Web: www.witpress.com Email witpress@witpress.com
Paper from: *Brownfield Sites*, CA Brebbia, D Almorza & H Klapperich (Editors).
ISBN 1-85312-918-6

City of Hopewell, Virginia – learning to deal with its industrial legacy

E. Bogdan
Earth Tech, Inc., USA

Abstract

The City of Hopewell is a perfect example of an American "Brownfields community." E. I. DuPont de Nemours purchased 1,800 acres along the James River in 1915 for the production of gunpowder. Over 25,000 employees aided in the manufacture of munitions for World War I. That plant was one of the first of many to be located in Hopewell, a community isolated from Virginia's capitol, Richmond. Unbridled growth and virtually unregulated chemical waste disposal led to contamination of Hopewell's air, water, and soil.

Many industrial properties in Hopewell now lay "idle, abandoned, or underutilized." Most are either contaminated or have been affected by nearby contamination. The resultant blight and threat to human health and the environment have thwarted past community redevelopment efforts.

The City of Hopewell has now tied its future directly to the cleanup and redevelopment of the Exeter property, located in close proximity to downtown, and within view of the old DuPont property. Cleanup will lead to reuse as an area shopping mall, but more significantly will foster refurbishment of Hopewell's downtown area and future cleanup and redevelopment of other nearby industrial "Brownfields" properties. Hopewell is looking to its industrial past for the promise of its economic future.

1 Introduction

Hopewell's 20th century industrial history makes it a perfect 21st century candidate for the designation "Brownfields community." To date, 15% of the city's 11.3 square miles has been targeted for Brownfields redevelopment. The Exeter property is the first of many such properties projected to be remediated,

Paper from: *Brownfield Sites*, CA Brebbia, D Almorza & H Klapperich (Editors).
ISBN 1-85312-918-6

redeveloped, and returned to the city's tax base. Successful redevelopment of Exeter will provide the needed impetus for the conversion of Hopewell's industrial legacy into a modern, community-wide revitalization program.

Hopewell did not incorporate until 1916, but its forbears date back to 1613 when Governor Thomas Dale began a settlement at Charles City Point, near the confluence of the James and Appomattox Rivers. The Reverend Patrick Copeland opened the doors to America's first free public school nearby in 1621. In 1622, however, the settlement was nearly destroyed in an attack. Fortunately, the ship "Hopewell" arrived from Jamestown with 70 men in time to drive off the Native American invaders and rescue the survivors. King Charles rewarded the ship's captain, Francis Eppes, with a large tract of land that he named "Hopewell Farms."

Both the James and Appomattox Rivers were significant sources of water transport (with City Point at their confluence) during the 19th century. City Point (the future Hopewell) served as the deepwater port for the cities of Petersburg and Richmond prior to the Civil War. In 1884 the United States Congress authorized improvement of the James River up to City Point. Shipping and trade were thus added to the city's predominantly agricultural base.

Hopewell and its immediate surroundings remained predominantly rural through the remainder of the 19th century, lying outside of the influence of Richmond and Petersburg. Commercialization and industrialization had not yet taken hold, leaving the environment relatively unscarred. With the advent of the 20th century, however, Hopewell's environment was to be affected dramatically, as were scores of other communities throughout the United States.

One century later, the once pristine environment has become a community burdened with heavily contaminated properties, an ailing downtown, and an eroding economic base. The Exeter property lies within an industrial corridor with many other idle, abandoned, or underutilized sites. Examining the city's 100-year path toward becoming a Brownfields community will help us understand the process chosen for transformation of Hopewell from a locality in decline into a revitalized and rejuvenated city.

2 Industrialization of Hopewell

Prior to formal incorporation as a city in 1916, Hopewell had, like many other rural communities throughout the United States, become the target of a "policy of isolation" adopted by major manufacturers. Siting criteria for chemical manufacturing facilities during the first three decades of the 20th century specified separation from major population centers, minimizing public and municipal opposition. In 1912, DuPont purchased a portion of Hopewell Farms (including the future 43-acre Exeter parcel) to build and operate a dynamite plant. Perhaps of greater significance, DuPont also purchased the rights to pollute neighboring properties. It drew up contracts with adjacent landowners that included disclaimers for property damage caused by the processes used at the plant, beginning decades of unbridled industrial growth and virtually uncontrolled pollution.

