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Workplan.HW336025.02-28-85.RevisedPumpingPlan

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

28 FEB 1985

N.Y. State Department of Environmental Conservation
202 Mamaronek Avenue
White Plains, New York 10601-5381

Dear Mr. Manfredi:

Enclosed please find a letter from the United States Environmental Protection Agency to General Switch Company, concerning the Interim Pumping Plan. Also enclosed is General Switch's Revised Pumping Plan.

Please send your comments on the Plan to me by March 15, 1985.

Sincerely yours,

Patricia Wells

Patricia Wells, Environmental Engineer
Site Investigation & Compliance Branch

Enclosure

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Gilbert Fleitas, Esq.
Rosenman, Colin, Freund,
Lewis & Cohen
575 Madison Avenue
New York, New York 10022

Re: General Switch

Dear Mr. Fleitas:

The Environmental Protection Agency (EPA) is concerned about General Switch's implementation of the steps required under the Order issued to the company. Now that the water main has been installed along Highland Avenue (after protracted discussions between the company and the town of Wallkill) and Phase I of the hydrogeological investigation has been completed, it is vital that other measures get underway without further delay.

As discussed on January 18, 1985, EPA believes that General Switch must insure the prompt performance of the next phase of the hydrogeological investigation and the prompt commencement of the interim pumping program. We understand that Middletown has refused, to date, to allow you to use its sewage treatment plant, even though there appears to be technical consensus that no risk would be posed to that facility or to the community. If you are unable to enlist community opinion and persuade Middletown to change its position, we will expect to receive from you a revised proposal for the pumping program by no later than February 20, 1985.

As to the program of monthly sampling, we wish to stress our desire to receive analytical results as soon as possible following collection of the samples. Dr. Johnson of Orange County and we are concerned about delays in receiving these results.

We are enclosing EPA's comments on the proposed Phase II program.

Sincerely yours,

Robert N. Ogg, P.E., Chief
Site Investigation and Compliance Branch

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P.W. 2/7/85

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INTERIM PUMPING PLAN

Prepared for:

U.S. Environmental Protection Agency

Region II

August 21, 1984

(Revised February 20, 1985)

1.0 Introduction

Under the terms of the Consent Order, signed May 1, 1984 by U.S. Environmental Protection Agency (USEPA) and General Swith Corporation (GSC), it is necessary to evaluate the effectiveness of pumping condemned wells, or other wells as an interim measure for (1) removing contaminated groundwater from geologic formations in the area, and/or (2) preventing further migration of tetrachloroethylene (PCE) in the groundwater.

It is the objective of this report to provide the conceptual design for a program which, after approval, may be implemented rapidly and at reasonable cost, and which will demonstrate the feasibility of groundwater extraction and disposal as a remedial option to eliminate the PCE contamination problem. It is expected that the proposed system will be effective at least as an interim remediation system, and possibly as a permanent system. An evaluation will be made at the end of a six week trial period regarding the feasibility of this option and which will lead to recommendation for the design of a more permanent system.

