BB&S Treated Lumber Corporation

Southampton (T), Suffolk County, New York
Site No. 1-52-123

PROPOSED REMEDIAL ACTION PLAN

September 1999

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) is proposing a remedy to address the significant threat to human health and/or the environment created by the presence of hazardous waste at the BB&S Treated Lumber Corporation, a Class 2 site on the New York State Registry of Inactive Hazardous Waste Disposal Sites. A Class 2 site is one which poses a significant threat to public health or the environment; action is required. On-site pressure-treatment of wood has resulted in the disposal of hazardous waste at the site, namely copper-chromate-arsenate (CCA), a wood preservative solution, some of which was released or has migrated from the site to the upper glacial aquifer, a local drinking water source, and soils in the adjacent Pine Barrens. These disposal activities have resulted in the following significant threats to the public health and/or the environment:

- a significant threat to human health associated with contamination of a drinking water aquifer and contamination of surface soils on and off BB&S property;
- a significant environmental threat associated with the impacts of contaminants to biota in natural areas surrounding the site.

In order to restore the BB&S Treated Lumber Corporation inactive hazardous waste disposal site to predisposal conditions to the extent feasible and authorized by law, but at a minimum to eliminate or mitigate the significant threats to the public health and/or the environment that the hazardous waste disposed at the site has caused, the following remedy is proposed:

- **Extraction and treatment of the groundwater plume.**
- **Solidification/ stabilization and on-site placement of contaminated surface and shallow soils.**

The proposed remedy, discussed in detail in Section 7 of this document, is intended to attain the remediation goals for this site identified in Section 6 of this Proposed Remedial Action Plan (PRAP), in conformity with applicable standards, criteria, and guidance (SCGs).

This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The NYSDEC will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The NYSDEC has issued this PRAP as a component of the citizen participation plan developed pursuant to the New York State Environmental Conservation Law (ECL) and 6 NYCRR Part 375. This document is a summary of the information that can be found in greater detail in the Remedial Investigation (RI), Feasibility Study (FS) and other relevant reports and documents, available at the document repositories.

To better understand the site and the investigations conducted, the public is encouraged to review the project documents at the following repositories:

Westhampton Free Library
7 Library Avenue
Westhampton Beach, NY 11978
(516) 288-3335
Hours: M-Th 9-9; Fri, Sat 9-5; Sun 1-5

NYSDEC Region 1
Bldg. 40, SUNY
Stony Brook, NY 11794
Hours: by appointment - contact Lauren Schmidt at (516) 444-0275

NYSDEC
50 Wolf Road Room 242
Albany, NY 12233-7010
Hours: by appointment - contact Kathleen McCue, Project Manager, at (518) 457-7924

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from **September 7, 1999 to October 8, 1999** to provide an opportunity for public participation in the remedy selection process for this site. A public meeting is scheduled for **September 21, 1999** at the **Eastport High School dining hall, 390 Montauk Highway, Eastport,** beginning at **7:00 p.m.**

At the meeting, the results of the RI/FS will be presented along with a summary of the proposed remedy. After the presentation, a question and answer period will be held, during which you can submit verbal or written comments on the PRAP.

The NYSDEC may modify the preferred alternative or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and responses provided in the Responsiveness Summary section of the Record of Decision. The Record of Decision is the NYSDEC's final selection of the remedy for this site. Written comments may be sent to Ms. McCue at the above address.

SECTION 2: SITE LOCATION AND DESCRIPTION

The BB&S Treated Lumber Corporation, Inactive Hazardous Waste Disposal Site No. 152123, is located in the Town of Southampton in eastern Suffolk County, Long Island. The five-acre site, currently in use as a lumberyard for wholesale and retail lumber distribution, is located on Speonk-Riverhead Road approximately 1.5 miles north of the hamlet of Speonk. The site is found in a rural area considered part of the Pine Barrens, a New York State forest preserve. Figure 1 shows the locale of the site.

There are no residences immediately adjacent to the site, but residences are found within a half-mile radius, including south of the site in the general direction of groundwater flow. All local businesses and residences have private water supplies, obtained primarily from the upper glacial aquifer, a highly transmissive sand and gravel aquifer which is underlain in this region of Long Island by the Gardiners Clay unit at approximately 150 feet below land surface.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The site operated as a lumber treatment and storage facility from the early 1980s. On-site lumber treatment consisted of placing wood in a pressure chamber with a concentrated solution of copper-chromate-arsenate (CCA), and pressurizing the chamber to drive the CCA into the wood. On depressurization, the chamber would be drained into lined sumps, the wood removed and allowed to drip-dry on a large concrete pad (shown on Figure 2). A flameproofing solution containing zinc oxide was also used at the Site for a time to treat wood.

Releases of CCA to groundwater are believed to have occurred through leakage from the collection sumps, and possibly also through malfunction of a supply well valve. Drippings from the concrete pad most likely account for soil contamination noted in its vicinity and perhaps for contamination found in drainageways on site. Higher concentrations of CCA-derived contaminants found on the west side of the road in the Pine Barrens, across from a site drainage culvert, suggest larger surface discharges or spills in the past. Section 4 of this PRAP describes the extent of this contamination, as determined during the RI/FS.

3.2: Remedial History

1985 Site contamination first came to the attention of the Suffolk County Department of Health Services when SCDHS sampled an on-site water supply well and found concentration of chromium of 11,000 ppb, which exceeded the NYS drinking water standard of 50 ppb. Arsenic was also found in the well at 1200 ppb, exceeding the standard of 50 ppb. Further investigation of the site by SCDHS and NYSDEC ensued.

