

RCRA FACILITY ASSESSMENT  
CENTRAL VERMONT PUBLIC SERVICE

Green Hills Lane  
Rutland, Vermont 05701

## Facility Waste Generation and Manufacturing Process Description

Central Vermont Public Service Corporation (CVPS) owns and operates its Rutland Gas Turbine utility on Greens Hill Lane in Rutland, Vermont. The site is located off lower West Street, near the city sewage treatment plant and the confluence of East and Otter Creeks (see Figure 1, Rutland Quadrangle, USGS 7.5 minute map series). The Rutland Gas Turbine facility was built in 1951 to serve as a power generation station for the CVPS grid. Three gas turbine generators were operated on site, units #1 and #2, which produced 5,000 KW and unit #5 which produced 13,200 KW. Unit #1 went into service on 9/7/51, unit #2 on 10/1/52 and unit #5 on 12/31/62. The site also serves as the storage location for hazardous wastes generated by CVPS.

For about 50 years CVPS operated a Transformer Service Shop at their Cleveland Avenue site in Rutland, Vermont. This facility is located on East Creek about 2,500 feet from the Gas Turbine Utility. Service of transformers and capacitors involved repair and cooling oil replacement. Transformers and capacitors utilize cooling oils which contain, since its invention in 1930, polychlorinated biphenyls (PCB). In 1978, federal regulations on PCB's were promulgated which set 500 ppm as the threshold over which a PCB contaminated oil was regulated. The law was modified in 1979 to include oil containing 50 ppm PCB as regulated, and stated that all transformers and capacitors, unless tested, were assumed to contain PCB contaminated oil (Over 50 ppm). At that time CVPS instituted a testing and modification program whereby all transformers and capacitors coming in for service were tested for PCB content in oil. All oil over 50 ppm PCB was stored for disposal as a hazardous waste. With the issuance of a recycle/reuse permit in December, 1984 CVPS was able to recycle oil containing less than 50 ppm PCB for reuse in transformers and capacitors by removing water and carbon.

On January 13, 1981, CVPS made application to the Agency for a hazardous waste treatment and storage facility permit for the Cleveland Avenue site. On July 14, 1982, the Agency informed CVPS that since the Cleveland Avenue site was located within the 100 year flood plain, its location precluded issuance of a RCRA permit for treatment and storage of hazardous wastes. At that time, CVPS made the decision to move the transformer shop to the Greens Hill Road Gas Turbine/Annex III site in order to obtain a RCRA permit.

A permit application was filed for storage of hazardous wastes on March 15, 1985, for the Gas Turbine Annex III site after AEC had issued interim certification. The new transformer service facility, located in the Gas Turbine building, had been deemed in compliance and ready for operation on January 15, 1985. The storage permit hasn't been issued, and a letter specifying where the application is incomplete was sent on January 30, 1987.

Additionally, CVPS has recently modified their waste handling procedures. These changes will be reflected in a new application for certification to be submitted by the end of the summer, 1987.

#### Historical and Present Waste Handling Practices

When the Transformer Service Shop was located on Cleveland Avenue, waste oil was stored there only temporarily and then moved to the Annex III site which is adjacent to the Gas Turbine. Waste oil was shipped over the road by tanker between the two facilities, thus no direct piping was used. Several tanks were maintained at the Gas Turbine facility for oil storage. One 20,000 gallon capacity underground tank received oils with less than 500 ppm of PCB, which at that time rendered it non-hazardous. This oil was later reclaimed and used as needed at the Transformer shop on Cleveland Avenue. Oil from the 20,000 gallon tank that had been "cleaned" of water and carbon was placed in a 4,800 gallon

underground tank until needed at the Turbine Facility. Additionally, four 1,000 gallon above-ground tanks were operated for storage of oil containing greater than 500 ppm PCB, which was shipped when necessary as a hazardous waste. Several fuel storage tanks are located on site to fuel the Gas Turbines. Specifically, two 316,000 gallon above-ground tanks and four 12,000 gallon underground tanks were operated on site.

When the decision was made to move the Transformer Shop to the Gas Turbine/Annex III site, waste handling procedures changed somewhat. The changeover occurred at the end of 1984, and the new location was approved by the Agency for waste storage in January of 1985. Transformers and capacitors were transported to the service center within a specially designed steel lined truck. All incoming oil in equipment was tested for PCB content using a disposable CLOR-N-OIL PCB screening kit. Oil removal was accomplished within the truck which had been garaged inside the building. Within the building was housed a 1,000 gallon concrete contained tank for temporary storage of oil with greater than 50 ppm PCB. A 1,000 gallon tank with an earthen dike, located just outside was used for temporary storage of less than 50 ppm PCB content recyclable oil. As these tanks filled, an over the road tanker specially fitted with two 1,000 gallon tanks was used to transport oil from the tanks to the long term storage area.

Additionally, the long term storage area had been changed. On December 5, 1984, the 20,000 gallon and 4,800 gallon underground tanks were removed under Agency supervision. The tanks were in good condition, and no leakage had occurred. A new storage building was built to house the four 1,000 gallon greater than 50 ppm PCB storage tanks that had formerly been outside. Two more tanks were added to bring capacity to 6,000 gallons. PCB contaminated solid waste (soils, junk capacitors and transformers) were packed in DOT containers and

stored inside the shed. A 10,000 gallon above ground reclaim tank was installed adjacent to the storage shed, with concrete containment, for storage of oil with less than 50 ppm PCB. The average PCB content of transformer/capacitor oil tested is 80 ppm. Approximately 10,000 to 12,000 gallons of greater than 50 ppm PCB oil have been shipped for disposal yearly, along with about 5,000 - 6,000 pounds of solid PCB waste. About 4,000 - 5,000 gallons yearly were reclaimed on site.

#### Future Waste Handling

CVPS filed a certification application for storage and treatment of hazardous waste on March 15, 1985, which is now being modified to reflect major changes in their waste handling practices.

At this point in time, the Gas Turbine building is being refitted for use as the hazardous waste storage facility. The process includes an asbestos abatement program to remove the asbestos cover around each turbine and the associated piping. After this removal program is complete, the turbines themselves will be removed. The current schedule indicates that this will be accomplished by August 1987.

The transformer shop, now inoperable during the asbestos remediation phase, will reopen in the Gas Turbine building once it has been refitted. No transformer maintenance is occurring at this time, and transformers and capacitors requiring service are being stockpiled behind the building.

The current drum storage shed will be used as an "overflow" unit, that is it will be used when storage in the Gas Turbine Building is at capacity. The 10,000 gallon tank adjacent to the former storage shed, formerly used as the recycle tank, will be used for storage of greater than 50 ppm PCB oil prior to shipment. The concrete and steel containment structure surrounding this tank drains to a

floor sump which drains to the yard. The sump contains imbibitor beads to collect any oil which may escape the containment unit.

The concrete contained 1,000 gallon tank formerly used for greater than 50 ppm PCB oil, located inside the Gas Turbine building, will be used for storage of greater than 500 ppm oil prior to shipment. A 5,000 gallon tank will be installed inside the building to hold less than 50 ppm recyclable oil. In future, no oil will be recycled on site. Oil will be shipped to Norlite for reclamation. The new procedures will include use of 0 ppm PCB mineral oil for refilling serviced transformers. Thus the plan is to eventually eliminate the use of oil containing detectable quantities of PCB.

The two above-ground 316,000 gallon tanks used for fuel storage for gas turbine operation are still on site and partially full. Since turbine operation has ceased, these tanks will eventually be emptied. Their removal is not anticipated at this time. For future SWMU locations see Figure 10.

#### Environmental Setting

The site lies at map coordinates 43°35'50" north latitude and 72°59'30" West longitude, which is at the confluence of Otter Creek and East Creek. The topographic relief of the site proper is typical of flood plain at about 20 feet, with elevations ranging from between 540 feet and 560 feet. At a distance of 1.5 mile northwest is Pine Hill Park with an elevation of 999 feet. Otter Creek is a fifth order "old age" stream with a well developed flood plain and numerous oxbow lakes and meander scars.

Geologically, the site lies within the Vermont Valley province of Vermont (see Figure 2), a long narrow valley that occurs between the Green and Taconic Mountains. The Centennial Geologic Map of Vermont, published by the Vermont Geological Society in 1961, shows the site located over Lower-Cambrian Dunham

Dolomite, near the contact of Dunham Dolomite and Chesire Quartzite. Closer examination in "the Geology of the Rutland Area, Vermont", 1953, by William F. Brace locates the site in approximately the same position (see Figure 3). A cross section running E-W and located north of the site, included as Figure 4, shows it situated on the western limb of a faulted south plunging syncline. The section clearly shows the Dunham Dolomite overlying the Chesire Quartzite. The stratigraphic column is shown in Figure 5.

The Vermont Valley was affected by glacial advance at least three times, including drift from the Bennington, Shelburne and Burlington glacial stades (see Figure 6). Nearby, Rutland moraines of Shelburne age are located, a kame moraine to the east and ablation till moraine to the west. Collectively, these moraines are called the Mendon moraine, described as very sandy and containing numerous boulders.

Well completion logs for nearby homeowner wells (location shown on Figure 7) corroborate this information. Drillers logs were obtained for wells within a one mile radius of the site. All logs report passing through till comprised of sand and boulders. Thicknesses varied from 8 feet northeast of the site to 213 feet to the south, with an average of about 70 feet. South of the site, well numbers 296, 97, and 51 reported terminating in limestone beneath the till, probably referring to Dunham dolomite. Going west, the remaining logs reported passing through a section of fractured quartzite, and then a more competent quartzite. The fractured quartzite ranges from 45 to 94 feet thick, averaging 63 feet. Most of the wells to the west terminate in quartzite. Two of the logs, numbers 352 and 276, reported passing through about 15 feet of ocre, a local term for a red gouge clay that forms at fault zones. One well, number 343, located to the far west, encountered black shale and then black quartz, probably corresponding to

the Mendon Formation. The local column, then, is summarized below.

#### Glacial Till

A deposit of sandy till containing numerous boulders, actually consisting of drift from three glacial stades, averaging 70 feet in thickness.

#### Dunham Dolomite

A thick bedded grey to pink siliceous dolomite, averaging about 1700 feet in thickness.

#### Cheshire Quartzite

A massive yellowish white quartzite, the upper 50 - 100 feet of which is highly fractured and contains lenses of ocre.

#### Mendon Formation

##### Moosalamoo Member

A dark quartzite overlain by a black phyllite ranging from 500 - 800 feet thick.

Presently, the site is bordered to the north by a heavily industrialized section of Rutland. Directly north is Homgas, Incorporated, a propane gas storage and distribution concern. The city of Rutland Sewage Treatment Plant is located northwest of the site. The new Vicon "trash to energy" solid waste incinerator is presently being constructed just north of the sewage treatment plant. The site is bordered to the southeast by East Creek, and to the southwest by Otter Creek and a section of the Old Vermont Marble Company railway siding right-of-way. The actual track was removed last year.

Aerial photographs are available from the site from 1942 (see Attachment 2). The 1942 photos show that the northwest portion of the site is being or has been mined for gravel. There are presently several quarries along the banks of Otter Creek in the near vicinity, one within .5 miles of the facility. A scar

from the one time existence of railroad tracks can be seen crossing the site from northwest to southeast which continues on the other side of East Creek, suggesting that a railroad bridge was once there. The site proper is completely undeveloped, and is vegetated with trees and other indigenous vegetation. Several residences are located northeast of the site along West Street. On the corner of West Street and Greens Hill Road is a General Electric facility. Just north of the site a building and several above ground tanks can be seen. An old blueprint supplied by the facility names this concern the Tidewater Oil Company. A cemetery is located directly north of that.

By 1962, as shown on the November 2, 1962 air photos, the Gas Turbine facility has been constructed. The railroad scar is still visible but fading. There is construction going on directly northwest of the facility, and an extensive sand and gravel mining operation seen further northwest. The General Electric facility and Tidewater Oil Company are still operational.

The area shown on the May 2, 1974 series air photos is essentially unchanged since 1962, with the exception that the sand and gravel mines are non-operational and beginning to be vegetated. The construction seen earlier was that of the Rutland City Sewage Treatment Plant. Presently, the cemetery is still there and east of that, Casella Waste Management operates a demolition debris site.

#### SWMU Locations and Other Areas of Concern

Former and present waste handling practices have been described above. Locations of waste management units and other areas of potential contamination have been identified on figures 8, 9 and 10. Areas are referred to below by number.

Former Locations (See Figure 8)

Location 1: These four 1,000 gallon single wall uncovered above ground tanks provided storage for oil contaminated with greater than 500 ppm PCB. No direct piping was used, hence waste was transferred in a coupling/uncoupling process from an over-the-road tanker. Waste was shipped as tanks became full to a qualified chemical waste landfill. These units were in operation from around 1972 to 1984. No information is available on whether the tanks were contained or diked. When the tanks were removed from service, their condition was good enough that they were placed back into service in the new PCB storage shed area.

Location 2: Two single wall steel underground storage tanks with a capacity of 20,000 gallons and 4,800 gallons respectively were located here and in service from about 1972 to 1984. Oil of concentration of less than 500 ppm (at that time non-hazardous) was stored in these tanks for reclamation and reuse at the Transformer Shop. Oil was transported from the Transformer Shop by over-the-road tanker and placed in the 4,800 gallon tank. Exterior surfaces of these tanks had a non-corrosive coating, and valves on the tanks remained locked except during loading or unloading operations. These tanks were excavated and removed on December 5, 1984, under Agency supervision. Tanks were found to be in sound condition, and photographic documentation is available in the RCRA file as proof of condition. No soil contamination was witnessed at that time.

Location 3: Two 316,000 gallon single wall welded steel tanks were in service here for the storage of #2 fuel oil for use in the generators. These tanks are surrounded by an earthen dike designed to contain one tank full of liquid. One report states that "significant quantities of rainwater will not accumulate inside the diked area." This statement calls into question the dike's ability to hold liquid. There are two above ground lines, one six-inch and one three-inch,

about 360 feet long that connect the bulk storage tanks and the service tanks, located on the map as area #4. Neither line is in use at this time. As noted above, transfer valves were locked when not in use. Loading and unloading of the bulk and service tanks was done by tanker. The substrate beneath the unloading area was stated in a 1981 certification application to be able to "absorb the contents of a tank truck." It is further stated that "gravel" in the unloading area is excavated annually to remove material "which has been subjected to normal drippings that occur in the unloading process." This statement documents quite clearly that spillage occurs as a normal part of operating procedure. These tanks have been in service since 1953 when the site was constructed.

Location 4: Four underground welded steel tanks painted with a non-corrosive coating are located here. As indicated above, lines connect the bulk tanks to each 1,200 gallon service tank, which in turn feed to the burners. No indication of tank condition is available. These tanks had been in service since construction in 1953.

It should be further noted that the entire site has been used for storage of out-of-service transformers, capacitors and voltage regulators. Additionally, there were power transformers in use, since it was a power generating facility. The area underlying the active transformer "bank" is termed a "gravel pad." The spare transformers, capacitors and voltage regulators stored on site contain PCB oil and are stored in accordance with TSCA regulations.

Former Locations, 1985 Certification Application (See Figure 9)

Waste management practices, and thus locations, were changed in 1984. Descriptions for each unit are given below, again listed by numbered location.

Location 1:

Location 1 was the long term storage area. A storage building had been constructed on a concrete slab, which contained six 1,000 gallon welded steel tanks (four of which had been in service previously). Oil with greater than 50 ppm was stored there for shipment. Apparently five of the tanks were used for storage, and one for monitoring quantity of fluid as it enters the storage system. Distribution of oil was accomplished through a pump driven manifold system. No spill containment was provided inside the building. Absorbant pads are available for small spills.

Oil that was stored for reclamation was stored within a concrete contained 10,000 gallon tank adjacent to the storage building. When stress cracks developed within the concrete, the entire structure was lined with welded steel to provide adequate containment.

Location 2:

Location 2 encompasses the operation of the Transformer Service Shop. As stated earlier, the actual oil replacement took place within the steel lined truck. Two tanks were in service in this location. A 1,000 gallon concrete diked tank was used inside for storage of greater than 50 ppm PCB oil prior to shipment. A 1,000 gallon tank with an earthen dike was located outside for reclaim oil storage. See Figure 11 for a close-up of this area.

Location 3:

The two 316,000 gallon above-ground tanks discussed earlier were still in use in 1985. At this time one is still partially full, but neither is in use since the gas turbines were removed.

Location 4:

The four 12,000 gallon service tanks for gas turbine fuel storage were in use in 1985, but were phased out with the removal of the gas turbines. The tanks themselves have not been removed. Several areas throughout the site were still in use in 1985 for storage of various types of equipment, including capacitors and transformers. These areas are indicated in blue on Figure 9.

Future SWMU Locations (see Figure 10)

Location 1:

The former Gas Turbine facility, as described above, is now in the process of being refitted for use as the hazardous waste storage facility. Exact locations of storage tanks within the building are unknown at this time. As mentioned above, the 1,000 gallon tank formerly used for greater than 50 oil will be used for greater than 500 oil, most probably in the same location.

