Ref. 13-38

11039635

U.S. Geolgical Survey
Hydrologic Atlas 730-F
Robert A Renken, 1998

REGIONAL SUMMARY

INTRODUCTION

The States of Arkansas, Louisiana, and Mississippi, which are located adjacent to each other and north of the Gulf of Mexico, compose Segment 5 of this Atlas. The three-State area encompasses an area of nearly 149,000 square miles. These States are drained by numerous rivers and streams, such as the Atchafalaya, the Teche, the Vermilion, the Calcasieu, the Mermentau, the Sabine, the Tombigbee, the Pascagoula, the Wolf, and the Pearl Rivers, that drain directly to the Gulf of Mexico. The Yazoo, the Big Black, the Arkansas, the St. Francis, the Red, and the White Rivers are tributaries of the Mississippi River, which is the largest of the rivers that drain the three States. Although surface water is the largest source of freshwater to public supply, domestic and commercial, industrial, mining, thermoelectric power and agricultural users, ground water also is important and accounts for 38 percent of total water use in Arkansas, Louisiana, and Mississippi.

Precipitation is the ultimate source of water that recharges the major aquifers in Segment 5. Average annual rainfall (195180) amounts range from about 40 to about 68 inches (fig. 1). Temporal (seasonal) and spatial variations in precipitation are evident in the three-State area.

Average annual rainfall is greatest (60 inches per year or more) in southern Louisiana and southern Mississippi and diminishes in Arkansas and in northwestern Louisiana. Precipitation is greatest during January and May in Arkansas. May to September represent the wettest months in southeastern Louisiana and southern Mississippi. March and April are the wettest months in northern Mississippi. Average annual (195180) runoff ranges from less than 12 inches in western Louisiana and northwestern Arkansas to more than 20 inches in southern and northern Mississippi and in central and western Arkansas (fig. 2). Comparison of precipitation and runoff maps shows that less than one-half of the annual precipitation leaves the area as stream runoff. Much of the water that does not exit Segment 5 as runoff is returned to the atmosphere by evapotranspiration, which is the combination of transpiration by vegetation and evaporation from marshes, swamps, lakes and streams. A small amount of water recharges aquifers that are either exposed or buried to shallow depths, and an even smaller amount percolates downward and enters the deep flow system.

PHYSIOGRAPHY

Segment 5 contains parts of four physiographic provinces‹the Coastal Plain, the Ouachita, the Ozark Plateaus, and the Interior Low Plateaus (fig. 3). Uplands of the Ouachita and the Ozark Plateaus Provinces occupy the northwestern one-half of Arkansas. The Fall Line, a physiographic boundary that marks the inner margin of the Coastal Plain, separates the two provinces from the lowlands of the Coastal

Plain Province. The Interior Low Plateaus Province is present in only a small part of the northeasternmost Mississippi and is discussed in Segment 6. The most extensively utilized aquifer systems of Segment 5 underlie the Coastal Plain Province.

The Mississippi Alluvial Plain Section separates the eastern and western sections of the Gulf Coastal Plain Province. The Mississippi Alluvial Plain consists of a low flood plain and delta system that were formed by the Mississippi River. Crowley's Ridge, Arkansas, is the most prominent topographic feature within the Mississippi Alluvial Plain and is, in part, a northsouth outlier of older, underlying Coastal Plain rocks. The southern portion of the ridge is covered with loess that is thought to have been deposited at the same time as the river terraces. The ridge cuts the northern part of the alluvial plain in half and is thought by some workers to have formed when the Mississippi and the Ohio Rivers flowed on opposite sides of the ridge. The Mississippi River captured the Ohio River along an upstream reach during late Pleistocene time, which reduced the river complex to one principal channel. Recent workers suggest Crowley's Ridge may be the result of Holocene fault movement. Although the Mississippi River is the principal river of the Mississippi Alluvial Plain Section, the Tensas, the Sunflower, and the Yazoo Rivers are among several other streams whose drainage basins are entirely or mostly contained within the alluvial plain. The distributary part of the Mississippi River system is in southern Louisiana. Deposition of sediments along and between distributaries has created a large delta, whose shape is best described as a bird-foot delta (fig. 4). The delta extends east-southeast and has built outward atop thick marine clay beds into the Gulf of Mexico. Thick sandy distributary channels are separated by interdistributary deposits of muds, thin muddy sands, and abundant organic deposits. The weight of the advancing delta front sand compacts the thick underlying clays and forms depressions in which prograding channel sand or bar-finger sand facies are protected from erosion. As progradation continues, distributary channels extended further seaward, and the delta enlarges.

The altitude of most of the inland part of the Coastal Plain Province ranges from 300 to 600 feet above sea level in Mississippi and from 200 to 400 feet above sea level in Arkansas and Louisiana (fig. 5). A 10- to 150-mile wide coastal zone immediately adjacent to the Gulf of Mexico lies no more than 50 feet above sea level. The eastern part of the Gulf Coastal Plain Province (fig. 3) is characterized by a coastal plain of low hills, low cuesta ridges, and gentle lowlands. Fine-grained strata of clay, chalk, and mudstone underlie the low-lying areas; coarse sand and gravel underlie low ridges and hills. The western part of the province is a southward-facing plain of low, rolling, slightly hilly terrain that becomes a flat plain to the south. A broad marshy zone is near the coast.

The Ouachita Province in Arkansas is north of the West Gulf Coastal Plain Section and can be separated into the Ouachita Mountains Section to the south and Arkansas Valley Section to the north (fig. 3). The Ouachita Mountains Section is distinguished by valley and ridge topography. The ridges form straight to zigzag patterns and increase in height westward. Some ridges rise to more than 2,000 feet above sea level. North of the Ouachita Mountains Section, the Arkansas Valley Section forms a low-lying plain with low ridges oriented east to west.

Although much of the Arkansas Valley Section generally is only 300 to 600 feet above sea level (fig. 5), the altitudes of several ridges range from 1,000 to more than 2,000 feet.

The Ozark Plateaus Province is north of the Ouachita Province and can be separated into the Boston Mountains Section to the south and the Springfield and the Salem Plateaus Sections to the north. The Springfield Plateau lies west and south of the Salem Plateau. The 200-mile long by 35-mile wide Boston Mountains Section is a deeply dissected plateau region that generally ranges from more than 1,900 to more than 2,500 feet above sea level and is characterized by flat-crested ridges that rise from 300 to more than 1,000 feet above V-shaped valleys. The surface of the Western Springfield Plateau, which is the intermediate level plateau, varies from gently rolling prairies to dissected terrain that ranges from 1,000 to 2,000 feet above sea level along its northern and southern margins. Topographic relief within this plateau area ranges from less than 100 feet in the prairie areas to more than 400 feet where streams have incised a north-facing escarpment that borders the Salem Plateau. In some areas of the Springfield Plateau, straight solution valleys intersect one another at 90-degree angles. The Salem Plateau, which is located east and north of the Springfield Plateau, lies at altitudes of 1,000 feet or less above sea level, but its land surface forms an irregular topography and is cut deeply by streams. However, topographic relief between hill crests and valley bottoms usually does not exceed 100 feet.

MAJOR AQUIFERS

Major aquifers in Segment 5 are highly varied in composition, consolidation, and hydraulic character. The majority of Segment 5 aquifers consist of unconsolidated to poorly consolidated Coastal Plain strata of gravel, sand, clay, and minor limestone of Cretaceous to Holocene age. Other Segment 5 aquifers consist of indurated limestone, dolomite, shale, sandstone, chert, and novaculite of Paleozoic age that are either flatlying or gently to highly folded and contorted and that may be faulted and fractured. These aquifers are combined into eight aquifer systems, all of which extend beyond the Segment 5 study area (fig. 6). Only small parts of the Texas coastal uplands and the Floridan aquifer systems are in Segment 5; these aquifer systems are discussed in Chapters E and G of this Atlas, respectively.

An aquifer system consists of two or more aquifers that are hydraulically connected. The aquifers may be separated, in places, by confining units, but there is regional hydraulic continuity within the system‹the flow systems of the aquifers function similarly, and a change in conditions within one aquifer commonly affects the other aquifer(s). Likewise, confining units that may contain local aquifers, but which function together to retard the vertical movement of water, are called confining systems. The outcrop extent of the principal aquifers, aquifer systems, and a confining system in the Segment 5 study area is shown in figure 7.

The surficial aquifer system consists of alluvial aquifers and includes one major and three minor aquifers (fig. 8). In terms of water use and areal extent, the most important aquifer is the highly productive Mississippi River Valley alluvial aquifer. The minor aquifers include the Arkansas River, the OuachitaSaline Rivers, and the Red River

alluvial aquifers. The Arkansas River alluvial aquifer is not as widespread as the other two aquifers, but locally is an important water source.

Parts of four Coastal Plain aquifer systems, the coastal lowlands (fig. 9), the Mississippi embayment (fig. 10), the Southeastern Coastal Plain (fig. 11), and the EdwardsTrinity, which are within rocks of Cretaceous to Quaternary age, are in the Segment 5 area. Coastal Plain rocks of Cretaceous age make up a locally important aquifer known as the Tokio-Woodbine aquifer. For purposes of this chapter, the Southeastern Coastal Plain and the EdwardsTrinity aquifer systems, and the Tokio-Woodbine aquifer are described in the section entitled, [3]Cretaceous Aquifers[2]; only parts of the aquifer systems are present (fig. 11). Aquifers and confining units within each of the four Coastal Plain aquifer systems thin landward to a featheredge and thicken with depth as they extend toward the Gulf of Mexico into the deep subsurface. Most Segment 5 Coastal Plain aquifers contain freshwater downgradient well beyond the extent of their outcrop. All of the Coastal Plain aquifers and aquifer systems are comprised predominantly of poorly consolidated to unconsolidated clastic sedimentary rocks. The distribution and pattern of permeability within the different Coastal Plain aquifer systems are a function of lithology and primary porosity. In general, the most permeable Coastal Plain aquifers consist of sand and some gravel and are separated by silt, clay, marl, or chalk confining units. As these aquifers extend downdip, most grade to less permeable facies, such as clay or marl, that are part of adjoining confining units. A geopressured zone truncates the gulfward limit of aquifers within the coastal lowlands aquifer system.

Flat-lying to southward-dipping limestone, dolomite, and sandstone comprise the principal aquifers of the Ozark Plateaus aquifer system (fig. 12). Permeability within this aquifer system is a function of regional and local tectonics, diagenesis, geochemistry, hydrology, and weathering.

The Western Interior Plains confining system underlies the rugged Boston Mountains and the rolling lowlands, synclinal mountains, and cuestas that characterize the northern flank of the Arkansas Valley. Although this confining system is poorly permeable, it contains sandstone, minor limestone, and highly jointed and fractured siltstone and shale that function as local aquifers. Geologic structure is a principal factor that controls the occurrence and movement of ground water within the unweathered part of the confining system. Another permeability control is associated with local faults, joints, and fractures. Ground-water movement within this system of secondary permeability depends on the intensity, aperture, orientation, connectivity, and filling of fracture systems.

Limited quantities of ground water can be obtained from sandstone, siltstone, shale, and chert-novaculite rocks of the Ouachita Mountains Section and the southern part of the Arkansas Valley Section. Primary porosity within the Paleozoic rocks of Segment 5 was destroyed by compaction during burial and structural deformation during uplift. Small amounts of ground water can be obtained from wells completed in rocks that contain joints and fractures or bedding planes.

GEOLOGY

Segment 5 is underlain by sedimentary rocks that range from unconsolidated to poorly consolidated clastic rocks in the Coastal Plain Province and alluvial areas to well-consolidated, flat-lying to southward-dipping fractured carbonate and clastic rocks in the Ozark Province to fractured, faulted, and folded shale, sandstone, limestone and chert-novaculite rocks in the Ouachita Province. Coastal Plain Province rocks are Mesozoic and Cenozoic (Jurassic to Quaternary) in age; rocks that underlie the Ozark and Ouachita Provinces are Paleozoic (Cambrian to Pennsylvanian) in age (figs. 13, 14).

The geologic and hydrogeologic nomenclature used in this report differs from State to State because of independent geologic interpretations and varied distribution and lithology of rock units. A fairly consistent nomenclature, however, can be derived from the most commonly used rock names. Therefore, the nomenclature used in this report is basically a synthesis of that used by the U.S. Geological Survey, the Arkansas Geological Commission, the Louisiana Geological Survey, and the Mississippi State Geological Survey. Individual sources for nomenclature are listed with each correlation chart prepared for this report.

Rocks of Ordovician to Pennsylvanian age underlie the outcrop areas of the Ozark Plateaus Province, and are, in turn, underlain by dolomite and sandstone beds of Cambrian age. The rocks of Cambrian age form the basal part of the Paleozoic sedimentary sequence, but are not exposed in northern Arkansas. The Ozark Uplift is a structural high area that affects the attitude of Paleozoic rocks in northern Arkansas. In general, the rocks in northern Arkansas crop out as annular bands around the center of the Ozark Uplift, which is located in southern Missouri (fig. 15). Rocks of Ordovician to Mississippian age in the Ozark Plateaus Province that dip gently southward from northern Arkansas are dominated by shallow-water carbonate-shale sequences and contain some prograding deltaic sandstones, all of which were deposited on a cratonic shelf of Precambrian age. Sedimentary rocks that underlie the Boston Mountains Section consist mostly of Pennsylvanian sandstone and shale deposited in deltaic, open marine, coastal, and swamp environments.

Rocks that underlie the Ouachita Province consist mostly of a thick sequence of shale and sandstone that was deposited during Cambrian to early Pennsylvanian time within an elongate, subsiding Ouachita Trough. This trough formed by rifting along a late Precambrianearly Paleozoic continental margin. Down-to-the-south normal faulting and subsidence during Mississippian to Pennsylvanian time formed the shallower Arkoma Basin that lies north of the Ouachita Trough. Clastic, deep-water sediments were deposited within the Ouachita Trough and prograding deltaic, clastic shallow-marine, and some deep-marine deposits infilled the Arkoma Basin. Compressional tectonic forces closed the trough during late Pennsylvanian time and helped form the Ouachita Anticlinorium. The Ouachita Anticlinorium is an intensely fold-ed structure of plunging synclines, anticlines, and north- and south-directed thrust faults; shale, chert, sandstone, conglomerate, novaculite, and volcanic tuff of this folded structure have been subject to widespread low-grade and low-temperature metamorphism. To the north, rocks of Pennsylvanian age within the Arkoma Basin were

gently folded into an alternating series of synclines and anticlines in which anticlinal axes are separated by a distance from 5 to 8 miles. Normal faults are common in areas north of the Arkansas River, and thrust faults are present south of the river.

Postorogenic rocks of Permian and Triassic age rest un-conformably on the eroded Ouachita folded rocks but lie buried beneath Coastal Plain deposits in northern Louisiana. These strata largely consist of continental red-bed sedimentary deposits derived from the erosion of the Ouachita Mountains.

The oldest Coastal Plain rocks of Segment 5 are Jurassic in age and are deeply buried in the subsurface. A thick and extensive salt layer of Jurassic age composes the lower part of the Coastal Plain sequence in the Gulf Coast Basin (Stage I, fig. 16). Collapse and the gulfward diapiric flow of salt occurred during crustal downwarping and infilling of the Gulf Coast Basin (Stage II, fig. 16). Coastal Plain sedimentary rocks of Cretaceous age were deposited across a broad shelf. Major Cretaceous depositional facies shifted landward or gulfward during transgressive or regressive cycles that were controlled by eustatic sea-level change and differential rates of subsidence. Rocks of early Tertiary age and younger were deposited during progradational depositional cycles of alluvial and deltaic infilling within the Gulf Coast Basin (Stages III, IV, fig. 16).

Salt-dome basins are in southern Mississippi and central and southern Louisiana (fig. 15). Although few occur near the land surface, salt domes penetrate most or all of the Tertiary rocks at isolated locations. The domes are usually only 1 to 3 miles in diameter, and their effect on ground-water flow and water quality is localized.

The Mississippi Embayment is a large reentrant that forms a southward-plunging syncline, which greatly influences the outcrop pattern of Coastal Plain rocks in Segment 5. The embayment axis is closely aligned with the present-day (1997) location of the Mississippi River (fig. 15). Except where they are covered by Holocene alluvial deposits of the ancestral Mississippi River, Coastal Plain sedimentary rocks of Cretaceous to early Tertiary age crop out mostly in offlapping bands that parallel the perimeter of the embayment and dip gently toward its axis. Younger outcropping Coastal Plain sediments of late Eocene to Pliocene age do not extend as far north into the embayment as do older strata, but crop out as a belt that parallels the coastline, dipping gently southward into the Gulf Coast geosynclinal basin. Late Quaternary alluvial and deltaic deposits of the Mississippi River and its tributaries form a wide band that extends southward from the northern part of the embayment into the Gulf of Mexico. From a landward, outcropping featheredge, the entire Coastal Plain sequence thickens greatly toward the axis of the Mississippi Embayment and the Gulf Coast Geosyncline. The general gulfward thickening is interrupted by uplifts, domes, anticlines, basins, synclines, and faults of subregional size, some of which are shown in figure 15.

FRESH GROUND-WATER WITHDRAWALS

Ground water serves as an important source of water for many of the 9 million people that live in Arkansas, Louisiana, and Mississippi and supplies 38 percent of all water needed for public supply, agriculture,

industry, mining, thermoelectric power, domestic, and commercial uses. About 6,800 million gallons per day of ground water were withdrawn in the three States of Segment 5 during 1985; about 80 percent of the ground water withdrawn is utilized by irrigated agriculture, mostly for growing rice, commercial vegetables, corn, and soybeans (fig. 17). The greatest increase in withdrawal rates occurred between 1970 and 1980, mostly within the Mississippi Alluvial Plain Section. In recent years, irrigation pumping has caused Arkansas to withdraw larger amounts of ground water than the other States of Segment 5 (fig. 18). Public supply represents the second largest user of ground water but accounts for less than 10 percent of the total water withdrawn. Ground water provides about 64 percent of the total freshwater withdrawn in Arkansas, about 68 percent of the freshwater used in Mississippi, and about 14 percent of the total freshwater withdrawn in Louisiana.

Total ground-water withdrawals, by county, during 1985 are shown in fig. 19. The largest withdrawals are in two major areas‹the Mississippi Alluvial Plain in eastern Arkansas and northeastern Mississippi and a five-county area in southwestern Louisiana. Much of the ground water withdrawn is used for agricultural purposes, mostly irrigation of rice with smaller amounts for aquaculture (primarily catfish farming), both of which provide an important economic base for the three-State area.

Total ground-water withdrawals during 1985 from each of the major aquifers and aquifer systems are shown in fig. 20. The Mississippi River Valley alluvial aquifer and minor alluvial aquifers (the surficial aquifer system), which are the most heavily used, provide about 5.1 billion gallons per day of ground water or about 75 percent of all ground water used in Segment 5. Of this amount, about 5,050 million gallons per day was withdrawn from the Mississippi River Valley alluvial aquifer. The second most heavily used source of ground water is the coastal lowlands aquifer system, which provided nearly 1,150 million gallons per day, or 17 percent of all ground water used. The Mississippi embayment aquifer system provided about 6 percent of the total ground water withdrawn in the three-State area, whereas Cretaceous and Paleozoic aquifers provided only about 1 percent each of the total ground-water withdrawals.

Withdrawals of large quantities of water from Coastal Plain aquifer systems during the last 90 years have lowered water levels, decreased the saturated thickness of several aquifers, caused encroachment of salt water, and even altered patterns of regional ground-water flow. Before development of the Coastal Plain aquifers, recharge entered the regional flow system in the upland, interstream areas between major rivers (fig. 21). Ground water was discharged in the valleys of the major rivers or along the coast. Recent regional investigations have shown that large, long-term withdrawals have caused an increase in the rate of recharge in some upland areas and that most of the major rivers no longer represent sites of regional ground-water discharge (fig. 22). Rather, because of extensive irrigation or the lowering of ground-water levels owing to pumpage near the rivers, most of the major river valleys have become recharge areas that provide water to the underlying Coastal Plain aquifers.

SURFICIAL AQUIFER SYSTEM

INTRODUCTION

The surficial aquifer system of Segment 5 contains one major and three minor alluvial aquifers, of which the Mississippi River Valley alluvial aquifer is the largest and most important. Some regional studies have included the Mississippi River Valley alluvial aquifer as part of the Mississippi embayment aquifer system. Less extensive but locally important are the stream-valley alluvial aquifers of the Arkansas River, the OuachitaSaline Rivers, and the Red River (fig. 23). Alluvial aquifers of the surficial aquifer system are characterized by their ability to yield large volumes of water and by their hydraulic interconnection with the rivers and streams that cross them. The alluvial aquifers generally are characterized by basal gravel that fines upward to sand.

The alluvial aquifers of Segment 5, with the exception of the aquifer along the Arkansas River, are located within the Coastal Plain Physiographic Province; the Arkansas River alluvial aquifer is in the Ouachita Physiographic Province. The alluvial aquifers consist of gravel and sand deposits of Quaternary age and generally contain ground water under unconfined conditions. Beds and lenses of poorly permeable silt and clay, however, locally create confined conditions. The alluvial aquifers are capable of yielding large amounts of water, especially where the saturated thickness of the aquifer is large. Natural recharge to the alluvial aquifers is by precipitation that falls directly on the alluvial deposits, runoff from adjacent slopes, upward flow from aquifers underlying the alluvial aquifer, and infiltration from streams during periods of high flow when water levels in the streams are higher than those in the aquifers. Additional recharge from induced stream infiltration may take place where withdrawals from wells located near the streams lower the adjacent water table below the stream level. During dry periods, water may discharge from the alluvial deposits or adjoining aquifers into the streams, which contributes to base flow.

MISSISSIPPI RIVER VALLEY ALLUVIAL AQUIFER

The Mississippi River Valley alluvial aquifer underlies the Mississippi River Valley, which is an extensive, low, flat plain that is a major physiographic feature of the segment. The aquifer extends southward from the head of the Mississippi Embayment, which is described in chapters D and K of this Atlas, and merges with the coastal lowlands aquifer system band of sediments in low-lying areas parallel to the Gulf Coast. The Mississippi River Valley alluvial aquifer underlies nearly 33,000 square miles in Segment 5 and ranges from about 75 miles wide between Vicksburg, Mississippi and Monroe, Louisiana to about 120 miles wide near the latitude of Little Rock, Arkansas. Sand, gravel, silt and minor clay deposits of Quaternary age that make up the aquifer in eastern Arkansas, northwestern Mississippi, and northeastern Louisiana also extend to the Gulf Coast in southeastern Louisiana (fig. 13). For purposes of this Atlas, however, the extent of the Mississippi River Valley alluvial aquifer is limited to the area shown in figure 23. Quaternary alluvial and deltaic deposits of the lower Mississippi River Valley generally are lithologically similar to and in good

hydraulic connection with the underlying deposits of the coastal lowlands aquifer system and, therefore, are included in that system.

HYDROGEOLOGY

The Mississippi River Valley alluvial aquifer was deposited within a broad erosional stream valley formed by a preglacial drainage system. The erosional river valley served as a major drainageway for glacial meltwater, and considerable amounts of coarse-grained detritus (sand and gravel) were deposited in the valley by a braided, ancestral Mississippi River system. As the glaciers waned, sea level and base level rose, and the Mississippi River Valley aggraded. About 12,000 years ago, a braided, ancestral Mississippi River system gradually gave way to a meandering regimen as discharge and sediment load diminished. This is reflected in the geologic character of sediments contained within the Mississippi River Valley; the aquifer consists of a braided sequence of gravel and coarse sand that is overlain by a finer sequence (confining unit) of sand, silt, and clay that was mostly deposited by a meandering river system (fig. 24).

Downcutting, lateral migration, sudden channel shifting, shift in stream regimen, and aggradation by the Mississippi River have resulted in a wide variety of depositional and geomorphic landforms from Pleistocene to early Holocene time (fig. 24). During sea-level rise, the Mississippi River aggraded and the valley infilled with alluvial deposits. Sea-level decline lowered the base level of the Mississippi River and caused the river to entrench into the adjoining valley fill. The Mississippi River Valley contains four stream terraces that formed in response to cyclic base-level change. Successive periods of entrenchment helped form the different erosional terraces. Braided streams that carried silt-laden glacial meltwater also served as the source of thick, wind-transported loess deposits.

The modern-day meandering Mississippi River system contains a wide assemblage of flood-plain depositional features that include point bars, natural levees, crevasse splays, backswamps, oxbow lakes, and alluvial fans. Meandering streams, which are formed by the helical, secondary flow of surface water as it moves downstream, shift their position by eroding outer banks of meander bends; transporting eroded, sandy sediment; and depositing it on the inside of downstream meander bends. When viewed in a vertical section, point-bar sediments are coarse at their base but fine upward. Natural levees build upward and outward, form as floodwaters rise above the bank level, and deposit sediment in bands that parallel the stream channel. Crevasse splays form where levees are breached and surface waters flow out onto the flood plain, which deposits sediment as a deltaic lobe. Backswamp areas generally form in low-lying, closed depressions, are underlain by silt and organic clay, and are covered by water for lengthy periods. Oxbow lakes form by meander cutoff, in which the upstream and downstream parts of a meander bend intersect, which shortens the length of the river. This crescent-shaped bend forms a closed lake that eventually fills with clay sediment. Alluvial fans form where smaller streams enter the valley and deposit sediment onto the flood plain. As surface waters diminish in depth and velocity, coarse detritus is deposited as a fan.

The deposits of the Mississippi River alluvial valley can be separated into two hydrogeologic units‹an upper confining unit of silt, clay, and fine sand that impedes the downward movement of water into a lower coarse sand and gravel aquifer. The confining unit was deposited in flood plain, backswamp, meander belt, and some braided stream environments. The thickness of the confining unit averages between 20 and 30 feet throughout most of its extent but is missing in some places. The confining unit increases to more than 60 feet in thickness north of the Arkansas River in east-central Arkansas (Grand Prairie area) and along the Mississippi River Valley in part of west-central Mississippi (fig. 25) and exceeds 100 feet locally. The thickness of the underlying Mississippi River Valley alluvial aquifer ranges from about 25 to more than 150 feet (fig. 26). The Quaternary sand and gravel of the Mississippi River Valley alluvial aquifer continue southward but are considered to be part of the coastal lowlands aquifer system.

The layered sequence of aquifer and confining units that lies east and west of the alluvial plain and that is part of the Mississippi embayment aquifer system also extends beneath the Mississippi River Valley alluvial aquifer (fig. 27). In places, the Mississippi River Valley alluvial aquifer directly overlies and is hydraulically interconnected with aquifers of the Mississippi embayment aquifer system; in such places, water moves freely between the aquifers (fig. 27). The movement may be into or out of the Mississippi River Valley alluvial aquifer; this depends on whether the hydraulic head in the aquifer is higher or lower than that in the underlying aquifers. The ground water also moves from areas of high head toward areas of lower head. In other areas, the aquifer overlies poorly permeable strata that function as confining beds. In general, the permeability of the Mississippi River Valley alluvial aquifer is greater than that of the underlying aquifers.

RELATION BETWEEN GEOLOGY AND PERMEABILITY

Understanding the physical framework and facies of the Mississippi River Valley alluvial aquifer is useful in predicting permeability and hydraulic conductivity. Hydraulic conductivity is a measure of how rapidly water will pass through an aquifer and is a good indication of the probable yield of wells completed in the aquifer‹the higher the hydraulic conductivity, the greater the expected well yield. Permeability is another way of measuring the ability of an aquifer to transmit water under a hydraulic gradient. Permeability is equal to the hydraulic conductivity of an aquifer multiplied by the gravitational constant and divided by the density and dynamic viscosity of the water.

Transmissivity is a third way of measuring the capacity of an aquifer to transmit water of the prevailing viscosity. The transmissivity of an aquifer is equal to the horizontal hydraulic conductivity of the aquifer multiplied by the saturated thickness of the aquifer. The hydraulic conductivity, transmissivity, and permeability of an aquifer are directly influenced by the particle size, particle shape, degree of packing, sorting, amount of material that fills pore space, and cementation of the mineral and rock material that composes the aquifer. These factors are, in large part, a reflection of the depositional history of the rock. The distribution of the hydraulic conductivity of an alluvial aquifer, therefore, might be estimated from a map of the

geologic facies of the aquifer because of the direct correlation between rock type and aquifer permeability. Hydraulic and lithofacies data also can be compared to help understand lateral variations within the alluvial sequence. Lithofacies maps of the Mississippi River Valley alluvial aquifer provide some insight to the distribution of hydraulic conductivity. To a degree, lithofacies maps can be used as a predictive tool in the search for overlooked or undeveloped sites that might prove suitable for ground-water resource development.

The distribution of the percentage of sand and gravel within the Mississippi River Valley alluvial aquifer is shown in Figure 28. The distribution of coarse-grained sediment indicates that higher concentrations of coarse detritus underlie the eastern one-half of the aquifer in a northsouth band. In this area, sand and gravel compose more than 80 percent of the aquifer. Less coarse detritus is located on both sides of this band and may possibly be associated with an ancient flood plain.

The map of the distribution of hydraulic conductivity of the Mississippi alluvial aquifer shown in figure 29 was constructed by using aquifer and specific-capacity test data, supplemented with trial-and-error estimates of hydraulic conductivity that were obtained by computer simulation of the ground-water flow system. The areas of highest hydraulic conductivity (greater than 245 feet per day) correspond well with the eastern part of the alluvial plain; this is an area in which sand and gravel have been concentrated (greater than 80 percent; fig. 28). In the western part of the alluvial plain (eastern Arkansas and northeastern Louisiana), the hydraulic conductivity of the alluvial aquifer generally ranges from 200 to 245 feet per day. Figure 28 shows a parallel reduction in the concentration of coarse-grained sediment in this area. Southward, the hydraulic conductivity of the aquifer diminishes; this reduction may reflect a progressive change in depositional facies southward from alluvial sand to a more clayey deltaic facies where the alluvial aquifer merges southward with the uppermost sediments of the coastal lowlands aquifer system.

RIVER-AQUIFER INTERACTION

The hydrology of an alluvial aquifer is greatly influenced by the rivers that cross and incise it. When a stream channel incises an unconfined aquifer, the stream may recharge the aquifer, or the aquifer may discharge water to the river. River stage altitude tends to be high owing to greater stream flow; water from the river seeps laterally into the river banks and vertically through the streambed and thus raises water levels in the aquifer. When this occurs, the alluvial aquifer receives water from the river (fig. 30A), and the river is called a losing stream because it loses water to the aquifer. Water-table contours ³point² downstream where they cross a losing stream. When streamflow and altitude of river stage are low, ground water stored in the aquifer and river banks is discharged to the river (fig. 30B). Under such conditions, water moves from the aquifer to the river, and the river is called a gaining stream. Where water-table contours cross a gaining stream, they ³point² in an upstream direction.

The Mississippi River Valley alluvial aquifer is incised by the Mississippi River, as well as several smaller rivers and streams that traverse the alluvial plain. The hydraulic connection of the rivers

depends on the nature of the riverbed material or the depth to which the rivers penetrate the confining unit and aquifer. A deep incision by the major river drains tends to enhance the hydraulic connection of the rivers with the alluvial aquifer. Because the larger streams incise deeply, they are likely to breach the upper confining unit and, thus, are in direct hydraulic connection with the aquifer. These rivers, therefore, are more likely to be affected by withdrawals by large wells completed in the alluvial aquifer. In contrast, streams that do not or only partially breach the confining unit are not likely to be hydraulically well-connected with the aquifer and may even be above the regional water table. Hydrographs that compare river stage and water-table altitude in wells located near some of the rivers that are tributaries of the Mississippi River show different degrees of river-aquifer interconnection (fig. 31). Stream hydrographs for the White River at St. Charles, Arkansas (fig. 31A) and the Cache River near Patterson, Arkansas (fig. 31B) closely correspond with water levels in nearby wells and show that high and low water levels in the aquifer parallel high and low flow periods in the rivers. The alluvial aquifer and the rivers are in direct hydraulic connection at these places, and water moves freely between the aquifer and the river. Conversely, hydrographs of stream stage and water levels in nearby wells for the Cache River at Egypt, Arkansas (fig. 31C) and L'Anguille River near Colt, Arkansas (fig. 31D) show poor correspondence. In these places, the rivers either have not breached or only partially breach the confining unit or alluvial aquifer and not as much water is exchanged between the river and the aquifer. In the Cache River area, long-term potentiometric decline has lowered water levels such that it lies beneath the streambed the entire year. Because the river stage levels are above aquifer water levels throughout the year, some water probably leaks downward from the rivers through the confining bed to re-charge the aquifer.

Large ground-water withdrawals have resulted in a long-term decline of water levels in some areas and also have reduced the amount of water that discharges to the rivers. By the early 1980's pumpage for irrigation and aquaculture, primarily to catfish farms, caused water levels in the alluvial aquifer to fall below the streambed of the Big Sunflower River in Mississippi (fig. 32). The Big Sunflower River and the lower part of the Yazoo River have historically acted as long-term drains from the alluvial aquifer; the potentiometric surface of the aquifer has sloped toward the Big Sunflower River even though the hydraulic connection was poor. During the early 1980's, pumpage for irrigation and catfish ponds caused water levels to decline from 1 to 2 feet per year and below the level of the lower stage of the Big Sunflower River. Because of the large amounts of water withdrawn, water levels in the aquifer did not recover during the winter and spring months even though the amount of precipitation is greater than the amount that falls during the growing season. Accordingly, water leaks downward from the Big Sunflower River to the aquifer year round. Water likewise moves from the Yazoo River to the aquifer throughout the year, but withdrawals from wells near the Yazoo River are not great enough to lower aquifer water levels below streambed levels. In contrast, flow between the Mississippi River and the aquifer is different at different times of the year. Precipitation is considerably less during the summer and fall, and the river stage is below that of the alluvial aquifer. In these conditions, water discharges from the aquifer to the river (fig. 32A). When precipitation increases during the winter and spring, the

positions of river and aquifer water levels may be reversed (fig. 32B), and the Mississippi River becomes a source of recharge for the aquifer. Away from the rivers, aquifer levels are lowered locally owing to pumping of irrigation wells during the growing season but recover during the winter and spring. Water levels remain low near catfish ponds, however, because wells that supply the ponds are pumped year-round.

The configuration of the water table near rivers that incise the Mississippi River Valley alluvial aquifer also is influenced by seasonal change in river stage altitude. During the winter and spring, river-stage altitude tends to be high owing to greater stream flow; water from the river seeps into the river banks and raises water levels in the aquifer. During the summer and fall, streamflow and river-stage altitude are low, and ground water stored in the aquifer and river banks is discharged to the river. The seasonal changes in water levels in the alluvial aquifer can be large. For example, the decline in water levels in the Mississippi River Valley alluvial aquifer from spring to fall 1965 was greater than 10 feet in some places (fig. 33).

GROUND-WATER FLOW

Ground water within the Mississippi River Valley alluvial aquifer occurs largely under confined conditions. In areas where the aquifer is confined, recharge enters the alluvial aquifer by downward leakage through the confining unit. The confining unit is not continuous everywhere. Unconfined conditions occur in an area between the Black and the Cache Rivers in Mississippi County, Arkansas, and also along major river courses that have incised the confining unit.

Before development of the Mississippi River Valley alluvial aquifer, water levels in the alluvial aquifer generally were less than 20 feet below land surface, and the regional direction of flow was southward (fig. 34). In the Grand Prairie area of Prairie, Monroe, and Arkansas Counties, Arkansas, flow generally was southeastward toward the White River and locally southward toward the Arkansas River. Downward leakage of rainfall (0.51.0 inch per year) through the upper confining unit accounted for nearly three-fourths of the recharge to the Mississippi River Valley alluvial aquifer before development. About one-fourth of the recharge to the alluvial aquifer before development was from upward leakage from Coastal Plain aquifers that underlie the Mississippi River Valley alluvial aquifer. Most of the discharge from the alluvial aquifer was to rivers that incised the aquifer.

