EXHIBIT VEC-AC-4

Transportation
Land Development
Environmental
Energy
Services

Vanasse Hangen Brustlin, Inc.

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Memorandum

To: Vermont Electric Cooperative, Inc.

Date: October 30, 2014

Project No.: 57667.00

From: Robert Athan, VHB Environmental Scientist

Re: VEC Alburgh Substation Project - OHM, Decommission, and Reclamation Memorandum

Vanasse Hangen Brustlin, Inc. ("VHB"), with the assistance of Vermont Electric Cooperative, Inc. ("VEC") has prepared this memorandum to describe VEC's Decommission and Reclamation Plan, with consideration of Oil and Hazardous Materials ("OHM"), in support of VEC's petition to the Vermont Public Service Board ("PSB") for a Certificate of Public Good ("CPG") in accordance with Section 248 for the replacement of the Alburgh substation ("Existing Substation") with a New Substation approximately 0.8 miles north of the Existing Substation ("New Substation").

VEC selected VHB as an environmental consultant to assist in developing a plan for soil inspections upon decommissioning and guidance in developing this reclamation plan for the Existing Substation. VHB has relied on the technical information provided by VEC to assist with the development of this plan.

Additionally, VHB has reviewed the attached proposed conceptual oil containment design for the New Substation to confirm that the design is consistent with applicable regulations intended to reduce the risk that any potential spills would reach waters of the state, and that the New Substation will conform to Section 248 criteria 1A concerning headwaters, 1E regarding streams, and 1B concerning disposal of wastes without injecting harmful or toxic substances into groundwater or wells. This memorandum has been prepared under the general guidance of the Vermont Department of Environmental Conservation ("VT DEC") Waste Management Division's ("WMD's") Section 248 Hazardous Material Procedure for CPG Condition (Draft: August 8, 2012).

SITE DESCRIPTION

The Existing Substation is located on the corner of Summit Road and U.S. Route 2, at 149 Summit Road, Alburgh, VT (Existing Substation Map, page 1). VEC plans to construct the New Substation on a separate property. The study area associated with the proposed New Substation is located roughly 0.8 miles north of the Existing Substation on U.S. Route 2, Alburgh VT (Proposed Substation Map, page 2). VEC plans to remove all equipment and structures at the Existing Substation that are located within the fenced area.

According to VEC, the Existing Substation contains the following components:

1. One (1) substation transformer, rated 10,000 kVA, 43.8/12.47 kV, mineral oil filled, non-PCB. The transformer contains 3,000 gallons of oil.
2. Three (3) voltage regulators filled with non-PCB containing mineral oil. Each regulator contains 200 gallons of oil. The total oil volume for the three regulators is 600 gallons.
3. One (1) AMI transformer, containing non-PCB mineral oil. The transformer contains 150 gallons of oil.
4. One (1) station service transformer, containing non-PCB mineral oil. The transformer contains 15 gallons of oil.
4. The fenced area measures approximately 50 feet by 50 feet.

VHB performed an inspection of the Existing Substation in July 2014 from outside of the fencing to observe the general condition of the facility and equipment. The Existing Substation is located on the top of a small hill and the topography is flat with a crushed stone surface. A small Class III wetland is located to the north and west of the Existing Substation. Larger wetlands are present on the east side of U.S. Route 2 and the south side of Summit Road. The remaining surrounding area is forested or farmlands.

VHB staff did not observe any surface stains associated with leaks, or any other signs of leaks from the transformers or regulators at the Existing Substation. No sheens or signs of contamination were observed in the nearby wetlands. No public or private wells are located within the vicinity of the Existing Substation.

VHB also performed an inspection of the New Substation site and surrounding areas in July 2014. VEC plans to build the New Substation at the end of a pre-existing cleared path. A large wetland is located immediately to the west of the New Substation. The remaining surrounding area is forested or open/regenerating fields.

Private well #16635 is located within the study area roughly 100 feet to the east of the New Substation. This is a domestic well that is owned by Gary Labounty (Private Well Report, pages 5-6). A public well from the Goose Point Campground water system is located approximately 900 feet to the southeast of the New Substation.

ENVIRONMENTAL DATABASE SEARCH

VHB reviewed reasonably available records to determine what, if any, hazardous materials may have been located, or potentially released into areas to be disturbed by the Project. According to VEC personnel, VEC acquired the Existing Substation on April 1, 2004 from Citizen's Utilities Corporation. The VT DEC WMD records reviewed included:

- Hazardous Waste Sites
- Spills
- Underground Storage Tanks

A review of these databases indicates that there has never been a reported release of hazardous materials at the Existing Substation or within the immediate area. The closest hazardous waste site (Dunham Bay Sea Ray, SMS #962040) is over 10,000 feet away. There are also no USTs located within the immediate area of the Existing Substation. The closest UST is also over 10,000 feet away and

contains gasoline. It is not expected that soil or groundwater contamination from these sites would occur at the Existing Substation due to the large distance. No evidence of a hazardous material release exists at the Existing Substation, the New Substation area, or within close proximity to either substation location. The WMD does not keep a georeferenced record of spills; however, no spills have been reported or attributed to VEC in the area of the Existing Substation. The likelihood of unknown releases from the transformers or regulators at the Existing Substation is low because a leak of oil would likely trip the line, which would have triggered a notification to the substation operator.

EXISTING SUBSTATION – DECOMMISSION PLAN

Regulatory Background for Transformer Removal and Disposal

Hazardous waste in Vermont is regulated by The Vermont Hazardous Waste Management Regulations ("VHWMR"), Chapter 7 of the Vermont Environmental Protection Rules, Effective March 15, 2013. VHWMR §7-203(t) provides a conditional exemption for PCB-containing dielectric fluid from the provisions of the VHWMR because "such fluid…is regulated under 40 CFR Part 761 of the Toxic Substance Control Act ("TSCA")." Therefore, activities related to the disposal of PCB-containing oil are subject to regulations set forth by the federal TSCA. TSCA (40 CFR Part 761.31(B)) has established the classifications indicated in Table 1 for transformers based on the concentration of PCBs in the oil.