It is the Agency's understanding that capacitors and transformers will no longer be stored at various locations outside, but will be placed within the building.

Location 2:

This area will serve as an additional storage location. The 1,000 gallon tanks formerly used in the building for waste oil storage prior to shipment have been removed. Waste oil will be stored in the 10,000 gallon tank adjacent to the building. The shed will house DOT containers with solid PCB waste, including rags, junk equipment and used clothing or clor-n-oil kits.

Waste Characteristics

All wastes handled on site are related to transformer and capacitor service and repair, comprised of mineral oil with various concentrations of PCB. Information from the facility contained in their manual for hazardous waste

handlers states that the name brand most commonly used is Askarel, although that name is not listed in the literature. Sax, in "Dangerous Properties of Industrial Material" lists PCB as a suspected human carcinogen. Dermal exposure causes chloracne, an acute skin disorder. A toxic action on the liver is also indicated. The carrier of the PCB in this case, mineral oil, is a suspected tumorigenic and carcinogenic agent as well.

Physical and chemical parameters indicate that PCB is essentially environmentally immobile. Attachment #3 presents the relevant mathematical modeling to support its immobility.

A vapor pressure of  $1.70 \times 10^{-5}$  mm Hg indicates that PCB will not volatilize. It is essentially insoluble in water at  $3.101 \times 10^{-2}$  mg/l. The three constants listed for  $f_{oc}$ ,  $n$  and  $b$  are specific to site soil type, that is glacial till and stream sediments including sand and gravel. The given value for  $k_{oc}$ , 530,000, is an extremely high number, and is indicative of a compound that sorbs to carbon very strongly. Generally, compounds with  $k_{oc}$ s that are three orders of magnitude lower are considered strong sorbers.  $k_{ow}$ , the octanol/water partition coefficient, is directly proportional to  $k_{oc}$ , and indicates the willingness of a substance to separate from water and enter octanol. The distribution coefficient,  $k_d$ , is also directly proportional to  $k_{oc}$ , and is referred to as the weight of solute sorbed onto soil divided by the concentration of solute in the original solution. A  $k_d$  of greater than 1 indicates that a contaminant is immobile. The  $k_d$  for PCB at 5300 indicates extreme immobility. As might be expected, PCB has an accompanying high retardation factor (RF) or velocity ratio, at 52,117. That indicates that water travels 50,000 times faster through site soils than will PCB, rendering it immobile in water.

### Pollution Migration Pathways

The lack of environmental mobility displayed by PCB tends to limit the number of migration pathways. It does not travel in water as a solute, that is, it doesn't dissolve and hence doesn't develop a contamination plume. Its lack of volatility rules out air as a receptor. Its tendency to adhere to soil particles makes it a soil contaminant of extreme tenacity. It is conceivable that PCB which has sorbed to clay, silt or sand could be mobile in water with sufficient velocity to transport those sediments. Hence, if soil contamination exists, it may be advisable to check stream sediments near the facility to assess PCB content. It is possible, but improbable, that PCB sorbed to clay could become an airborne contaminant, since the mineral oil carrier would tend to render the soil more resistant to wind erosion.

### Evidence of Release

No direct evidence of release exists, although, as mentioned above, the certification application does refer to gravel removal from the various gravel pads annually because they are subject to normal drippings "during the loading/unloading operations." Soils checked during the tank evacuation were clean. No soil samples were taken at that time, or have been taken since which might substantiate unconfirmed releases. During routine transformer servicing exposure potential is greatest. Sufficient safeguards have been built into the system to protect employees from direct exposure, and to prevent release.

The storing of transformers and capacitors outside before servicing, and storing out-of-service equipment outdoors could allow release due to equipment "weepage." As discussed above, contamination is probably confined to soil. Exposure potential to soil is limited. The site is completely fenced, with the gate locked at 4:30 p.m. There is minor potential for on-site workers to be exposed to contaminated soil, should it exist. In the absence of soil testing, no confirmed release information exists.

## Visual Site Inspection Report

A visual Site Inspection was conducted at CVPS on April 10, 1987. The VSI logbook is included as Attachment 5. Viewing the various locations of former SWMUs and those to be used in the future yielded very little additional information regarding release from various units. Since waste handling practices have often changed and are still changing, it was not possible to view any SWMUs in operation.

Exceptions to this were present. The 1,000 gallon indoor tank formerly used for waste oil storage for oil greater than 50 ppm PCB showed evidence of numerous spillages, either from overflow or careless filling. No evidence of oil was seen on the floor in the building, (see photodocumentation in Attachment 4).

Of greater concern was the outside storage of hundreds of transformers and capacitors either stored, junked or awaiting service. Most of these pieces of equipment contain oil with some amount of PCB contamination. Some have been drained (those adjacent to the hazardous waste storage shed) and will be shipped out. Several transformers showed evidence of oil weepage from seals. Photodocumentation of all SWMUs and transformers and capacitors is provided in Attachment 4.

Additionally, outside storage occurs above an area filled with very coarse sand, gravel and boulder material. With sufficient volumes of water, this material would provide permeabilities capable of moving soil particles to the adjacent rivers. Since PCB adheres so strongly to soil, a possible migration of PCB could have occurred.

In light of the above, the Agency has required CVPS, as part of their permit process, to sample soils at the Gas Turbine/Annex III site. Agency staff will be present during the sampling. Samples will be taken of soils beneath storage areas and of sediments near the banks of adjacent streams. Sample results will be incorporated into this document.

## Sampling Visit Report

Soils were sampled on November 14, 1987 by Aquatec, Incorporated under Agency direction for PCB analyses. Sample locations and results of analyses are included in Attachment 6.

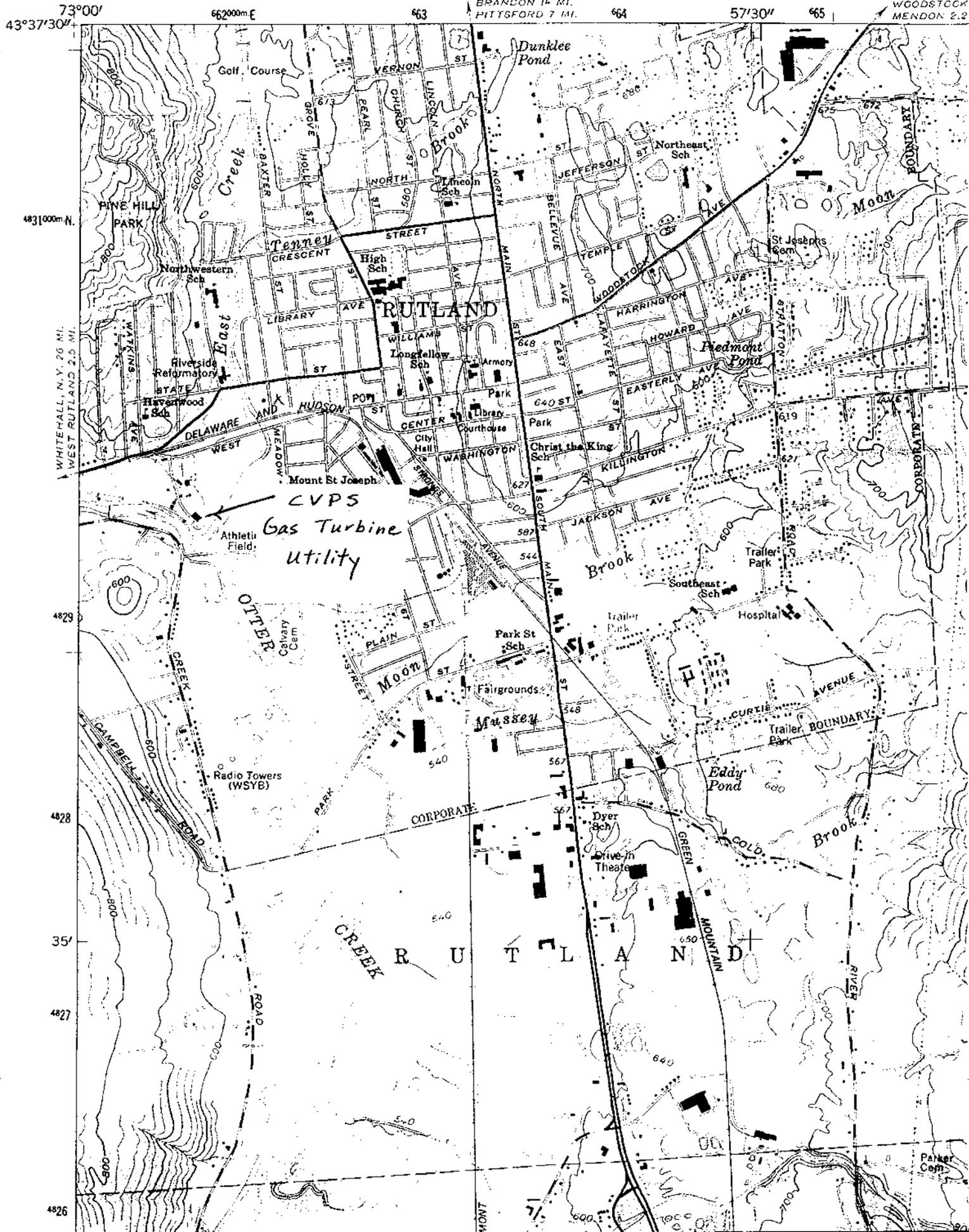
The highest values for PCB content were reported for sample locations 2 and 5. Sample 2 was taken from the outdoor capacitor storage area which is no longer in use. Samples were of soils that were visibly oil-stained. Sample 5 was taken of stream sediment near the confluence of East and Otter Creeks. Of note is that when the split spoon sampler was driven into the river sediments, an oil sheen rose to the water surface.

CVPS has been informed that a larger scale soils investigation is necessary in light of the positive show of PCBs in two samples. All outdoor storage areas will be sampled in a grid array and further river sediment sampling will be necessary. A work plan for additional investigation will be forthcoming by February 15, 1988.

3711 NE  
PROCTOR

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

Figure 1.



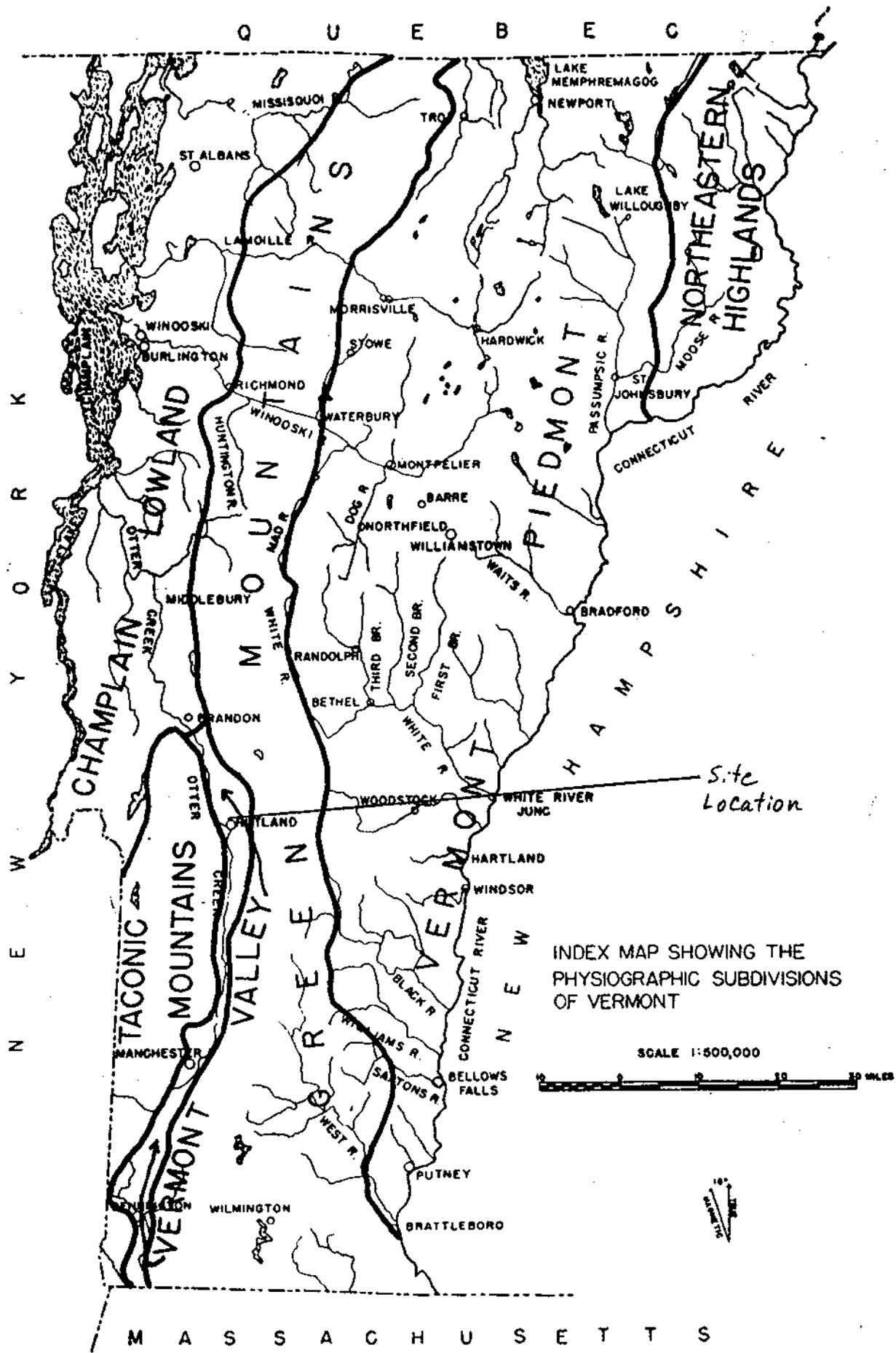
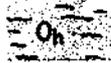


Figure 2

**EXPLANATION**

**METAMORPHIC ROCKS**

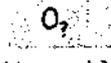
Middle  
Ordovician



Hortonville Slate  
Black phyllite, blue calcite marble

----- unconformity -----

Ordovician  
(?)



Gray, white calcite marble

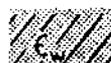


Clarendon Springs Dolomite  
Dark gray limy dolomite

Upper  
Cambrian



Danby Quartzite  
Thin bedded gray dolomite with glassy cross-laminated quartzites



Winooski Dolomite  
Pink, white, blue thin bedded dolomite



Monkton Quartzite  
Varicolored thin bedded dolomite; thick sandstone; red, black, green schist

Lower  
Cambrian



Durham Dolomite  
Thick bedded gray, pink sandy dolomite

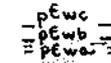


Cheshire Quartzite  
Massive buff vitreous quartzite



Mendon Formation  
Emm: Moosalamoo member: dark quartzite, black fine banded phyllite  
Emf: Forestdale member: pink sandy dolomite  
Emn: Nickwacket member: thick graywacke, quartzite, thin schist, conglomerate

----- unconformity -----



Pre-  
Cambrian

Wilcox Formation  
pEwa: white, gray, green, black schist, thin buff dolomite  
pEwb: gneiss

----- unconformity -----

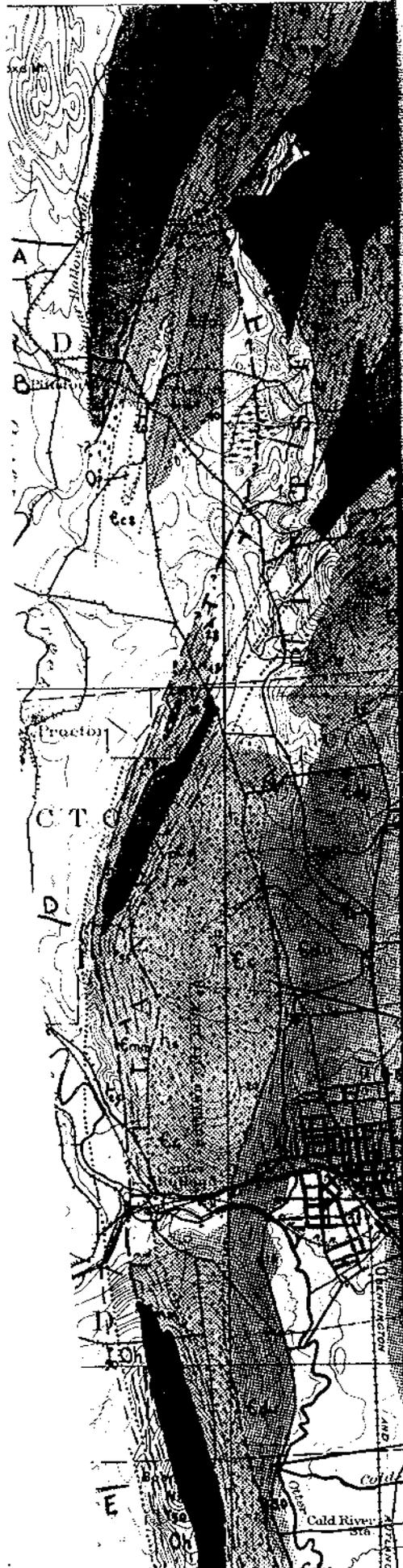


Figure 3.