Well withdrawals, the construction of drainage canals and flood control structures, river navigational improvements, and changes in agricultural land use over the last 70 years have contributed to changes in the ground-water flow system and have reduced discharge from the Mississippi River Valley alluvial aquifer. Although development of this aquifer has been extensive, the regional movement of ground water generally remains unchanged (fig. 35). Many areas within the Mississippi River Valley have only a local change in the ground-water flow direction. The most dramatic area of change in water level-decline and ground-water flow direction is within the Grand Prairie and the Cache River areas of Arkansas. Large amounts of ground water are withdrawn in these areas to irrigate rice crops. The large withdrawals have caused water-level declines within the alluvial aquifer, which

resulted in a cone of depression between the White and the Arkansas Rivers. A second depression in the potentiometric surface is located between the Cache River and the southern one-half of Crowleys Ridge (fig. 35).

WELL YIELD, PUMPAGE, AND LONG-TERM WATER-LEVEL DECLINE

Before the middle 1970's, most ground-water discharge was to the major rivers that incised the Mississippi River Valley alluvial aquifer. During the middle 1970's, withdrawals by wells reduced the amount of water that naturally discharged to the Mississippi River and its tributaries by nearly two-thirds. Well withdrawals presently (1997) represent the principal mechanism of ground-water discharge.

Properly constructed wells capable of yielding 500 gallons per minute can be completed almost anywhere within the Mississippi River Valley alluvial aquifer. Some irrigation wells yield from 1,000 to as much as 5,000 gallons per minute. However, long-term decline in water levels in some areas has resulted in diminished saturated aquifer thickness and reduced aquifer transmissivity. These factors limit the amount of water that can be withdrawn without producing an adverse impact on the aquifer.

Hydrographs for some observation wells completed in the alluvial aquifer show a long-term decline of the potentiometric surface. Most of the long-term decline shown in figures 36A through C is attributed to rice-crop irrigation in eastern Arkansas. Water levels in some wells in Arkansas declined more than 55 feet between 1930 and 1985 as a result of irrigation withdrawals. Long-term declines also are evident locally in Mississippi, as shown in figure 36E, but are not as great as those in Arkansas. In some areas, the Mississippi River Valley alluvial aquifer water levels are not greatly affected by well withdrawals as indicated by figures 36D and F. These hydrographs show only seasonal fluctuations or response to variations in precipitation.

Concurrent with a long-term decline in the potentiometric surface of the alluvial aquifer has been a steady change in recharge to and discharge from the aquifer. Before development, recharge entered the aquifer in topographically high areas and most of the water was discharged to rivers. By the middle 1970's, the potentiometric surface had been greatly lowered, and downward leakage from rivers accounted for more than 20 percent of the recharge to the alluvial aquifer. Recharge by upward leakage from the deeper aquifers was increased by the decline in the potentiometric surface of the alluvial aquifer.

Of the water withdrawn by wells completed in the Mississippi River Valley alluvial aquifer, about 20 to 50 percent is obtained from ground water held in storage. A change in the volume of water that discharges from the aquifer or that recharges it results in a change in the volume of water in storage within the aquifer. In an unconfined aquifer, a change in storage is produced by draining or filling pore space within the aquifer. In a confined aquifer, a change in storage is produced by expansion or compression of the aquifer and the water it contains.

Increased rates of withdrawal from wells completed in the Mississippi River Valley alluvial aquifer have paralleled the increase in rice acreage. The cultivation of rice requires large quantities of water to

maintain the 4- to 6-inch depth of water on rice fields (fig. 37) for the May to August growing season. The rice acreage expanded greatly between 1972 and 1982, but decreased in 1983 in response to a change in the national farm policy. Ground-water withdrawals in rice-growing counties of Arkansas and Mississippi (fig. 38) showed a steady increase from 1960 until 1980, and then declined in 1985 in direct proportion to a decline in the amount of acreage irrigated for rice.

Pumpage from wells completed in the Mississippi River Valley alluvial aquifer in 1940, 1960, and 1980 (figs. 39A, C, E) illustrates a direct cause-and-effect relation with water-level declines in 1942, 1962, and 1982 (figs. 39B, D, F). In the Grand Prairie, Arkansas, area, adjacent to the White River, water-level decline within the Mississippi River Valley alluvial aquifer was reported as early as 1929. Areas with large water-level declines generally coincide with areas that have been stressed by heavy, long-term pumpage. In 1942, declines that ranged from 40 to 60 feet were reported in the Grand Prairie area (fig. 39B), where withdrawal rates during 1940 were high (fig. 39A). West of Crowleys Ridge, in the Cache River area, irrigation withdrawals were initiated in the 1940's with little decline in the potentiometric surface in 1942. However, as pumpage increased during 1960 (fig. 39C), water-level declines ranged from 40 to 60 feet (fig. 39D). The early 1980's marked a zenith in rice cultivation in Arkansas, northeastern Louisiana, and Mississippi. Large withdrawals from wells during 1980 (fig. 39E) contributed to water level-declines that ranged from 60 to 90 feet in the Grand Prairie and the Cache River areas of Arkansas and from 10 to 20 feet in northwestern Mississippi by 1982 (fig. 39F).

GROUND-WATER QUALITY

The quality of ground water can be characterized in terms of the hydrochemical facies of the water and its dissolved-solids concentration. Hydrochemical facies are determined by the dominant anions and cations contained within the ground water. For example, calcium bicarbonate water is one which calcium ions are more than 50 percent of the total cations in the water, and bicarbonate ions are more than 50 percent of the anions. The dissolved-solids concentration is the total concentration of minerals that are in solution. In this report, the dissolved-solids concentration in ground water is used to classify the water as fresh, saline, or brine. The concentrations used to categorize the water are as follows:

Term	Dissolved solids concentrations (mg/L)
Freshwater	Less than 1,000
Slightly saline water	1,000 to 3,000
Moderately saline water	3,000 to 10,000
Very saline water	10,000 to 35,000
Brine	Greater than 35,000

The chemical constituents in ground water are determined, in part, by the mineralogy of the materials that compose the aquifer and by the length of time the water is in contact with these materials. Meteoric water contains few dissolved solids and enters the flow system as precipitation. As the meteoric water moves down the hydraulic gradient, either the water partially dissolves aquifer minerals or an exchange of ions takes place between the water and the minerals. Accordingly, water

in the deeper parts of the aquifer tends to be more mineralized than that in the shallower parts. The water quality of the Mississippi River Valley alluvial aquifer also may be influenced by the upward movement of more mineralized water from underlying aquifers.

The quality of water within the Mississippi River Valley alluvial aquifer generally is suitable for most uses. For the most part, the water can be characterized as a calcium bicarbonate type with dissolved-solids concentrations that are usually less than 500 milligrams per liter (fig. 40). In some areas, however, dissolved-solids concentrations range from 1,000 to 3,000 milligrams per liter. Water-quality characteristics that often limit usefulness of water from the Mississippi River alluvial aquifer for public supply are excessive hardness and large concentrations of iron and manganese. The north-to-south increase in dissolved solids within the Mississippi River Valley alluvial aquifer is attributed to mineral-water interaction along ground-water flow paths.

FRESH GROUND-WATER WITHDRAWALS

Total withdrawals from the Mississippi River Valley alluvial aquifer were about 5,050 million gallons per day during 1985 (fig. 41). About 96 percent of this amount was withdrawn for agricultural use; about 80 percent of the total ground water withdrawn was used for the irrigation of rice. Other agricultural uses include the irrigation of soybean, cotton, and corn, as well as withdrawals for aquaculture, primarily the raising of catfish, as well as crawfish and alligator farming. Crawfish farming is largely concentrated in southern Louisiana, whereas catfish farms are mostly located in Mississippi and the northwestern part of the Grand Prairie area in Arkansas. The aquaculture industry requires substantial pumpage to maintain water levels within artificial ponds. Withdrawals for all other uses during 1985 were only about 4 percent of the total withdrawals, or about 182 million gallons per day.

Total withdrawals from the aquifer increased steadily from 1960 to 1980 (fig. 42). The greatest increase in withdrawals was between 1970 and 1980 and corresponded to a large increase in rice acreage. A change in the national farm policy and the corresponding decrease in irrigated rice acreage partly account for the decrease in withdrawals between 1980 and 1985. Drier climatic conditions occurred in 1980 than 1985 and partly explain the decline in ground-water withdrawals.

STREAM-VALLEY ALLUVIAL AQUIFERS

The Arkansas River, the OuachitaSaline Rivers, and the Red River alluvial aquifers represent the minor alluvial aquifers of Segment 5 (fig. 23). All are stream-valley alluvial aquifers that consist of terraced alluvial deposits of Pleistocene age and flood plain alluvial deposits of Holocene age. Many of these aquifers are characterized by a lower unit of sand and gravel that was deposited by lateral fluvial accretion and an upper confining unit of silt and clay that was formed by vertically accreted flood deposits (fig. 43). Holocene sand, silt, and clay deposits that underlie the modern flood plain generally are restricted to a smaller area within the alluvial valley. For the most part, alluvial and terrace deposits that compose these stream-valley alluvial aquifers were deposited in response to sea-level changes during the Pleistocene. Highstands of sea level resulted in channel

aggradation and lowstands were accompanied by incision of channels. Most of the minor alluvial aquifers in Segment 5 are thin, usually not exceeding 100 feet in thickness; some are less than 50 feet thick. The thickness of alluvium is most often controlled by pre-Pleistocene erosion and topography; the thickest deposits are within depressions or paleovalleys cut into the underlying bedrock.

Ground water within the stream-valley alluvial aquifers is partly under confined or artesian conditions; water-table conditions exist in the part of the aquifer that is adjacent to the river. Artesian conditions generally are in areas where upper terrace or flood plain deposits consist of silt and clay and act as a confining unit. Recharge to the stream-valley alluvial aquifers is by either infiltration of precipitation or recharge from underlying or adjacent water-yielding rocks; discharge is by seepage to streams that incise the aquifer or by evapotranspiration. In places where the flood plain is well-developed for agricultural purposes, the aquifer can be recharged by downward seepage of irrigation water. Water induced from the river into the aquifer where the water-table surface is lowered by nearby pumping from wells near the river also is a source of recharge. Recharge by upward discharge from underlying aquifers is much more prevalent in the Coastal Plain areas than the Arkansas River Valley or the Ouachita Mountains areas where the aquifer is underlain by poorly permeable bedrock. Ground-water flow in all three stream-valley alluvial aquifers is, for the most part, largely downstream with a local component of movement toward the major stream channels.

Water levels within the Arkansas, the Ouachita Saline, and the Red River alluvial aquifers usually are within a few feet of land surface but are as much as 25 feet below the land surface in some places. Seasonal variation in the amount of rainfall and varying rates of ground-water withdrawal may cause as much as a 10-foot change in the potentiometric surface. Where the alluvial aquifer is hydraulically connected to the river, water levels vary in response to change in the river stage. Hydrologic conditions within the Arkansas and the Red River alluvial aquifers have been locally altered by the reservoirs, locks and dams, and levees built on these rivers. Such control structures have locally raised upstream river stages and nearby ground-water levels, which affect the local direction of ground-water flow. Changes in land use and in the amount of ground- and surface-water withdrawals for agricultural purposes also affect local ground-water flow patterns. The ³dampening² effect on water-level fluctuations in the Arkansas River alluvial aquifer as a result of construction of the Dardanelle Reservoir is shown on figure 44. Before reservoir construction, water levels near the river fluctuated seasonally as much as 10 feet each year. After the reservoir was completed, water levels have varied less than 5 feet per year.

Several factors control the yield of water to wells completed in the Arkansas River, the OuachitaSaline Rivers, and the Red River alluvial aquifers. These factors include the lithologic and hydraulic characteristics of the aquifer and the degree of hydraulic interconnection between the aquifer and the river. One of the most important factors that influences well yield is the saturated thickness of the aquifer. For example, assuming that the saturated thickness of the OuachitaSaline Rivers alluvial aquifer was 25 feet and that a withdrawal rate of 1 gallon per minute resulted in 1 foot of drawdown,

the yield to wells could not exceed 25 gallons per minute. Ranges of aquifer thickness, well yield, transmissivity, and hydraulic conductivity for stream-valley alluvial aquifers of Segment 5 are shown in table 1.

Wells are reported to yield from 300 to 700 gallons per minute from the Arkansas River alluvial aquifer, whereas the yield of wells completed in the OuachitaSaline River alluvial aquifer is more variable and ranges from 25 to 2,500 gallons per minute. The yield of wells completed in the Red River alluvial aquifer generally ranges from 200 to 1,700 gallons per minute; some test wells are reported to yield as much as 2,800 gallons per minute.

The quality and composition of ground water contained in stream-valley alluvial aquifers in Segment 5 varies considerably. Although the quality of water within the Arkansas River alluvial aquifer is suitable for most uses, large concentrations of iron and nitrate and excess hardness locally make the water undesirable for some public supply and industrial uses. Water within this aquifer is a calcium magnesium bicarbonate type (fig. 45). Ground-water contained within the Ouachita-Saline Rivers alluvial aquifer can vary greatly in chemical composition and hardness. Water from this aquifer ranges from a sodium bicarbonate to a sodium chloride type. Although water withdrawn from the Ouachita-Saline Rivers alluvial aquifer generally is suitable for irrigation, stock watering, domestic, and some industrial uses, concentrations of iron, manganese, nitrate, sulfate, chloride, and dissolved solids locally exceed the drinking water standards recommended by the U.S. Environmental Protection Agency. Water in the Red River alluvial aquifer is suitable chiefly for stock watering and irrigation purposes; concentrations of iron and dissolved solids in water from this aquifer may exceed U.S. Environmental Protection Agency recommended secondary drinking water standards.

COASTAL LOWLANDS AQUIFER SYSTEM

INTRODUCTION

The coastal lowlands aquifer system consists of a gulf-ward-thickening, heterogeneous, and unconsolidated to poorly consolidated wedge of discontinuous beds of sand, silt, and clay that range in age from Oligocene to Holocene (fig. 46). The aquifer system underlies parts of the East and West Gulf Coastal Plain and the Mississippi Alluvial Plain Sections of the Coastal Plain Physiographic Province. The coastal lowlands aquifer system in Segment 5 extends eastward from Texas across southern and central Louisiana into southern Mississippi. The aquifer system extends westward and southwestward across Texas to the Rio Grande; this part of the system is described in Chapter E of this Atlas. A very small part of the system extends into southern Alabama and the western part of the Florida panhandle, where the system is called the sand and gravel aquifer; it is described in Chapter G of this Atlas. To the north, the uppermost unit of the system (Permeable zone A) merges with the Mississippi River Valley alluvial aquifer. The aquifer system extends to the edge of the continental shelf in the Gulf of Mexico, but it contains saline water in most of its offshore areas. Major rivers that flow across this aquifer system include the Mississippi, the Pearl, and the Red Rivers. Average annual

precipitation ranges from 56 inches in western Louisiana to as much as 68 inches in southeastern Mississippi. The coastal lowlands aquifer system yields large quantities of water for agricultural, public supply, domestic and commercial, and industrial uses.

Permeable zones of the coastal lowlands aquifer system typically consist of interbedded sand and clay, rather than the massive, areally extensive sand beds common in other Coastal Plain aquifers and aquifer systems described in this Atlas segment. Numerous water-yielding and confining zones within the coastal lowlands aquifer system have been identified and mapped locally. Many local aquifer names have been applied to parts of the aquifer system primarily in Louisiana (fig. 47). The ³Chicot aquifer² and the ³Evangeline aquifer² are names commonly applied to the upper part of the coastal lowlands aquifer system in southwestern Louisiana. However, these aquifers do not extend into southeastern Louisiana as mappable hydrogeologic units. In the southeastern part of the State, therefore, an entirely different nomenclature is used for local aquifers; many of the aquifers in southeastern Louisiana have been named according to the depth at which they are usually encountered in the industrial districts of Baton Rouge and New Orleans, where ground-water pumpage is substantial (for example, the ³1,200-foot² sand). Because of the regional southward dip of the aquifers and because they are cut and displaced by faults, the ³1,200-foot² sand at New Orleans is not the same permeable unit as the ³1,200-foot² sand at Baton Rouge. In this case, as in other cases, the same name has been applied locally to water-yielding strata that are neither stratigraphically equivalent nor hydraulically interconnected.

The diverse nature of the texture and thickness of the strata in the coastal lowlands aquifer system makes extension of local hydrogeologic units into a regional sequence extremely difficult. Lenticular sand and clay beds of the aquifer system have lateral and vertical boundaries that are gradational, poorly constrained, and difficult to trace over more area than a few counties or parishes. Some water-yielding zones and local aquifers have been distinguished solely on the basis of local differences in hydraulic head or hydraulic conductivity. In many cases, such distinguishing characteristics are important only locally. The aquifer system composes mostly deltaic and associated marginal marine deposits in which changes in lithologic facies are rapid, numerous, and complex. Intrastate and interstate correlation, even with the aid of geophysical well logs and paleontologic information, usually is extremely tenuous. Correlation is further complicated by the presence of numerous growth faults that vertically displace the hydrogeologic units and by the lack of widespread marker horizons or continuous clay beds. The lack of widespread clay beds means that few continuous confining units can be used to divide the section into the customary sequence of alternating aquifers and confining units. Despite all these difficulties, intensive studies have indicated that the aquifer system can be divided into five permeable zones of regional extent (fig. 47).

THICKNESS AND EXTENT

From a landward featheredge, sediments that compose the coastal lowlands aquifer system extend and thicken coastward or toward the axis of the Mississippi Embayment. The oldest sediments of the aquifer system are exposed farthest inland, with belts of progressively younger sediments exposed coastward in an offlap relation. A notable exception

are the youngest sediments that compose the aquifer system's uppermost water-yielding unit, Permeable zone A. This zone locally overlaps older strata where it extends northward and merges with the Mississippi River Valley alluvial aquifer.

The thickness of the coastal lowlands aquifer system is greatest in southern Louisiana and adjoining offshore areas where the aquifer system is more than 14,000 feet thick (fig. 48). The thickness of the aquifer system and its downdip, gulfward extent are determined, in part, by progressive facies change as permeable deltaic sands grade seaward to less permeable prodelta silt and clay. These prodelta sediments are fine-grained terrigenous clastics deposited from suspension seaward of the delta front. The coastal lowlands aquifer system consists largely of sediments deposited in a deltaic to marginal marine environment. The aquifer system, therefore, contains a highly interbedded mix of sand and clay. Thick sand beds of wide areal extent are uncommon.

A second factor that determines the gulfward extent and thickness of the coastal lowlands aquifer system is the depth to the top of the geopressured zone (figs. 49, 50). In deep subsurface areas of southern Louisiana, southern Mississippi, and the Gulf of Mexico, the coastal lowlands aquifer system is truncated downdip by the geopressured zone, which is a zone of abnormally high fluid pressures that lies at depths that usually range from more than 5,000 to 13,000 feet in southern Louisiana. Under normal rates of sedimentation, water called formation water is trapped between sediment grains but is expelled when the sediments compact as they are slowly buried by younger sediments. The geopressured zone, however, contains formation water that was trapped in the sediments under conditions of very rapid burial and sediment compaction; the buried sediments remain undercompacted and the formation water is under great pressure. Extensive growth faulting in southern Louisiana also contributed to formation of the geopressured zone. The faults isolated and hydraulically cut off beds into sealed compartments. These faults eliminated the opportunity for pressured pore water to dissipate as sediments were more deeply buried. Movement of water within the geopressured zone is extremely slow and a small volume of geopressured water moves upward toward the meteoric flow system, but the amount is minuscule relative to the quantity of water that circulates within the coastal lowlands aquifer system. The geopressured water moves only into deeply buried parts of the aquifer system that contain highly mineralized water.

HYDROGEOLOGIC UNITS

Recent studies have separated the coastal lowlands aquifer system into five zones of permeability as part of a regional assessment of ground-water conditions in coastal Texas, southern Louisiana, and southern Mississippi. The equivalency of the five permeable zones with local aquifers is shown in figure 48. Owing to the difficulty of making stratigraphic and hydrogeologic correlations within the coastal lowlands aquifer system and to the general absence of widespread confining units, a set of hydrologic criteria is used to delineate and map the regional permeable zones. A comparison of conditions in the permeable zones indicates that large contrasts in hydraulic head increase with depth and that differences in hydraulic conductivity between different zones are large. Where such differences are not

readily observable, separation of the permeable zones tends to be arbitrary. Although the five zones are called permeable zones because they are difficult to define precisely, they can be considered to be regional aquifers because of their wide extent and great thickness. All the zones consist of unconsolidated to poorly consolidated beds of sand and clay.

In the deep subsurface of southern Louisiana and offshore areas near southwestern Louisiana, the deltaic sediments of the coastal lowlands aquifer system grade to a marine sequence that contains two extensive clay beds. These clay beds were used to separate and map regionally the two lowermost permeable zones of the coastal lowlands aquifer system. A widespread, effective confining unit underlies the coastal lowlands aquifer system throughout its extent in Louisiana and Mississippi (figs. 49, 50). This confining unit, known as the VicksburgJackson confining unit, separates the coastal lowlands aquifer system from the underlying Mississippi embayment aquifer system.

Permeable zone A consists of deposits of Holocene to late Pleistocene age. Because it is widespread and contains freshwater in most places, it is the most intensively pumped aquifer of the system, and, for this reason, it is the only zone for which the hydrogeology is described in this report in detail. Permeable zone A is thickest in southern Louisiana where its thickness is greater than 1,000 feet near the coast (fig. 51). In northeastern Louisiana, it merges with the Mississippi River Valley alluvial aquifer. Alluvial deposits of the Mississippi River Valley that overlie Permeable zones B through E of the coastal lowlands aquifer system are not considered to be part of the Mississippi River Valley alluvial aquifer because those deposits are hydraulically well connected to the wide, coast-parallel band of Holocene and upper Pleistocene deposits in southern Louisiana and southwestern Mississippi that makes up the main body of Permeable zone A.

Permeable zone B, which comprises deposits of early Pleistocene to late Pliocene age, underlies zone A. The two zones are not separated by an intervening confining unit; separation of the two aquifers is based solely on differences in vertical hydraulic gradient and hydraulic conductivity. The part of Permeable zone B that contains freshwater generally is less than 1,000 feet thick. Freshwater parts of the aquifer in the southern Mississippi and central Louisiana subsurface generally are at depths of more than 500 feet below sea level. In eastern Louisiana, the aquifer may contain freshwater at depths from 600 to 700 feet below sea level. Permeable zone B is the second most intensively pumped aquifer of the coastal lowlands aquifer system; most withdrawals from the zone are concentrated in the Baton Rouge industrial area.

Permeable zone C consists of deposits of early Pliocene to late Miocene age, Permeable zone D comprises deposits of middle Miocene age, and Permeable zone E consists of deposits of early Miocene to late Oligocene age. Permeable zones C, D, and E crop out as narrow bands that extend across central Louisiana and southern Mississippi and thicken in the subsurface as they extend coastward (fig. 50). Each aquifer is truncated at its southernmost extent by the geopressured zone. In the coastal areas of Louisiana and adjacent offshore areas, a deeply buried confining zone separates Permeable zones D and E.

Offshore from southwestern Louisiana; a second confining unit separates Permeable zones C and D. These confining zones pinch out, or grade by facies change to more permeable strata, as they extend updip into the shallower subsurface. For the most part, however, the confining units separate only the parts of Permeable zones C, D, and E that contain saline water or brine. The freshwater lens contained within Permeable zones C, D, and E generally is less than 2,000 feet thick and lies at depths that are shallower than 2,000 feet below sea level.

RELATION BETWEEN GEOLOGY AND PERMEABILITY

Understanding the physical framework of the clastic lithofacies of the aquifers of the coastal lowlands aquifer system is useful in predicting the hydraulic characteristics of the aquifers. Hydraulic and lithofacies data can be compared to help understand lateral heterogeneity within the aquifer system. Lithofacies maps provide valuable insight into the distribution of permeability in clastic Coastal Plain aquifers, especially where hydraulic data are limited, and can be used as a predictive tool in the search for previously overlooked or unexplored sites suitable for development of ground-water resources.

In an aquifer that comprises clastic sediments, the hydraulic conductivity of the aquifer is directly influenced by particle size and shape, the degree of particle packing and sorting, the amount of clay or fine-grained material that fills intergranular pore spaces, and cementation of the sediments. To a large degree, these factors are influenced by the depositional history of the rock. In southern Louisiana, the compaction of sediments that follows their burial results in a systematic loss in the porosity of sand beds that averages 1.28 percent per 1,000 feet of burial depth. The reduction in porosity of clay beds as a result of burial is much greater and averages 20 percent per 1,000 feet of burial depth. The hydraulic conductivity of the unconsolidated to poorly consolidated sediments that compose Coastal Plain aquifers does not appear to be greatly altered by diagenesis and geochemical processes. The distribution of hydraulic conductivity in Coastal Plain aquifer, therefore, can be estimated from maps of lithofacies, because the correlation between sediment type and aquifer permeability is direct.

Sediments that compose the coastal lowlands aquifer sys-tem were, for the most part, transported by rivers and streams that flowed coastward and were deposited in deltaic environments. For the most part, sufficient quantities of fluvially transported sand, silt, and clay were deposited in subaerial and subaqueous environments near the coast at a rate that exceeded removal of the sediments by wave action and longshore currents. As a result, constructional deltas prograded or built outward into the Gulf of Mexico, primarily from the mouth of the Mississippi River.

Constructional deltas are characterized by either distributaries with a lobate (fan) shape (fig. 52A) or an elongate (bird-foot) shape (fig. 52D). Lobate and elongate distributaries have sand deposits in the distributary channels and as arcuate accumulations at the delta front, where the sand settles out of suspension when the river water confined in the distributary loses velocity as it enters deeper water (fig. 53). Fine-grained deposits of silt and clay accumulate as interdistributary

bay, swamp and marsh deposits within the delta plain as prodelta clays are deposited seaward of the delta-front sands.

Delta-plain and delta-front facies show a complex distribution associated with lobe (fig. 52B) and elongate (fig. 52E) distributary patterns. The branching of lobate distributaries resembles the splayed fingers of a human hand, and these distributaries tend to build a fan-shaped delta outward into the Gulf of Mexico. In the lobate delta front, the coarsest sands are in the distributary mouth bars; grain size diminishes seaward through the delta-front slope, with only silt and clay deposited within the prodelta area. Delta-front deposits are a mixture of clay, silt, and fine to coarse sand and accumulate mostly under the influence of currents and wave action. On the lobate delta plain, coarse-grained deposits are in distributary channels and adjacent levees, whereas interdistributary deposits are fine grained. Lower delta-plain distributary channel sands tend to be restricted in lateral extent, thus forming straight, narrow channels. Upper delta-plain point-bar sands form disconnected, linear, lenticular sand bodies that show evidence of lateral migration by meandering. Sandy crevasse-splay deposits are located in the lower part of the delta plain where low-lying levees are easily breached; sand accumulates as a small fan or delta as floodwaters flow over the levee into the inter-distributary areas. Silt and clay are the principal sediment types of interdistributary bay, marsh, and swamp environments; these sites areally compose the largest part of the lower delta plain. The delta-front facies is small in an elongate delta compared with a lobate delta. The delta-plain facies parallel elongate distributary channels and are more complex than the facies of a lobate delta but show a banded pattern of sediment that is progressively finer with increasing distance from the distributary channel.

Sand accumulations along lobate (fig. 52C) and elongate (fig. 52F) distributaries reflect the general shape of the distributary. In both types of distributaries, the axis of maximum sand thickness is located at the distributary channel. Sand thickness decreases in all directions away from the channel. An important factor that controls the type of constructional delta that forms is the thickness of the underlying clay beds. Elongate deltas tend to overlie thick prodelta clay deposits that subside and compact in response to sediment loading, thus helping preserve the distributary channels. Lobate deltas tend to overlie thinner prodelta clays that do not afford great differential subsidence; distributary channels are more numerous and thinner. Lobate and elongate (bird-foot) distributary channel facies are reported in buried sedimentary strata of the coastal lowlands aquifer system.

The overall distribution of sand within Permeable zone A (fig. 54) is similar to that of a lobate, rather than an elongate, delta system. Although some parts of the zone are characterized by sand concentrations as high as 100 percent that extend as narrow sand bodies, the zone comprises a series of small delta lobes that are combined as a single hydrogeologic unit. Locally, some areas contain concentrated sand bodies that may be part of small elongate deltas. These elongate sand bodies are located offshore and possibly reflect areas where distributary channels have prograded over thicker prodelta clays. Interdistributary deposits contain only 20 to 60 percent sand; they comprise mostly silt, clay, and lignite and were deposited between distributary channel sands. Distributary and interdistributary

lithofacies grade gulfward to prodelta silt and mud that contain less than 20 percent sand.

A hydraulic conductivity map of Permeable zone A was constructed by using aquifer and specific-capacity test data, as well as trial-and-error estimates of permeability obtained from computer simulation of the regional ground-water flow system. Areas of moderately high (from 100 to greater than 120 feet per day) hydraulic conductivity (fig. 55) compare well with the location of high sand percentages within the zone (fig. 54). Interbedded silt, mud, lignite and very fine sand probably account for the less permeable nature of possible distributary channel sands in more coastward areas. Areas of less than 10 percent sand with a hydraulic conductivity of less than 5 feet per day are associated with probable prodelta areas. Interdistributary deposits are poorly permeable (hydraulic conductivity from 5 to 100 feet per day) but are more permeable than prodelta deposits.

GROUND-WATER FLOW

Under natural conditions, precipitation entered the coastal lowlands aquifer system in mostly landward, interstream areas. Owing to the gravity-driven nature of the ground-water flow system, topography greatly influences the areas most likely to be sites of recharge and discharge, as well as the rate and direction of ground-water flow. Under natural conditions, recharge to the coastal lowlands aquifer system was greatest in the topographically high areas east and west of the Mississippi River and along the landward margin of the aquifer (fig. 56). Regional ground-water flow was directed southward to the coast with ground water discharged by diffuse upward leakage to major rivers, low-lying coastal marsh areas, and to the ocean as seabed seepage in shallow nearshore areas.

Although Permeable zone A is not overlain by a regional confining unit, ground water is contained within the deeper parts of the zone under confined conditions. This is due to abundant, but discontinuous, fine-grained beds of local extent that act as confining units, but cannot be traced over an area larger than several counties. Because these local confining units combine to retard the vertical movement of ground water, water in the aquifer at depths of a few hundreds of feet is under confined conditions in most locations.

More than 90 years of increasingly large withdrawals of water from the coastal lowlands aquifer system in southwestern and southeastern Louisiana, primarily for agricultural and municipal uses, has greatly altered the ground-water flow system. Large ground-water withdrawals from Permeable zone A have resulted in water-level declines and large cones of depression (fig. 57). The greatest water-level declines in this zone are in southwestern Louisiana and in the New Orleans area. Water-level decline has resulted in a considerable change in horizontal and vertical components of ground-water flow. Near pumping centers, the current (1987) direction of ground-water flow was in places opposite to natural or predevelopment direction. Large withdrawals also have induced greater infiltration of precipitation at aquifer outcrop areas and greater streambed leakage. The areal extent of discharge areas (compare figs. 56 and 57) has correspondingly decreased. Large withdrawals have caused similar large declines in water levels in Permeable zone B in the Baton Rouge area.

GROUND-WATER QUALITY

Dissolved-solids concentrations of water in the coastal lowlands aquifer system are directly related to ground-water flow in the system. In updip areas where the aquifers are recharged, ground water has small concentrations of dissolved solids, but the water becomes increasingly saline as it moves toward the coast. Several factors contribute to the coastward increase in dissolved-solids concentration. Dissolved solids increase, in part, as a result of dissolution of aquifer minerals. Water that approaches the coastline becomes even more mineralized as a result of mixing with sea water. Ground-water movement near the coast is sluggish and may not be sufficient to flush saltwater from the aquifer.

Permeable zone A contains fresh or slightly saline water nearly to the coast in most areas (fig. 58). A band of water that contains dissolved-solids concentrations from 500 to 1,000 milligrams per liter parallels the Atchafalaya River. In coastal areas of Louisiana, the zone contains water with dissolved-solids concentrations of more than 1,000 milligrams per liter.

Water in aquifer recharge areas of Permeable zone A is primarily a calcium bicarbonate type (fig. 59). As the water moves downgradient, it becomes a sodium bicarbonate type because calcium ions are exchanged for sodium ions in aquifer minerals, primarily clay minerals. A sodium chloride hydro-chemical facies near the coast is in an area that corresponds to the gulfward increase in dissolved solids and mixing with saline water (fig. 59).

FRESH GROUND-WATER WITH-DRAWALS AND DECLINE OF WATER LEVELS

The coastal lowlands aquifer system is the second most important source of ground water in Segment 5. During 1985, about 1,140 million gallons per day of fresh ground water was withdrawn from the aquifer system for all uses (fig. 60). Withdrawals for agricultural use accounted for more than 51 percent of the total withdrawals from the aquifer system, or about 585 million gallons per day. About 25 percent, or about 283 million gallons per day, of the total withdrawals were used for public supply purposes. Domestic and commercial users withdrew about 178 million gallons per day, nearly 16 percent of the total withdrawals. Industrial, mining and thermoelectric power withdrawals were about 95 million gallons per day, or about 8 percent of the total withdrawals.

Most ground-water withdrawals from the coastal lowlands aquifer system are concentrated in New Orleans, Baton Rouge, and southwestern Louisiana (fig. 61). Of the five aquifers in the coastal lowlands aquifer system, Permeable zone A has the largest withdrawals. However, ground-water withdrawals from the Baton Rouge pumping center have been mostly from Permeable zones B and C with smaller amounts from Permeable zone D. Withdrawals in New Orleans and Baton Rouge are primarily for industrial purposes. Agricultural withdrawals from Permeable zone A in southwestern Louisiana are mostly for irrigation of rice.

Several hundred wells were constructed in Permeable zone A before 1903 to provide water for rice irrigation in southwestern Louisiana. Ground-water withdrawals in this area increased from about 280 to about 800

million gallons per day between 1947 and 1980. In figure 62, hydrographs of two wells in southwestern Louisiana completed in the zone show a steady decline in water levels from 1943 to 1983. Hydraulic heads declined during this period by almost 150 feet near the center of intense pumping and about 75 feet at a more distant location (fig. 62). A decrease in total withdrawals caused a rise in water levels between 1983 and 1990.

Withdrawals primarily for industrial uses and smaller withdrawals for public supply are concentrated in Baton Rouge and New Orleans. In New Orleans, ground-water withdrawals of about 5 million gallons per day from Permeable zone A in 1900 increased to approximately 55 million gallons per day in 1970. Water levels declined steadily from 1950 to 1970, as shown in figure 63. Industrial activities changed, however, and smaller quantities of ground water were withdrawn from 1970 through 1985. This decrease in pumpage was followed by a steady period of recovery, and water levels rose to within 10 feet of the 1950 levels.

In the Baton Rouge area, estimated withdrawals of 2 million gallons per day in 1900 increased steadily until 1970 when shallow water-yielding strata (Permeable zone A) were abandoned in favor of deeper zones as withdrawal rates increased. Between 1970 and 1990, withdrawal rates ranged from 120 to 150 million gallons per day. Wells completed in Permeable zones C and D in the Baton Rouge area withdraw smaller volumes of water; in figure 64, hydrographs of two wells screened in Permeable zone C show a steady decline in water levels until 1974. Both wells are located near a heavily pumped industrial district in which 1990 withdrawals were estimated to be 20 million gallons per day. The difference in water levels of the two wells is attributed to their proximity to the center of a large cone of depression that surrounds the industrial district; well EB90 is located at a greater distance from the center of the depression than well EB367. The recovery of water levels in Permeable zone C that began in the early 1980's may reflect changes in the amount of water withdrawn for industrial needs.

