STATE OF NEW YORK: DEPARTMENT OF ENVIRONMENTAL CONSERVATION

IN THE MATTER OF an Inactive Hazardous Waste Disposal Site Focused Remedial Investigation and Interim Remedial Measures for the Inactive Hazardous Waste Disposal Site, known as

FINDINGS OF FACT

DEC Index # W1-0707-94-08

FULTON AVENUE
(GARDEN CITY PARK INDUSTRIAL AREA)

Site # 1-30-073

WHEREAS, after investigation, including review of the attached Affidavit of John B. Swartwout, Jr., I FIND THAT:

1. Records of the New York State Department of Environmental Conservation (the "Department") identify an inactive hazardous waste disposal site located in the Town of North Hempstead in Nassau County, nominated the Fulton Avenue (Garden City Park Industrial Area) Site.

2. The Fulton Avenue (Garden City Park Industrial Area) Site is located within the Garden City Park Industrial Area at 150 Fulton Avenue in the Town of North Hempstead, Nassau County.

3. The site was listed as inactive hazardous waste disposal site # 1-30-073 in the New York State Registry of Inactive Hazardous Waste Disposal Sites (the "Registry") on August 2, 1994.

4. The site is classified as a Class "2" site at which hazardous waste disposed at poses a significant threat to the public or environment and at which remedial action is required.

5. In 1986, the Nassau County Department of Health (the "NCDH") conducted an investigation entitled "Investigation of Contaminated Aquifer Segments, Nassau County, New York" which identified the Garden City Park Industrial Area as one of the areas of the County where groundwater contamination was a concern. Analytical results are available from 17 wells, nine of which were installed for the investigation and eight of which were existing wells.

6. The 1986 NCDH investigation established that:

(a) The wells installed in Garden City Park tap the upper glacial aquifer;

(b) The upper glacial aquifer is between 50-100 feet

thick in the area;

(c) There is no confining clay layer or interstitial clay in these wells which have a maximum depth of about 70 feet below land surface;

(d) A clean well sorted medium sized sand serves as a tentative boundary between the glacial and Magothy sediments;

(e) The regional groundwater flow direction in Garden City Park is towards the southwest;

(f) Nine of the 17 wells in the area exceed NYS guidelines for organic compounds in drinking water. Two of the wells are significantly contaminated. These wells are GCP-1 and GCP-7. Well GCP-7 is located 800 feet down-gradient of GCP-1;

(g) Total organic compounds in GCP-1 increased from 3,436 ug/l in March 1985 to 37,795 ug/l in December 1985. The principal contaminant is tetrachloroethene ("perchloroethene", "PCE"), which increased from 3,400 ug/l to 36,000 ug/l during that time. In addition, cis and trans-1,2-dichloroethene was not detected in the March 1985 sample, but was reported at 1,400 ug/l in December 1985;

(h) Total organic compounds in GCP-7 were 2,572 ug/l in December 1985. December 1985 sampling of wells to the northeast (GCP-2,3,4,5) indicate that they also seem to be contaminated with tetrachloroethene (about 300 ug/l each). Additionally, well GCP-5 was found to contain 210 ug/l of trichloroethene;

(i) In January 1986, total organic compounds in GCP-1 increased to 51,210 ug/l. The principal contaminant, tetrachloroethene ("PCE"), had increased to 50,000 ug/l.

(i) PCE appears to have migrated into the deeper wells as indicated by water supply well N2565 (410 feet) and water supply well N3185 (463 feet deep). Contamination has migrated into the deeper portions of the Magothy aquifer up to about 450 feet deep. All of the water supply wells contain detected organic compounds.

7. In 1991 through 1993 NCDH conducted a follow-up investigation ("1991-1993 NCDH Investigation") in conjunction with Nassau County Department of Public Works (the "NCDPW") in

an attempt to define the extent of and source of the groundwater contamination in the vicinity of Garden City Park Industrial Area. The 1991-1993 Investigation report, dated April 28, 1993, is entitled "NCDH/NCDPW Cooperative Agreement Project Garden City Park Groundwater Quality Study Preliminary Report."

