	TITLE: <p style="text-align: center;"><b>Working Procedure</b></p>	
<b>RECOMMENDED:</b> J. Richardson	NO: <p style="text-align: center;"><b>VIS0001</b></p>	REV: <p style="text-align: center;"><b>1</b></p>
<b>APPROVED:</b> Ben Hazlett, P. Eng.		
<b>REV. DATE:</b> 2017-11-22		

## Electrical Equipment Vault Inspection and Maintenance

## REVISION SHEET

<b>Revision</b>	<b>Description</b>	<b>Date</b>	<b>Initial</b>
0	Original Document	2007-05-14	es/csm
1	General Revision and added new Section: 'Restrictions When Working within an Electrical Equipment Vault'	2017-11-22	jr/bh

# TABLE OF CONTENTS

# PAGE

<b>1</b>	<b>Introduction .....</b>	<b>4</b>
<b>2</b>	<b>References .....</b>	<b>4</b>
<b>3</b>	<b>Scope .....</b>	<b>5</b>
<b>4</b>	<b>Definitions .....</b>	<b>5</b>
<b>5</b>	<b>Program Details .....</b>	<b>6</b>
<b>6</b>	<b>Hydro Ottawa Inspection and Testing .....</b>	<b>7</b>
6.1	Visual and Mechanical Inspection .....	7
6.2	Making Decisions .....	8
6.3	Costs of Inspections and Cost Sharing .....	8
<b>7</b>	<b>Preparation for Maintenance of Electrical Equipment .....</b>	<b>8</b>
7.1	Responsibilities and Notifications .....	9
7.2	Costs and Cost Sharing .....	10
<b>8</b>	<b>Electrical Equipment Vault Maintenance.....</b>	<b>10</b>
8.1	Maintenance Process.....	10
8.1.1	<i>Visual Inspection:</i> .....	10
8.1.2	<i>Mechanical Tests:</i> .....	11
8.1.3	<i>Electrical Tests:</i> .....	11
8.2	Hydro Ottawa Owned Equipment.....	12
8.3	Maintenance of Customer Owned Equipment.....	12
<b>9</b>	<b>Restrictions When Working within an Electrical Equipment Vault.....</b>	<b>13</b>
9.1	Hi-Voltage Contractor Qualifications.....	13
9.2	Working in an Energized Electrical Equipment Vault .....	13
9.3	Working with a De-energized Transformer Bus.....	13
9.4	Working with a De-energized Electrical Equipment Vault Complete.....	14
9.5	Work that may cause Damage to Electrical Equipment .....	15
9.6	Duration of Vault Work.....	15
<b>10</b>	<b>Records .....</b>	<b>16</b>
<b>Schedule 1</b>	<b>Vault Inspection Data Sheet .....</b>	<b>17</b>
<b>Schedule 2</b>	<b>Authorization for Release of Information Form .....</b>	<b>18</b>

# 1 Introduction

Hydro Ottawa encourages customers to regularly maintain their primary electrical service equipment including the structures that house this equipment. This procedure provides direction for the detailed maintenance and inspection for all types of primary serviced Electrical Equipment Vaults and customer owned substations connected to Hydro Ottawa's Distribution System.

# 2 References

Hydro Ottawa – DFS0008: Time and Date Format Standard

Hydro Ottawa – ECS0012: Condition of Service

Hydro Ottawa – GCG0001: Underground Secondary Cable Termination and Testing

Hydro Ottawa – GCS0015: Thermographic Scanning of Power Lines and Distribution Apparatus

Hydro Ottawa – GQS0002 - Civil Contractors Qualifications To Work On or Around Hydro Ottawa Electrical UG Distribution System

Hydro Ottawa – UIS0001: Padmount/Kiosk Transformer Inspection

Hydro Ottawa – UIS0002: Padmount Switchgear Inspection

Hydro Ottawa – Work Instructions: WI-HEA-007 Asbestos Cable Wrap Removal in Customer Owned Vaults

Infrastructure Health and Safety Association (IHSA) – Electrical Utility Safety Rules

Infrastructure Health and Safety Association (IHSA) –Utility Work Protection Code