WELL YIELD

The coastal lowlands aquifer system is capable of yielding large quantities of water to properly constructed wells. Large-capacity industrial and municipal wells have been reported to flow as much as 4,000 gallons per day when they are first drilled. Many large-capacity wells screened opposite water-bearing sands of Permeable zones A through D typically yield more than 1,000 gallons per minute. The uppermost part of Permeable zone A is apparently less productive than its lower part. Many wells completed in the upper part yield less than 1,000 gallons per minute; shallow sands commonly yield less than 500 gallons per minute. Conversely, wells completed in the lower part of Permeable zone A characteristically yield more than 1,000 gallons per minute; the greatest reported yield of large industrial wells is 3,000 gallons per minute. Wells screened opposite water-bearing sands of Permeable zone B in southwestern Louisiana yield from 100 to more than 2,000 gallons per minute, whereas industrial wells completed in the same zone located in Baton Rouge have a reported average yield of 830 gallons per minute. Permeable zone C is highly productive in terms of well yield. In southwestern Louisiana, some wells completed in this zone are reported to yield between 2,100 and 4,000 gallons per minute, whereas the yield to large-capacity wells in Permeable zone C in the

remainder of Louisiana range from 1,000 to 3,000 gallons per minute. Wells screened in Permeable zone D yield between 300 and 1,000 gallons per minute and average 750 gallons per minute in the Baton Rouge area. In southwestern Louisiana, municipal wells completed in Permeable zone D reportedly yield between 300 and 800 gallons per minute; a few wells produce as much as 1,000 gallons per minute. No information is available regarding the yield of wells completed in Permeable zone E.

MISSISSIPPI EMBAYMENT AQUIFER SYSTEM

INTRODUCTION

The Mississippi embayment aquifer system is the most extensive aquifer system in Segment 5, and parts of the system are discussed in Chapters C, D, G, and K (fig. 65) of this Atlas. The system underlies most of the East and West Gulf Coastal Plains and the Mississippi Alluvial Plain Sections of the Coastal Plain Province. The Mississippi embayment aquifer system merges eastward in Mississippi and in Alabama with the Pearl River aquifer that is part of the Southeastern Coastal Plain aquifer system (see Chapter G of this Atlas) and merges westward with the Coastal uplands aquifer system in Texas and Oklahoma (see Chapter E of this Atlas). A small area of equivalent rocks in southwestern Arkansas and northwestern Louisiana has been mapped as part of the Texas coastal uplands aquifer system in some reports but is considered to be part of the Mississippi embayment aquifer system in this Atlas.

The Mississippi embayment aquifer system extends eastward from Arkansas to northwestern Mississippi and comprises six aquifers that crop out as an arcuate band of poorly consolidated to unconsolidated, bedded sand, silt and clay (fig. 66). Geologic units of the aquifer system range from Late Cretaceous to middle Eocene in age. In southern Mississippi and central Louisiana, an extensive, thick, clay confining unit, the VicksburgJackson confining unit, separates the Mississippi embayment aquifer system from the overlying Oligocene and younger water-yielding strata of the coastal lowlands aquifer system. In the embayed part of the Gulf Coastal Plain of eastern Arkansas, northeastern Louisiana, and northwestern Mississippi, the southward-dipping strata of the Mississippi embayment aquifer system are hydraulically connected to the Mississippi River Valley alluvial aquifer.

The geologic formations and groups that compose the Mississippi embayment aquifer system thicken greatly in southern Mississippi and Louisiana (fig. 67) where large volumes of sediment were deposited by streams that emptied into the ancestral Gulf of Mexico. The Mississippi embayment aquifer system ranges in thickness from a featheredge to more than 6,000 feet (fig. 67). The aquifer system thickens eastward and westward from its updip limits toward the axis of the Mississippi Embayment. The aquifer system is thickest in south-central Louisiana and southwestern Mississippi. Three of the system's six aquifers, the upper and the middle Claiborne and the lower Claiborneupper Wilcox aquifers, become increasingly clayey and pinch out to the south (fig. 68). Some of the clayey confining units pinch out northward as they become increasingly sandy and more permeable.

A different perspective of the geologic and hydrogeologic units that make up the aquifer system is shown in a section that crosses the

central part of the Mississippi Embayment (fig. 69). Some of the aquifers (for example, the lower Claiborne upper Wilcox aquifer) thicken eastward across the embayment locally, the middle Claiborne, the lower Claiborne upper Wilcox, and the middle and the lower Wilcox aquifers are in direct hydraulic contact near the western side of the embayment.

HYDROGEOLOGIC UNITS

The Mississippi embayment aquifer system is divided into nine hydrogeologic units‹six regional aquifers and three regional confining units. Thick, regionally-extensive clay and shale confining units separate some parts of the aquifer system into distinct, regionally mappable aquifers that are largely homogeneous sand. Other parts of the aquifer system lack regional confining units and the regional aquifers in these parts are defined on the basis of different geohydrologic characteristics. The contacts of many aquifers and confining units within the Mississippi embayment aquifer system conform well to the contacts of geologic units (fig. 70). For example, the Midway confining unit coincides exactly with the different geologic formations that compose the Midway Group, and the upper Claiborne aquifer is identical to the Cockfield Formation. For some hydrogeologic units, however, particularly those that include rocks of the Claiborne Group, there is little or no equivalency with geologic units. The conformance of aquifers and confining units with geologic units also departs markedly as the Mississippi embayment aquifer system merges eastward with the Southeastern Coastal Plain aquifer system, which is described in Chapter G of this Atlas.

The extensive JacksonVicksburg confining unit is formed by massive clay beds and separates the Mississippi embayment system from the overlying coastal lowlands aquifer system. The Midway confining unit within the Mississippi embayment aquifer system also consists of massive clay beds and separates the aquifers in sediments of Tertiary age from underlying aquifers of rocks of Cretaceous age. Although the uppermost aquifers of the Mississippi embayment aquifer system, the upper and the middle Claiborne aquifers, are bounded above and below by confining units in most places, the lower Claiborneupper Wilcox aquifer and the middle and the lower Wilcox aquifers are not separated by confining units. Sandy strata of the Wilcox Group are more heterogeneous than other rocks of Tertiary age and consist of a highly variable sequence of massive to thinly bedded sand and thin clay beds that are part of the three aquifers. The middle Wilcox aquifer differs considerably from overlying and underlying aquifers because its thin beds of sand and clay result in lower hydraulic conductivity than that of the massive, more permeable strata that lie above and below it.

Of the six aquifers contained within the Mississippi embayment aquifer system, the middle Claiborne aquifer is the most heavily used. Consequently, the description of the Mississippi embayment aquifer system in this chapter principally focuses on the hydrogeologic, hydraulic, and hydrochemical characteristics of the middle Claiborne aquifer. The McNairyNacatoch aquifer of this system also is described because the ground-water flow system is quite different from that of the other aquifers in this aquifer system.

MIDDLE CLAIBORNE AQUIFER

The middle Claiborne aquifer comprises mostly the Sparta Sand but also includes the Memphis Sand in the northern part of the Mississippi Embayment. In this area, the Memphis Sand is equivalent to the Sparta Sand, the Cane River Formation, and the Carrizo Sand/Meridan Sand Member of the Tallahatta Formation (fig. 70). The aquifer is thickest in a large area of east-central Louisiana and southwestern Mississippi, and in a smaller area of southeastern Arkansas (fig. 71). Although its thickness is greater than 1,000 feet in Louisiana and Mississippi, the aquifer largely contains water with more than 1,000 milligrams per liter dissolved solids. Such highly mineralized water is considered to be unsuitable for most purposes. In most areas where water in the middle Claiborne aquifer contains smaller concentrations of dissolved solids, the thickness of the aquifer generally ranges from 200 to 800 feet.

Confining units separate the middle Claiborne aquifer from overlying and underlying aquifers in most places. These confining units comprise prodelta and marine shelf deposits of clay, mud, marl, and shale. The lower Claiborne confining unit (the Cane River Formation) which underlies the middle Claiborne aquifer, and the middle Claiborne confining unit (the Cook Mountain Formation), which overlies the aquifer, were deposited as a result of widespread marine invasions that interrupted progradation of clastic sediments into the Gulf Coast Basin. Clay and shale of the lower Claiborne confining unit coarsens northward and grades to sandy channel sediments (the Winona Sand and the Tallahatta Formation) deposited in a coastal margin delta system. The predominantly marine clay facies of the lower Claiborne confining unit thus changes to an updip sand facies that forms part of the middle Claiborne aquifer. In Arkansas and northernmost Mississippi, where the lower Claiborne confining unit is missing, the middle Claiborne aquifer and the lower Claiborne upper Wilcox aquifers function as a single aquifer, which is known locally as the Memphis aquifer.

Relation Between Geology And Permeability

Basinwide changes in geologic facies have been shown in preceding sections of this chapter to be a principal factor that controls the hydraulic character of the surficial and the coastal lowlands aquifer systems. A similar relation exists for the Mississippi embayment aquifer system. Aquifers of the Mississippi embayment aquifer system consist of an interbedded sequence of poorly consolidated fluvial, deltaic, and marine deposits in which diagenesis or postdepositional geochemical processes have not greatly altered the original pattern of permeability. The hydraulic conductivity of the unconsolidated to poorly consolidated sediments that compose the aquifers of the Mississippi embayment aquifer system does not appear to have been greatly reduced by cementation or compaction. Consequently, the distribution of hydraulic conductivity and transmissivity of the Mississippi embayment aquifer system can be inferred from maps of sediment lithofacies, if a direct correlation between sediment type and aquifer permeability is assumed.

The Sparta Sand that composes most of the middle Claiborne aquifer in Louisiana and Mississippi (fig. 72) was deposited within a constructional delta system. A constructional delta system is

characterized by a large-scale complex of elongate and lobate deltas formed by rivers with large discharge and sediment loads; the delta progrades into ocean water. Constructive delta systems contain mostly fluvial and deltaic facies in which coarser sediment is concentrated in landward fluvial tributaries or meandering channels and as deltaic distributaries and delta front-sand bodies. Distributary channels that contain permeable sand are separated by less permeable interdistributary clay (fig. 54). In constructional delta systems, fluvially transported sand, silt, and clay are deposited near the coast at a rate that exceeds the rate at which they are removed by wave energy and longshore currents. The meandering fluvial channel facies is characterized by wide, uniform, multilateral sand bodies with little clay content. The distributary channel facies differs in terms of its sand content and pattern of sedimentation. Channel sand bodies within the delta plain show a distributary pattern of sedimentation and do not show extensive lateral migration. Distributary channels are effectively isolated by the weight of sandy channel sediment, which causes compactional subsidence. Eventually, channel progradation results in its overextension, and the distributary channel shifts position by abandonment and diversion of floodwaters to an area with a steeper gradient. Younger distributary channels may overlap older channels as the delta builds up thick sequences of complexly interbedded deposits.

Distributary deposits are in the middle Claiborne aquifer as elongate bodies separated by areas almost devoid of sand that represent interdistributary deposits (fig. 72). The distribution of sand in the middle Claiborne aquifer, expressed as a percentage of the total thickness of the aquifer, suggests that sand was deposited within a distributary channel facies of a constructive delta system. Distributary channels of the middle Claiborne aquifer area characterized by high concentrations of sand (50 percent or greater) that extend as narrow, slightly meandering, elongate sand bodies (fig. 73). Interdistributary deposits contain from 30 to 50 percent sand and consist primarily of silt, clay, and lignite. Distributary and interdistributary channel lithofacies grade gulfward to prodelta silt and mud, which contains small concentrations of sand (less than 30 percent). The sandy channel sediments represent the most permeable parts of the middle Claiborne aquifer in Louisiana and Mississippi. The predominant direction of the distributary channels is southward or southwestward. Comparison of sand percentage and the distribution of transmissivity in the middle Claiborne aquifer (Sparta Sand) suggests that the more transmissive parts of the aquifer correspond to its sandier parts, which are interpreted as distributary channel facies (compare figs. 72 and 74). In these areas, transmissivity is more than 13,000 feet squared per day generally and locally exceeds 27,000 feet squared per day. Less transmissive sediments appear to be associated with the interdistributary channel facies that contain smaller percentages of sand. In the poorly transmissive areas, transmissivity is reported to be less than 13,000 feet per day.

Well Yield

The middle Claiborne aquifer is capable of yielding water to properly constructed wells at a rate that ranges from 100 to 300 gallons per minute in Louisiana and Mississippi. Wells screened in the middle Claiborne aquifer in Arkansas are reported to yield from 300 to 1,000 gallons per minute. Yields of as much as 2,000 gallons per minute are

obtained in northernmost Mississippi and eastern Arkansas where the middle Claiborne aquifer merges with the lower Claiborneupper Wilcox aquifer and is known locally as the Memphis aquifer.

Ground-water Flow

Gravity is the principal driving force for ground-water movement within the Mississippi embayment aquifer system. Regional movement of water in the aquifer system is from aquifer recharge areas that range from 100 to 400 feet higher than the uniformly low, flat terrain of the Mississippi Alluvial Plain where water discharges. This difference in altitude provides the gravitational energy needed to drive the ground-water flow system.

Most of the precipitation that falls on the exposed part of the Mississippi embayment aquifer system is lost to streams and rivers as direct runoff, is returned to the atmosphere from plants and soil by processes of evapotranspiration, or discharges as baseflow to streams in the outcrop area. Before development of the aquifer, water that entered the deeper, regional flow system moved toward the center of the Mississippi Embayment (fig. 75). Water in the confined parts of the system was discharged by upward leakage into shallower aquifers, such as the Mississippi River Valley alluvial aquifer. Ultimately, ground water was discharged to streams and rivers that incised the shallower aquifers.

Development of the ground-water resources of the Mississippi embayment aquifer system has greatly modified the pre-development regional flow system. Large ground-water withdrawals in southern Arkansas and northern Louisiana have caused declines of the potentiometric surface and some changes in direction of regional predevelopment flow. Lows in the predevelopment potentiometric surface were located only in areas of natural ground-water discharge. The location of potentiometric lows has changed and now depressions are in areas with large withdrawals from wells. Pumping centers in northern Louisiana and southern Arkansas were the major sites of regional ground-water discharge from the middle Claiborne aquifer in 1980 (fig. 76). Within the middle Claiborne aquifer, large withdrawals have resulted in a long-term decline in water levels, which locally exceeds 100 feet, and have created cones of depression in several places. Declines in the potentiometric surface have helped to induce greater areal recharge and recharge from incised streams in outcrop areas. Ground water removed from storage also has contributed to the long-term decline in water levels within the aquifer. Large withdrawal rates from the middle Claiborne aquifer have induced downward leakage of water into the middle Claiborne aquifer from the upper Claiborne and the Mississippi River Valley alluvial aquifers.

Ground-water Quality

The middle Claiborne aquifer in Segment 5 contains water with less than 500 milligrams per liter dissolved solids over about one-half of its extent (fig. 77). However, the dissolved-solids concentration increases to more than 1,000 milligrams per liter where the aquifer underlies the junction of the Mississippi and the Ouachita Rivers, an area of natural ground-water discharge. The aquifer contains moderately saline water

(3,00010,000 milligrams per liter dissolved solids) in middip areas, but contains brine in the deep surface.

The hydrochemical character of water in the Mississippi embayment aquifer system changes progressively downgra-dient in a pattern that is consistent with the pattern of other aquifer systems in clastic Coastal Plain sediments. Chemical constituents in the ground water of clastic Coastal Plain aquifer systems are controlled, in part, by solution of the minerals in the sediments that make up the aquifers; in part, by the exchange of ions between the water and the minerals in the sediments as the water moves down the hydraulic gradient; and in part, by mixing of freshwater and saltwater in deep parts of the aquifers. The major hydrochemical facies (the dominant cations and anions) in water from the Mississippi embayment aquifer system are calcium bicarbonate, sodium bicarbonate, and sodium chloride. Other hydrochemical facies are local in extent. Calcium bicarbonate and sodium bicarbonate waters dominate the exposed and shallow subsurface areas of the middle Claiborne aquifer (fig. 78). Sodium bicarbonate water is the major type in middip subsurface areas, whereas sodium chloride water is in the deeply buried parts of the aquifer.

MCNAIRYNACATOCH AQUIFER

The McNairy-Nacatoch aquifer (fig. 79) comprises sand of Late Cretaceous age. The aquifer crops out or subcrops in parts of northern Mississippi and eastern and southwestern Arkansas and is the lowermost aquifer of the Mississippi embayment aquifer system. The McNairy-Nacatoch aquifer (fig. 79) extends northward into southeastern Missouri, which is described in Chapter D of this Atlas, and northeastward into western Tennessee, southern Illinois, and southwestern Kentucky, which is described in Chapter K of this Atlas. Although Missouri, Illinois, and Kentucky are not within Segment 5, the pattern of regional ground-water flow within the McNairyNacatoch aquifer cannot be described without also describing intersegment ground-water movement. The hydrogeology of the entire McNairyNacatoch aquifer is, therefore, described in this chapter.

The McNairyNacatoch aquifer consists of the Nacatoch Sand in Arkansas and the McNairy Sand in Mississippi. The McNairy Sand is considered to be a member of the Ripley Formation in Mississippi but is of formational rank where it extends into Tennessee and the northern part of the Mississippi Embayment. The McNairyNacatoch aquifer crops out as a narrow band that extends northward from Mississippi into southern Illinois and as a second narrow band in southwestern Arkansas. The aquifer subcrops beneath the Mississippi River Valley alluvial aquifer in northeastern Arkansas, southeastern Missouri, and southernmost Illinois. A confining unit separates the McNairyNacatoch aquifer from part of the underlying Southeastern Coastal Plain aquifer system in Mississippi, but the McNairy-Nacatoch aquifer directly overlies the Ozark Plateaus aquifer system along part of the western margin of the Coastal Plain of Arkansas and Missouri. The McNairyNacatoch aquifer consists of glauconitic, clayey sand deposited in a deltaic to prodeltaic environment in Arkansas and Mississippi. The aquifer is interbedded with and grades into chalk and clay as it extends southward. Deltaic deposits of sand, minor gravel, and clay compose the aquifer where it extends northward into Tennessee, southeastern Missouri, and beyond.

Ground-water Flow

Water enters the McNairyNacatoch aquifer as precipitation that falls directly on the aquifer where it crops out in eastern Mississippi and the northern part of the Mississippi Embayment. Water in the aquifer moves westward from topographically high interstream areas on the northern and eastern sides of the Mississippi Embayment to a large area of regional discharge on the western side of the embayment (fig. 80). The discharge zone, which is identified by a low area of the potentiometric surface, encompasses some of the places where the McNairyNacatoch aquifer directly underlies the Mississippi RIver Valley alluvial aquifer in northeastern Arkansas and southeastern Missouri. The discharge zone also includes a large area where the McNairyNacatoch aquifer is confined by clay and shale of the Midway confining unit. Discharge of ground-water from the McNairyNacatoch aquifer does not coincide with any surface drainage features, but does correspond closely to an area subject to large ground-water withdrawals. The discharge area also is nearly coincident with the western margin of the Reelfoot Rift. Hydrochemical data and simulation of ground-water flow suggest that fractures and a tensional fault, both of which were caused by deep-seated, periodic crustal rifting in northeastern Arkansas, enhance vertical upward leakage of water from the Ozark Plateaus aquifer system and the McNairyNacatoch aquifer to shallower aquifers of the Mississippi embayment aquifer system.

Ground-water Quality

The concentration of dissolved solids in water from the McNairyNacatoch aquifer increases in a southwesterly direction (fig. 81). Dissolved-solids concentrations are generally lowest in areas where the aquifer crops out and where it is buried only to shallow depths. In northeastern Arkansas, dissolved-solids concentrations generally are greater than 500 milligrams per liter. Concentrations of more than 1,000 milligrams per liter are present in a small area in southeastern Missouri apparently as the result of upward leakage of water from the Ozark Plateaus aquifer system. The McNairyNacatoch aquifer generally contains more than 3,000 milligrams per liter dissolved-solids concentration in its deepest parts. The aquifer is dominated by sodium bicarbonate water where it contains water with less than 2,000 milligrams per liter dissolved solids and by sodium chloride water where it contains water with more than 2,000 milligrams per liter dissolved solids.

FRESH GROUND-WATER WITHDRAWALS

Fresh ground-water withdrawals from the Mississippi embayment aquifer system are estimated to be 433 million gallons per day (fig. 82). Public supply use accounts for about 52 percent of the total water withdrawn from the aquifer system, or about 224 million gallons per day. Withdrawals for domestic and commercial use were about 23 percent of the total withdrawals, or about 99 million gallons per day. Agricultural withdrawals from the Mississippi embayment aquifer system averaged about 71 million gallons per day, or about 16 percent of the total ground-water withdrawn. Industrial, mining, and thermoelectric power users withdrew about 39 million gallons per day, or about 9 percent of the total withdrawals.

More water is withdrawn from the middle Claiborne aquifer than from any other aquifer of the Mississippi embayment aquifer system. In 1980, for example, about 308 million gallons per day was withdrawn from the aquifer principally from major pumping centers (fig. 83) in the cities of Stuttgart, Pine Bluff, El Dorado, and Magnolia, Arkansas; Ruston, Jonesboro, Monroe, and Bastrop, Louisiana, and Yazoo City and Jackson, Mississippi. Large withdrawals are also made by pumping centers in the Memphis, Tennessee area (Chapter K).

CRETACEOUS AQUIFERS

INTRODUCTION

In Segment 5, Coastal Plain sediments of Cretaceous age compose parts of two aquifer systems and one minor aquifer. Small parts of the Southeastern Coastal Plain and the Ed-wardsTrinity aquifer systems are within the segment as is the TokioWoodbine aquifer, which is a minor aquifer in southwestern Arkansas (fig. 84).

The Southeastern Coastal Plain aquifer system is a multi-aquifer system that consists of three major aquifers that comprise unconsolidated and poorly consolidated clastic sedimentary strata of Tertiary and Cretaceous age. Most of this aquifer system underlies Alabama, Georgia, and South Carolina and is described in Chapter G of this Atlas. However, the aquifer system extends westward into Mississippi where the Chick-asawhay and the Pearl River aquifers merge with and are considered to be part of the Coastal Lowlands and the Mississippi embayment aquifer systems, respectively. The Black Warrior River aquifer, which is the lowermost aquifer of the Southeastern Coastal Plain aquifer system, underlies about 32,000 square miles in Mississippi. The geologic formations that compose this aquifer are shown in figure 85.

The EdwardsTrinity aquifer system comprises rocks of Cretaceous age that crop out as a wide, looping band that extends across the middle of Texas, into the southeastern corner of Oklahoma and southwestern Arkansas. The aquifer system is separated into the Edwards, Edwards-Trinity, and the Trinity aquifers, all of which are described in detail in Chapter E of this Atlas. The Trinity aquifer is the only part of the EdwardsTrinity aquifer system that extends into southwestern Arkansas. The water-yielding formations that compose the Trinity aquifer in Arkansas are part of the Trinity Group (fig. 85).

The TokioWoodbine aquifer crops out and extends into the subsurface in a limited area in southwestern Arkansas but extends westward into Oklahoma and Texas where it is considered to be a minor aquifer and is known as the Woodbine aquifer (Chapter E of this Atlas). The Tokio-Woodbine aquifer in Arkansas is a minor aquifer that serves only as a local source of water for domestic use.

BLACK WARRIOR RIVER AQUIFER

The Black Warrior River aquifer consists of an interbedded mix of fluvial sand and gravel, deltaic sand, silt and clay, and marginal marine sand, silt, and clay. In Mississippi, the Black Warrior River

aquifer includes unnamed water-yielding rocks of Early Cretaceous age and the Tuscaloosa Group, the McShan and the Eutaw Formations, and the Coffee Sand of Late Cretaceous age. The Black Warrior River aquifer is confined by a thick sequence of clay and marl of the Selma Group, which effectively separates it from overlying rocks of the Mississippi embayment aquifer system (fig. 86). The Black Warrior River aquifer is greater than 4,000 feet thick in east-central Mississippi (fig. 87) but generally is less than 1,000 feet in thickness in much of the State.

Ground-Water Flow

Water enters the Black Warrior River aquifer as precipitation that falls on the aquifer outcrop areas in northeastern Mississippi, as well as Alabama. Most of this water moves to streams as direct runoff, is returned to the atmosphere by evapotranspiration, or follows short flow paths in the aquifer and discharges to local streams as baseflow. A small part of the precipitation enters deeper parts of the ground-water flow system, moves downgradient into the confined part of the aquifer, and reemerges as discharge in the valleys of major streams (fig. 88). Ground water that discharges from the deeper, or regional, part of the flow system exits where erosion has deeply incised and exposed the aquifer along the Tombigbee River in western Mississippi and eastern Alabama.

Transmissivity

The highest estimated transmissivity (8,50050,000 feet squared per day) within the Black Warrior River aquifer is in two areas in northeastern Mississippi (fig. 89). The largest area is where the aquifer is thickest and the part of the aquifer consists of highly permeable, fluvial strata. The aquifer is less transmissive (9508,500 feet squared per day) as it extends northward, owing, in part, to a decrease in the amount of fluvial sand and gravel within the aquifer's lower section and, in part, to a thinning (less than 1,000 feet thick) of the aquifer. In the smaller area in the extreme northeastern-most corner of Mississippi, the aquifer consists primarily of unconsolidated, highly permeable gravel. Transmissivity decreases westward and southward because the aquifer contains saline water in its lower parts, and, thus, its effective thickness is less (fig. 89).

Ground-Water Quality

The principal chemical constituents that vary areally within the Black Warrior River aquifer are dissolved solids, dissolved iron, and dissolved chloride, all of which increase in concentration from outcrop to downgradient areas. Dissolved-solids concentrations generally are less than 400 milligrams per liter in water from the upper part of the aquifer where it crops out or is buried only to shallow depths (fig. 90). Dissolved-solids concentrations of more than 1,000 milligrams per liter may result from the mixing of fresh and saline (mostly mineralized water not flushed from the aquifer system) waters. The concentration of dissolved iron in the ground water of the Black Warrior River aquifer locally can range from 0.5 to 20 milligrams per liter.

Changes in dissolved-solids concentrations correlate reasonably well with changes in the hydrochemical facies of the water in the aquifer

(compare figs. 90 and 91). ³Hydrochemi-cal facies² refers to a classification scheme used to describe the water in terms of the major anions and cations that the aquifer contains. Three major hydrochemical facies are in water from the upper part of the Black Warrior River aquifer. A calcium bicarbonate facies is mostly in updip, landwardmost interstream areas where the aquifer is recharged, whereas a sodium bicarbonate facies dominates the parts of the aquifer that are shallow downgradient areas of the flow system. The concentration of dissolved solids within the calcium bicarbonate waters is small, usually not more than 100 milligrams per liter. Sodium bicarbonate ground waters generally contain dissolved-solids concentrations that are not greater than 400 milligrams per liter. Dissolved-solids concentrations of greater than 1,000 milligrams per liter are characteristic of the sodium chloride hydrochemical facies.

TOKIOWOODBINE AQUIFER

The TokioWoodbine aquifer serves as a local source of water for domestic use in southwestern Arkansas. The aquifer overlies and in places is hydraulically interconnected with water-yielding sands of the Trinity aquifer. The upper part of the TokioWoodbine aquifer consists of the Tokio Formation, which is a sequence of cross-bedded sand, gravel, and lignitic clay that grades downdip to sand and shale. The lower part of the aquifer comprises the Woodbine Formation, which is a red and gray clay that includes a massive, cross-bedded sand and gravel lithofacies where the formation extends into the shallow subsurface. Freshwater in the TokioWoodbine aquifer is very limited in Arkansas and is restricted to a narrow band that extends southward from the outcrop area of the aquifer and lies between the Little and Little Missouri Rivers (fig. 84). Factors that appear to control freshwater within the aquifer include the degree of incision by rivers in outcrop areas and a rapid downdip decrease in permeability as the aquifer extends into the subsurface.

FRESH GROUND-WATER WITHDRAWALS

Total fresh ground-water withdrawals from the Black Warrior River, Trinity, and TokioWoodbine aquifers of Segment 5 were estimated to be 81 million gallons per day in 1985 (fig. 92). Public supply withdrawals represent about 42 million gallons per day, or nearly 52 percent of the total withdrawals. Domestic and commercial users withdrew nearly 32 million gallons per day, or about 39 percent of the total amount of water withdrawn. Pumpage by agricultural users was estimated to be about 4.7 million gallons per day, or about 6 percent of the total; industrial, mining, and thermoelectric users withdrew about 2.7 million gallons per day, or about 3 percent of the total.

TRINITY AQUIFER

The Trinity aquifer consists of Coastal Plain rocks of Early Cretaceous age that yield mostly freshwater where they crop out in southwestern Arkansas. The Trinity aquifer is part of the larger EdwardsTrinity aquifer system, which extends westward into Oklahoma and southwestward across Texas (Chapter E of this Atlas) where it functions as an important source of potable water. The Trinity aquifer was deposited as part of a wedge of sediments that thickens southward from an erosional featheredge in southwestern Arkansas (fig. 93). The Trinity aquifer is

overlain by the TokioWoodbine aquifer and underlain by the Ouachita Mountains aquifer. The TokioWoodbine aquifer is more than 1,000 feet thick (fig. 93) in the deep subsurface.

Several water-yielding geologic formations compose the Trinity aquifer in southwestern Arkansas; from oldest to youngest, they are the Pike Gravel, the Delight Sand, the Holly Creek Formation (including the Ultima Thule Gravel Member), and the Paluxy Formation (fig. 85). Intervening limestone, anhydrite, clay and shale of the Dierks and the DeQueen Limestones are poorly permeable and serve to separate water-yielding zones in the aquifer. The uppermost permeable rocks of the Trinity aquifer, which are equivalent to the Paluxy Sand, extend westward into Oklahoma where they are locally called the Antlers aquifer. The occurrence of freshwater within the Trinity aquifer is quite limited in Arkansas and is restricted to a 10- to 25-mile wide band that extends southward from aquifer outcrop areas between the Little and the Little Missouri Rivers (fig. 84).

OZARK PLATEAUS AQUIFER SYSTEM

INTRODUCTION

The Ozark Plateaus aquifer system, which includes the Springfield Plateau, Ozark, and St. Francois aquifers, crops out in a 40- to more than 50-mile wide band that extends across most of northern Arkansas (figs. 94, 95). The aquifer system consists of a thick sequence of lithified, flat-lying to southward-dipping limestone and dolomite that contains some beds of sandstone, shale, and chert. Rocks that comprise the system range in age from Cambrian to Mississippian (fig. 96). The aquifer system extends northward into Missouri and westward into southeastern Kansas. It is discussed in detail in Chapter D of this Atlas, which describes aquifers in these States. A small part of the aquifer system extends into eastern Oklahoma and is discussed in Chapter E. The Ozark Plateaus aquifer system extends eastward beneath Coastal Plain and alluvial sediments where it is overlain regionally by the Mississippi embayment aquifer system and locally by the Mississippi River Valley alluvial aquifer (fig. 97). The Ozark Plateaus aquifer system is confined on its southern margin in Arkansas by the Western Interior Plains confining system (fig. 98). Northern Arkansas is physiographically characterized by three erosional plateaus from southwest to northeast‹these are the Boston Mountains and the Springfield and the Salem Plateaus. The Western Interior Plains confining system, which is a thick sequence of poorly permeable Pennsylvanian and Mississippian rocks, underlies the rugged topography of the Boston Mountains. The Ozark Plateaus aquifer system underlies the Springfield and the Salem Plateaus.

HYDROGEOLOGIC UNITS

Three regional aquifers, separated by two regional confining units, compose the Ozark Plateaus aquifer system. From shallowest to deepest, the regional aquifers are the Springfield Plateau, the Ozark, and the St. Francois aquifers. The Ozark confining unit separates the Springfield Plateaus and the Ozark aquifers, and the St. Francois confining unit is between the Ozark and the St. Francois aquifers (fig. 96). In Segment 5, the Springfield Plateau aquifer and the upper and

the middle parts of the Ozark aquifer yield most of the ground water withdrawn (fig. 97, 98). It usually is not economically feasible to drill wells into the lower parts of the aquifer system that lies at great depths. Only a few wells penetrate the lower parts of the Ozark aquifer, and none are known to produce water from the St. Francois aquifer.

The Springfield Plateau aquifer consists of interbedded Mississippian limestone and chert that generally yield only small volumes of water to wells. Because the aquifer is thin, relative to the great thickness of the Ozark aquifer, and has been highly dissected by erosion, it is used primarily as a source of water for domestic and stock-watering wells. The Springfield Plateau aquifer is underlain by the Ozark confining unit, which consists of the Chattanooga Shale in Segment 5. Where this confining unit is present and has not been breached by erosion, it effectively separates the Springfield Plateau and the Ozark aquifers.

The thick, extensive, and productive Ozark aquifer is the principal source of ground water in northern Arkansas. Although this aquifer consists of numerous geologic formations, which consist chiefly of limestone and dolomite (fig. 96), the most important water-yielding strata in the aquifer are sandstones of the Roubidoux Formation and the Van Buren Formation. Wells that obtain water from these formations commonly yield from 100 to 300 gallons per minute; yields of 500 gallons per minute have been reported for some wells. Shale and dolomite of the St. Francois confining unit underlie the Ozark aquifer and separate it everywhere from the deeper St. Francois aquifer. No wells are known to yield water from the St. Francois aquifer in Segment 5.

SPRINGFIELD PLATEAU AQUIFER

The Springfield Plateau aquifer is the uppermost aquifer of the Ozark Plateau aquifer system. The aquifer crops out along the southern and western perimeter of the Springfield Plateau as a narrow belt 5- to 10-mile wide belt in north-central Arkansas but is exposed in a more than 50-mile wide band in northwestern Arkansas (fig. 99). Outside Segment 5, the Springfield Plateau aquifer extends northward into western Missouri and westward into Oklahoma. Before deposition of the Coastal Plain sediments, erosion removed rocks in northeastern Arkansas equivalent to those that compose the Springfield aquifer. In northern Arkansas, beds of the Springfield Plateau aquifer dip southward beneath the Western Interior Plains confining system and extend to depths of more than 4,000 feet below sea level (fig. 98). The Springfield Plateau aquifer generally ranges from 200 to 400 feet thick throughout northern Arkansas. In Arkansas, the aquifer is composed entirely of the Boone Formation of Mississippian age and is characterized by gray crinoidal limestone and interbedded chert. Its basal member, the St. Joe Limestone, lacks the chert nodules common to the upper part of the formation and is less than 60 feet thick.

Sparse hydrologic data are available for the Springfield Plateau aquifer in northern Arkansas, in part, because the aquifer is exposed in a limited area and, in part, because the aquifer dips steeply beneath the thick shale, siltstone, and sandstone sequence of the Western Interior Plains confining system. Where the aquifer dips beneath this confining system, it is buried at great depths, which

makes water-well drilling costs prohibitive. The yield of wells completed in the Springfield Plateau aquifer are reported to range from less than 1 to more than 75 gallons per minute; average yield is reported to be 5 gallons per minute.

OZARK AQUIFER

The Ozark aquifer (fig. 100), which is the thickest and most extensive aquifer within the Ozark Plateaus aquifer system of northern Arkansas, comprises limestone and dolomite and includes sandstone and minor chert and shale beds that range from Late Cambrian to Middle Devonian in age. The Ozark aquifer crops out in the deeply dissected, rugged terrain of the Salem Plateau. The aquifer serves as a source of water chiefly for agricultural and domestic purposes but supplies some water for municipal and industrial uses. Outcropping rocks of the Ozark aquifer are nearly flat lying in northern Arkansas, but the dip of the rocks progressively steepens as they extend southward beneath the Ozark confining unit, the Springfield Plateau aquifer, and the north-facing escarpment of the Boston Mountains, which marks the northern extent of the Western Interior Plains confining unit (fig. 98). In northeastern Arkansas, the Ozark aquifer extends eastward beneath the embayed part of the Coastal Plain where the aquifer is overlain by the Mississippi embayment aquifer system and the Mississippi River Valley alluvial aquifer. The Ozark aquifer is more than 5,000 feet thick in the central part of northern Arkansas (fig. 100). The aquifer generally is more than 3,000 feet thick in most outcropping localities. In western Arkansas, the aquifer is less than 1,500 feet thick in local areas in the subsurface.