2.0 Previous Groundwater Extraction Program

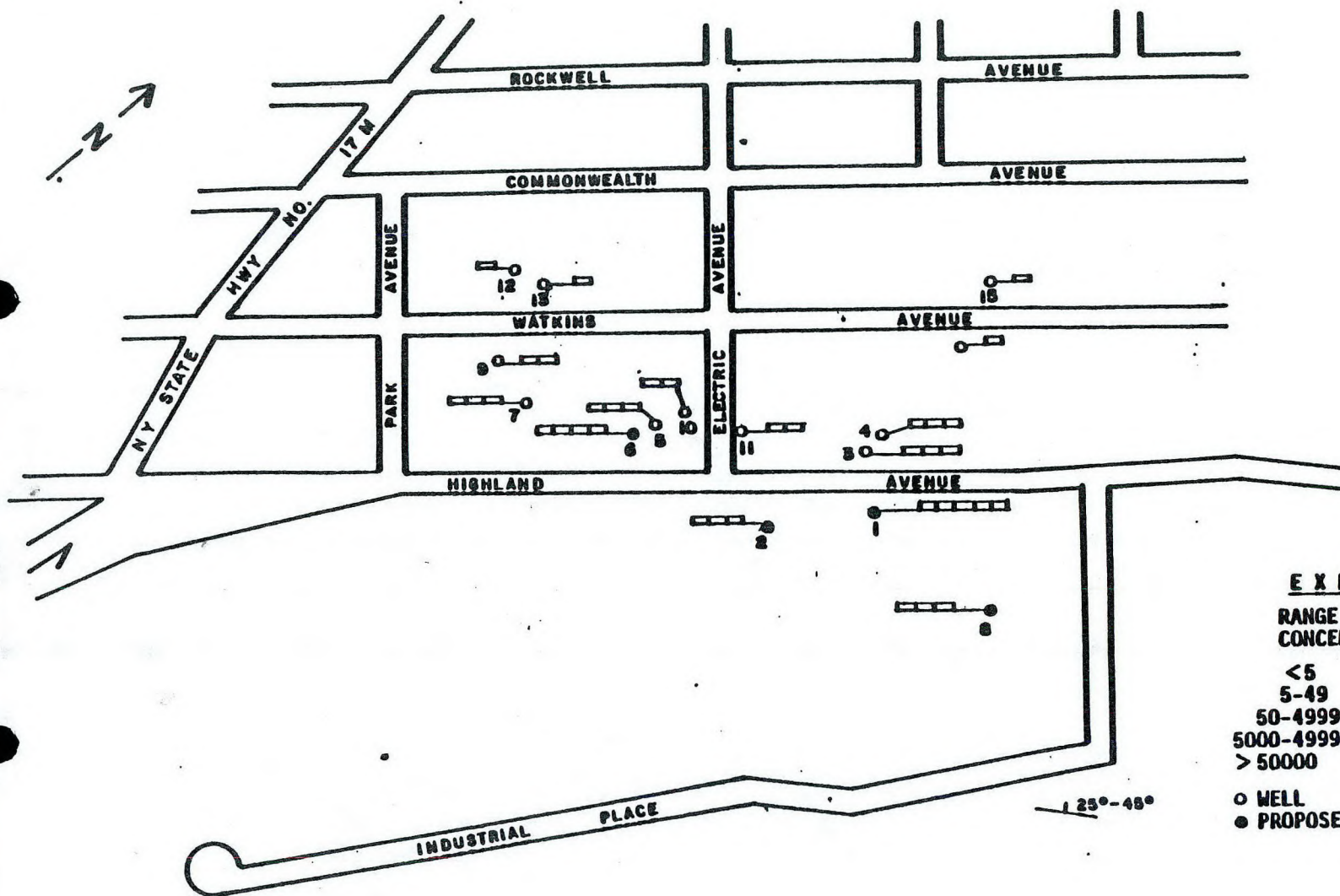
2.1 Program Summary

A limited pumping program was initiated for the USEPA by the Technical Assistance Team (TAT) between November 15 and December 26, 1983 until freezing weather made continued operation unfeasible.

The TAT groundwater extraction program was primarily limited to the Parella well (see Figure 1), although the Lobb well, located directly across Highland Avenue, was pumped for 2 days, while the Parella well was shutdown. The pumping rate varied between one-half and four gallons per minute (gpm). A total of 33,490 gallons of water were reported to have been extracted. Disposal was to the Wallkill Sewage system. Pump discharge was collected in a 2,000-gallon tank truck, from which it was transferred to a 5,000-gallon tank truck stationed at the manhole on Mud Mills Road, approximately two miles from the site. Water was then discharged into the Wallkill Sewer system at a rate which varied between one-half and two gpm. At an assumed average concentration of 74,500 ppb PCE, the TAT estimates removal of 20.75 pounds of PCE. No adverse reactions were noted at the Wallkill Treatment Plant during the period of discharge.