NETA – MTS-1997 - International Electrical Testing Association, “Maintenance Testing. Specifications for Electrical Power Distribution Equipment and Systems”

OEB – Distribution System Code – Appendix C – Minimum Inspection Requirements

### 3 Scope

This procedure describes Hydro Ottawa cyclic inspection and maintenance program for Electrical Equipment Vaults. This program will ensure all areas (urban, rural, and difficult access) will be visited to detect deficiencies before they lead to system failures that may:

- Impair the safety of Hydro Ottawa employees or the public at large;
- Impair system reliability and reduce the quality of service to our customers;
- Seriously reduce the life expectancy of equipment and increase costs;
- Adversely affect the environment, or;
- Damage adjacent building(s)/structures(s).
- Impair the access to the Electrical Equipment Vault

It is impossible to write a detailed specification of everything to look for while inspecting the system so, the inspector is to use their own and others' experience and knowledge when deciding the priority of the repair.

### 4 Definitions

**'GIS'** means Hydro Ottawa's Geographical Information System

**'Electrical Equipment Vault'** aka **'Vault'** means "customer-specific substation" a transformation facility supplying a specific industrial/commercial customer. The primary operates at a distribution or subtransmission voltage and the secondary typically operates at 600V.

**'Loop System'** means that the Electrical Equipment Vault has two primary electrical supply feeds, which are connected to separate load-breaking switches. These switches are connected to a common bus to supply the transformers via protective devices. Both load-breaking switches are normally closed so that the supply is looped in and out of the building. This is commonly used in the underground supply areas.

**'Shared Vault'** means that the capacity of the Electrical Equipment Vault is shared between the customer at the location of the Vault and surrounding customers fed from Hydro Ottawa's equipment in the Vault.

**'Single Radial Vault'** means that the Electrical Equipment Vault has only one supply circuit feeding the Vault transformers through a protective device. This system is used when the Vault is fed from a distribution circuit.

**'Dual Radial'** means that the Electrical Equipment Vault has two primary electrical supply circuits, which are connected to separate load-breaking switches. These switches are connected to a common bus to supply the transformers via protective devices. Only one of the two load-breaking switches is closed during normal operation while the other remains open in a back-up capacity. This system is used exclusively in certain overhead supply areas.

## 5 Program Details

Hydro Ottawa's Distribution System consists of various arrangements, which include, Hydro Ottawa owned primary electrical equipment (cables, switchgear & transformers) in customer owned Electrical Equipment Vaults, customer owned pad-mount transformers, customer owned substations and customer owned switchgear Vaults in customer-owned buildings. (Refer to Condition of Service document, ECS0012, to determine the demarcation point).

In parts of the Hydro Ottawa service territory, there are also Electrical Equipment Vaults where the equipment is shared between the customer and Hydro Ottawa. These Vaults are to be referred to as Shared Vaults. The costs associated with the maintenance of them are also shared as per the original service Vault agreement(s). The specifics relating to sharing of capacity and costs are defined by the service Vault agreement for each application.

In Electrical Equipment Vaults, normal maintenance activities involve cleaning, torquing, calibrating relays, confirming Oil Circuit Breaker (OCB) oil level, SF<sub>6</sub> gas level, maintenance of incoming load interrupters, distribution transformers, potential transformer compartments, and lightening arrester compartments.

Due to supply configuration, not all Vaults have the same impact on system reliability and therefore not all Vaults will be shut down for regular asset level inspection or maintenance. As a good utility practice, Hydro Ottawa has adopted a model based on the condition and reliability to determine the maintenance and inspection cycles. This strategy helps with effective planning, safe operation, and costs reduction.

Hydro Ottawa conducts minimum detailed inspection cycles for Electrical Equipment Vaults as shown in table 5.1. This detailed inspection is used to assess the condition of the facilities, and equipment and support planning and identification of equipment maintenance requirements. As an outcome of the inspection the equipment owner is notified of deficiencies or concerns with the customers equipment.