Although the Ozark aquifer is very thick, most of the water withdrawn from the aquifer is obtained from only a few water-yielding zones. Water-yielding sandstones, such as the Roubidoux Formation and the Gunter Sandstone Member of the Van Buren Formation are notable because of their large yields. The Gasconade Dolomite, which is a bed of cherty dolomite that is about 100 feet thick and yields little water, separates the productive sandstone beds. The Roubidoux Formation is comprised of dolomite, quartz sandstone, and chert and thickens eastward across northern Arkansas from 180 to 260 feet. The yield of wells completed in the formation is reported to average 60 gallons per minute, but some wells yield 600 gallons per minute. The Gunter Sandstone Member is the principal water-yielding zone within the Ozark aquifer; wells that penetrate the unit commonly yield from 150 to 300 gallons per minute, and some wells yield as much as 730 gallons per minute. The Gunter Sandstone Member consists of quartz sandstone; weak to strong cementation of sandstone generally reflects dolomitic or siliceous intergranular cement, respectively. The Potosi Dolomite of Cambrian age is the principal source of water for municipalities in the Salem Plateau area of Missouri, as described in Chapter D of this Atlas. In northern Arkansas, however, the water-yielding characteristics of this formation are poorly understood because it is buried at great depths and, accordingly, is economically unsuited for development as a water resource. Minor water-yielding zones of the Ozark aquifer are contained within the Jefferson City, the Cotter, and the Powell Dolomites; the upper part of the Everton Formation; the St. Peter Sandstone; and the St. Clair, the Lafferty, and the Clifty Limestones (fig. 96). These strata generally yield less than 50 gallons per minute but are capable of yielding as much as 80 gallons per

minute. However, the yield of wells completed in these rocks shows that they are not as permeable as the sandstone beds in the lower part of the aquifer.

Dissolved-solids concentrations of water in the Ozark aquifer are, for the most part, less than 400 milligrams per liter throughout northern Arkansas (fig. 101). The largest concentrations of dissolved solids are in eastern Arkansas where the aquifer dips beneath the Coastal Plain. The hydrochemical facies reflect, in part, the limestone and dolomite lithology of the aquifer and, in part, saline water in the deeper parts of the aquifer. Most of the water in the Ozark aquifer in northern Arkansas can be classified as either calcium bicarbonate or a sodium chloride facies (fig. 102). The calcium bicarbonate facies results from the partial dissolution of carbonate rocks that compose the aquifer, whereas the sodium chloride facies is indicative of mixing of freshwater with saltwater contained within the deep, stagnant part of the ground-water flow system. Sodium bicarbonate is representative of a transition zone that separates the fresh and saline parts of the flow system. The small area of magnesium bicarbonate facies is probably due to partial dissolution of dolomite, which is calcium-magnesium bicarbonate mineral.

ST. FRANCOIS AQUIFER

The St. Francois aquifer, which is the basal aquifer of the Ozark Plateaus aquifer system, is deeply buried in northern Arkansas, usually to depths that range from 1,500 to more than 4,000 feet below land surface (figs. 97, 98). The thickness of the St. Francois aquifer generally is less than 250 feet, and its irregular thickness reflects a rugged Precambrian paleotopographic surface. The aquifer is not used as a source of water in northern Arkansas because the depth to the top of the aquifer makes the costs of drilling and completing wells in the aquifer prohibitively expensive. Other ground-water supplies, which are sufficient in terms of quantity and suitable water quality, are more easily obtained from shallower aquifers.

GROUND-WATER FLOW

The source of the water that recharges the Ozark Plateaus aquifer system is precipitation that falls on the aquifer system where it is exposed at the land surface. The carbonate rocks that compose the upper parts of the aquifer system are readily dissolved, and the end results of partial dissolution are a network of subsurface openings and an irregular rock surface characterized by sinkholes, caves, and other types of openings, which are called karst topography. Water that recharges an aquifer with a karstified surface either enters as direct runoff through sinkholes and sinking streams (streams that flow into shallow holes and sinkholes) or enters by downward diffuse infiltration through shallow soil cover in the upland, interstream areas. Ground-water flow in the Ozark Plateaus aquifer system tends to be concentrated by a system of well-connected conduits formed by solution-enlarged fractures and bedding-plane partings. Some of the conduits are cavern-sized, form parts of large cave systems and, in places, are part of a subsurface trunk drainage system. Where fractures, bedding-plane partings, and other solution conduits are widely spaced, the flow system tends to be poorly interconnected; in such places, subsurface conduits can cross one another without interference, and water levels

can vary widely among closely spaced wells. Conversely, where solution conduits are closely spaced and well-connected, the potentiometric surface will probably reflect the shape of the local topography. Such is the case with the Springfield Plateau aquifer in northwestern Arkansas (fig. 103).

Sparse data are available for the Springfield Plateau aquifer in northwestern Arkansas owing to the limited area in which the aquifer crops out and thick deposits of low-permeability material that overlie the aquifer where it extends beneath the Boston Mountains and the Western Interior confining system. However, regional ground-water flow within the Springfield Plateau aquifer probably is similar to that of the more extensive Ozark aquifer.

The source of most water that enters the Ozark aquifer is precipitation that falls on aquifer outcrop areas. Some water recharges the aquifer by downward leakage from overlying aquifers. For example, the Ozark confining unit (the Chattanooga Shale) is thin (locally absent) and fractured where it overlies the Ozark aquifer and separates it from the Springfield Plateau aquifer in northwestern Arkansas. In this area, water leaks downward from the Springfield Plateau aquifer and recharges the Ozark aquifer.

Potentiometric data for the Ozark aquifer suggest that ground-water movement is controlled by topographic relief; much of the water that enters the aquifer is quickly discharged to local streams as indicated by the irregular shape of the aquifers potentiometric surface (fig. 104). Some water, however, moves toward major rivers that serve as points of regional discharge. In extreme northwestern Arkansas, there is a component of westward and northwestward ground-water movement into Oklahoma. Limited data make it difficult to assess the direction of ground-water flow where the Ozark aquifer dips beneath the Western Interior Plains confining system. However, a ground-water divide is thought to underlie the Boston Mountains, and available geologic and hydrologic data suggest that the freshwater part of the flow system probably does not extend very far southward beyond the northern edge of the Western Interior Plains confining system. In the eastern part of the Ozark aquifer, ground-water flow is southeastward. Ground water discharges to the overlying Coastal Plain deposits of the Mississippi embayment aquifer system and the Mississippi River Valley alluvial aquifer.

SOLUTION FEATURES

Dissolution of limestone and dolomite rocks of the Ozark Plateaus aquifer system has resulted in the development of karst terrain in much of northern Arkansas. In the Ozark Plateaus aquifer system, karstic features that have developed on rocks of hydrologic significance include buried cutter and pinnacle bedrock topography, sinkholes, conduit springs, and caves. Solution features are hydrologically important because they serve as the principal conduits for concentrated ground-water flow and, thus, account for practically all the permeability within the Ozark Plateaus aquifer system.

Cutter and pinnacle bedrock topography is not readily visible because it usually is buried beneath a cover of soil and regolith. Cutters are vertical linear solution trenches that generally develop along buried

joints or fracture zones. Cutters act as collectors of water that infiltrates through the overlying soil cover and regolith and they channel the water along the trench before it enters the bedrock through other types of solution openings. Pinnacles, which comprise limestone bedrock, are located between the cutter solution trenches.

Sinkholes are circular or oval, bowl-shaped depressions that form by the dissolution of underlying carbonate bedrock (fig. 105). Sinkholes range in size from small, local depressions to broad, shallow depressions that extend over an area of a square mile or more. Sinkholes can form by slow subsidence or by sudden collapse. Sinkholes that form by slow subsidence are the result of the dissolution of the upper part of the limestone bedrock and may be accompanied by piping (mechanical transportation) of thick overlying soil into underlying fractures and conduits. Collapse sinkholes form by the sudden collapse of the roof of an underlying cave or other large solution opening. In northern Arkansas, sinkholes are most abundant in the north-central part of the Springfield Plateau, where they develop in the rocks that form the Springfield Plateau aquifer (fig. 106). Sinkholes are less common in the north-central and northeastern areas of northern Arkansas that are underlain by carbonate rock of the Ozark aquifer. Sinkholes are hydrologically important because they are sites where concentrated recharge directly enters the aquifer.

Springs are sites where concentrated discharge emerges from an aquifer at the land surface. In carbonate rocks, the spring flow is channeled along solution conduits to the spring orifice. Many springs that discharge from the Ozark Plateaus aquifer system are located along the sides of deeply incised valleys in the Salem Plateau area and maintain a relatively constant rate of discharge, which is characteristic of springs in the Ozark region. Mammoth Spring (fig. 107), which is the largest spring in Arkansas and the second largest spring that discharges from the Ozark Plateaus aquifer system, is classified as a first-magnitude spring, or a spring whose discharge is 100 cubic feet per second or more. Measured discharge from Mammoth Spring has ranged from 240 to 431 cubic feet per second. Average discharge from other springs in the Segment 5 area is reported to range from less than 1 to about 80 cubic feet per second, which suggests that the other springs probably drain smaller catchment areas. Dye-trace studies of Mammoth Spring have shown that water from this spring discharges from a subterranean system of conduits and channels that extends from 9 to 15 miles to the northwest and north into Missouri (fig. 108).

Caves represent the third major type of solution feature in the Ozark Plateaus aquifer system. An accurate survey of caves is not available for Arkansas; however, more than 1,000 caves with passageways that are 100 feet long are estimated to be in northern Arkansas. Some zones of cavernous porosity have been reported to be more than 1,000 feet below land surface. Caves in northern Arkansas are located mostly within the Springfield and Salem Plateaus, with only a few along the escarpment of the Boston Mountains. The greatest concentration of caves is in the Boone Formation and its lower member, the St. Joe Limestone Member, which are geologic units that compose the Springfield Plateau aquifer. Caves within the Ozark aquifer reportedly are developed in the Kimmswick and Plattin Limestones, the Joachim Dolomite, the Everton Formation, and the Powell Dolomite.

Caves in the Springfield Plateau aquifer formed randomly in response to changes in lithology, fracture density, and the presence or absence of local, low-permeability rock layers that created perched water-table conditions. In the Springfield Plateau aquifer, caves appear to have formed above and below the saturated part of the aquifer. Small caves that formed above the water table were probably caused by discontinuous, poorly permeable shale, siltstone, or chert within the aquifer. These poorly permeable confining units perch water above the main water table, which allows partial dissolution of the limestone or may reflect an earlier, higher base level. The larger, connected caves are within the lower part of the Springfield Plateau aquifer (the St. Joe Limestone Member) where it immediately overlies the Ozark confining unit (the Chattanooga Shale). These caves formed at or below the main water table of the aquifer. Small caves are within some sandstone beds of the Ozark aquifer. These [3]pseudocaves[2] probably formed as water leaked downward into solution-enlarged fractures in underlying carbonate strata. Continued dissolution of the underlying carbonate rocks and removal of carbonate cement in the sandstone beds allowed sand to enter solution cavities in the carbonate rocks by piping and (or) cave collapse.

GEOLOGIC FACTORS THAT CONTROL PERMEABILITY

The movement of ground water in the carbonate rocks of the Ozark Plateaus aquifer system is very different from that in the clastic deposits of the surficial aquifer system and the aquifer systems in Coastal Pain clastic sediments. Ground-water moves through clastic materials by diffuse flow through intergranular pore spaces in the poorly consolidated to unconsolidated sediments. The carbonate rocks of northern Arkansas have been subjected to the geologic processes of lithification, compaction, burial, tectonic uplift, and diagenesis during which some to most of the intergranular pore spaces in the rocks have been filled or destroyed. These rocks are very dense and commonly consist of thick-bedded, massive, crystalline limestone and dolomite. Porosity and permeability within such carbonate rocks is, for the most part, secondary. Dissolution of carbonate rocks enlarges vertical fractures caused by joining and faulting and horizontal surfaces formed along bedding planes and unconformities. In some geologic formations, however, movement of water in the carbonate rocks is not limited to these types of secondary openings. For example, ground water within the Potosi Dolomite reportedly moves within interconnected vugs. Vugs are cavities within a carbonate rock that are large enough to be seen without the aid of magnification and do not necessarily conform to the internal fabric of the rock.

As described above, the dense crystalline limestone and dolomite strata of northern Arkansas transmit water chiefly through fractures and along bedding planes that have been enlarged by dissolution. As precipitation falls through the atmosphere, it absorbs small amounts of carbon dioxide to form a weak carbonic acid. Much more carbon dioxide is absorbed from plant roots and decaying organic matter in the soil as the precipitation infiltrates through the soil cover and percolates downward to underlying limestone and dolomite bedrock. Water that enters fractures dissolves parts of the adjoining bedrock, which slowly enlarges the fractures. As the fractures widen to form conduits, more water is funneled to the conduits that grow even larger. Soil and regolith thicken over these fracture zones; contain more decaying

organics and thus higher concentrations of carbon dioxide; and serve as an even greater source of carbonic acid. The high permeability zones within dense crystalline rocks of the Ozark Plateaus aquifer system are characteristically separated by low-permeability, unfractur-ed blocks of limestone and dolomite through which water moves more slowly (fig. 109).

The development of a vertical fracture system that has created directional differences in permeability within the Ozark Plateaus aquifer system is thought to be related, at least in part, to the continental collision that helped form the Ouachita Mountains and, in part, to tectonic stresses associated with the formation of the Reelfoot Rift. The Reelfoot Rift is a northeast-trending graben structure that is buried beneath the Coastal Plain sediments in northeastern Arkansas and has been intermittently active from late Precambrian to Holocene time. Northeast- and northwest-trending faults, grabens, and half-graben structures also vertically displace deeply buried rocks of the Roubidoux Formation, which is part of the Ozark Plateaus aquifer system (fig. 110).

The specific capacity of a well is the rate the well yields water per unit of distance the water level in the well drops as the well is being pumped. Specific capacity is usually expressed as gallons per minute (the rate) per foot of drawdown (the water level drop). In general, high values of specific capacity indicate that wells are completed in an aquifer that has a high transmissivity, and low specific capacities suggest the aquifer has a low transmissivity. Regional fault and (or) fracture zones appear to be directly related to variations in the specific capacity of wells with two water-yielding zones of the Ozark aquifer. These zones are the Roubidoux Formation and the Gunter Sandstone Member of the Van Buren Formation. Areas of high specific capacity in both geologic units seem to correlate with areas that are in proximity to inferred faults and horst and graben structures (compare fig. 110 and fig. 111). The areas of high specific capacity within the Roubidoux Formation appear to be related to the development of increased secondary permeability due to dissolution along fault and fracture zones.

A well completed in a carbonate-rock aquifer is likely to yield large volumes of water if the well is drilled into a fracture zone (fig. 112). Vertical fracture zones commonly are expressed as linear topographic features at the land surface. These linear features, which are called lineaments, may consist of straight stream segments, aligned sinkholes, or different soil colors, all of which can be seen on aerial photographs (fig. 113). Some of the linear features extend continuously or discontinuously for many miles. Individual fracture traces are aligned parallel to the lineaments but are smaller in lateral extent. Numerous studies have shown a strong correlation between aquifer transmissivity and photographic lineaments in the Ozark Plateaus aquifer system of northern Arkansas. Hydrologic studies in northern Arkansas also indicate that areas of fractured rock commonly have a greater thickness of regolith than those of nonfractured rocks; the same investigations show that well yields are greater in areas with a thicker regolith. The thick regolith serves to store ground water and subsequently releases the stored water slowly so that it percolates downward into bedrock aquifers. The largest limestone and dolomite

conduits may parallel the orientation of regional fracture systems rather than local fracture bedrock systems.

MINOR AQUIFERS

WESTERN INTERIOR PLAINS CONFINING SYSTEM

The Western Interior Plains confining system is part of a widespread, thick, geologically complex, poorly permeable, sedimentary sequence that extends eastward from the Rocky Mountains to western Missouri and northern Arkansas. In northern Arkansas, the Western Interior Plains confining system underlies a wide area that extends southward between 60 and 80 miles from its northern margin at the Boston Mountains escarpment to the Ouachita Mountains (fig. 114). The Western Interior Plains confining system consists of a sequence of shale, sandstone, and limestone of Mississippian to Pennsylvanian age that thickens to more than 8,000 feet as it extends southwestward (fig. 115). On a regional scale, the rocks that compose the confining system are poorly permeable and function as a confining unit. Locally, however, individual geologic units or parts of units within the confining system yield as much as 19 gallons per minute to wells. The confining system is, therefore, considered to be a minor aquifer.

The Western Interior Plains confining system is topographically characterized by the rugged relief of the Boston Mountains and the low relief of the Arkansas River Valley. The Boston Mountains range in altitude from 1,000 to 2,000 feet above sea level, and the Arkansas River Valley ranges in altitude from 300 to 600 feet above sea level but locally contains east to west-trending ridges whose summits range from 1,000 to over 2,000 feet above sea level. Rocks of the confining system that underlie the Arkansas Valley Section are dominated by siltstone and shale that are overlain by a weathered zone that ranges from 10 to 30 feet thick. Sandstone beds of the system that are in the Arkansas Valley Section are well-cemented by silica and iron, resistant to erosion and form higher ridges. The Boston Mountains area, which is the highest erosional plateau in northern Arkansas, is underlain by sandstone, shale, and minor limestone beds of the confining system. The geologic formations that compose the confining system are shown in figure 116.

The ground-water flow system within the Western Interior Plains confining system can be separated into two zones: an upper zone within soil and highly weathered bedrock and a lower zone within moderately weathered to unweathered bedrock. The base of the weathered rock zone generally is no more than 300 feet below land surface. Weathering processes that act on the upper zone have increased its porosity and permeability, and the movement of water within it is primarily through interparticle pore spaces.

A map of the potentiometric surface of the upper zone of the Western Interior Plains confining system before development (fig. 117) shows the altitude of the water table within the weathered zone. Wells withdraw water from the confining system mostly for domestic use because well yield and water quality are inadequate for public supply. The predevelopment potentiometric map, therefore, probably is representative of current (1997) conditions. Water enters the confining

system as precipitation that falls on topographically high interstream areas and then moves through the weathered zone toward stream valleys where much of the water is discharged. Regional ground-water movement toward the Arkansas River is southward.

Ground water within the unweathered zone is, for the most part, dependent on fracture density and fracture interconnection of the bedrock. Vertical or horizontal fractures or bedding planes can locally divide water-yielding strata into discrete, separate blocks that are hydraulically independent of each other. Joint sets, fractures, bedding-plane partings, and fault zones represent the fracture types most commonly associated with permeable zones of the unweathered part of the Western Interior Plains confining system. Bedding-plane partings, fracture cleavage in shaly rocks, and closely spaced joint sets in shale and siltstone beds of the confining system tend to be zones of high permeability that are more reliable sources of water than massive sandstone beds which contain less densely spaced fractures.

Secondary permeability within interbedded carbonate rocks of the Western Interior Plains confining system may locally be enhanced by meteoric dissolution. In the Boston Mountains area, outcropping carbonate rocks of the Pitkin Limestone, the Hale Formation, and the Brentwood Limestone Member of the Bloyd Formation locally contain cave systems sandwiched between poorly permeable shale beds, thus forming mazelike passageways.

Water levels within the Western Interior Plains confining system can fluctuate as much as 10 feet per year in response to seasonal variations in rainfall and evapotranspiration. These water-level fluctuations are directly attributed to the nature of the fractures in the rocks that compose the water-yielding zones. In narrow fractures, a small change in the volume of water can cause a significant change in the water level. In areas where fractures are widely spaced or poorly interconnected, small withdrawals could result in a large drawdown in a pumped well.

Wells completed in the weathered zone of the Western Interior Plains confining system generally yield only small volumes of water. In northwestern Arkansas, the yield of wells completed in the weathered zone ranges from 2.5 to 19 gallons per minute; much of the water was obtained from the Hale Formation and the Pitkin Limestone. The Atoka Formation also functions as a local water-yielding zone; the median yield of wells completed in the Atoka Formation is reported to be 9 gallons per minute.

The quality of ground water in the Western Interior Plains confining system is highly variable but meets most secondary drinking-water standards and is considered to be suitable for domestic and livestock uses. The quality of the water generally is not considered to be adequate for municipal supply. Principal constituents in the water are sodium and bicarbonate ions (fig. 118). Saline water is reported to be at depths that range from 500 to 2,000 feet below land surface.

OUACHITA MOUNTAINS AQUIFER

The Ouachita Mountains aquifer has a north-to-south width of 80 miles along the ArkansasOklahoma State line but progressively narrows

eastward (fig. 119). The maximum length of the aquifer is about 130 miles. The Ouachita Mountains aquifer consists mostly of shale, sandstone, and chert beds of Cambrian to Pennsylvanian age (fig. 120), all of which were deposited in deep-marine water conditions; the coarsest deposits were part of turbidity-current or debris-flow deposits. The Ouachita Mountains are topographically characterized by alternating mountains and intermontane valleys to the north and a southernmost piedmont area. The mountains rise to summit altitudes of as much as 2,600 feet above sea level near the Oklahoma border but are only about 500 feet above sea level where they abut the Coastal Plain. Bedrock units that underlie the Ouachita Mountains have been thrust faulted, are highly folded, and contain overturned formations. The piedmont area is underlain by shale and sandstone and borders the Coastal Plain in southwestern Arkansas. The surface of the area generally is flat to gently rolling but contains a series of low ridges and swells that strike east to west.

The importance of the Ouachita Mountains aquifer is due more to its wide areal extent than to its water-yielding characteristics. Only limited quantities of water for domestic and nonirrigation farm uses can be obtained from wells completed in the aquifer. Base-flow discharge during periods of low or no precipitation is not large enough to sustain streamflow. Streams that drain areas of less than 100 square miles usually go dry every year, while streams that drain more than 100 but less than 200 square miles go dry every 10 years on average. Most wells completed in the aquifer yield less than 50 gallons per minute; [3]large-yield[2] wells generally are viewed as those capable of yielding more than 10 gallons per minute. Water levels in the aquifer can fluctuate by as much as 10 feet per year as rainfall and evapotranspiration rates change seasonally.

High-permeability fracture zones in the Ouachita Mountains commonly form along bedding-plane partings but are best developed where folding has caused differential movement along contacts between shale and sandstone beds. Wells in the Ouachita Mountain aquifers should be drilled along the flanks of anticlines or near a plunging anticlinal nose (fig. 121). Bedrock areas that include fractured chert-novaculite or limestone also are considered to be preferred drilling sites. Fault zones, which often contain milky quartz veins, also function as local conduits for ground-water flow within the Ouachita Mountains aquifer. However, the fault zones may conduct little water if they are filled with fault gouge or cemented breccia. In Hot Springs, Arkansas, faults are the principal conduit for deep-seated, thermal ground-water discharge. Most joints and fractures in the Ouachita Mountains aquifer, however, are within 300 feet of land surface. Joints and other fractures tend to close or decrease in width with depth owing to lithostatic pressure, which is the vertical pressure caused by the weight of overlying rock and soil.

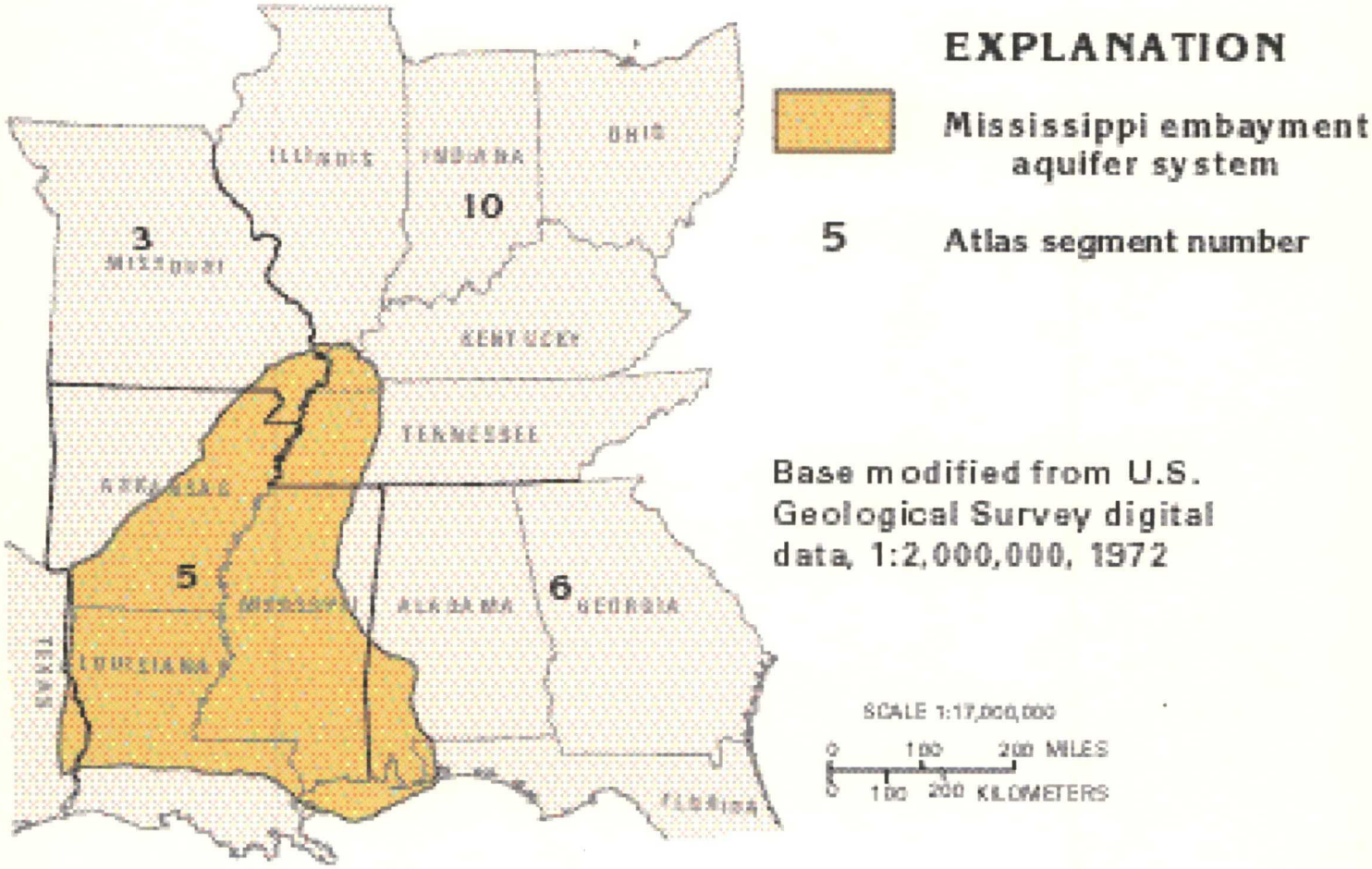
The thermal springs of the Hot Springs area represent an interesting and unique aspect of ground-water flow in the Ouachita Mountains aquifer. Before their development for commercial resort purposes in the late to middle 1800[1]s, the Hot Springs area may have contained as many as 72 spring openings. Many of the springs were concentrated along a faulted and jointed bedrock area that is a few hundred feet wide and 0.25 mile long and that is located on the southwestern slope of Hot Springs Mountain. Many spring openings were walled in and covered to

prevent contamination, and an extensive piping system was developed to supply hot water to various bathhouses (fig. 122).

Springs classified according to temperature are described as nonthermal and thermal types. Nonthermal, or cold, springs have about the same temperature as the mean annual air temperature in the area where they are located. Thermal springs are separated into hot- and warm-water types. Hot springs have temperatures that are higher than 98 degrees Fahrenheit. The temperatures of warm springs are less than 98 degrees Fahrenheit but higher than the mean annual air temperature. Many [3]cold-water[2] springs in the Hot Springs and the west-central Ouachita areas should more correctly be classified as warm-water springs. The temperatures of the hottest springs may have declined slightly with time. In 1804, the maximum temperature for the hottest spring was reported to be 154 degrees Fahrenheit, whereas the hottest spring temperature reported in 1972, for example, was 143.2 degrees Fahrenheit.

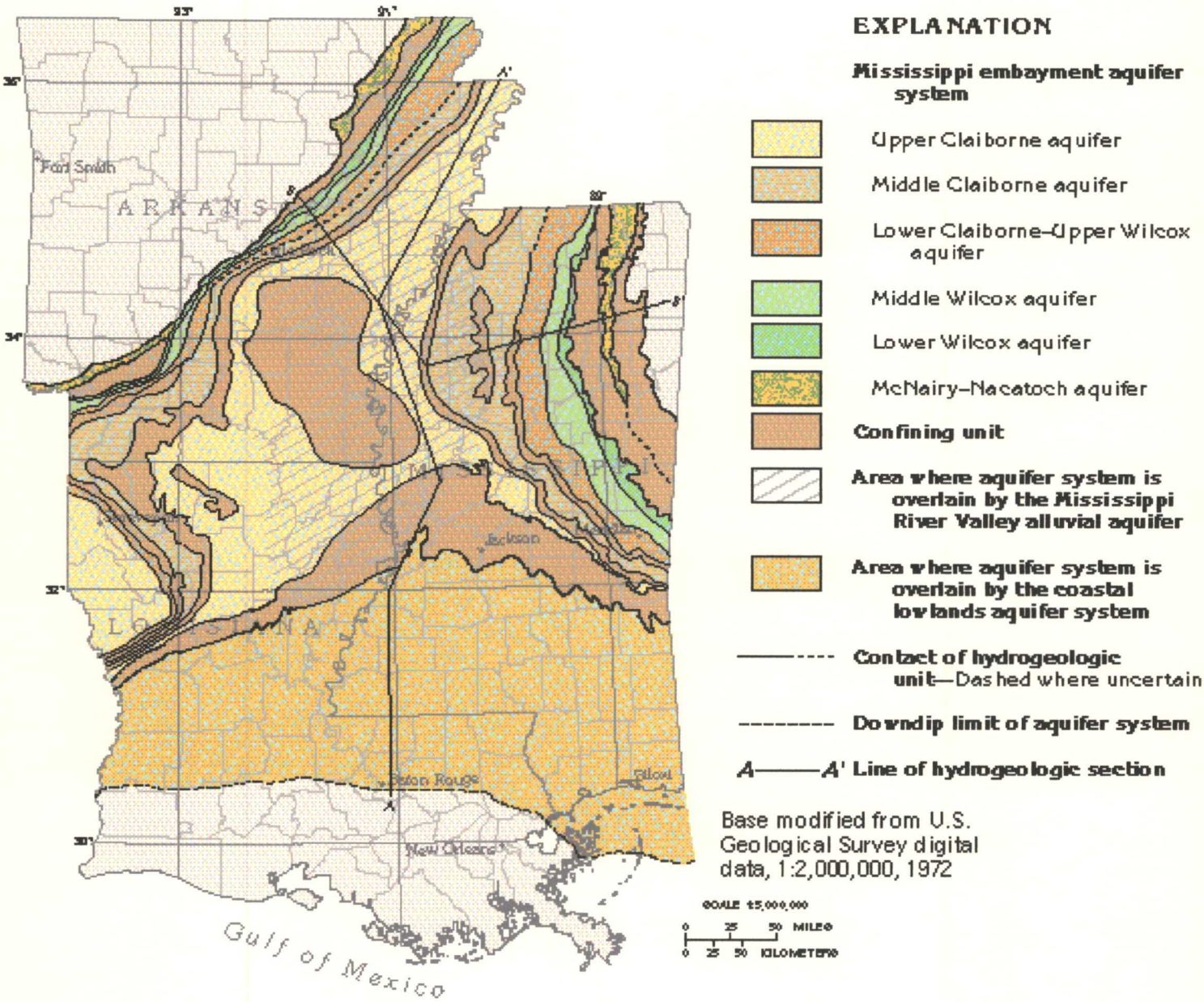
The mechanics of spring flow associated with thermal springs of central Arkansas parallels that of other fault- or fracture-related springflow systems. Topographic relief provides the hydraulic energy needed to drive the movement of water in fault- and fracture-spring settings, and the spring openings function as a focal point of concentrated ground-water discharge (fig. 123). Water enters the aquifer as precipitation in a topographically high area and is discharged in a topographically low area. A fault or fracture zone serves as a high-permeability avenue that allows ground water to exit the flow system. The principal difference between thermal and non-thermal springs is that thermal springs discharge water that has been circulated to a great depth. In the Hot Springs area, thermal springs discharge water that is estimated to have circulated to depths that range from 4,500 to 7,500 feet below land surface. However, thermal and nonthermal springs of the Hot Springs area discharge some water that apparently has circulated only to shallow depths. The heat that warms the water from warm- and hot-water springs is derived from the geothermal gradient, which is the progressive warming of the Earth's crust with depth. The normal increase in temperature with depth is about 1 degree Fahrenheit per 100 feet. In general, waters that circulate to great depths are warmer than those that circulate to shallower depths.

The Bigfork Chert, which is an important water-yielding zone in the Ouachita Mountains aquifer, is moderately to highly fractured and contains some intergranular permeability. Meteoric waters recharge the chert within a 3- to 10-square mile upland area northwest of the city of Hot Springs, in which the central part of a large anticline is exposed (fig. 123). The regional movement of ground water is to the southwest, and bedrock fracturing is of sufficient density and interconnection to allow some water to move downward to depths that range from 4,500 to possibly 7,500 feet below land surface. Ground water at such depths is warmed by heat conduction from adjoining low-permeability rocks. Fractured and faulted bedrock compose high-permeability zones that function as conduits for heated water and allow it to move rapidly to the surface with only a slight decrease in water temperature.



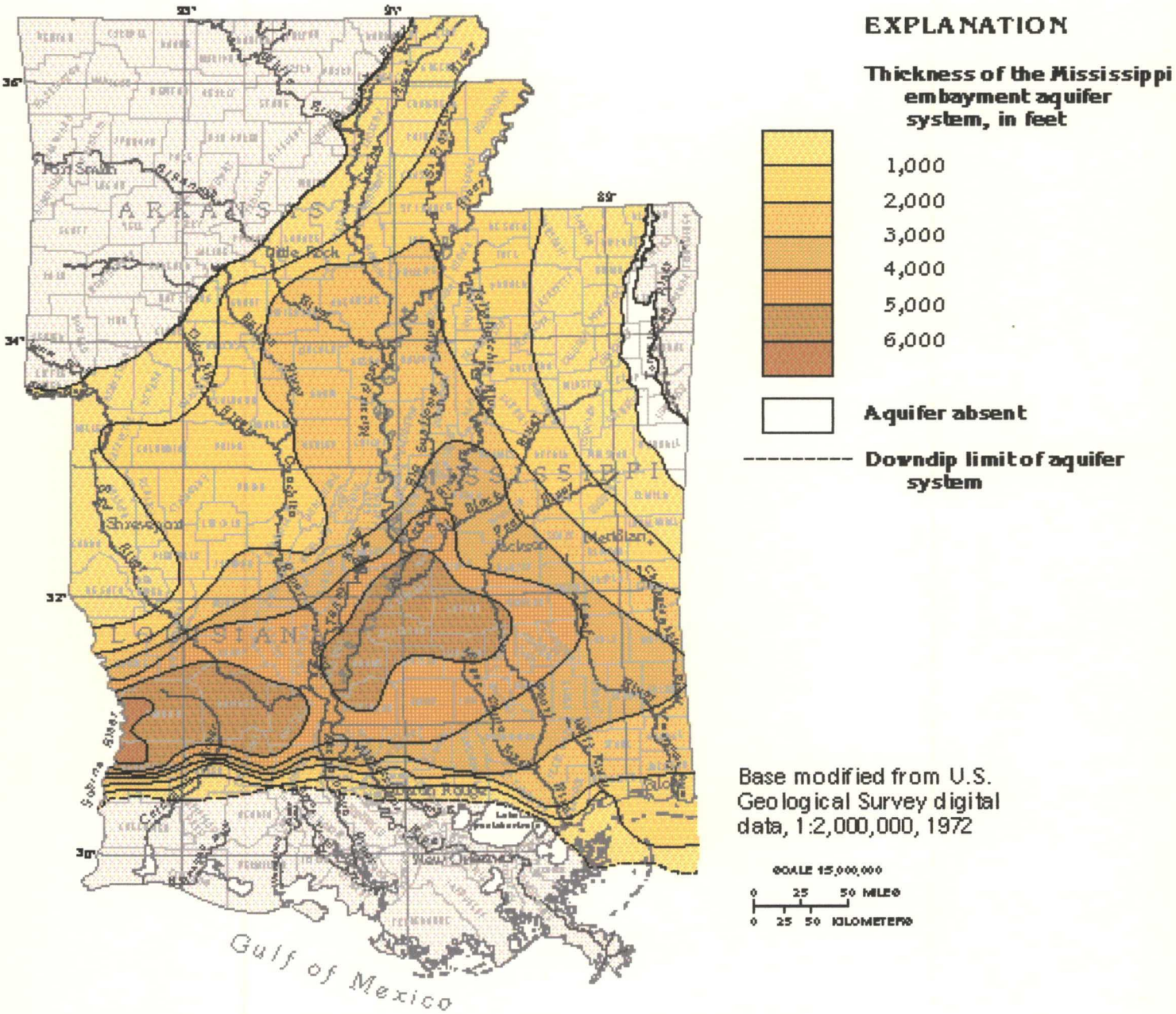
Modified from Hosman, R.L., and Weiss, J.S., 1991, Geohydrologic units of the Mississippi embayment and Texas coastal uplands aquifer systems, south-central United States: U.S. Geological Survey Professional Paper 1416–B, 19 p.

