Black and Decker (U.S.), Inc.

Environmental Investigation Report
Black and Decker, Incorporated
Hampstead, Maryland Facility

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ENVIRONMENTAL INVESTIGATION REPORT
BLACK AND DECKER, INCORPORATED
HAMPSTEAD, MARYLAND FACILITY

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EXECUTIVE SUMMARY

Black and Decker, Inc. (Black & Decker) retained Roy F. Weston, Inc. (WESTON) to conduct an environmental investigation of Black & Decker's Hampstead, Maryland facility. The study was initiated as a result of the detection of chlorinated hydrocarbons in the groundwater at the plant site.

WESTON's objectives in the investigation were to:

- Identify sources or potential sources of groundwater contamination on-site.
- Delineate the nature and extent of potential contamination on-site.
- Characterize possible routes of chlorinated hydrocarbon migration.
- Develop recommendations based on the available data.

POTENTIAL SOURCE AREA CHARACTERIZATION

Using a variety of nonintrusive and intrusive investigation techniques, the Phase I Source Area identification program efficiently achieved the objective of identifying which of the potential source areas could represent significant current sources of groundwater contaminants. Follow-up sampling was conducted on selected areas during Phase II to further define suspected source areas.

Storage Tank Areas (Zone A)

Of the three storage tank areas, the aboveground storage tank area does not appear to be a current source area. Soils in the other two areas, underground Tank Farms 1 and 2, appear to contain localized "hot spots" of both total petroleum hydrocarbons (TPH) and volatile organic compounds (VOCs). The VOCs are present mainly in soils with elevated TPH concentrations.

Tank Farm 1

Soils in the tank farm area contain TPH, toluene, ethyl benzene, and xylene in limited horizons. A comparison of the nearby groundwater quality and the Toxicity Characteristic Leaching Procedure (TCLP) leachate concentrations against proposed draft Federal drinking water standards indicates that these compounds are present below levels that have or would significantly impact groundwater quality.

Tank Farm 2

Soils in this tank farm area contain primarily TPH, PCE, and TCE in limited horizons. A comparison of the nearby groundwater quality and the TCLP leachate concentrations against Federal drinking water standards indicates that these compounds may be present at sufficiently high concentrations to impact groundwater quality. Although the potential future groundwater impacts were not quantified (i.e., using leachate generation rates, lateral groundwater flow rates, and transport characteristics), the available data indicate that soil remediation is appropriate for Tank Farm 2.

Other Potential Source Areas

The evaluation of other potential source areas generally indicates that, although previous source inputs cannot be precluded, the following areas are not current sources of PCE and TCE to the groundwater:

- Fill site near seep area (Zone B).
- Potential heat treating residues disposal areas (Zone C).
- Product (tool) disposal area (Zone D).
- Corner of Buildings 5 and 6 (Zone E).
- Past potential burn area (Zone F).
- Lagoon area (Zone G).

The overall groundwater flow and VOC distribution characterization indicate that Tank Farm 2 may not have been the only, nor the principal, source of PCE and TCE in the groundwater. More likely, historical use of solvents at the Hampstead facility may have contributed to the current quality of groundwater onsite. The current distribution of TCE and PCE probably reflects the migration of a plume or plumes of these contaminants from a source or sources, no longer existing, along pathways of preferred shallow and deep groundwater flow.

GROUNDWATER CONTAMINANT/MIGRATION CHARACTERIZATION

The investigation has confirmed that the principal direction of groundwater movement is to the south-southwest. An additional component of flow to the east has been identified in the northeastern edge of the facility. Groundwater migration pathways in the bedrock are expected to be preferentially oriented along fracture zones and schistosity planes. Shallow groundwater flow

appears to be perpendicular to the hydraulic gradient, which corresponds generally with surface topography. Preferred flow pathways within the saprolite may partially reflect trends in the underlying bedrock.

Characterization of the VOC distribution in the groundwater indicates that essentially separate plumes of TCE and PCE exist on the eastern half and western half of the facility, respectively. The TCE plume appears to extend south from an origin near the aboveground storage tank area. Eastern components of flow in this area suggest that a small portion of the groundwater that contains TCE may be migrating toward Route 30. The PCE plume, with highest concentrations at production well 7, encompasses the western half of the facility. Evidence suggests that groundwater containing PCE is generally moving toward the southwest.