Table 1: Transformer PCB Classification

Concentration Range of PCBs (mg/kg)	Classification
0 to < 50	non-PCB
50 to < 500	PCB-contaminated
≥ 500	PCB Transformer

Transformers containing less than 50 ppm PCBs in the dielectric fluid are not regulated by the EPA or the TSCA. Additionally, wastes containing less than 50 ppm PCBs are not a Vermont listed hazardous waste according to the Vermont Hazardous Waste Regulations §7-211 (VHWR 2013).

VEC Transformer Oil and Transformer Disposal

VEC has had the oil in the one substation transformer at the Existing Substation analyzed for operational evaluation by SD Myers, a laboratory that specializes in transformer dielectric fluid analysis. The most recent test results are presented in a laboratory report from July 2013 on pages 3 and 4 of the Attachment. These results show that PCB concentrations were <2 mg/kg during the July 2013 test. The previous test in July 1996 also shows PCB concentrations of <2 mg/kg. The remaining AMI transformer, service station transformer, and three regulators have not been tested for PCBs by SD Myers, however, they all possess a label declaring that they have been tested and the fluid has been classified as "non-PCB." Based on the available information, VEC and VHB have no reason to suspect that the oil in any of the transformers or regulators would contain PCBs at concentrations that would result in the classification of the transformers as "PCB-contaminated" or "PCB-transformers" according to the thresholds established by TSCA.

Because TSCA considers the transformers and the transformer oil to be "non-PCB" transformers, they are not regulated by the EPA or Vermont DEC. Therefore, VEC intends to return the transformers and regulators into stock as spare units.

Decommissioning Work Plan

VEC plans to remove all structures from within the fence at the Existing Substation, including complete removal of transformer pads. VEC will return the substation transformer, AMI transformer, station service transformer, and three regulators at the Existing Substation to stock for future use by VEC. Qualified VEC technicians would disconnect the transformers, remove the highside bushings, and load the transformers onto a VEC truck. No oil draining would occur. A spill kit containing absorbent pads would be readily accessible and VEC technicians will follow protocol as outlined in VEC's current Spill Prevention, Control, and Countermeasure (SPCC) Plan.

As stated above, VHB staff did not observe any signs of leaks from the transformers or regulators at the Existing Substation. No sheens or signs of contamination were observed in the nearby wetlands. Records available to VHB also did not show any releases of hazardous materials at the Existing Substation site. For these reasons, VHB does not recommend any further site investigation prior to the removal of all structures within the fence at the Existing Substation.

RECLAMATION PLAN

Site Restoration

Following site decommissioning activities, VEC would restore the area to a natural vegetative condition following the details outlined here. Upon removal of the Existing Substation components, VHB recommends the following approach for restoration which VEC proposes to implement:

- Return substation to near original grade, leaving room for application of topsoil;
- Apply a layer of topsoil (4-6 inches in depth) native to the site or nearby locale, or acceptable material outlined in the Vermont Standards & Specifications for Erosion Prevention and Sediment Control (2006) ("VT S&S") (see below);

Topsoil Materials

1. Topsoil shall have at least 6 percent by weight of fine textured stable organic material, and no greater than 20 percent. Muck soil shall not be considered topsoil.

2. Topsoil shall have not less than 20 percent fine textured material (passing the NO. 200 sieve) and not more than 15 percent clay.

3. Topsoil treated with soil sterilants or herbicides shall be so identified to the purchaser.

4. Topsoil shall be relatively free of stones over 1 1/2 inches in diameter, trash, noxious weeds such as nut sedge and quackgrass, and shall have less than 10 percent gravel.

5. Topsoil containing soluble salts greater than 500 parts per million shall not be used.

- Apply a commercially available conservation-type seed mix, or at minimum as the General Seed Mix described below, or as otherwise recommended in the VT S&S. Ensure seed mix is applied following manufacturer's instructions, and is free of seeds from species included on the current Vermont non-native and invasive species Quarantine Rule and invasive species watch list;

General Seed Mix:

	Variety	lbs./acre	lbs/1000 sq. ft.
Birdsfoot trefoil[1] OR	Empire/Pardee	5[2]	0.10
Common white clover[1]	Common	8	0.20
PLUS			
Tall fescue	KY-31/Rebel	10	0.25
PLUS			
Redtop OR	Common	2	0.05
Ryegrass (perennial)	Pennfine/Linn	5	0.10

[1] Add inoculant immediately prior to seeding
[2] Mix 2.5 lbs each of Empire and Pardee OR 2.5 lbs of Birdsfoot and 2.5 lbs white clover per acre.

- Stabilize exposed soils following seeding through application of hay mulch (straw mulch if within a wetland or other sensitive resource area) at a rate of 2 tons/per acre during summer construction and 4 tons/acre during winter construction on slopes less than 3:1. Refer to the VT S&S for stabilization options on steeper slopes.