Figure 65. The Mississippi embayment aquifer system extends over parts of 10 States and 5 segments of this Atlas and is the most widespread aquifer system in Segment 5.



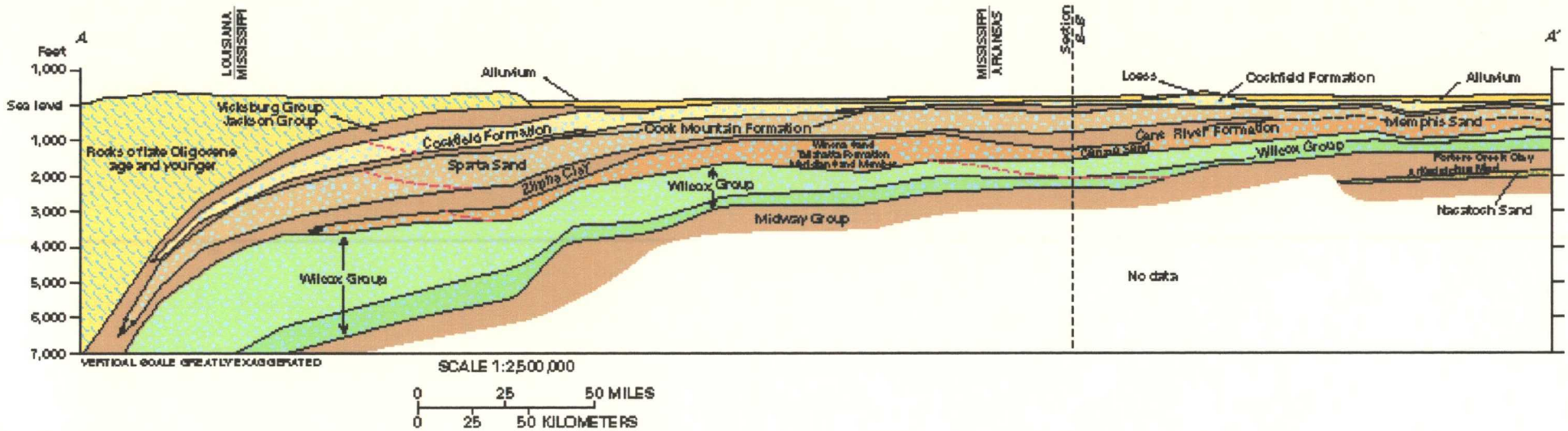
Modified from Hosman, R.L., and Weiss, J.S., 1991, Geohydrologic units of the Mississippi embayment and Texas coastal uplands aquifer systems, south-central United States: U.S. Geological Survey Professional Paper 1416–B, 19 p.

Figure 66. Coastal Plain sedimentary rocks that compose the aquifers and confining units of the Mississippi embayment aquifer system crop out mostly as parallel bands. The Mississippi embayment aquifer system is covered in a large part of Segment 5 by the Mississippi River Valley alluvial aquifer which is part of the surficial aquifer system.



Modified from Hosman, R.L., and Weiss, J.S., 1991, Geohydrologic units of the Mississippi embayment and Texas coastal uplands aquifer systems, south-central United States: U.S. Geological Survey Professional Paper 1416–B, 19 p.

Figure 67. The Mississippi embayment aquifer system is more than 5,000 feet thick in a wide area of south-central Louisiana and southwestern Mississippi. The aquifer system thickens eastward and westward from its updip limit toward the axis of the Mississippi Embayment.



EXPLANATION

Surficial aquifer system

- Mississippi River Valley alluvial aquifer
- Coastal lowlands aquifer system

Mississippi embayment aquifer system

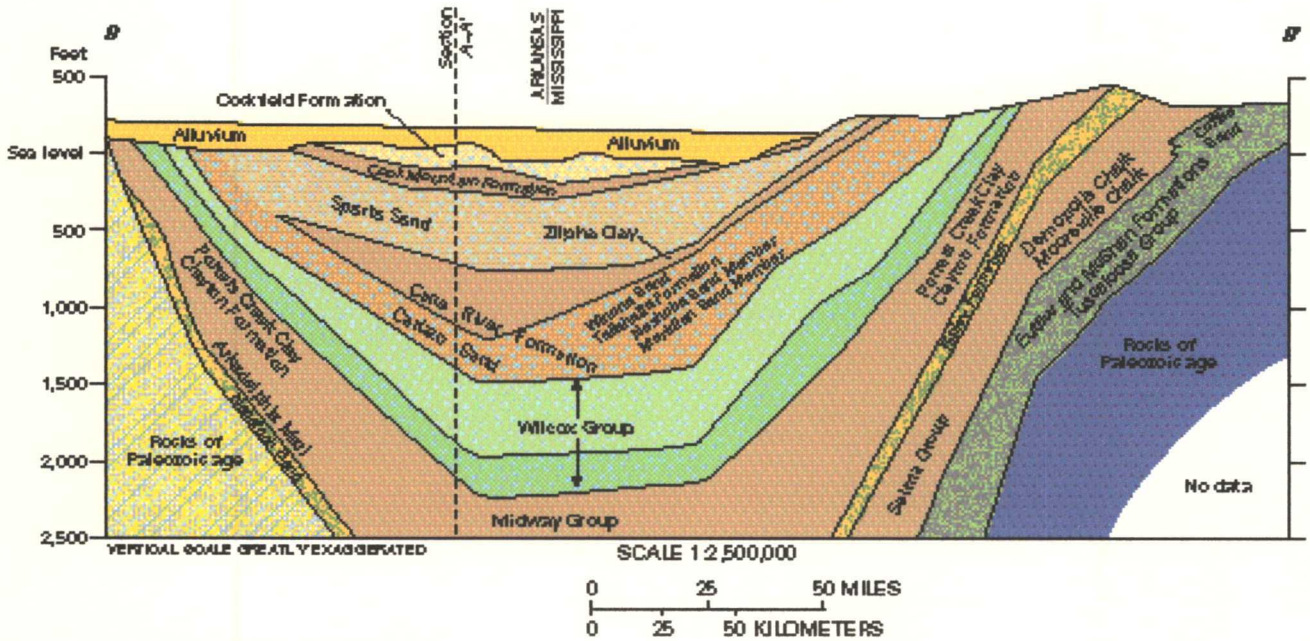
- Upper Claiborne aquifer
- Middle Claiborne aquifer
- Lower Claiborne–upper Wilcox aquifer
- Middle Wilcox aquifer
- Lower Wilcox aquifer
- McNairy–Nacatoch aquifer
- Ozark Plateaus aquifer system

Southeastern Coastal Plain aquifer system

- Black Warrior River aquifer
- Appalachian Plateaus and Interior Low Plateaus aquifers (see Chapter K for detailed description)
- Confining unit
- Contact of hydrogeologic unit—Dashed where uncertain
- Estimated line of equal dissolved-solids concentration equal to 10,000 milligrams per liter dissolved solids

Modified from Hosman, R.L., and Weiss, J.S., 1991, Geohydrologic units of the Mississippi embayment and Texas coastal uplands aquifer systems, south-central United States: U.S. Geological Survey Professional Paper 1416–B, 19 p.

Figure 68. A hydrogeologic section of the Mississippi embayment aquifer system shows that the Coastal Plain sedimentary rocks that compose the system dip southward beneath the rocks that compose the coastal lowlands aquifer system. The line of the section is shown in figure 66.



EXPLANATION

Surficial aquifer system

Mississippi River Valley alluvial aquifer

Coastal lowlands aquifer system

Mississippi embayment aquifer system

Upper Claiborne aquifer

Middle Claiborne aquifer

Lower Claiborne–upper Wilcox aquifer

Middle Wilcox aquifer

Lower Wilcox aquifer

McNairy–Nacatoch aquifer

Ozark Plateaus aquifer system

Southeastern Coastal Plain aquifer system

Black Warrior River aquifer

Appalachian Plateaus and Interior Low Plateaus aquifers (see Chapter K for detailed description)

Confining unit

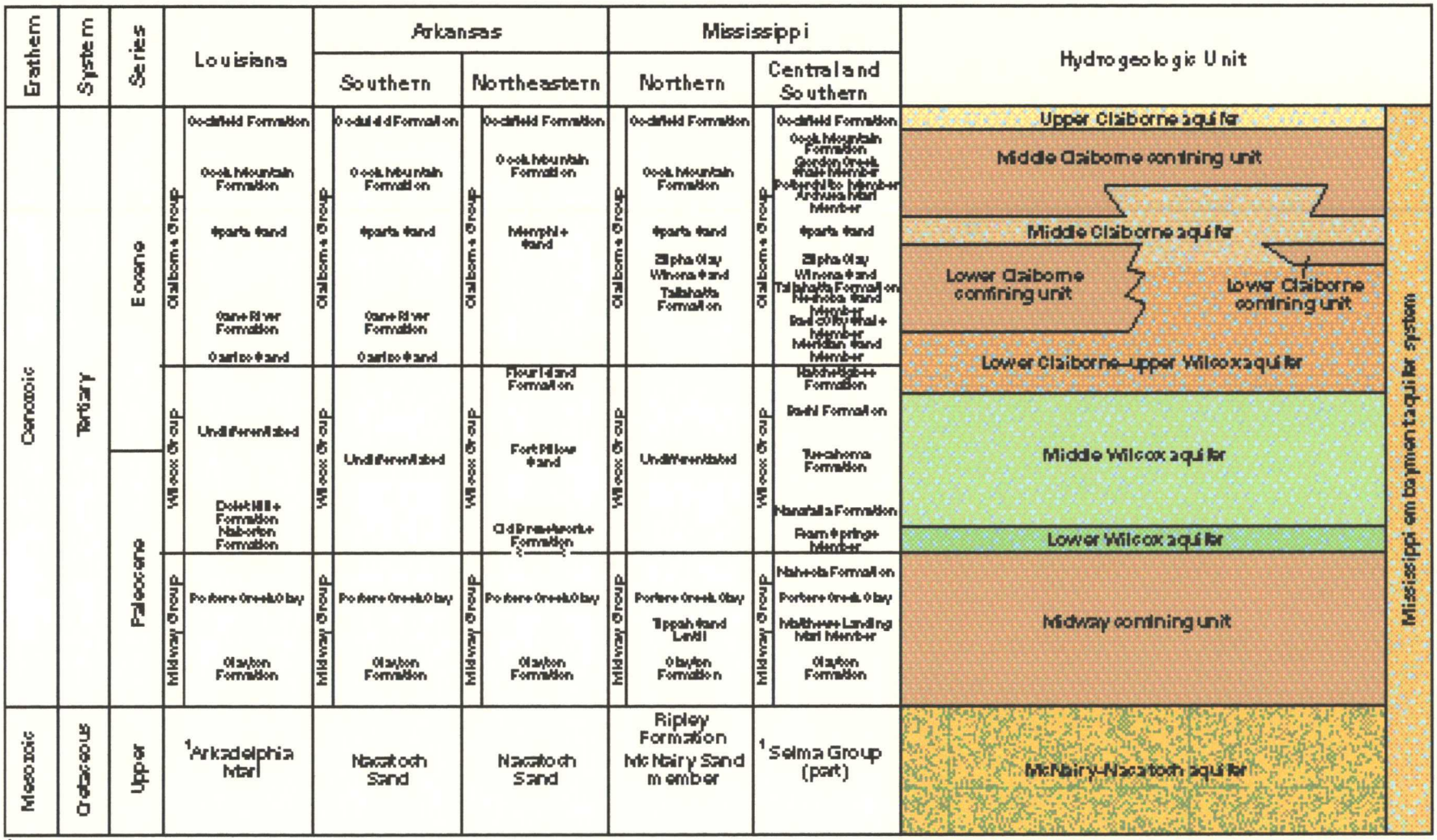
Contact of hydrogeologic unit—Dashed where uncertain

Estimated line of equal dissolved-solids concentration equal to 10,000 milligrams per liter dissolved solids

Modified from:

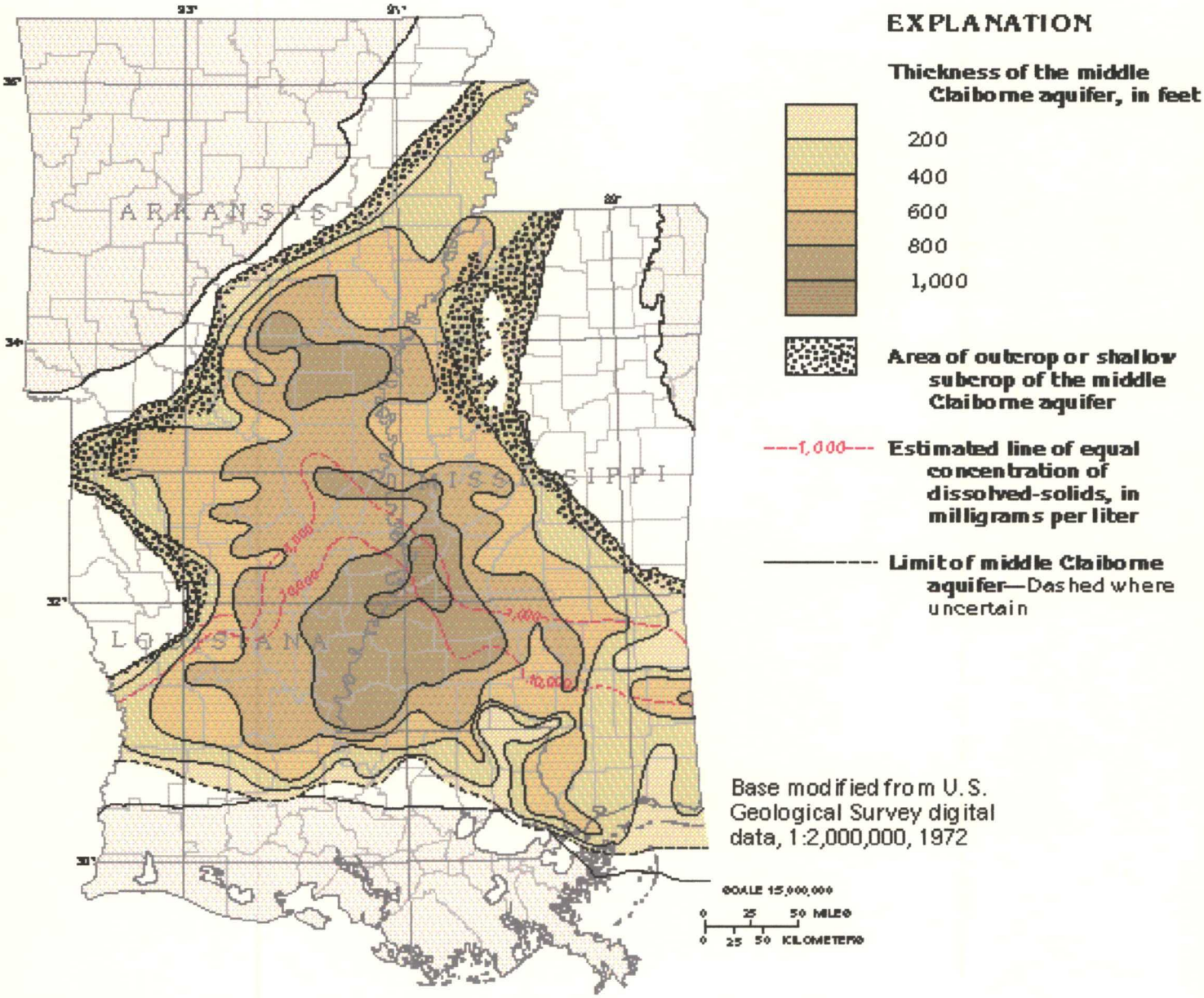
Boswell, E.H., Moore, G.K., MacCary, L.M., and others, 1965, Cretaceous aquifers in the Mississippi Embayment, with discussions on Quality of the water, by H.G. Jeffery: U.S. Geological Survey Professional Paper 448–C, 37 p.
Hosman, R.L., Long, A.T., Lambert, T.W., and others, 1968, Tertiary aquifers in the Mississippi Embayment, with discussions on Quality of the water, by H.G. Jeffery: U.S. Geological Survey Professional Paper 448–D, 29 p.
Hosman, R.L., and Weiss, J.S., 1991, Geohydrologic units of the Mississippi embayment and Texas coastal uplands aquifer systems, south-central United States: U.S. Geological Survey Professional Paper 1416–B, 19 p.

Figure 69. An idealized hydrogeologic section drawn westward from south-central Arkansas to north-central Mississippi shows that most aquifers and confining units of the Mississippi embayment aquifer system are continuous across the downwarped embayment. Some of the aquifers thicken, and others thin from west to east across the embayment. The line of the section is shown in figure 66.



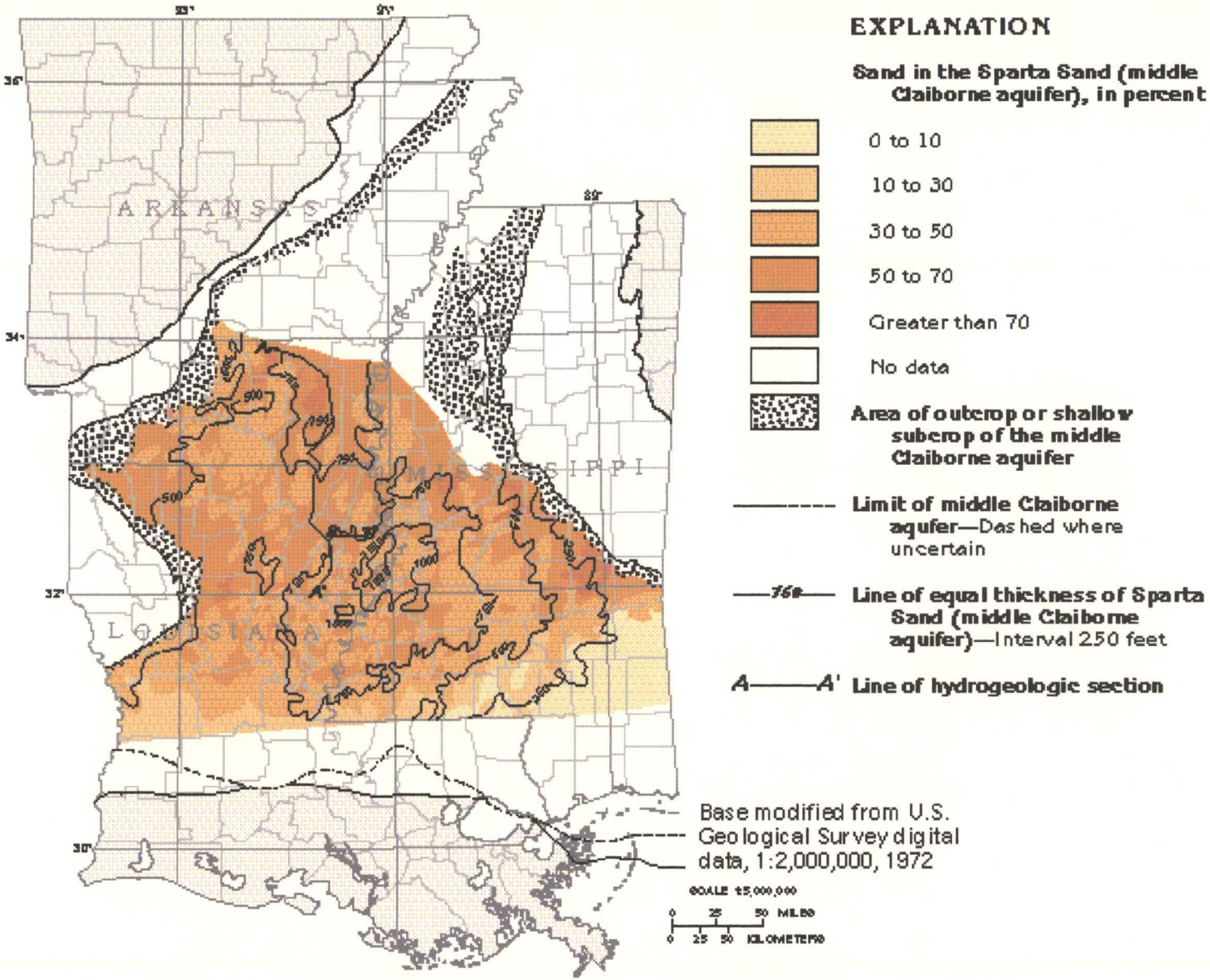
Modified from Hosman, R.L., and Weiss, J.S., 1991, Geohydrologic units of the Mississippi embayment and Texas coastal uplands aquifer systems, south-central United States: U.S. Geological Survey Professional Paper 1416–B, 19 p.

Figure 70. Many of the geologic units of Eocene to late Cretaceous age in Segment 5 conform well with the six aquifer and three confining units of the Mississippi embayment aquifer system. This chart does not imply the thickness or exact equivalency of the different geologic units, but does show the principal units that compose the regional aquifers and confining units.



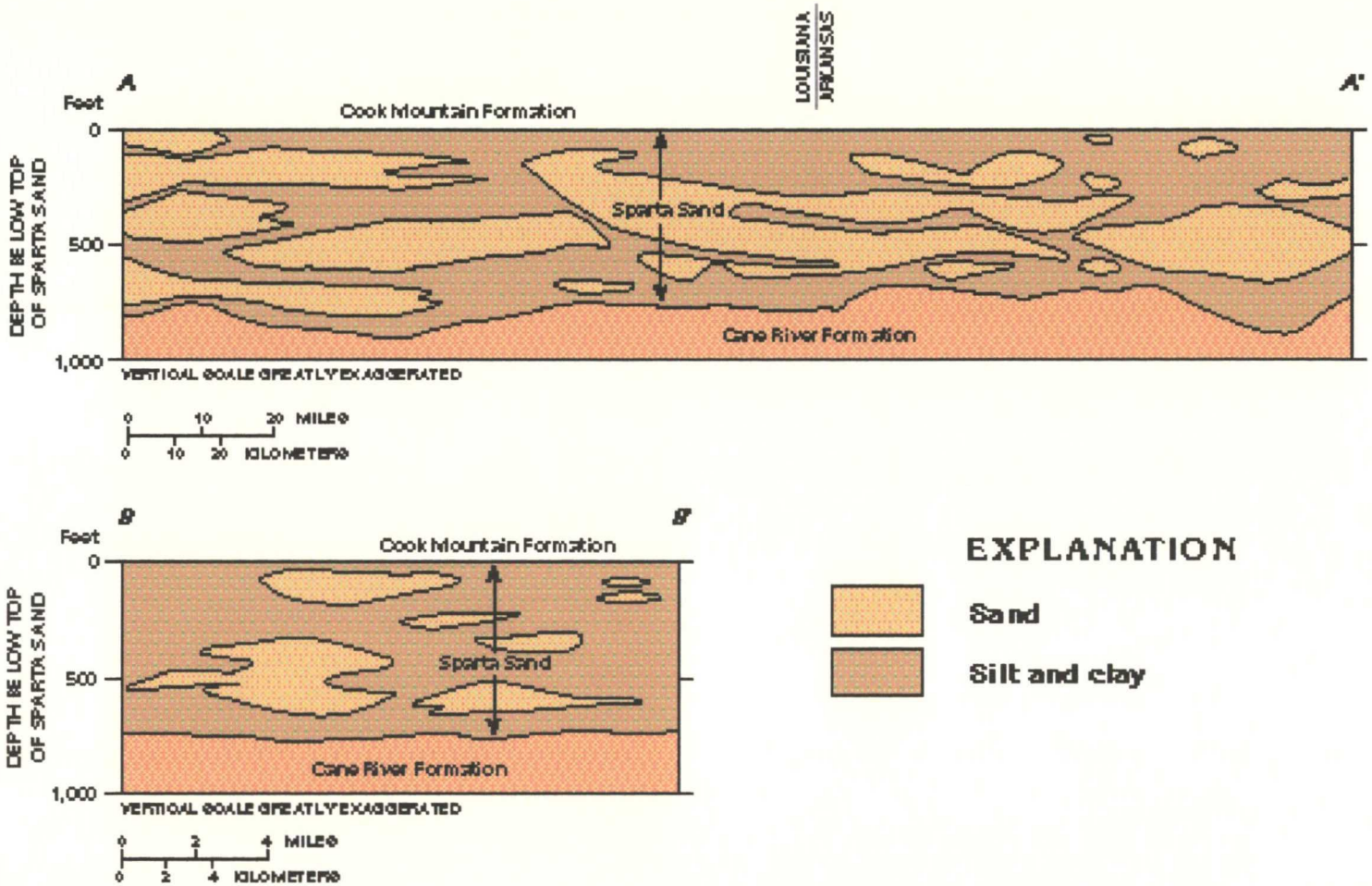
Modified from Hosman, R.L., and Weiss, J.S., 1991, Geohydrologic units of the Mississippi embayment and Texas coastal uplands aquifer systems, south-central United States: U.S. Geological Survey Professional Paper 1416–B, 19 p.

Figure 71. The middle Claiborne aquifer is thickest in east-central Louisiana, southwestern Mississippi, and southeastern Arkansas where its thickness is greater than 800 feet. The aquifer generally is less than 800 feet thick where it contains water with less than 1,000 milligrams per liter of dissolved solids.



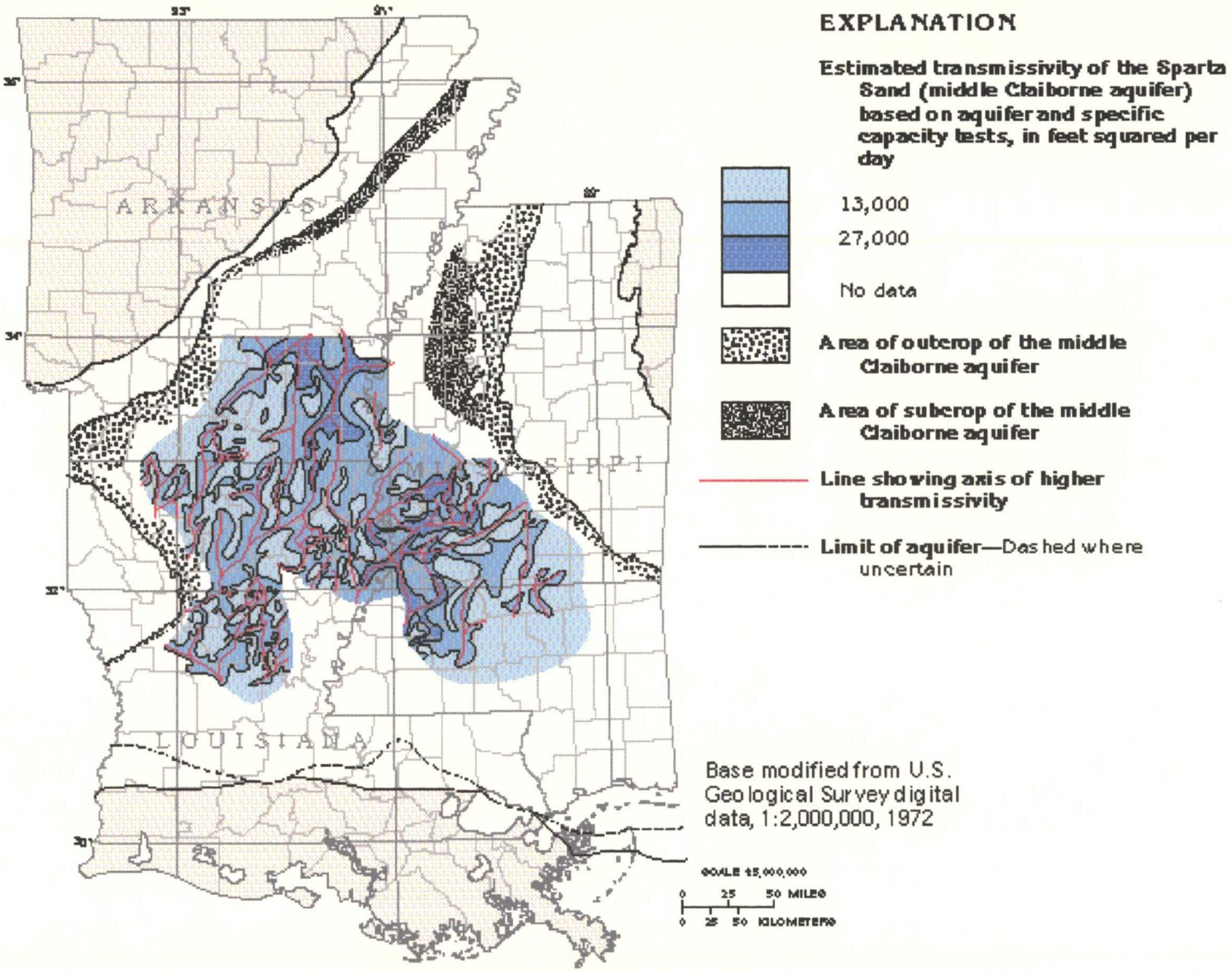
Modified from Payne, J.N., 1968, Geohydrologic significance of the lithofacies of the Sparta Sand in Arkansas, Louisiana, Mississippi, and Texas: U.S. Geological Survey Professional Paper 569–A, 17 p.

Figure 72. The distribution of sand within the Sparta Sand that makes up most of the middle Claiborne aquifer suggests that the sand was deposited in constantly shifting distributary channels separated by interdistributary marshes, lakes, and swampy areas that received fine-grained sediment. This is a sedimentary environment that typifies a constructive delta.



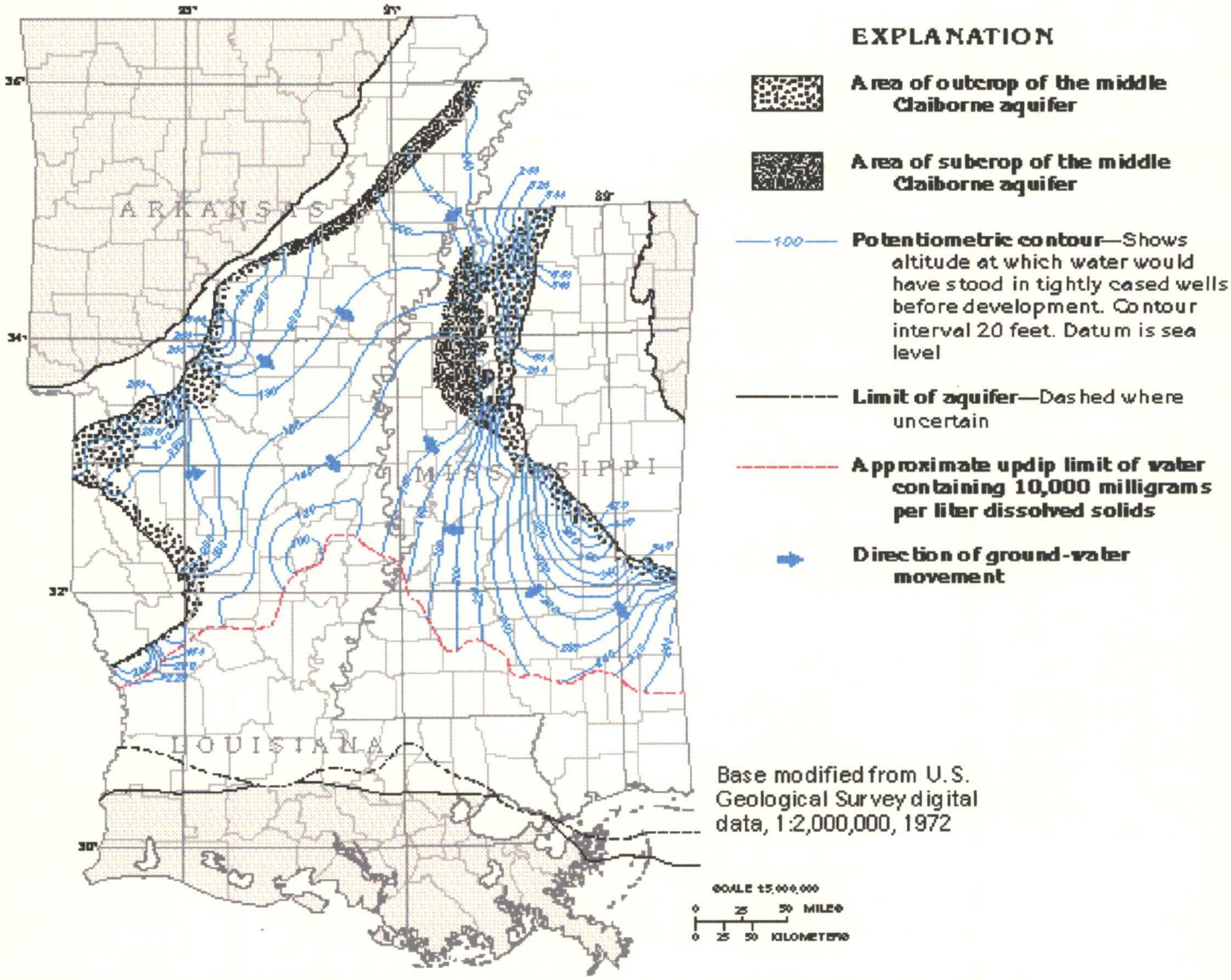
Modified from Figure 72. The distribution of sand within the Sparta Sand that makes up most of the middle Claiborne aquifer suggests that the sand was deposited in constantly shifting distributary channels separated by interdistributary marshes, lakes, and swampy areas that received fine-grained sediment. This is a sedimentary environment that typifies a constructive delta.

Figure 73. Lenticular beds of sand that extend southward for several tens of miles characterize the Sparta Sand, which composes most of the middle Claiborne aquifer. Section A–A′ is parallel to the general course of the ancient distributary channels that contain the permeable sands of the aquifer. Section B–B′ is perpendicular to the channel direction and shows that the water-yielding sands were deposited in narrow channels. The lines of the hydrogeologic sections are shown in figure 72.



Modified from Payne, J.N., 1968, Geohydrologic significance of the lithofacies of the Sparta Sand in Arkansas, Louisiana, Mississippi, and Texas: U.S. Geological Survey Professional Paper 569–A, 17 p.