RECOMMENDATIONS

Tank Farm Soils

Based on field and soil-water partition data for Tank Farm 2 and the concentration of groundwater contaminants in RFW-8, remediation of the Tank Farm 2 soils is recommended to minimize the future migration of contaminants to the groundwater.

Groundwater

Based on the distribution of PCE and TCE in the groundwater on-site and groundwater flow directions, a groundwater remediation plan is recommended. The proposed plan incorporates the pumping of several recovery wells to create a hydraulic barrier to contaminated groundwater flow along the northeast and southwest property boundaries. The remedial plan is designed to recover contaminated groundwater on-site and prevent migration of contaminants off-site and to result in eventual restoration of the aquifer.

SECTION 1

INTRODUCTION

Black and Decker, Inc. (Black & Decker) retained Roy F. Weston, Inc. (WESTON) in 1987 to conduct an environmental investigation of Black & Decker's Hampstead, Maryland facility. The study was initiated as a result of the detection of chlorinated hydrocarbons in the groundwater at the plant site.

WESTON's objectives in the investigation were to:

- Identify sources or potential sources of groundwater contamination on-site.
- Delineate the nature and extent of potential contamination on-site.
- Characterize possible routes of chlorinated hydrocarbon migration.
- Develop recommendations based on the available data.

WESTON's investigation at the plant was approached in two phases. The first phase, conducted in November and December 1987, utilized soil-gas sampling, geophysical surveying, test pit excavations, soil borings, lagoon water and sediment sampling, and groundwater sampling in an effort to identify sources or potential sources of the constituents found in the groundwater. Data collected during this phase were evaluated and the resultant conclusions were incorporated in the design of the second phase.

Phase II of the investigation, conducted in June, July and December 1988, involved supplemental monitor well installation, additional soil borings, and groundwater and soil sampling and analysis. These activities aided in further definition of the extent of contamination of the on-site soil and groundwater, characterized routes of migration and provided preliminary data to be considered in developing remedial alternatives.

This report provides a comprehensive description of both Phase I and Phase II field activities, discusses the results of the data analysis, and includes recommendations for further action at the Black & Decker site.

SECTION 2

BACKGROUND

2.1 SITE DESCRIPTION

The Black & Decker facility is located in Hampstead, Maryland in northeastern Carroll County, approximately 35 miles north of Baltimore (Figure 2-1). The plant is situated on 150 acres of Black & Decker property in a predominantly rural setting. The population center of Hampstead is approximately 0.8 mile north of the plant along Hanover Road, State Route 30.

As shown in Figure 2-2, centrally located on the plant site is a large building, which serves as the center of operations. On the northwest side of this building are several single story buildings, which are used for the maintenance of plant operations. Five water supply wells line the northwest boundary of the site. A gravel road provides access to the wooded area surrounding the well houses. This road continues along the western boundary and connects with a paved road, leading to the wastewater treatment facility and lagoons on the south end of the property.

2.2 SITE ACTIVITIES

The original Black & Decker facility on the property was built in 1952 for the manufacture of power hand tools. There have been additions to the main building and construction of several ancillary buildings on-site since 1952. The main building is actually a composite of several buildings constructed in phases during the plant's operation. Various areas within the composite building have been designated Buildings 1 through 6.

Beginning in 1983, the focus of plant activities was gradually changed from manufacturing to distribution. The transformation was officially completed in July 1987; currently, the Hampstead facility serves as Black & Decker's principal distribution center on the East Coast. Subordinate activities still conducted on-site include manufacturing gears from powdered metal, heat treatment of the gears, and cleaning and treatment of power tool accessories for rust prevention.

