hydro has retrieved nameplate data from the transformer, and, based on the serial number, manufacturer data, and historical sampling results, the transformer has been determined to be a high risk for containing PCBs greater than 50 ppm. These transformers will be subject to the removal requirements of 2005 and 2011 noted above.

Transformer Symbol with the Letter "T"

The letter "T" used in the transformer symbol will signify that the transformer has been queried by GIS and found to be within 140' (allowing for mapping error) of a mapped stream, water body, or wetland, or serves a primary or secondary school (Phase I) or found on poles pre-1979 with unknown PCB information (Phase II). These transformer banks will be referred to as "target transformers". Bangor Hydro's goal is to retrieve nameplate data from all target transformers; by October 1, 2005, to remove those that are determined to be a high risk for PCB contamination (Phase I); and by December 31, 2011, to remove those that are determined to be high risk and tested > 50 ppm PCBs (Phase II).

Note: That for two and three phase transformer installations, the entire bank will carry the worst case PCB status. For example, a three-phase bank with two "O" transformers and one "H" transformer will carry an "H" PCB status.

These changes to GIS transformer symbology will help to facilitate locating target ("T") transformers whose PCB status needs to be identified, and to facilitate documenting the PCB status of transformer locations.

CHANGES TO GIS TRANSFORMER EDITOR

In order to assign the PCB status to the transformer installation, transformer editor has been modified to include a pull down selection for PCB status. The PCB status choices will be:

Existing Symbol Blank – PCB status is unknown

Ok-Less than 50 ppm

Low – For low risk of PCB contamination

High- For high risk of PCB contamination

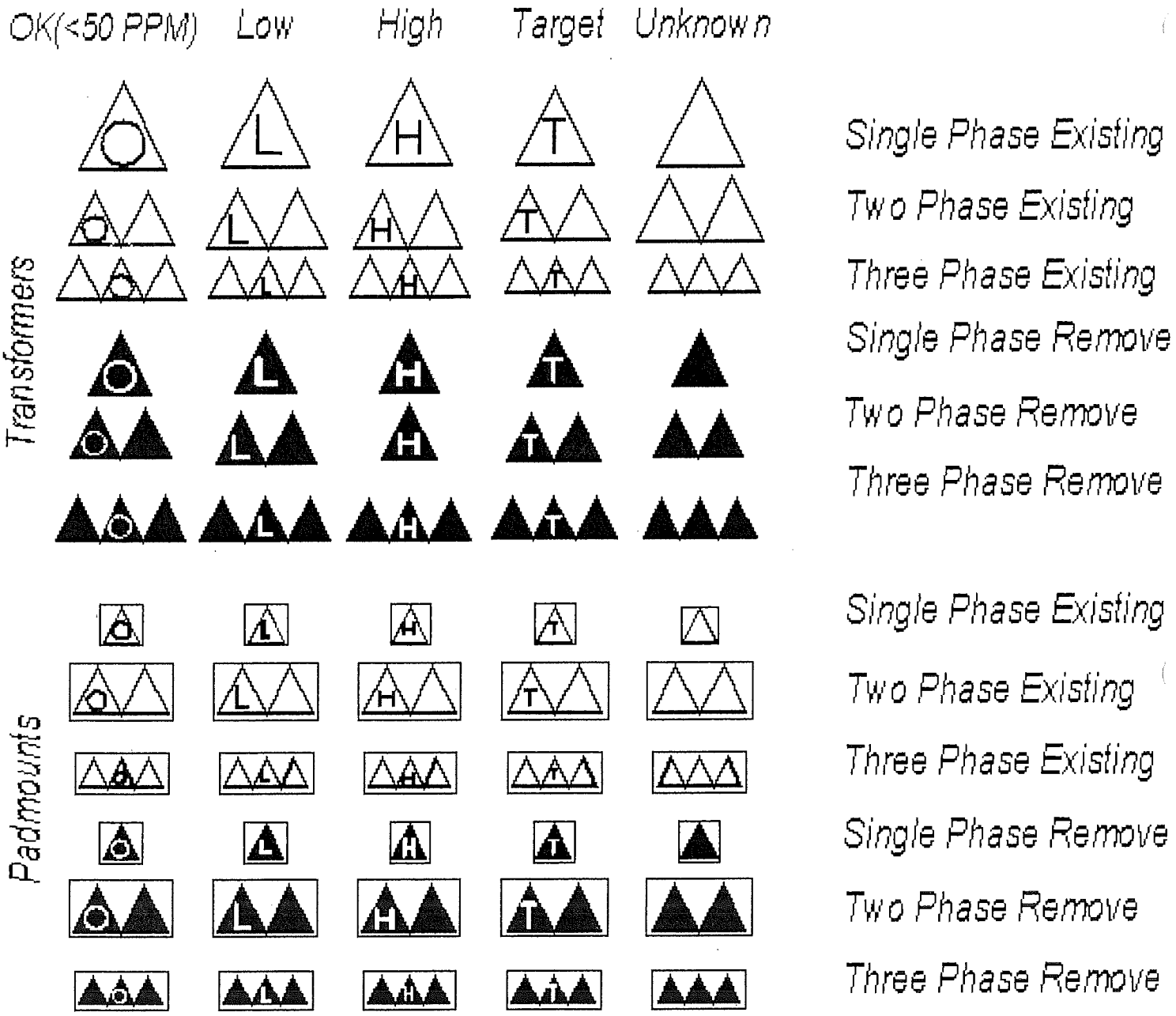
Target Transformer – Near water, wetlands, or serves a school (Phase I) and transformers on poles older than 1979 (Phase II)

Default PCB Status

For all new transformer placements going forward, the PCB status will default to "Ok-Less than 50 ppm". If for some reason a transformer must be placed whose PCB status is not "Ok-Less than 50 ppm", a warning message will be displayed ("Warning-PCB status is not less than 50 ppm"). However, the system will allow the transformer to be inserted.

Updating Transformer Records

Whenever a padmount or transformer bank is updated, the PCB status is checked. If the PCB status value is not "Ok-Less than 50 ppm" a message will appear asking if the PCB status is correct ("Is PCB Status Correct?"). This will prompt the user to confirm that an existing transformer is being replaced with a transformer that is less than 50 ppm PCB.


OK(<50 PPM)
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Transformers
Padmounts
Single Phase Existing
Two Phase Existing
Three Phase Existing
Single Phase Remove
Two Phase Remove
Three Phase Remove
Single Phase Existing
Two Phase Existing
Three Phase Existing
Single Phase Remove
Two Phase Remove
Three Phase Remove

SECTION 4

TRANSFORMER NAMEPLATE DATA COLLECTION AND PCB CATEGORIZATION

Phase I: -Complete

In an effort to voluntarily comply with Maine's Law (38 M.R.S.A. 419-B) – Voluntary Removal of PCB-Containing Transformers, the nameplate data will be collected from distribution transformers (polemounts and padmounts) identified by Bangor Hydro's GIS as being within 100 feet of a water body, wetland or school (target transformers). Using the GIS transformer item number and GIS prints, Bangor Hydro will record target transformer nameplate data onto a data collection form. An "Instructions for Transformer Nameplate Data Collection" sheet, data collection forms, and a GIS print will be used by line crews to collect the necessary nameplate data.

District office staff will then use target transformer nameplate data, the attached "Instructions for Categorizing Transformers for PCB Risk" sheet, and attached manufacturer transformer information sheets to categorize the transformer into one of the following PCB categories:

Category 1 – **Non PCB** (known less than 50 ppm by manufacturer's nameplate or "BHE" Number Tag) – Category 1 transformers will be denoted with an "O" on GIS prints.

Category 2 – **Low Risk** of PCB Contamination (based on serial number and manufacturer data) – Category 2 transformers will be denoted with an "L" on GIS prints.

Category 3 – **High Risk** of PCB Contamination (based on serial number and manufacturer data) – Category 3 transformers will be denoted with an "H" on GIS prints.

Once the PCB category for the transformer has been established, district office staff will update the GIS transformer symbology and attribute to identify the status and PCB category of that transformer installation.

The GIS system will use five unique symbols to identify transformers and PCB status of transformers in Bangor Hydro's distribution system (see the "GIS Transformer Symbol Identification" sheet in Section 3). The GIS symbols will represent the following transformer PCB status:

A. Existing Transformer Symbology (PCB Status is unknown)

B. Target Transformers (within 100 feet of water, wetland or schools and the PCB status is unknown)-Denoted with a "T" on GIS prints.

C. Category 1 Transformers - **Non PCB** (known less than 50 ppm by manufacturer's nameplate or "BHE" Number Tag) - Category 1 transformers will be denoted with an "O" on GIS prints.

D. Category 2 Transformers - **Low Risk** of PCB Contamination (based on serial number and manufacturer data) - Category 2 transformers will be denoted with an "L" on GIS prints.

E. Category 3 Transformers - **High Risk** of PCB Contamination (based on serial number and manufacturer data) - Category 3 transformers will be denoted with an "H" on GIS prints.

Phase II:

In an effort to voluntarily comply with Maine's Law (38 M.R.S.A. 419-B) – Voluntary Removal of PCB-Containing Transformers, the nameplate data will be collected from distribution transformers (polemounts and padmounts) identified by Bangor Hydro's GIS on poles pre-1979 with no existing PCB information and all padmount transformers with no PCB information (target transformers). Using the GIS transformer item number and GIS prints, Bangor Hydro and designated contractors will record target transformer nameplate data into the PCB Removal database. An "Instructions for Transformer Nameplate Data Collection" sheet, data collection form (in database), and a GIS print will be used by line crews and designated contractors to collect the necessary nameplate data. Nameplate data will initially be collected from the ground using high powered, image stabilizing binoculars. If the necessary information cannot be gathered from the ground, the transformer will then be visited by a bucket truck and nameplate data will be collect by an aerial bucket read.