Figure 74. The trans-missivity of the Sparta Sand (middle Claiborne aquifer) ranges from less than 13,000 to more than 27,000 feet squared per day. Areas of higher transmissivity cor-relate to ancient distributary channels mapped on the basis of the percentage of sand. Areas of low trans-missivity compare well with the probable location of interdistributary deposits.



Modified from Arthur, J.K., and Taylor, R.E., 1990, Definition of geohydrologic framework and preliminary simulation of ground-water flow in the Mississippi embayment aquifer system, Gulf Coastal Plain, United States: U.S. Geological Survey Water-Resources Investigations Report 86–4364, 97 p.

Figure 75. Before development of the middle Claiborne aquifer, water entered the aquifer at outcrop areas and moved toward the center of the Mississippi Embayment. Regional discharge was mostly by diffuse upward leakage to shallower aquifers and eventually to major streams such as the Mississippi River.

Reference 14
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176

DEPT OF ENVIRONMENTAL QUALITY
RECD
APR 20 1992

WARE LIND FURLOW ENGINEERS, INC.
GEOTECHNICAL AND EARTH SCIENCE CONSULTANTS

850 PEAR ORCHARD ROAD • POST OFFICE BOX 13955 • JACKSON, MISSISSIPPI 39236-3955 • AREA CODE 601: 956-4467

April 20, 1992

Mississippi Office of Pollution Control
Post Office Box 10385
Jackson, Mississippi 39289-0385

Report No. 92025

Attention: Mr. Steve Spangler

Groundwater Assessment
Enterprise Recovery Systems
Cayce, Mississippi

Gentlemen:

Submitted herein is the report of our groundwater assessment of the Enterprise Recovery Systems facility located in Cayce, Mississippi. This study was requested by the Mississippi Office of Pollution Control on December 23, 1991.

The scope of work for this investigation was outlined in our proposal dated February 3, 1992. Details of the investigation are provided in the body of this report.

We appreciate the opportunity of providing services to you on this project. If we can furnish any additional information or further assist you in any way, please call on us.

Very truly yours,

WARE LIND FURLOW ENGINEERS, INC.

Ronald J. Tarbutton, P. G.

Charles R. Furlow, P. E.

RJT/CRF/tls
Copies Submitted: (4)

10300477

groundwater levels. Water used by WLFE during the field investigation phase of this study was obtained from fire hydrants from the cities of Byhalia, Mississippi and Collierville, Tennessee.

Relatively undisturbed samples of cohesive soils encountered in the soil borings were obtained by pushing a 3-in. OD thin-wall Shelby tube sampler a distance of approximately 2 ft into the soil using hydraulic cylinders on the drill rig (ASTM D 1587). The depths at which these samples were obtained are indicated by shaded portions in the "Samples" column of the boring logs. The undisturbed samples were removed from the Shelby tube in the field using a hydraulic extruder mounted on the drill rig. Each sample was extruded into an aluminum foil-lined sample catcher. The upper and lower 2 in. of soil samples were trimmed and discarded. In granular materials, representative soil samples will be obtained by driving a standard 2-in. OD split-spoon sampler a distance of 18 in. into the soil with a 140-lb hammer falling a distance of 30 in. The number of blows required to drive the sampler the final 12 in. of penetration was observed and recorded (ASTM D 1586). Representative portions of the soil samples were placed in glass jars for future reference. A representative portion of each sample was placed in a foil-covered glass jar for field screening analyses. The lithologic descriptions of the soil samples were made by a qualified geologist. Soil classification was performed in general agreement with ASTM Standard Test Methods D 2487 and D 2488. The soils were characterized by strength, plasticity, color and particle size. Each sample was identified by boring number, sample depth and sample number.

To prevent cross contamination between borings, the drilling and sampling equipment was decontaminated between samples and between boring locations. Equipment included in the decontamination process were soil samplers, augers and drill rods. The decontamination procedure consisted of cleaning the equipment with a steam cleaner and thoroughly washing with a non-phosphate detergent. The equipment was then rinsed with tap water, deionized water and double rinsed with pesticide grade isopropanol alcohol. The decontamination procedures for the soil sampling equipment consisted of thoroughly washing the equipment with a non-phosphate detergent and rinsing with tap water. The equipment was allowed to air-dry before utilization.

Field screening was used to determine if volatile organic compounds were present. Soil samples were allowed to equilibrate to ambient temperatures for a period of approximately 10 minutes. After the sample equilibrated to ambient

temperature, the headspace of the glass jar was sampled using a HNu photoionization detector (PID). The PID readings are presented in the right-hand column of the graphical boring logs. The instrument was periodically adjusted during the day to compensate for instrument drift and ambient concentrations of petroleum hydrocarbons in the air, if any.

A temporary benchmark with an assumed elevation of 100 ft NGVD was established at the corner of a sidewalk near the office building located on the site. Relative elevations of existing borings and groundwater levels were referenced to this temporary benchmark. The observed water levels for the borings are noted at the bottom right of the graphical logs. A table indicating the relative top of casing elevations, water levels and water elevations is shown on Plate 22. A potentiometric map of the groundwater surface was constructed from water level observations made on April 10, 1992. This potentiometric map is presented on Plate 23.

The field investigation also included the installation of seven groundwater monitoring wells. Five of these wells (MW-1 through MW-4 and MW-6) were installed to a total depth of 110 ft; and two wells (MW-7 and MW-8) were installed to at total depths of 77 ft and 76.5 ft, respectively. Monitor Well MW-5 was installed by E.F. Williams and Associates located in Memphis, Tennessee. The locations of the monitoring wells were selected by a representative of MDEQ. The general location of the monitor wells are shown on Plate 1. The monitor wells were installed to provide hydrological data and a means of groundwater sampling. Monitor well construction details are presented on Plates 24 through 30. Water well drillers logs were submitted to MDEQ Office of Land and Water Resources. Copies of the well drillers logs are presented on Plates 31 through 34.

The groundwater monitoring wells installed consist of 2-in. diameter Triloc Schedule 40 PVC as manufactured by Brainard-Kilman. The well screens are 10 ft in length and have No. 10 slot sizes. At two of the monitor well locations (MW-7 and MW-8), a portion of each screen was placed above the groundwater level to allow monitoring of phase product, if any. The screens were installed to provide at least 5 ft of well screen below the observed groundwater surface. After the well materials were installed in the borings, a silica sand was placed around the well screens. The filter sand extended approximately 3 ft above the top of the screens. A 2 ft thickness of bentonite pellets was placed in the annular space between the boring sidewall and riser pipe to provide a seal. The

pellets were wetted and allowed to hydrate for approximately one hour. A cement-bentonite grout was placed from the top of the bentonite seal to the surface. Above-ground metal shrouds with locking lids were installed over the monitor wells. The shrouds were installed in 4 ft by 4 ft concrete pads to prevent surface water from entering the annular space. At the existing monitor well, a flush mount was installed in a 4 ft by 4 ft concrete pad to prevent surface water from entering the annular space.

Boring B-4 was advanced using rotary wash drilling techniques to a terminal depth of 114 ft. Based on the information provided from the field screening analyses, a 6-in. diameter surface casing was installed to a terminal depth of 80 ft. Prior to installing the surface casing, the boring was enlarged to 10-in. in diameter and completely filled with a cement-bentonite grout mixture. The grout was placed into the boring from the bottom to the surface using the tremie method. Subsequent to grouting the boring, the 6-in. diameter surface casing was installed and advanced into the underlying soils using the hydraulics on the drill rig. The grout was allowed to harden for approximately 24 hours before advancing the boring. Prior to advancing the soil boring, the pump system on the drill rig was decontaminated by circulating a nonphosphate detergent for approximately 30 minutes. Drill fluids and soil cuttings were removed from the mud pit and the pit flushed with fresh water. Boring B-4 was then advanced to a terminal depth of approximately 114 ft.

The groundwater monitor wells were purged before taking samples in order to clear any stagnant water from the well casing. Approximately three well volumes of groundwater were removed from the monitor wells before the samples were taken. The groundwater samples were placed in 40-mil glass vials (volatiles). The water was placed in the containers taking care not to agitate the samples to limit the volatilization and amount of oxygen added. The head space of the samples bottles was eliminated by completely filling the bottles. The bottles were then placed upside down in a container with ice and kept at 4°C. The water samples were delivered to the Mississippi State Health Department (MSHD) laboratory located in Jackson, Mississippi for analytical testing. All groundwater samples were identified with a label. The information provide on the label consisted of the project name, project number, monitor well number, type of test to be performed and date collected. A chain-of-custody seal was placed across the lid of each sample bottle.

For this investigation, three types of sample blanks were used. The sample blanks included trip blanks, equipment rinseate blanks and a Collierville City water blank. The trip blanks were prepared at the laboratory by filling the appropriate containers with deionized water. The trip blanks were transported from the laboratory to the field and back to the laboratory in a manner identical to the handling procedures used for the soil and water samples. The trip blanks were subjected to the same analytical tests as the water samples. In order to verify the effective decontamination of the sampling equipment, an equipment rinseate sample was collected. The rinseate sample was obtained by pouring purged deionized water over the sampling equipment. The resultant rinseate solution was collected in a decontaminated pyrex dish and placed in the appropriate containers for subsequent laboratory analyses. The purged deionized water was obtained from the MSHD laboratory. The City of Collierville water sample was obtained by filling bottles from WLFE equipment used to transport water obtained from the Collierville Water System. All water samples were collected in 40 mm vials supplied by the MSHD laboratory.

A chain-of-custody/analyses request form accompanied all samples delivered to the analytical laboratory. The chain-of-custody forms document sample possession from the time the samples were collected until analysis, in accordance with Federal and State guidelines. To maintain a permanent document of sample possession, the chain-of-custody documentation contained the following information: name and address of the sampling location, sample number, date and time of collection and sample type. Other pertinent information included identification of the boring, well number, number of sample containers, parameters requested for analyses, signature of the person(s) involved in the chain-of-possession and inclusive dates of possession. A seal was placed across the lid of each water sample bottle taken at the facility and had the signature of the person collecting the sample and the date. Copies of the chain-of-custody/analyses request forms are presented in the Appendix. The samples were delivered to the MSHD laboratory for analysis.

GENERAL SOIL CONDITIONS AND HYDROGEOLOGY

Physiographically, the site is located in the north central hills physiographic province. The geologic units encountered at the site from the youngest to the oldest are the Holocene Age Alluvial Sediments associated with

the Nonconnah River and the Eocene Kosciusko Formation. A generalized soil profile illustrating the stratigraphic relationship of the formations is presented on Plate 35.

The sediments associated with the Nonconnah River alluvium vary from clays and silty clays to sandy clays. The alluvium ranges in thickness from a minimum of 12 ft at Boring 5 to a maximum of 17 ft at Boring 2.

The Kosciusko Formation is characterized by dense white, brown and red, very fine to coarse grained sands with some reworked clays. Based on available geologic literature, the Kosciusko Formation is approximately 100 ft thick beneath the facility. The potentiometric map of the groundwater surface presented on Plate 23 was constructed from water level observations made on April 10, 1992. This potentiometric map indicates the direction of shallow groundwater flow is to the west-northwest.

Based on the review of the geologic literature, the site of this investigation is within a recharge area for the Kosciusko Aquifer. A potentiometric surface map of the Kosciusko Aquifer in the study area (Gandl, 1982) indicates a general groundwater flow for that aquifer to the west. The Kosciusko Formation is directly recharged from rainfall and streams.

REPORT LIMITATIONS

The borings made for this report were located in the field based on the direction of MDEQ, MOPC. The boring logs shown in this report contain information related to the types of soil encountered at specific locations and times and show lines delineating the interface between these materials. The logs also contain our field representative's interpretation of conditions that are believed to exist in those depth intervals between the actual samples taken. Therefore, these boring logs contain both factual and interpretative information. It is not warranted that these logs are representative of subsurface conditions at other locations and times.

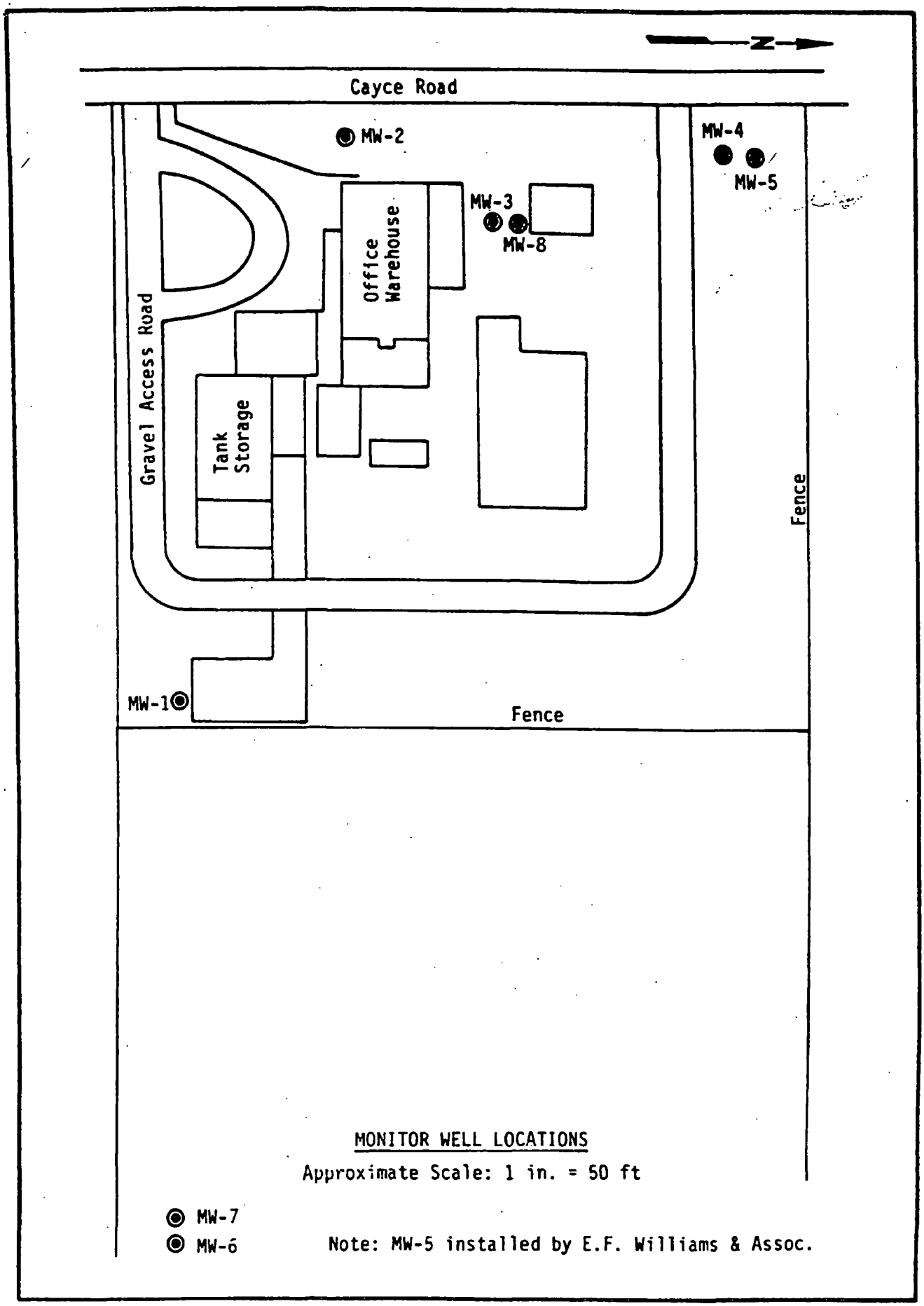
With regard to groundwater conditions, this report presents data on groundwater levels as they were observed during the course of the field work. In particular, water level observations have been accomplished at the times and under conditions stated in the text of the report and on illustrations contained in the report. It should be noted that fluctuations in the level of the

groundwater table will occur with passage of time due to variations in rainfall, temperature and other factors.

This report presents data concerning the presence of organic vapors as measured within the headspace of selected soil samples. These data are dependent upon ambient conditions and can be expected to fluctuate. Additionally, the presence of organic vapors can fluctuate over time.

This report has been prepared for the exclusive use of Mississippi Department of Environmental Quality for specific application to the environmental assessment of the Enterprise Recovery Systems site located near Cayce, Mississippi. The only warranty made by us in connection with the services provided is that we have used that degree of care and skill ordinarily exercised under similar conditions by reputable members of our profession practicing in the same or similar locality. No other warranty, expressed or implied, is made or intended.

ILLUSTRATIONS



WARE LIND PURLOW
ENGINEERS

PLATE 1

LOG OF BORING NO. 1
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
MARSHALL COUNTY, MISSISSIPPI

TYPE: Rotary Wash

LOCATION: See Plate 1

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/50 FT (1, 2, 3, 4)	PLASTIC LIMIT / WATER CONTENT, % / LIQUID LIMIT (20, 40, 60, 80)	PID, PPM
			Firm light gray silty clay with iron nodules					
5			-stiff and tan below 6'					1.6
10								3.6
			-silty sand, carbonaceous below 13'					
15								5
			Medium dense tan fine to medium sand					
20				42				9.2
			-clay layers below 23'					
25				25				12.5
			-red and fine below 28'	63				34
30								
			-stiff light gray silty clay layers below 33'	42				62
35								
40				20				19
			-white fine sand below 44'	51				72
45								
			-fine to medium sand below 48'	100				40
50								

(continued next page)

LOG OF BORING NO. 1
(Continued)

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4)	PLASTIC LIMIT / WATER CONTENT, % / LIQUID LIMIT (20, 40, 60, 80)	PID, PPM
			Medium dense tan fine to medium sand (cont'd)					
55								
			-white and red below 58'	100				68
60								
65								
			-slightly clayey below 68'	52				126
70								
75								
				100				36
80								
85								
				100				16
90								
95								
			-clay pockets below 98'	100				18
100								
			(continued next page)					

LOG OF BORING NO. 1
(Continued)

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4)	PLASTIC LIMIT / WATER CONTENT, % / LIQUID LIMIT (20, 40, 60, 80)	PID, PPM
			Medium dense tan fine to medium sand (cont'd)					
105								
110				100				36
115								
120								
125								
130								
135								
140								
145								
150								

COMPLETION DEPTH: 110.0 ft
DATE: 3/4/92

DEPTH TO WATER IN BORING: Not Determined

LOG OF BORING NO. 2
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
MARSHALL COUNTY, MISSISSIPPI

TYPE: Rotary Wash

LOCATION: See Plate 1

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4) / PLASTIC LIMIT — WATER CONTENT, % (20, 40, 60, 80) — LIQUID LIMIT	PID, PPM
			Firm tan and light gray silty clay				
5							3.6
			-tan below 8'				
10							3.2
			-sand with carbonaceous fragments below 13'				
15							9
			Medium dense white and tan very fine to fine sand with red layers of clayey sand	26			
20							14
			-red, slightly clayey below 23'	48			
25							36
			-alternating seams of light gray fine sand and clay below 28'	39			
30							20
			Firm light gray clay				
			Medium dense red very fine to medium sand with seams of white sand and light gray clay	100			
35							24
			-tan and white below 38'	100			
40							78
				100			
45							52
				100			
50							34

(continued next page)

LOG OF BORING NO. 2
(Continued)

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4)	PLASTIC LIMIT / WATER CONTENT, % / LIQUID LIMIT (20, 40, 60, 80)	PID, PPM
			Medium dense red very fine to medium sand with seams of white sand and light gray clay (cont'd)					
55								
			-white below 58' -seam of iron oxide 59.5'-60'					
60		X		100				46
65								
			-tan below 68'					
70		X		100				80
75								
80		X		100				39
85								
90		X		100				28
95								
100		X		100				26*

(continued next page)

LOG OF BORING NO. 2
(Continued)

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4) / PLASTIC LIMIT — WATER CONTENT, % (20, 40, 60, 80) — LIQUID LIMIT	PID, PPM
			Medium dense red very fine to medium sand with seams of white sand and light gray clay (cont'd)				
105							
			-red and white below 108'				
110				100			22
115							
120							
125							
130							
135							
140							
145							
150							

COMPLETION DEPTH: 110.0 ft
DATE: 3/7/92

DEPTH TO WATER IN BORING: Not Determined

LOG OF BORING NO. 3
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
MARSHALL COUNTY, MISSISSIPPI

TYPE: Rotary Wash

LOCATION: See Plate 1

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4)	PLASTIC LIMIT / WATER CONTENT, % / LIQUID LIMIT (20, 40, 60, 80)	PID, PPM
			Stiff tan silty clay with iron oxide nodules, slickensided					
5								22
10								34
			-red, slightly sandy below 13'					
15								110
			Medium dense white and red very fine to medium sand					
20				19				28
			-slightly clayey 23'-25'					
25				34				28
			-dense tan and white very fine to fine below 28'					
30				63				20
35				100				44
40				100				36
45				100				60
50				100				20

(continued next page)

LOG OF BORING NO. 3
(Continued)

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4)	PLASTIC LIMIT / WATER CONTENT, % / LIQUID LIMIT (20, 40, 60, 80)	PID, PPM
			Medium dense white and red very fine to medium sand (cont'd)					
55								
60		X		100				22
65								
70		X		100				174
75								
80		X		100				28
85								
90		X		100				20
95								
100		X	Stiff light gray silty clay with slight iron oxide staining	100				12

(continued next page)

LOG OF BORING NO. 3
(Continued)

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4)	PLASTIC LIMIT / WATER CONTENT, % (20, 40, 60, 80) / LIQUID LIMIT	PID, PPM
			Dense white and tan medium to coarse sand with occasional seams of light gray clay					
105								
110		X		100				18
115								
120								
125								
130								
135								
140								
145								
150								

COMPLETION DEPTH: 110.0 ft
DATE: 3/7/92

DEPTH TO WATER IN BORING: Not Determined

MARE LIND FURLOW
ENGINEERS

LOG OF BORING NO. 4
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
MARSHALL COUNTY, MISSISSIPPI

TYPE: Rotary Wash

LOCATION: See Plate 1

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4) / PLASTIC LIMIT — WATER CONTENT, % (20, 40, 60, 80) — LIQUID LIMIT	PID, PPM
			Stiff light gray and red clay, slightly silty				
5							16
10							24
15							66
			Medium dense red fine to medium sand, slightly clayey				
20				32			11.5
			Dense red fine to medium clayey sand				
25				17			16
30				18			32
			Medium dense red and white very fine to fine sand				
35				100			13.8
40				100			15.2
45				100			13.8
50				100			10.5

(continued next page)

MARE LIND FURLOW
ENGINEERS

LOG OF BORING NO. 4
(Continued)

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4) / PLASTIC LIMIT — WATER CONTENT, % (20, 40, 60, 80) — LIQUID LIMIT	P.D., PCF
			Medium dense red and white very fine to fine sand (cont'd)				
55							
60		X		66			12.8
65							
			-red, fine to medium sand below 68'				
70		X		100			30
75							
80		X		100			18.0
85							
90		X		100			20
95		X		100			10
100		X		100			280

(continued next page)

LOG OF BORING NO. 4
(Continued)

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4) / PLASTIC LIMIT — WATER CONTENT, % (20, 40, 60, 80) — LIQUID LIMIT	PID, PPM
			Medium dense red and white very fine to fine sand (cont'd)				
105							
110				84			24
115							
120							
125							
130							
135							
140							
145							
150							

COMPLETION DEPTH: 110.0 ft
DATE: 3/9/92

DEPTH TO WATER IN BORING: Not Determined

LOG OF BORING NO. 5
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
MARSHALL COUNTY, MISSISSIPPI

TYPE: Rotary Wash

LOCATION: See Plate 1

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4)	PLASTIC LIMIT / WATER CONTENT, % / LIQUID LIMIT (20, 40, 60, 80)	P.I.D., PPM
			Stiff tan and light gray silty clay					
5								0.4
10								2.4
			Medium dense red silty very fine to fine sand, slightly clayey					
15								7.0
			-fine to medium sand with light gray clay lenses below 18'					
20				40				9.1
25								
30				100				12.8
35								
40				60				12.0
45								
			-trace of black pea gravel below 48'					
50				36				17.4

(continued next page)

LOG OF BORING NO. 5
(Continued)

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4) / PLASTIC LIMIT — WATER CONTENT, % (20, 40, 60, 80) — LIQUID LIMIT	PID, PPM
			Medium dense red silty very fine to fine sand, slightly clayey (cont'd)				
55							
60							11.2
65							
			-white and tan below 68'				40.0
70							30.0
75							
80							30
85							
90							22
95							
100							11.5

(continued next page)

LOG OF BORING NO. 5
(Continued)

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4)	PLASTIC LIMIT / WATER CONTENT, % / LIQUID LIMIT (20, 40, 60, 80)	PID, PPM
			Medium dense red silty very fine to fine sand, slightly clayey (cont'd)					
105								
110		X						7.2
115								
120								
125								
130								
135								
140								
145								
150								

COMPLETION DEPTH: 110.0 ft
DATE: 4/7/92

LOG OF BORING NO. 6
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
MARSHALL COUNTY, MISSISSIPPI

TYPE: Rotary Wash

LOCATION: See Plate 1

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4)	PLASTIC LIMIT / WATER CONTENT, % / LIQUID LIMIT (20, 40, 60, 80)
			Stiff tan and light gray silty clay			
5						
10						
			Medium dense red silty very fine to fine sand, slightly clayey			
15						
			-fine to medium sand with light gray clay lenses below 18'			
20						
25						
30						
35						
40						
45						
			-trace of black pea gravel below 48'			
50						

(continued next page)

LOG OF BORING NO. 6
(Continued)

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4) / PLASTIC LIMIT — WATER CONTENT, % (20, 40, 60, 80) — LIQUID LIMIT
			Medium dense red silty very fine to fine sand, slightly clayey (cont'd)		
55					
60					
65			-white and tan below 68'		
70					
75					
80					
85					
90					
95					
100					

COMPLETION DEPTH: 80.0 ft
DATE: 4/7/92

LOG OF BORING NO. 7
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
MARSHALL COUNTY, MISSISSIPPI

TYPE: Rotary Wash

LOCATION: See Plate 1

DEPTH, FT.	SYMBOL	SAMPLER	DESCRIPTION OF MATERIAL	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4) / PLASTIC LIMIT — WATER CONTENT, % — LIQUID LIMIT (20, 40, 60, 80)
			Stiff tan silty clay with iron oxide nodules, slickensided		
5					
10					
			-red, slightly sandy below 13'		
15					
			Medium dense white and red very fine to medium sand		
20					
			-slightly clayey 23'-25'		
25					
			-dense tan and white very fine to fine below 28'		
30					
35					
40					
45					
50					

(continued next page)

LOG OF BORING NO. 7
(Continued)

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4) / PLASTIC LIMIT — WATER CONTENT, % (20, 40, 60, 80) — LIQUID LIMIT
55			Medium dense white and red very fine to medium sand (cont'd)		
60					
65					
70					
75					
80					
85					
90					
95					
100					

COMPLETION DEPTH: 77.0 ft
DATE: 4/9/92

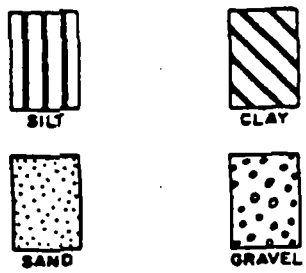
DEPTH TO WATER IN BORING: Not Determined

MARE LIND FURLOW
ENGINEERS

SYMBOLS AND TERMS USED ON BORING LOGS

SYMBOL DESCRIPTIONS

SOIL TYPES
(SHOWN IN SYMBOL COLUMN)

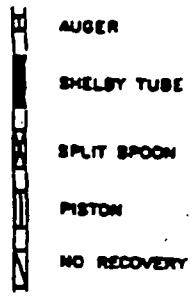


(PREDOMINANT TYPE SHOWN HEAVY)

GROUNDWATER INFORMATION
(SHOWN IN SYMBOL COLUMN)

- Depth where groundwater was initially encountered
- Water level in boring approximately 15 minutes after initial encounter
- Water level in boring at least 10 hours after rotary washing

SAMPLER TYPES
(SHOWN IN SAMPLES COLUMN)



TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (more than 50% retained on No. 200 sieve): Includes clean gravels and sands, and silty or clayey gravels and sands. Condition is rated according to Standard Penetration Resistance. (ASTM D1586)

DESCRIPTIVE TERM	STANDARD PENETRATION RESISTANCE (BLOWS/FT)
Very Loose	0 to 4
Loose	5 to 9
Medium Dense	10 to 29
Dense	30 to 50
Very Dense	Above 50

FINE GRAINED SOILS (50% or more passes the No. 200 sieve): Includes (1) inorganic and organic silts and clays, (2) gravely, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength as indicated by field or laboratory tests.

DESCRIPTIVE TERM	UNDRAINED SHEAR STRENGTH (KIPS/SQ FT)
Very Soft	Below 0.25
Soft	0.25 to 0.50
Firm	0.50 to 1.00
Stiff	1.00 to 2.00
Very Stiff	2.00 to 4.00
Hard	Above 4.00

TERMS DESCRIBING SOIL STRUCTURE

SLICKENSIDED - having fracture planes that appear polished and glossy
FISSURED - having definite planes of fracture with little resistance to fracturing
LAMINATED - composed of thin seams of varying color and texture
STRATIFIED - composed of alternating layers of varying material or color
CALCAREOUS - containing appreciable quantities of calcium carbonate
INDURATED - hardened by pressure or cementation
GLAUCONITIC - containing a green mineral commonly occuring in soils of marine origin
FRIABLE - easily crumbled

HOMOGENEOUS - having the same color and appearance throughout
WELL GRADED - having wide range in grain sizes and substantial amounts of all intermediate particle sizes
POORLY GRADED - predominantly of one grain size, or having a range of sizes with some intermediate size missing
BLOCKY - having a structure that can be broken down into small angular lumps which resist further breakdown
ORGANIC - containing remains of living organisms
LAYER - a soil deposit with a thickness of about six inches
SEAM - a bed of soil less than six inches thick deposited within another soil mass
PARTING - a very small thickness of soil within another soil

NOTES

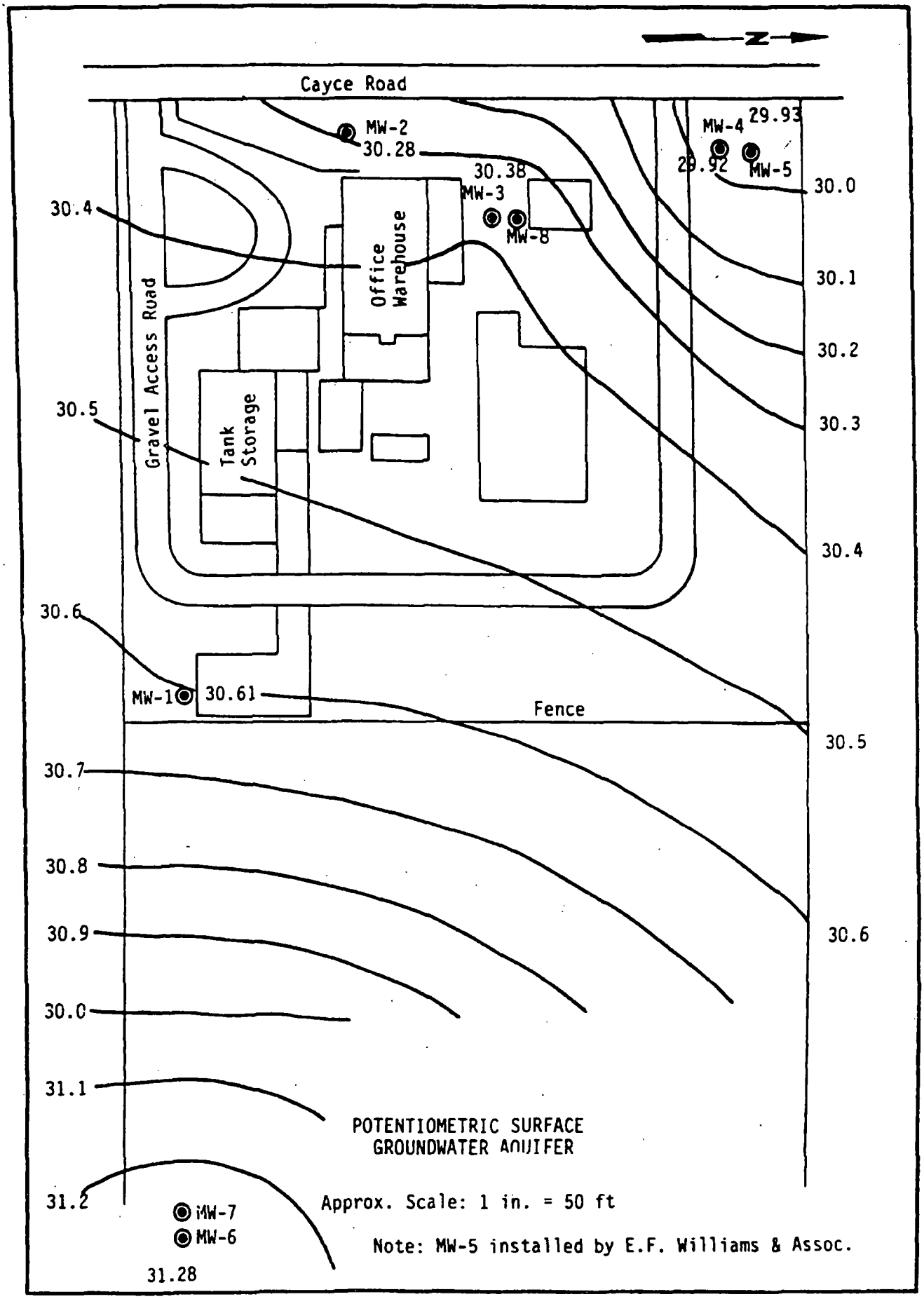
(1) Soil classification methods are in general agreement with ASTM Standard Test Methods D2487 and D2488. Wherever possible, classifications are based on laboratory test results. Where laboratory testing is insufficient to completely describe soil conditions, visual identifications are provided.

(2) Groundwater information is presented when available. The presence of initial free water is missed in borings advanced by rotary wash methods. Drilling fluid levels indicated might not reflect static groundwater conditions. Groundwater level fluctuations with rainfall and other seasonal factors will occur.

Table of Elevations

Monitor Well	TOC	Water Level (4/10/92)	Water Elevation
1	102.70	71.71	30.61
2	102.37	72.09	30.28
3	101.38	71.00	30.38
4	99.52	69.60	29.92
5	97.82	67.89	29.93
6	103.04	71.76	31.28
7	103.81	*	
8	101.02	*	

* MW-7 and MW-8 were developed and sampled on 4/10/92.


N
Cayce Road
MW-2
30.28
30.38
MW-3
MW-8
MW-4
29.93
29.92
MW-5
30.0
30.1
30.2
30.3
30.4
30.5
30.6
30.4
Office Warehouse
Gravel Access Road
Tank Storage
30.5
30.6
MW-1
30.61
Fence
30.7
30.8
30.9
30.0
31.1
31.2
31.28
MW-7
MW-6
POTENTIOMETRIC SURFACE
GROUNDWATER AQUIFER
Approx. Scale: 1 in. = 50 ft
Note: MW-5 installed by E.F. Williams & Assoc.