Based on the recollections of current employees, several areas on the property were believed to be used for disposal of debris and off-specification tool products during the history of manufacturing operations. These materials were believed to be relatively inert. In addition, the manufacturing processes utilized numerous solvents and oils, which were stored in on-site aboveground and belowground tanks. The use of these materials has largely been discontinued with the change in emphasis at the

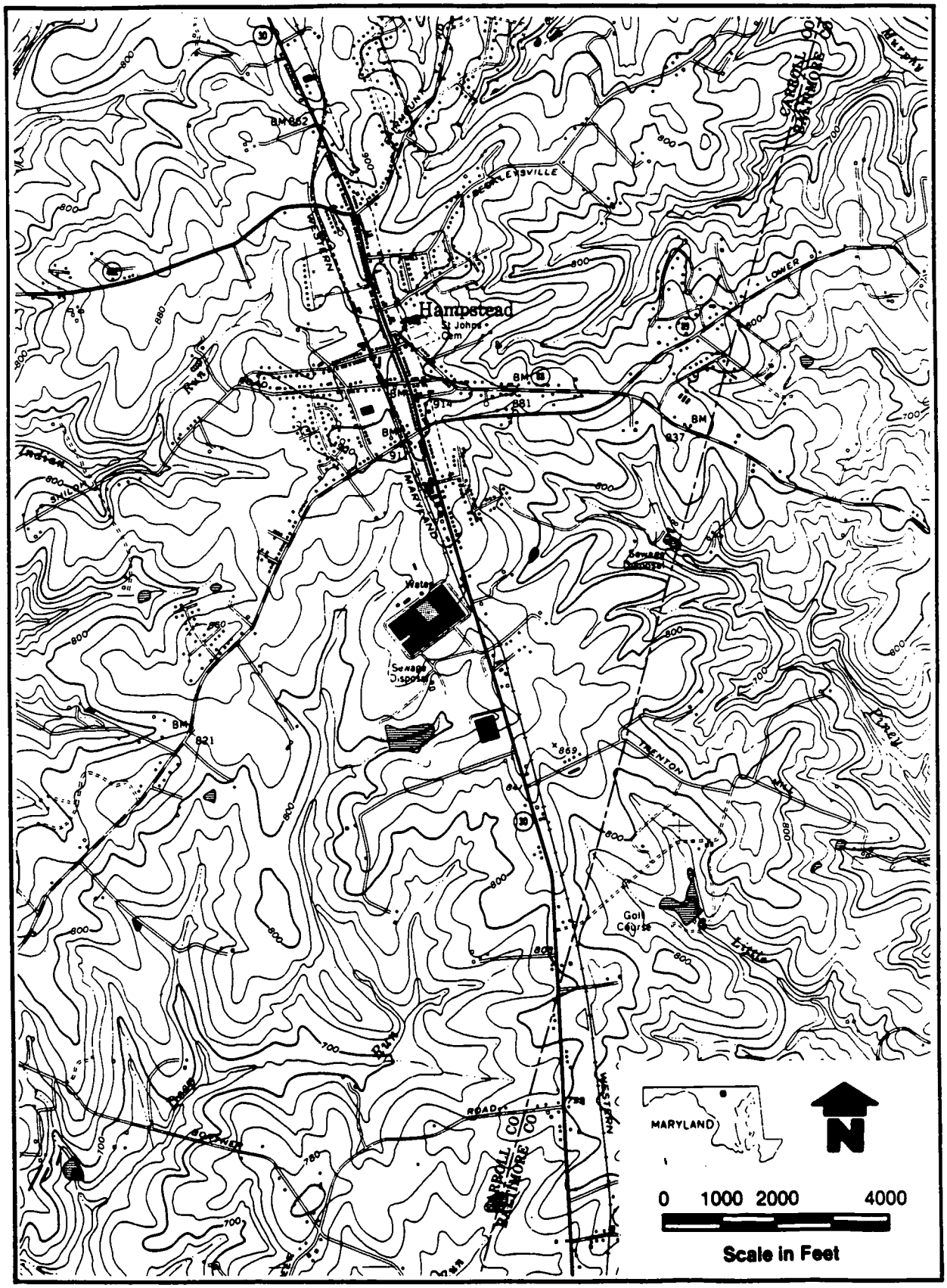

FIGURE 2-1 TOPOGRAPHIC MAP OF BLACK & DECKER PLANT, HAMPSTEAD, MD AND VICINITY

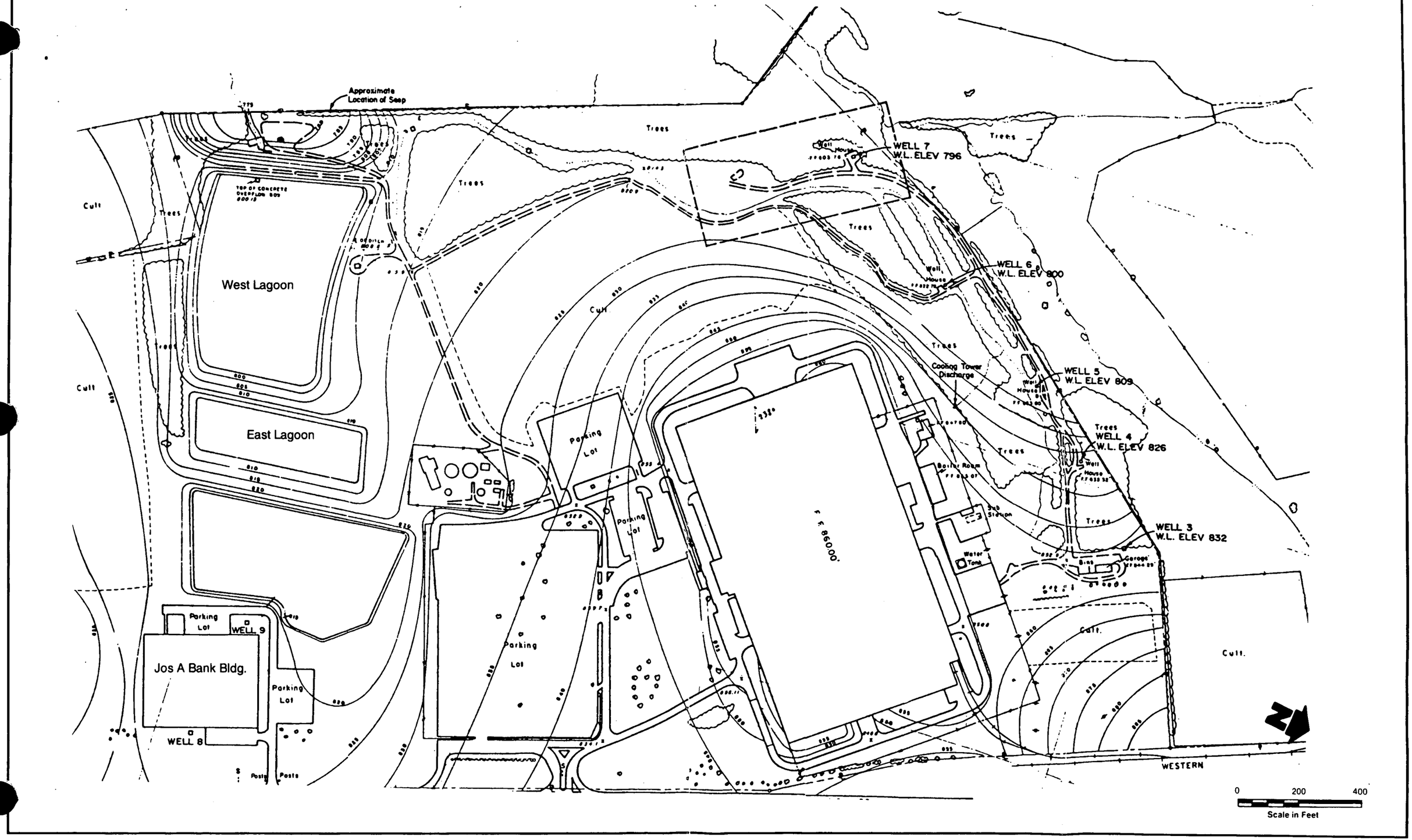

FIGURE 2-2 SITE MAP OF BLACK & DECKER FACILITY, HAMPSTEAD, MD

facility from manufacturing to distribution. All of the underground storage tanks have since been excavated, cleaned, and filled with sand.

Since 1978, the two lagoons on-site have been used by the facility for wastewater treatment. The smaller East Lagoon is used as a holding pond for the boiler blow-down water and for the effluent of the biotreatment plant. This water is, in turn, treated in the chemical treatment plant and discharged to the larger West Lagoon or "process lake." A portion of the water from the West Lagoon is recycled for use as noncontact cooling water and the excess discharged to a small stream west of the site via a NPDES permitted outfall.

