1.0 INTRODUCTION

1.1 Purpose of Report

The process of gathering sufficient information to characterize the nature and extent of risks posed by uncontrolled hazardous waste sites is called a Remedial Investigation (RI). This process was developed to address the requirements of the National Oil and Hazardous Waste Substance Pollution Contingency Plan (NCP) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). The RI at the Brunswick Wood Preserving (Brunswick Wood) Superfund site, in Brunswick, Georgia was conducted according to the Final Remedial Investigation Work Plan, Brunswick Wood Preserving Superfund Site, Brunswick, Glynn County, Georgia, February 1997 (1) by the United States Environmental Protection Agency (EPA), Science and Ecosystems Support Division (SESD), Environmental Investigations Branch (EIB), Hazardous Waste Section (HWS). The objectives were to gather sufficient information to:

1) define the nature and extent of soil, surface water, sediment and ground water contamination at the site, and

2) aid in the development of remedial alternatives that may be necessary to address any threat identified by the investigation.

This RI Report was prepared in accordance with the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (2) and will be used to support the Feasibility Study (FS), subsequent decision documents, and the design and implementation of remedial actions at the Brunswick Wood site. Major resources used for the site background as well as the site's operational and regulatory history were reports issued by the Georgia Department of Natural Resources (RCRA Facility Assessment Report) and Black and Veatch (HRS Documentation Package). (3)(4)

1.2 Site Location

The Brunswick Wood Preserving Superfund site is located in north Glynn County, Georgia, north of the city of Brunswick (6.5 miles northwest of the courthouse). The site is located on Perry Lane Road approximately 0.5 miles east of the intersection of Perry Lane and Highway 341, New Jesup Highway (see Figure 1-1). The site was originally located in the city of Brunswick, but moved to its present location in 1959-60 due to enticements by the city to move from the downtown location. The total contiguous property comprising the site is approximately 84 acres, however, the portion of the site on which most site activity occurred was restricted to about 50 acres.

The site is about two-thirds of a mile long, from its extreme western corner on Perry Lane Road to the eastern corner, where the old siding intersected the Norfolk Southern right-of-way. The entire northern perimeter is defined by Perry Lane. A short segment of the southern or southwestern border is defined by the CSX Railroad right-of-way. Most of the southern property/site boundary, however, is defined by residential properties and wooded areas. The eastern boundary is defined by the Norfolk Southern Railroad right-of-way.

Burnett Creek, a tidally influenced stream, is located at the extreme western corner of the site. At several points, most, if not all, of the drainage from the site flows into Burnett Creek.

1.3 Site Status

Operations at the Brunswick Wood site ceased in 1991. The following section, Site Description, details the events surrounding this closure and EPA and the State of Georgia's actions following this closure.

1.4 Site Description

1.4.1 Ownership and Operational History (3)

The site was originally operated by American Creosote Company, who constructed the facility at the current location sometime between 1958 and 1960. This fact is based on several site drawings, dating from 1958, which indicate American Creosote Company owned the site. The site was acquired by Escambia Treating Company in 1969 from Georgia Creosoting Company and the Brunswick Creosoting Company, thought to be the same corporate entity. The relationship and nature of transition between American Creosote Company and Georgia Creosoting Company/Brunswick Creosoting Company is not clear. In 1985, a corporate reorganization resulted in the purchase of the facility by the Brunswick Wood Preserving Company, who operated the site until it closed in 1990. Figure 1-2, Historical Site Map, shows the site as it existed during the end of its operating history.

In 1991, Region 4, USEPA began an emergency removal action after a fire occurred at the site. All but a few of the site structures were demolished and removed with large areas of contaminated soil excavated and stockpiled. In particular, the siding which ran along the southern boundary of the active portion of the facility was removed and soil along almost the entire length was excavated. In addition, large volumes of soil were removed from the creosote/penta and CCA treatment areas, treated pole storage areas and the lagoon area, located west of the office building.

The contaminated material removed during the EPA removal action was placed in four different encapsulated waste cells, three containing PAH-contaminated material and one containing primarily CCA-contaminated material. The contents of the three largest cells, containing the PAH-contaminated material, have since been removed by Georgia EPD. A new rail spur was constructed to facilitate the removal of the cell contents. It originates at the CSX line, just east of Burnett Creek, and generally follows a path just north of the old spur line, which is now a series of water-filled

excavations. Figure 1-3, Current Site Conditions Map, shows the main site features today, after the removal action.

1.5 Processes and Wastewater Handling (3)

1.5.1 Site Processes

The site operated as a preserver of wood products, primarily pine round-wood for utility poles and marine pilings. Logs were delivered both raw and peeled and were stored on-site prior to pressure impregnation with any of several chemical preservatives. Once treated, the wood products were stacked and stored in various storage areas until shipped to customers via rail or truck.