District office staff and designated contractors will then use target transformer nameplate data, the attached "Instructions for Categorizing Transformers for PCB Risk" sheet, attached manufacturer transformer information sheets and the PCB removal database to categorize the transformer into one of the following categories:

Category 1 – **Non PCB** (known less than 50 ppm by manufacturer's nameplate or "BHE" Number Tag) – Category 1 transformers will be denoted with an "O" on GIS prints.

Category 2 – **Low Risk** of PCB Contamination (based on serial number and manufacturer data) – Category 2 transformers will be denoted with an "L" on GIS prints.

Category 3 – **High Risk** of PCB Contamination (based on serial number and manufacturer data) – Category 3 transformers will be denoted with an "H" on GIS prints

Once the PCB category for each transformer has been established, all category 3 transformers (high risk) will be sampled and analyzed for actual PCB concentration. Field personnel will be able to rank transformers in the field at the time of inspection. If the inspection is being completed by bucket truck, then a sample can be drawn at that time. Otherwise, a bucket truck will be dispatched to collect a sample from all

transformers ranked as high risk from ground reads. All high risk transformers that have a PCB concentration of greater than 50 ppm PCBs will be scheduled for change out. All data collected will then be updated in GIS to represent the current PCB status for each transformer.

Note: Some high risk transformers will never be updated to Category 3 ("H") in GIS as they will all eventually become zero, either through analysis or change out.

The GIS system will use five unique symbols to identify transformers and PCB status of transformers in Bangor Hydro's distribution system (see the "GIS Transformer Symbol Identification" sheet in Section 3). The GIS symbols will represent the following transformer PCB status:

A. Existing Transformer Symbology (PCB Status is unknown)

B. Target Transformers (on poles pre-1979 with no PCB status)-Denoted with a "T" on GIS prints.

C. Category 1 Transformers - **Non PCB** (known less than 50 ppm by manufacturer's nameplate or "BHE" Number Tag) - Category 1 transformers will be denoted with an "O" on GIS prints.

D. Category 2 Transformers - **Low Risk** of PCB Contamination (based on serial number and manufacturer data) - Category 2 transformers will be denoted with an "L" on GIS prints.

E. Category 3 Transformers - **High Risk** of PCB Contamination (based on serial number and manufacturer data) - Category 3 transformers will be denoted with an "H" on GIS prints.

SECTION 5

INSTRUCTIONS FOR TRANSFORMER NAMEPLATE DATA COLLECTION (Phase I) - Complete

Line 1: GIS Item Number_____

Line 2: Blue or White PCB Label on Trans.
(Circle color)

Line 3: Manufacturer_____

Line 4: Serial Number_____

Line 5: D.O.M._____
(if shown on nameplate)

Line 6: KVA Rating_____

Line 7: Primary Voltage_____

Line 8: Secondary Voltage_____

Line 9: PCB info._____

(exactly as stated)

Line 10: BHE Number_____

Line 11: Road Middle Field

Line 1 – GIS Item Number

Each item in the GIS system, including transformers, carries a unique GIS Item Number. Write in the transformer's GIS item number in Line 1 in order to create a link between the completed data collection form and the transformer symbol on the GIS print.

Line 2 – Blue or White PCB Labels on Transformers

In accordance with Bangor Hydro's PCB Labeling Program found in Section 2, a blue, six-inch square NON-PCB or white, six-inch square NO PCBs label may be attached to the transformer. These labels indicate that the transformer PCB concentration is known to be less than 50 ppm (blue label) or less than 2 ppm (white label) based on nameplate or testing data. If a target transformer is labeled with a blue or white label, circle the appropriate color on Line 2. At this point, no data needs to be collected from the transformer nameplate, simply complete Line 11 on the data collection form regarding the location of the transformer tap (this is only needed when a single phase transformer is tapped to a three phase line).

If the target transformer is not labeled with a blue or white PCB status label, review the nameplate carefully and determine if the PCB status of the transformer is stated on the nameplate.

For target transformers whose nameplate is marked with the words like "Non-PCB" or "Less than 50 ppm", complete Lines 9 and 2 of the data collection form and apply a blue, NON-PCB label to the transformer.

For target transformers that are marked with the words like "Less than 1 ppm PCB", "Less than 2 ppm PCB, or "No PCBs", complete Lines 9 and 2 of the data collection form and apply a white, No-PCBs label to the transformer.

For target transformers that are classified as less than 50 ppm on the nameplate, no further nameplate data needs to be collected, simply complete Line 11 on the data collection form regarding the location of the transformer tap (this is only needed when a single phase transformer is tapped to a three phase line).

For target transformers that are not classified on the nameplate to be less than 50 ppm PCB, Lines 3 through 11 on the data collection form must be completed.

Line 3 - Manufacturer

From the transformer nameplate, write in the complete name of the transformer manufacturer, for example, General Electric, Westinghouse, Line Material, etc.

Line 4 - Serial Number

From the transformer nameplate, write in the transformer serial number. Be sure to write in the entire serial number from the serial number block on the transformer. Do not mistake the transformer style number or catalog number for the serial number. Be sure to write legibly.

Line 5 – D.O.M. (Date of Manufacture)

From the transformer nameplate determine if the date of manufacture is given. If so, write in the date of manufacture on Line 5. If the date of manufacture is not given, write in the word "none".

Line 6 – KVA Rating

From the transformer nameplate, write in the KVA rating of the transformer.

Line 7 – Primary Voltage

From the transformer nameplate, write in the primary voltage of the transformer.

Line 8 – Secondary Voltage

From the transformer nameplate, write in the secondary voltage of the transformer.

Line 9 – PCB Information

Write in the words "none given".

Line 10 – BHE Number

Transformers that have been serviced at the Graham Station transformer shop will have been tagged with a black and white plastic "BHE" number tag. For transformers that have a "BHE" number tag, write in the BHE number.

Line 11 – Road Middle Field

In order to enhance GIS information, where a single phase transformer is tapped onto a three phase line, circle the location of the phase on which the transformer is tapped (Road, Middle, Field) or you can write in the word left, middle, or right phase.

INSTRUCTIONS FOR TRANSFORMER NAMEPLATE DATA COLLECTION (Phase II)

1. At the beginning and end of each day, a representative of the contractor must call in to System Operations or Central Dispatch (depending on time of day) to report location and status of each crew.

2. Image stabilizing binoculars will initially be used to read a label or nameplate on a transformer if it is possible to do it accurately.

3. Enter data for each transformer into the Access database called "PCB Target Transformers."

4. Always record the name of inspector; date of inspection; the position of transformer if more than one on pole; and any problems found with the transformer (i.e., rusted, wrong # of transformers or KVA size), pole, crossarms, guy wires, etc. (in the "comments" field) in the database.

   Road/Middle/Field (pole position): Just indicate which one of the transformers in the bank is closest to the road no matter which side of the road it is on or which phase it is (A, B or C). The transformer furthest from the road would be marked field. Enter this information into computer application.

5. If transformer is labeled with blue or white label indicating "no PCBs" or "non PCBs" in transformer, record which label was on the transformer in the database. The transformer will automatically be ranked as zero risk and you can move to a new record.

6. If the transformer does not have a label indicating No PCB or Non PCB, see if there is a statement on the nameplate about no PCBs in the transformer. If so, chose the correct statement about PCBs from the lookup list in the database. If the statement on the transformer does not match one of the choices in the database, please call Mona or Kevin. If unable to reach, type exact nameplate statement in the comments section and chose the closest statement from the lookup list so it will be ranked as zero. The transformer will automatically be ranked as zero risk and you can move to a new record.

7. If there is a BHE # on the equipment, record that # in the database. The transformer will automatically be ranked as zero risk and you can move to a new record.

8. If there is no label and no statement on the nameplate about no PCBs in the oil or a BHE #, then collect the serial number and manufacturer. Be accurate because those are the pieces of information we use to rank the transformers as to their PCB risk.

9. Be careful to enter the serial no. and not the style no. from the nameplate. If unsure which number on the nameplate is actually the serial number, enter the 2nd number in the comments field.
   Examples of serial numbers: 89AF838293, 2938389, 78A929383.
   Example of style number: C711BA15WRE

10. If the manufacturer is GE, then push the "Look for Match" button after entering serial no. Ranking field will automatically fill in with low or high risk depending on what the computer found. Remember to not enter in the numbers/letters that come after or before the "–"in the serial no. for GE transformers. (i.e., 61P-D392938 or F9293884-61P)

11. If manufacturer is Westinghouse, after entering serial no., you will need to manually rank the transformer using the Westinghouse information on the screen.

12. If the manufacturer is someone other than GE or Westinghouse, the computer will automatically chose the ranking as low if there is no PCB information available, however, you should still enter the serial no. if you can read it.

13. If you have no PCB information available and are unable to read the manufacturer, the transformer must be visited with a bucket truck. Note exception: If the serial no. is a Westinghouse serial no. (i.e., 50A392883, 57AK299384, 77A392983, etc.), you could rank it as high or low accordingly but do not mark mfg. as Westinghouse.

14. If you have no PCB information available and are unable to read the serial no., but can read the manufacturer, you only need to visit the transformer with a bucket truck if the manufacturer is GE or Westinghouse.

15. If the transformer is a high risk transformer and is cast iron, please check off the "cast iron" box in the appropriate record as these transformers will not have an oil sample taken.

16. If the transformer is a high risk transformer, it should be recorded somehow that this transformer will need to be visited with a bucket truck for an oil sample.