Non-Native Invasive Plant Species Monitoring and Control

VEC anticipates being requested and would agree to monitor for and control any non-native invasive plant species ("NNIS") during the reclamation process at the Existing Substation area as well as within sensitive resources areas at the New Substation location. It should be noted that during natural resources assessments for the Project sites, VHB notes that NNIS are prevalent at both the Existing and the New Substation sites (see VHB's separate Section 248 Natural Resources Assessments technical memoranda). However, VEC proposes to implement a similar NNIS plan to the one that was approved by ANR for the VEC Madonna Project docket 8171, as follows:

a) For purposes of this plan, "non-native invasive plant species" shall mean any NNIS plant on the current Vermont Quarantine List and European Alder (*Alnus glutinosa*), Wild Chervil (*Anthriscus sylvestris*), Reed Canary Grass (*Phalaris arundinacea*), and Giant Knotweed (*Fallopia sachalinensis*).
b) VEC shall monitor once per year during the growing season for NNIS plants for a period not to exceed 3 years starting with the first full growing season following decommissioning of the Existing Substation and construction of the New Substation. If any NNIS plants are present during monitoring, VEC will control the NNIS via manual control (hand removal, etc.) if feasible, and refuse collection or burning disposal. If manual control is not feasible or effective, VEC shall consult with ANR Department of Fish and Wildlife regarding the appropriate control method. Unless directed by ANR as the most practicable control option for success in a particular location, VEC will not use herbicides for vegetation control. The specific control activities undertaken in any given year will be included in that year's annual monitoring report (see e below).
c) The "Monitoring Area" means the area of soil disturbance at the Existing Substation site that will be decommissioned, and all disturbed soil areas at the New Substation site that VEC will not cover with gravel or impervious surface, as well as areas that may be required per other permit approvals that are collateral to the CPG. VEC has agreed to perform NNIS monitoring at the New Substation, because it considers the monitoring area to be small, and any ratepayer impacts would be limited.
d) In addition to following the Low Risk Site Handbook for Erosion Prevention and Sediment Control, to prevent or minimize the introduction or spread of NNIS during Existing Substation decommissioning and New Substation construction, VEC shall clean all construction equipment prior to entering the Existing Substation and the New Substation site. Additionally, any topsoil and temporary or permanent stabilization seed shall be free of noxious weeds (per the 2006, amended 2008, Vermont Standards and Specifications for Erosion Prevention and Sediment Control). The purpose of this requirement is to minimize the spread of invasive species by reducing the potential for transportation and introduction of seeds and plant material.
e) Annual reports presenting an analysis of the monitoring results for NNIS will be submitted to the ANR Department of Fish and Wildlife, and Office of Planning and Legal Affairs, no later than December 31 of the monitoring year.

NEW SUBSTATION SPCC PLAN AND OIL CONTAINMENT PLANS

SPCC Requirements

The storage of greater than 1,320 gallons of oil above ground on-site requires the establishment and implementation of a SPCC Plan in accordance with the federal statute Title 40 CFR 112, Oil Pollution

Prevention. VEC anticipates that the total volume of oil storage in OFOE at the New Substation will be greater than 1,320 gallons, which necessitates a SPCC Plan. VEC will update its existing SPCC plan with the required site specific information for the New Substation.

In general, the SPCC Plan shall discuss VEC's spill prevention and readiness of response materials, equipment, and procedures. The purpose of the SPCC Plan is:

1) To minimize the chances that a spill of oil or hazardous material will occur; and,

2) To prepare for a proper response in case a spill were to occur.

Title 40 CFR 112 requires that this SPCC Plan shall be prepared, reviewed regularly by VEC, and amended, as necessary, by a Registered Professional Engineer at least every 60 months or five years. Additionally, VEC will revise the Plan within six months of each review for implementation of new or more effective spill prevention and control technology. The development and implementation of the site-specific SPCC Plan for the New Substation in accordance with 40 CFR 112 is intended to prevent the discharge of oil to Waters of the State.

Oil Containment

The New Substation will consist of one large-volume substation transformer with an estimated oil capacity of 1,900 gallons. Smaller volume OFOE include three regulators with an estimated 188 gallons of oil each, one AMI transformer with 150 gallons, and one station service transformer with 15 gallons. VEC proposes to construct the New Substation on level ground and fill the yard with approximately 14 inches of 0.75 -inch to 1.5 - inch diameter crushed stone. The crushed stone will have sufficient pore volume to contain oil from potentials spills or leaks from smaller volume OFOE and will prevent sheet flow of surface water and oil.

VEC would place the new transformer in a passive secondary containment structure, consisting of a concrete pit with a PETRO-Barrier (water filtration device with an oil barrier). The concrete pit will encompass the transformer foundation, with walls approximately 2.0 feet tall. According to VEC, VEC will construct the pit with sufficient capacity to contain 110% of the volume of oil in the transformer plus five inches of freeboard. The PETRO Barrier serves to allow rain water, but not oil, to discharge from the containment structure into a catch basin with a drain pipe. If oil is discharged to the containment structure, the PETRO Barrier will absorb it and form a plug that prevents further discharge into the catch basin. VEC operation personnel would be notified of an oil leak by a low-oil level alarm on the transformer, or by an outage. In the event of a release of oil into the containment structure, VEC personnel or a spill response contractor would remove the collected oil from the site for proper disposal. Normally, the catch basin will discharge uncontaminated rain water to a drainage pipe that daylights outside of the substation yard. VEC has provided preliminary design plans for the containment structure, which are included on page 7 of the Attachment. It is VHB's opinion that the proposed conceptual design for the passive secondary containment structure is consistent with the requirements of 40 CFR 112 as well as recently approved past projects (e.g. VEC's Madonna Substation project), and therefore will adequately reduce the risk of a discharge of oil to Waters of the State.

In addition to the passive secondary containment structure for the transformer, VEC will implement active secondary containment through the use of an on-site spill kit that contains sorbent materials.

VEC will inspect the New Substation on a regular basis for signs or leaks or imminent equipment failures.

Potential Impact to Streams, Groundwater, and Wells

Based on the information available to VHB and discussed herein, the proposed New Substation would not result in the injection of harmful or toxic substances into groundwater or wells, and would not allow the discharge of hazardous materials to streams, because the containment system is adequately designed to detain any potential spills along with accumulated rainwater. Potential leaks from smaller volume OFOE would be contained within the New Substation gravel and prevented from reaching waters of the state by VEC's active containment measures. Furthermore, VHB opines that the decommissioning of the existing substation and the construction of the New Substation will meet applicable Department of Health and Department of Environmental Conservation regulations regarding the disposal of wastes.