<b>Equipment Type</b>	<b>Minimum Inspection Cycle</b>
<b>Air Metal-Clad Switchgear</b>	3-yr
<b>Overhead Air Switches</b>	3-yr
<b>Vacuum or SF<sub>6</sub> Switchgear</b>	6-yr
<b>Oil Filled Switchgear</b>	6-yr

**Table 5.1: Vault Minimum Detailed Inspection Cycles (years)**

Documented inspection of Vaults may consist of infrared scanning, visual inspection of electrical equipment, and civil inspection of Vault.

## 6 Hydro Ottawa Inspection and Testing

It is expected that as part of Hydro Ottawa's inspection program all Electrical Equipment Vaults identified follow the proposed minimum inspection cycles listed in Table 5.1. However, some of the Vaults may be inspected or maintained more often than the specified frequency based on customer requirements and/or Hydro Ottawa analysis due to system reliability. In particular, if a Vault is subject to heavy contamination, moisture, excessive operations, or vibration, the inspection frequency in Table 5.1 can be increased.

### 6.1 Visual and Mechanical Inspection

Before Hydro Ottawa staff accesses an Electrical Equipment Vault, they shall observe the area outside the Vault for any signs of failure and approach the Vault door with caution. The temperature shall be tested by hand before any attempt is made to open the door, as an exceptionally warm door may be the sign of fire inside the Vaults. In such cases, Fire Department should be called.

No Hydro Ottawa staff shall enter a Vault that contains fire, electrical arcing, smoke or any other hazardous condition, until after the hazardous condition has been eliminated.

An inspection requires reporting on each device rather than "reporting by exception." Reportable items are described on the Electrical Equipment Vault Inspection and Maintenance Data Sheet (Schedule 1), and the scope of Inspections performed will relate to the following key areas of concern:

- Hazardous Materials eg: Asbestos
- Mechanical Operation (only during system operations or during shutdown)
- Insulation Condition
- Electrical Integrity
- Overheating Connections or Equipment
- Ventilation
- Equipment Anchorage
- Equipment Security
- Grounding and Bonding
- Identification and Nomenclature
- Civil Structure
- Vault - Person or Equipment Access

The inspectors will complete the attached report (see Schedule 1), detailing any problem discovered with its location, and mark-up the map/schematic provided. The deficiency lists and schematics are to be returned to Vault Maintenance Technical Specialists to prioritize any remedial work, correct records, and or notify the owner as needed.

If required, use the 'Remarks' area to expand upon any deficiencies noted on the data sheet, or identify any other deficiencies found.

## 6.2 Making Decisions

High priority problems should be attended to immediately. Judgment must be exercised whether to repair medium and low priority deficiencies while on site. The decision will be determined by the inspections team dependent on personnel skill set, equipment required and nature of problems found. The priority is to complete the system inspection, and identify problems and have equipment repaired before it fails or causes personal injury.

- **High priority** or “urgent” problems should be repaired immediately, or as soon as practicable. High priority items are those that are likely to cause an outage, damage equipment, or pose a significant safety or environmental risk, e.g.: loose connections, exposed electrical hazards, operational hazards, overheating equipment, etc. Immediate isolation of defective equipment may be necessary.
- **Medium priority** items are those that if left unattended could lead to a future problem i.e. incorrect records, not visible or missing or incorrect nomenclature, rust, unit cleanliness (e.g. dust film, cob webs, etc.), etc.
- **Low priority** items are not likely to cause an outage, or pose a safety risk. Examples include mostly aesthetic issues, grading or base levelling issues, etc.

Please note – If an “urgent” problem is discovered through the inspection and maintenance process that cannot be repaired at the time of inspection and maintenance, the inspector/maintainer will notify HOL System Control Centre and Vault Maintenance Group immediately, so the problem can be remedied as soon as possible.

## 6.3 Costs of Inspections and Cost Sharing

All associated costs of inspections and reporting by Hydro Ottawa are covered under normal internal budgets. Customers that perform inspections and report results are to cover their own costs including any HOL costs to facilitate that, as per HOL conditions of service.