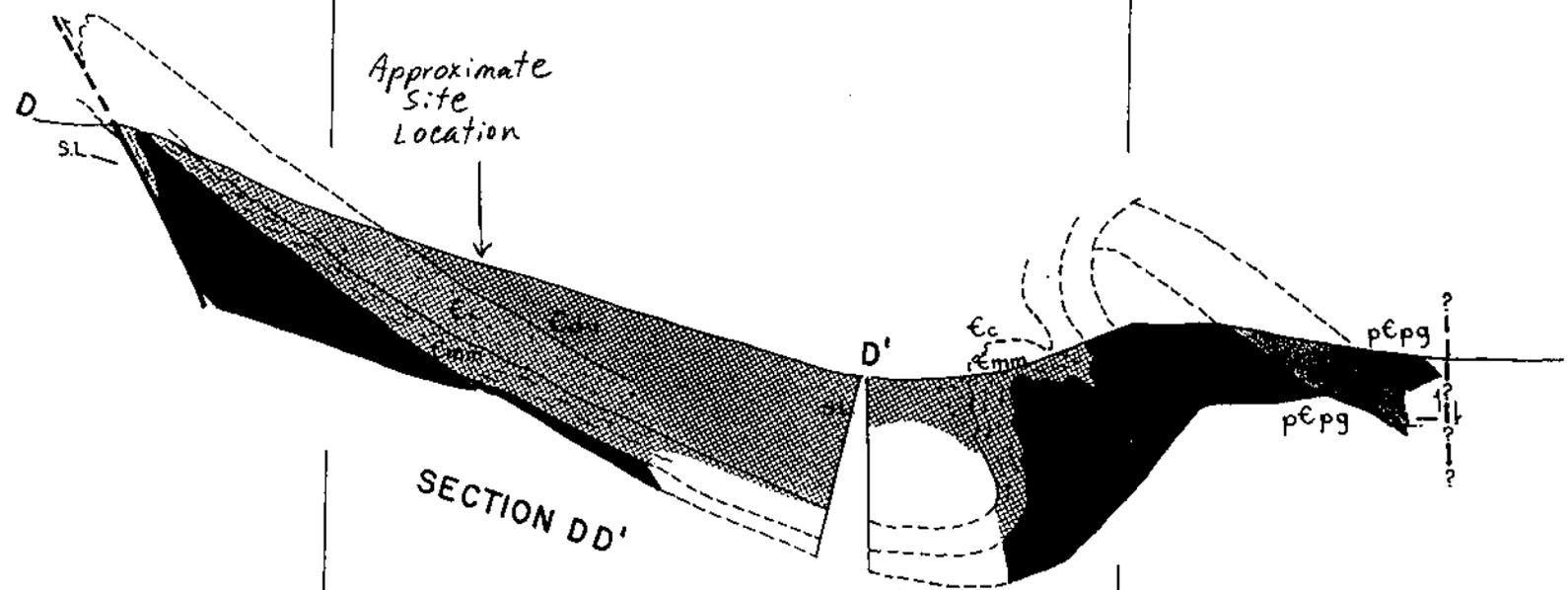
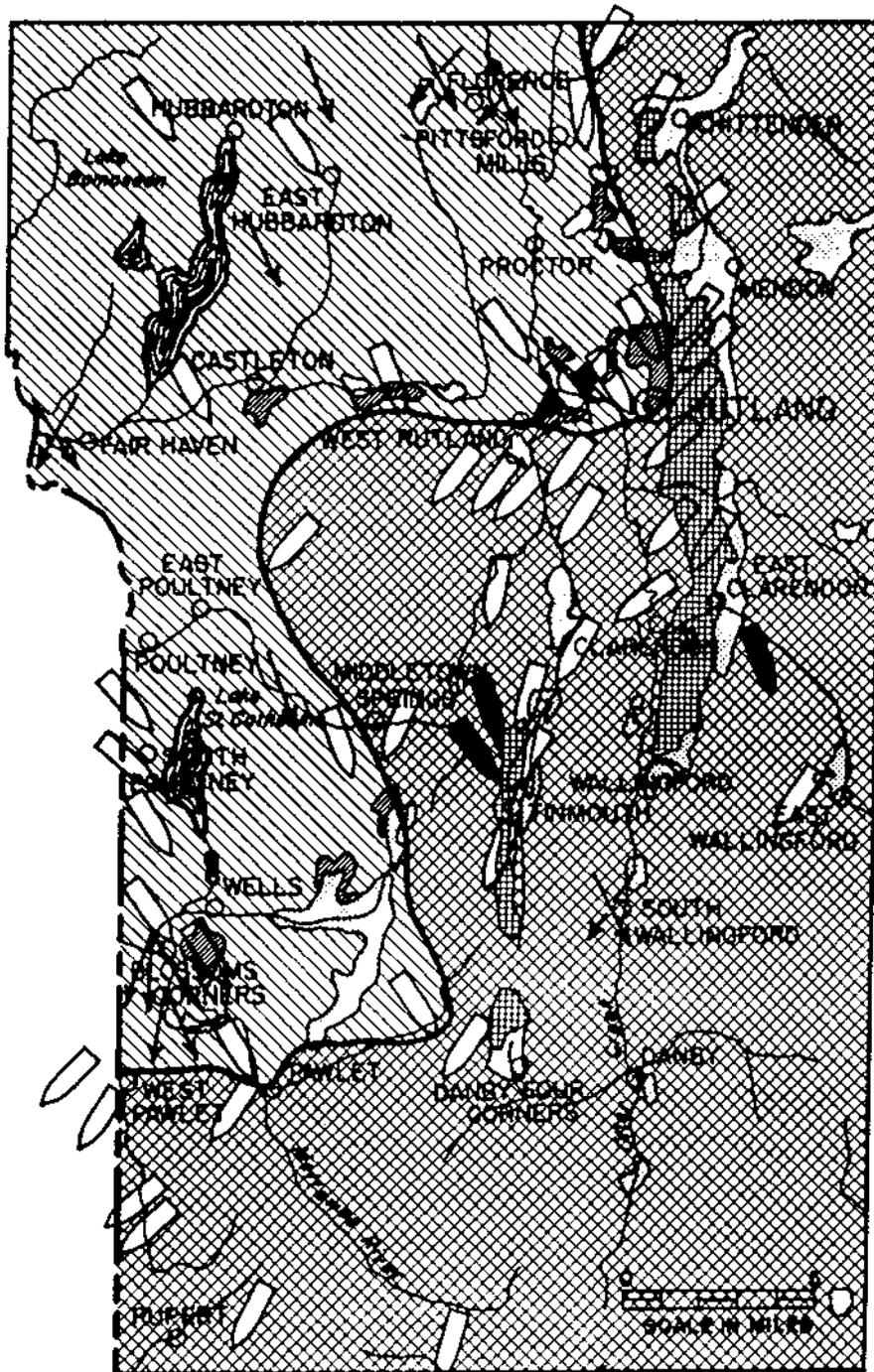


Figure 4.

Figure 5.  
Western Sequence

Age	Formation	Lithology	Thickness
M. Ord.	Hortonville slate	black phyllite, blue calcite marble	> 300'
----- UNCONFORMITY -----			
Ord.?		grey, white calcite marble	?
U. Camb.	Clarendon Springs Dolomite	dark grey limy dolomite	200' <sub>-</sub> <sup>+</sup>
	Danby formation	thin-bedded grey dolomite with glassy cross-laminated quartzites	1000' <sub>-</sub> <sup>+</sup>
L. Camb.	Winooski dolomite	pink, white, blue thin-bedded dolomite	600' <sub>-</sub> <sup>+</sup>
	Monkton quartzite	varicolored, thin-bedded dolomite; thick sandstone, red, black, green schist	400-800'
	Dunham dolomite	thick-bedded grey, pink sandy dolomite; thick grey sandstone in middle	1700' <sub>-</sub> <sup>+</sup>
	Cheshire quartzite	massive buff to white vitreous quartzite	1000' <sub>-</sub> <sup>+</sup>
	Mendon formation	Moosalamoo member: dark quartzite, black fine-banded phyllites	500-800'
		Forestdale member; pink sandy dolomite	0-150'
		Nickwacket member: thick graywacke, quartzite, thin schist and conglomerate	25-800'
----- UNCONFORMITY -----			
Pre-Cambrian	Wilcox formation	schist, dolomite, gneiss	3000' <sub>-</sub> <sup>+</sup>
	----- UNCONFORMITY -----		
	Mount Holly complex	schist, gneiss, quartzite, amphibolite	> 7000'