17. Banks with more than one transformer should have a record filled out for each transformer in the bank. Please record information for each transformer on a separate record under that GIS ID # in the computer application.

18. If transformers could not be ranked from ground because not enough data could be collected with binoculars, this information should be recorded somehow so that a visit can be made by bucket truck. All the same information will be entered as mentioned before when visited by bucket.

19. If the PCB information statement is found on the transformer's nameplate once visited by bucket, it should be recorded in the database and the appropriate "No PCB" or "Non PCB" label should be placed on the transformer near the bottom on the side of the transformer facing you as you drive down the road. If statement on nameplate reads as the first column indicates, place the label indicated in the 2nd column:

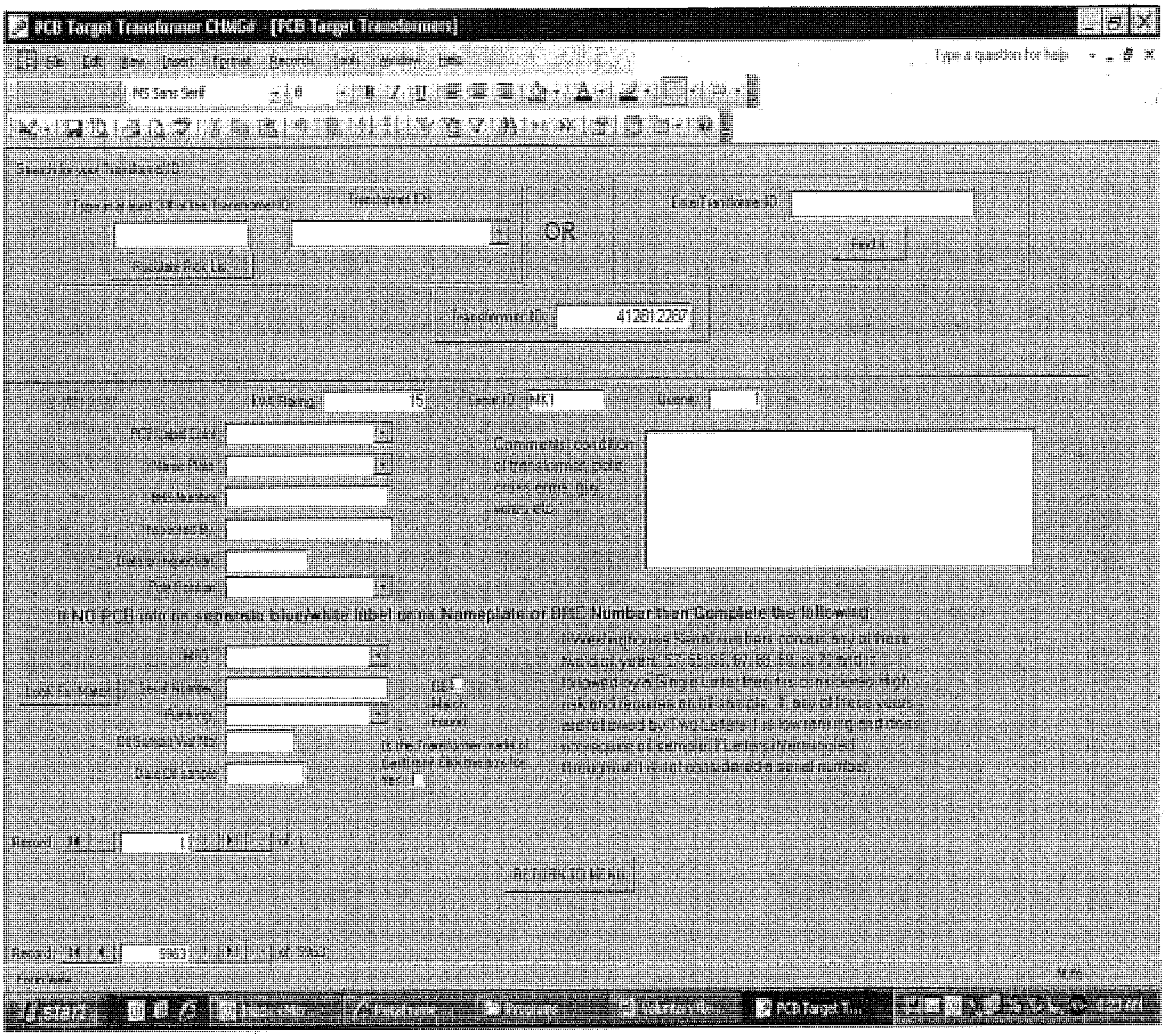
Nameplate Statement	Label
< 50 ppm PCBs	"Non PCBs" label
Non-PCB	"Non PCBs" label
< 2 ppm PCBs	"No PCBs" label
< 1 ppm PCBs	"No PCBs" label
No PCBs	"No PCBs" label

20. Also, if the transformer is ranked as high risk for containing PCBs and is not a cast iron transformer, an oil sample must be taken. Refer to oil sampling procedures.

21. If we are not able to read enough information to rank the transformer, get an oil sample. Refer to oil sampling procedures. Collect as much information as possible in the database and record the PCB ranking of High.

22. If any staining is noticed on the transformer or oil on the ground, please note that in the "comments" field of the database. Also, if any oil is on the ground, please report to BHE Environmental Group 973-2055 right away (street, pole #, house #, town).

23. Database information will have to be downloaded at the end of each week and oil samples and debris must be submitted to Environmental Group weekly.


PCB Target Transformer CHWG# - [PCB Target Transformers]
OR
Transformer ID: 4128122287
If NO PCB info on separate blue/white label or on Nameplate or BHC Number then Complete the following:
RETURN TO MENU

SECTION 6

INSTRUCTIONS FOR CATEGORIZING TRANSFORMERS FOR PCB RISK

Based on historical PCB sampling conducted by Bangor Hydro, as well as other utilities, the potential for a transformer to contain greater than 50 ppm PCBs can be predicted based on the manufacturer and serial number of the transformer. The manufacturer and serial number information indicates the facility where the transformer was manufactured, and the year the transformer was manufactured.

Once Bangor Hydro or designated contractors collect the target transformer nameplate data, district office staff or designated contractors will use the nameplate data and, based on the following instructions, the transformer will be categorized into one of the PCB categories listed below.

Category 1 – **Non PCB** (known less than 50 ppm by manufacturer's nameplate or "BHE" Number Tag) – Category 1 transformers will be denoted with an "O" in GIS.

Category 2 – **Low Risk** of PCB Contamination (based on serial number and manufacturer data) – Category 2 transformers will be denoted with an "L" in GIS.

Category 3 – **High Risk** of PCB Contamination (based on serial number and manufacturer data) – Category 3 transformers will be denoted with an "H" in GIS.

CRITERIA FOR CATEGORIZING TRANSFORMER PCB RISK:

Category 1 - Non PCB Transformers

All transformers that are certified on the manufacturer's nameplate that the unit contains less than 50 ppm will be categorized as a Non PCB transformer. All transformers where Bangor Hydro has a lab analysis certifying that the transformer contains less than 50 ppm PCBs will be categorized as a Non-PCB transformer. Transformers that are tagged with a black and white or yellow and black BHE number transformer tag will have been tested for PCB content. The PCB lab results can be confirmed by calling Bangor Hydro's electrical department and providing the BHE number of the transformer.

Category 2 – Transformers with Low Risk of PCB Contamination

All transformers that are not certified on the nameplate or by lab analysis to be Non-PCB, and that are not identified as one of the high risk group defined below, will be categorized as a low risk for PCBs transformer.

Category 3- Transformers with High Risk of PCB Contamination

The transformers manufactured by the following manufacturers during the years noted will be categorized as a high risk for PCBs transformer.

General Electric transformers manufactured in Pittsfield, Massachusetts, during the years 1937-1969, and

Westinghouse transformers manufactured in Sharon, Pennsylvania, in 1957 or during the years 1965-1970.

Categorization Instructions for General Electric Transformers

Any General Electric transformer manufactured in Pittsfield, Massachusetts, between 1937 and 1969 will be categorized as a high risk for PCBs transformer. For General Electric transformers, use the serial number tables in Section 7 to determine the year the transformer was manufacture and the facility where the transformer was manufactured. For each range of serial numbers, the year of manufacture is given and transformers manufactured in Pittsfield, Massachusetts, are identified by the letter "P" in the factory column.

Note that for the time period 1957-1974, General Electric transformers were suffixed by a two digit year of manufacture and one letter character that indicates the manufacturing factory (the letter "P" indicates that the transformer was manufactured in Pittsfield, Massachusetts):

For example, a General Electric transformer with serial number D495050-60P was manufactured in 1960 in Pittsfield.

For General Electric transformers manufactured between 1937 and 1956, the General Electric transformer tables in Section 7 will need to be reviewed in order to determine the year and place of manufacture.

The PCB Removal database will also rank GE transformers as either high risk or low risk. This can be done by selecting the correct GIS identification number for the transformer that is being looked at and then entering the nameplate data in the record. Once the manufacture and serial number (less any suffixes) has been entered the database can run a query against the transformers tables found in Section 7. If the transformer was manufactured in Pittsfield, Massachusetts, between 1937-1969, then the database will automatically rank that transformer as high risk.

Categorization Instructions for Westinghouse Transformers

Any Westinghouse transformer manufactured in Sharon, Pennsylvania, in 1957 or during the years 1965-1970 will be categorized as a high risk for PCBs transformer. Westinghouse serial numbers begin with two digits that represent the year of manufacture, followed by a one letter factory code, a one letter month code, and finally a sequential number. The factory codes used were, **Sharon: blank**; Athens: A; Sunnyvale: S; Jefferson City: J. For example, a Westinghouse transformer with a serial number such as 65A1 indicated that the unit was manufactured in Sharon in 1965, whereas, a serial number such as 65AA1 would indicate that the transformer was manufactured in Athens in 1965.