LOG OF GROUNDWATER OBSERVATION WELL

Project & Location Enterprise Recovery Services Facility Byhalia, Mississippi

Client Mississippi Department of Environmental Quality Date of Report 4/13/92

Observation Well No. MW-1 (B-1) Date Completed 3/4/92 Technician Tarbutton

Riser Pipe: Material PVC Diameter 2 in. Type of Joints Threaded

Screen: Material PVC Slot Size .010 Diameter 2 in. Length 10 ft

Diameter of Borehole 6 in. Type of Filter Pack No. 3 Blasting Sand

Method of Placement of Filter Material Tremie

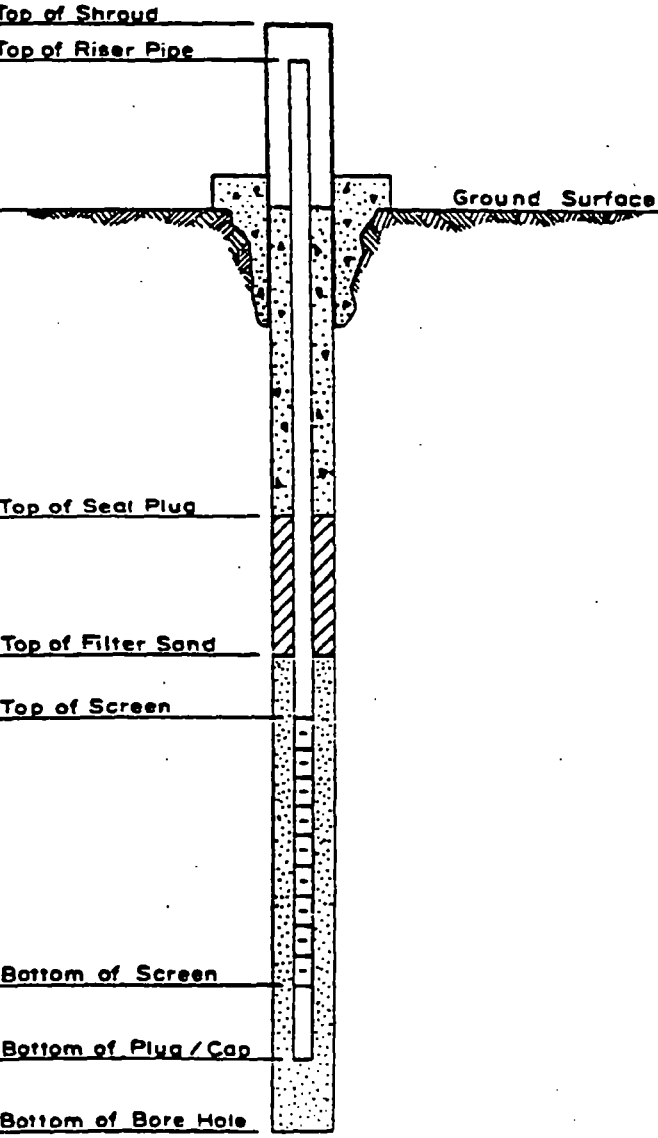
Type of Seal Above Screen Bentonite Pellets Backfill Above Seal Grout

Drilling Mud Yes used. Fresh Water Flush Before Setting Well Screen Yes

Well Developed by Air Lift Method Development Time 1 hrs

Groundwater Level @ 2 hrs _____ @ 24 hrs _____ Other 71.70 4/6/92

ELEV, MSL / DEPTH, FT	FEATURE	GENERALIZED SOIL STRATIFICATION
2.8	Top of Shroud	
2.5	Top of Riser Pipe	
		Ground Surface
95	Top of Seal Plug	
97	Top of Filter Sand	
100	Top of Screen	
110	Bottom of Screen	
110	Bottom of Plug / Cap	
114	Bottom of Bore Hole	



DEPTH, FT

WARE LIND FURLOW ENGINEERS

PLATE 24

LOG OF GROUNDWATER OBSERVATION WELL

Project & Location Enterprise Recovery Services Facility Byhalia, Mississippi

Client Mississippi Department of Environmental Quality Date of Report 4/13/92

Observation Well No. MW-2 (B-2) Date Completed 3/7/92 Technician Tarbutton

Riser Pipe: Material PVC Diameter 2 in. Type of Joints Threaded

Screen: Material PVC Slot Size .010 Diameter 2 in. Length 10 ft

Diameter of Borehole 6 in. Type of Filter Pack No. 3 Blasting Sand

Method of Placement of Filter Material Tremie

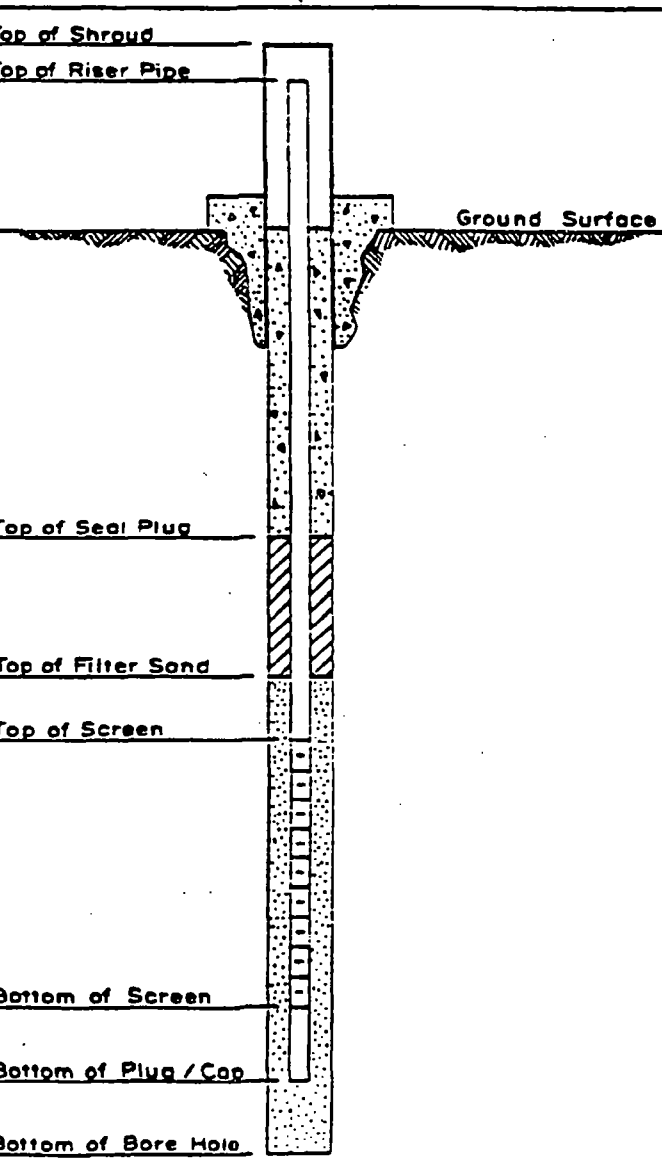
Type of Seal Above Screen Bentonite Pellets Backfill Above Seal Grout

Drilling Mud Yes used. Fresh Water Flush Before Setting Well Screen Yes

Well Developed by Air Lift Method Development Time 1 hrs

Groundwater Level @ 2 hrs _____ @ 24 hrs _____ Other 72.09 4/6/92

ELEV, MSL / DEPTH, FT	FEATURE	GENERALIZED SOIL STRATIFICATION
2.8	Top of Shroud	
2.5	Top of Riser Pipe	
		Ground Surface
95	Top of Seal Plug	
97	Top of Filter Sand	
100	Top of Screen	
110	Bottom of Screen	
110	Bottom of Plug / Cap	
114	Bottom of Bore Hole	



DEPTH, FT

WARE LIND FURLOW ENGINEERS

LOG OF GROUNDWATER OBSERVATION WELL

Project & Location Enterprise Recovery Services Facility Byhalia, Mississippi

Client Mississippi Department of Environmental Quality Date of Report 4/13/92

Observation Well No. MW-3 (B-3) Date Completed 3/7/92 Technician Tarbutton

Riser Pipe: Material PVC Diameter 2 in. Type of Joints Threaded

Screen: Material PVC Slot Size .010 Diameter 2 in. Length 10 ft

Diameter of Borehole 6 in. Type of Filter Pack No. 3 Blasting Sand

Method of Placement of Filter Material Tremie

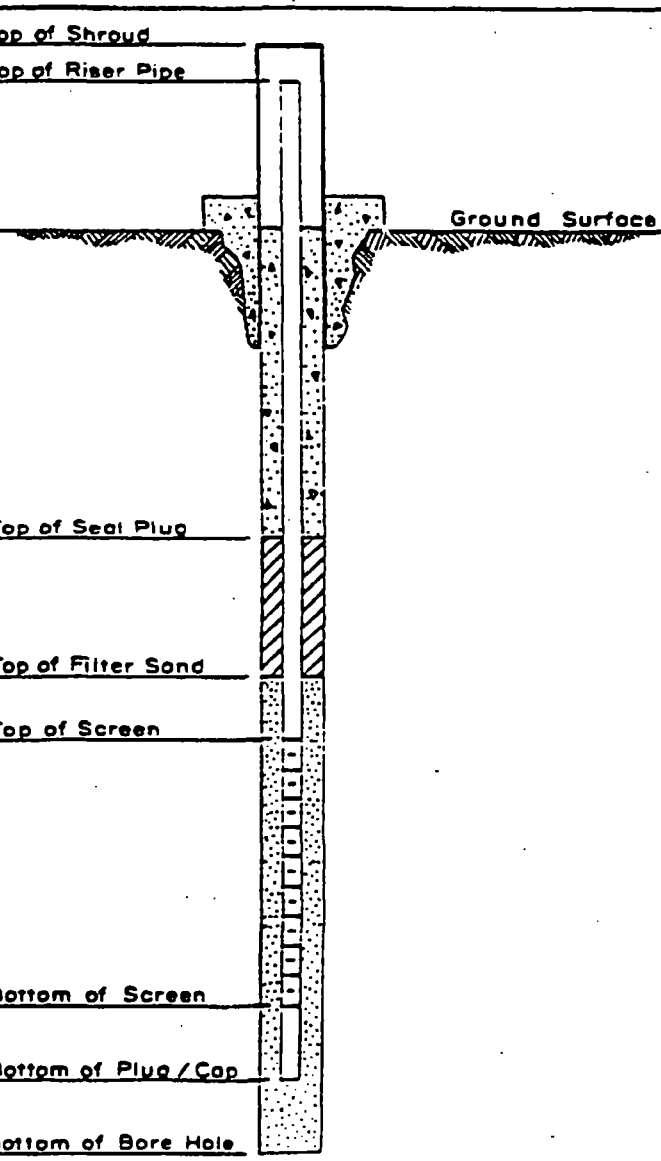
Type of Seal Above Screen Bentonite Pellets Backfill Above Seal Grout

Drilling Mud Yes used. Fresh Water Flush Before Setting Well Screen Yes

Well Developed by Air Lift Method Development Time 1 hrs

Groundwater Level @ 2 hrs _____ @ 24 hrs _____ Other 70.98 4/6/92

ELEV, MSL / DEPTH, FT	FEATURE	GENERALIZED SOIL STRATIFICATION
2.8	Top of Shroud	
2.5	Top of Riser Pipe	
		Ground Surface
95	Top of Seal Plug	
97	Top of Filter Sand	
100	Top of Screen	
110	Bottom of Screen	
110	Bottom of Plug / Cap	
114	Bottom of Bore Hole	



DEPTH, FT

WARE LIND FURLOW ENGINEERS

LOG OF GROUNDWATER OBSERVATION WELL

Project & Location Enterprise Recovery Services Facility Byhalia, Mississippi

Client Mississippi Department of Environmental Quality Date of Report 4/13/92

Observation Well No. MW-4 (B-4) Date Completed 3/9/92 Technician Tarbutton

Riser Pipe: Material PVC Diameter 2 in. Type of Joints Threaded

Screen: Material PVC Slot Size .010 Diameter 2 in. Length 10 ft

Diameter of Borehole 6 in. Type of Filter Pack No. 3 Blasting Sand

Method of Placement of Filter Material Tremie

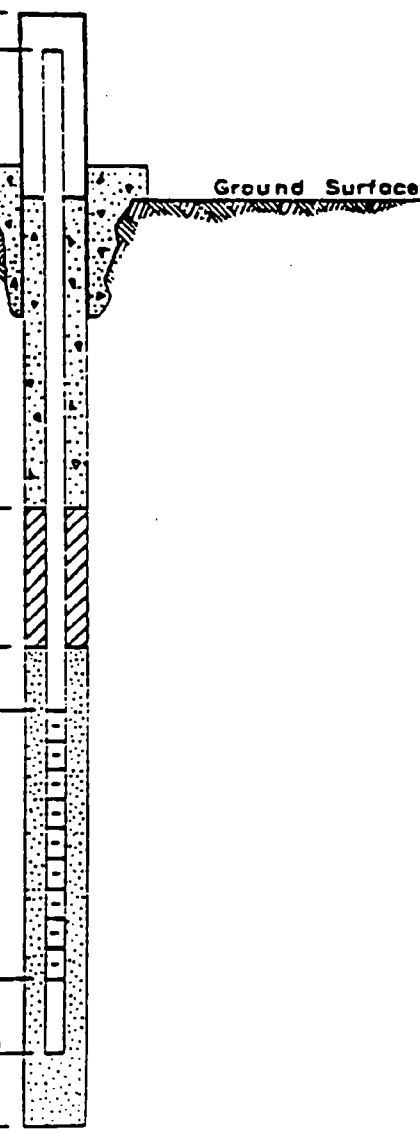
Type of Seal Above Screen Bentonite Pellets Backfill Above Seal Grout

Drilling Mud Yes used. Fresh Water Flush Before Setting Well Screen Yes

Well Developed by Air Lift Method Development Time 1 hrs

Groundwater Level @ 2 hrs _____ @ 24 hrs _____ Other 69.56 4/6/92

ELEV, MSL / DEPTH, FT	FEATURE	GENERALIZED SOIL STRATIFICATION	DEPTH, FT
2.8	Top of Shroud		
2.5	Top of Riser Pipe		
		Ground Surface	
95	Top of Seal Plug		
97	Top of Filter Sand		
100	Top of Screen		
110	Bottom of Screen		
110	Bottom of Plug / Cap		
114	Bottom of Bore Hole		



WARE LIND FURLOW ENGINEERS

LOG OF GROUNDWATER OBSERVATION WELL

Project & Location Enterprise Recovery Services Facility Byhalia, Mississippi

Client Mississippi Department of Environmental Quality Date of Report 4/13/92

Observation Well No. MW-6 (B-5) Date Completed 4/8/92 Technician Tarbutton

Riser Pipe: Material PVC Diameter 2 in. Type of Joints Threaded

Screen: Material PVC Slot Size .010 Diameter 2 in. Length 10 ft

Diameter of Borehole 6 in. Type of Filter Pack No. 3 Blasting Sand

Method of Placement of Filter Material Tremie

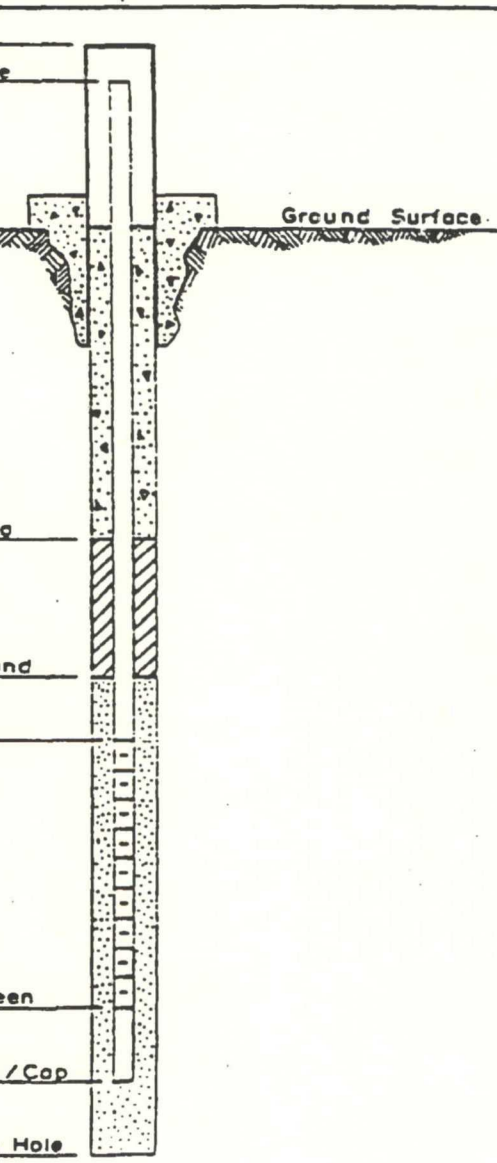
Type of Seal Above Screen Bentonite Pellets Backfill Above Seal Grout

Drilling Mud Yes used. Fresh Water Flush Before Setting Well Screen Yes

Well Developed by Air Lift Method Development Time 1 hrs

Groundwater Level @ 2 hrs _____ @ 24 hrs _____ Other 71.76 4/10/92

ELEV, MSL / DEPTH, FT	FEATURE	GENERALIZED SOIL STRATIFICATION
2.8	Top of Shroud	
2.5	Top of Riser Pipe	
		Ground Surface
95	Top of Seal Plug	
97	Top of Filter Sand	
100	Top of Screen	
110	Bottom of Screen	
110	Bottom of Plug / Cap	
114	Bottom of Bore Hole	



DEPTH, FT

WARE LIND FURLOW ENGINEERS

LOG OF GROUNDWATER OBSERVATION WELL

Project & Location Enterprise Recovery Services Facility Byhalia, Mississippi

Client Mississippi Department of Environmental Quality Date of Report 4/13/92

Observation Well No. MW-8 (B-7) Date Completed 4/9/92 Technician Tarbutton

Riser Pipe: Material PVC Diameter 2 in. Type of Joints Threaded

Screen: Material PVC Slot Size .010 Diameter 2 in. Length 10 ft

Diameter of Borehole 6 in. Type of Filter Pack No. 3 Blasting Sand

Method of Placement of Filter Material Tremie

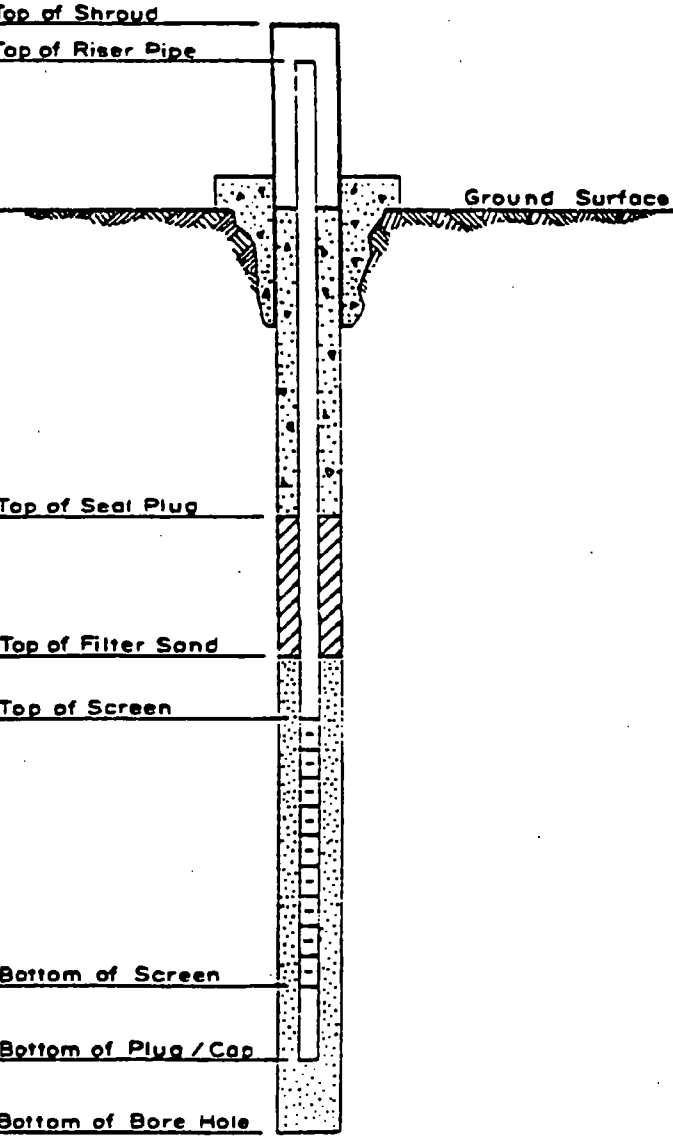
Type of Seal Above Screen Bentonite Pellets Backfill Above Seal Grout

Drilling Mud Yes used. Fresh Water Flush Before Setting Well Screen Yes

Well Developed by Air Lift Method Development Time 1 hrs

Groundwater Level @ 2 hrs _____ @ 24 hrs _____ Other _____

ELEV, MSL / DEPTH, FT	FEATURE	GENERALIZED SOIL STRATIFICATION	DEPTH, FT
3.3	Top of Shroud		
3	Top of Riser Pipe		
		Ground Surface	
62	Top of Seal Plug		
64	Top of Filter Sand		
67	Top of Screen		
77	Bottom of Screen		
77	Bottom of Plug / Cap		
80	Bottom of Bore Hole		



WARE LIND FURLOW ENGINEERS

LOG OF GROUNDWATER OBSERVATION WELL

Project & Location Enterprise Recovery Services Facility Byhalia, Mississippi

Client Mississippi Department of Environmental Quality Date of Report 4/13/92

Observation Well No. MW-7 (B-6) Date Completed 4/8/92 Technician Tarbutton

Riser Pipe: Material PVC Diameter 2 in. Type of Joints Threaded

Screen: Material PVC Slot Size .010 Diameter 2 in. Length 10 ft

Diameter of Borehole 6 in. Type of Filter Pack No. 3 Blasting Sand

Method of Placement of Filter Material Tremie

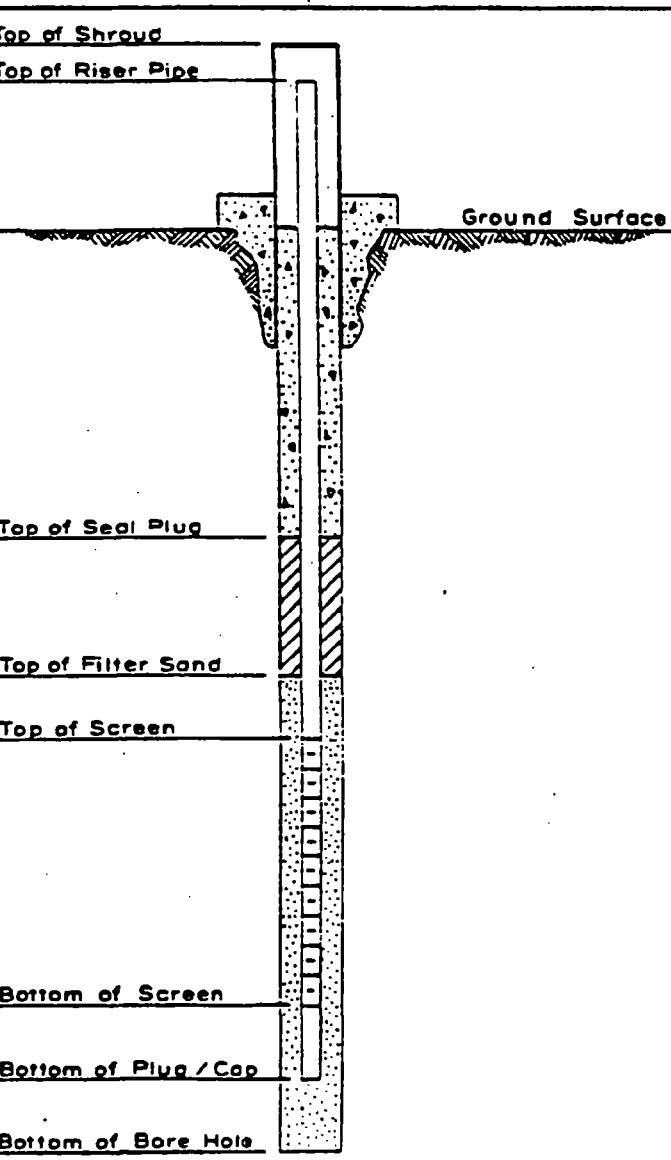
Type of Seal Above Screen Bentonite Pellets Backfill Above Seal Grout

Drilling Mud Yes used. Fresh Water Flush Before Setting Well Screen Yes

Well Developed by Air Lift Method Development Time 1 hrs

Groundwater Level @ 2 hrs _____ @ 24 hrs _____ Other _____

ELEV, MSL / DEPTH, FT	FEATURE	GENERALIZED SOIL STRATIFICATION	DEPTH, FT
3.3	Top of Shroud		
3	Top of Riser Pipe		
		Ground Surface	
62	Top of Seal Plug		
64	Top of Filter Sand		
66.5	Top of Screen		
76.5	Bottom of Screen		
76.5	Bottom of Plug / Cap		
80	Bottom of Bore Hole		



WARE LIND FURLOW ENGINEERS

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
Bureau of Land and Water Resources

P. O. Box 10631
Jackson, MS 39289-0631
WATER WELL DRILLERS LOG

COUNTY WELL LOCATED	Marshall
WELL NUMBER	MW-1
CODED	
DATE WELL COMPLETED	3/14/92
PERMIT NUMBER	
NAME OF DRILLING FIRM	Ware Lind Furlow Engineers Inc

NAME & MAILING ADDRESS OF LANDOWNER: Bob Thompson, C&R Products
Rt. 5 Box 287
Buralia, Ms 38611

WELL LOCATION	SEC	TOWNSHIP	RANGE
NW/4	27	1 N (S)	4 E (W)

DISTANCE _____ Miles _____ DIRECTION _____ of _____ NEAREST TOWN _____

OTHER LANDMARK

WELL PURPOSE: Home, Irrigation, Municipal, Industrial, Fish Pond, etc.
Monitor Well

PUMP DATA

PUMP TYPE (Circle One): N/A
Submersible, Turbine, Jet, Flowing Well, Other (Describe) _____

POWER TYPE (Circle One):
Electric, Tractor, Diesel, Gasoline, Butane, Other (Describe) _____ H/P _____

Pump Capacity (GPM)	No. of Stages	Setting Depth
		FT.

PUMP TEST N/A
Well yielded _____ GPM with
a drawdown of _____ ft.
after _____ hours of pumping

WELL DATA

Well Depth	Casing Diameter (In.)	Casing Length (Ft.)
110	2	100

Type of Casing	Hole Depth	Depth to Static Water Level
PVC	114	71.70

TYPE OF COMPLETION: (Circle One or More):
Gravel Packed, Underreamed, Telescoped, Natural Development, Open Hole, Other (Describe) Sand Pack

Top of Lap Pipe or Reduction in Casing
FEET — IF TELESCOPED OR MORE THAN ONE SCREEN: USE BACK PAGE

LOG DATA

TYPE OF LOG RUN (Circle One): No Log Run
Electric, Gamma Ray, Density, Sonic, Neutron, Other (Describe) _____

Name of Organization Running Log

GEOLOGIC DATA (Office Use Only)

Surface Elev.	Geologic Unit	Unit Thickness	Depth to Top
Subs. Sft.	Date	Analysis	Aquifer Test

Driller's Remarks

SCREEN DATA

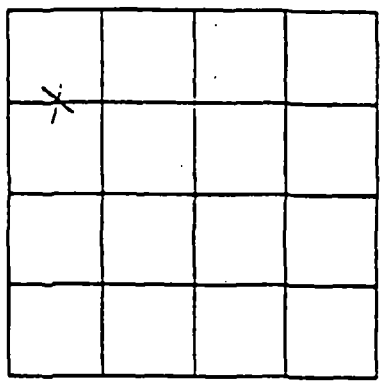
Diameter - Inches	Length - Feet	Slot Size - Inches
2	10	.01

Screen Type	Depth to Bottom - Feet
PVC	110

DESCRIPTION OF FORMATIONS ENCOUNTERED	FROM	TO	FORMATIONS (Continued)	FROM	TO
Firm light gray silty clay	0	16.5			
- Stiff below 6'					
- Silty sand bel 13'					
Medium dense tan fine to	16.5	110			
medium sand occasional					
clay layers					
- Silty below 43'					
			IF MORE SPACE IS NEEDED, USE BACK		

If well telescopes please sketch and show depths.

GROUND LEVEL



SECTION 27

Please indicate well location X.

ADDITIONAL INFORMATION

MW's 2, 3, 4, and 6 to 110' as MW 1 in accordance with MDEQ hand and water regulations.

If more than one screen, show location of each on sketch.

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
Bureau of Land and Water Resources

P. O. Box 10631
Jackson, MS 39289-0631
WATER WELL DRILLERS LOG

COUNTY WELL LOCATED	Marshall
WELL NUMBER	MW-7
CODED	
DATE WELL COMPLETED	
PERMIT NUMBER	C-495
NAME OF DRILLING FIRM	Wareland Furlow Engineers Inc

NAME & MAILING ADDRESS OF LANDOWNER
Bob Thompson, C&R Products
Rt. 5, Box 287
Buhalia, Mis 38611

WELL LOCATION	SEC	TOWNSHIP	RANGE
NW/4	27	1 N/S	4 E/W

DISTANCE _____ Miles DIRECTION _____ of NEAREST TOWN _____

OTHER LANDMARK

WELL PURPOSE. Home, Irrigation, Municipal, Industrial, Fish Pond, etc.
Monitor Well

PUMP DATA

PUMP TYPE (Circle One): N/A
Submersible, Turbine, Jet, Flowing Well, Other (Describe) _____

POWER TYPE (Circle One):
Electric, Tractor, Diesel, Gasoline, Butane, Other (Describe) _____ H/P _____

Pump Capacity (GPM)	No. of Stages	Setting Depth
		FT.

PUMP TEST
Well yielded _____ GPM with a drawdown of _____ ft. after _____ hours of pumping

WELL DATA

Well Depth	Casing Diameter (In.)	Casing Length (Ft.)
77	2	67

Type of Casing	Hole Depth	Depth to Static Water Level
PVC	80	

TYPE OF COMPLETION: (Circle One or More):
Gravel Packed, Underreamed, Telescoped, Natural Development, Open Hole, Other (Describe) Sand Pack

Top of Lap Pipe or Reduction in Casing
FEET — IF TELESCOPED OR MORE THAN ONE SCREEN: USE BACK PAGE

LOG DATA

TYPE OF LOG RUN (Circle One): No Log Run
Electric, Gamma Ray, Density, Sonic, Neutron, Other (Describe) _____

Name of Organization Running Log

GEOLOGIC DATA (Office Use Only)

Surface Elev.	Geologic Unit	Unit Thickness	Depth to Top
Subs. SWL	Date	Analysis	Aquifer Test

Driller's Remarks

SCREEN DATA

Diameter - Inches	Length - Feet	Slot Size - Inches
2	10	.01

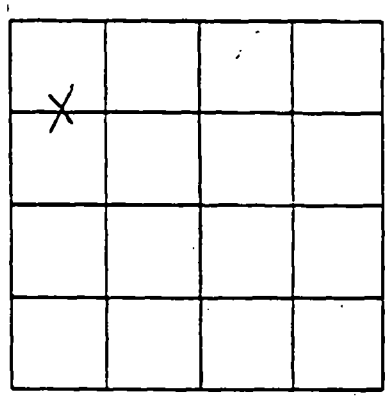
Screen Type	Depth to Bottom - Feet
PVC	77

DESCRIPTION OF FORMATIONS ENCOUNTERED	FROM	TO	FORMATIONS (Continued)	FROM	TO
Stiff Tan and light Gray silty clay	0	12			
Medium dense Tan to red vf to medium sand, siltly	12	80			
			IF MORE SPACE IS NEEDED, USE BACK		

WARE LIND FURLOW
ENGINEERS

If well telescopes please sketch and show depths.

GROUND LEVEL



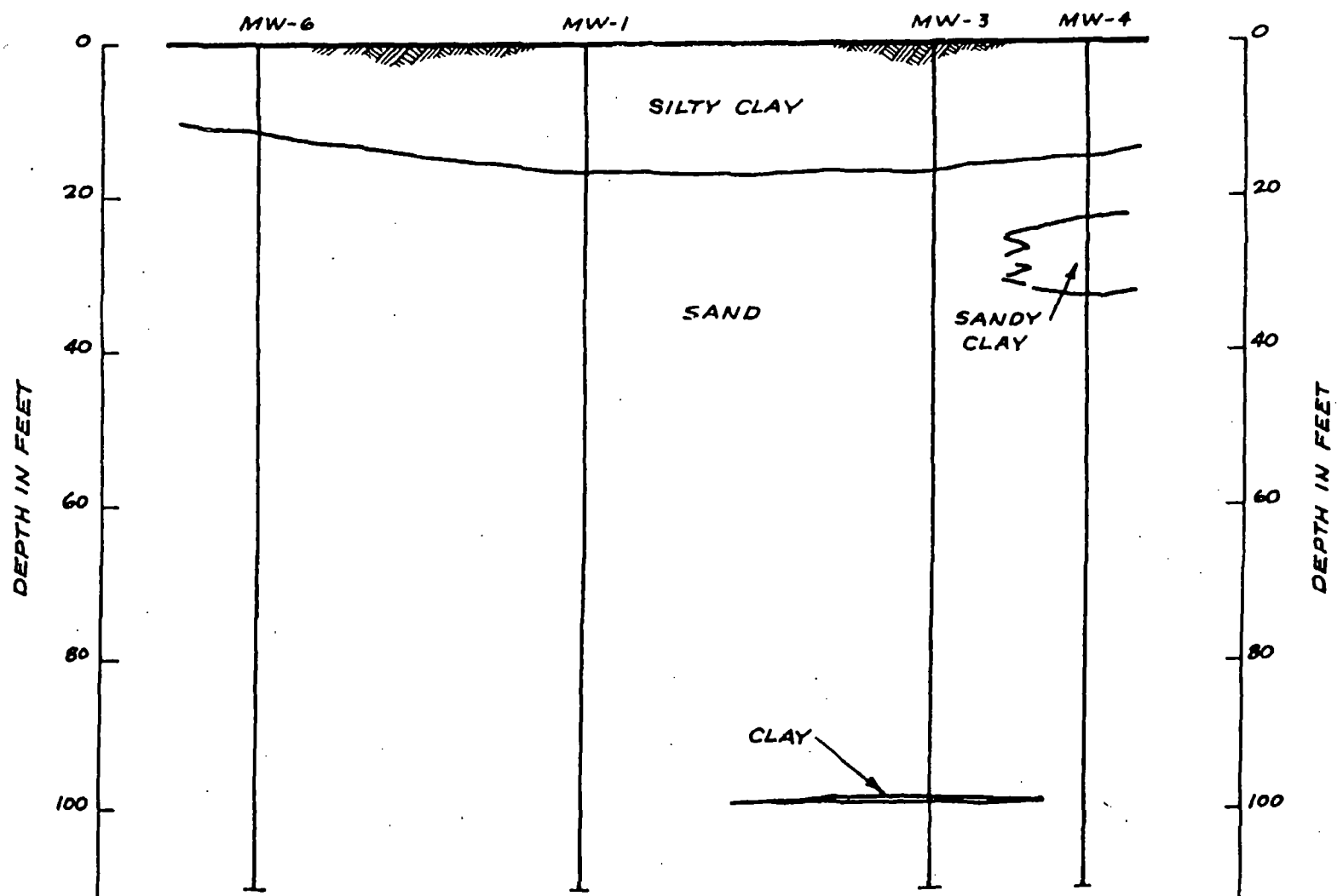
SECTION 27

Please indicate well location X.

ADDITIONAL INFORMATION

MW3 is in addition to MW1 completed to 76.5'. Monitor wells were installed in accordance with MDEQ hazardous waste regulations

If more than one screen, show location of each on sketch.



GENERALIZED SOILS PROFILE

Horizontal Scale: 1 in. = 100 ft
Vertical Scale: 1 in. = 20 ft

APPENDIX

MISSISSIPPI DEPARTMENT
OF ENVIRONMENTAL QUALITY

CHAIN OF CUSTODY RECORD

OFFICE OF
POLLUTION CONTROL
P. O. Box 10385
Jackson, Mississippi 39289-0385

MSD

PROJECT LEADER: Ron Tarbutton

PROJECT NAME/LOCATION: Marshall County - DEQ

REMARKS

DATA TO:

ESD SAMPLE TYPES
1. SURFACE WATER
2. GROUND WATER
3. POTABLE WATER
4. WASTEWATER
5. LEACHATE
6. SOIL/SEDIMENT
7. SLUDGE
8. WASTE
9. AIR
10. FISH
11. OTHER

SAMPLER: James G Brown

CIRCLE/ADD parameters desired. List no. of containers submitted.