2.2 Contaminant Distribution

Concentrations of PCE above the 50 ppb criteria established by New York State Department of Health as the maximum permissible level allowed in drinking water have been found in seven⁹ private residences and one industrial well (General Switch). Lower concentrations (less than 50 ppb) have been detected in other wells in the vicinity. There appears to have been little change in PCE distribution over the period of investigation (October, 1983 to present). Figure 1 shows that generalized distribution of PCE. The ranges of values plotted were selected to distinguish the clustering of concentration values observed. Wells which had PCE contamination in only one analysis (e.g., Pitt) have not been shown. The values indicated are the highest verified concentrations for each well, and do not necessarily reflect the present concentrations.



WELL IDENTIFICATION

1. PARELLA
2. STOUT
3. LOBB
4. OSBORNE
5. BARRY
6. RUPPERT
7. ROBANNA
8. GENERAL SWITCH
9. RASHOSSAN
10. LEWIS
11. KNAPP
12. WINNER
13. MORSE
14. RADIVOV
15. PRIOR KING PRESS

EXPLANATION

RANGE OF TETRACHLOROETHYLENE
CONCENTRATION (ppb)

- | | |
|------------|---|
| < 5 | □ |
| 5-49 | ▤ |
| 50-4999 | ▥ |
| 5000-49999 | ▧ |
| > 50000 | ▨ |

- WELL
● PROPOSED EXTRACTION WELL

FIGURE 1

TETRACHLOROETHYLENE CONTAMINATION DISTRIBUTION

PREPARED BY: FRED G. HART ASSOC.

A linear distribution of PCE concentration is readily apparent from the figure, trending approximately northeast to southwest. This closely approximates the attitude of bedding observed at an outcrop north of Lubricants Inc. on Industrial Place (strike, N45°E, dip 25° to 45° NW). This suggests that the primary PCE containing fractures are parallel to bedding. However, as will be discussed later, the greatest hydraulic connection between wells appears to follow a more northwest to southeast direction (probably a joint set). The traces of PCE (less than 5 ppb) observed in the Radivoy and Prior King Press Wells are probably following the favored hydraulic direction.

Figure 2 is a semi-logarithmic plot of concentrations of PCE by date of analysis for the seven condemned wells and the General Switch well. The highest concentrations detected have been in the Parella well, which had 260,000 ppb on November 15, 1983. Significant fluctuations in concentrations may be observed during November and December, 1983, during the interval of groundwater pumping from that well. Since pumping ceased, the concentrations have shown a slight decline. At the last available analysis for the condemned wells, (March 22, 1984) the concentrations were 44,500 ppb.

The second highest concentration observed has been in the Ruppert Well. The well has been sampled on only two occasions, showing 7,000 ppb on November 15, 1983 and 5,517 on February 3, 1984. On the second sampling date, samples were taken after 30, 60 and 180 minutes, during which time the concentration increased to 13,985 ppb.