# 7 Preparation for Maintenance of Electrical Equipment

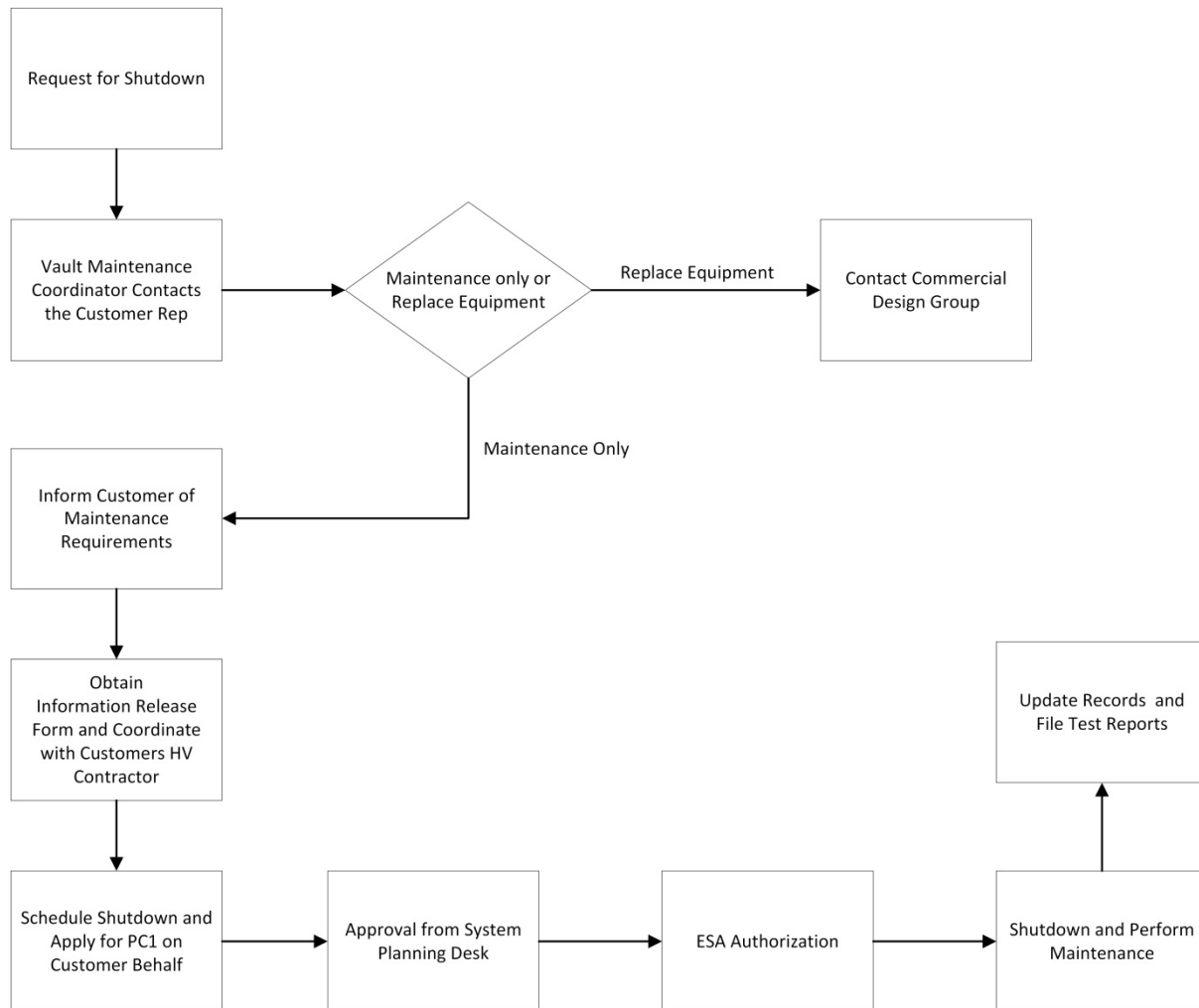
Maintenance must be performed by either Hydro Ottawa qualified personnel or its approved contractor when maintaining equipment that is owned by Hydro Ottawa or in the case where a customer has requested the maintenance it is to be carried out by a qualified contractor on customer owned equipment.

All applications and notifications as per Utility Work Protection Code and IHSA Rule Book are to be carried out and verified before any maintenance proceeds.