1987 BB&S Treated Lumber Corporation installed a network of seventeen monitoring wells and three extraction (recovery) wells to capture the plume of contaminated groundwater (chromium, copper, and arsenic, with mostly chromium off site). Extracted groundwater was treated on site using reverse osmosis (RO). Treated groundwater was returned to the aquifer by means of an on-site infiltration gallery. BB&S' pump-and-treat system, using RO, continued until 1995.

1990 It had become evident to NYSDEC that the RO system was failing to treat groundwater adequately due to operational problems. The Department notified BB&S of violations of State Pollutant Discharge Elimination System (SPDES) discharge limitations.

1993 NYSDEC designated the site a Class 2 site on the NYS Registry of Inactive Hazardous Waste Disposal Sites. NYSDEC began negotiations with BB&S to enter into an Order on Consent for a Remedial Investigation/ Feasibility Study (RI/FS).

1995 On refusal of BB&S to conduct an RI/FS, NYSDEC began the RI/FS under the State Superfund. The Department revoked the SPDES permit for the RO treatment system; BB&S ceased pumping and treating the plume.

1996 BB&S ceased pressure-treatment of wood at the site. SCDHS sampled residential wells south of the site to Old Country Road; no exceedances of standards were noted for chromium or arsenic. Levels of copper or lead found in some of the wells were attributed to pipe or solder materials in home plumbing.

1998 Again, SCDHS sampled private water supply wells south of the site, and no exceedances of standards were found for chromium or arsenic. Copper was found in some wells due to home plumbing, as previously noted.

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the site and to evaluate alternatives to address the significant threat to human health and the environment posed by the presence of hazardous waste, the NYSDEC has recently conducted a Remedial Investigation/ Feasibility Study (RI/FS).

4.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site.

The RI was conducted in two phases. The first phase of field work was conducted between March 1996 and August 1996, and the second phase between February 1997 and November 1997. A report entitled "Remedial Investigation Report: BB&S Treated Lumber Site, Speonk, New York" (June 1998) has been prepared which describes the field activities and findings of the RI in detail. In addition, soil sampling was conducted during the FS, in September 1998, to more precisely define areas of contamination identified in the RI.

The RI included the following activities:

- *Installation of soil borings and temporary monitoring wells for analysis of subsurface soils and groundwater as well as physical properties of soil and hydrogeologic conditions.*

- *Surface and shallow soil sampling to determine the extent of shallow soil contamination on and off site.*

- *An engineering evaluation of the existing RO system and pumping well network to determine whether they could comprise a portion of the final remedy.*

To determine which media (soil, groundwater, etc.) contain contamination at levels of concern, the RI analytical data were compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater and drinking water SCGs identified for the BB&S Treated Lumber Corporation site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of the NYS Sanitary Code. For soils, NYSDEC TAGM 4046 provides soil cleanup objectives (SCOs) for the protection of groundwater, background conditions, and health-based exposure scenarios. Site-specific soil cleanup goals are further discussed in Section 6.

Based on the RI results, in comparison to the SCGs and relative to potential public health and environmental exposure routes, soil and groundwater at the site require remediation. These are summarized below. More complete information can be found in the RI report.

Chemical concentrations are reported in parts per billion (ppb) and parts per million (ppm). For comparison purposes, where applicable, SCGs are provided for each medium.

4.1.1 Nature of Contamination:

As described in the RI report, many soil and groundwater samples were collected at the Site to characterize the nature and extent of contamination. The category of contaminants which exceed their SCGs is the inorganics, specifically metals. The primary inorganic contaminants of concern are chromium (in both the hexavalent and trivalent forms) and arsenic. Copper was often found above its SCG in soil where arsenic and chromium were found. Zinc is also found in soil above its SCG, but to a lesser extent throughout the site. Copper and zinc were infrequently noted in groundwater above SCGs.

4.1.2 Extent of Contamination

Table 1 summarizes the extent of contamination for the contaminants of concern in groundwater and soils and compares the data with the SCGs for the Site. The following are the media which were investigated and a summary of the findings of the investigation.

Soil

Surface samples (zero to three-inch depth) and subsurface soil samples (up to three-foot depth, and at select locations to 37 feet) uncovered soil contamination throughout the lumber yard, along Speonk-Riverhead Road, and in the "tributary", an off-site drainageway for surface water leading approximately 200 feet into the undeveloped, forested land west of the road. Chromium (as total chromium) was found in concentrations up to 284 ppm on site, within the fenced lumberyard, and in the off-site "tributary" area up to 845 ppm [the soil cleanup objective (SCO) is 50 ppm]. Arsenic was found up to 169 ppm on site and in the tributary up to 591 ppm (SCO is 7.5 ppm). Soil contamination was also found offsite immediately to the east of the lumberyard, in the "windrow" area.

Groundwater

Groundwater on site in the vicinity of the former wood treatment building is contaminated predominantly with hexavalent chromium in excess of SCGs (the groundwater standards are 25 ppb for arsenic and 50 ppb for chromium). The approximate limits of the plume in the vicinity of the site are depicted on Figure 2. Most sampling was conducted, and results show, contamination to exist at or near the water table (in a depth range from 38 to 70 feet below land surface). Concentrations of chromium near the building were found up to 10,810 ppb in recovery well RW-2. Arsenic was also noted in on-site groundwater, up to 571 ppb in well RW-1, but diminished rapidly to non-detect levels in most off-site wells. The monitoring well farthest south and downgradient of the site, MW-14, has shown chromium concentrations up to 416 ppb, which exceeds the SCG of 50 ppb. The plume extends to the south of the former wood-treatment building at least 1500 feet. Further well installation and groundwater sampling will be conducted during the remedial design to determine the areal and vertical extent of the plume.