Paper from: *Brownfield Sites*, CA Brebbia, D Almorza & H Klapperich (Editors).
ISBN 1-85312-918-6

World War I broke out soon after the dynamite plant began production. DuPont purchased an additional 1,700 acres from Hopewell Farms, converted the small dynamite facility into a 14-unit, 1.5-million pound/day gun cotton plant, and began construction of new mills. City Point's population swelled from 200 to over 30,000 almost overnight. DuPont attempted to accommodate its workers via construction of three nearby housing developments, rentals, and the DuPont Hotel. Similar to scores of other American communities of that era, Hopewell became a company town with "the company store," company housing, company recreation facilities, and a company hospital.

Hopewell's rapid growth vastly exceeded the resources of local law enforcement. An official police department was not established until after the city was incorporated. Corruption of every kind abounded, protected by a so-called "businessman's uplift organization." The city quickly gained a reputation as the "toughest town north of Hell."

The gun cotton facility closed within one month of Armistice in 1919, and the city's population dropped to a level below 1,500 within one year. The people were gone, but the impacts from uncontrolled contamination remained. For example, scores of munitions casings and associated debris were discovered on the Exeter property during Earth Tech's site investigation in 2001.

Industrialization of Hopewell continued immediately after the war. Tubize Artificial Silk Company began construction of its textile building on the western sector of the site in 1920 and began operations with over 3,000 employees shortly afterward. Other companies operating manufacturing facilities in the city during the 1920s included Hummel Ross Fiber, Hopewell Insulation & Mfg., Special Products, Hopewell Sheet Metal Works, Imperial Bagging, Hopewell Trunk & Bag, Allied Chemical & Dye, and Hercules Powder. All opened virtually without restrictions on discharges to adjoining water bodies, exhausts to the atmosphere, or disposal on land.

Tubize Artificial Silk Company vacated the site in 1935, leaving it abandoned until 1946 when the Celanese Corporation became the new tenant. Firestone Fibers & Textiles purchased the property in 1965 for the production of polyester fibers for use in tires. The property was purchased by Perry Realty in 1983, subsequently by Exeter in 1985, and has been abandoned ever since. Other industrial properties throughout the city likewise have had multiple tenants and have been subjected to environmental neglect.

3 Superfund action – 1991

The United States Environmental Protection Agency (USEPA) was formed in 1969 as a result of heightened public environmental awareness and activism. It took another 11 years for the U.S. Congress to enact the Comprehensive Response Compensation Liability Act, otherwise known as CERCLA or Superfund. Finally in 1980, a federal trust fund was established for the cleanup of contaminated properties.

CERCLA also mandated that responsible parties be held liable for cleanup. Unfortunately, only a handful of significantly contaminated properties were

Paper from: *Brownfield Sites*, CA Brebbia, D Almorza & H Klapperich (Editors).
ISBN 1-85312-918-6

remediated during the 1980s. Most cases were delayed in the courts to determine responsible parties and levels of liability. The 1990s saw more sites remediated as court issues were resolved. It was only as recently as 2001, however, when the U.S. Congress passed and President Bush signed new legislation mitigating the liability issue.

The Exeter property provides a perfect example of century-long environmental degradation. The first evidence of environmental neglect at Exeter came with USEPA's Superfund action in 1991. Fire on the property ravaged portions of the Sawtooth Building and outlying structures. Inspection of the fire damage revealed large quantities of loose asbestos-containing materials (ACM) and exposed polychlorinated biphenyls (PCBs). The potential for airborne dissemination to neighboring properties and to the city's downtown created an imminent threat to human health. The Superfund action was limited to removal of the exposed asbestos and PCBs. Other concerns arising from 70 years of industrial activities on site would not be addressed until 2000, the year the City of Hopewell activated its progressive Brownfields redevelopment program.