Generally, notifications to customers by Hydro Ottawa staff are provided 48-hours before any scheduled maintenance/inspection or as per the agreed terms and conditions of Hydro Ottawa’s Conditions of Service document (ECS0012). It is important that the customer is aware of the actions and notifications required for them to complete. An accurate communication record (e.g. email, letter request) is important to ensure timely coordination.

The process is further explained in Figure 7.1: Electrical Equipment Vault Maintenance Request Flowchart.



**Figure 7.1: Typical Equipment Vault Maintenance Request Flowchart**

### 7.1 Responsibilities and Notifications

Hydro Ottawa’s Conditions of Service document (ECS0012) also defines additional roles and responsibilities for both Hydro Ottawa and the customer. Customers are required to notify Hydro Ottawa for any lack of or substandard operation of protection equipment within the next business day. Customers are required to provide Hydro Ottawa with their maintenance and testing results after each maintenance shutdown. An Authorization for

Release of Information Form for the building owner to sign is provided as Schedule 2. For customer reporting, Vault maintenance requests or general Vault enquiries, see Section 1.5 of Conditions of Service (ECS0012) for Hydro Ottawa contact information.

Before any switching is performed, a complete visual check of the physical appearance of the Electrical Equipment Vault and all equipment shall be completed and contained in the Vault for possible mechanical or electrical hazards. The Vault shall be isolated and de-energized following safe work procedures prior to any attempt at maintenance on the apparatus. Once the isolation is established, proper Work Protection Code permits must be accepted by the Holder before any de-energization procedures take place.

## 7.2 Costs and Cost Sharing

All associated costs are to be captured as per Hydro Ottawa's financial policies as available through Assets Planning Department. Costing may also include customer contributions as per established Operating and Maintenance Agreements between the customer(s) or Hydro Ottawa's Conditions of Service. All costs for temporary rearrangements or removals to accommodate structural or other repairs will be the building owner's responsibility. Some Shared Vault agreements will have cost sharing arrangements between building owners and Hydro Ottawa for cleaning or maintaining Electrical Equipment Vaults. Refer to Hydro Ottawa's Conditions of Service Section for standard charges:

- G-3.1 Primary Maintenance Shutdown Fees
- G-3.2 Vault Access Fees
- G-3.6 Construction/Maintenance Field Support

# 8 Electrical Equipment Vault Maintenance

Customers are responsible for the maintenance of customer owned equipment in the Electrical Equipment Vault and Hydro Ottawa is responsible for Maintenance of the equipment it owns in the Electrical Equipment Vault. Such maintenance generally involves cleaning, torquing and maintenance of equipment such as incoming load interrupters, potential transformer compartments, lightning arrester compartments, relays, oil circuit breaker oil level, SF6 switch gas level and distribution transformer connections.

## 8.1 Maintenance Process

Maintenance of Electrical Equipment in a Vault should at a minimum include but not be limited to visual inspections as well as mechanical and electrical testing described in the sections listed below.

### 8.1.1 Visual Inspection:

Inspect apparatus, alignment, grounding, and required clearances of switches.

Verify that an adequate grounding network is present for personal and equipment safety while carrying out maintenance and later when the apparatus is in operation.

Prior to cleaning the apparatus, perform as-found inspection, if applicable. These checks include:

- Hazardous Materials e.g.: Asbestos
- Verification of nameplate information,
- Checks for insulators chips, cracks and tracking
- Inspect insulating assemblies for evidence of physical damage or contaminated surfaces.
- Inspection of lightning arrestors
- Visual inspection of contacts and bus.
- Arc Chute Condition
- Check in-cell heaters
- For oil circuit breakers, inspection of candles for damage or cracking, oil leakage and oil level will also be required.
- For SF6 devices, check gauge to verify the gas in the device is at the appropriate level.

Once the above visual inspections have been completed, clean the apparatus in the Vault.

If any of these inspections reveal problems that require further extensive work, and cannot be completed during the inspection, the report is to be brought to the attention to Hydro Ottawa's Electrical Equipment Vault Maintenance Department for a follow-up shutdown. In the case of customer owned Vaults ESA permission must be given before re-energization.

#### 8.1.2 Mechanical Tests:

Perform mechanical tests on the Vault apparatus in accordance with manufacturer's guidelines, if applicable.