The nearest residential well is approximately 600 feet from the site, but not considered directly downgradient. The most recent residential well sampling and analysis by the SCDHS did not find any wells contaminated above SCGs, but the direction of the plume indicates a possible future impact to water supplies if the groundwater is not remediated.

4.2 Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 6.0 of the RI report.

An exposure pathway is how an individual may come into contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Pathways which are known to or may exist at the site include:

- ingestion of soils or dusts on and off site; ingestion of groundwater.

- inhalation of dust from on- and off-site soils.

- direct contact with contaminated soils or groundwater.

4.3 Summary of Environmental Impacts:

This section summarizes the types of environmental impacts which may be presented by the site. The Fish and Wildlife Impact Assessment included in the RI presents a more detailed discussion of the potential impacts from the site to fish and wildlife resources. The following pathways for ecological exposure have been identified:

- ingestion of soils or dusts on BB&S property or in off-site contaminated areas.

- absorption of contaminants into plant roots and/or animal ingestion of contaminated plants.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The Potential Responsible Parties (PRP) for the site, documented to date, include the BB&S Treated Lumber Corporation and related individuals and business entities.

The PRPs declined to implement the RI/FS at the site when requested by the NYSDEC. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the NYSDEC will evaluate the site for further action under the State Superfund program. The PRPs are subject to legal actions by the State for recovery of all response costs the State has incurred.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all Standards, Criteria and Guidance (SCGs) and be protective of human health and the environment. At a minimum, the remedy selected should eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- *Eliminate, to the extent practicable, ingestion of groundwater affected by the site that does not attain NYSDOH Part 5 Drinking Water Standards.*

- *Eliminate, to the extent practicable, off-site migration of groundwater that does not attain NYSDEC Class GA Ambient Water Quality Criteria.*

- *Eliminate, to the extent practicable, exposures to workers from shallow contaminated soils on site.*

- *Eliminate, to the extent practicable, exposures to the public from shallow contaminated soils on and off site.*

- *Eliminate, to the extent practicable, the exposure of wildlife to shallow contaminated soils on and off site.*

To these ends at the BB&S Treated Lumber Corporation site, scenarios for remediation of soil and groundwater, the affected media, were developed during the RI/FS. These scenarios are described below:

Soil:

- **Remedial Scenario A.** This scenario looks at cleanup (removal, treatment or containment) of all soils contaminated with arsenic in excess of the default SCO published in TAGM 4046 (7.5 ppm). The existing data indicate that a cleanup based on an arsenic SCO of 7.5 ppm would result in on-site chromium residuals no greater than about 11 ppm (SCO for chromium is 50 ppm). Figure 3 depicts the preliminary areas and average depths of impacted soil under this scenario (to be confirmed through further sampling during remedial design). The preliminary estimated volume of soil to be remediated under Scenario A would be 14,300 cubic yards.

- **Remedial Scenario B.** This soil cleanup scenario is based on cleanup of all soils exceeding the TAGM 4046 SCO for chromium (50 ppm). The pattern of soil results shows that if the chromium soil cleanup objective of 50 ppm is achieved (Clean -Up Scenario B), residual arsenic concentrations would be no greater than about 30 ppm and the quantity of soil to be remediated would be substantially less. Under either scenario the cleanup objectives would be considered protective of public health and the environment. Ensuring that chromium is remediated to the TAGM 4046 objective of 50 ppm is compatible with the proposed plan to address the substantial chromium groundwater plume beneath the site. The arsenic residual of approximately 30 ppm would not impact groundwater, since the form of arsenic in the soil would not readily leach into groundwater. This is confirmed by RI results showing arsenic groundwater contamination only in the vicinity of the CCA spill locations, where arsenic was introduced to the water table in a soluble form.

  Figure 4 depicts the preliminary areas and average depths of impacted soil under this scenario (to be confirmed in remedial design). Some soils have been included in Remedial Scenario B, for example outside the eastern fence line, because the chromium concentration approaches 50 ppm. The preliminary estimate of soil to be remediated under Scenario B would be 5,300 cubic yards.

Both Scenarios A and B would be considered protective of public health and the environment. Moreover, these concentrations would not be inconsistent with cleanup objectives used for arsenic and chromium at other sites. In addition, either of these scenarios would promote removal, in most instances, of copper and zinc in soils to below their TAGM 4046 SCOs. The SCOs for copper and zinc are not health-limited, and RI data do not show these metals to be significant contributors to groundwater contamination at the Site.

Groundwater:

- **On-Site Groundwater Collection/ Treatment Scenario.** This scenario consists of groundwater extraction from the previously-established pumping well locations depicted on Figure 2. These three wells would remove a volume of water (preliminarily determined to be 105 gallons per minute, to be confirmed during remedial design) sufficient to capture the source zone of chromium contamination at and near the site. This extraction well array, however, would not draw in or stop off-site migration of the portion of the plume south of the capture zone of RW-3. Due to the nature of this contaminant and the soils though which it would travel, very little natural attenuation of the off-site plume is expected. Therefore, under this scenario a Contingency Plan would be developed whereby, if monitoring of sentinel wells detected chromium above its SCG near private water supply wells, a fourth extraction well would be installed at the leading edge of the plume to arrest further movement of the contaminant. Water removed from all remedial extraction wells would be pumped back to the site for on-site treatment, as described under the summary of groundwater alternatives in Section 7. Groundwater, after treatment to achieve SCGs, would be reinjected to the aquifer at the site.