CONCLUSION

A review of the VT DEC environmental hazard databases indicates that there has never been a recorded release of any hazardous material at the Existing Substation, the proposed New Substation site, or within close proximity to the substation sites. VHB staff did not observe any evidence of current or previous leaks at the Existing Substation.

The existing transformers are classified as "non-PCB," and, therefore, their disposal is not subject to TSCA Regulations or Vermont Hazardous Waste Management Regulations. VEC's plan to dismantle the transformers and return them to stock is consistent with the Regulations. In conclusion, VEC has met the recommendations of the draft guidance document and no further site investigations are necessary.

VHB concludes that VEC will need to update the SPCC Plan to incorporate the New Substation in accordance with 40 CFR 112 because the New Substation is proposed to contain greater than 1,320 gallons of oil in OFOE. VHB also concludes that the proposed conceptual design of the New Substation crushed stone and secondary containment structure(s) for the new transformer(s), active containment measures that VEC will implement, and SPCC Plan will be sufficient to meet the requirements of 40 CFR 112.

Based on the information available and presented herein, it is VHB's opinion that the dismantling and reclamation of the Existing Substation, and the construction and use of the New Substation area would not result in the injection of harmful or toxic substances into groundwater or wells, or to allow the discharge of hazardous materials to streams. Furthermore, VHB opines that the decommissioning of the existing substation and the construction of the New Substation will meet applicable Department of Health and Department of Environmental Conservation regulations regarding the disposal of wastes. Additionally, implementation of the Reclamation Plan and NNIS Plan would stabilize and restore the site.

ATTACHMENT:

- Existing Substation Oil and Hazardous Materials Map (page 1)

- Proposed Substation Oil and Hazardous Materials Map (page 2)
- Laboratory Results For Existing Transformer (pages 3-4)
- Private Well Report (pages 5-6)
- Preliminary Oil Containment Design Plans (page 7)

REFERENCES

Agency for Toxic Substances and Disease Registry (ASTDR), 2001. Polychlorinated Biphenyls. US Department of Health and Human Services.

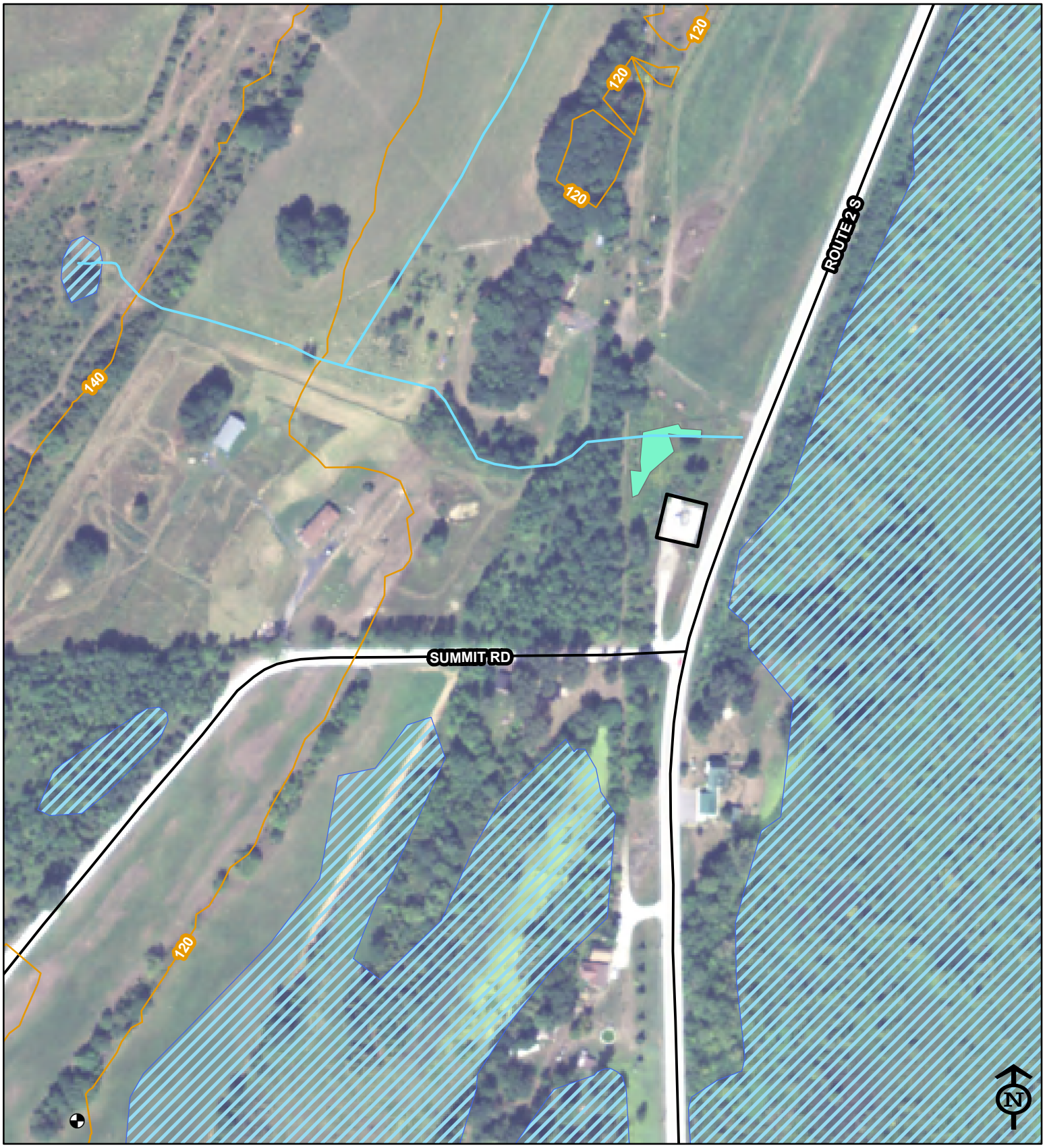
Environmental Protection Agency (EPA), Code of Federal Regulations, Title 40 (Protection of the Environment), Parts 761 Polychlorinated biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions. Electronic version current as of November 23, 2012. http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=9c9151d5375345ef5284e004ddf6d9c2&rgn=div5&view=text&node=40:32.0.1.1.18&idno=40