INDEX MAP SHOWING THE BURLINGTON  
DRIFT BORDER IN THE RUTLAND AND LAKE ST.  
CATHERINE REGIONS

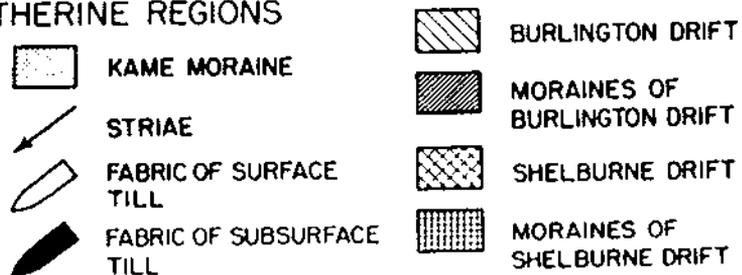


Figure 6



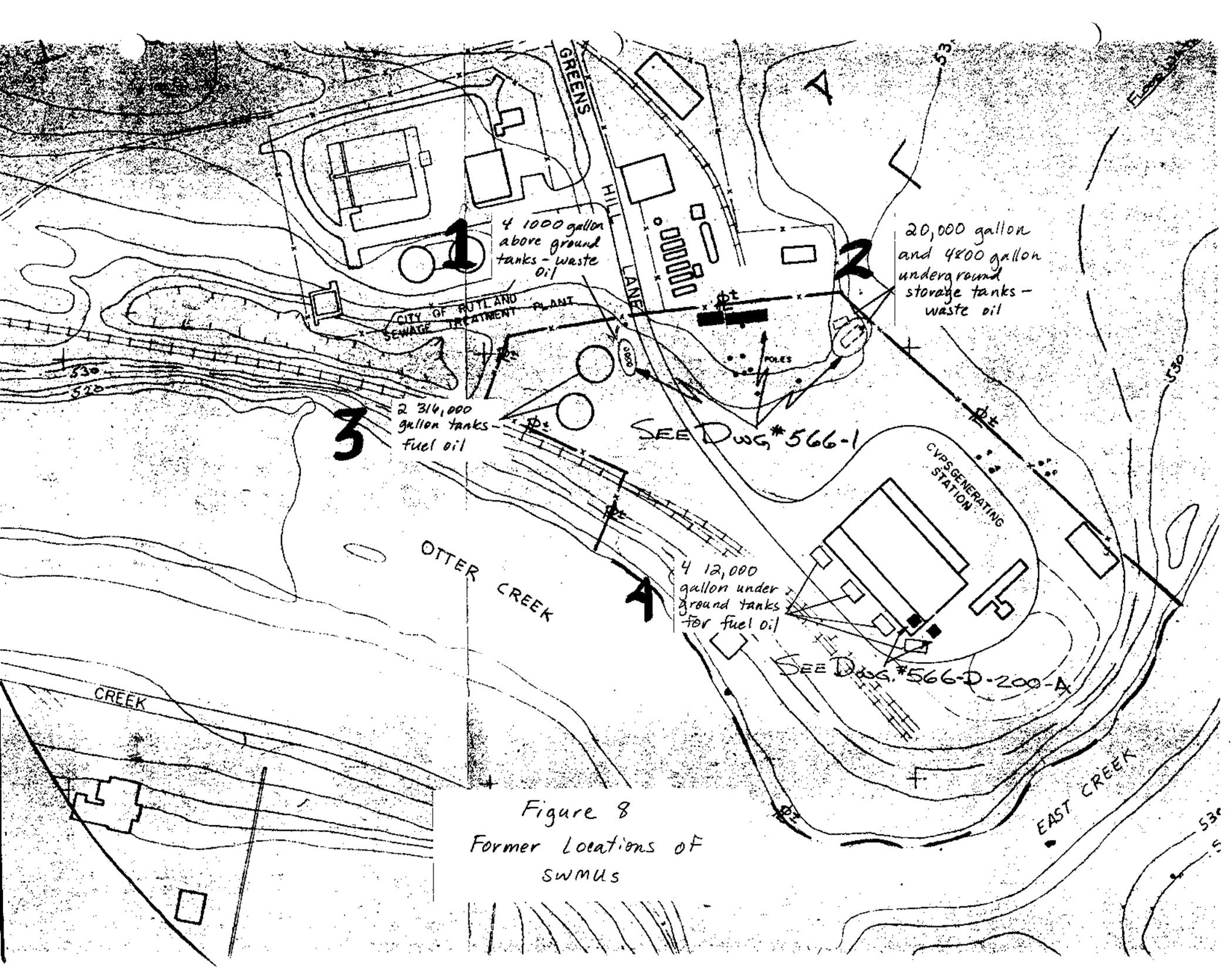


Figure 8  
Former Locations of  
SWMUs

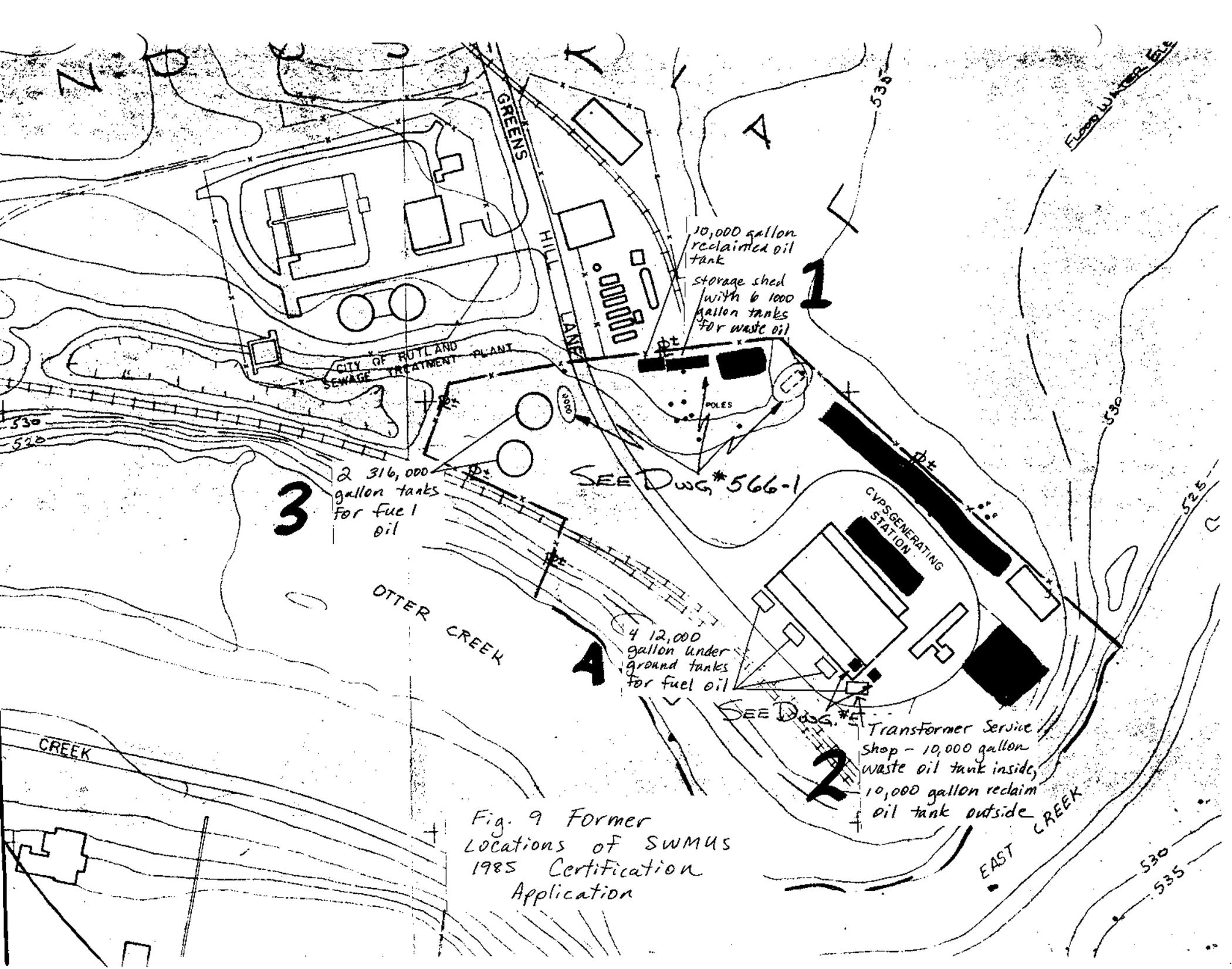


Fig. 9 Former Locations of SWMUS 1985 Certification Application

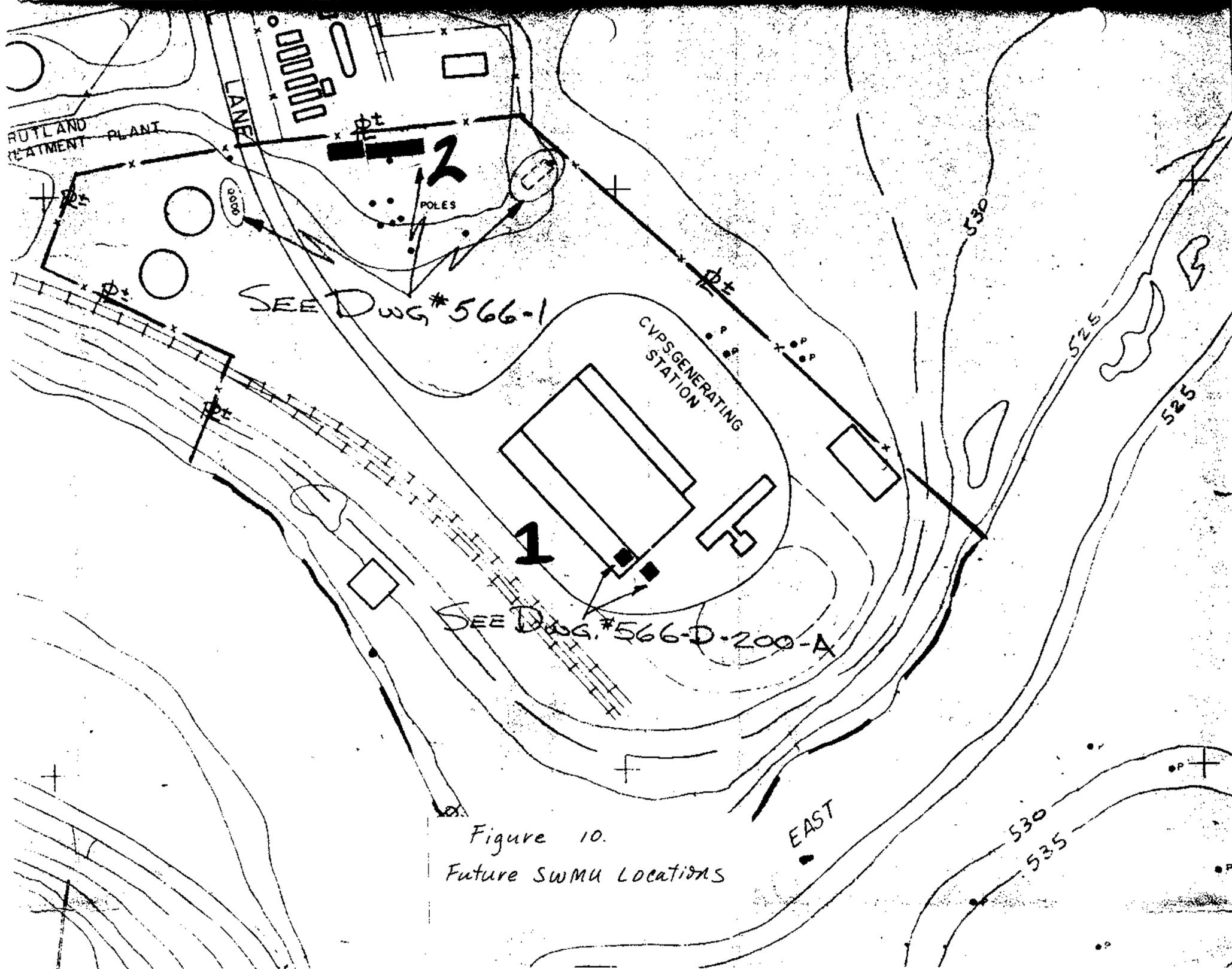


Figure 10.  
Future SWMU Locations

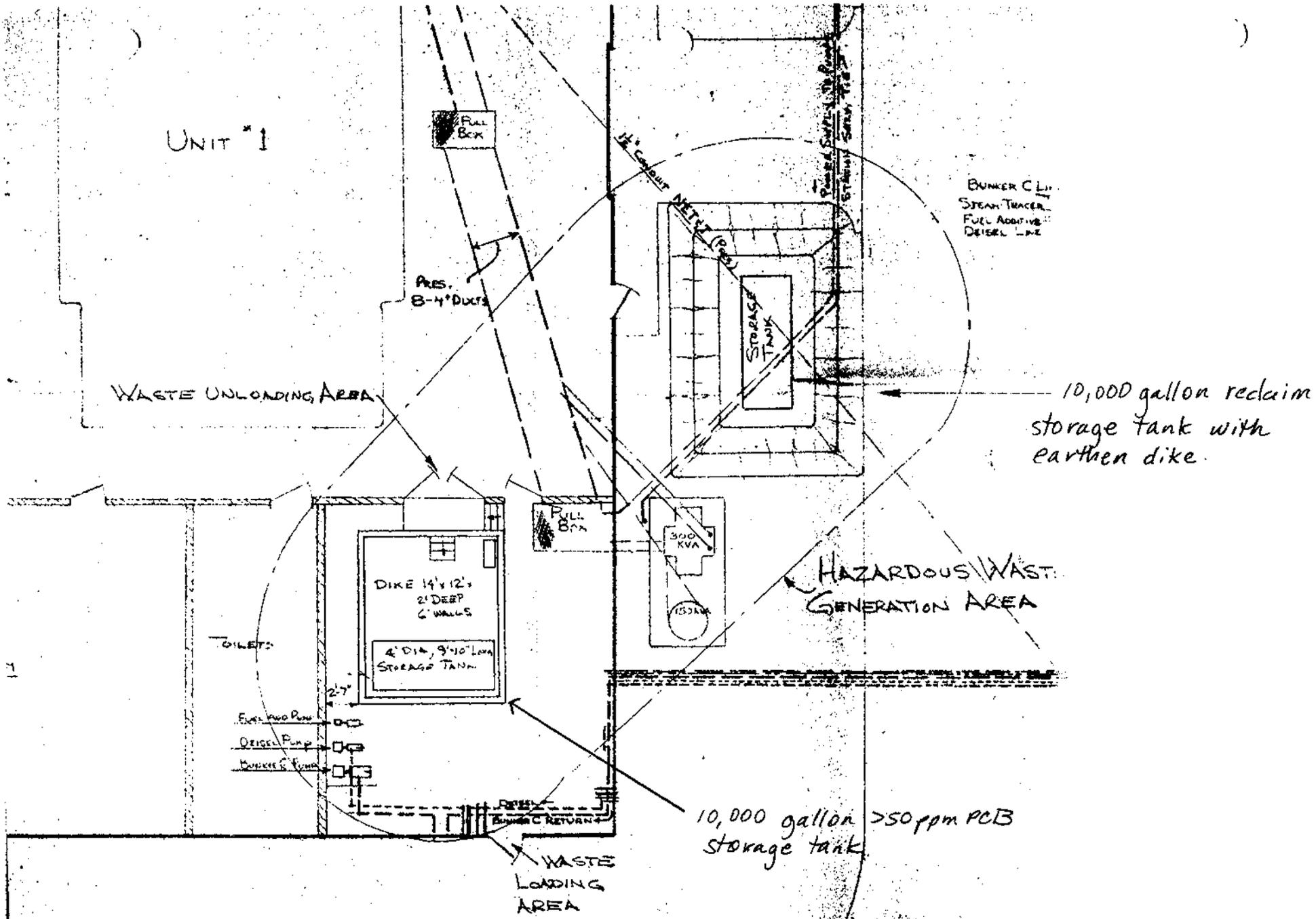


Figure 11.  
 Enlarged View of  
 Transformer Service Shop

ATTACHMENT 1

6 v

06-010-002

26 B1

State of Vermont  
DEPARTMENT OF WATER RESOURCES

Form WR-59

WELL COMPLETION REPORT

WR #2 USGS ROW-18  
Field Loc  Map Des  itted to  
La 43°37'47" Alt 620 TS Office  
Lo 72°58'55" HU er than  
Scale: 62500  125000  24000

Do not fill in  
State Well No. 433700  
Other No. 725911

WELL OWNER *Lyle & Bucklin* Rutland Vt.  
Name Mailing Address

WELL DRILLER *Walter & Bert's Peterson Wheelwright Vt.*  
Name Mailing Address

PROPOSED USE OR USES (Check):

- Domestic
- Agricultural
- Business Establishment
- Municipal
- Industrial
- Other (Specify use)

CASING DETAILS (Inside)	YIELD TEST		WATER LEVEL (From land surface) (if possible)		SCREEN DETAILS
Length: 15 Feet	<input type="checkbox"/> Bailed or <input type="checkbox"/> Pumped or <input checked="" type="checkbox"/> Compressed Air	Hours	Static: 10 Feet	Make:	
Diameter: 6 1/4 Inches		100 GPM	During Yield Test: 75 Feet		
Kind: steel		DRILLING EQUIPMENT		Material:	
Weight: 23 lbs/p/ft		<input type="checkbox"/> Cable Tool	<input checked="" type="checkbox"/> Rotary	Slot Size	
<input checked="" type="checkbox"/> New <input type="checkbox"/> Used	Yield: 100 GPM	<input type="checkbox"/> Air Percussion	<input type="checkbox"/> Other (specify)	Length: Ft.	
				Diameter: in.	

TOTAL DEPTH OF WELL 75 FEET TOWN WELL IS LOCATED IN: Rutland Vt.  
(Make sketch of well location on reverse side of sheet)

WELL LOG

Depth From Ground Surface	Give description of formations penetrated, such as: peat, silt, sand, gravel, clay, hardpan, shale, limestone, granite, etc. Include size of gravel (diameter) and sand (fine, medium, coarse) color of material, structure (loose, packed, cemented, hard). For example: 0 ft. to 27 ft. fine, packed, yellow sand; 27 ft. to 134 ft. gray granite.
0 ft. to 7 ft.	Sand
7 ft. to 75 ft.	ledge
ft. to ft.	
ft. to ft.	
ft. to ft.	

YIELD TEST DATA IN G.P.M.  
If yield was tested at different depth during drilling, List Below

75 ft.	100 G.P.M.
ft.	G.P.M.
ft.	G.P.M.

Has sample of well water been analyzed? No

Where was sample analyzed?  
(Include analysis of sample if analyzed by other than Department of Water Resources.)

Date Well was Completed May 15, 1970

Date of Report May 26, 1970

Water Well Driller's License No. 90

Well Driller *Penick of Alton*  
(signature)

State of Vermont  
DEPARTMENT OF WATER RESOURCES

Form WR-59

WELL COMPLETION REPORT

WR #52 USGS RTW-204

Field Loc  Map Des  nitted to  
La. 43°35'58 Alt 490 TS te Office  
Lo. 73°01'13  HU ter than  
Scale: 62500  , 25000  , 24000

Do not fill in  
State Well No. 43 35 57  
Other No. 73 01 03

WELL OWNER Walter Dutton Name Rutland, VT. Mailing Address

WELL DRILLER Green Mt. Drilling Co., Inc. Box 26 Name GR. Rutland, VT. Mailing Address

PROPOSED USE OR USES (Check):

- Domestic  Agricultural  Business Establishment  Municipal  Industrial  
 Other (Specify use) USED CAR LOT

CASING DETAILS (Inside)	YIELD TEST	WATER LEVEL (From land surface) (if possible)	SCREEN DETAILS
Length: <u>58</u> Feet	<input type="checkbox"/> Bailed or <input type="checkbox"/> Pumped or <input checked="" type="checkbox"/> Compressed Air	Static: <u>15</u> Feet	Make: <u>NONE</u>
Diameter: <u>6</u> Inches		During Yield Test: _____ Feet	
Kind: <u>STEEL</u>	Yield: <u>100</u> GPM	DRILLING EQUIPMENT	
Weight: <u>16</u> lbs/p/ft		<input type="checkbox"/> Cable Tool	Material: _____
<input checked="" type="checkbox"/> New <input type="checkbox"/> Used		<input checked="" type="checkbox"/> Rotary	Slot Size _____
		<input type="checkbox"/> Air Percussion	Length: _____ Ft.
		<input type="checkbox"/> Other (specify)	Diameter: _____ in.

TOTAL DEPTH OF WELL 97 FEET TOWN WELL IS LOCATED IN: Center Rutland  
(Make sketch of well location on reverse side of sheet)

WELL LOG

Depth From Ground Surface	Give description of formations penetrated, such as: peat, silt, sand, gravel, clay, hardpan, shale, limestone, granite, etc. Include size of gravel (diameter) and sand (fine, medium, coarse) color of material, structure (loose, packed, cemented, hard). For example: 0 ft. to 27 ft. fine, packed, yellow sand; 27 ft. to 134 ft. gray granite.
<u>0</u> ft. to <u>10</u> ft.	<u>FILL</u>
<u>10</u> ft. to <u>50</u> ft.	<u>GLACIAL TILL w/ Boulders</u>
<u>50</u> ft. to <u>97</u> ft.	<u>MARBLE</u>
ft. to ft.	
ft. to ft.	

YIELD TEST DATA IN G.P.M.  
If yield was tested at different depth during drilling, List Below

ft.	G.P.M.
ft.	G.P.M.
ft.	G.P.M.

Has sample of well water been analyzed? NO

Where was sample analyzed?  
(Include analysis of sample if analyzed by other than Department of Water Resources.)

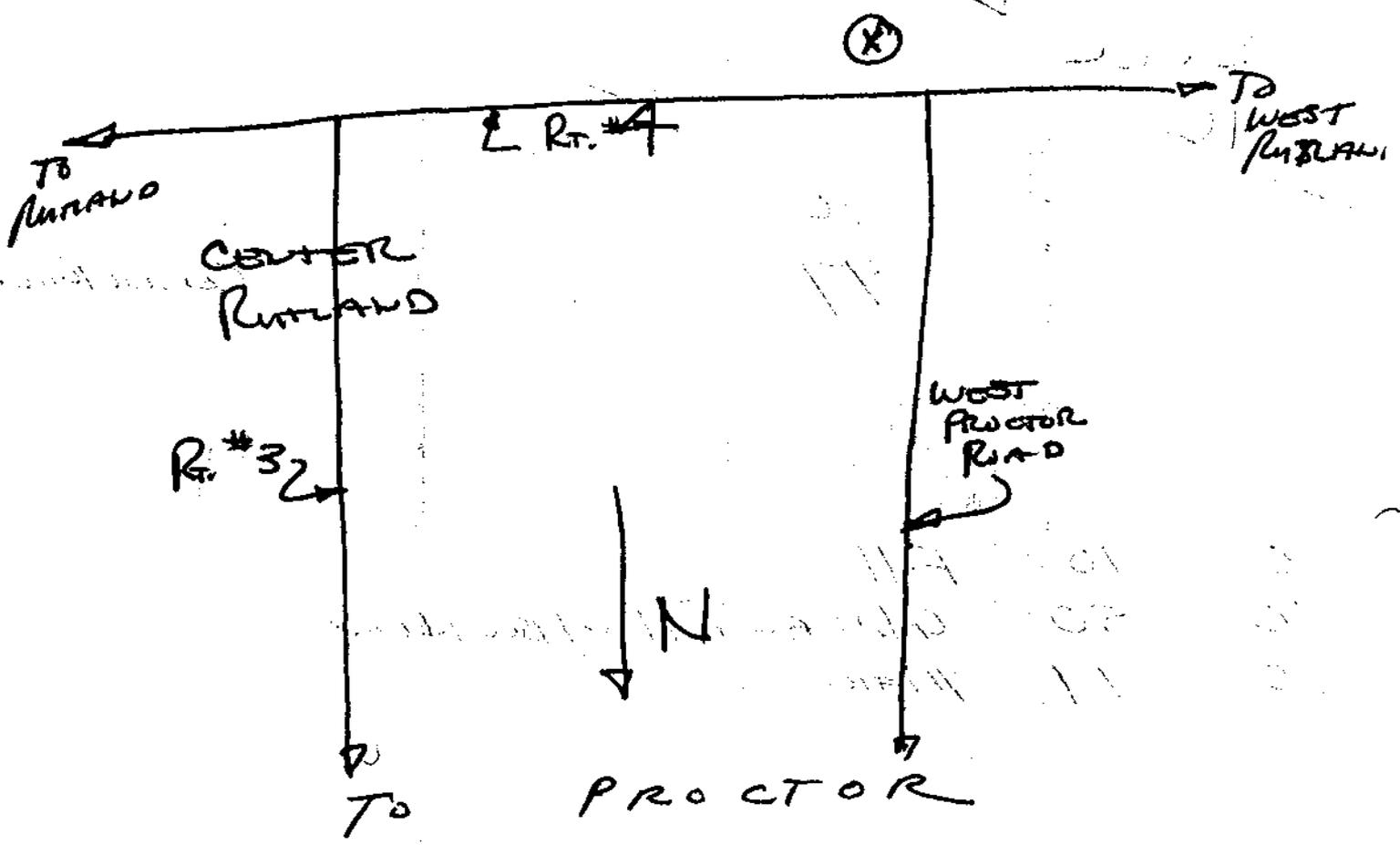
Date Well was Completed 9-5-69

Date of Report 5-17-69

Water Well Driller's License No. 51

Well Driller Joseph Robert  
(signature)