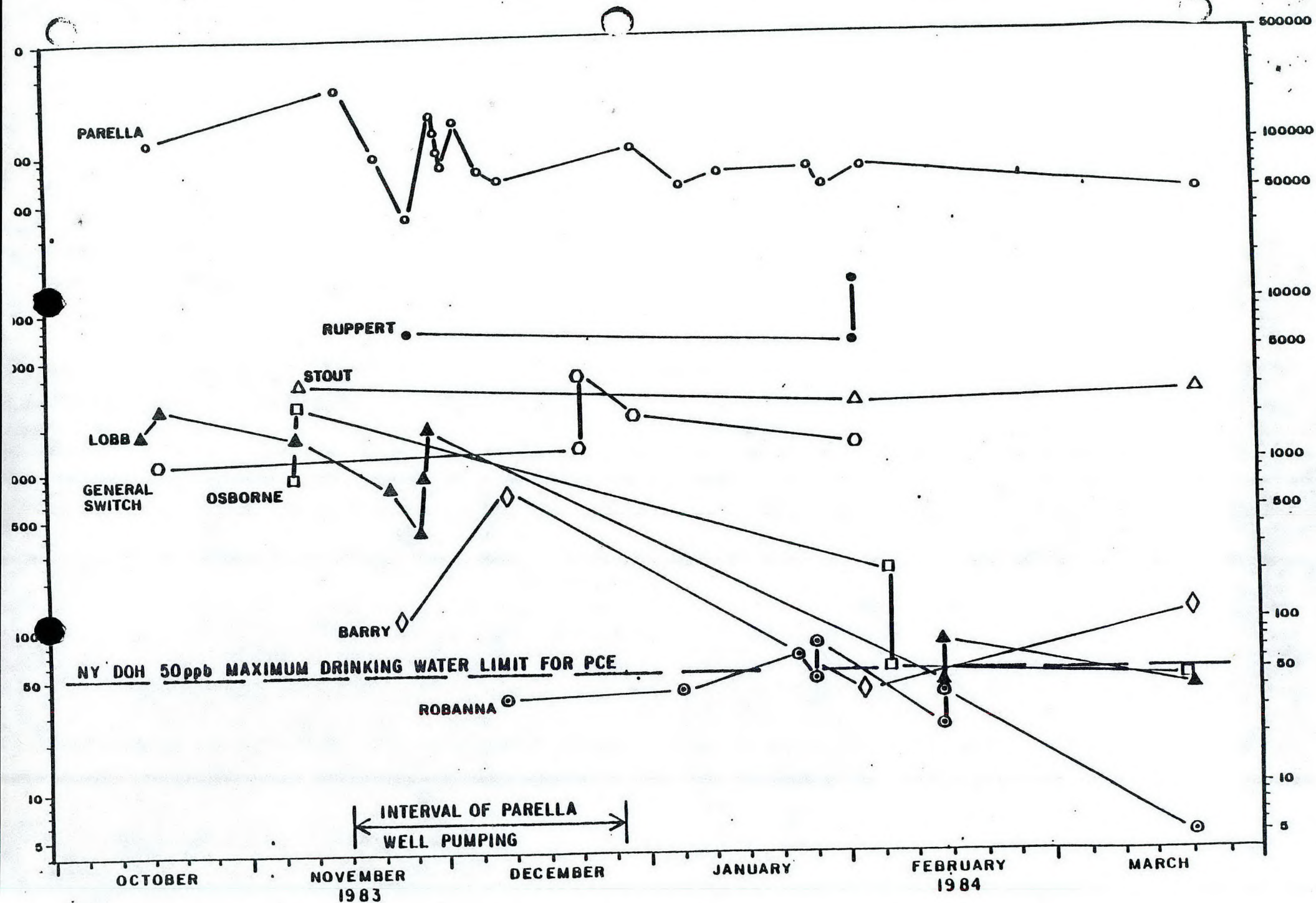


FIGURE 2 - VARIATIONS IN PCE CONCENTRATION WITH TIME

Concentrations observed over time in the Stout, General Switch, Osborne, Lobb and Barry wells are shown on Figure 2. With analyses on only three occasions, no trend can be seen in the Stout well. Levels have been greater than 2,000 ppb. On February 8, 1984, a time concentration test was performed, during which concentrations increased from 2,341 to 2,909 ppb after 60 minutes of pumping.

The General Switch well has been relatively constant in concentrations, with two notable exceptions. During a time-concentration test on December 22, 1983, samples taken after 15, 30 and 45 minutes of pumping increased in concentrations from 1,294 to 3,877 ppb. A sample taken one week later (December 29, 1983) was significantly higher than the values at 2,051 ppb. A second time-concentration test on February 2, 1984 showed a gradual increase from 1,440 ppb to 1,760 ppb after 180 minutes of pumping, followed by a slight decline to 1,660 ppb after 240 minutes. No analyses have been made since that date.