Environmental Protection Agency (EPA), Code of Federal Regulations, Title 40 (Protection of the Environment), Parts 112 Oil Pollution Prevention. Electronic version Current as of November 23, 2012. http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&sid=b1391cacd23f411fc11f1110ac896388&tpl=/ecfrbrowse/Title40/40cfr112_main_02.tpl

Vermont Agency of Natural Resources. 2013. Vermont Hazardous Waste Management Regulations. Chapter 7 of the Vermont Environmental Protection Rules. Vermont Department of Environmental Conservation, Waste Management Division.

Vermont Agency of Natural Resources. 2006. Vermont Standards & Specifications for Erosion Prevention and Sediment Control (2006). Vermont Department of Environmental Conservation.

ATTACHMENT



Legend

- Public Water Sources
- Private Wells
- Hazardous Waste Sites
- USTs
- VEC S. Alburgh Substation
- Wetlands
- VHB Delineated Wetlands
- 20ft Contour
- Roads
- Streams

VEC - South Alburgh Existing Substation OHM, Decommission, and Reclamation
Alburgh, Vermont
Draft: August 20, 2014

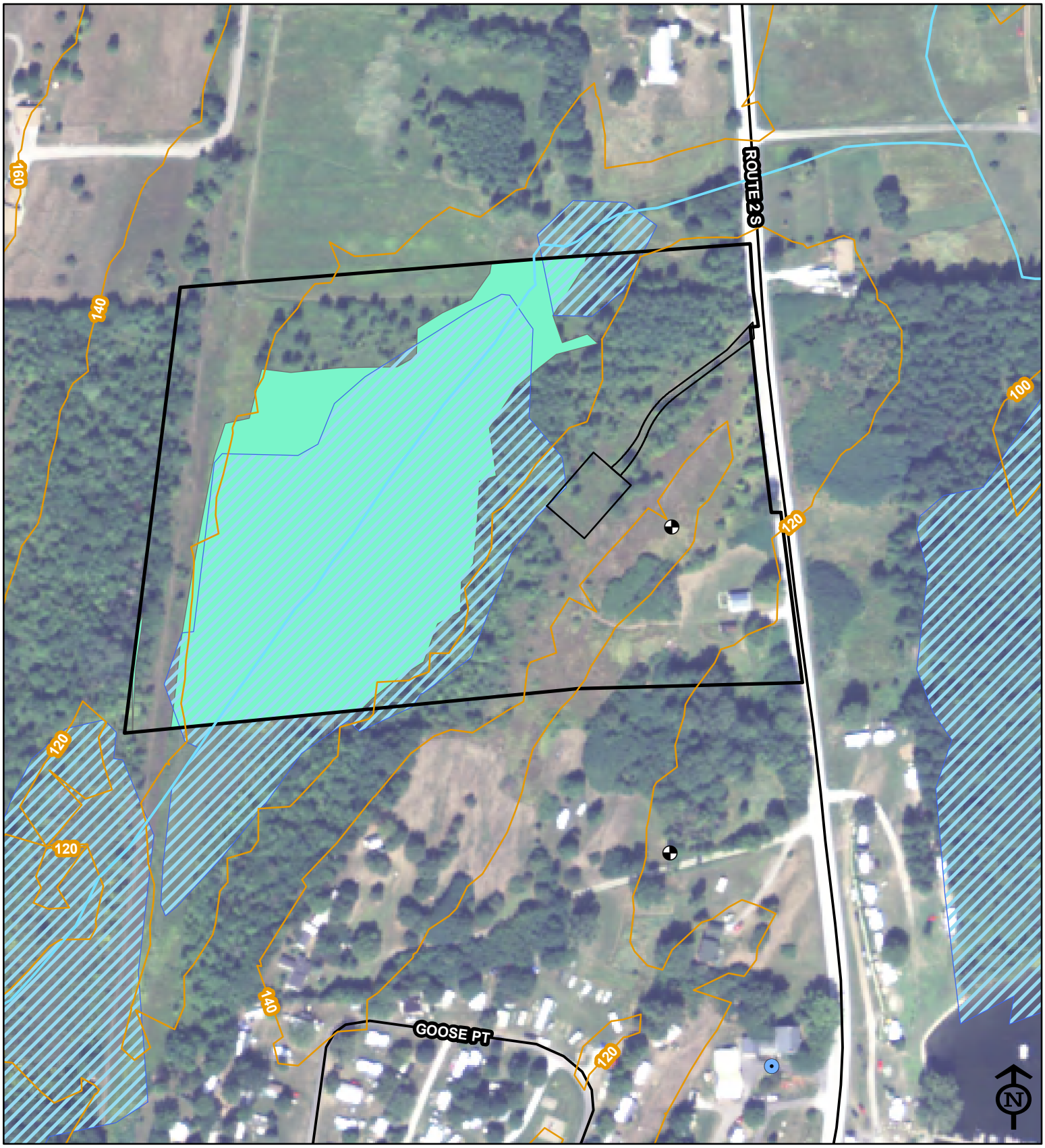
250 125 0 250 Feet

Sources: Background - NAIP aerial photograph (2011); Roads by VTrans (2012); Streams by VGCI (2008); Contours by VCGI (2009); Hazardous Waste Sites from VT DEC (2014); USTs from VT DEC (2014); Private Wells from VT DEC (2014); Public Water Sources from VT DEC (2014); Wetlands by ANR (2010).