RECEIVED  
MAY 1959



State of Vermont  
DEPARTMENT OF WATER RESOURCES

Form WR-59

010-097  
06-~~2010~~

WELL COMPLETION REPORT

WR #97 USGS RTW-44  
Field Loc  Map Des  
La. 43° 35' 42" Alt 675 TS  
Lo. 73° 00' 08" HU  
Scale: 62500  25000  24000

Submitted to  
State Office  
later than

Do not fill in  
State Well No. 433539  
Other No. 730009

WELL OWNER Tony Graziano Center Rutland  
Name Mailing Address

WELL DRILLER Spafford & Son Barnesbury  
Name Mailing Address

PROPOSED USE OR USES (Check):

- Domestic  Agricultural  Business Establishment  Municipal  Industrial  
 Other (Specify use)

CASTING DETAILS (Inside)	YIELD TEST	WATER LEVEL (From land surface) (if possible)	SCREEN DETAILS
Length: <u>135</u> Feet	<input type="checkbox"/> Bailed or <input type="checkbox"/> Pumped or <input checked="" type="checkbox"/> Compressed Air	Static: <u>36</u> Feet	Make:
Diameter: <u>6</u> Inches		During Yield Test: <u>100</u> Feet	Material:
Kind: <u>New</u>	Yield: <u>10</u> GPM	DRILLING EQUIPMENT	
Weight: <u>19.45</u> lbs/p/ft		<input type="checkbox"/> Cable Tool	Slot Size
<input checked="" type="checkbox"/> New <input type="checkbox"/> Used		<input type="checkbox"/> Rotary	Length: Ft.
		<input checked="" type="checkbox"/> Air Percussion	Diameter: in.
		<input type="checkbox"/> Other (specify)	

TOTAL DEPTH OF WELL 155 FEET TOWN WELL IS LOCATED IN: Rutland City  
(Make sketch of well location on reverse side of sheet)

WELL LOG

Depth From Ground Surface	Give description of formations penetrated, such as: peat, silt, sand, gravel, clay, hardpan, shale, limestone, granite, etc. Include size of gravel (diameter) and sand (fine, medium, coarse) color of material, structure (loose, packed, cemented, hard). For example: 0 ft. to 27 ft. fine, packed, yellow sand; 27 ft. to 134 ft. gray granite.
<u>0</u> ft. to <u>60</u> ft.	<u>Sand</u>
<u>60</u> ft. to <u>112</u> ft.	<u>Hard pan &amp; boulders</u>
<u>112</u> ft. to <u>135</u> ft.	<u>clay &amp; chunks ledge</u>
<u>135</u> ft. to <u>155</u> ft.	<u>Limestone</u>
ft. to ft.	

YIELD TEST DATA IN G.P.M.  
If yield was tested at different depth during drilling, List Below

ft.	G.P.M.
ft.	G.P.M.
ft.	G.P.M.

Has sample of well water been analyzed?

Where was sample analyzed?

(Include analysis of sample if analyzed by other than Department of Water Resources.)

Date Well was Completed Aug 12

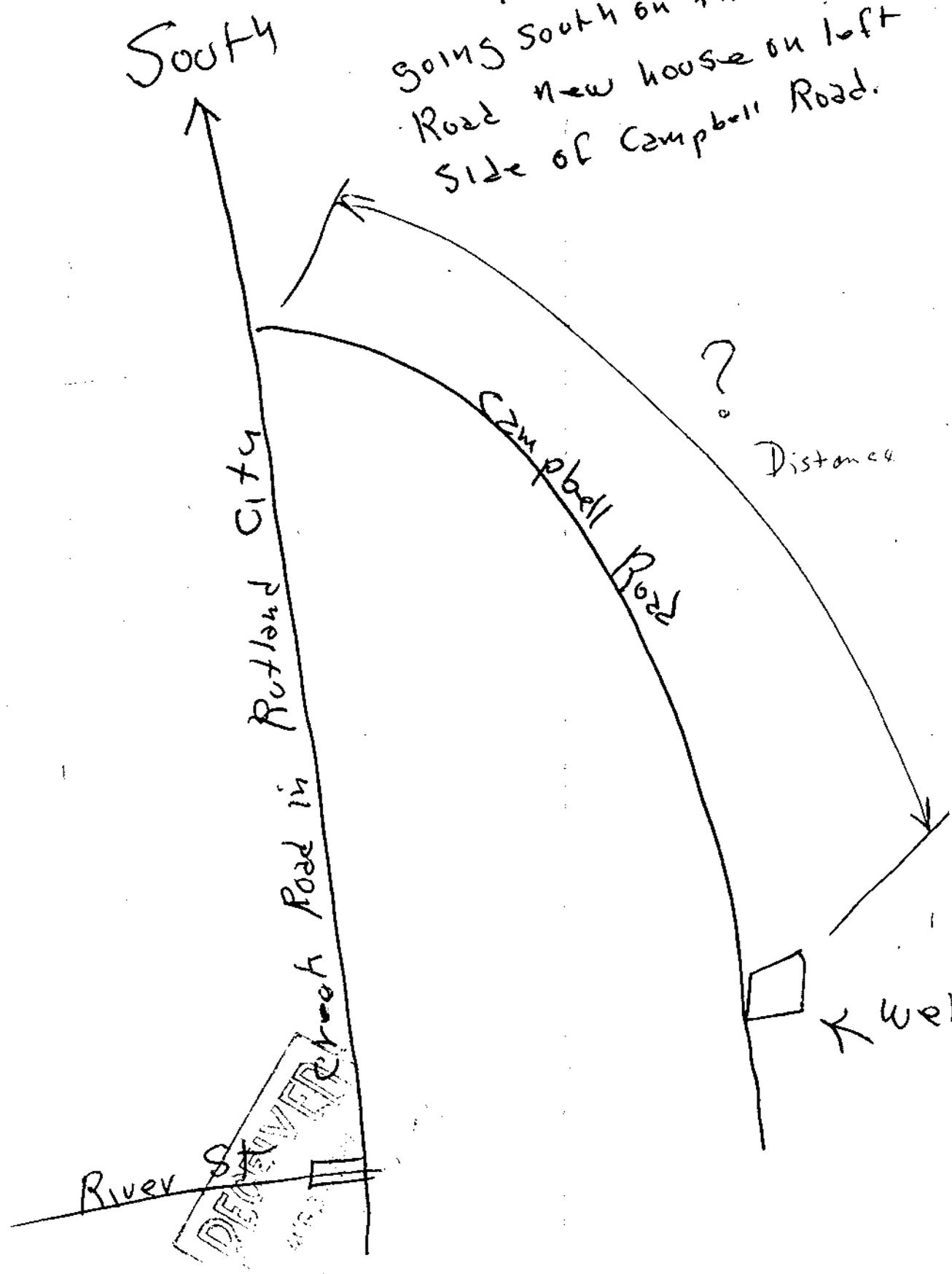
Date of Report Aug 20, 68

Water Well Driller's License No. 42

Well Driller John E. Spafford  
(signature)

Insufficient information  
to locate well on map

First Right hand turn  
going South on the creek  
Road new house on left  
side of Campbell Road.



1979-64  
(For Driller's Use)

State of Vermont  
DEPARTMENT OF WATER RESOURCES

WELL COMPLETION REPORT

DO NOT FILL IN  
221

NOV 26 1979

WR \_\_\_\_\_ USGS \_\_\_\_\_  
Field Loc  Map Des \_\_\_\_\_  
La. \_\_\_\_\_ Alt \_\_\_\_\_ TS \_\_\_\_\_  
Lo. \_\_\_\_\_ HU \_\_\_\_\_  
Scale: 62500 , 25000 , 24000

WELL OWNER: FRANCIS HOWLAND BARRETT HILL CTR. PUTLAND, VT  
Name Mailing Address

TOWN IN WHICH WELL IS LOCATED: PUTLAND TOWN (Please locate well on a large scale map to accompany this report. Maps are available on request.)

DATE WELL WAS COMPLETED: 9-26-79

PROPOSED USE OF WELL:  Domestic  Agricultural  Business Establishment  
 Municipal  Industrial  Other (Specify) \_\_\_\_\_

DRILLING EQUIPMENT:  Cable Tool  Rotary  Air Percussion  
 Other (Specify) \_\_\_\_\_

TOTAL DEPTH OF WELL: 265 STATIC WATER 46'

CASING DETAILS: Length 80 ft. Diameter 6 in. Material STEEL  
Weight 17 lb./ft.

SCREEN DETAILS: Make \_\_\_\_\_ Material \_\_\_\_\_ Length \_\_\_\_\_ ft.  
Diameter \_\_\_\_\_ in. Slot Size \_\_\_\_\_

METHOD OF SEALING CASING TO SCREEN OR BEDROCK: Coupling

FINAL YIELD TEST:  Bailed, or  Pumped, or  Compressed Air  
1 Hours at 8 1/2 gallons per minute  
Water level during yield test \_\_\_\_\_

WELL LOG  
Depth From Ground Surface  
Give description of formations penetrated, such as: peat, silt, sand, gravel, clay, hardpan, shale, limestone, granite, etc. Include size of gravel (diameter) and sand (fine, medium, coarse, color of material, structure (loose, packed, cemented, hard). For example: Surface to 27 ft. fine, packed, yellow sand; 27 ft. to 134 ft. gray granite.

Surface to 65 ft. GLACIAL TILL  
65 to 135 ft. MIXED QUARTZ  
135 to 210 ft. CHESTER QUARTZITE  
210 to 265 ft. MIXED QUARTZ

At 140' of 4" ABS w/SEAL to seal off sand seam in mixed quartz 80-135'

YIELD TEST DATA IN G.P.M.			
If yield was tested at different depths during drilling, List Below			
<u>2 1/2</u> G.P.M. @	<u>250</u> ft.	G.P.M. @	ft.
G.P.M. @	ft.	G.P.M. @	ft.

WATER ANALYSIS: Has water been analyzed?  Yes  No If Yes, Where \_\_\_\_\_  
Include Analysis

DRILLED BY: Raymond L. Leonard Jr. Signature

DOING BUSINESS AS: Green Mt. Drilling Co., Inc. Company

DATE OF REPORT: 10-29-79 WELL DRILLERS LICENSE NO. 51

To PROCTOR

WEST  
PROCTOR  
RD.

Rt. # 3



Rt. # 47

To  
WEST  
LUTAWAY

FIRE  
HOUSE

CENTER  
LUTAWAY

To  
LUTAWAY

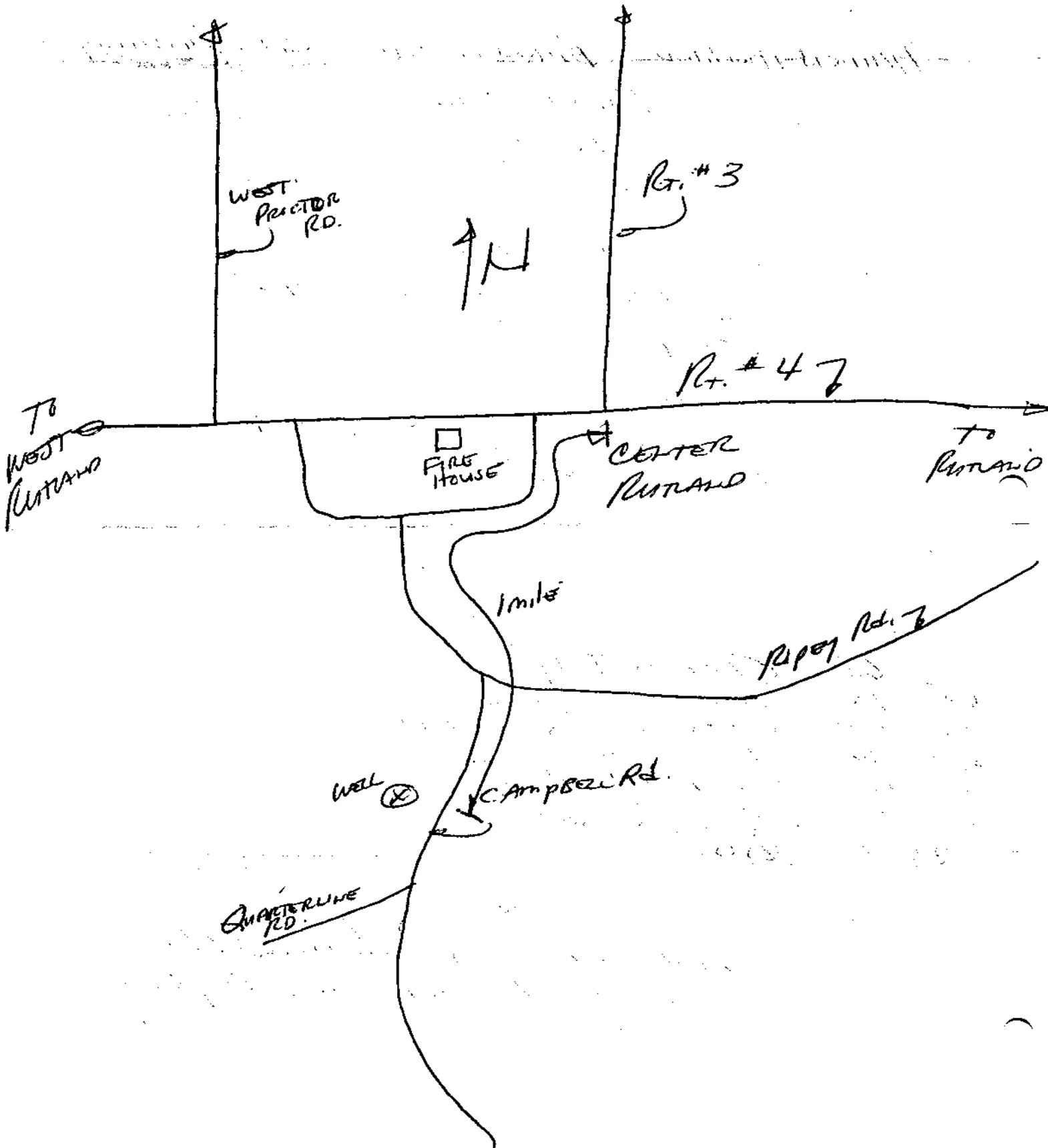
1 mile

Popey Rd. 7

WELL (X)

CAMPBELL Rd.

QUARTERLINE  
RD.



1982-7

(For Driller's Use)

This report must be completed and submitted to the Department of Water Resources and Environmental Engineering, State Office Building, Montpelier, Vermont 05602, no later than 60 days after completion of the well.

DEPARTMENT OF WATER RESOURCES AND ENVIRONMENTAL ENGINEERING

WELL COMPLETION REPORT

MAY 24 1982

Location map attached to WCR

W.R. 269 U.S.G.S.

Field Location Map area

Latitude "Elev.

Longitude "Topo.

Scale: 62,500, 25,000, 24,000

Data in Town Files ( )

1. WELL OWNER GEORGE MUNGER AD #2 Rutland, Vt.
OR
WELL PURCHASER

2. LOCATION OF WELL: TOWN Rutland Town SUBDIVISION LOT NO.

3. DATE WELL WAS COMPLETED 4-27-82

4. PROPOSED USE OF WELL: X Domestic, Other

5. REASON FOR DRILLING WELL: X New Supply, Replace Existing Supply, Deepen Existing Well, Test or Exploration, Provide Additional Supply, Other

6. DRILLING EQUIPMENT: Cable Tool, X Rotary with A-P, Other

7. TYPE OF WELL: X Open Hole in Bedrock, Open End Casing, Screened or Slotted, Other

8. TOTAL DEPTH OF WELL: 158 feet below land surface.

9. CASING FINISH: Above ground, Finished, X Above ground, Unfinished, Burled, In Pit, Removed, None used, Other

10. CASING DETAILS: Total length 107 ft. Length below L.S. 105 ft. Dia. 6 in. Material STEEL wt 17 lb./ft.

11. LINER OR INNER CASING DETAILS: Length used ft. Diameter in. Material Weight lb./ft.

12. METHOD OF SEALING CASING TO BEDROCK: X Drive Shoe, X Grout - type Bentonic, Drilled in hole 8 1/2 in hole 55 ft. in Bedrock, Other

13. SCREEN DETAILS: Make and Type, Material, Length ft, Diameter in, Slot Size, Depth to top of screen in feet below land surface ft, Gravel pack if used: Gravel Size or Type

14. YIELD TEST: Bailed, Pumped, X Compressed Air, for 2 Hours at 12 Gallons per minute, Measured by Bucket, Orifice pipe, Wier, Meter, Permanent Airline Installed

15. STATIC WATER LEVEL: 35 feet below land surface, Date or Time measured 4-28-82, Overflows at G.P.M.

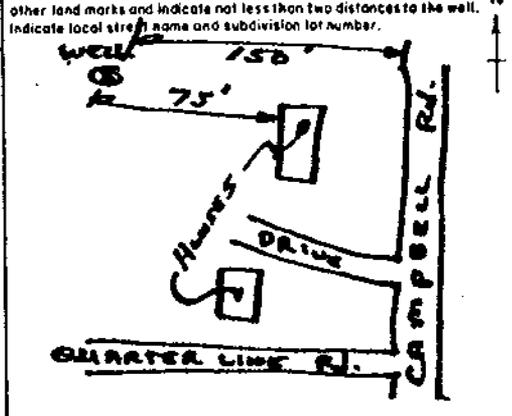
16. WATER ANALYSIS: Has the water been analyzed? Yes, No, If Yes, Where

17. SPECIAL NOTES:

18. WELL LOG

19. SITE MAP Show permanent structure such as buildings, septic tanks, and/or other land marks and indicate not less than two distances to the well. Indicate local street name and subdivision lot number.