Concentrations in the Lobb and Osborne wells have shown similar trends over time (Figure 2). Both wells showed rapid concentration increases up to approximately 2,500 ppb prior the Parella well pumping, followed by a decline to levels slightly below the 50 ppb maximum permissible concentrations. Time-concentration tests (60 minute duration) of the two wells conducted in February showed opposite behavior. The Lobb well increased slightly over time, whereas the Osborne well declined.

The Barry well increased from 100 ppb on November 23, 1983 to 730 ppb on December 9, 1983. Subsequent analyses on February 7, 1984 and March 20,

1984 have been 39 and 118 ppb, respectively. The low value is probably the result of a pump test conducted by the TAT February 2, 1984, on the Ruppert well, approximately 50 feet to the northeast.

The Robanna well increased slightly in concentration between December and the end of January. A time-concentration test was performed on January 25. During that test, concentrations were 48, 78 and 76 ppb after 15, 60 and 90 minutes of pumping. Since that test, the concentration has dropped significantly, to 5 ppb on March 20, 1984.

2.3 Effectiveness of Previous Pumping

The preceding information and the limited hydraulic testing performed by the TAT suggests that the existing wells may be an effective means for extraction of contaminated groundwater. Data available on characteristics of the Austin Glen aquifer are as yet not sufficient to predict long-term effects of pumping the wells. The significant reductions in PCE concentrations in the Lobb and Osborne wells between October and November 1983 analyses (before and during pumping of the Parella well) with those of February and March, 1984 (following the pumping) may be explained by two possible mechanisms: either a slug of highly concentrated groundwater passed through the fractures feeding the wells; or the plume of contamination was pulled back toward the Parella well by pumping. The continued presence of PCE in the other wells in the area indicates that the second mechanism is the more likely.

The radius of influence of wells in the area appears to be relatively small and appears to be anisotropic. Data collected by the TAT suggests that the influence of the Parella well is limited to approximately 350 feet. It also suggests that the preferred direction is generally along a north-west-southeast line, or roughly perpendicular to Highland Avenue. This was evident from drawdown patterns during a short duration pump test conducted on the Parella well on December 21, 1983, and is also apparent in the reduction of PCE concentration as shown in Figure 2. The most significant reduction in concentration following the pumping of the Parella well was in the Osborne and Lobb wells, located directly across Highland Avenue, within 200 feet of the pumping well. No apparent reduction can be observed in the Stout and General Switch wells, located to the southwest and northeast of the Parella well at distances of approximately 230 and 370 feet, respectively.

3.0 Recommended Interim Pumping Plan

3.1 Well Investigation

By changing the distribution of contaminants within the area of pumping the interim pumping test may interfere with the collection of data needed for the Phase II Hydrogeological Investigation. For this reason, a well investigation study will be performed prior to the start of the interim pumping test. The well investigation study will include downhole television logging and packer testing.

Prior to the start of the pumping test, downhole television logging will be performed on the four wells selected for utilization in the pump test as well as other wells within the study area. The television logging will provide a visual examination of the depths, magnitude and orientation of fractures in the bedrock aquifer, in order to evaluate the zones by which the PCE is entering the wells.

Once these zones have been identified, pump-out type packer testing will be performed on these fracture zones. In the packer tests, pneumatic packers will be set to the depths of the major fracture systems and in zones between the major fracture systems. The packers are inflated with compressed air. When inflated, the area between the two packers is effectively sealed off from the rest of the well. Water will be pumped out from each of the zones and analyzed for PCE. The effectiveness and the ability for bedrock fracture systems to act as pathways for contaminant migration can then be assessed.

In conjunction with water level measurements, the vertical and horizontal contaminant distribution can be confirmed. It is anticipated that these efforts along with the pumping test will constitute a significant portion of the Phase II Hydrogeological Investigation.