VHB *Vanasse Hangen Brustlin, Inc.*

\\VTDATA\Projects\57667.00 VEC S. Alburgh Sub\GIS\Project\OHM_Map_ExistingSub_8-20-14.mxd

Prepared by: RFA



Legend

- Proposed Substation
- Public Water Sources
- Private Wells
- Hazardous Waste Sites
- USTs
- 20ft Contour
- VHB Study Area
- Streams
- VHB Delineated Wetlands
- Wetlands
- Roads

VEC - South Alburgh Proposed Substation OHM, Decommission, and Reclamation
Alburgh, Vermont
Draft: September 10, 2014

250 125 0 250 Feet

Sources: Background - NAIP aerial photograph (2011); Roads by VTrans (2012); Streams by VGCI (2008); Contours by VCGI (2009); Hazardous Waste Sites from VT DEC (2014); USTs from VT DEC (2014); Private Wells from VT DEC (2014); Public Water Sources from VT DEC (2014); Wetlands by ANR (2010); Proposed Substation provided by VEC (2014).

VHB *Vanasse Hangen Brustlin, Inc.*

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Prepared by: RFA

SDMyers ACTS 4:12 INTELLIGENT TRANSFORMER MANAGEMENT®

Date Printed 7/24/2014

TC# 39

Customer	**0857000 VERMONT ELECTRIC COOP (VT)**	**City**	JOHNSON, VT	**Location**	OUTDOOR/GROUND
Sub-Name	**SOUTH ALBURG #28**	**Unit No.**	140	**Other**	

NAMEPLATE DATA

Manufacturer	T&R		**Equipment Type**	TRANSFORMER
Manufacture Date			**Transformer Class**	OA
Serial No.	03362		**Impedance %**	7.10
KVA Rating	10,000		**Phase/Cycle**	3/60
High Voltage	43,800	D	**Liquid Type**	OIL
Low Voltage	12,470	Y	**Gallons**	3,000
Weight	50,500		**Other Access**	1/4 INCH

ADDITIONAL EQUIPMENT

Radiators	Yes	**Conservator Tank**	No
Fans	No	**LTC Compartment**	No
Water Cooled	No	**Bushing Location**	Top
Oil Pumps	No	**Breather**	N2 Blanket
Top FPV (inch)	1.00 Valve	**Hose Length (feet)**	50
Bottom FPV (inch)	2.00 Valve	**Service Online**	Yes
InsulationType	65C	**Power Available**	No

VISUAL INSPECTION

DATE	LEVEL	SAMPLE TEMP	TOP TEMP	P/V	PAINT	LEAKS
08/11/09	HIGH	30	45	2.50	GOOD	NONE
08/26/10	HIGH	25	40	0.50	GOOD	NONE
05/18/12	HIGH	22	38	1.50	GOOD	NONE
07/26/13	NORMAL	24	36	0.50	FAIR	NONE

FIELD SERVICE

DATE	SERVICE

Additional Information

Reason Not Tested 07/27/06 NOT TESTED PER CUSTOMERS REQUEST

LIQUID SCREEN TEST DATA

DATE	SERVICE	ACID	IFT	DIEL 877	DIEL 1816	GAP	COLOR	SP. GRAV.	VISUAL	SEDIMENT
08/01/02		0.030 AC	33.8 AC	49 AC			1.50 AC	0.885 AC	CLEAR AC	NONE AC
10/18/02		0.030 AC	33.6 AC	41 AC			1.50 AC	0.880 AC	CLEAR AC	NONE AC
06/28/07		0.040 AC	31.8 QU	49 AC			1.50 AC	0.890 AC	CLEAR AC	NONE AC
07/18/08		0.020 AC	33.4 AC	41 AC			1.50 AC	0.880 AC	CLEAR AC	NONE AC
08/11/09		0.040 AC	34.3 AC	37 AC			1.50 AC	0.890 AC	CLEAR AC	NONE AC
08/26/10		0.030 AC	33.7 AC	31 AC			1.50 AC	0.880 AC	CLEAR AC	NONE AC
05/18/12		0.030 AC	34.1 AC	53 AC			1.50 AC	0.880 AC	CLEAR AC	NONE AC
07/26/13		0.030 AC	34.8 AC	38 AC			1.50 AC	0.880 AC	CLEAR AC	NONE AC

INHIBITOR CONTENT

DATE	PCT. BY WEIGHT
07/26/93	0.324% AC
12/22/94	0.338% AC
07/26/13	0.260% AC

NOTE - STUDIES SHOW THAT A LEVEL OF 0.3% INHIBITOR IS OPTIMUM FOR PRESERVATION OF IN-SERVICE TRANSFORMER OILS. OILS WITH A LEVEL BELOW 0.08% ARE CONSIDERED TO BE UNINHIBITED.

LIQUID POWER FACTOR

DATE	25 C	100 C
07/18/08	0.017 AC	0.665 AC
08/11/09	0.018 AC	0.518 AC
08/26/10	0.021 AC	0.652 AC
05/18/12	0.018 AC	0.319 AC
07/26/13	0.031 AC	0.961 AC

KEY TO ABBREVIATIONS: AC - ACCEPTABLE QU - QUESTIONABLE UN - UNACCEPTABLE RS - RESAMPLE

NOTE: * After a result indicates that the test or service was performed by an outside source.