8. Twelve additional monitoring wells were installed for the 1991-1993 NCDH Investigation to better define the areal extent of the plume. Seven wells were screened at the water table and five were screened approximately one hundred feet below the water table. GCP-10s and GCP-10d were installed up-gradient to provide background information on water quality entering the industrial area. GCP-16s was installed within the industrial area, while the remaining nine wells were installed from approximately 400 ft. to 2800 ft. down-gradient of the industrial area. Water level measurements and water quality results were used to determine the extent and movement of groundwater contamination both horizontally and vertically. Two rounds of water quality testing at all monitoring wells were performed during the six month period from January 1992 through June 1992.

9. The 1991-1993 NCDH Investigation established that:

(a) The greatest concentration of total volatile organic compounds ("TVOCs") at the water table was at GCP-1 with a high of 13,128 ug/l, primarily made up of PCE (13,000 ug/l). Down-gradient wells GCP-7 and GCP-8 showed lesser though still significant amounts of TVOCs. The down-gradient deeper wells showed greater concentrations of TVOCs than the water table wells located at the same sites. These sampling results are from two rounds of water quality testing performed during the six month period from January 1992 through June 1992.

(b) The plume is moving vertically downward as it migrates to the southwest. The extent of migration is assumed to be quite extensive based on the concentrations of TVOCs found in well cluster GCP-14s and GCP-14d, which were originally installed to define the down-gradient boundary of the plume. Well GCP-14d contained the greatest concentration of TVOCs of all deep monitoring wells with a high of 744 ug/l, while GCP-14s levels ranged from below detectable to 41 ug/l.

(c) The presence of the concentration of TVOCs in the down-gradient deep well plus the detection in public supply wells also located down-gradient of the industrial area, may indicate the presence of a widespread plume in the area. A cross section through

the industrial park and down-gradient areas (see 1991-1993 NCDH Investigation report figs. 4 & 5) shows the inferred extent of the plume. From data thus far, this appears to be the largest groundwater plume of VOCs identified in Nassau County.

(d) The current water table contours indicate groundwater flow is in the southwest direction. In the past, flow paths were altered by heavy public supply well pumping in Brooklyn and in Queens. This pumping created a large cone of depression in both the Upper Glacial and Magothy aquifers. This phenomenon could have accelerated the rate of groundwater flow and even changed groundwater flow direction. Figure 6 of the 1991-1993 NCDH Investigation report shows water table contours from four different time periods. It demonstrates how contamination could have migrated westerly towards the Queens border during periods of heavy pumping. When pumping levels decreased in the 1980s, groundwater flow direction changed to a southwesterly direction. Localized pumping could also affect groundwater flow patterns. These factors combined could cause the plume of contaminants to impact a wider area.

(e) Based on preliminary results of this study and information on groundwater flow, it appeared that 17 public supply wells have been impacted to some degree by a single plume emanating from the industrial area located in Garden City Park. Raw water quality in thirteen of the seventeen wells contain volatile organic compounds ("VOCs") in excess of current drinking water standards. The majority of wells that contain VOCs in excess of drinking water standards are screened within the lower or basal Magothy, while the wells that currently meet the standards are screened much shallower. This indicates that the source may be found at some distance from the wells, thus allowing the contaminants time to penetrate beneath the screen zones of the shallower wells and to impact the deeper wells.

(f) An additional well cluster installed between down-gradient public supply well locations in Floral Park provides additional evidence of a plume migrating deep into the area. The deeper of these wells, which is also screened in the basal Magothy, shows TVOCs in the same range as the supply wells while the shallower well shows TVOCs at only detectable levels. To allow for the extensive migration of the plume, the contaminants in question would have to be present in the groundwater for a significant length of time.

This is supported by the detection of the contaminant(s) in all 17 public supply wells at or around the time when analysis for organic chemicals were first required.

10. The 1991-1993 NCDH Investigation found levels of VOCs, predominantly tetrachloroethene, in the groundwater at up to 13,128 parts per billion ("ppb"). The ambient groundwater PCE standard set by the Department for this resource is 5 ppb. This groundwater standard, found in 6 NYCRR Part 703, is intended to protect the health of those who utilize the groundwater in an untreated manner as a drinking water source. The plume of contaminated groundwater was found to originate in the Garden City Park Industrial Area and to extend 5 miles in a southwesterly direction.

11. In June 1993, the Department categorized 40 acres of the Garden City Park Industrial Area as a potential inactive hazardous waste disposal site at the request of the NCDH. Property owners in and adjacent to the industrial area were notified that the Department intended to conduct a Preliminary Site Assessment ("PSA") to locate the source of the contamination so that it could be listed on the Registry and be remediated. The Department immediately assigned the PSA to its consultant Dvirka and Bartilucci Consulting Engineers ("D & B") under a State Superfund standby contract.