- **On- and Off-Site Groundwater Collection/ Treatment Scenario.** This scenario presumes immediate installation of the fourth off-site well described previously at the leading edge of the plume, to be determined through an off-site groundwater investigation during the remedial design. All four collection wells would be piped back to the site for on-site treatment of groundwater and reinjection to the aquifer. The preliminary estimate of the volume of groundwater that must be collected to achieve this scenario is 135 gallons per minute, to be confirmed in remedial design.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

Potential remedial alternatives for the BB&S Treated Lumber Corporation site were identified, screened and evaluated in the report entitled "Engineering Feasibility Study, BB&S Treated Lumber Site" (August 1999).

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to design and implement the remedy, and does not include the time required to procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy. With the exception of the No-Action Alternative, alternatives are presented separately for the media of soil and groundwater.

7.1: Description of Alternatives

The potential remedies are intended to address the contaminated soils and groundwater at the site. A complete remedy for this site would consist of one alternative for soil combined with one alternative for groundwater. In this section of the PRAP, soil alternatives are compared to one another and groundwater alternatives are compared to one another, to select the best alternative for each contaminated medium.

7.1.1 No-Action Alternative

The no-action alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

At BB&S, the no-action alternative would include implementing deed or use restrictions, where legally possible, both on and off site to limit exposures to soil and groundwater. The fence around the BB&S lumber yard would be repaired and maintained. New sentinel wells would be installed off-site to detect movement of the plume toward private water supplies, and monitored regularly, in addition to on-site wells.

7.1.2 Alternatives for Soil

Asphalt Cover On Site and Disposal of Off-Site Soils

Under this alternative, the areas of affected soil within the fenced lumberyard would be paved with asphalt to prevent future contact. Impacted soils outside the fence would be excavated and transported to a licensed off-site facility for treatment and disposal. All excavated areas would be backfilled with clean soil and reseeded. Under either Scenario A or B, the area of impacted soil discussed on page 7 and shown on Figure 3 (Scenario A) would be paved (essentially, the entire active working area of the lumberyard). It would be impractical to pave and maintain small, disconnected soil contamination areas exceeding the soil action levels under Scenario B, as shown on Figure 4. The asphalt cover on site would be sloped to drain to dry wells. The annual O&M cost pertains to yearly maintenance of the cover.

Scenario A:

Present Worth:	$2,153,400
Capital Cost:	$2,075,400
Annual O&M:	$5,100
Time to Implement	11 months

Scenario B:

Present Worth:	$2,078,100
Capital Cost:	$2,000,100
Annual O&M:	$5,100
Time to Implement	11 months

In-Situ Treatment by Solidification/ Stabilization

This alternative would consist of treating impacted soils at and around the site through the technology of solidification/ stabilization (S/S). This soil treatment is performed by mixing the soils with binding reagents (e.g., polymers or cement) to render the contaminants non-leachable. Solidification/ stabilization is especially appropriate for soils contaminated by metals and other inorganic contaminants which cannot be destroyed through chemical reaction or incineration. The exact binding reagents would be determined in a treatability study during the remedial design, and would be developed specifically for the soil matrix and contaminants at this site.

The in-situ S/S alternative would involve excavating and moving all impacted soils outside the fenced lumber yard to a treatment pit inside the fence. Soils in the treatment pit and on-site soils to be remediated would be mixed in the ground (using tilling equipment) with the S/S reagents and water. After testing to determine that the solidified/stabilized soils are not leaching contaminants, they would be covered in place with topsoil. Excavated off-site areas would be backfilled with clean soil and reseeded to prevent erosion.

Scenario A:

Present Worth:	$1,133,100
Capital Cost:	$1,133,100
Annual O&M:	$ 0
Time to Implement	10 months

Scenario B:

Present Worth:	$705,100
Capital Cost:	$705,100
Annual O&M:	$ 0
Time to Implement	10 months

In-Situ Electrokinetic Remediation

This alternative would utilize an emerging, proprietary technology to remove the metallic contaminants from soils on and off site without having to excavate them. Electrodes would be placed in the ground in the impacted zones and current passed through the soil, while moisture and pH are maintained at appropriate levels through irrigation, as necessary. Metallic contaminants would migrate toward the electrodes, where they would be retained by a membrane and could be concentrated for disposal.

Naturally-occurring, beneficial metals would be returned to the soil. This technology, compared to other soil treatments, would not significantly alter soil properties. Excavation would only be necessary to consolidate very shallow contaminated areas (six-inch depths on Figures 3 and 4) for treatment, after which the soils could be replaced.

Scenario A:

Present Worth:	$3,029,200
Capital Cost:	$3,029,200
Annual O&M:	$ 0
Time to Implement	24 months

Scenario B:

Present Worth:	$2,214,000
Capital Cost:	$2,214,000
Annual O&M:	$ 0
Time to Implement	18 months

Ex-Situ Treatment by Solidification/ Stabilization and On-Site Disposal

This alternative would utilize the same technology described previously for in-situ S/S, but instead of blending S/S reagents with the soils in the ground, all on- and off-site soils to be remediated would be excavated, brought to an on-site staging and treatment area and blended with the reagent in a temporary mixing plant. All excavated areas would be backfilled with clean soil and reseeded. The solidified soils would be placed on-site (in an unused portion of the lumberyard) and covered with six inches of clean soil to protect them from future disturbance. There would be increased site disturbance during soil excavation and treatment and a greater need to control contaminant dusts; however, it would be easier to ensure thorough blending of soil and S/S reagents, which is critical to the effectiveness of this treatment. Leach testing would be performed on treated soil to ensure the contaminants are stabilized and will not migrate through leaching.