Importantly, in order to identify Westinghouse transformers that were manufactured in Sharon, look for a number as the fourth character in the serial number as opposed to a letter.

Example Westinghouse serial numbers that indicate transformers that were made in Sharon, Pennsylvania:

57B12613 – manufactured in Sharon in 1957
57J6404 – manufactured in Sharon in 1957

Example Westinghouse serial number not manufactured in Sharon:

65AA11353 – manufactured in Athens in 1965

The Westinghouse serial number tables are located in Section 8 for reference.

The PCB removal database is unable to automatically rank Westinghouse transformers. These transformers must be ranked manually by field personnel and the ranking must then be selected in the database.

Categorization of Other Transformers

Any transformer that does not have a nameplate or the nameplate is not legible will be categorized as a high risk for PCBs transformer with some exceptions. For transformers where the manufacture is not legible but the serial number can be read and the serial number pattern is that of a Westinghouse transformer, then the transformer can be ranked based on the serial number alone (with the assumption that it is a Westinghouse transformer). If no serial number can be read but the transformer is any manufacturer other then G.E. or Westinghouse, then the transformer can assumed to be low risk for PCBs. If the transformer is G.E. or Westinghouse and the serial number cannot be read, then it must be assumed to be high risk.

Serial Numbers

This information, which is approximate and subject to many exceptions, applies primarily to distribution transformers rated 500 kva below. It is intended to give a rough idea of transformer age and place of manufacture.

The place of manufacture is coded as follows:

K—Oakland, Calif.
M—Merced, Calif. (starting 1967)
P—Pittsfield, Mass. (includes former Holyoke, Mass. plant)
T—Shreveport, La.
Y—Hickory, N. C.

All requests for distribution transformer replacement parts should be directed to Hickory.

Transformer Serial Numbers	Manufactured	
	Approx Year	Factory
0000 to 2569450	1887-1921	P
2569451 to 2836550	1922	P
2836551 to 3025765	1923	P
3025766 to 3032800	1924	P
3032801 to 3037800	1923	K
3037801 to 3182500	1924	P
3182501 to 3198100	1925	P
3198101 to 3203100	1924	K
3203101 to 3254100	1925	P
3254101 to 3255100	1924	K
3255101 to 3300000	1925	K
3300001 to 3374099	1926	P
3374100 to 3379099	1925	K
3379100 to 3456099	1926	P
3456100 to 3461099	1925	K
3461100 to 3523399	1926	P
3523400 to 3528399	1925	K
3528400 to 3615399	1926	P
3615400 to 3625399	1926	K
3625400 to 3700000	1926	P
3700001 to 3835699	1927	P
3835700 to 3845699	1926	K
3845700 to 3935699	1927	P
3935700 to 3936699	1926	K
3936700 to 4060899	1927	P
4060900 to 4065899	1927	K
4065900 to 4070899	1927	P
4070900 to 4071899	1927	K
4071900 to 4127299	1928	P
4127300 to 4137299	1927	K
4137300 to 4332199	1928	P
4332200 to 4342199	1928	K
4342200 to 4499499	1929	P
4499500 to 4509499	1929	K
4509500 to 4590999	1929	P
4591000 to 4591999	1929	K
4592000 to 4668499	1929	P
4668500 to 4678499	1929	K
4678500 to 4731800	1929	P
4731801 to 4793499	1930	P
4793500 to 4803499	1930	K
4803500 to 4859700	1930	P
4859701 to 4912699	1931	P
4912700 to 4922699	1930	K
4922700 to 4974199	1931	P
4974200 to 4975199	1930	K
4975200 to 4985500	1931	P
4985501 to 4993100	1932	P
4993101 to 5050299	1933	P
5050300 to 5052200	1931	K
5052201 to 5054700	1932	K
5054701 to 5056700	1933	K
5056701 to 5060299	1934	K
5060300 to 5094800	1933	P
5094801 to 5162999	1934	P
5163000 to 5165800	1934	K
5165801 to 5167999	1935	K
5168000 to 5196200	1934	P
5196201 to 5212999	1935	P
5213000 to 5216900	1935	K
5216901 to 5217999	1936	K

Transformer Serial Numbers	Manufactured	
	Approx Year	Factory
5218000 to 5287555	1935	P
5287556 to 5305099	1936	P
5305100 to 5310099	1936	K
5310100 to 5372099	1936	P
5372100 to 5377099	1936	K
5443000 to 5443899	1937	K
5443900 to 5444300	1936	K
5444301 to 5505500	1936	P
5505501 to 5517899	1937	P
5517900 to 5522899	1937	K
5522900 to 5624899	1937	P
5624900 to 5634200	1937	K
5634201 to 5634899	1938	K
5634900 to 5646000	1937	P
5646001 to 5776899	1938	P
5776900 to 5782500	1938	K
5782501 to 5786899	1939	K
5786900 to 5842500	1938	P
5842501 to 5898587	1939	P
5898588 to 5898600	1939	K
5898601 to 6162999	1939	P
6163000 to 6165999	1939	K
6166000 to 6190000	1939	P
6202000 to 6205200	1939	K
6205201 to 6207999	1940	K
6208000 to 6352499	1940	P
6352500 to 6357481	1940	K
6357482 to 6421500	1940	P
6421501 to 6453499	1941	P
6453500 to 6456156	1940	K
6456157 to 6457499	1941	K
6457500 to 6484599	1941	P
6484600 to 6490599	1941	K
6490600 to 6589838	1941	P
6589839 to 6590382	1941	K
6590383 to 6704500	1941	P
6704501 to 6892999	1942	P
6893000 to 6898527	1941	K
6898528 to 6902999	1942	K
7089000 to 7093999	1942	K
7094000 to 7098200	1942	P
7098201 to 7219999	1943	P
7220000 to 7220410	1942	K
7220411 to 7224999	1943	K
7225000 to 7225007	1943	K
7225008 to 7316200	1943	P
7316201 to 7334499	1944	P
7334500 to 7334535	1943	K
7334536 to 7334599	1944	P
7334600 to 7337250	1943	K
7337251 to 7339599	1944	K
7339600 to 7440599	1944	P
7440600 to 7445599	1944	K
7445600 to 7650000	1944	P
7650001 to 7692099	1945	P
7692100 to 7693163	1944	K
7693164 to 7697099	1945	K
7697100 to 7793099	1945	P
7793100 to 7797324	1945	K
7797325 to 7798108	1946	K
7798109 to 7854700	1945	P
7854701 to 8101108	1946	P
8101109 to 8106099	1946	K
8106100 to 8215700	1946	P
8215701 to 8269099	1947	P

Transformer Serial Numbers	Manufactured	
	Approx Year	Factory
8269100 to 8272430	1946	K
8272431 to 8274099	1947	K
8274100 to 8276373	1947	P
8276374 to 8276403	1947	K
8276404 to 8551099	1947	P
8551100 to 8559099	1947	K
8559100 to 8799000	1947	P
8799001 to 8810999	1948	P
8811000 to 8816999	1947	K
8817000 to 8984499	1948	P
8984500 to 8986099	1947	K
8986100 to 8991499	1948	K
8991500 to 9162999	1948	P
9163000 to 9169999	1948	K
9170000 to 9247900	1948	P
9247901 to 9364900	1949	P
9364901 to 9374999	1950	P
9580000 to 9583700	1948	K
9583701 to 9586999	1949	K
9631500 to 9638499	1949	K
9643500 to 9645799	1949	
9645800 to 9648499	1950	
9653500 to 9658499	1950	K
9668700 to 9672473	1950	
9672473 to 9673699	1951	
9678700 to 9683699	1951	
9708700 to 9713699	1951	
9718700 to 9723699	1951	K
9728700 to 9733699	1952	
9748700 to 9753699	1952	
9768700 to 9773699	1952	
9780700 to 9785699	1953	
9790700 to 9795699	1953	K
9800700 to 9809999	1953	
9805700 to 9809999	1953	
9810000 to 9815699	1954	
9828300 to 9833299	1954	
9843300 to 9853299	1954	K
9853300 to 9863299	1955	
9868300 to 9878299	1955	
9893300 to 9903299	1956	
9903500 to 9913499	1956	
9913500 to 9918499	1956	K
9938500 to 9943499	1956	
8211000 to 8298098	1950	
8298099 to 8310999	1951	
8323500 to 8337000	1951	P
8337001 to 8345999	1952	
8365100 to 8447250	1951	
8447251 to 8465099	1952	
8472100 to 8484000	1951	
8484001 to 8491999	1952	P
8535600 to 8543599	1953	
8543600 to 8552599	1954	
8552600 to 8560599	1955	
8700100 to 8746999	1952	
8747000 to 8800099	1953	P
8971100 to 8980099	1953	
8980100 to 8981099	1954	
C100000 to C124099	1953	
C124100 to C149999	1954	
C168000 to C173099	1954	P
C173100 to C177999	1955	
C200000 to C252599	1954	