3.2 Well Selection

Based upon the results of the well investigation and other existing data, four existing wells will be selected for conversion to groundwater extraction wells.

Based upon the existing data on PCE distribution and concentration in the aquifer and available data on well construction and pumping characteristics, Fred C. Hart Associates (FCHA) recommends immediate conversion of the following four existing wells for groundwater extraction.

1. Parella, 320 Highland Avenue
2. Stout, 316 Highland Avenue
3. Ruppert, 307 Highland Avenue
4. General Switch, 20 Industrial Place

These wells have been selected on the basis of their consistently high concentrations of PCE and their distribution along the linear zone of contamination. The evidence available at present suggests that the PCE contamination is concentrated primarily in a fracture set parallel to the strike of the formation (northeast to southwest) although the most productive water-producing fractures appear to trend in a nearly perpendicular direction (northwest to southeast). It is expected that by proper adjustment of pumping rates from the four wells, a significant reduction will be made in PCE concentration in the aquifer with minimum impact on groundwater availability in the area.

After carbon adsorption and treatment to reduce the PCE concentration to less than 50 ppb, the groundwater will be discharged to the Middletown Sewer system. The method of connection and system startup procedures proposed are detailed in Section 3.3. A detailed sampling plan for the startup period and continued monitoring is presented in Section 3.4.