In April 1984, as part of an effort to determine the impact of a gasoline spill at the Hampstead Exxon Service Station, water samples of supply wells at the Hampstead Black & Decker facility were analyzed by Carroll County officials for volatile organic compounds (VOCs). As a result of the detection of chlorinated hydrocarbons in the samples (particularly trichloroethene and tetrachloroethene), an environmental investigation was initiated by Black & Decker in conjunction with the then Maryland Department of Health and Mental Hygiene. Initial activity involved a preliminary characterization of the potential sources of the chlorinated hydrocarbons, which may have been related to past activities at the plant site. Since beginning the study, Black & Decker has provided for groundwater remediation through the use of an air stripping unit to remove moderate concentrations of VOCs from groundwater at the plant site.

2.3 ENVIRONMENTAL SETTING

2.3.1 Physiography

The plant site lies within the eastern division of the Piedmont physiographic province, which is characterized by moderate relief, gentle slopes, and rounded hills (Meyer, 1958). The climate in the Hampstead area is considered humid temperate; the average rainfall is 44 inches, and the average annual temperature is 53°F (Duigon, 1981).

As shown in Figure 2-1, the Black & Decker plant is situated on a N35°E trending ridge, which is an extension of a topographic high to the north on which the town of Hampstead lies. One hundred feet of relief (a 2° to 4° slope) separates the main building from a small stream, which follows the western perimeter of the plant site and drains south to Deep Run.

As shown in Figure 2-1, on the southeastern portion of the facility, the land surface slopes gently toward the lagoons. Storm drainage in this area is directed toward these lagoons and regionally toward Deep Run. In a small portion of the facility adjacent to the main building along the eastern

perimeter of the site, the land surface slopes gradually to the east-northeast. Surface drainage in this area is directed east toward Piney Run.

2.3.2 Geology

As in most of eastern Carroll County, an indeterminate thickness of the albite-chlorite schist facies of the Wissahickon Formation underlies the Black & Decker property. This facies consists principally of tightly folded albite schist or phyllite interbedded with layers of chlorite and or muscovite schist. Cream to yellow, vitreous, micaceous quartzite veins are frequently injected along the planes of foliation.

Thin quartzite beds (<5 feet thick) are interbedded with the phyllite near the base of the formation. As is common in the Piedmont, the Wissahickon bedrock underlying the property has been highly deformed and fractured. Zones of intense fracturing may have surface expression as valleys or draws, or as other linear topographic features. Meyer (1958) reports that the strike of schistosity on the plant grounds ranges from N35°E to N46°E.

Chemical weathering has produced a 25- to 80-foot thickness of weathered schist or saprolite overlying the crystalline bedrock on-site. The saprolite grades from a micaceous, clayey reddish-brown silt at shallow depths to a medium soft, greyish-brown, slightly weathered schist/phyllite near the interface with competent bedrock. Residual quartz veins are encountered throughout the saprolite.

2.3.3 Hydrogeology

In the Hampstead area, groundwater occurs chiefly in the tension joints, fractures, and shear zones in the Wissahickon Schist, in the pore spaces of the overlying saprolite, and in fractured quartz veins. Recharge to the bedrock fractures is principally from the downward percolation of water stored in the saprolite (Meyer, 1958). Groundwater flow in the bedrock may follow preferred directions as dictated by the strike of schist foliation or principal direction of jointing. Shallow groundwater flow is generally perpendicular to the hydraulic gradient, which corresponds generally with surface topography. Preferred flow pathways within the saprolite may partially reflect trends in the underlying bedrock.

The large areal extent and moderately good water-bearing properties have made the albite-chlorite facies an important aquifer in Carroll County. A high percentage of domestic and farm water wells and several municipal and industrial supply wells tap fractures in this unit at an average depth of 100 feet. The yields of these wells average approximately 16 gpm with an average specific capacity of 1.5 gpm per foot of drawdown (Meyer, 1958).

The supply wells at Black & Decker exceed the reported area averages for the bedrock aquifer. Well records for August 1988 indicate an average yield of 32 gpm and a range of specific capacities from 0.8 to 2.8 gpm per foot of drawdown for the five wells used by the plant. Step-drawdown tests conducted by the Maryland Geological Survey in 1954 on Black & Decker supply well 3 yielded an average coefficient of transmissivity and a storage coefficient for the bedrock aquifer as 5,000 gpd per foot and 0.03, respectively. A decrease in pumping levels with increased pumping rate during the test indicates that bedrock permeability decreases with depth (Meyer, 1958).