Serial Numbers

Transformer Serial Numbers	Manufactured	
	Approx Year	Factory
C319100 to C334099	1954	
C334100 to C369099	1955	
C374100 to C376999	1955	P
C377000 to C379999	1956	
C380300 to C383782	1956	
C386600 to C437499	1955	
C442200 to C446599	1956	
C447600 to C497599	1955	P
★C497600 to C650999	1956	
C711300 to C712099	1956	
C715100 to C720099	1956	P
C782100 to C783341	1956	P
C788100 to C790008	1956	P
C800100 to C805899	1957	P
C866000 to C873334	1956	Y
C873335 to C878999	1957	Y
C978417 to C978436	1956	K
C979000 to C979400	1956	K
C979401 to C988999	1957	K
D100000 to D149999	1956	
D150000 to D201999	1957	
D209000 to D258999	1957	P
D264000 to D268999	1957	
D270000 to D317999	1958	
D319000 to D319999	1958	
D321000 to D356799	1958	
D358000 to D446742	1958	P
D446743 to D457999	1960	
D458000 to D461799	1959	
D461800 to D511799	1960	
D511800 to D512799	1959	
D512800 to D513299	1960	P
[illegible]00 to D513799	1959	
00 to D528416	1960	
D528417 to D549999	1961	P
D600000 to D628749	1957	Y
D628750 to D654999	1958	Y
D744000 to D757999	1957	K
D758000 to D761999	1958	K
D762000 to D763999	1957	K
D864000 to D873999	1958	K
D874000 to D892915	1958	Y
D892916 to D923999	1959	Y
D924000 to D933999	1958	K
D939000 to D940299	1958	K
D940300 to D948999	1959	K
D949000 to D988622	1959	Y
D988623 to D999999	1960	Y
E100000 to E128999	1960	Y
E229000 to E249999	1959	K
E252500 to E258999	1960	K
E360000 to E399078	1961	P
E399079 to E414799	1962	P
E414800 to E417196	1961	P
E417197 to E459999	1962	P
E460000 to E500647	1960	Y
E500648 to E559999	1961	Y
E564000 to E583999	1960	K
E696000 to E697113	1960	K
E697114 to E715999	1961	K
E816000 to E825999	1961	K
E829000 to E842549	1961	Y
E842550 to E922604	1962	Y
E922605 to E928999	1963	Y
E929000 to E934299	1962	P
E934300 to E999999	1963	P
F100000 to F128999	1964	P
F129000 to F130966	1961	K
F130967 to F138999	1962	K
F240000 to F259500	1962	K
F259501 to F271999	1963	K
F372000 to F464704	1963	Y
F464723 to F472999	1964	Y
F478000 to F501958	1964	P
F501959 to F524099	1965	P
F524100 to F532099	1964	P
F532100 to F559532	1965	
F582100 to F584099	1965	
F607000 to F614700	1966	P
F614701 to F634099	1967	
F634100 to F638099	1966	
F639100 to F649099	1966	P
F651000 to F677999	1967	P
F678000 to F687999	1963	K
F689000 to F697480	1963	K
F697481 to F698999	1964	K
F803500 to F813499	1964	K
F816000 to F924837	1964	Y
F924838 to F935999	1965	Y
F936000 to F955999	1964	K
G166000 to G175999	1965	K
G180000 to G301612	1965	Y
G301613 to G304597	1966	Y
G305000 to G314999	1965	K
G415400 to G432304	1965	K
G432305 to G435399	1966	K
G435400 to G570399	1966	Y
G570400 to G590399	1966	K
G710900 to G725900	1966	K
G725901 to G750899	1967	K
G867608 to G999999	1967	Y
H200500 to H207999	1968	
H208000 to H238461	1968	
H238462 to H254000	1969	P
H254001 to H259161	1968	
H259162 to H267885	1969	
H267886 to H273999	1970	
H274000 to H274340	1969	
H274341 to H292666	1970	P
H292667 to H330062	1971	
H330063 to H361999	1973	
H362000 to H366000	1972	P
H367001 to H369508	1973	P
H369509 to H369799	1974	P
H378759 to H400399	1974	P
H420500 to H422289	1967	M
H422290 to H425498	1968	M
H525500 to H540446	1967	K
H540447 to H565498	1968	K
H566000 to H592119	1967	Y
H592120 to H726520	1968	Y
H726521 to H734999	1969	Y
H735000 to H735124	1968	Y
H735125 to H735466	1969	Y
H838500 to H846341	1968	K
H846342 to H875909	1969	K
H875910 to H878437	1970	K
H888500 to H890062	1968	M
H890063 to H895483	1969	M
H895484 to H898495	1970	M
J100000 to J218999	1969	Y
J330195 to J330615	1972	P
J330616 to J330999	1973	P
J331135 to J331249	1972	P
J443698 to J631499	1971	Y
J734500 to J769850	1970	
J769851 to J790700	1971	
J790701 to J790818	1973	K
J790819 to J790906	1974	
J791000 to J814400	1971	
J814401 to J814499	1970	K
J814500 to J819182	1970	M
J819183 to J824499	1971	M
J927000 to J933269	1971	T
J933270 to J936999	1972	T
K140000 to K325560	1971	Y
K325561 to K339999	1972	Y
K446078 to K450499	1973	P
K450500 to K471432	1971	K
K471433 to K510011	1972	K
K510030 to K510076	1975	K
K511213 to K529878	1973	K
K530500 to K540499	1971	M
K651500 to K842393	1972	Y
K842394 to K851499	1973	Y
K851500 to K861499	1973	T
K861500 to K999999	1973	Y
L100000 to L161167	1973	Y
L161500 to L169898	1973	T
L170000 to L171499	1973	T
L171500 to L180914	1973	K
L187000 to L192499	1973	T
L192521 to L192976	1973	P
L192977 to L198500	1974	P
L202500 to L229938	1973	K
L229939 to L242498	1974	K
L242578 to L260308	1973	Y
L260309 to L442449	1974	Y
L440500 to L440619*	1973	P
L442500 to L444999	1973	T
L445000 to L465683	1974	T
L462500 to L462999*	1974	Y
L463000 to L463404*	1974	
L463405 to L463668†	1975	
L463669 to L463847†	1976	
L463848 to L464102†	1977	P
L465000 to L473954*	1974	
L473955 to L478675	1974	
L478676 to L480727	1974	P
L480737 to L480823	1977	P
L495000 to L495097	1974	P
L495098 to L495739	1975	P
L663000 to L700471	1974	K
L700472 to L702999	1975	K
L705683 to L711116	1975	T
L711117 to L718169	1976	T
L718197 to L723481	1977	T
L723500 to L787629	1974	Y
L787630 to L891130	1975	Y
L891131 to L999976	1976	Y

Note: Starting with 1957 and thru 1974, all serial numbers were suffixed by a dash and the last two digits of the year and a letter—"P" for Pittsfield, "Y" for Hickory, "K" for Oakland, and "M" for Merced, "T" for Shreveport. Example: C979401-57K.

In 1975 the serial number suffix was changed to use the GE date code. Example: M316674TEPA was built in Shreveport, May 1978. The final "A" signifies aluminum windings.

* Some duplication of numbers has occurred between factories. Where this has happened, the suffix correctly indicates the approximate year of manufacture and the factory.

† Distribution Switches.

★Changed since Mar. 10, 1980 issue.

★TRANSFORMER SERIAL NUMBERING SYSTEM

Starting with 1957 and thru 1974, all serial numbers were suffixed by a dash and the last two digits of the year and a letter —"P" for Pittsfield, "Y" for Hickory, "K" for Oakland, "M" for Merced, and "T" for Shreveport. Example: C979401-57K.

In 1975 the serial number suffix was changed to use the GE date code. For example, M316674TEPA can be interpreted as follows:

1. **T** = Shreveport (see above)
2. **E** = May
   The month code began with "A" in January 1965 and ended with M in December, excluding the letter "I". This code will be used thru 1985. In 1986, with a new year code, the month code would be then begin with the letter "N" through "Z", excluding the letter "Q" and this sequence will run through the year 2006.
3. **P** = 1978
   The year sequence was begun in 1965 with the 1 letter "A", and excluding letters I, O, Q, V and Z, will end in 1985 with the letter "Y". This sequence will begin again in 1986 with the letter "A", but with a different month code.
4. **A** = aluminum windings

This past history of the numbering system and what can be expected in the future should be of assistance in determining proper warranty procedures, and should also eliminate constantly updating instructions on the serial number sequences.

Transformer Serial Numbers	Manufactured		Transformer Serial Numbers	Manufactured		Transformer Serial Numbers	Manufactured	
	Approx. Year	Factory		Approx. Year	Factory		Approx. Year	Factory
M000001 to M013933	1975	K	M574338 to M575700	1978	Y	N000001 to N001355	1979	Y
M029001 to M039183	1975	Y	M585700 to M586199	1978	Y	N001500 to N002093	1979	Y
M039184 to M039354	1976	Y	M586200 to M589717	1978	T	N002094 to N002299	1980	Y
M039355 to M039499	1977	Y	M590001 to M593173	1978	T	N002300 to N007704	1979	T
M049500 to M130484	1976	Y	M593174 to M606001	1979	T	N007705 to N008744	1980	T
M130485 to M295875	1977	Y	M606200 to M606967	1978	Y	N010001 to N020562	1980	T
M300000 to M300392	1976	Y	M606968 to M606989	1978	Y	★N020563 to N022299	1981	T
M300393 to M303496	1977	Y	M607000 to M701185	1978	Y	N022300 to N023028	1979	Y
M303571 to M312770	1977	★T	M701186 to M806951	1979	Y	N023029 to N199026	1980	Y
M312771 to M322859	1978	T	M807000 to M807573	1978	Y	★N199027 to N223592	1981	Y
M323100 to M323450	1978	T	M807574 to M807775	1978	Y	N223650 to N224511	1980	Y
M323500 to M409959	1977	Y	M807800 to M808099	1978	Y	★N224512 to N225499	1981	Y
M409960 to M573456	1978	Y	M813100 to M813280	1978	Y	★N225500 to N229878	1981	T
M573501 to M573566	1977	Y	M813281 to M815368	1979	Y	★N230001 to N234963	1981	T
M573567 to M573800	1978	Y	M815500 to M995569	1979	Y	★N245500 to N414941	1981	Y
M573801 to M574337	1977	Y	M995572 to M999964	1980	Y	★N445500 to N446156	1981	Y

Serial Numbers

SERIAL NUMBERS FOR G-E DISTRIBUTION TRANSFORMERS MADE IN PITTSFIELD, MASS.