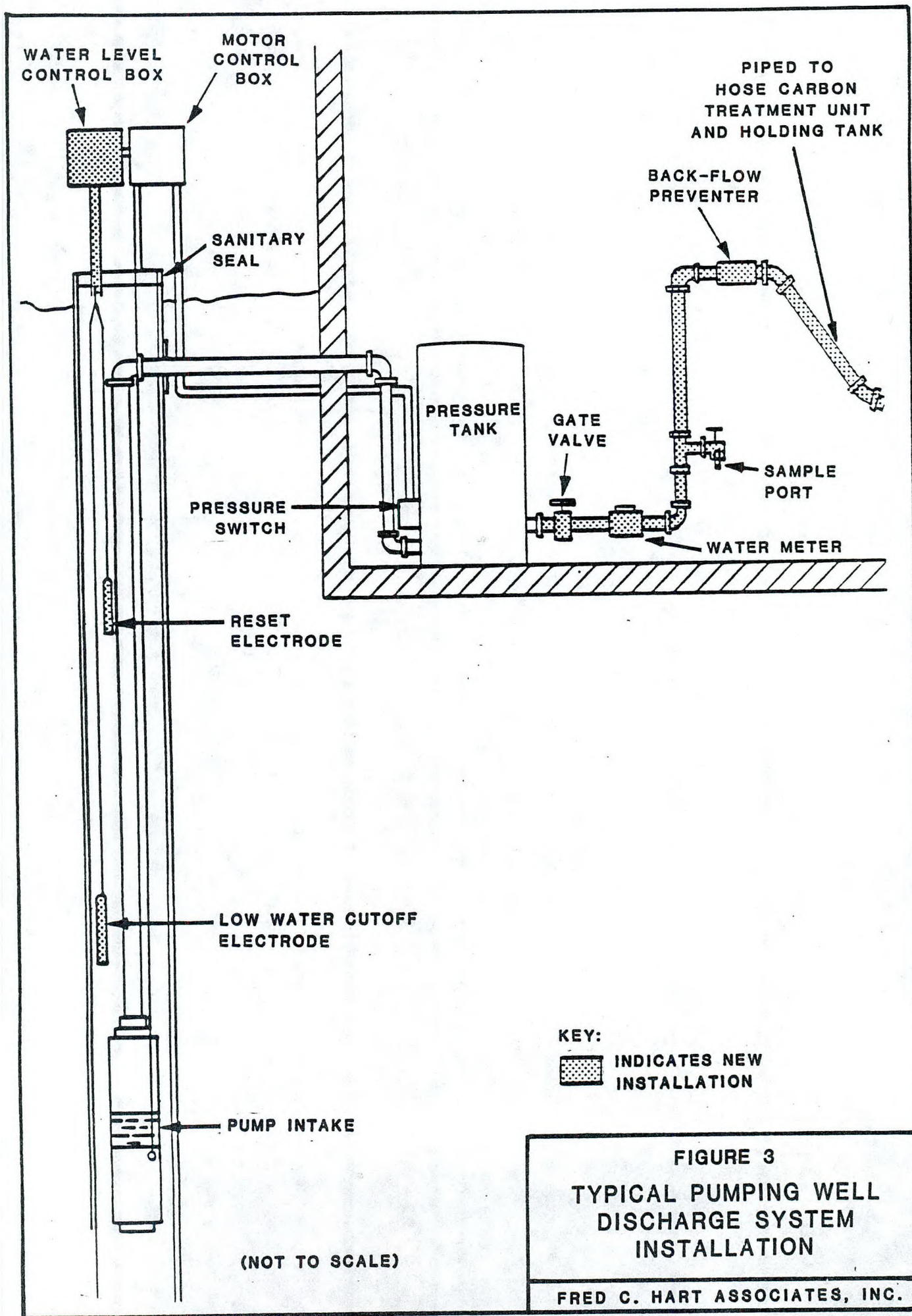
3.3 Well Discharge

The four wells proposed for pumping under this plan are all currently equipped with pumps, although the wells are not presently in service. The proposed discharge system will need to be custom fitted to each installation. Typical features of the system, as shown in Figure 3 are:

- ° low water cutoff and restart switching to be installed in the well casing.
- ° a gate valve for flow control
- ° a water meter for rate adjustment and total contributions measurement.
- ° an in-line sampling port
- ° a dual check-valve back flow preventer
- ° carbon treatment of groundwater prior to discharge to Middletown STP.

The proposed low level cutoff and restart switching is considered a vital part of the system. In addition to protection of the pump from burn-out by running dry, it will allow a fine tuning of each well. The cutoff and restart switch positions in the well may be adjusted, allowing control of drawdown at each well.

The gate valve and water meter will be used to adjust pumping rate from the well. By experimentation over the startup period, it will be determined whether restricted flow as an approach to steady state, or unrestricted flow with frequent on-off cycles controlled by the water level switching mechanism will produce better results.



The four wells in the proposed extraction system will be brought on line in the system at a rate of one well per day. Static water levels of the pumping wells and neighboring wells will be recorded. The initial setting for the low water cutoff will be approximately 10 feet above the pump intake. The initial reset switch setting will be $\frac{1}{2}$ way between the low water setting and the static water level. When the well is started, the rate will be adjusted with the gate valve and water meter to the initial pumping rates (1 gpm for Parella, Ruppert and Stout, $\frac{1}{2}$ gpm for General Switch). Samples will be collected and water levels measured while pumping continues. If necessary, the pumping rate and water level controls will be adjusted to maintain the initial pumping rate. Periodic measurements of neighboring wells will be made. If any neighboring wells still in use become endangered of dewatering by the extraction program, pumping rates will be reduced immediately.

All water collected from the extraction wells will be piped through activated carbon adsorption treatment units located outside of the affected homes. The objective of the carbon treatment system will be to reduce the PCE concentration to less than 50 ppb. After treatment, the water will flow into large holding tanks. The water in the holding tanks will be analyzed in the field using a portable gas chromatograph. If the PCE concentration in any holding tank is less than 50 ppb, the water will be discharged into the Town of Middletown sewer line.