Table with 4 columns: Depth from Land Surface (Feet), Water Seoring, Formation Description, Sketch. Rows include: Ground Surface 50, Till & Boulders; 50-100, Fractured Quartz; 100-158, Quartz.



20. TESTED YIELD If the yield was tested at different depths during drilling, list below. WELL DRILLED BY: Ray & Jeff Leonard

Table with 2 columns: Feet, Gallons Per Minute. Multiple empty rows for data entry.

DOING BUSINESS AS: Green Mt. Drilling Co., Inc. Company or Business Name

REPORT FILED BY: Raymond L. Leonard Jr. Authorized Signature

DATE OF REPORT: 5-2-82 WELL DRILLERS LIC. NO. 51

1982.21

(For Driller's Use)

This report must be completed and submitted to the Department of Water Resources and Environmental Engineering, State Office Building, Montpelier, Vermont 05602, no later than 60 days after completion of the well.

DEPARTMENT OF WATER RESOURCES AND ENVIRONMENTAL ENGINEERING WELL COMPLETION REPORT

AUG 24 1982

Location map attached to WCR 274

W.R. 275 U.S.G.S. Field Location Map area Latitude Longitude Scale: 62,500, 25,000, 24,000 Data in Town Files

1. WELL OWNER George Munger Const. Co. R.D. #1 Rutland, Vt. OR WELL PURCHASER

2. LOCATION OF WELL: TOWN Rutland Town SUBDIVISION LOT NO.

3. DATE WELL WAS COMPLETED 6-18-82

4. PROPOSED USE OF WELL Domestic, Other

5. REASON FOR DRILLING WELL New Supply, Replace Existing Supply, Deepen Existing Well, Test or Exploration, Provide Additional Supply, Other

6. DRILLING EQUIPMENT: Cable Tool, Rotary with A-P, Other

7. TYPE OF WELL Open Hole in Bedrock, Open End Casing, Screened or Slotted, Other

8. TOTAL DEPTH OF WELL: 280 feet below land surface.

9. CASING FINISH: Above ground, Finished, Above ground, Unfinished, Buried, in Pit, Removed, None used, Other

10. CASING DETAILS: Total length 86 ft. Length below L.S. 84 ft. Dia. 6 in. Material STEEL wt 17 lb/ft

11. LINER OR INNER CASING DETAILS: Length used ft. Diameter in. Material Weight lb./ft.

12. METHOD OF SEALING CASING TO BEDROCK Drive Shoes, Grout-type BENTONITE, Orificed hole 8 ft. in Bedrock, Other

13. SCREEN DETAILS: Make and Type, Material, Length ft, Diameter in, Slot Size, Depth to top of screen in feet below land surface, Gravel pack if used: Gravel Size or Type

14. YIELD TEST: Bailed, Pumped, Compressed Air, for Hours at Gallons per minute Measured by Bucket, Orifice pipe, Wier, Meter Permanent Airlift installed

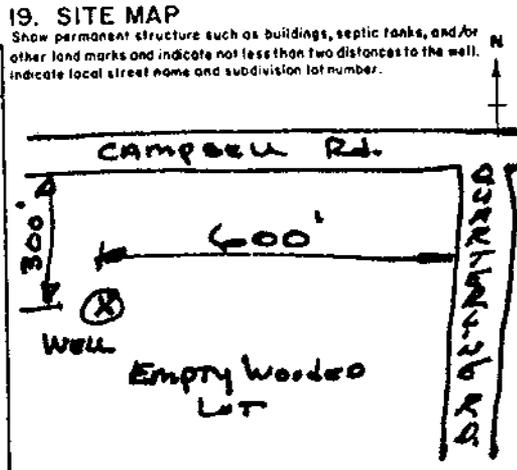
15. STATIC WATER LEVEL: feet below land surface, Date or Time measured, Overflows at G.P.M.

16. WATER ANALYSIS: Has the water been analyzed? Yes No, If Yes, Where

17. SPECIAL NOTES:

18. WELL LOG

Table with columns: Depth from Land Surface (Feet), Water Bearing, Formation Description, Sketch. Rows include: Ground Surface 76, 76 280 v GLACIAL TILL (Mostly Boulders), QUARRITE (EXTREMELY ABRASIVE)



20. TESTED YIELD If the yield was tested at different depths during drilling, list below.

Table with columns: Feet, Gallons Per Minute. Row: 175, 1

WELL DRILLED BY: Ray & Jeff Leonard

DOING BUSINESS AS: Green Mt. Drilling Co. Inc. Company or Business Name

REPORT FILED BY: Raymond L. Leonard Jr. Authorized Signature

DATE OF REPORT: 6-29-82 WELL DRILLERS LIC. NO. 51

1982-20

(For Driller's Use)

This report must be completed and submitted to the Department of Water Resources and Environmental Engineering, State Office Building, Montpelier, Vermont 05602, no later than 60 days after completion of the well.

DEPARTMENT OF WATER RESOURCES AND ENVIRONMENTAL ENGINEERING WELL COMPLETION REPORT

W.R. 276 U.S.G.S. Field Location Map area Latitude Elev. Longitude Topo. Scale: 62,500, 25,000, 24,000 Data in Town Files

AUG 24 1982

Location map attached to WCR 274

1. WELL OWNER: George Mungster Court G. R.D. #1 Rutland, VT. OR WELL PURCHASER

2. LOCATION OF WELL: TOWN Rutland TOWN SUBDIVISION LOT NO.

3. DATE WELL WAS COMPLETED 6-15-82

4. PROPOSED USE OF WELL: Domestic, Other

5. REASON FOR DRILLING WELL: New Supply, Replace Existing Supply, Deepen Existing Well, Test or Exploration, Provide Additional Supply, Other

6. DRILLING EQUIPMENT: Cable Tool, Rotary with A-P, Other

7. TYPE OF WELL: Open Hole in Bedrock, Open End Casing, Screened or Slotted, Other

8. TOTAL DEPTH OF WELL: 145 feet below land surface.

9. CASING FINISH: Above ground, Finished, Above ground, Unfinished, Burled, In Pit, Removed, None used, Other

10. CASING DETAILS: Total length 102 ft. Length below L.S. 100 ft. Dia. 6 in. Material: Steel Wt. 17 lb./ft.

11. LINER OR INNER CASING DETAILS: Length used ft. Diameter in. Material Weight lb./ft.

12. METHOD OF SEALING CASING TO BEDROCK: Drive Shoe, Grout - type Bentonite, Drilled in hole 16 ft in Bedrock

13. SCREEN DETAILS: Make and Type, Material, Length, Diameter, Slot Size, Depth to top of screen in feet below land surface, Gravel pack if used: Gravel Size or Type

14. YIELD TEST: Bailed, Pumped, Compressed Air, for 3 Hours at 10 Gallons per minute Measured by Bucket, Orifice pipe, Wier, Meter Permanent Atrline installed

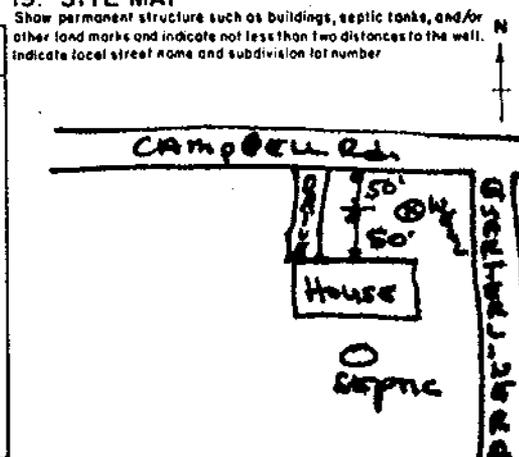
15. STATIC WATER LEVEL: 51 feet below land surface, Date or Time measured 6-18-82, overflows at G.P.M.

16. WATER ANALYSIS: Has the water been analyzed? Yes No, If Yes, Where

17. SPECIAL NOTES:

18. WELL LOG 19. SITE MAP

Table with columns: Depth from Land Surface (Feet), Water Bearing, Formation Description, Sketch. Rows include: Ground Surface 60, Glacial Till w/ Boulders; 60 84, OCCE; 84 145, ROTARY QUARTZ.



20. TESTED YIELD WELL DRILLED BY: Ray & Jeff Leonard

Table with columns: Feet, Gallons Per Minute. For yield testing at different depths.

DOING BUSINESS AS: Green Mt. Drilling Co., Inc. Company Business Name

REPORT FILED BY: Raymond L. Leonard Jr. Authorized Signature

DATE OF REPORT: 6-29-82 WELL DRILLERS LIC. NO. 51

WELL NUMBER

State of Vermont

WATER RESOURCE USE ONLY

DEPARTMENT OF WATER RESOURCES AND ENVIRONMENTAL ENGINEERING WELL COMPLETION REPORT

W.R. 295 U.S.G.S. Field Location Map area 16 D7 Latitude Longitude Scale: 62,500 25,000 24,000 Data in Town Files L

(For Driller's Use) This report must be completed and submitted to the Department of Water Resources and Environmental Engineering, State Office Building, Montpelier, Vermont 05602, no later than 60 days after completion of the well.

DEC 9 1983

Location map attached to WCR

- 1. WELL OWNER OR WELL PURCHASER: Frank Migliorice Jr., 231 S Main St, Rutland, Vt.
2. LOCATION OF WELL: TOWN Rutland SUBDIVISION LOT NO.
3. DATE WELL WAS COMPLETED: 6/14/83
4. PROPOSED USE OF WELL: Domestic
5. REASON FOR DRILLING WELL: New Supply
6. DRILLING EQUIPMENT: Rotary with A-P
7. TYPE OF WELL: Open Hole in Bedrock
8. TOTAL DEPTH OF WELL: 205 feet below land surface
9. CASING FINISH: Above ground, finished
10. CASING DETAILS: Total length 110 ft. Length below L.S. 108 ft. Dia. 4 in. Material Wt. 10 lb./ft.
11. LINER OR INNER CASING DETAILS: Length used 110 ft. Diameter 4 in. Material Wt. 10 lb./ft.
12. METHOD OF SEALING CASING TO BEDROCK: Drive Shoe
13. SCREEN DETAILS: Make and Type Material Length Diameter Slot Size Depth to top of screen in feet below land surface Gravel pack if used: Gravel Size or Type
14. YIELD TEST: Compressed Air, for 2 Hours at 12 Gallons per minute
15. STATIC WATER LEVEL: 15 feet below land surface
16. WATER ANALYSIS: Has the water been analyzed?
17. SPECIAL NOTES:

18. WELL LOG

Table with 5 columns: Depth from Land Surface (Feet), Water Bearing, Formation Description, Sketch. Rows include: Ground Surface 60' CLAY HARD PAN, 60-105 BROKEN LEDGE, 105-205 QUARTZ.

19. SITE MAP

Show permanent structure such as buildings, septic tanks, and/or other land marks and indicate not less than two distances to the well. Indicate local street name and subdivision lot number.



20. TESTED YIELD

If the yield was tested at different depths during drilling, list below.

Table with 2 columns: Feet, Gallons Per Minute. Rows for testing at different depths.

WELL DRILLED BY: Donald Parkrahn
DOING BUSINESS AS: Parkrahn Water Wells
REPORT FILED BY: Donald Parkrahn
DATE OF REPORT: 12/6/83 WELL DRILLERS LIC. NO. 176

WELL NUMBER

State of Vermont

WATER RESOURCE USE ONLY

DEPARTMENT OF WATER RESOURCES AND ENVIRONMENTAL ENGINEERING  
WELL COMPLETION REPORT

W.R. 343 U.S.G.S. 1607  
Field Location  Map area 1607  
Latitude \_\_\_\_\_ "Elev. \_\_\_\_\_  
Longitude \_\_\_\_\_ "Topo. \_\_\_\_\_  
Scale: 62,500 , 25,000 , 24,000   
Data in Town Files

(For Driller's Use)  
This report must be completed and submitted to the Department of Water Resources and Environmental Engineering, State Office Building, Montpelier, Vermont 05602, no later than 60 days after completion of the well.

DEC 7 1984

Location map attached to WCR \_\_\_\_\_

- WELL OWNER John Fodor OR WELL PURCHASER \_\_\_\_\_  
Name \_\_\_\_\_ Permanent Mailing Address \_\_\_\_\_
- LOCATION OF WELL: TOWN Rutland SUBDIVISION \_\_\_\_\_ LOT NO. \_\_\_\_\_
- DATE WELL WAS COMPLETED 10/16/84
- PROPOSED USE OF WELL:  Domestic,  Other \_\_\_\_\_
- REASON FOR DRILLING WELL:  New Supply,  Replace Existing Supply,  Deepen Existing Well,  Test or Exploration,  Provide Additional Supply,  Other \_\_\_\_\_
- DRILLING EQUIPMENT:  Cable Tool,  Rotary with A-P,  Other \_\_\_\_\_
- TYPE OF WELL:  Open Hole in Bedrock,  Open End Casing,  Screened or Slotted;  Other \_\_\_\_\_
- TOTAL DEPTH OF WELL: 425 feet below land surface.
- CASING FINISH:  Above ground, Finished,  Above ground, Unfinished,  Burled,  In Pit,  Removed,  None used,  Other \_\_\_\_\_
- CASING DETAILS: Total length 30 ft. Length below L.S. 28 ft. Dia. 6 in. Material Steel Wt. 17 lb./ft.
- NA LINER OR INNER CASING DETAILS: Length used \_\_\_\_\_ ft. Diameter \_\_\_\_\_ in. Material \_\_\_\_\_ Weight \_\_\_\_\_ lb./ft.
- METHOD OF SEALING CASING TO BEDROCK:  Drive Shoe,  Grout - type \_\_\_\_\_, Drilled \_\_\_\_\_ in. hole \_\_\_\_\_ ft. in Bedrock  Other \_\_\_\_\_
- NA SCREEN DETAILS: Make and Type \_\_\_\_\_, Material \_\_\_\_\_, Length \_\_\_\_\_ ft., Diameter \_\_\_\_\_ in., Slot Size \_\_\_\_\_, Depth to top of screen in feet below land surface \_\_\_\_\_ ft., Gravel pack if used: Gravel Size or Type \_\_\_\_\_
- YIELD TEST:  Bailed,  Pumped,  Compressed Air, for 2 Hours at 5 Gallons per minute  
Measured by  Bucket,  Orifice pipe,  Wier,  Meter  Permanent Airline Installed
- STATIC WATER LEVEL: 40 feet below land surface, Date or Time measured \_\_\_\_\_, Overflows at \_\_\_\_\_ G.P.M.
- WATER ANALYSIS: Has the water been analyzed?  Yes  No, If Yes, Where \_\_\_\_\_
- SPECIAL NOTES: \_\_\_\_\_
- WELL LOG

19. SITE MAP  
Show permanent structure such as buildings, septic tanks, and/or other land marks and indicate not less than two distances to the well. Indicate local street name and subdivision lot number

Depth from Land Surface		Water Bearing	Formation Description	Sketch
Feet	Feet			
Ground Surface	20		GRAVIE	
	20		BLACK Shale	
	30		BLACK Shale quartz	
	30	423		

20. TESTED YIELD  
If the yield was tested at different depths during drilling, list below.

Feet	Gallons Per Minute

WELL DRILLED BY: Gerald E. Parker Jr.  
 DOING BUSINESS AS: Parker Water Wells  
Company or Business Name  
 REPORT FILED BY: Gerald E. Parker Jr.  
Authorized Signature  
 DATE OF REPORT: 12/6/84 WELL DRILLERS LIC. NO. 176

WELL NUMBER

1985-35  
(For Driller's Use)

This report must be completed and submitted to the Department of Water Resources and Environmental Engineering, State Office Building, Montpelier, Vermont 05602, no later than 60 days after completion of the well.