This information applies principally to distribution transformers 500-kva and smaller as built at Pittsfield, but is only approximate and is subject to many exceptions. Its intent is to give a rough idea of transformer age. The serial numbers of transformers manufactured in Oakland are tabulated on page 4.

Approx Year of Manufacture	Transformer Serial Numbers	Approx Year of Manufacture	Transformer Serial Numbers	Approx Year of Manufacture	Transformer Serial Numbers
1887	to 2072	1928	4071101 to 4338000		B543600 to B552599
1888	2073 to 3540	1929	4338001 to 4731800		B980100 to B981099
1889	3541 to 14403	1930	4731801 to 4859700	1954	C124100 to C149999
1890	14404 to 29150	1931	4859701 to 4985500		C168000 to C173099
1891	29151 to 41094	1932	4985501 to 4993100		C200000 to C252599
					C319100 to C334099
1892	41095 to 55330				
1893	55331 to 63360	1933	4993101 to 5094800		
1894	63361 to 70489	1934	5094801 to 5196200		B552600 to B560599
1895	70490 to 82645	1935	5196201 to 5287555		C173100 to C177999
1896	82646 to 93109	1936	5287556 to 5505500	1955	C334100 to C369099
		1937	5505501 to 5646000		C374100 to C376999
1897	93110 to 104636				C386600 to C437499
1898	104637 to 119851				C447600 to C497599
1899	119852 to 141172	1938	5646001 to 5842500		
1900	141173 to 166949	1939	5842501 to 6190000		
1901	166950 to 204734	1940	6208000 to 6421500		C377000 to C379999
1902	204735 to 241407	1941	6421501 to 6704500		C380300 to C383782
		1942	6704501 to 7098200		C442200 to C446599
1903	241408 to 283870	1943	7098201 to 7316200		C647000 to C650999
1904	283871 to 319724			1956	C711300 to C712099†
1905	319725 to 389739	1944	7316201 to 7650000		C715100 to C720099
1906	389740 to 487259	1945	7650001 to 7854700		C782100 to C783341
1907	487260 to 565649	1946	7854701 to 8215700		C788100 to C79000
1908	565650 to 618711	1947	8215701 to 8799000		C866000 to C87333
1909	618712 to 717241	1948	8799001 to 9247900		
					C800100 to C805899
1910	717242 to 829763	1949	9247901 to 9364900	★1957	C873335 to C878999ϕ
1911	829764 to 932100	1950	9364901 to 9374999		D264000 to D268999
1912	932101 to 1052033		B211000 to B298098		D600000 to D628749ϕ
1913	1052034 to 1311374				
					D270000 to D317999
1914	1311375 to 1385802		B298099 to B310999		D319000 to D319999
1915	1385803 to 1478900		B323500 to B337000	★1958	D321000 to D356799
1916	1478901 to 1739466	1951	B365100 to B447250		D358000 to D459099
1917	1739467 to 1924215		B472100 to B484000		D628750 to D654999ϕ
					D874000 to D892950ϕ
1918	1924216 to 2045370				
1919	2045371 to 2230650		B337001 to B345999		
1920	2230651 to 2406249		B447251 to B465099		D459100 to D459299
1921	2406250 to 2569450	1952	B484001 to B491999	★1959	D461300 to D513799
1922	2569451 to 2836550		B700100 to B746999		D892951 to D923999ϕ
					D949000 to D986806ϕ
1923	2836551 to 3025765				
1924	3025766 to 3182500		B535600 to B543599		D513800 to D514199
1925	3182501 to 3300000		B747000 to B800099	★1960	D986807 to D999999ϕ
1926	3300001 to 3700000	1953	B971100 to B980099	(Portial)	E100000 to E128999ϕ
1927	3700001 to 4071100		C100000 to C124099		E460000 to .....ϕ

† Manufactured in Holyoke, Mass.
ϕ Manufactured in Hickory, N. C.

1964)

★Added since May 6, 1957 issue. Formerly Section 5407.

SERIAL NUMBERS FOR G-E DISTRIBUTION TRANSFORMERS

MADE IN PITTSFIELD

Approximate Year of Manufacture	Transformer Serial Numbers
1956	D100000-D149999
1957	C800100-C805899
	D150000-D201999
	D209000-D258999
	D264000-D268999
1958	D270000-D275999
	D276000-D277999
	D278000-D317999
	D319000-D319999
	D321000-D325999
	D326000-D326799
	D326800-D356799
	D358000-D457999
	D458000-D458499
	D458500-D458999
	D459000-D459099
1959	D459100-D459299
	D461300-D461799
	D461800-D511799
	D511800-D512299
	D512300-D512799
	D512800-D513299
	D513300-D513799
1960	D446743-D528416
1961	D528417-E417100
1962	E417101-E933245
1963	E934300-6[illegible]-E999272-6[illegible]
1964	E 999273-6[illegible]
1965	F501959-6[illegible]

Date of Manufacture by Serial Number

Note that distribution transformers having serial number less than 1,000,000 were built at East Pittsburgh plant. Distribution transformers having serial number 1,000,000 or over were built at the Sharon plant or Sunnyvale, Calif., plant.

Serial Numbers	Year of Manufacture
404400 to 435299	①1916
435300 to 514457	②1917
514458 to 526174	②1918
526175 to 549169	②1919
549170 to 604799	1920
604800 to 631693	1912
631694 to 674000	1922
674001 to 774799	1923
1006740 to 1082622	1924
1082623 to 1234960	1925
1234961 to 1336354	1926
1336355 to 1472121	1927
1472122 to 1591242	1928
③1600000 to 1608230	1928
1591243 to 1761152	1929
③1608231 to 1618757	1929
1761153 to 1874075	1930
③1618758 to 1619999	1930
③1740000 to 1748857	
1874076 to 1924631	1931
③1748858 to 1756785	1931
1924632 to 1960000	1932
③1756786 to 1758310	1932
1960001 to 2026230	1933
③1758311 to 1769720	1933
2026231 to 2062299	1934
③1759721 to 1759999	1934
③2000001 to 2002400	1934
2062300 to 2103800	1935
③2002401 to 2008828	1935
2103801 to 2229999	1936
③2008829 to 2020000	1936
③2420000 to 2420165	1936
2230000 to 2417299	1937
③2420166 to 2433064	1937
2417300 to 2566000	1938
③2433065 to 2436334	1938
2566001 to 2722500	1939
③2436335 to 2439999	1939
③2660000 to 2665389	
2722501 to 2845700	1940
③2665390 to 2678900	1940
2845701 to 3129900	1941
③2678901 to 2679999	1941
③2960000 to 2975999	
3129901 to 3179100	1942
2976000 to 2979999	1942
③3260000 to 3262869	
3179101 to 3529682	1943
③3262870 to 3269129	1943
3529683 to 3695000	1944
③3269130 to 3279999	1944
③3700000 to 3703359	1944
3695001 to 3920099	1945
3940100 to 3956327	1945
③3703360 to 3719999	1945
③3920100 to 3928750	1945
3956328 to 4140099	1946
4160100 to 4210495	1946
③3928751 to 3940099	1946
③4140100 to 4152117	1946
4210496 to 4575060	1947
③4252118 to 4160099	1947
③4460100 to 4480099	1947
③4480600 to 4489999	1947
③4870000 to 4889999	1947
4575061 to 5097122	1948
③4890000 to 4909999	1948
③5350000 to 5363000	1949
5087123 to 5523654	1949
③5363001 to 5389113	1949
5523655 to 5870999	1950
③5389114 to 5399999	1950
③5440000 to 5458055	1950
5871000 to 6049850	1951
③5458056 to 5459999	1951
③6160000 to 6184279	1951
③6320000 to 6322167	1951
③6322168 to 6349185	1952
6060000 to 6159999	1952
6350000 to 6424934	1952
③6349186 to 6349992	1953
6402953 to 6560388	1953
③6900000 to 6921222	1953
6556000 to 6643849	1954
③6921223 to 6941514	1954
55A1	④1955
55SM10	④1955
65AD10	④1965
76A010001	⑥1976

Code Identification: Sharon, Sunnyvale, Athens

Year	Code Year	55 1955			56 1956			65 1965						
Place of Manufacture	Code Location	Blank Sharon			S Sunnyvale⑤			A Athens						
Month	Code Month	A Jan.	B Feb.	C Mar.	D Apr.	E May	F June	G July	H Aug.	J Sept.	K Oct.	L Nov.	M Dec.	
Week	Code Week	01 Week 1	01 Week 2	.....									52 Week 52	

Manufacturing Serial Number (Maximum of Five Digits): 1 to 99,999

Examples: 55A1, 55SM10, 65AD10, 76A010001

Year	Location	Month/ Week	Manufacturing Serial Number	Description
55	..	A	1	First unit built at Sharon in January, 1955
55	S	M	10	Tenth unit built at Sunnyvale in December, 1955
65	A	D	10	Tenth unit built at Athens in April, 1965
76	A	01	0001	First unit built at Athens in first week in January, 1976

Some overhead distribution transformers are made in Jefferson City. The letter "J" between year and month identifies those units.

Example: 77JA350001

Year	Month	Production Date	Serial
77 J	A	350	001

① Refer to Westinghouse for serial numbers prior to 1916.

② In July 1917, serial numbers on distribution transformers having style numbers were discontinued until June 1919, when they were reinstated. During the period in question, the date of manufacture and L spec. number were stamped on the nameplate in place of the serial number.