4 The Exeter property and Brownfields redevelopment

Many industrial properties along Hopewell's Route 10 corridor lie idle, abandoned, or underutilized. Population figures have been either steady at approximately 20,000 or declining since the 1980s. In 2000 the city administration recognized that past failures at economic revitalization stemmed from several factors:

- Blight and environmental hazards presented by the Exeter property and other properties near the city's central business district;
- Deterioration of the city's central business district;
- Economic deterioration of other properties, including the city's only shopping mall;
- Declining or stagnant residential real estate values; and
- Lack of surrounding employment opportunities to support a population influx.

Perhaps as important, the City of Hopewell's charter prevents the city from annexation of additional land. Its only true hope for economic revitalization is tied to the return of its idle and abandoned industrial properties to the city's tax base. All other properties within its municipal boundaries have been developed.

The Exeter property has become the prime target for renewal because it is located only three blocks from and within view of the central business district. Successful redevelopment of the property will, if the city's approach is proven correct, act as the incubator for rejuvenation of the downtown area and redevelopment of other abandoned industrial properties. Conversion from blight to beautification will instill a renewed civic pride. We will now examine in

Paper from: *Brownfield Sites*, CA Brebbia, D Almorza & H Klapperich (Editors).
ISBN 1-85312-918-6

detail the Exeter property, the contaminants generated, and ongoing remediation operations.

5 Comprehensive site assessment

The City of Hopewell is operating under an "Agreement and Covenant Not to Sue" among USEPA, the city, and a third-party developer. Pursuant to the Agreement, the city is proceeding in good faith to remove all remaining asbestos and demolish all site structures. The city administration had the foresight to allocate millions of dollars from its 2001 budget toward site cleanup, knowing that completion would require additional funds. Entry into the Brownfields arena and receipt of future federal and state grants and loans would be their future ticket to success.

Earth Tech, through the standard competitive bidding process, was awarded the Environmental Consultant and Site Remediation Management contract in July of 2001.

Earth Tech first conducted a comprehensive, but non-intrusive, site assessment. Through prior knowledge of the site's history and the industrial processes conducted on site, the list of known chemical substances was determined to include asbestos, lead and other heavy metals, PCBs, solvents, petroleum products, volatile organic compounds (VOCs), and particulates.

A building-by-building investigation yielded the following observations.

5.1 North Building

This building had been used for shipping and receiving. More than one hundred fluorescent lighting PCB ballasts were identified and tagged for removal. One section with unstable and partially collapsed roofing was targeted for shoring or dismantling. Other environmental/safety concerns included ACM-laden pipe runs and dismantled heating oil tanks.

5.2 Nylon Building

During identification and quantification of ACM for ultimate removal, the Nylon Building was quickly identified as "an accident waiting to happen." Several large storage tanks and vessels had been removed from the five-story building, leaving gaping holes in the steel-plate flooring. Many multi-floor, vertical pipe runs were also removed, leaving smaller trip/fall hazards. One storage room containing several hundred munitions casings, and a nylon synthesis process area containing two boilers marked as a "Radiation Hazard," were isolated pending further investigation.

Rain pouring through the damaged roof for nearly 20 years has left many sections of the steel-plate flooring, some stairwells, and structural steel rust-encrusted and structurally unsound. Broken glass windowpanes and gaping holes in several sections of the building's edifice added to containment and cleanup problems.

Paper from: *Brownfield Sites*, CA Brebbia, D Almorza & H Klapperich (Editors).
ISBN 1-85312-918-6

5.3 Aboveground storage tanks (ASTs)

ASTs located between the Nylon and North Buildings were found to be full or partially full and each required sampling and analysis.

5.4 Cooling towers

Cooling towers located adjacent to the Nylon Building presented both environmental and safety hazards. Significant pooling of rainwater housed within these open-air towers was sampled for chromates and other potential contaminants. Wood-constructed stairwells presented worker safety hazards.