State of Vermont  
DEPARTMENT OF WATER RESOURCES  
AND ENVIRONMENTAL ENGINEERING  
WELL COMPLETION REPORT

AUG 14 1985

WATER RESOURCE USE ONLY

W.R. 352 U.S.G.S.  
Field Location  Map area 16DT  
Latitude \_\_\_\_\_ " Elev. \_\_\_\_\_  
Longitude \_\_\_\_\_ " Topo. \_\_\_\_\_  
Scale: 62,500  25,000  24,000   
Data in Town Files

Location map attached to WCR \_\_\_\_\_

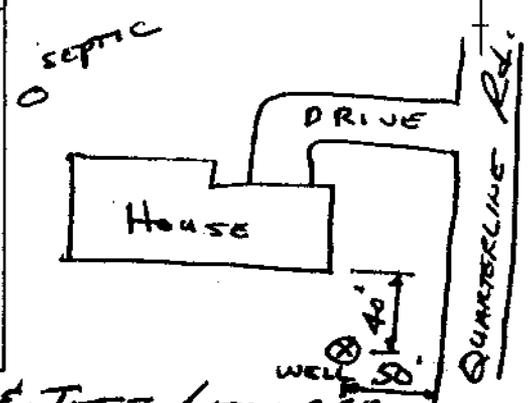
- WELL OWNER Munger Construction RO #1 Rutland, VT.  
OR  
WELL PURCHASER \_\_\_\_\_  
Name \_\_\_\_\_ Permanent Mailing Address \_\_\_\_\_
- LOCATION OF WELL: TOWN Rutland Town SUBDIVISION \_\_\_\_\_ LOT NO. \_\_\_\_\_
- DATE WELL WAS COMPLETED 6-25-85
- PROPOSED USE OF WELL  Domestic,  Other \_\_\_\_\_
- REASON FOR DRILLING WELL  New Supply,  Replace Existing Supply,  Deepen Existing Well,  Test or Exploration,  
 Provide Additional Supply,  Other \_\_\_\_\_
- DRILLING EQUIPMENT:  Cable Tool,  Rotary with A-P,  Other \_\_\_\_\_
- TYPE OF WELL  Open Hole in Bedrock,  Open End Casing,  Screened or Slotted,  Other \_\_\_\_\_
- TOTAL DEPTH OF WELL: 380 feet below land surface.
- CASING FINISH:  Above ground, Finished,  Above ground, Unfinished,  Buried,  In Pit,  Removed,  None used,  Other \_\_\_\_\_
- CASING DETAILS: Total length 283 ft. Length below L.S. 281 ft. Dia. 6 in. Material Steel Wt. 17 lb./ft.
- LINER OR INNER CASING DETAILS: Length used \_\_\_\_\_ ft. Diameter \_\_\_\_\_ in. Material \_\_\_\_\_ Weight \_\_\_\_\_ lb./ft.
- METHOD OF SEALING CASING TO BEDROCK  Drive Shoe,  Grout - type \_\_\_\_\_, Drilled 8 3/4 in. hole 68 ft. in Bedrock  
 Other \_\_\_\_\_
- SCREEN DETAILS: Make and Type \_\_\_\_\_, Material \_\_\_\_\_, Length \_\_\_\_\_ ft., Diameter \_\_\_\_\_ in.,  
Slot Size \_\_\_\_\_, Depth to top of screen in feet below land surface \_\_\_\_\_ ft., Gravel pack if used: Gravel Size or Type \_\_\_\_\_
- YIELD TEST:  Bailed,  Pumped,  Compressed Air, for 1 Hours at 3 1/2 Gallons per minute  
Measured by  Bucket,  Orifice pipe,  Wier,  Meter  Permanent Airline installed
- STATIC WATER LEVEL: \_\_\_\_\_ feet below land surface, Date or Time measured \_\_\_\_\_, Overflows at \_\_\_\_\_ G.P.M.
- WATER ANALYSIS: Has the water been analyzed?  Yes  No, If Yes, Where \_\_\_\_\_
- SPECIAL NOTES: \_\_\_\_\_

18. WELL LOG

Depth from Land Surface		Water Bearing	Formation Description	Sketch
Feet	Feet			
Ground Surface	213		GLACIAL TILL	
	213	270	FRACTURED QUARTZ w/locks	
	270	380	QUARTZ	

19. SITE MAP

Show permanent structure such as buildings, septic tanks, and/or other land marks and indicate not less than two distances to the well. Indicate local street name and subdivision lot number



20. TESTED YIELD

If the yield was tested at different depths during drilling, list below.

Feet	Gallons Per Minute
360	2

WELL DRILLED BY: RAY & JEFF LEONARD

DOING BUSINESS AS: GREEN Mt. Drilling Co., Inc.  
Company or Business Name

REPORT FILED BY: Raymond L. Leonard Jr.  
Authorized Signature

DATE OF REPORT: 6-28-85 WELL DRILLERS LIC. NO. 51

(For Driller's Use)  
 This report must be completed and submitted to the Department of Water Resources and Environmental Engineering, State Office Building, Montpelier, Vermont 05602, no later than 60 days after completion of the well.

DEPARTMENT OF WATER RESOURCES AND ENVIRONMENTAL ENGINEERING  
**WELL COMPLETION REPORT**

JAN 28 1986

Location map attached to WCR \_\_\_\_\_

W.R. 361 U.S.G.S. \_\_\_\_\_  
 Field Location  Map area 1627  
 Latitude \_\_\_\_\_ "Elev. \_\_\_\_\_  
 Longitude \_\_\_\_\_ "Topo. \_\_\_\_\_  
 Scale: 62,500 , 25,000 , 24,000   
 Data in Town Files

1. WELL OWNER Charles Moulton Campbell Hill Rd. Rutland, Vt  
 OR  
 WELL PURCHASER \_\_\_\_\_

2. LOCATION OF WELL: TOWN Rutland SUBDIVISION \_\_\_\_\_ LOT NO. \_\_\_\_\_

3. DATE WELL WAS COMPLETED 5-18-85

4. PROPOSED USE OF WELL:  Domestic,  Other \_\_\_\_\_

5. REASON FOR DRILLING WELL:  New Supply,  Replace Existing Supply,  Deepen Existing Well,  Test or Exploration,  
 Provide Additional Supply,  Other \_\_\_\_\_

6. DRILLING EQUIPMENT:  Cable Tool,  Rotary with A-P,  Other \_\_\_\_\_

7. TYPE OF WELL:  Open Hole in Bedrock,  Open End Casing,  Screened or Slotted;  Other \_\_\_\_\_

8. TOTAL DEPTH OF WELL: 370 feet below land surface.

9. CASING FINISH:  Above ground, Finished,  Above ground, Unfinished,  Buried,  In Pit,  Removed,  None used,  Other \_\_\_\_\_

10. CASING DETAILS: Total length 146 ft. Length below L.S. 144 ft. Dia. 6 in. Material Steel Wt. 17 lb./ft.

11. LINER OR INNER CASING DETAILS: Length used \_\_\_\_\_ ft. Diameter \_\_\_\_\_ in. Material \_\_\_\_\_ Weight \_\_\_\_\_ lb./ft.

12. METHOD OF SEALING CASING TO BEDROCK:  Drive Shoe,  Grout - type \_\_\_\_\_, Drilled \_\_\_\_\_ in. hole \_\_\_\_\_ ft. in Bedrock  
 Other \_\_\_\_\_

13. SCREEN DETAILS: Make and Type \_\_\_\_\_, Material \_\_\_\_\_, Length \_\_\_\_\_ ft., Diameter \_\_\_\_\_ in.,  
 Slot Size \_\_\_\_\_, Depth to top of screen in feet below land surface \_\_\_\_\_ ft., Gravel pack if used: Gravel Size or Type \_\_\_\_\_

14. YIELD TEST:  Boiled,  Pumped,  Compressed Air, for 4 hours at 1 Gallons per minute  
 Measured by  Bucket,  Orifice pipe,  Wier,  Meter  Permanent Airline installed

15. STATIC WATER LEVEL: 15 feet below land surface, Date or Time measured \_\_\_\_\_, Overflows at \_\_\_\_\_ G.P.M.

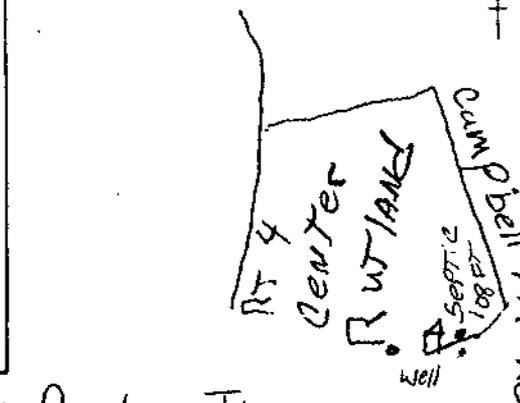
16. WATER ANALYSIS: Has the water been analyzed?  Yes  No, If Yes, Where \_\_\_\_\_

17. SPECIAL NOTES: \_\_\_\_\_

18. WELL LOG

19. SITE MAP  
 Show permanent structure such as buildings, septic tanks, and/or other land marks and indicate not less than two distances to the well. Indicate local street name and subdivision lot number.

Depth from Land Surface		Water Bearing	Formation Description	Sketch
Feet	Feet			
Ground Surface	<u>50</u>		<u>CLAY</u>	
	<u>50</u>	<u>144</u>	<u>Broken up ledge</u>	
	<u>144</u>	<u>370</u>	<u>Quartz</u>	



20. TESTED YIELD

If the yield was tested at different depths during drilling, list below.

Feet	Gallons Per Minute

WELL DRILLED BY: Gerald Parker, Jr.

DOING BUSINESS AS: Parker Water Wells  
 Company or Business Name

REPORT FILED BY: Gerald E. Parker  
 Authorized Signature

DATE OF REPORT: 1/16/86 WELL DRILLERS LIC. NO. 176

ATTACHMENT 2

1N

DCC-6

Site where  
Gas Turbine  
Facility will  
be built

September 1, 1942  
Air Photo



November 2, 1962 Air photo

↑ N

VT-62-L 33-10

10-2-62

CVPS /  
Gas Turbine  
Site

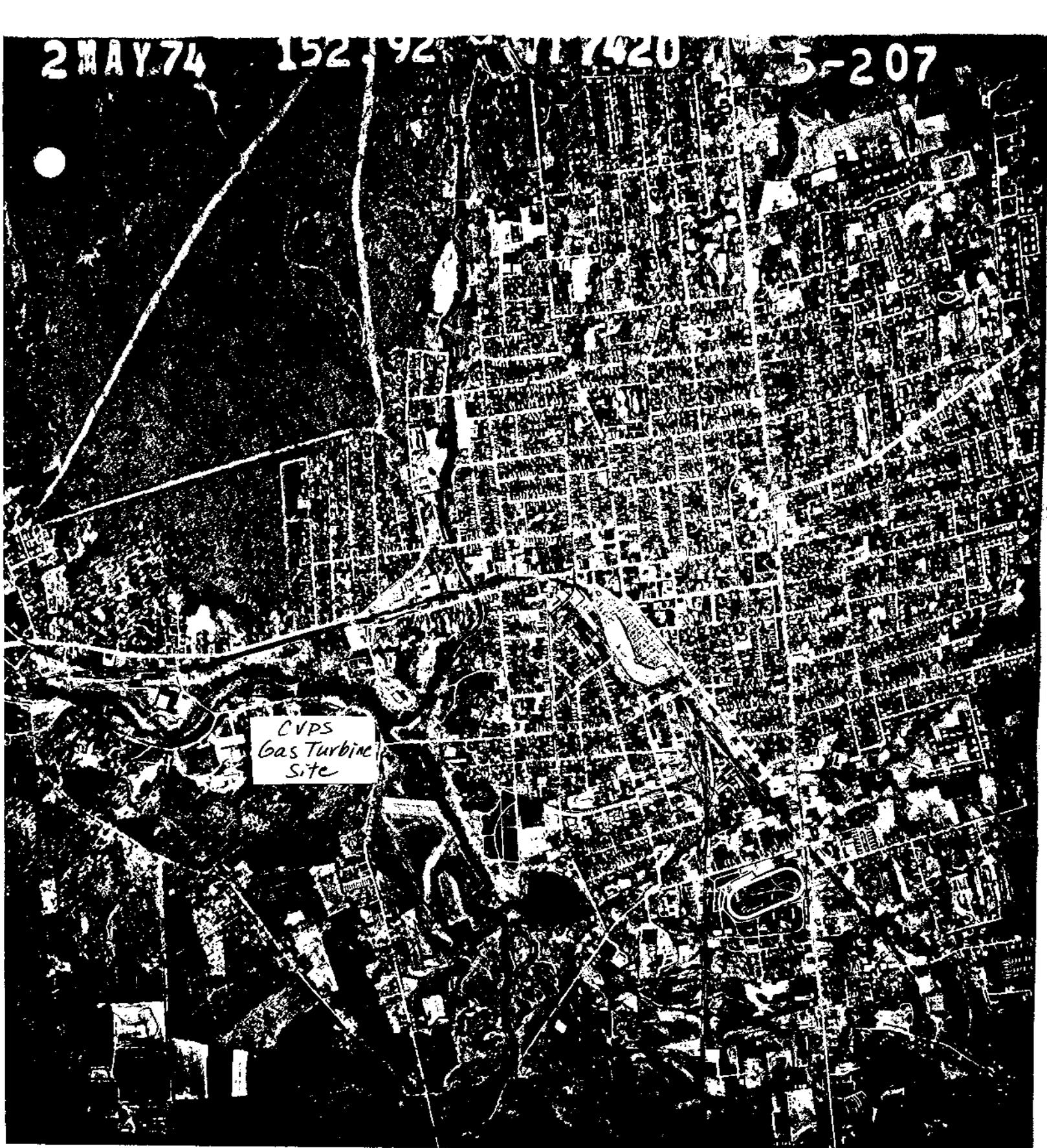


2 MAY 74

152.92

WY 420

5-207



May 2, 1974 Air photo

1N

ATTACHMENT 3

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factor by which water travels faster  
than contaminant

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## Physical, Chemical and Fate Parameters

$$\text{vapor pressure} = 1.70 \times 10^{-5}$$

$$\text{solubility} = 3.101 \times 10^{-2}$$

$$\text{density} = 1.44$$

$$f_{oc} = .01$$

$$n = .3$$

$$\rho_b = 2.65$$

$$K_{oc} = 530000 \quad \log K_{oc} = 5.724$$

$$K_{ow} = 881,138 \quad \log K_{ow} = 5.934$$

$$K_d = 5,300$$

$$R_f = \frac{v_w}{v_e} = 52,117$$

where:

$f_{oc}$  = weight fraction of organic carbon in soil

$n$  = soil porosity

$\rho_b$  = bulk density of soil

$K_{oc}$  = organic carbon/water partition coefficient

$K_{ow}$  = octanol/water partition coefficient

$K_d$  = distribution coefficient =

$$\frac{\text{mass of solute on solid phase per unit mass solid}}{\text{concentration of solute in solution}}$$

$$R_f = \frac{v_w}{v_e} = \text{retardation factor} = \frac{\text{velocity of groundwater}}{\text{velocity of contaminant measured at } C/C_0 \text{ of } .5}$$

→ factor by which contaminant transport is slowed by chemical sorption or factor by which water travels faster than contaminant

### Equations

$$\log K_{oc} = \log K_{ow} - 0.21$$

$$5.724 = \log K_{ow} - 0.21$$

$$5.724 + 0.21 = \log K_{ow}$$

$$5.934 = \log K_{ow}$$

$$859014 = K_{ow}$$

$$K_d = K_{oc} \cdot F_{oc}$$

$$= (530,000)(.01)$$

$$K_d = 5,300$$

$$\frac{V_w}{V_e} = R_f = 1 + \frac{pb}{n} \cdot K_d$$

$$= 1 + \frac{2.65}{.3} \cdot 5,300$$

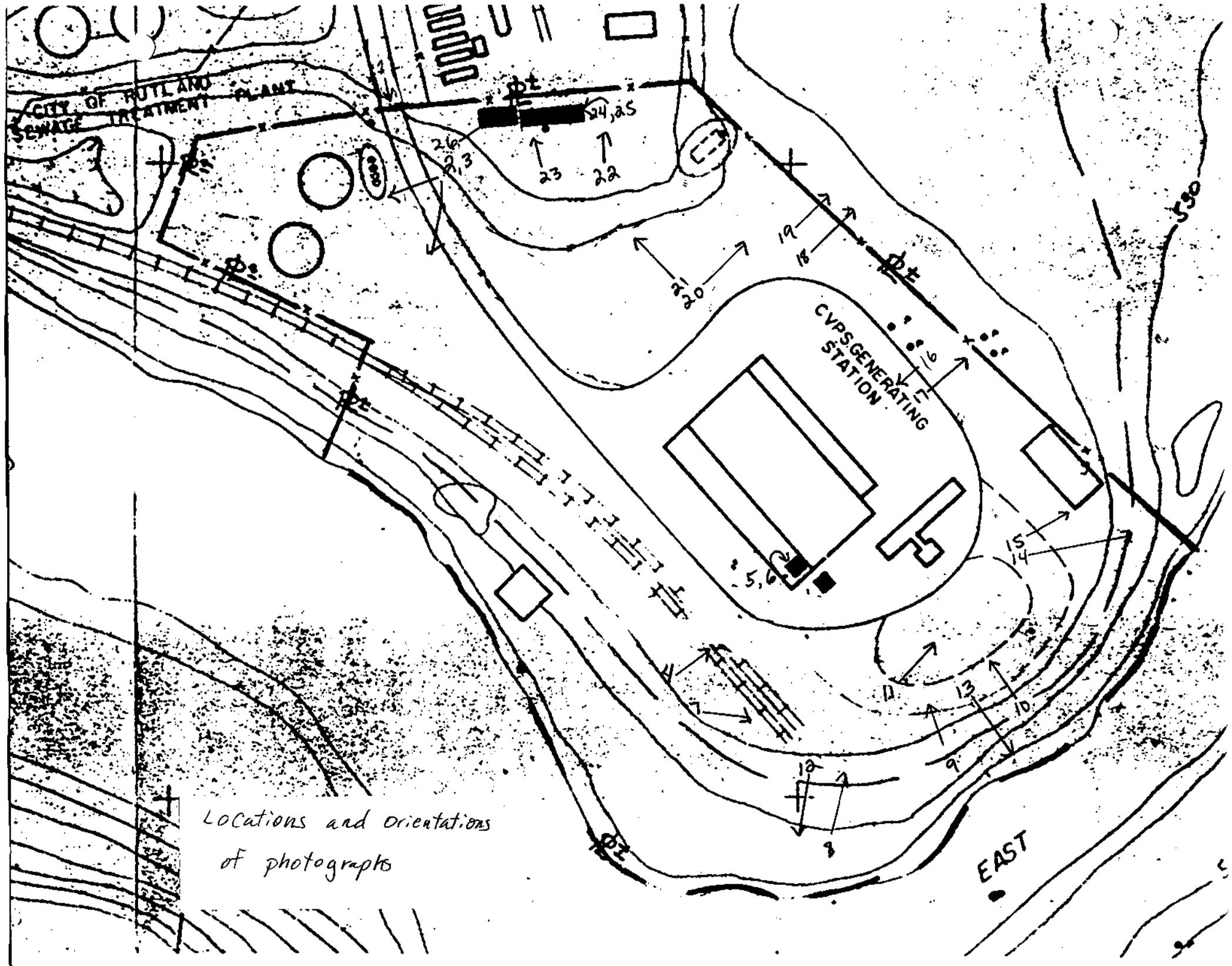
$$= 1 + 8.83 \cdot 5300$$

$$= (9.83)(5300)$$

$$= 52,117$$

ATTACHMENT 4

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Locations and orientations  
of photographs