12. D & B gathered and reviewed all available information and developed a proposed field investigation work plan to locate the source. Following Department review and approval, the work plan was implemented by D & B. Field investigations took place during April 1994. Geoprobes were used to sample groundwater followed by real time chemical analysis in an on-site laboratory. In addition, to the collection of groundwater samples from the probe locations, 16 groundwater samples were collected from existing monitoring wells. Confirmatory analysis of selected samples at a contract laboratory was completed in May 1994. The PSA was finalized in September 1994.

13. More specifically, as part of the PSA, 61 groundwater samples were collected from 31 Geoprobe locations and analyzed for select volatile organic compounds. Except for one location, GP-25, groundwater samples were collected from each location at shallow/water table depths (between 42 to 56 feet below grade) and deeper depths (15 to 20 feet below the water table), between 59 and 71 feet below ground surface. The sample from GP-25 was collected only at the deeper depth.

14. The PSA Geoprobe sampling found that a number of the compounds analyzed for exceeded groundwater standards and guidelines. The primary contaminants of concern detected in the

samples were PCE, trichloroethene ("TCE") and 1,1,1-trichloroethane ("TCA"). PCE levels of 46,000 ug/l were detected in GP-26. Several other shallow samples collected in the immediate vicinity of GP-26 exhibited the presence of PCE at levels greater than 1000 ug/l. Deeper samples collected in this area range in concentration from low levels (13 ug/l) to levels as high as 1200 ug/l.

15. As for the PSA sampling of monitoring wells, groundwater samples were collected from 16 monitoring wells in the vicinity of the study area. In addition to the 13 existing monitoring wells which were installed by Nassau County Department of Public Works ("NCDPW") and Nassau County Department of Health ("NCDH"), three wells installed by Precision Fabricators, Inc. (designated PF-1, PF-2, and PF-3) were also sampled as part of the investigation.

16. The PSA monitoring well sampling found that:

(a) The majority of wells sampled exhibited the presence of at least one compound greater than NYSDEC Class GA standards/guidelines. The two upgradient monitoring wells, GCP-10S and GCP-10D, did not exhibit the presence of any compounds above the detection limits. In addition, GCP-16S, located outside and upgradient of the northern study area boundary, did not exhibit the presence of any compounds above the detection limits.

(b) GCP-1 exhibited the highest levels of contaminants with PCE at 7,900 ug/l and TCE at 530 ug/l. Levels of contamination in GCP-7S generally appear to decrease with time. Levels in GCP-8 have increased significantly between January and June 1992 almost the same time that the levels decreased in GCP-7S, indicating a possible shift of the dissolved plume to the southwest immediately downgradient of the study area.

17. The PSA established that:

(a) The Upper Glacial deposits on site are approximately 106 feet thick at GCP-10D to 125 feet thick at GCP-7D, and consist of fine to coarse quartz sand and gravel with occasional lenses of silty sand. Geologic literature indicates that the Magothy formation is approximately 300 feet thick in the study area and that there is no general confining unit between the two formations. Data from boring log GCP-7D and GCP-10D indicate the presence of a 20 foot thick sandy clay to clay unit at 106 to 125 feet below

grade. One sample collected for grain size analysis from probe GP-14 at a depth of 57 to 59 feet indicates that the soil is fine to coarse quartz sand with trace medium to fine quartz gravel and trace salt.

(b) The groundwater contour map indicates groundwater flow in a west-southwesterly direction at an approximate gradient of 0.0016 feet/feet across the study area, turning more toward the southwest in the western portion of the study area. This is consistent with the flow direction mentioned in previous reports. The gradient indicates that groundwater elevation drops 0.0016 feet for every one foot of horizontal travel.

(c) PCE, TCE and TCA are all dense non-aqueous phase liquids ("DNAPL"). These compounds are denser than water and have relatively low viscosities. Consequently, the non-aqueous phase of these compounds may be relatively mobile in the subsurface and the movement in both the vadose zone, the area directly above the water table, and below the water table is driven by gravity. In addition, due to the low solubilities of these compounds, the DNAPL acts as a long-term source of dissolved phase groundwater contamination resulting in large dissolved phase plumes.