③ Sunnyvale plant.

④ Code identification began late in 1954.

⑤ Distribution transformer manufacturing discontinued in December, 1964.

⑥ Week code rather than month code effective January 1, 1976.

Note: Cast iron tanks were discontinued with serial number about 520000.

SELLING POLICY
46-000

DISTRIBUTION TRANSFORMERS

DATE OF MANUFACTURE BY SERIAL NUMBERS

Customers sometimes desire, for inventory or other purposes, to check the date of manufacture of their apparatus. The following table gives the date of manufacture of our distribution transformers by serial numbers. This table applies to transformers 200 kva and below—33 kv and below. For other ratings refer to Transformer Sales Dept., Sharon Plant.

Transformers built prior to 1906 do not have silicon steel and it is recommended that they be replaced by new units.

Transformers built between the years 1906 and 1910, may or may not have been built with silicon steel. It is recommended that Sharon be checked in regard to any of these units now in use.

NOTE: Distribution Transformers having serial numbers less than 1,000,000 were built at the East Pittsburgh Plant. Distribution Transformers having serial numbers 1,000,000 or over were built at the Sharon Plant.

1950

SERIAL NUMBERS	YEAR OF MANUFACTURE	SERIAL NUMBERS	YEAR OF MANUFACTURE	SERIAL NUMBERS	YEAR OF MANUFACTURE
78200 to 83799	1896	**1608231 to 1618757	1929	-3529683 to 3695000-	1944
83800 to 88849	1897	1761153 to 1874075	1930	**3269130 to 3279999	1944
88850 to 96699	1898	**1618758 to 1619999	1930	**3700000 to 3703359	1944
96700 to 103711	1899	**1740000 to 1748857		-3695001 to 3920099-	1945
103712 to 112099	1900	1874076 to 1924631	1931	- 3940100 to 3956327-	1945
112100 to 117749	1901	**1748858 to 1756785	1931	**3703360 to 3719999	1945
117750 to 130799	1902	1924632 to 1960000	1932	**3920100 to 3928750-	1945
130800 to 140999	1903	**1756786 to 1758310	1932	-3956328 to 4140099-	1946
141000 to 152099	1904	1960001 to 2026230	1933	- 4160100 to 4210495-	1946
152100 to 163699	1905	**1758311 to 1759720	1933	**3928751 to 3940099-	1946
163700 to 188999	1906	2026231 to 2062299	1934	**4140100 to 4152117-	1946
189000 to 209099	1907	**1759721 to 1759999	1934	-4210496 to 4575060-	1947
209100 to 218799	1908	**2000001 to 2002400	1934	**4152118 to 4160099-	1947
218800 to 253899	1909	2062300 to 2103800	1935	**4460100 to 4480099	1947
253900 to 260899	1910	**2002401 to 2008828	1935	**4480600 to 4489999	1947
260900 to 287699	1911	2103801 to 2229999-	1936	**4870000 to 4889999	1947
287700 to 319799	1912	**2008829 to 2020000	1936	-4575061 to 5097122-	1948
319800 to 349799	1913	**2420000 to 2420165	1936	**4890000 to 4909999	1948
349800 to 379999	1914	- 2230000 to 2417299-	1937	**5350000 to 5363000	1948
380000 to 404399	1915	**2420166 to 2433064	1937	-5097123 to 5523654-	1949
404400 to 435299	1916	- 2417300 to 2566000-	1938	**5363001 to 5389113	1949
435300 to 514457	*1917	**2433065 to 2436334	1938	-5523655 to 5870999	1950
514458 to 526174	*1918	- 2566001 to 2722500 -	1939	**5389114 to 5399999	1950
526175 to 549169	*1919	**2436335 to 2439999	1939	**5440000 to 5458055	1950
549170 to 604799	1920	**2660000 to 2665389			
604800 to 631693	1921	- 2722501 to 2845700 -	1940		
631694 to 674000	1922	**2665390 to 2678900-	1940		
674001 to 774799	1923	- 2845701 to 3129900-	1941		
1006740 to 1082622	1924	**2678901 to 2679999	1941		
1082623 to 1234960	1925	**2960000 to 2975999			
1234961 to 1336354	1926	- 3129901 to 3179100 -	1942		
1336355 to 1472121	1927	**2976000 to 2979999	1942		
1472122 to 1591242	1928	**3260000 to 3262869			
**1600000 to 1608230	1928	- 3179101 to 3529682-	1943		
1591243 to 1761152	1929	**3262870 to 3269129	1943		

Cast iron tanks were discontinued with serial number about 520000.

** Sunnyvale Plant

* In July 1917, serial numbers on distribution transformers having style numbers were discontinued until June 1919, when they were reinstated. During the period in question, the date of manufacture and L spec. number were stamped on the nameplate in place of the serial number.

Prices, Discounts and Commissions Subject to Change Without Notice

WESTINGHOUSE ELECTRIC CORPORATION

SHARON PLANT, SHARON, PA. • **SUNNYVALE PLANT, SUNNYVALE, CALIF.**

Printed in U.S.A.

liquid-immersed distribution transformers
pole, substation and pad mounted

date of manufacture by serial number

Note: Distribution transformers having serial numbers less than 1,000,000 were built at East Pittsburgh plant. Distribution transformers having serial numbers 1,000,000 or over were built at the Sharon plant or Sunnyvale, Calif., plant.

serial numbers	year of manufacture
404400 to 435299	I1916
435300 to 514457	■1917
514458 to 526174	■1918
526175 to 549169	■1919
549170 to 604799	1920
604800 to 631693	1921
631694 to 674000	1922
674001 to 774799	1923
1006740 to 1082622	1924
1082623 to 1234960	1925
1234961 to 1336354	1926
1336355 to 1472121	1927
1472122 to 1591242	1928
++1600000 to 1608230	1928
1591243 to 1761152	1929
++1608231 to 1618757	1929
1761153 to 1874075	1930
1617758 to 1619999 / ++1740000 to 1748857	1930
1874076 to 1924631	1931
++1748858 to 1756785	1931
1924632 to 1960000	1932
+1756786 to 1758310	1932
1960001 to 2026230	1933
++1758311 to 1759720	1933
2026231 to 2062299	1934
++1759721 to 1759999	1934
++2000001 to 2002400	1934
2062300 to 2103800	1935
++2002401 to 2008828	1935
2013801 to 2229999	1936
++2008829 to 2020000	1936
++2420000 to 2420165	1936
2230000 to 2417299	1937
++2420166 to 2433064	1937
2417300 to 2566000	1938
++2433065 to 2436334	1938
2566001 to 2722500	1939
++2436335 to 2439999 / ++2660000 to 2665389	1939
2722501 to 2845700	1940
++2665390 to 2678900	1940
2845701 to 3129900	1941
++2678901 to 2679999 / ++2960000 to 2975999	1941
3129901 to 3179100	1942
2976000 to 2979999 / ++3260000 to 3262869	1942
3179101 to 3529682	1943
262870 to 3269129	1943
3529683 to 3695000	1944
++3269130 to 3279999	1944
++3700000 to 3703359	1944
3695001 to 3920099	1945
3940100 to 3956327	1945
++3703360 to 3719999	1945
++3920100 to 3928750	1945
3956328 to 4140099	1946
4160100 to 4210495	1946
++3928751 to 3940099	1946
++4140100 to 4152117	1946
4210496 to 4575060	1947
++4152118 to 4160099	1947
++4460100 to 4480099	1947
++4480600 to 4489999	1947
++4870000 to 4889999	1947
4575061 to 5097122	1948
++4890000 to 4909999	1948
++5350000 to 5363000	1949
5087123 to 5523654	1949
++5363001 to 5389113	1949
5523655 to 5870999	1950
++5389114 to 5399999	1950
++5440000 to 5458055	1950
5871000 to 6049850	1951
++5458056 to 5459999	1951
++6160000 to 6184279	1951
++6320000 to 6322167	1951
++6322168 to 6349185	1952
6060000 to 6159999	1952
6350000 to 6424934	1952
++6349186 to 6349992	1953
6402953 to 6560388	1953
++6900000 to 6921222	1953
6556000 to 6843849	1954
++6921223 to 6941514	1954
55A10	✣1955
55SM10	✣1955
58AD10	✣1958

new code identification

year													
	code	55			56			58					
	year	1955			1956								
place of manufacture	code	blank			S			A					
	location	Sharon			Sunnyvale			Athens					
month	code	A	B	C	D	E	F	G	H	J	K	L	M
	month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
manufacturing serial number (maximum of five digits)		1 to 99,999											

examples: 55SM10 - 58AD10 - 56C1

year	location	month	manufacturing serial number	description
55	S	M	10	tenth transformer manufactured at Sunnyvale in December, 1955
58	A	D	10	tenth transformer manufactured at Athens in April, 1958
56	..	C	1	first transformer manufactured at Sharon in March, 1956

I Refer to Westinghouse for serial numbers prior to 1916.

■ In July 1917, serial numbers on distribution transformers having style numbers were discontinued until June 1919, when they were reinstated. During the period in question, the date of manufacture and L spec. number were stamped on the nameplate in place of the serial number.

++ Sunnyvale plant.

✣ New code identification began late in 1954.

note: Cast iron tanks were discontinued with serial number about 520000.

Westinghouse Electric Corporation
Distribution Transformer Division: Sharon Plant • Sharon, Pa.
Athens Plant • Athens, Georgia
printed in U.S.A.

SECTION 9

INSTRUCTIONS FOR SAMPLING OF HIGH RISK TRANSFORMERS (BHE Employees)

Tools required:

Hilti Powder-Actuated Tool- These tools are specifically designed to pierce a ¼"hole in the transformer for oil sampling. The tools operate using a .27 caliber powder booster. Hands on training will be required for anyone using these tools.