SDMyers ACTS 4:12 INTELLIGENT TRANSFORMER MANAGEMENT®

Date Printed 7/24/2014

TC# 39

Customer	**0857000 VERMONT ELECTRIC COOP (VT)**	**S/N**	03362				
Sub-Name	**SOUTH ALBURG #28**	**Mfg.**	T&R	**Gallons**	3,000	**High Volt.**	43,800
Location	OUTDOOR/GROUND	**Unit No.**	140	**KVA**	10,000	**Low Volt.**	12,470

KARL FISCHER TESTING MOISTURE CONTENT EXPRESSED IN PPM

DATE	AVG. TEMP	PPM	PCT. SATURATION		MOISTURE BY DRY WEIGHT PCT.
06/28/07	35	6	6.0	AC	0.43
07/18/08	29	9	11.3	AC	1.24
08/11/09	36	6	5.3	AC	0.52
08/26/10	30	3	3.0	AC	0.33
05/18/12	27	6	7.5	AC	0.84
07/26/13	29	8	10.1	AC	1.10

RECOMMENDATION RETEST 1 YEAR

FURAN ANALYSIS EXPRESSED IN PPB

DATE	5H2F	2FOL	2FAL	2ACF	5M2F	TOTAL
08/11/09	ND	ND	21	ND	ND	21
05/18/12	ND	ND	18	ND	ND	18
07/26/13	ND	ND	8	ND	ND	8

RECOMMENDATION RETEST 1 YEAR
NO DIAGNOSTIC CHANGES ARE NOTED IN FURAN LEVELS SINCE THE PREVIOUS ANALYSIS. THE CELLULOSIC INSULATION APPEARS TO BE IN GOOD CONDITION.

CALCULATED DP 800 **EST. LIFE REMAINING** 100%

GAS-IN-OIL ANALYSIS GAS CHROMATOGRAPHY EXPRESSED IN PPM

DATE	HYDROGEN	OXYGEN	NITROGEN	METHANE	CARBON MONOXIDE	CARBON DIOXIDE	ETHANE	ETHYLENE	ACETYLENE	TOTAL COMBUST.	TOTAL GAS
08/01/02	20	16,158	72,524	17	887	6,622	5	6	11	946	96,250
10/18/02	21	13,876	70,706	18	882	7,975	5	6	10	942	93,499
06/28/07	16	10,586	65,265	17	971	8,370	11	5	8	1,028	85,249
07/18/08	18	12,947	68,108	17	928	8,715	5	4	8	980	90,750
08/11/09	16	10,973	64,525	18	1,041	10,280	5	6	10	1,096	86,874
08/26/10	14	12,583	56,886	15	699	8,000	6	4	7	745	78,214
05/18/12	3	16,288	63,242	17	527	10,347	7	7	7	568	90,445
07/26/13	ND	17,353	59,248	12	293	8,215	7	5	6	323	85,139

RECOMMENDATION RETEST 1 YEAR
B-THE ANALYSIS OF THIS SAMPLE SHOWS NO SIGNIFICANT INCREASE IN THE COMBUSTIBLE GAS VOLUME. THIS INDICATES NORMAL OPERATION.

ICP METALS-IN-OIL EXPRESSED IN PPM

DATE	ALUMINUM	IRON	COPPER
07/26/93	ND	ND	ND
12/22/94	ND	ND	0.060
07/26/13	ND	ND	0.061

RECOMMENDATION RETEST 1 YEAR
THERE HAS BEEN NO DIAGNOSTIC CHANGE SINCE THE PREVIOUS ANALYSIS. THESE DATA INDICATE NORMAL OPERATION.

PCB CONTENT EXPRESSED IN PPM

DATE	1242	1254	1260	OTHER	TOTAL
07/02/96					ND
07/26/13					ND

COLOR LABEL: Green **CLASS:** NON-PCB

Results in mg/kg
ND means None Detected
(<2 mg/kg per ASTM D4059)

NOTE: * After a result indicates that the test or service was performed by an outside source.

Well Details

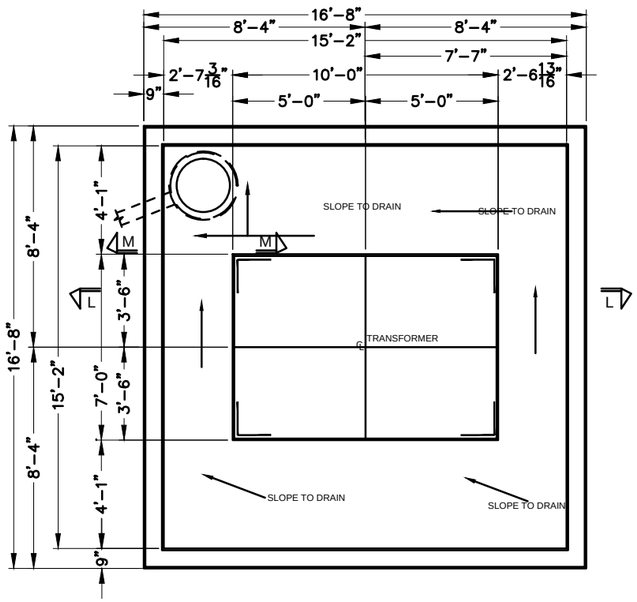
Date Completed	05/25/2001
Date Received	06/05/2001
Driller	191 - David Chevalier , Chevalier Drilling Co Inc
Well Report Number	16635
Tag	16635
Comments	
Town	Alburg
Map Cell	
Tax Map	
E911 Address	Route 2
Subdivision	
Lot Number	
Owners First Name	Gary
Owners Last Name	Labounty
Purchaser First Name	
Purchaser Last Name	
Well Use	Domestic
Well Reason	Replace existing supply
Drilling Method	
Well Depth	522.00 feet
Yield Gallons Per Minute	0.50
Yield Test Tested For Hours	1.00
Static Water Level	0.00 feet
Over Flowing	
Overburden Thickness	4 feet
Casing Length	20.00 feet
Casing Diameter	6.00 inches
Casing Length Below Land Surface	18.00 feet
Casing Length Exposed	2.00
Casing Material	Steel
Casing Weight	19.00 lbs/foot
Casing Finish	
Liner Length	0.00 feet
Liner Diameter	0.00 inches
Liner Material	
Liner Weight	0.00 lbs/foot
Grout Type	Clay/Seal Bentonite
Seal Type	
Diameter Drilled In Bedrock	0.00 inches
Depth Drilled in Bedrock	0.00 feet
Screen Make Type	
Screen Material	
Screen Length	0.00 feet
Screen Diameter	0.00 inches
Screen Slot Size	0.000 inches
Depth of Screen	0.00 feet
Gravel Size Type	