Scenario A:

Present Worth:	$1,289,800
Capital Cost:	$1,289,800
Annual O&M:	$ 0
Time to Implement	14 months

Scenario B:

Present Worth:	$741,700
Capital Cost:	$741,700
Annual O&M:	$ 0
Time to Implement	13 months

Ex-Situ Treatment by Soil Washing and On-Site Disposal

Soil washing would involve excavation of impacted soils on and off site, and mixing soils in a treatment mill with water and leaching agents or surfactants to remove contaminants. A treatability study would be conducted during remedial design to find the appropriate washing reagents for site soils. Treated soils would be placed in an on-site disposal pit and covered with topsoil. All excavated areas would be backfilled with clean soil and reseeded.

Scenario A:

Present Worth:	$ 4,791,600
Capital Cost:	$ 4,791,600
Annual O&M:	$ 0
Time to Implement	16 months

Scenario B:

Present Worth:	$ 1,950,000
Capital Cost:	$ 1,950,000
Annual O&M:	$ 0
Time to Implement	14 months

Off-Site Treatment and Disposal

This alternative consists of excavation, removal and off-site disposal of contaminated soils on and off site at a licensed treatment and disposal facility. Soil would have to be transported a considerable distance off Long Island, since no treatment and disposal facilities were found to be available nearby. In accordance with current federal and state SCGs, the soils would be treated before placement in a landfill or use for another purpose. All excavated areas would be backfilled with clean soil and reseeded.

Scenario A:

Present Worth:	$ 5,278,900
Capital Cost:	$ 5,278,900
Annual O&M:	$ 0
Time to Implement	6 months

Scenario B:

Present Worth:	$ 1,974,100
Capital Cost:	$ 1,974,100
Annual O&M:	$ 0
Time to Implement	5 months

7.1.3 Alternatives for Groundwater

Reverse osmosis, the groundwater treatment originally used at the site, was rejected from the alternatives for final evaluation in the FS. Reverse osmosis would generate two to four thousand gallons of concentrate (waste liquid high in contaminants) per hour; on- or off-site treatment of this volume of concentrate would be extremely costly. Unless wood treatment were to resume at BB&S, in which case the concentrate could be recycled and used in the treatment process, reverse osmosis would be very difficult and costly to implement compared to the alternatives below, which would be equally or more effective.

Chemical Precipitation Treatment

Chemical precipitation is a conventional treatment for metals in wastewater. At BB&S, a treatment system would include the addition of reagents to the collected groundwater to cause metallic contaminants to precipitate out as solids. The resulting sludge would be separated from the clean water by filtration. The sludge, highly concentrated in contaminant metals, would be treated on-site if possible to render it non-hazardous before off-site disposal, or disposed of off site as a hazardous waste. Approximately four to five tons of sludge would be generated weekly and taken off-site for proper disposal. Treated groundwater would be returned to the aquifer through an on-site infiltration gallery.

On-Site Groundwater Collection/ Treatment Scenario:

Present Worth:	$ 3,718,200
Capital Cost:	$ 1,374,400
Annual O&M:	$ 152,400
Time to Implement	20 months

On- and Off-Site Groundwater Collection/ Treatment Scenario:

Present Worth:	$ 3,900,000
Capital Cost:	$ 1,450,000
Annual O&M:	$ 159,400
Time to Implement	20 months

Electrochemical Treatment

This treatment for metals-contaminated wastewaters is more innovative and utilizes electric current passed through wastewater together with appropriate reagents to ensure precipitation of the contaminants. At BB&S, following the electrochemical treatment, groundwater would be clarified, filtered and returned to the aquifer through an on-site infiltration gallery. This technology is proprietary and only one vendor could be found.

On-Site Groundwater Collection/ Treatment Scenario:

Present Worth:	$ 4,030,800
Capital Cost:	$ 1,691,000
Annual O&M:	$ 152,200
Time to Implement	20 months

On- and Off-Site Collection/ Treatment Scenario:

Present Worth:	$ 4,310,300
Capital Cost:	$ 1,773,400

Annual O&M:	$ 165,000
Time to Implement	20 months

Permeable Reactive Wall

This alternative for groundwater treatment was not evaluated in the FS, nor is included in the Evaluation of Remedial Alternatives below. An emerging technology, a permeable reactive wall consists of a deep trench across the path of contaminated groundwater, filled with a reagent such as iron filings. Groundwater flows across the trench/ wall and through the reagent. Iron would reduce hexavalent chromium to the less soluble and hazardous trivalent form, effectively removing it from groundwater as it continues to flow through the wall by natural movement. Permeable reactive walls have been successfully implemented to address groundwater plumes, but installation depths have been limited until recently. It is proposed to evaluate this technology as an alternative to groundwater collection and treatment during the remedial design in accordance with evaluation criteria in Section 7.2, and as more information concerning this technology becomes available.

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided, followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is included in the Feasibility Study.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

The no-action alternative would not comply with groundwater or soil SCGs, in each medium leaving contaminants above quality standards or guidance values. For groundwater, either treatment alternative would result in achieving water quality SCGs. However, the On-Site Collection/Treatment Scenario would result in an untreated portion of the plume being left to migrate. Under this scenario, SCGs for water supply protection would be met through monitoring and the contingency plan to intercept the plume should it threaten to impact users. The On- and Off-Site Collection/ Treatment Scenario would comply better with ambient groundwater quality standards and guidance values, since the plume would be intercepted off-site sooner, minimizing the impact to the aquifer.