No anticipated impacts are expected to occur from the Interim Pumping Test. The program will use activated carbon adsorption and treatment to reduce the PCE concentration to less than 50 ppb. This concentration is

acceptable for drinking water purposes. Holding tanks will be installed at each home to collect water from the extraction wells after carbon treatment so that the water can be field analyzed to ensure compliance with the 50 ppb cutoff concentration. At this concentration, and assuming a daily flow at the Middletown STP of 3.7 mgd, and even assuming no additional removal of PCE at the Middletown STP, the anticipated effluent concentration will be several orders of magnitude below the STP's 40 ppb NYSDEC discharge limit.

3.4 Sampling Program

Samples from the four proposed extraction wells, and the four non-pumping condemned wells (Robanna, Berry, Lobb and Osborne) will be taken and handled in accordance with procedures discussed in the General Switch Site Operations Plan, and the Interim Monitoring Plan with exceptions to be noted below.

In addition to samples collected for laboratory analysis, samples will be collected for analysis in the field with an OVA, in order to provide rapid evaluation of PCE concentrations in the well discharge water.

Time-concentration series samples will be taken twice from each of the non-pumping condemned wells. A time-concentration series will consist of samples taken at the follow intervals after pump startup: 5 minutes, 15 minutes, 1 hour, 2 hours. The first time-concentration series will be taken prior to startup of the four extraction wells. A second series will be taken from one to two weeks after the system has achieved steady-state operations. Subsequently, these wells will be sampled after 15 minutes of running, concurrent with the Interim Monitoring program.

A time-concentration sampling series program will be conducted for each of the extraction wells during the startup period. Analysis will be done either by the OVA or by laboratory analysis, using the Direct Injection Method. Exact time intervals cannot be determined in advance, since it is anticipated that the wells will be cycling on and off. The interval between samples will increase as pumping continues approximately as follows:

15 minutes, 1 hour, 3 hours, 8 hours,
12 hours, 24 hours, 48 hours, 120 hours.

Weekly samples will be taken during the remainder of the trial period. A schedule for continued sampling will be determined based upon the results of the initial sampling, and will be presented with the Interim Pumping Plan Evaluation.

Samples from the holding tanks will be analyzed daily in the field with a portable gas chromatograph. Holding Tank samples will be analyzed daily during the start up period and at least weekly thereafter. In addition, ten percent of these samples will be replicates collected for confirmation by laboratory analysis. A schedule for continued monitoring, if needed, will be included in the Interim Pumping Plan Evaluation.

4.0 Pumping Plan Evaluation

Evaluation of the effectiveness of the Interim Pumping Plan will be an on-going process. It is not possible to predict the length of time that may be needed for removal of sufficient PCE to consider the aquifer "restored". It is hoped that a trend may become apparent after four to six weeks of

pumping. It is proposed, therefore, that an Interim Pumping Evaluation be submitted to EPA within eight weeks from the date pumping begins. If a prediction can be made of the time needed for the proposed system to extract sufficient PCE to prevent the endangerment of the water supply of any homes still dependent on private wells, and if that time is sufficiently short that the system, modified as needed, will be cost-effective, continued operation will be recommended. Other possible options may be considered as well, such as the replacement of additional water supplies.

If it should become apparent that substantial modification of the Plan is required before submission of the evaluations. EPA will be notified immediately.

5.0 Implementation Schedule

The implementation of this proposed program is contingent upon receiving permission from homeowners to use their wells and their property for pumping and treatment. It is hoped that EPA, the New York DEC and the Orange County Health Department will assist, if needed, in obtaining these permissions.

The following schedule begins from the time formal EPA approval of the plan is received by FCHA.

INTERIM PUMPING PLAN-IMPLEMENTATION SCHEDULE

ACTIVITY

TIME IN WEEKS

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

EPA FORMAL APPROVAL

PERMISSION FROM HOME
OWNERS AND
MIDDLETOWN STP

WALKILL WELL
INVESTIGATION

INSTALLATION OF
DISCHARGE SYSTEM

PUMPING PROGRAM
START-UP

TRIAL PERIOD

INTERIM PUMPING PLAN
EVALUATION (REPORT)