- Perform mechanical operation tests in accordance with manufacturer's guidelines e.g. check all switches for correct operation and alignment.

Lubricate all the moving contacts. Lubrication requirements are:

- Use appropriate (manufacturer approved) lubrication on moving current-carrying parts.
- Use appropriate (manufacturer approved) lubrication on moving and sliding surfaces.
- If required from manufacturer, apply contact grease in a manner that follows guidelines appropriate for the type of switching device.

All (current carrying) bolted connections must be verified with a torque wrench calibrated to the appropriate hardware specifications.

#### 8.1.3 Electrical Tests:

For the Vault apparatus:

- Perform insulation resistance test (phase to phase & phase to ground) and verify phase colours if applicable.

- Testing voltages should properly correspond with the voltage rating of the apparatus as well as the manufacturers testing specifications.
- Over potential tests may also be required with some insulating mediums (i.e. Vacuum Bottles).
- Contact resistance shall be tested with the use of a micro-ohmmeter on all opening contacts and free air fuse holders.

All electrical relays are to be tested and calibrated to Hydro Ottawa approved settings.

- Tests performed must verify that the relay is still within acceptable limits as per manufacturer's specifications. These tests include pick-up and dropout value tests, time current characteristics, instantaneous pick-up etc.
- If any changes have been made to the apparatus or protection relay, an "as-left test" is required.

## 8.2 Hydro Ottawa Owned Equipment

Maintenance of Hydro Ottawa owned equipment in Electrical Equipment Vaults generally involves cleaning, torqueing and maintenance of equipment such as Reyrolle Switchgear, S&C SF6 Vista switchgear, switchgear oil level or SF6 switch gas level and grounding or distribution transformer connections. Structural, lighting, ventilation or fire safety equipment maintenance is generally the responsibility of the building owner.

Shared Vaults contain additional 347/600V and 120/240V cables, mole sets, switches, dry-type transformers which also require cleaning, torqueing and thermographic scanning as per GCS0015.

Maintenance of these apparatus are to be completed as per Hydro Ottawa and manufacture recommendation procedures.

Maintenance, replacement and upgrade of Hydro Ottawa's assets will be coordinated, with the internal Maintenance and capital programs such work might include: metal clad extensions, relay replacing and/or implementing settings, circuit breaker maintenance/replacement, HV switch maintenance/replacement, transformer maintenance/replacement, and review of Vault structure changes.

## 8.3 Maintenance of Customer Owned Equipment

The customer and their approved contractor, are responsible for establishing the procedures and methods to be applied in the maintenance of their equipment. Such program should align with the recommend maintenance program described in Section 7.1

The customer is to be informed of findings by their approved contractor and advised to arrange for repair of customer owned faulty equipment. Hydro Ottawa shall maintain and repair its own equipment.

## 9 Restrictions When Working within an Electrical Equipment Vault

### 9.1 Hi-Voltage Contractor Qualifications

Customers and building owners frequently need to perform work on Electrical Hi-Voltage Equipment Vault. When working on customer owned HV equipment the contractor must be Hydro Ottawa approved. HOL approval requires that the contractor be ESA Authorized Contractor Program (ACP) Station HV licenced and IHSA Certified for HV Work Protection Code.

### 9.2 Working in an Energized Electrical Equipment Vault

Work in an energized Electrical Equipment Vault can only take place in a secure operating area of the Vault and under supervision of a designated, competent Hydro Ottawa employee or Hydro Ottawa contractor. Supervision consists of monitoring to ensure safe limits of approach to energized apparatus and that there is no possibility of damage to equipment. Before any work is started, the operating area and electrical equipment are visually checked for hazards then discussed with everyone working in the Vault. Under no circumstances shall metal measuring tapes be brought into or used in the Vault.

Typically, work is minor and of short duration. For example;

- Testing / replacing fire detection systems
- Testing / replacing ventilation or high temperature alarm thermostats
- Drilling into operating area of Vault from outside and well away from energized equipment
- Removal of water accumulation from floor area or oil sump pit if safe to do so and located in operating area.
- Other minor repairs as required.