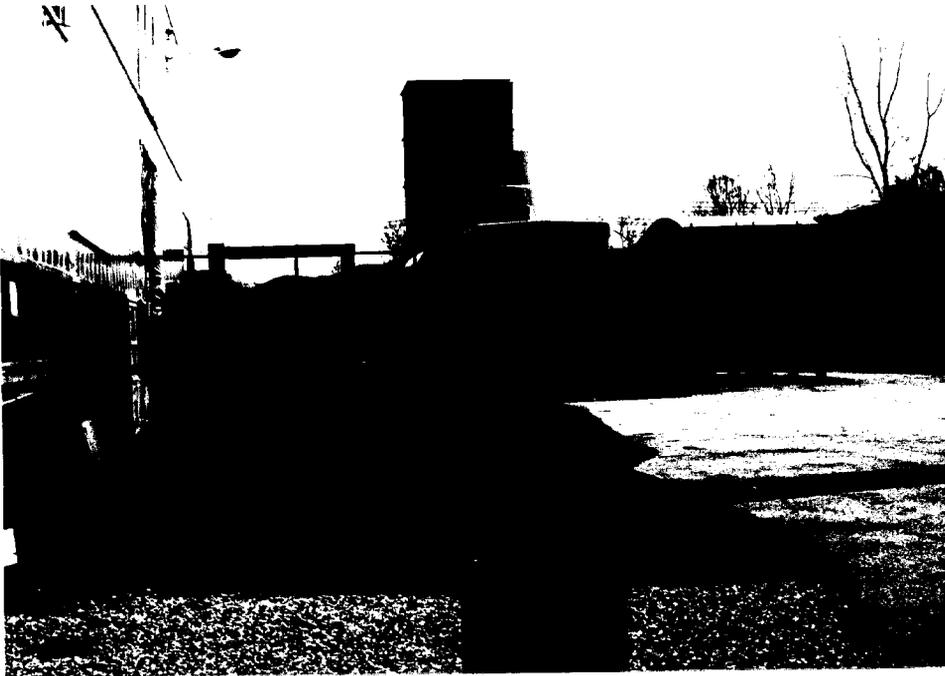
1. The gate at CUPS Rutland Turbine on Greens Hill Lane in Rutland, Vermont. The fencing continues on all sides of the facility that are not adjacent to rivers.



2. The two 316,000 gallon tanks and associated piping, now defunct. Also shown is the former 10,000 gallon UST and several drums of waste crankcase oil.



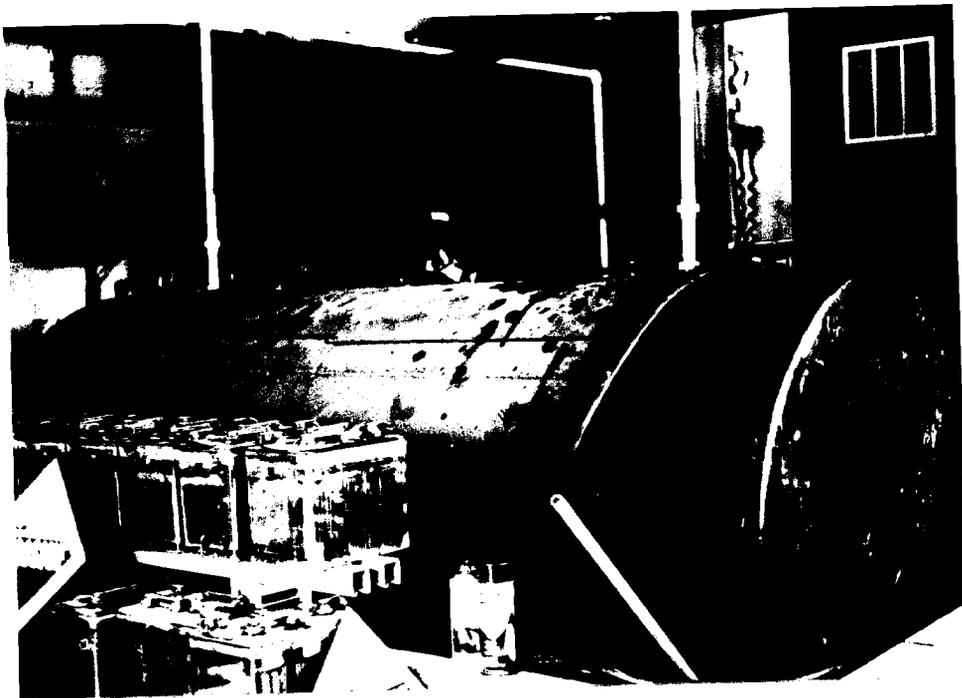
3. Piping as it runs southeast across facility.  
This piping is no longer in use.



4. # 5 Turbine and associated Transformer.  
Also shown is earthen bermed 1000 gallon tank  
formerly used for reclaim oil storage.



5. Location of former Transformer Service Shop showing the sign indicating an asbestos danger area.



6. 1000 gallon tank with a concrete berm located in Former Transformer Service Shop used for storage of oil with  $>50$  ppm PCB. Sloppy operating procedures are evident.



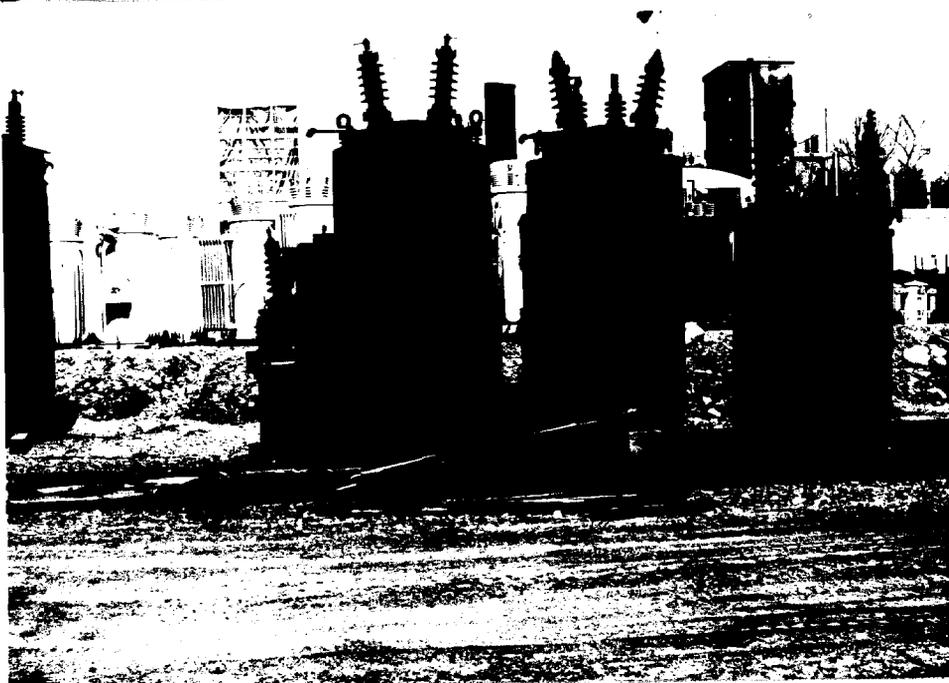
7. View of southeast portion of facility adjacent to confluence of East and Otter Creek. Of note is the large number of transformers and capacitors stored outside on wooden pallets over gravel pads.



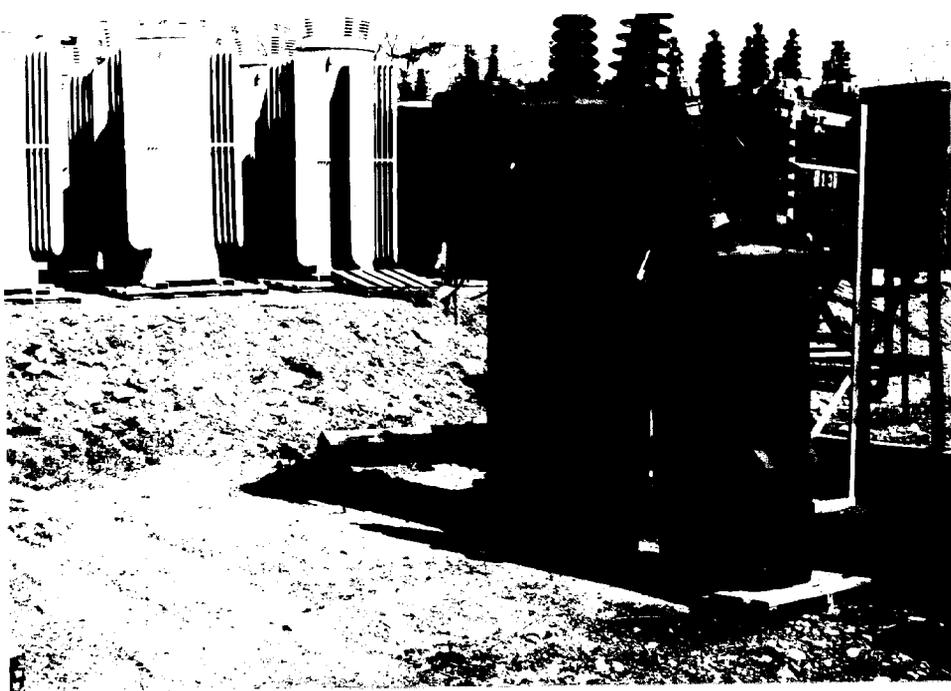
Shown in #1. Note that transformers have "wept" oil near their bases, and coarseness of fill material beneath them.



9. Out of service capacitors behind # 5 Turbine, all of which contain oil.



10. Rusted transformer behind # 5 Turbine.



11. Close-up of rusted and "weeping" transformers behind # 5 Turbine.



12. The entire site is fenced down to the river edge.



and parts being stored  
at river edge.



14. Fence which meets river edge at  
eastern portion of site.



capacitors being stored near eastern property boundary.



16. Transformers and capacitors await servicing northeast of main Turbine building.



17. Junk capacitors and transformers being stored adjacent to northeastern property boundary.



The site is a  
low swamp area  
containing demolition  
debris from  
Casella Waste  
Management Corp.



19. Same as above  
taken 10 feet  
north of # 18.



20. Junk autos,  
auto parts, augers  
and oil stained  
soil along northeast  
boundary of site.



hazardous waste storage shed, and 10,000 gallon tank to be installed. Focus as  $>50$  ppm PCB oil prior to shipment.



22. Capacitors stored adjacent to hazardous waste storage shed. Propan containers further north.



23. Close-up of 10,000 gallon tank to be used for  $>50$  ppm PCB oil storage.

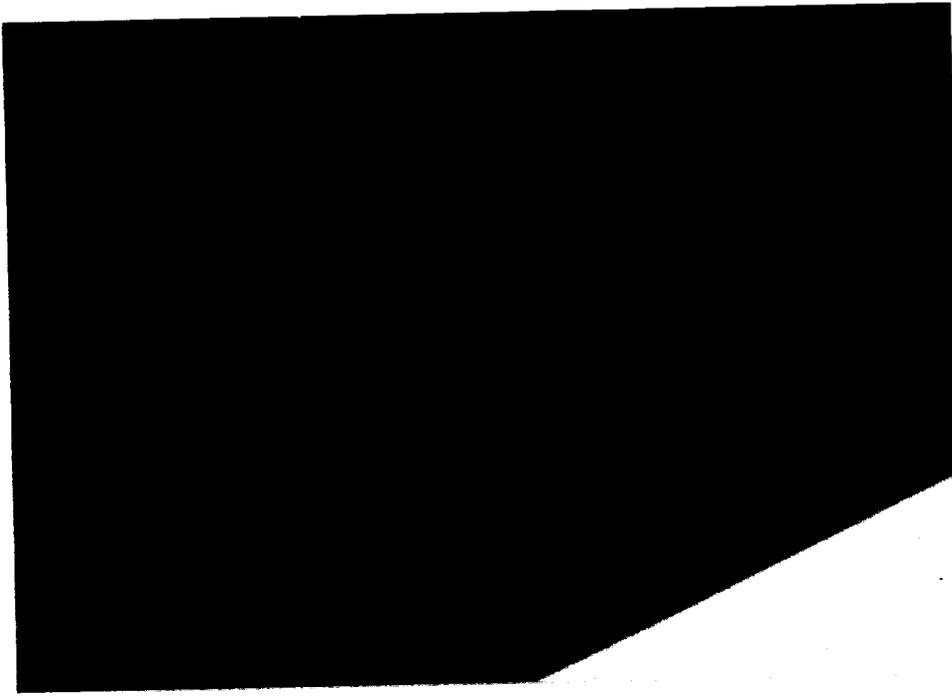


waste storage shed.

25. Steel containment  
inside hazardous  
waste storage shed.



26. Steel containment  
inside concrete berm  
which will contain  
10,000 gallon storage  
tank. Note floor  
drain with imbibent  
beads which flows  
to parking lot.



ATTACHMENT 5

4/10/87 VSI logbook  
CUPS

migration pathway.

- breast

- gas turbines being removed  
→ asbestos abatement

- 200 capacitors

next to bldg

now non PCB capacitors

storage shed

→ drum storage

↳ 1000 gallon tanks  
gone

4 drums PCB

- drums of  
spill debris  
speedi din, etc.

→ new 50 ppm storage

outside tank

20,000 gallon

was 1 recycle tank

sump - w/ under beds

drain → yard

PCB caps should  
out

316,000 tanks, lines not

- tanker used for <sup>20 ppm</sup> ~~recycle~~ <sup>used</sup> oil

- transformer shop in  
August

→ enter Gas Turbine shop

→ recycle oil will be in

bdy. 10,000 new oil

5000-8 < 50

1000 > 500

→ after service, want

to use 0 ppm oil

send out oil for recycle

Abilite

recycle

> 50 tank full, will be  
used for > 500

on siding out last year

carcasses have been

drawn

→ leaving

fence locked 3:30-4 PM

area patrolled

casella waste management

Nongas next door

ATTACHMENT 6

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# aquatec

ENVIRONMENTAL SERVICES

75 Green Mountain Drive, So. Burlington, VT 05403  
TEL. 802/658-1074

## ANALYTICAL REPORT

CVPS Sediment

Date: 11/19/87  
Project No: 87159  
ETR No: 11886  
Sample(s) Received On: 10/14/87  
Page 1 of 1

Standard analyses were performed in accordance with Methods for Analysis of Water and Wastes, EPA-600/4/79-020, Test Methods for Evaluating Solid Waste, SW-846, or Standard Methods for the Examination of Water and Wastewater. All results are in mg/l unless otherwise noted.

Parameter	76254	76255	76256	76257	76258			
PCB's (µg/Kg as received)	<50	910	<50	<50	360			
% Moisture					38.4			

Lab No.

Sample Description

- 76254. Soil sample #1, surface soil, collected 10/14/87 at 1055 hours.
- 76255. Soil sample #2, 32' west of hydro. bldg., collected 10/14/87 at 1110 hours.
- 76256. Soil sample #3, collected east of gas turbine bldg., on 10/14/87 at 1120 hours.
- 76257. Soil sample #4, collected east of gas turbine bldg., on 10/14/87 at 1140 hours.
- 76258. Sediment sample #5, collected at Otter Creek on 10/14/87 at 1215 hours.

Submitted By:

*R. Mason McNeer*

Aquatec Inc.