Initially, the site was designed and operated as a treatment facility for oil-based preservatives only, namely creosote and working solutions of pentachlorophenol in oil (penta). Sometime between 1968 and 1970, a separate facility, used for the chromated copper arsenate (CCA) process, was constructed at the far eastern extent of the developed portion of the site. The inorganic salts which make up CCA are carried in a water solution and the raw wood is kiln-dried prior to treatment; therefore, wastewaters are not typically generated from the CCA process. The locations at which the two different treating processes operated is shown in Figure 1-2.

Pressure-treatment with creosote or penta, as practiced at this site, generated a considerable amount of wastewater during the “steam conditioning” phase of the process cycle. The steam conditioning technique used throughout the operating history at the site used live steam. Steam was introduced, at 10 to 20 psig, into the horizontal treatment cylinders, coming into direct contact with the various wood products. During this process live steam incidentally contacts the surfaces of the trams and the cylinder interior. Per charge, approximately 7,000 gallons of steam condensate became commingled with as much as 1,000 gallons of wood moisture (which contains resins and wood sugars) and both became contaminated with the residual preservative in the cylinder from the previous

treatment cycle. This contaminated wastewater was the primary wastewater generated at the facility. The cylinder was purged of water prior to refilling the cylinder with warm preservative chemical. The preservative was then forced into the wood under approximately 160 psig.

Considerable flexibility, with respect to the treatment cycles, appears to have existed throughout the years of operation of the various site owners. There were various acceptable combinations of steam, vacuum, pressure and time used during treatment. It was not unusual for facility operations to continue around the clock, with penta cycles lasting 14 hours and creosote cycles lasting 24 hours.

The creosote preservative was delivered by rail to the site at working concentrations. The penta preservative was also delivered by rail, but as a 40% concentrate of technical pentachlorophenol which was mixed on site with diesel fuel to make up a 6 % to 8% working solution. This mixture was referred to as "oil", not to be confused with diesel fuel used for blending. Because diesel fuel was readily available in the Brunswick area, it was not stored on site, but was delivered to the site as needed to make new penta working solutions.

1.5.2 Wastewater/Stormwater Treatment and Handling (3)

During the operational lifetime of the site, wastewater and stormwater management underwent numerous changes. Primary wastewater streams that were managed include boiler blowdown, condensate from the tank heaters and condensate from steam conditioning of the wood products. The first impoundment constructed was IM-2 (see Figure 1-2) on the east side of the site, next to the creosote/penta treating area. This unit allowed for partial recovery of the floating and sinking product which separated after the pressure vessels were emptied following treating of wood product. The contaminated water phase, located between the two oily phases, was discharged from IM-2 into Burnett Creek, after "filtering" with a drum full of straw. Evidence indicates that a substantial amount of oil made it through the filter and into the stream. At some point following

construction of IM-2, IM-1, a twin of IM-2, was constructed to replace or supplement IM-2. It was located just west and north of IM-2 (see Figure 1-2). IM-3 was constructed along the northern border of the site and appears to have been a Storm water retention basin, used to collect storm waters from the east and north parts of the site prior to discharge into ditches along Perry Lane Road (see Figure 1-2). Impoundment IM-1 was eventually filled in and turned into parking, but was subsequently partially removed during the EPA emergency removal. IM-3 was most likely filled in and its previous location is in the general area of the northeastern corner of the westernmost encapsulated waste cell currently at the site.

Impoundments IM-4 and IM-5 are large, contiguous lagoons located near the eastern end of the site (see Figure 1-2). Initial impoundment construction in this area began in 1970, with what is referred to in several reports as IM-4a, which occupied a much smaller area than the combined impoundment area today. Its purpose was overflow storage to help maintain adequate freeboard in IM-2. Wastewaters, consisting primarily of contaminated water, i.e., the aqueous phase, and associated, varying amounts of oily waste, were pumped, as needed, from IM-2 to IM-4a. At some point, probably in 1972, the treatment/storage area occupied by IM-4a was expanded with the addition of "units" IM-4b and IM-4c. In late 1972, all of the IM-4 series ponds were incorporated into a re-engineered, new IM-4.

In 1973, a spray system was installed along the northeast dike of IM-4, and eventually a new impoundment, IM-5, was constructed along the north side of this dike, forming roughly the large impoundment complex present at the site today. Over the years, numerous breaks in dikes around the pre-existing and current impoundments were reported and a secondary dike complex was bulldozed into place around the current impoundments. Evidence of this secondary dike is still present today north and east of the impoundments. Within this area are numerous low, ponded areas, containing stagnant water, some of which may harbor unknown degrees of contamination, resulting from the historical breaches of the dike complex.

The historical record of the site is very complex, particularly with respect to wastewater handling in impoundments and conveyance of stormwater and wastewater. The removal action conducted by USEPA resulted in drastic changes to the site, with respect to physical structures. Only IM-4 and IM-5, and visibly contamintaed soil at the location of IM-1 remain today.