### 9.3 Working with a De-energized Transformer Bus

A transformer bus is the primary voltage connection between the primary switchgear protective device and the transformer primary bushings. A limited amount of work may be performed in the Electrical Equipment Vault with the transformer bus de-energized. In this case, only the transformer bus, the transformers it feeds and secondary cables from the transformer are de-energized. The primary supply cables to the Vault and the primary switchgear remain energized as well as any other transformer buses not de-energized. Thus, a safe working distance must be maintained to these areas still energized. Typically, these areas are excluded by Caution tape or Danger tape with “Danger Live Apparatus” signs placed strategically. If there are additional transformers still energized in the Vault, they must be separated from the work area by a standard fencing arrangement or a physical

barrier; like a plywood wall. Care must be taken to ensure there is no back feed from secondary sources or generators.

If a customer requires work done in a Vault with the transformer bus de-energized Hydro Ottawa requires that the customer engage a hi-voltage contractor (as in Section 9.1) to hold a work protection code supporting guarantee permit issued by the Hydro Ottawa System office, provide and install grounds on the transformer bus and be responsible for all workers and the work to be performed in the Vault. Application for this permit will be facilitated by the Electrical Equipment Vault Maintenance group.

Typical types of work performed with transformer bus de-energized are;

- Complete clean and torque in the Vault and on the customer secondary main breaker
- Work on customer secondary main breaker cell
- Work on secondary voltage cables between transformers and secondary main switchgear
- Testing, maintaining or replacing transformers
- Maintaining or replacing ventilation ducts or openings if located in a safe area
- Replacing light bulbs or adding additional lighting
- Cleaning safe areas of the Vault

Please note: any work involving disconnecting the primary or secondary cables requires a rotation test prior to de-energization and electrical integrity tests before restoring power. After re-energization a follow up rotation test should be performed to verify rotation has not changed before energizing motors.

Re-energization of the transformer bus requires ESA approval, removal of all grounds and surrendering the work protection permit

#### **9.4 Working with a De-energized Electrical Equipment Vault Complete**

De-energized Vault complete means the Vault and apparatus have been isolated from all Hydro Ottawa sources. Care must be taken to ensure there is no back feed from secondary sources and/or emergency generators.

If a customer requires work done in a Vault with the Vault completely de-energized; Hydro Ottawa requires that the customer engage a hi-voltage contractor to hold a work protection code supporting guarantee permit issued by the Hydro Ottawa System Office, provide and install grounds on the incoming supply cables and be responsible for all workers and the work to be performed in the Vault. Application for this permit will be facilitated by the Hydro Ottawa Vault Maintenance group.

Typical types of work performed with De-energized Vault Complete are;

- Inspection, maintenance and/or replacement of primary voltage switchgear
- Removal of Asbestos from supply cables

- Major repairs and/or repairs to the structure of the Vault
- Complete clean and torque in the Vault and on the customer secondary main breaker
- Any work outlined in De-energized Transformer Bus above

Please note: any work involving disconnecting the primary or secondary cables requires a rotation test prior to de-energization and electrical integrity tests before restoring power. After re-energization a follow-up rotation test should be performed to verify rotation has not changed before energizing motors.

Removal of any asbestos cable wrap is to be carried out as per Hydro Ottawa's Health and Safety Work Instructions WI-HEA-007 and applicable provincial regulations. A new and approved cable wrap is to be installed once the successful removal of asbestos wrap is completed.

Re-energization of the transformer bus requires ESA approval, removal of all grounds and surrendering the work protection permit.

#### **9.5 Work that may cause Damage to Electrical Equipment**

Major structural work in or on top of the Electrical Equipment Vault is sometimes required. Care must be taken not to damage the transformers, cables or any electrical equipment in the Vault as a result of falling debris, flying concrete or installation/removal of structural members. Temporary rearrangement or removal of cables, transformers or switchgear etc. may be required to facilitate major structural work if there is a possibility of damage to the electrical equipment. Where such rearrangements are required customers are to cover their own costs including any HOL costs to facilitate that work, as per HOL conditions of service.

#### **9.6 Duration of Vault Work**

Radial supplied or dual radial supplied primary voltage electrical Vaults may be de-energized as long as required by the customer. ESA approval and possibly electrical integrity re-testing are required before re-energization.