5.5 Oil pump and tank

An oil sheen on puddles of rainwater and a strong odor adjacent to an oil pump and storage tank indicated the existence of volatile organic compounds (VOCs). Samples were taken from the rainwater as well as the storage tank to identify specific VOCs.

5.6 Sawtooth Building

The roof at one of the entrances to the Sawtooth Building had caved in, and associated structural steel had either fallen to the floor or become loose and dangerous. As evidenced by charred remains and other forms of debris, this had also been the site of a fire. During inspection of the roof for ACM, several hundred air conditioning units were found attached to the Sawtooth roof sections. Each unit must be examined for Freon prior to disposal.

5.7 Process drainage

All process lines, equipment drains, condensation lines, and process sumps flowed by gravity into sub-grade drains which, in turn, ultimately drained into on-site lagoons, holding ponds, or subterranean cisterns.

5.8 Elevated exterior/interior pipe runs

Elevated pipe runs, many of them bundled, were found inside most of the structures, adjacent to exterior walls, and between major buildings. Many were covered with ACM thermal insulation. Each run had to be inspected for hazardous chemicals and residuals.

Paper from: *Brownfield Sites*, CA Brebbia, D Almorza & H Klapperich (Editors).
ISBN 1-85312-918-6

5.9 Powerhouse equipment and vent stacks

Oil sheens were observed throughout the Powerhouse that housed several coal-stoked boilers, elevated storage tanks, and vent stacks. One doorway leads to a tunnel that had been used for rail-cart transfer of coal from an on-site railroad terminus.

5.10 Tunnels, cisterns, manholes, and other subterranean storage facilities

Several 1920–1930-vintage process drawings found in the South Building indicated the existence of other sub-grade, on-site tunnels. Ex-Firestone employees confirmed the presence of at least one such tunnel in the Sawtooth Building and a cave-in of a parking area above another suspected tunnel alignment during subsequent interviews.

Due to the obvious potential for contamination and structural instability, the city approved further investigations to determine tunnel alignments, connections to cisterns and other subterranean storage facilities, and the structural stability of concrete platforms above the tunnels.

6 Site preparation

According to the "Agreement and Covenant Not to Sue" with USEPA, the city is required to bring the site to a clean condition, cleared of all environmental liabilities. Soil and groundwater contamination is recognized as a distinct possibility. Investigation of this potential has been postponed until after asbestos removal and demolition activities in order to permit the city to submit an application for Brownfields Assessment Pilot funds. Upon acceptance into the program by USEPA, the city will be able to use some of the federal funds for on-site remedial investigations. Additionally, federal legislation just passed in December of last year opens funding to cleanup activities as well.

The next series of site activities and investigations conducted by Earth Tech targeted confirmation and removal of on-site chemical, physical, and electrical hazards. Elimination of these hazards minimizes the potential for accidents, improves operational logistics, and reduces asbestos removal time requirements and costs.

6.1 Munitions investigation

The munitions casings found in the Nylon Building storage room were individually examined for potential explosive content. Although the contents were determined to be benign, most casings were coated with creosote. All casings were isolated and staged for transportation and disposal (T&D) to an approved and authorized landfill.

Paper from: *Brownfield Sites*, CA Brebbia, D Almorza & H Klapperich (Editors).
ISBN 1-85312-918-6

6.2 Radiation hazard investigation

Nylon Building boilers marked "Radiation Hazard" were examined, and their atmospheres tested for potential radiation. The boilers, their interiors, and immediate environs were all found to be clear of any radioactive contamination.

6.3 Removal/reinforcement of collapsed roofing

The collapsed and unstable sections of roofing in the North and Sawtooth Buildings were cleared or reinforced to facilitate removal and demolition activities.

6.4 Removal of ground-level debris, PCB ballasts, oil burners, and oil drums

Movement on the ground floors of each building was severely restricted by debris and equipment strewn throughout. All forms of asbestos-free debris were cleared and stockpiled in areas isolated from removal activities. All fluorescent lighting PCB ballasts were removed and stockpiled for T&D.