With regard to soil alternatives, all those including treatment or containment of soils would comply with SCGs. Both Scenarios A and B were developed in accordance with the process found in TAGM 4046 to establish soil cleanup levels, in that groundwater protection, background levels, and human exposure have been considered for arsenic and chromium. Scenario A uses TAGM 4046's generic "background soil" concentration for arsenic, while Scenario B uses the process in TAGM 4046 to determine a site-specific cleanup level.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

The no-action alternative provides insufficient protection of human health and the environment, though it includes monitoring and improved control of site access and use. These measures would not prevent exposure now or in the future to soils contaminated above clean-up objectives in the fenced lumberyard and especially off site. Without any collection of groundwater, both the "source" area of the plume, and its off-site extension, will continue to disperse and degrade aquifer quality, inevitably reaching the capture zones of private water supply wells. As discussed in the FS report, little natural attenuation of the chromium is expected in this aquifer.

Except for the no-action alternative, the alternatives for groundwater would each protect human health and the environment through collection and effective treatment. The On-Site Collection/ Treatment Scenario would be less protective of the environment than the On-and Off-Site Collection/Treatment Scenario, since the off-site plume would continue to disperse and degrade aquifer quality. Immediate implementation of off-site collection and treatment would remove contaminants from the off-site aquifer, increasing protection of this resource for present and future use. In either case, protection of public health would be ensured by a program of groundwater monitoring and additional control measures if necessary.

Each alternative for soil (excepting no-action) would, in its end result, provide significant protection to human health and the environment by eliminating exposures to contaminated soils. Both Scenarios A and B are considered protective of human health, and would result in protection to the environment through minimizing potential future impact to biota.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

The no-action alternative would generate few or no additional impacts to the environment or community during its implementation. No short-term reduction of risk, however, can be expected from leaving the groundwater or soil in its present state.

The two alternatives for groundwater treatment each would pose few or no impacts to the public or the environment during construction, and are equivalent in time to achieve protectiveness. Comparing the scenarios of on-site versus on- and off-site collection/treatment, the latter would lead to a faster removal of contamination from the aquifer, and would therefore be more effective in the short term.

The soil alternatives would pose various degrees of short-term impacts to BB&S workers, visitors, the public, and environment from disturbance and/or transport. In-Situ Electrokinetic Remediation would pose the least impact of all, and is the only alternative which would not require clearing native vegetation in the "tributary" area off-site. The In-Situ Solidification/Stabilization minimizes to some extent soil disturbance compared to Ex-Situ S/S, not only because of in-ground mixing, but also because the time to complete the S/S would be shortened. The asphalt cap alternative would eliminate soil disturbance on site, but off -site soils would have to be excavated and transported over public roads to the off-site treatment and disposal facility. A greater risk of impact to off-site receptors through transportation of soil would be encountered in the Off-Site Treatment and Disposal Alternative, in which larger volumes of soil would be transported off site. In terms of the time for the remedial alternatives for soil to become effective, this last alternative of off-site disposal would require the least time, and in-situ electrokinetic remediation the longest. In general for these alternatives, because the soil volume to be remediated under Scenario B would be less than Scenario A, both the time to achieve effectiveness and short-term impacts would be less under Scenario B.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

The no-action alternative would not be permanent or effective in the long term to control site risks, relying solely on monitoring, site security, and institutional controls such as deed and use restrictions, without eliminating or physically controlling site contamination.

The groundwater alternatives would require operation and maintenance over many years to be effective in the long term. Experience with "pump and treat" remedies shows that removal of contamination from an impacted aquifer, and attainment of cleanup goals, is not soon or easily achieved. Containment of a plume to protect surrounding water resources, however, is effective in the long term through a well-maintained system. Over the long term, both treatment alternatives and both collection/ treatment scenarios could be considered equivalent in terms of protection of surrounding water resources, because of the Contingency Plan contained in the On-Site Collection/ Treatment Scenario. The On- and Off-Site Collection/ Treatment Scenario would be more effective in the long term, however, since the entire plume would be targeted for prompt treatment, leaving less contamination that must be monitored and controlled.

For soil, the no-action alternative would leave a large volume of surface and shallow soil both in the lumberyard and off site. Fencing and deed restrictions would not be sufficient to prevent exposure to on-site soils, and no long-term protection is afforded from soils off site. The asphalt cap leaves on-site soils in place, though covered, and requires maintenance to remain effective in the long term. With the other alternatives, treatment of the soils would be permanent, though S/S would leave contaminants at the site. Electrokinetic remediation and soil washing would separate the metallic contaminants, which cannot be destroyed, from the soils; excavation and off-site disposal also would remove contamination from the site. By using S/S reagents appropriate to the site-specific soil matrix and the contaminants, however, long-term integrity of the treated soils against leaching could be assured. In addition, the treated soils would be placed within the fenced lumberyard where disturbance could be prevented and would be covered. Scenario A would leave a higher area and volume of treated soil residual on site requiring long-term management. Nevertheless, S/S under both Scenarios A and B would be permanent and effective in the long term to reduce site risks.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

The no-action alternative would do nothing to reduce the toxicity, mobility or volume of site contaminants.

The contaminants of concern at the BB&S Treated Lumber Site are metals and cannot be destroyed, or permanently rendered non-toxic, as can organic contaminants. The groundwater and soil alternatives each reduce the mobility of the metallic contaminants and to various degrees, their volume. The groundwater collection/ treatment alternatives would reduce the mobility of contaminants in the aquifer through collection and containment, the On-and Off-Site Collection/ Treatment Scenario doing so more effectively by not permitting dispersion of contaminants in the aquifer south of the source area. Moreover, groundwater collection/ treatment alternatives would remove and concentrate contaminants for off-site disposal, reducing their volume and presence at the site. The On-and Off-Site Collection/ Treatment Scenario would remove a larger mass of contamination.