Loop fed electrical Vaults may only be de-energized for short periods of time. A re-energization plan must be in place in case the circuit loop must be restored due to failure on another part of the circuit. Typically, loop fed electrical Vaults are shutdown for periods of 4 – 8 hours or 12 – 24 hours. Hydro Ottawa and the system control office will decide on a case by case, circuit by circuit basis if the loop can remain open for a 48 hour or longer period. If any shutdown length is deemed unacceptable by Hydro Ottawa, then the loop supply cables will need to be temporarily spliced together outside (typically in the supply manhole), cutting the electrical Vault out of the loop completely. Restoration of the service and splicing the electrical Vault cables back into the loop requires ESA approval and electrical integrity testing of the components in the Vault and the supply cables.

## **10 Records**

For Hydro Ottawa owned equipment, all records will be kept as per Hydro Ottawa's Corporate Directive on record keeping. Regular update of Vault Maintenance Database in the GIS is required for records and tracking. The Vault Maintenance Database has all information related to ownership and maintenance/inspection records.

For customer owned facilities, the owner is strongly encouraged to keep good maintenance records and ensure the timely completion of scheduled maintenance. Once the customer completes its inspection and testing of its HV equipment directly connected to Hydro Ottawa's distribution system, the customer shall provide Hydro Ottawa a copy of the results after each maintenance shutdown



# Schedule 1 Vault Inspection Data Sheet

VAULT INSPECTION DATA SHEET					
Data Collection					
Identifier #	Building Type:	Demarcation Point: Property line Secondary)			
Street No.:	Street Name:		Vault Location:		
Access to location: [Unsafe] [Needs Clean-Up] [Hindered] [Vegetation] [Floods]					
Contact Information					
Company:			Management Co.:		
Basic Inspection					
Feed Type: Loop Radial Dual Radial	Sub Vaults:		Also suppliess:		
Primary Cable Size:	Nomenclature:		Warning Signs Satisfactory		
Asbestos: Yes No			Asbestos in feet (estimated):		
Fire Detector	No Yes in safe working area	Fencing:		Satisfactory Require Maintenance	
Door Condition:	Satisfactory Require Maintenance	Locks:		Satisfactory Require Maintenance	
Walls:	Satisfactory Require Maintenance	Floors:		Satisfactory Require Maintenance	
Signs of Water:	Yes No	Sump Pit:		Yes No	
Grounding:	Satisfactory Require Maintenance	Ventilation:		Mechanical Require Maintenance	
Louvers:	Mechanical Require Maintenance	Screens:		Satisfactory Require Maintenance	
Lighting:	Satisfactory Require Maintenance	Fans:		Working Require Maintenance	
Hinges:	Satisfactory Require Maintenance	Public Safety:		Satisfactory Require Maintenance	
Ceiling:	Satisfactory Require Maintenance	Sills:		Satisfactory Require Maintenance	
Electrical Equipment					
Inspection Form in UIS0001: Pad-mount/Kiosk Transformer Inspection completed		Yes No	Comments:		
Inspection Form in UIS0002: Pad-mount Switchgear Inspection completed		Yes No	Comments:		
Maintenance					
Maintenance Required	Yes No	Performed		Yes No	
Details:		Details:			
Remarks (Use this area to expand upon deficiencies identified, or to note other deficiencies found)					
Follow-up Action Needed: Yes – (High) (Medium) (Low) No Inspected by Date					

# Schedule 2 Authorization for Release of Information Form



## Authorization for Release of Inspection, Maintenance and Testing Results

**BUILDING OWNER**  
**BUILDING ADDRESS**  
Ottawa, Ontario  
**(VAULT NUMBER)**,

I (please print) \_\_\_\_\_

Authorize (name of Hi-Voltage Contractor):

\_\_\_\_\_ Company \_\_\_\_\_

To release the Inspection, Maintenance and Testing Results to Hydro Ottawa for their records  
In accordance with Hydro Ottawa Limited Conditions of Service, Appendix G Section 3.1

Authorized Building Representative Signature: \_\_\_\_\_

Company: \_\_\_\_\_

Date: \_\_\_\_\_