1.6 Site Regulatory Status

1.6.1 NPDES

The RCRA facility assessment, prepared by the Georgia Environmental Protection Division (Georgia EPD), details the history of wastewater management at the site from the early 1960s to the closure of the facility in 1991 (3). According to this document, the Brunswick Wood facility apparently never applied for or obtained an NPDES permit for wastewater discharges to ditches or surface waters adjacent to the site, choosing to manage the wastewaters in on-site lagoons or discharge it to a nearby sanitary sewer. Some wastewaters were trucked to the Brunswick sanitary landfill. During the entire time the facility was operating, numerous un-permitted discharges of spills and stormwater run-off occurred at the facility, either to ditches along the CSX rail line or to Burnett Creek. Discharges are still occurring during periods of heavy precipitation, via a cement culvert on the banks of Burnett Creek.

1.6.2 RCRA

The RCRA Facility Assessment conducted by Georgia EPD (3) summarizes RCRA enforcement from April 1981 until facility closure in 1991. The following is a list of major enforcement areas dealt with by Georgia EPD during this period.

April 1981 - Escambia (Brunswick Wood) cited for, among other things, inadequate freeboard in impoundments IM-4/5.

1982-1985 - Numerous discussions/negotiations occurred to resolve wastewater management issues. Georgia EPD was on record indicating that impounds IM-2 and IM-4/5 were unfit for wastewater management. Several proposals were offered by the company to resolve the issue. During this time, the spray towers at IM-4/5 remained in use.

1982 or 1983 - Impoundment IM-2 apparently closed, at some point, during this time. A closure plan, apparently prepared in 1982, indicates that Escambia (Brunswick Wood) would close this impoundment as a hazardous waste impoundment, regardless of EPA's interpretation. A May 24, 1984 letter from Escambia describes a 240,000 gallon tank which apparently replaced impoundment IM-2.

April to May 1984 - There were problems with the process piping for wastewater discharged to IM-4. A rupture occurred in a 4-inch PVC pipe to the impoundment and an inspection by Georgia EPD found that significant volumes of wastewater had been discharged outside the dike at IM-4. During this time, wastewater was discharged to both Dixon Swamp and Burnett Creek.

November 7, 1985 - A letter from the company indicates that there will be no more discharges to surface impoundments. They will be using a cooling tower or, as Georgia EPD described it, a forced draft evaporator. This use was never approved by Georgia EPD. At this time, Escambia was still seeking approval to haul wastewater to the city WWTP.

January 28, 1986 - Georgia EPD inspection reveals that spray towers continue to spray water into IM-4. Boiler blowdown was observed entering IM-4. Much of the bottoms of both IM-4 and IM-5 were exposed, indicating more than the required two feet of freeboard.

June 17, 1987 - Escambia indicates to Georgia EPD during an inspection that all wastewater is being pre-treated and trucked to a dedicated tank at the city WWTP. This continued until November 1988, at which time it was sent to the plant via a sewer connection. The author

of the assessment report indicated that, to his knowledge, no other discharges to surface water occurred after connection to the sewer.

1.6.3 EPA Removal

Beginning in 1991, Region 4, USEPA Emergency Response and Removal Branch (ERRB) conducted a removal at the site. Most of the structures on site were demolished and removed, and large volumes of contaminated soil were removed and stored in encapsulated waste cells. Three cells were comprised of PAH-contaminated soil and one was comprised of CCA contaminated soil. A part of this removal entailed complete removal of the rail spur which stretched across the southern portion of the site, from the Southern tracks to the CSX tracks. This was done to enable removal of the contaminated soil from beneath the spur. The total cost of the EPA action was approximately $10.2 million dollars.

1.6.4 Georgia EPD Removal

Following the EPA removal and encapsulation, Georgia EPD conducted a removal action to remove the PAH-contaminated soils from the three largest cells and dispose of the material off-site. 151,343 tons of material were shipped off-site for disposal at a cost of $18,457,202. This action was completed in October 1997.

1.7 Report Organization

This RI report consists of five main sections:

Section 1.0, Introduction, provides the purpose of the report, a description and history, and a summary of previous investigations at the Brunswick Wood Preserving site.

Section 2.0, Sampling Locations and Rationale, discusses the sampling locations and rationale for the soil, surface water, sediment and ground water samples collected; the sample identification; the sample collection and handling procedures; the sample analysis procedures; the quality assurance methods; and the management of investigation derived waste.

Section 3.0, Site Characteristics, describes the topography, climate, demography and land use, surface water, geology and ground water characteristics for the Brunswick Wood Preserving site.

Section 4.0, Nature and Extent of Contamination, discusses the characteristics and contamination of surface and subsurface soils, surface water, sediment and ground water at the Brunswick Wood Preserving site.

References are provided. Supporting information is provided in the appendices to the report.