(d) When released in the unsaturated zone, free phase DNAPL moves downward through the soil matrix by the force of gravity or laterally along the surface of the sloping, fine-grained stratigraphic units. As free phase DNAPL moves, globules or ganglia are trapped in soil pores by capillary forces. DNAPL migrates preferentially through small scale fractures and heterogeneities in the soil permitting the DNAPL to penetrate areas much deeper than would be predicted. Saturated aqueous concentrations of DNAPL are rarely observed in groundwater. Literature indicates that unless a monitoring well is installed extremely close to the DNAPL zone and the well intake is short, saturated or near saturated levels of dissolved constituents will not be observed.

(e) Due to the characteristics of DNAPL and its preferential migration path, it is not unlikely that in the immediate vicinity of the source entry area, elevated levels of contamination can be found immediately adjacent to lower levels of contamination.

(f) Utilizing a USEPA calculation, several samples indicated the presence of residual DNAPL at the site.

Residual DNAPL is defined as "the volume of hydrocarbon trapped in the pores relative to the total volume of pores." (USEPA/600/R-92/030). The significance of residual DNAPL is that there may be an area that is a continuing source of contamination in the saturated zone. As groundwater flows past this residual DNAPL, increased volumes of groundwater become contaminated with dissolved DNAPL. Most DNAPLS undergo only limited degradation in the subsurface, and persist for long periods while slowly releasing organic constituents to groundwater through dissolution. However, some degradation is expected to occur.

(g) The dissolved plume extends upgradient of the suspected source entry area. This can be explained by various characteristics of DNAPL. DNAPL vapors from residual can extend significant distances in the unsaturated zone. This is very applicable to the Garden City Industrial Park Area because essentially all of the area is capped with either paved surfaces or buildings which would mitigate the vertical release of vapors through the ground surface to the air and cause faster lateral migration. Lateral migration of this vapor can act as a source for the dissolved concentrations found in the groundwater. If residual DNAPL exists, elevated levels of dissolved concentrations of DNAPL constituents are likely to be found in the groundwater upgradient of the source.

(h) Elevated levels of PCE have also been found with depth. This would indicate that vertical migration spreading/dispersion of contamination with depth is occurring. The majority of public water supply wells reportedly impacted by this plume downgradient of the site are screened in the lower Magothy. Downgradient supply wells screened much shallower, however, are meeting standards/guidelines.

(i) Elevated levels of TCE are also detected with depth downgradient of the suspected PCE source entry area. TCE contamination also appears to be migrating vertically and potentially impacting downgradient water supply wells.

(j) Groundwater in and directly downgradient of the Garden City Park Industrial Area is significantly contaminated with PCE. Elevated levels of TCE, TCA, dichloroethene and vinyl chloride were also found in the groundwater in and downgradient of the study area.

(k) The results of the analysis of the groundwater

samples obtained in the vicinity of 150 Fulton Avenue indicate the possible presence of residual dense non-aqueous phase liquid ("DNAPL") in this source entry area. A comparison of historical data shows little or no attenuation of groundwater contamination during the last 10 years, and that this area is a continuing major source of PCE, and likely TCE, and is a threat to drinking water supply.

18. The PSA found the source of the high level volatile organic contamination to be a facility located at 150 Fulton Avenue in the Garden City Park Industrial Area. Historical information indicated that a former tenant at the facility, Halnit Finishers, used an organic solvent for dry cleaning.

19. The accompanying affidavit confirms that the toxicity profiles for contaminants PCE and TCE are as follows:

Tetrachloroethene ("PCE")
Tetrachloroethene is a colorless liquid with a chloroform-like odor. There is no "Immediately Dangerous to Life and Health" ("IDLH") level due to the fact that it is a suspected carcinogen. The target organs are the liver, kidneys, eyes, upper respiratory system, and the central nervous system. These organs are affected by all three routes of exposure: inhalation, ingestion, and dermal contact. The symptoms of exposure include irritation of the eyes, nose, and throat, nausea, flushed face and neck, vertigo, dizziness, incoordination, headache, somnolence and erythema.