Bellows type pipette- These are a pipette similar to the style of pipette used to take oil samples in the field during spills. These pipettes have a 12" flexible vinyl tubing which is small enough to fit the ¼" hole created by the Hilti tool.

Heavy duty two handled rivet tool- The rivet tool is a two handled manually operated tool that is designed to close the ¼" inch hole in the transformer created by the Hilti tool.

Sealing tool- These tools are the typical gun style tool used to apply standard sealants.

Supplies required:

Insulated gloves with leather protectors (designated pair for this project only)
¼" blind hole, closed end rivet with neoprene-bonded sealing washer
.27 caliber powder tool booster
4 ml sample vial (pre-printed label)
Trash bags (for sample supplies)
Hazardous debris drums
Spill Supplies
Door Hangers (notify customers that outage occurred)
Hilti tool maintenance kit
Bellows pipettes w/ 12" flexible tubing
Sealant
Paint Marker
Rated face shield

Sampling Method:

Sampling will be performed on all transformers that are ranked as high risk (either by serial number or lack of a positive identification), except cast iron transformers. Cast iron transformers will only have the nameplate information gathered on them. The sampling will be conducted on de-energized transformers only. All work conducted in the primary area must be conducted wearing rated insulated gloves with leather protectors. The following are the steps to the sampling method:

1. Contact customers that will be affected by the outage. If customers are unavailable, leave the provided door hanging.
2. Notify Central Dispatch or System Operations that an oil sample needs to be taken and that a transformer will be taken offline.
3. De-energize transformer using safe work practices.
4. When puncturing transformer or removing the pressure relief valve, wear a rated face mask and hold a rag around the hilti tool when puncturing to catch any drippage. Also have a rag ready when removing pressure relief valve in the event the oil level is too high and leaks out.
5. If a pressure relief valve is present on the transformer, depressurize the transformer.
6. If a pressure relief valve is present, remove the pressure relief valve and sample the transformer through the opening. If pressure relief valve is not present;
7. Puncture the transformer on the side, above the oil level with the Hilti tool. When selecting the position where the hole will be punched, be sure to pay attention to location of bushings as well as any lean to the transformer.
8. Withdraw an oil sample from the transformer using a new bellows type pipette.
9. Place sample from pipette into pre-numbered sample vial. Vials should be full.
10. Collect pipettes and any other contaminated debris in a plastic bag. Bag should be placed in the provided drum on the back of the vehicle.
11. If pressure relief valve was removed, replace the valve. If no pressure relief valve present;
12. Seal ¼" hole in transformer using the rivet tool and ¼" blind hole, closed end rivet with neoprene-bonded sealing washer and epoxy. Rivet and washer should be oriented so the neoprene side of the washer will face the transformer. Once the rivet is installed, it cannot be removed unless it is drilled out.
13. Seal the outside of the rivet with provided sealant.
14. Write the sample No. on the top of the transformer using the provided paint marker.
15. Re-energize the transformer using safe work practices.
16. Ensure that power has been restored to all customers taken offline.
17. Notify Central Dispatch or System Operations that the transformer has been restored.
18. Record the sample number, in the appropriate record for that transformer, in the computer database.
19. Periodically all samples will be transferred to the BHE Environmental Group for processing and analysis.
20. At the end of the project, debris will be returned to the Division Office for proper disposal.
21. Periodically, laptops will be downloaded.

- Note: Some Westinghouse transformers are made of metal too thick for the hilti gun to puncture. If unable to puncture, do not sample and note in the comments field that metal is too thick to puncture.

- Note: Some older style transformers with bushings that are pointed down and have a small sample port cover can be sampling energized as long as proper clearances are maintained.

INSTRUCTIONS FOR SAMPLING OF HIGH RISK TRANSFORMERS (Contractors)

Tools required:

Hilti Powder-Actuated Tool- These tools are specifically designed to pierce a ¼"hole in the transformer for oil sampling. The tools operate using a .27 caliber powder booster. Hands on training will be required for anyone using these tools.

Bellows type pipette- These are a pipette similar to the style of pipette used to take oil samples in the field during spills. These pipettes have a 12" flexible vinyl tubing which is small enough to fit the ¼" hole created by the Hilti tool.

Heavy duty two handled rivet tool- The rivet tool is a two handled manually operated tool that is designed to close the ¼" inch hole in the transformer created by the Hilti tool.

Sealing tool- These tools are the typical gun style tool used to apply standard sealants.

Supplies required:

Insulated gloves with leather protectors (designated pair for this project only) (Contractor supplied)
¼" blind hole, closed end rivet with neoprene-bonded sealing washer
.27 caliber powder tool booster
4 ml sample vial (pre-printed label)
Trash bags (for sample supplies) (Contractor supplied)
Hazardous debris drums
Spill Supplies (Contractor supplied)
Door Hangers (notify customers that outage occurred)
Hilti tool maintenance kit
Bellows pipettes w/ 12" flexible tubing
Sealant
Paint Marker
Rated face shield (recommended)
Rags

Sampling Method:

Sampling will be performed on all transformers that are ranked as high risk (either by serial number or lack of a positive identification), except cast iron transformers. Cast iron

transformers will only have the nameplate information gathered on them. The sampling will be conducted on de-energized transformers only. All work conducted in the primary area must be conducted wearing rated insulated gloves with leather protectors. The following are the steps to the sampling method:

1. Prior to beginning work each day notify Central Dispatch or System Operations (depending on time of day) of where crews will be working.
    - Central Dispatch- 6:30am to 3:30pm (973-2660)
    - System Operations- 3:30pm to 6:30am (942-4416)
2. Contact customers that will affected by the outage. If customers are unavailable, leave the provided door hanging.
3. Notify Central Dispatch or System Operations that an oil sample needs to be taken and that a transformer will be taken offline.
4. De-energize transformer using safe work practices.
5. When puncturing transformer or removing the pressure relief valve, it is recommended that a rated face shield is worn. Hold a rag around the hilti tool when puncturing to catch any drippage. Also have a rag ready when removing pressure relief valve in the event the oil level is too high and leaks out.
6. If a pressure relief valve is present on the transformer, depressurize the transformer.
7. If a pressure relief valve is present, remove the pressure relief valve and sample the transformer through the opening. If pressure relief valve is not present;
8. Puncture the transformer on the side, above the oil level with the Hilti tool. When selecting the position where the hole will be punched, be sure to pay attention to location of bushings as well as any lean to the transformer.
9. Withdraw an oil sample from the transformer using a new bellows type pipette.
10. Place sample from pipette into pre-numbered sample vial. Vials should be full.
11. Collect pipettes and any other contaminated debris in a plastic bag. Bag should be placed in the provided drum on the back of the vehicle.
12. If pressure relief valve was removed, replace the valve. If no pressure relief valve present;
13. Seal ¼" hole in transformer using the rivet tool and ¼" blind hole, closed end rivet with neoprene-bonded sealing washer and epoxy. Rivet and washer should be oriented so the neoprene side of the washer will face the transformer. Once the rivet is installed, it cannot be removed unless it is drilled out.
14. Seal the outside of the rivet with provided sealant.
15. Write the sample No. on the top of the transformer using the provided paint marker.
16. Re-energize the transformer using safe work practices.
17. Ensure that power has been restored to all customers taken offline.
18. Notify Central Dispatch or System Operations that the transformer has been restored.
19. Record the sample number, in the appropriate record for that transformer, in the computer database.
20. At the end of the week all samples will be transferred to the BHE Environmental Group for processing and analysis.

21. At week end debris will be returned to the BHE Environmental Group for proper disposal.
22. At week end laptops will be returned to the BHE Environmental Group for the transfer of data.

SECTION 10

INSTRUCTIONS FOR REMOVAL OF > 50 PPM PCB TRANSFORMERS AND UNKNOWN HIGH RISK TRANSFORMERS

1. Caution to prevent leakage and spillage must be exercised while these transformers are being taken down. In most cases these transformers are known to be >50 ppm PCBs, in some cases these transformers are known to be >500 ppm PCBs and all other not identified as >50 or >500 ppm PCBs have a high probability of being >50 ppm PCBs.

2. Prior to transporting all transformers removed under this program, they must be placed into secondary containment. The preferred method for secondary containment (this method should be used in all possible cases) is to place transformers into **black** (heavy duty) transformers sacs. If for some reason a black transformer sac is not available, then the transformers may be placed into drums.

3. Upon return to a division office, all transformers removed under this program should be placed onto secondary containment pallets.

4. All transformers removed under this program must be labeled on the outside of the containment (bag or drum) with the black and white "PCB TRANSFORMER REMOVAL PROGRAM" label.

5. Upon return to the division office, all transformers that are >500 ppm PCBs must also be labeled with the yellow and black "Caution Contains PCB" label.

6. When a >500 ppm transformer is removed, it is critical that Graham Station be notified that a pickup is needed and that it will contain a >500 ppm PCBs transformer. If a division has more than one >500 ppm PCBs transformer to be removed, please try to schedule the removal of them as close together as possible to help facilitate efficient use of resources.

7. All >500 ppm PCBs transformers must be removed and designated for disposal within 30 days of the date that BHE knew that the transformer was >500 ppm PCBs.

Graham Station

8. Upon return to Graham Station it is critical that all >500 ppm PCBs transformers be processed immediately.

9. All >500 ppm PCBs transformers must be designated for disposal right away and labeled with a "Hazardous Waste" label with the current date.

10. All >500 ppm PCBs transformers must also be label with the TCI, red and white ">499 ppm" label.

11. Be sure to ship these >500 ppm PCBs transformers off site within 90 days of the date designated for disposal.