6.5 Marking/isolating manholes, underground storage tanks (USTs), and tunnels

A comprehensive structural stability evaluation was performed within the areas of known and suspected tunnels to maximize safety for future movement of heavy equipment. Ground-penetrating radar (GPR), test borings, and confined space entry investigations were used to locate tunnel alignments, determine depths, ascertain maximum safe working loads, and confirm connections to manholes, cisterns, and other subterranean storage areas.

All manholes, USTs, open pits and lagoons, and confirmed/suspected tunnels were marked and barricaded to maximize worker safety. Specific tunnel sections were inspected for explosive atmospheres and hazardous materials. The Demolition Plan was revised to accommodate safety hazards and other uncertainties posed by the tunnels.

6.6 Clearing and grubbing

These site preparation activities were significant steps essential to making the site safe for asbestos removal and demolition, but clearing and grubbing of the site revealed other hidden hazards. Vegetation overgrown for 20 years had concealed a pump house, additional tunnels and storage lagoons, process discharge mixing basins, on-site soils contamination, and off-site discharges.

Paper from: *Brownfield Sites*, CA Brebbia, D Almorza & H Klapperich (Editors).
ISBN 1-85312-918-6

7 Pre-demolition decontamination

The last steps taken to maximize worker safety were to conduct additional product sampling and analysis and drain and dispose of product considered hazardous within designated work zones. Sediment/soils samples were taken from lagoon discharge sluices, a sump/site discharge, and the contaminated sand pit adjacent to the Powerhouse. Product samples were taken from the newly discovered lagoons and an associated concrete vault. Product and residuals were removed from the oil tank, oil pump, several ASTs, process lines, and exterior pipe chases throughout the property.

Those tunnels identified as devoid of safety or environmental hazards and as logistically preferable have been designated for on-site disposal of concrete and masonry debris. Movement of heavy machinery within and across barricaded areas will be prohibited until the debris is sufficiently compacted, rendering the area structurally stable. This will not only maximize safety, but will also reduce T&D costs.

8 Capitalizing on Hopewell's heritage

Hopewell has been America's prototypical industrial community. The city has been the subject of phenomenal economic growth as well as decline during the 20th century. Industrialization in the early part of that century converted this previously small rural community into a robust but rancorous "company" town. DuPont was the first to produce chemicals and pollute the environment in Hopewell, but many others followed. Now most of those firms are gone, but they have left their contaminants behind. Brownfields has become Hopewell's only veritable avenue toward economic revitalization in the 21st century.

The city has timed redevelopment of the Exeter property to coincide with refurbishment of its downtown business district. Since the two are within eyeshot of one another, successful revitalization of one is directly dependent on the success of the other. Receipt of federal Brownfields funds this fall will permit the city to accomplish some of its immediate goals:

- Completion of the Exeter property soil and groundwater contamination investigation;
- Initiation of site remediation required prior to redevelopment;
- Development of a "Greenbelt" pedestrian linkage between Exeter and the downtown area;
- Screening of other idle/abandoned industrial properties for future inclusion into the Brownfields program; and
- Solicitation of additional funds from other public agencies for future remedial investigations and cleanup.

Meanwhile, the city has hired other consultants to formulate and implement a downtown revitalization program. Refurbishment of building facades, signage, and parking will be only a partial solution. The city will also evaluate alternative

Paper from: *Brownfield Sites*, CA Brebbia, D Almorza & H Klapperich (Editors).
ISBN 1-85312-918-6

methods for developing and maintaining economic compatibility between new downtown merchants and the future Exeter mall.

The City of Hopewell's annual budget is still significantly dependent on revenues received from Hercules, Allied Chemical, and other manufacturers. Hopewell's future lies with its ability to not only retain its remaining industrial base, but also successfully redevelop idle properties and refurbish its downtown. Investment of millions of dollars from its own budget, in addition to future utilization of Brownfields funds, will provide the city with a golden opportunity for conversion of its 20th century industrial legacy into economic prosperity during the 21st century.