Casing Sealing Method	Shoe & grout bottom
Yield Test Method	
Well Development	
Not Steel Casing	
Water Analysis	
Well Screen	
AW Partial	
Unique GIS Name	AM16635
Lat Degree	44
Lat Minutes	55
Lat Seconds	27.1200
Long Degree	73
Long Minutes	16
Long Seconds	29.2801
Location Determination Method	GPS location
Well Type	
Depth To Liner Top	0.00
Hydro Fractured	
Hydro Fractured Resulting Flow	0.00
Well Location Submitted As A Dot On A Map	N

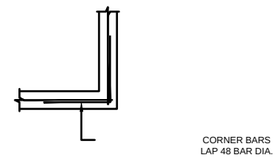
WellMainRecordNumber	StartingDepth	EndingDepth	WaterBearing	LithologyCode	LithologyDescription
84371	0.00	4.00		T	till
84371	4.00	522.00		R	shale

EXAMPLE CONTAINMENT DESIGN: CONTAINMENT WILL BE 110% OF THE TRANSFORMER OIL VOLUME PLUS 5 INCHES OF FREEBOARD (VHB 10/29/2014)

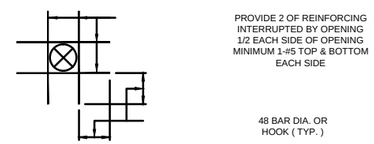
DESIGN CRITERIA	
TRANSFORMER TOTAL OIL:	GAL
150%:	GAL
CONTAINMENT AMOUNT:	GAL



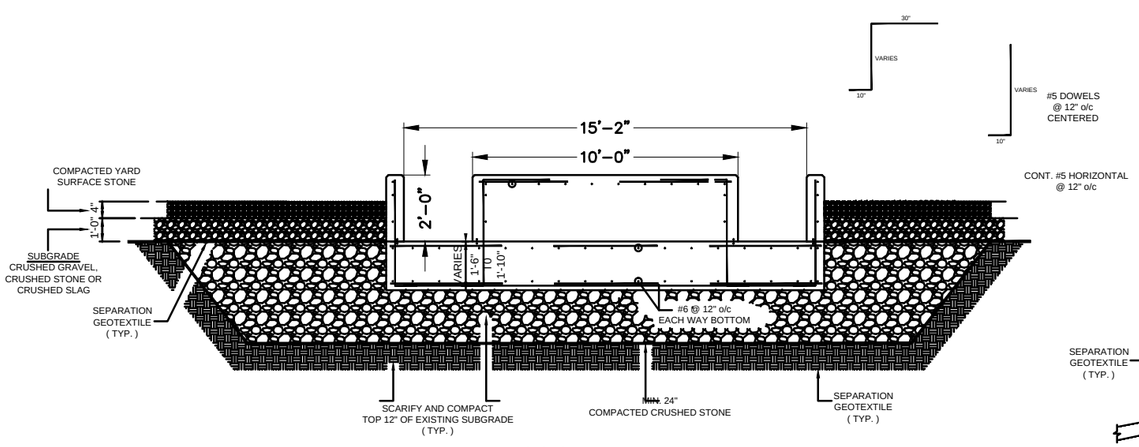
TRANSFORMER FOUNDATIOPN PLAN TR



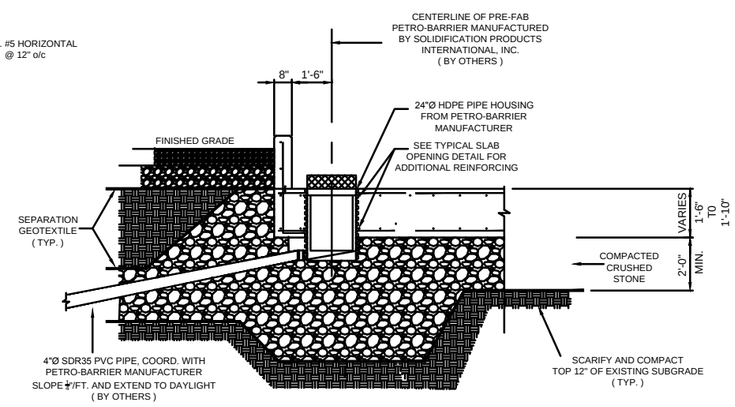
TYPICAL DETAIL OF REINFORCEMENT AT CORNERS OF CONCRETE WALLS



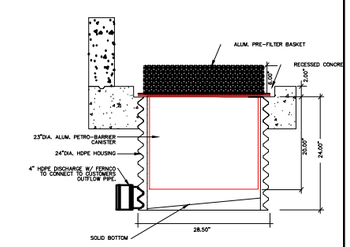
TYPICAL DETAIL OF REINFORCING AT CONCRETE SLAB OPENINGS



SECTION "L-L"



SECTION "M-M"



VERMONT ELECTRIC CO OP INC
the co-op advantage
energy smart today

NO.	DATE	DESCRIPTION	BY	CK'D
01	8.13.14	DWG CLEANUP	RJP	KAS

NOT FOR CONSTRUCTION PRELIMINARY PLANS

SOUTH ALBURGH NO. 28 SUBSTATION

ALBURGH, VT

SHEET TITLE
S.ALBURGH OIL CONTAINMENT

OIL CONTAINMENT

DRAWN BY	DATE
RJP	DEC. 2013
CHECKED BY	VEC PROJECT #
RJP	2014088828
PROJ. ENG.	VEC ARCHIVE #
DRD	

SHEET NUMBER

SHEET 1 OF 1