Likewise for the soil alternatives, alternatives which separate and remove either the contaminants themselves, or contaminated soil altogether, most effectively reduce the volume of contaminated material at the site. These include electrokinetic remediation, off-site treatment and disposal, and soil washing. S/S would not reduce the volume of contaminated material, but would permanently reduce the mobility of contaminants. The asphalt cover would reduce mobility of contaminants through erosion or leaching, but not through permanent treatment. For alternatives involving treatment, Scenario A would lead to treatment of a greater mass of contaminants and waste than Scenario B. The difference in contaminant masses removed or treated between these two scenarios may not exceed 20-30 percent, even though the volume of soil to be remediated under Scenario A would be roughly three times larger (in preliminary estimates) than under Scenario B. This is because the contaminants are concentrated in soil zones that would be remediated under either scenario.

6. Implementability. The technical and administrative feasibility of implementing each alternative is evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

The no-action alternative poses few or no technical difficulties to implement; obtaining and enforcing deed and use restrictions, however, may not be feasible off site.

Both groundwater alternatives are considered readily implementable from a technical point of view, space being available on site for both the treatment plant and a new reinjection gallery north of existing facilities. The lack of vendors for the electrochemical treatment alternative could pose an administrative difficulty in meeting competitive bidding requirements. No unusual delays would be encountered in obtaining discharge approvals and other permits for the construction and operation of the systems.

The treatment alternatives for soil (S/S, soil washing and electrokinetic remediation) vary in feasibility. S/S is the most proven technology and predictable in its implementation. The significant advantage of the ex-situ S/S alternative over in-situ S/S lies in the ability to better control the mixing of reagents and soil in a pug mill or other equipment versus in the ground. Thorough blending of the reagents with soil is critical to the effectiveness of S/S. The soil washing alternative would entail a treatability study to determine appropriate washing reagents to remove contaminants, and there is the possibility that no effective combination of reagents would be found, since multiple metals must be removed. Even if effective, the soil washing equipment could occupy too large an area to perform treatment on BB&S property, especially under Scenario A. Similarly, in-situ electrokinetics is untried in the physical and geological setting of the BB&S Site, and could be found insufficiently effective upon testing. The excavation or in-situ treatment of soils on site would interfere with normal lumberyard operation. Interferences with lumberyard operation would be minimized under Scenario B versus Scenario A because of the reduced area and volume of soils to be disturbed on site.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and

compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan are evaluated. A "Responsiveness Summary" will be prepared that describes public comments received and how the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC proposes Ex-Situ Solidification/ Stabilization, Remedial Scenario B for soil and Chemical Precipitation, On- and Off-Site Collection/ Treatment Scenario for groundwater as the remedy for this site.

This proposal is based on the evaluation of the alternatives developed for the respective media. With exception of the no-action alternative, each of the soil and groundwater alternatives would comply with the threshold criteria. For groundwater, the On- and Off-Site Collection/ Treatment Scenario would provide more immediate protection to public water supplies and remove more contamination permanently from the aquifer, at a marginally higher present worth than under the On-Site Collection/ Treatment Scenario. Conventional chemical precipitation is predicted to cost less to build and operate than electrochemical treatment.

For contaminated soils, S/S under Scenario B would be protective of public health and the environment. Human and environmental exposure would be further reduced by maintaining site security through the use of fencing. It is also reasonable to expect that low levels of CCA-related contaminants will continue to be deposited in the lumberyard soils from storage of treated wood, and therefore it would be difficult to maintain the "pre-release" (TAGM 4046) concentrations achieved under Scenario A, particularly for arsenic. Furthermore, the forms of arsenic and chromium present in the soil would not readily leach to groundwater, particularly in untreated areas left under Scenario B.

S/S is the most reliable and cost-effective of the treatment alternatives, and is a more permanent solution to the site threat than the asphalt cap. The reduced volume of soil to be treated under Scenario B would significantly ease the implementation of S/S and on-site disposal, and reduce short-term impacts from disturbance of soils. The marginal increase in cost and time for the ex-situ S/S alternative versus the in-situ S/S alternative would be greatly outweighed by the more reliable results which would be obtained through ex-situ mixing of soil and S/S reagents. Additionally, consolidation of the treated soils into one place would ensure better long-term controls.

Designation of a Corrective Action Management Unit (CAMU): In order to complete the proposed remedy component for soils, ex-situ solidification/ stabilization, it would be necessary to designate a portion of the BB&S property as a Corrective Action Management Unit (CAMU). A CAMU is an area of the facility that is approved by the NYSDEC for the purpose of managing and implementing the treatment requirements of the chosen remedial action. A CAMU is based on federal regulations and promotes the use of on-site treatment of contaminated soil. Without the use of this mechanism, the treated soil could not be placed back into the ground on-site even after contaminants are treated by S/S. Use of a CAMU would promote on-site remediation and reduce off-site disposal. The dimensions, location, and maintenance/ monitoring program for the CAMU for this Site would be determined during remedial design, in accordance with procedures outlined in 6NYCRR Part 373-2.19.

The estimated present worth to implement the remedy, for both soil and groundwater collection/ treatment, is $4,641,700. The cost to construct the remedy is estimated to be $2,191,700 and the estimated average annual operation and maintenance cost for 30 years is $159,400.