Trichloroethene ("TCE")
Trichloroethene is a stable, colorless, heavy, mobile liquid, with a chloroform-like odor. There is no IDLH value due to the fact that it is considered to be a possible carcinogen. The targets organs involved are the respiratory system, heart, liver, kidneys, central nervous system and the skin. The routes of exposure are inhalation, ingestion and dermal contact. The symptoms of exposure are headaches, vertigo, visual disturbances, tremors, somnolence, nausea, vomiting, irritation of the eyes, dermatitis, cardiac arrhythmia, and paresthesia.

20. Halnit Finishers was a cutting mill which received knit fabrics in a tubular form, cut the tube open, dry cleaned the material, sewed pieces together, placed the bolts in plastic bags, and shipped out the goods. Tetrachloroethene was the solvent commonly used for dry cleaning at that time.

21. The facts in the accompanying affidavit demonstrate that

seventeen public water supply wells, which had previously been shut down or required treatment systems due to volatile organic contamination, are within or adjacent to the plume of contamination.

22. The facts in the accompanying affidavit demonstrate that the U.S. Environmental Protection Agency has designated the aquifer underlying Long Island as a sole source aquifer because it is the only source of drinking water in the region. Five water supply companies serving a population of 215,000 rely on wells located downgradient of the Garden City Park Industrial Area. During 1993 alone, these companies collectively treated about 4 billion gallons of contaminated groundwater withdrawn from the plume to make it potable. Additional wells utilized by these companies are at risk of becoming contaminated as the plume continues to migrate.

23. The facts in the accompanying affidavit demonstrate that immediate action must be taken to prevent continuing and expanding contamination of drinking water without waiting for identification of responsible parties or negotiations with such parties. That action consists of the Department proceeding immediately with a Focused Remedial Investigation ("FRI") of the property at 150 Fulton Avenue and its environs to identify appropriate interim remedial measures ("IRMs") which would be taken to prevent continued and further contamination of drinking water, and then implementing those IRMs as soon as possible.

24. The facts in the accompanying affidavit demonstrate that without implementing appropriate IRMs to address the contaminant plume flowing from the site, the likelihood for exposure to contaminated drinking water by the public will continue to exist. If the FRI and appropriate IRMs are not implemented promptly, the plume of contamination will deepen and widen as it travels in a southwesterly direction. This will result in further drinking water contamination and degradation. It is prejudicial to the public interest to delay implementation of the FRI and any appropriate IRMs.

NOW, THEREFORE, pursuant to the provisions of 27-1313 of the Environmental Conservation Law ("ECL"), and in view of the foregoing, **I FURTHER FIND THAT:**

I. The hazardous waste disposed at and released from the Fulton Avenue (Garden City Park Industrial Area) Site presents a significant threat to human health and the environment because of the adverse impact of contamination from the Fulton Avenue (Garden City Park Industrial Area) Site on drinking water quality in the area of the site. The hazardous waste has contaminated a sole source aquifer. The groundwater which is

now contaminated is the only drinking water source and thus must be remediated and protected.

II. A. The hazardous waste disposed at and released from the Fulton Avenue (Garden City Park Industrial Area) Site has already damaged the environment by contaminating a drinking water supply. This poses a risk to human health and the environment. During 1993 alone, about 4 billion gallons of contaminated groundwater were treated in order to make them potable.

B. The hazardous waste disposed at and released from the Fulton Avenue (Garden City Park Industrial Area) Site also presents an imminent danger of causing irreversible or irreparable damage to the environment in that there is a high likelihood of further contamination of drinking water supplies as the plume migrates. Conditions giving rise to the danger are present at any given moment and are continuously capable of causing serious harm.

III. The existing damage to drinking water supplies and the imminent threat of additional losses of uncontaminated drinking water supplies attributable to the hazardous waste disposed at and released from the Fulton Avenue (Garden City Park Industrial Area) Site, and the need for action to address damage already suffered and to avert further damage make it prejudicial to the public interest to delay action until a hearing can be held in which potentially responsible parties could defend against assertions of liability. The administrative and judicial adjudicatory process to be pursued under ECL 27-1313.4 would so dramatically delay the process of an FRI and any appropriate IRM(s) that the public interest in preserving and utilizing an uncontaminated drinking water supply would suffer significantly since during the pendency of such process, the contamination would spread and the public would continue to utilize a contaminated drinking water source that must be treated as a condition precedent to safe consumption.

Dated: November 1, 1994

Albany, N.Y.

Langdon Marsh
Commissioner
New York State Department of
Environmental Conservation