The elements of the proposed remedy are as follows:

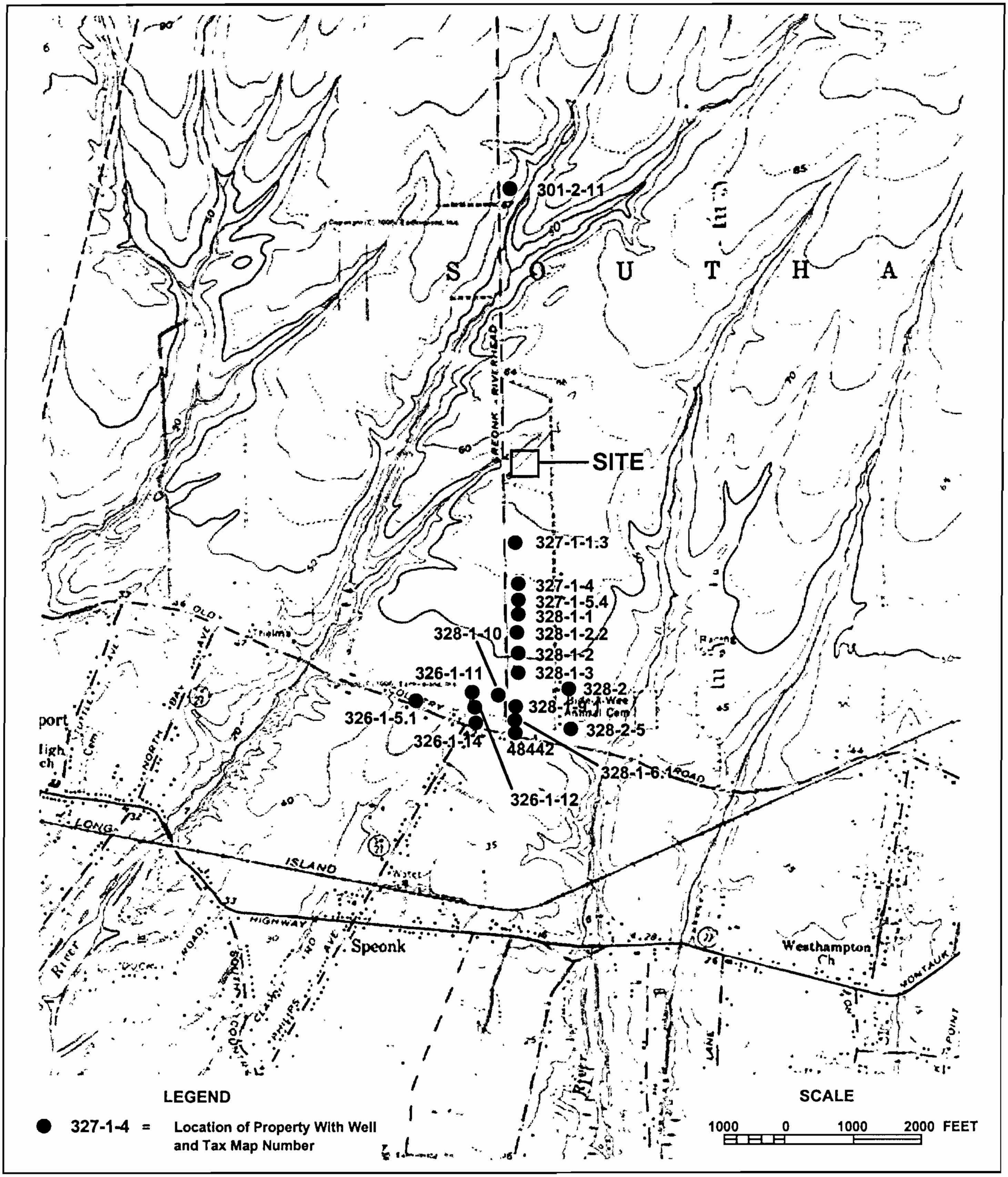
1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI/FS would be resolved.

2. Installation of extraction wells on and off site both to capture the source area of the plume and to intercept the plume at its leading edge, i.e., where chromium exceeds its SCG of 50 ppb. All collected groundwater would be piped back to the BB&S property, where a chemical precipitation treatment system in a new building, and a reinjection gallery, would be constructed. Sludge produced from the chemical precipitation treatment would be disposed of off site, either as a hazardous waste, or if feasible, as a non-hazardous waste following on-site treatment.

3. Excavation of soils contaminated above limits proposed in Scenario B. All excavated soils would be brought into the lumberyard and treated ex-situ in a temporary plant by solidification/ stabilization. Treated residues would be placed on-site and covered with six inches of clean soil. All excavated areas would be backfilled with clean soil and reseeded.

4. Site fencing would be repaired and maintained to restrict access and protect remedial components.

5. The remedy results in untreated hazardous waste remaining at the site, since a long period of time would be needed to clean up the groundwater plume. A long term monitoring program would therefore be instituted. This program would consist chiefly of periodic sampling of existing on-site monitoring wells and new off-site wells. This monitoring would begin prior to and continue during and after installation of the proposed groundwater collection and treatment system. The new offsite wells would include sentinel groundwater monitoring wells between the contaminant plume or recovery wells and downgradient water supply wells. This program would monitor the effectiveness of the groundwater remediation and would be a component of the operation and maintenance for the site.



Source: U.S.G.S. Quadrangle Map - Eastport

LOCATION OF SITE AND PUBLIC AND PRIVATE WATER SUPPLY WELLS

BB&S TREATED LUMBER CORP.
SPEONK, NEW YORK

MALCOLM PIRNIE

APRIL 1999