ANALYSIS

STATION NO.	SAMPLE TYPE	DATE (1992)	TIME	COMP	GRAB	STATION LOCATION/DESCRIPTION	TOTAL CONTAINERS	VOA	Semi volatile org. cpds	Pest/PCBs	METALS	CYANIDE					TAG NO./REMARKS	Custody Seals Intact at Lab	Seals Not Intact Upon Receipt by Lab	LAB USE ONLY
City WTR		4/1/92	1210		✓	City of Collierville WTR Supply	4	X												
City WTR						Trip Blank for City WTR	1	X												

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
(PRINT) James W Brown	4/7/1420	(PRINT) Sammie Malone	(PRINT)		(PRINT)
(SIGN) James W Brown		(SIGN) Sammie Malone	(SIGN)		(SIGN)
RELINQUISHED BY: (PRINT)	DATE/TIME	RECEIVED BY: (PRINT)	RELINQUISHED BY: (PRINT)	DATE/TIME	RECEIVED BY: (PRINT)
(SIGN)		(SIGN)	(SIGN)		(SIGN)

DISTRIBUTION: White and Yellow copies accompany sample shipment to laboratory; Yellow copy retained by laboratory
White copy is returned to samplers; Pink copy retained by samplers.

PAGE ____ OF ____ 8/90

MISSISSIPPI DEPARTMENT
OF ENVIRONMENTAL QUALITY

CHAIN OF CUSTODY RECORD

OFFICE OF
POLLUTION CONTROL
P. O. Box 10385
Jackson, Mississippi 39289-0385

MSD

PROJECT LEADER: Ken Tarbutton

PROJECT NAME/LOCATION: Marshall County - DE2

REMARKS

DATA TO:

ESD SAMPLE TYPES
1. SURFACE WATER
2. GROUND WATER
3. POTABLE WATER
4. WASTEWATER
5. LEACHATE
6. SOIL/SEDIMENT
7. SLUDGE
8. WASTE
9. AIR
10. FISH
11. OTHER

SAMPLER: James W Brown

STATION NO.	SAMPLE TYPE	DATE 1992	TIME	COMP	GRAB	STATION LOCATION/DESCRIPTION	TOTAL CONTAINERS	VOA	Semi volatile org. cpds	Pest/PCBs	METALS	CYANIDE				TAG NO./REMARKS	Custody Seals Intact at Lab	Seals Not Intact Upon Receipt by Lab	LAB USE ONLY
MW-7	2	4/10	1105		X		4	X											
MW-6	2	4/10	1115		X		4	X											
MW-5	2	4/10	1130		X		4	X											
MW-7						BLANK	1	X											
MW-6						BLANK	1	X											
MW-5						BLANK	1	X											

CIRCLE/ADD parameters desired. List no. of containers submitted.

ANALYSIS

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
(PRINT) James W Brown	4/10	(PRINT) Summie Malone	(PRINT)		(PRINT)
(SIGN) James W Brown	1535	(SIGN) Summie Malone	(SIGN)		(SIGN)
RELINQUISHED BY: (PRINT)	DATE/TIME	RECEIVED BY: (PRINT)	RELINQUISHED BY: (PRINT)	DATE/TIME	RECEIVED BY: (PRINT)
(SIGN)		(SIGN)	(SIGN)		(SIGN)

DISTRIBUTION: White and Yellow copies accompany sample shipment to laboratory; Yellow copy retained by laboratory
White copy is returned to samplers; Pink copy retained by samplers.

PAGE ____ OF ____ 8/90

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY

CHAIN OF CUSTODY RECORD

OFFICE OF POLLUTION CONTROL
P. O. Box 10385
Jackson, Mississippi 39289-0385

MSD

PROJECT LEADER: Ron Tarbutton

PROJECT NAME/LOCATION: Marshal County

REMARKS

DATA TO:

ESD SAMPLE TYPES
1. SURFACE WATER
2. GROUND WATER
3. POTABLE WATER
4. WASTEWATER
5. LEACHATE
6. SOIL/SEDIMENT
7. SLUDGE
8. WASTE
9. AIR
10. FISH
11. OTHER

SAMPLER: James W Brown

ANALYSIS

STATION NO	SAMPLE TYPE	1992 DATE	TIME	COMP	GRAB	STATION LOCATION/DESCRIPTION	TOTAL CONTAINERS	VOA	Sem I volat II e org. cpds	Pest/PCBs	METALS	CYANIDE					TAG NO./REMARKS	Custody Seals Intact at Lab	Seals Not Intact Upon Recs I pt by Lab	LAB USE ONLY
MW-2	2	4/6	1730		X		4	X												
MW-4	2	4/6	1750		X		4	X												
MW-1	2	4/6	1900		X		4	X												
MW-3	2	4/7	1000		X		4	X												
MW-5	2	4/7	1010		X		4	X												
MW-2						Blank	1	X												
MW-4						Blank	1	X												
MW-1						Blank	1	X												
MW-3						Blank	1	X												
MW-5						Blank	1	X												
Rinse	3	4/7/6	1145	X		Equipment [illegible]	4	X												
Rinse						Rinsate Blank	1	X												

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
(PRINT) James W Brown	4/7 1620	(PRINT) Sammie Malone	(PRINT)		(PRINT)
(SIGN) James W Brown		(SIGN) Sammie Malone	(SIGN)		(SIGN)
RELINQUISHED BY: (PRINT)	DATE/TIME	RECEIVED BY: (PRINT)	RELINQUISHED BY: (PRINT)	DATE/TIME	RECEIVED BY: (PRINT)
(SIGN)		(SIGN)	(SIGN)		(SIGN)

DISTRIBUTION: White and Yellow copies accompany sample shipment to laboratory; Yellow copy retained by laboratory
White copy is returned to samplers; Pink copy retained by samplers.

PAGE ____ OF ____ 8/90

ile
Marshall Co., Cayce

MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES
Bureau of Pollution Control
P. O. Box 10385
Jackson, Mississippi 39209
(601) 961-5171

Reference 15
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176

A-W-P

DATE: October 24th, 1983

SUBJECT: Complaint Explosion, E.R.S., Cayce, Marshall Co., MS

PERSON REPORTING: Bill Barnett

On October 21st, 1983, I investigated a complaint of an explosion at Enterprise Recovery System in Marshall County.

I found that one still had ruptured a seam near the top of the still. The still contained waste oil and trichlorethylene. Approximately two hundred gallons of the material splashed against the back of the building through the rupture. This material ran into catch basins in the pad and onto the ground.

Pot holes were dug to collect the spilled material. The material was pumped from the pot holes into a storage tank.

Some of the spilled material ran into the ground water retention basin. This basin is approximately twenty by twenty feet and of undetermined depth. All water from this basin is being pumped into drums at this time. This water will be transferred to a main tank for separation.

The area onto which the material spilled has been limed and covered with sand. All oil soaked earth will be removed by digging.

A follow-up inspection will be conducted in a couple of days. The complaintant was notified of my findings.

If you need more information, please call.

Respectfully,

Earl Richard

cc: Jerry Banks
Larry Hamil
Bob Rogers

Reference 16
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176

7/13/84

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION
01 STATE: MS | 02 SITE NUMBER: D000693176

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site): ENTERPRISE RECOVERY SYSTEMS, INC.
02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER: CAYCE RD. (ROUTE 5 BOX 287)
03 CITY: BYHALIA
04 STATE: MS | 05 ZIP CODE: 38611 | 06 COUNTY: MARSHALL | 07 COUNTY CODE: 47 | 08 CONG DIST: 01
09 COORDINATES LATITUDE: 34 58 30 | LONGITUDE: 089 37 00
10 DIRECTIONS TO SITE (Starting from nearest public road): TAKE HIGHWAY 78 to VICTORIA, MS. TURN NORTH ON CAYCE RD. ERS IS LOCATED ~11 MILES FROM THAT INTERSECTION

III. RESPONSIBLE PARTIES

01 OWNER (If known): ENTERPRISE RECOVERY SYSTEMS, INC.
02 STREET (Business, mailing, residential): P.O. BOX 567
03 CITY: COLLIERVILLE
04 STATE: TN | 05 ZIP CODE: 38017 | 06 TELEPHONE NUMBER: (601) 851-7557
07 OPERATOR (If known and different from owner):
08 STREET (Business, mailing, residential):
09 CITY:
10 STATE | 11 ZIP CODE | 12 TELEPHONE NUMBER: ( )
13 TYPE OF OWNERSHIP (Check one): [X] A. PRIVATE [ ] B. FEDERAL: (Agency name) [ ] C. STATE [ ] D. COUNTY [ ] E. MUNICIPAL [ ] F. OTHER: (Specify) [ ] G. UNKNOWN
14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply): [X] A. RCRA 3001 DATE RECEIVED: 7/26/82 (MONTH DAY YEAR) [ ] B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: / / (MONTH DAY YEAR) [ ] C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION: [X] YES DATE 7/20/82 (MONTH DAY YEAR) [ ] NO
BY (Check all that apply): [ ] A. EPA [ ] B. EPA CONTRACTOR [X] C. STATE [ ] D. OTHER CONTRACTOR [ ] E. LOCAL HEALTH OFFICIAL [ ] F. OTHER: (Specify)
CONTRACTOR NAME(S):
02 SITE STATUS (Check one): [X] A. ACTIVE [ ] B. INACTIVE [ ] C. UNKNOWN
03 YEARS OF OPERATION: 1978 (BEGINNING YEAR) / (ENDING YEAR) [ ] UNKNOWN
04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED: SPENT SOLVENTS AND THINNERS (PAINT AND LACQUERS) INCLUDING F002, F003 F005, U002, U112, U159, U220
05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION: MODERATE POTENTIAL HAZARD. SEVERAL SPILLS HAVE BEEN DOCUMENTED IN THE 6 YEARS OF OPERATION. SOME SOIL CONTAMINATION DOCUMENTED AFTER ONE SPILL A STILL EXPLODED IN OCT. 1983. DOCUMENTATION OF WASTE ANALYSIS WEAK. THIS SITE IS IN PROCESS OF PART B PERMITTING WITH THE MS. BOPC. THE FACILITY IS UNDER CLOSE SCRUTINY AND ENFORCEMENT ACTION IS IN PROCESS.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents): [ ] A. HIGH (Inspection required promptly) [ ] B. MEDIUM (Inspection required) [X] C. LOW (Inspect on time available basis) [ ] D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT: JIM HARDAGE
02 OF (Agency/Organization): MS. BOPC
03 TELEPHONE NUMBER: (601) 961-5171
04 PERSON RESPONSIBLE FOR ASSESSMENT: DONALEA DINSMORE
05 AGENCY:
06 ORGANIZATION: EPS
07 TELEPHONE NUMBER: (601) 922-8242
08 DATE: 3/27/84 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

10300666

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES *(Check all that apply)*

- ☐ A. SOLID
- ☐ B. POWDER, FINES
- ☐ C. SLUDGE
- ☐ D. OTHER _____ *(Specify)*
- ☐ E. SLURRY
- ☐ F. LIQUID
- ☐ G. GAS

02 WASTE QUANTITY AT SITE *(Measures of waste quantities must be independent)*

TONS _____

CUBIC YARDS _____

NO. OF DRUMS _____

03 WASTE CHARACTERISTICS *(Check all that apply)*

- ☐ A. TOXIC
- ☐ B. CORROSIVE
- ☐ C. RADIOACTIVE
- ☐ D. PERSISTENT
- ☐ E. SOLUBLE
- ☐ F. INFECTIOUS
- ☐ G. FLAMMABLE
- ☐ H. IGNITABLE
- ☐ I. HIGHLY VOLATILE
- ☐ J. EXPLOSIVE
- ☐ K. REACTIVE
- ☐ L. INCOMPATIBLE
- ☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES *(See Appendix for most frequently cited CAS Numbers)*

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION

V. FEEDSTOCKS *(See Appendix for CAS Numbers)*

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
MS	R000693176

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☐ A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ E. DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: _____ (Acres)
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: _____
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS *(Continued)*

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION *(Include name(s) of species)*

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES *(Spills/runoff/standing liquids/leaking drums)* — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

V. SOURCES OF INFORMATION *(Cite specific references, e. g., state files, sample analysis, reports)*

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

1. Site Identification:

Site number: MSD000693176

Site name: Enterprise Recovery Systems

Site county: Marshall

2. Site Inspection Summary:

Company Name: Enterprise Recovery Systems

Address: P. O. Box 567
Collierville, TN 38017

Telephone No.: (601) 851-7557

10300667

Contact: Joe Spilka

Introduction

A site inspection was conducted by Environmental Protection Systems, Inc., personnel at Enterprise Recovery systems (ERS) on September 12, 1984. The facility is located on Cayce Road approximately 1.5 miles North of Cayce, Mississippi. Mr. Joe Spilka, owner, met the sampling team and escorted them during a visual inspection of the property.

The plant reclaims solvents and paint thinners by a distillation process. The plant handles listed hazardous wastes; F001, F002, F003 and F005. These contain halogenated and non-halogenated solvents. The facility is currently operating under interim status and has submitted a part "B" application. Mr. Spilka indicated that 75% of their raw material is brought in drums. The remaining 25% is received in bulk.

The plant has had a few major spills in recent years, and there have been numerous complaints from neighbors. Visually the plant looked reasonably clean, especially when compared to past pictures. Contamination or stressed vegetation was not visible.

Sampling

Mr. Spilka indicated that a new well had been installed for the plant. Its depth is approximately 250 feet. A pressure tank is to be installed, but until that time, the pump runs continuously while the plant is in operation. A water sample was taken from the cold water tap in the office restroom (RES-WA1-WL). This was the only access before the process area. Samples were split with the facility; however, it was indicated that the samples would not be analyzed immediately. The sample was analyzed for acid, base/neutral, and volatile organics.

In October 1983, ERS had a still erupt which spilled trichloroethylene (Trichloroethene). An areal composite of the area between the stills, and the groundwater retention basin was taken (ERS-SO1-CS). The soil was damp from the prior day's rain and appeared clean. Clay was found approximately 2" below the surface. The sample was analyzed for acid, base/neutral, and volatile organics.

The plant's wastewater is discharged through an oil/water separator and then into a ditch running across the property. Sediment/Soil samples from the ditch running from the fence to the separator were composited (ERS-SD1-DI). The ditch contained a very healthy growth of weeds in its bottom. The soil/sediment consisted mostly of clay and was very difficult to composite. Quantities of lime also appeared to be present in the samples. A duplicate sample (ERS-SD2-DI) was also taken. The samples were analyzed for acid, base/neutral and volatile organics.

ERS is located next to a few residences with drinking water wells. A well sample (ERS-WA2-WL) was taken at the Al Ashmore residence across Cayce Road from ERS. Mrs. Ashmore stated the well was approximately 200 feet deep. The sample was taken from the spigot in the front yard.

The well of Mrs. Marcia Bisceglia was also sampled (ERS-WA3-WL). Mrs. Bisceglia lives next to the plant on the South side. A sample was taken from the spigot in the front yard. Mrs. Bisceglia indicated the well was approximately 150 feet deep. Both well samples were analyzed for acid, base/neutral, and volatile organics also. Mrs. Bisceglia stated that she has complained about ERS numerous times and is very scared living next to them.

Results

The samples were returned to Jackson, MS, and sent by state van to the Mississippi State Chemical Laboratory for analysis.

The soil sample taken in the area of the October, 1983, spill (ERS-SO1-CS) indicated that soil contamination exists in this area. Trichloroethylene (trichloroethene), as well as a higher amount of bis(2-ethylthexyl) phthalate, and diethyl phthalate, were detected.

The sediment samples taken from the ditch (ERS-SD1-DI & ERS-SD2-DI) showed extremely high concentrations of trichloroethylene (trichloroethene). The samples indicated quantities of phthalate esters also. The water flowing over the sediment was not sampled.

Although the two samples were duplicates, only ERS-SD2-DI showed signs of 1,1,1-trichloroethane and toluene. This is possibly due to the great difficulty experienced in compositing the very thick clay samples.

The well sample taken at ERS (ERS-WA1-WL) showed trace quantities of 1,1,1-trichloroethane and trichloroethylene (trichloroethene) also. The results from the well water of the two residences (ERS-WA2-WL) did not indicate any organic compounds present.

Conclusions

The samples taken at ERS indicate on-site contamination of soil and ditch sediments. Values of trichloroethylene (trichloroethene) in the ditch sediment were extremely high. Hologenated aliphatics such as trichloroethylene, appear to be rapidly lost from the water column because of high vapor pressure and an accumulation in the sediment would not be expected. ("Design of Monitoring Studies for Priority Pollutants", Chapman, Romburg, and Vigers, Journal WPCF, Vol. 54, No. 3, 1982). This tends to indicate that the contamination found in the sediment was probably due to the wastewater being discharged through the ditch at the time of sampling.

The well on ERS property is used for drinking as well as for process water. The level of trichloroethylene detected in the ERS well sample is above levels recommended to protect human health ("Handbook of Toxic and Hazardous Chemicals", Marshal Sittig, 1981). Additional samples of the ERS well are needed to confirm the existence of the contamination.

EPA

POTENTIAL HAZARDOUS WASTE SITE
TENTATIVE DISPOSITION

REGION	SITE NUMBER
MSD	000693176

File this form in the regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force *(EN-335)*; 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME	B. STREET	
Enterprise Recovery Systems		
C. CITY	D. STATE	E. ZIP CODE
Cayce	MS	

II. TENTATIVE DISPOSITION

Indicate the recommended action(s) and agency(ies) that should be involved by marking 'X' in the appropriate boxes.

RECOMMENDATION	MARK 'X'	ACTION AGENCY: EPA	STATE	LOCAL	PRIVATE
A. NO ACTION NEEDED -- NO HAZARD					
B. INVESTIGATIVE ACTION(S) NEEDED *(If yes, complete Section III.)*		X	X		
C. REMEDIAL ACTION NEEDED *(If yes, complete Section IV.)*					
D. ENFORCEMENT ACTION NEEDED *(If yes, specify in Part E whether the case will be primarily managed by the EPA or the State and what type of enforcement action is anticipated.)*					

E. RATIONALE FOR DISPOSITION

high levels of phthalates & TCE found in soil onsite, and TCE in well onsite. Nearby residents have private wells (150' to 200') that were not found contaminated at this time. Ditch sediments showed high levels of TCE.

F. INDICATE THE ESTIMATED DATE OF FINAL DISPOSITION *(mo., day, & yr.)*	G. IF A CASE DEVELOPMENT PLAN IS NECESSARY, INDICATE THE ESTIMATED DATE ON WHICH THE PLAN WILL BE DEVELOPED *(mo., day, & yr.)*

H. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE *(mo., day, & yr.)*
KEN Richard	881-2930	12/26/84

III. INVESTIGATIVE ACTIVITY NEEDED

A. IDENTIFY ADDITIONAL INFORMATION NEEDED TO ACHIEVE A FINAL DISPOSITION.

The Company has submitted a part B RCRA permit. The State wants to address these problems under RCRA. ~~the~~ EPA should do an HRS and let the State follow-up sampling under RCRA.

B. PROPOSED INVESTIGATIVE ACTIVITY *(Detailed Information)*

1. METHOD FOR OBTAINING NEEDED ADDITIONAL INFO.	2. SCHEDULED DATE OF ACTION *(mo, day, & yr)*	3. TO BE PERFORMED BY *(EPA, Contractor, State, etc.)*	4. ESTIMATED MANHOURS	5. REMARKS
a. TYPE OF SITE INSPECTION				
(1)				
(2)				
(3)				
b. TYPE OF MONITORING				
(1)				
(2)				
c. TYPE OF SAMPLING				
(1)				
(2)				

EPA Form T2070-4 (10-79)

Continue On Reverse

Continued From Front

III. INVESTIGATIVE ACTIVITY NEEDED and PART B - PROPOSED INVESTIGATIVE ACTIVITY *(Continued)*

d. TYPE OF LAB ANALYSIS (1)				
(2)				
e. OTHER *(specify)* (1)				
(2)				

C. ELABORATE ON ANY OF THE INFORMATION PROVIDED IN PART B *(on front & above)* AS NEEDED TO IDENTIFY ADDITIONAL INVESTIGATIVE WORK.

D. ESTIMATED MANHOURS BY ACTION AGENCY

1. ACTION AGENCY	2. TOTAL ESTIMATED MANHOURS FOR INVESTIGATIVE ACTIVITIES	1. ACTION AGENCY	2. TOTAL ESTIMATED MANHOURS FOR INVESTIGATIVE ACTIVITIES
a. EPA		b. STATE	
c. EPA CONTRACTOR		d. OTHER *(specify)*	

IV. REMEDIAL ACTIONS

A. SHORT TERM/EMERGENCY STRATEGY *(On Site & Off-Site)*: List all emergency actions needed to bring site under immediate control, e.g., restrict access, provide alternate water supply, etc. See instructions for a list of Key Words for each of the actions to be used in the space below.

1. ACTION	2. EST. START DATE *(mo,day,& yr)*	3. EST. END DATE *(mo,day,& yr)*	4. ACTION AGENCY *(EPA, State, Private Party)*	5. ESTIMATED COST	6. SPECIFY 311 OR OTHER ACTION; INDICATE THE MAGNITUDE OF THE WORK REQUIRED
				$	
				$	
				$	
				$	
				$	
				$	

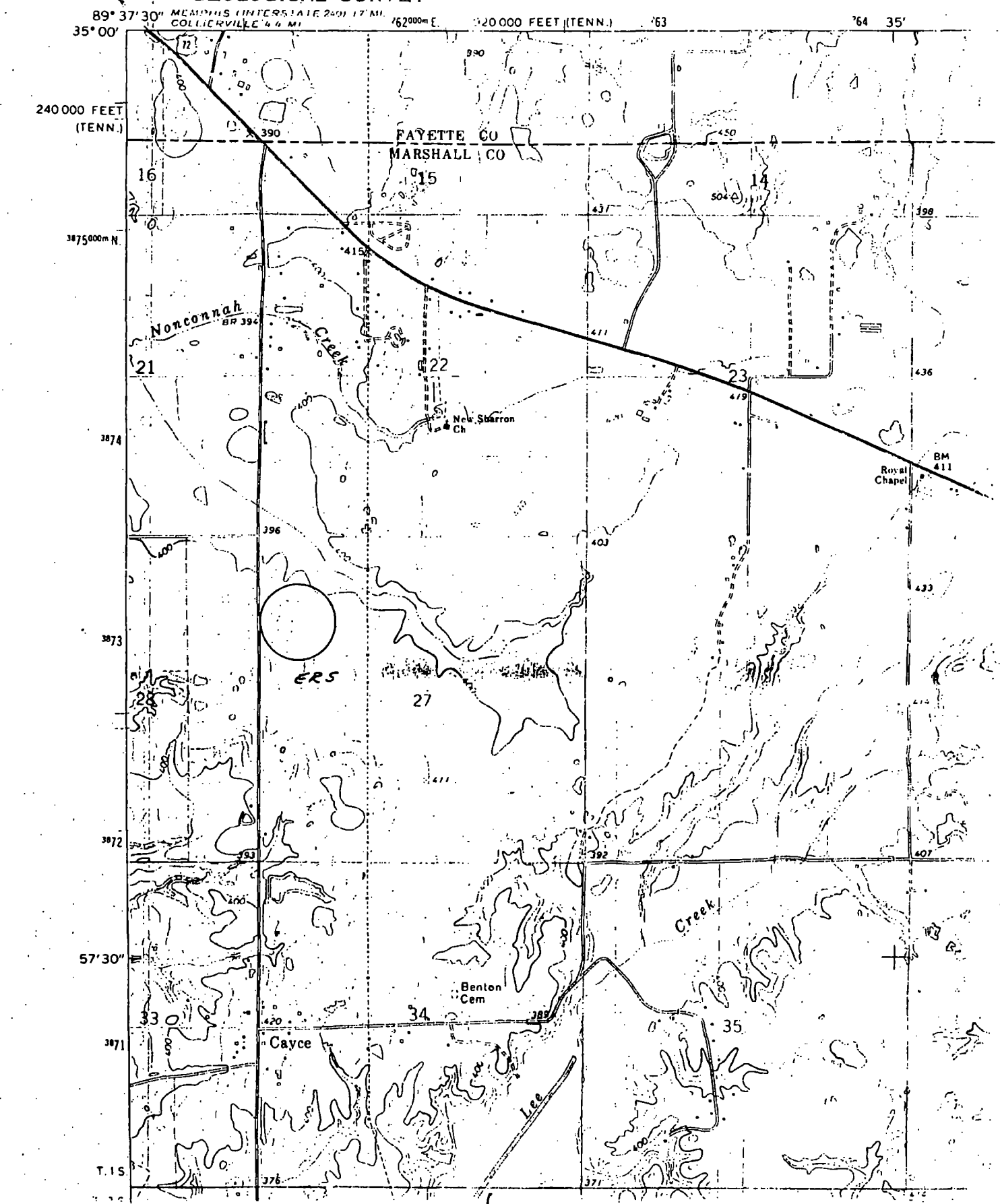
B. LONG TERM STRATEGY *(On Site & Off-Site)*: List all long term solutions, e.g., excavation, removal, ground water monitoring wells, etc. See instructions for a list of Key Words for each of the actions to be used in the spaces below.

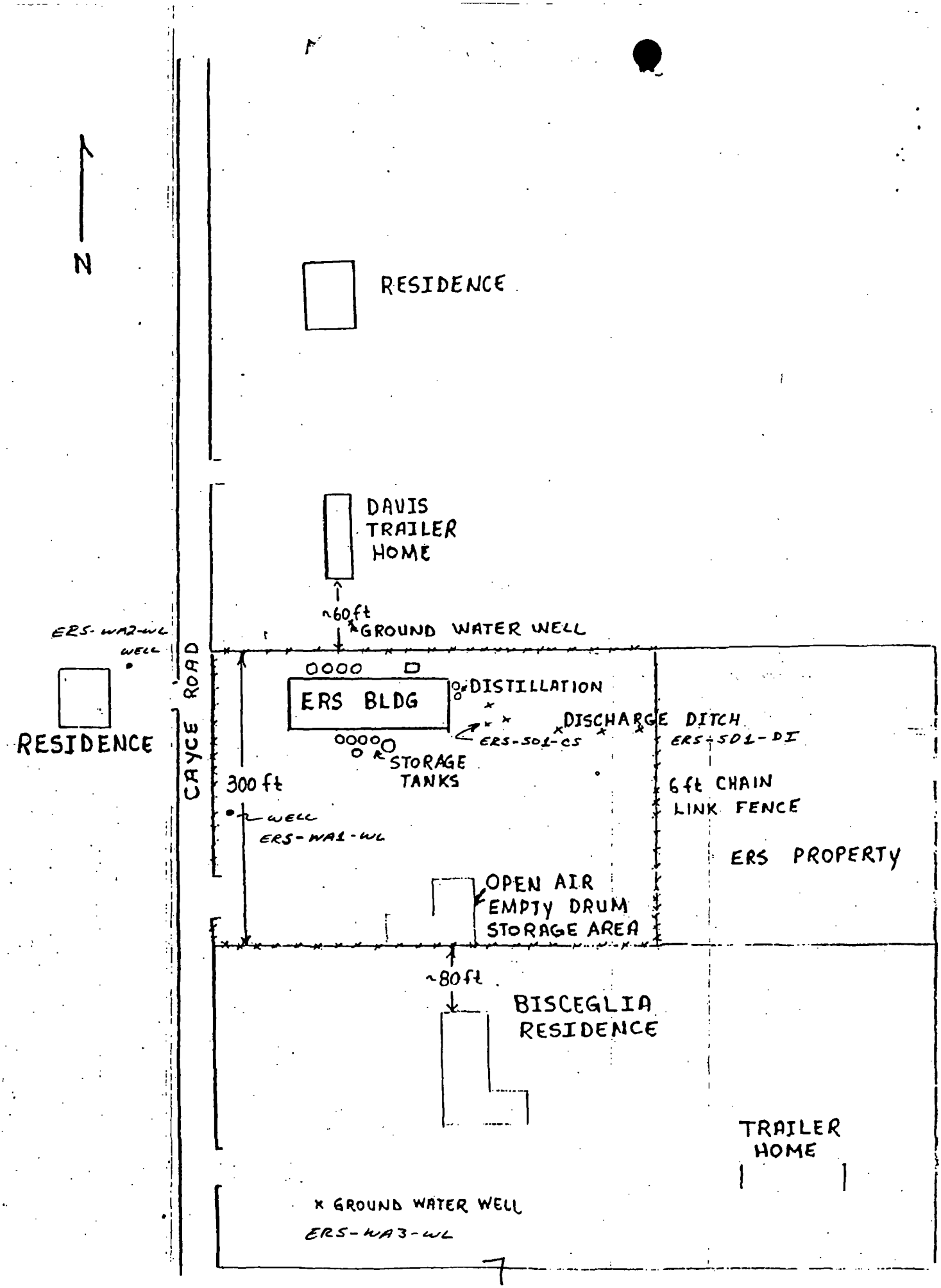
1. ACTION	2. EST. START DATE *(mo,day,& yr)*	3. EST. END DATE *(mo,day,& yr)*	4. ACTION AGENCY *(EPA, State Private Party)*	5. ESTIMATED COST	6. SPECIFY 311 OR OTHER ACTION, INDICATE THE MAGNITUDE OF THE WORK REQUIRED
				$	
				$	
				$	
				$	
				$	
				$	

C. ESTIMATED MANHOURS AND COST BY ACTION AGENCY

1. ACTION AGENCY	2. TOTAL EST. MANHOURS FOR REMEDIAL ACTIVITIES	3. TOTAL EST. COST FOR REMEDIAL ACTIVITIES	1. ACTION AGENCY	2. TOTAL EST. MANHOURS FOR REMEDIAL ACTIVITIES	3. TOTAL EST. COST FOR REMEDIAL ACTIVITIES
a. EPA			b. STATE		
c. PRIVATE PARTIES			d. OTHER *(specify)*		

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY




N
RESIDENCE
DAVIS TRAILER HOME
~60 ft
GROUND WATER WELL
ERS-WA2-WL
WELL
RESIDENCE
CAYCE ROAD
ERS BLDG
DISTILLATION
DISCHARGE DITCH
ERS-SD1-DI
ERS-SD1-CS
STORAGE TANKS
300 ft
WELL
ERS-WA1-WL
6 ft CHAIN LINK FENCE
ERS PROPERTY
OPEN AIR EMPTY DRUM STORAGE AREA
~80 ft
BISCEGLIA RESIDENCE
TRAILER HOME
x GROUND WATER WELL
ERS-WA3-WL

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MS	D000693176

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
JOE SPILKA ENTERPRISE RECOVERY SYSTEMS		P.O. BOX 567		COLLIERVILLE	TN	38017

PARENT COMPANY (If applicable)

08 NAME	09 D+B NUMBER	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE	12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE

IV. REALTY OWNER(S) (If applicable: list most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
JOE SPILKA ENTERPRISE RECOVERY SYSTEMS		P.O. BOX 567		COLLIERVILLE	TN	38017

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. CURRENT OPERATOR (Provide if different from owner)			OPERATOR'S PARENT COMPANY (If applicable)		
01 NAME	02 D+B NUMBER		10 NAME	11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER				

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)			PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)		
01 NAME	02 D+B NUMBER		10 NAME	11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD				
01 NAME	02 D+B NUMBER		10 NAME	11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD				
01 NAME	02 D+B NUMBER		10 NAME	11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD				

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
MS	D000693176

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ H. ON SITE BURIAL — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ L. ENCAPSULATION — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ N. CUTOFF WALLS — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
MS	D000693176

II PAST RESPONSE ACTIVITIES *(Continued)*

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

III. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☐ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

III. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

EPA FORM 2070-13 (7-81)

SITE INSPECTION REPORT
LABORATORY RESULTS EVALUATION

I have reviewed the data and the accompanying QA/QC checks performed at the Mississippi State chemical laboratory and the results are within acceptable levels.

ENVIRONMENTAL PROTECTION SYSTEMS, INC.

Herbert A. Johnston

Herbert A. Johnston, Ph.D.
Associate Director, Analytical Services

Reference 18
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176

17 8 0001 10107

E. F. WILLIAMS & ASSOCIATES INC.

ENVIRONMENTAL ENGINEERS

3637 PARK AVENUE, SUITE 224, MEMPHIS, TENN. 38111
TELEPHONE ~~901-458-4696~~
FAX# 901-452-3525

901-685-2077

Checked 6/12/91
Every page matches copy
Recieved (RKS)

RECEIVED
JUN 13 1991
DEQ-OPC

QUADREX ENVIRONMENTAL

PRELIMINARY ENVIRONMENTAL SURVEY

of

ENTERPRISE RECOVERY SERVICES FACILITY

BYHALIA, MISSISSIPPI

DECEMBER 20, 1989

Edward F. Williams III, P.E.
Diplomate, American Academy of
Environmental Engineers

TEC

MSD000693176

December 20, 1989

EXECUTIVE SUMMARY

The preliminary environmental survey of the Enterprise Recovery Services, Inc. facility on Cayce Road near Byhalia, Mississippi included setting one monitoring well, drilling three boreholes, and having 22 samples analyzed. The analysis of both water and soil samples revealed the presence of ethyl benzene, styrene, methylene chloride, toluene, trichloroethene, xylenes, acetone, methyl ethyl ketone, methyl isobutyl ketone, 1,1-dichloroethene, tetrachloroethene, and total petroleum hydrocarbons in a range from below detection limits to 51,900 ppb.

Further investigation of this site should be conducted to determine the extent of the apparent contaminant plume and the full extent of soil contamination on-site. This investigation would include more monitoring wells, more soil sampling, and the possible testing of neighbors' well water.

Data currently on hand is inadequate to draw reliable conclusions about the extent of potential remedial action requirements. Based upon the information already on hand, we anticipate a cost of $25,000 to satisfactorily characterize the existing subsurface contamination for regulatory contact. We estimate a remediation cost of no less than $50,000 once the Mississippi Department of Environmental Quality becomes aware of these preliminary findings, and based upon prior experience with comparable sites in Tennessee and Florida, the remedial cost could approach $500,000.

Edward F. Williams III

Edward F. Williams III, Diplomate
American Academy of Environmental Engineers

STATEMENT OF PURPOSE

Quadrex Environmental of Gainesville, FL while considering the possibility of purchasing Enterprise Recovery Services (ERS) of Byhalia, MS retained E. F. Williams & Associates (EFW&A) to conduct a preliminary environmental survey of the site. The purpose of this preliminary environmental survey is to identify potential areas of concern on the site which might adversely effect the environment and could require further investigation if the purchaser proceeds with the acquisition of the property.

SITE DESCRIPTION

Enterprise Recovery Services, Inc. (ERS) is located on Cayce Road in North Marshall County, Mississippi on 8 acres. The facility is located 0.5 miles off U.S. Highway 72 East, as shown in Figure 1. The surrounding land use is residential.

ERS is a permitted (EPA permit MSD 000693173) hazardous waste storage and treatment facility for waste solvents. Waste solvents are received on-site either by tank wagon or drums. The waste solvents are transferred to storage tanks of similar material to await processing. Processing is either distillation to recycle solvents or blending for incorporation into a fuels program. Solvents typically stored or processed on site are:

Trichloroethylene	F001/2
1,1,1-Trichloroethane	F001/2
Methylene Chloride	F001/2
Perchloroethylene	F001/2
Freon	F001/2
Acetone	F003
Methyl Ethyl Ketone	F005
Toluene	F005
Xylene	F003
Ethyl Acetate	F003
Blended Solvents	F003/5, D001
Mineral Spirits	D001

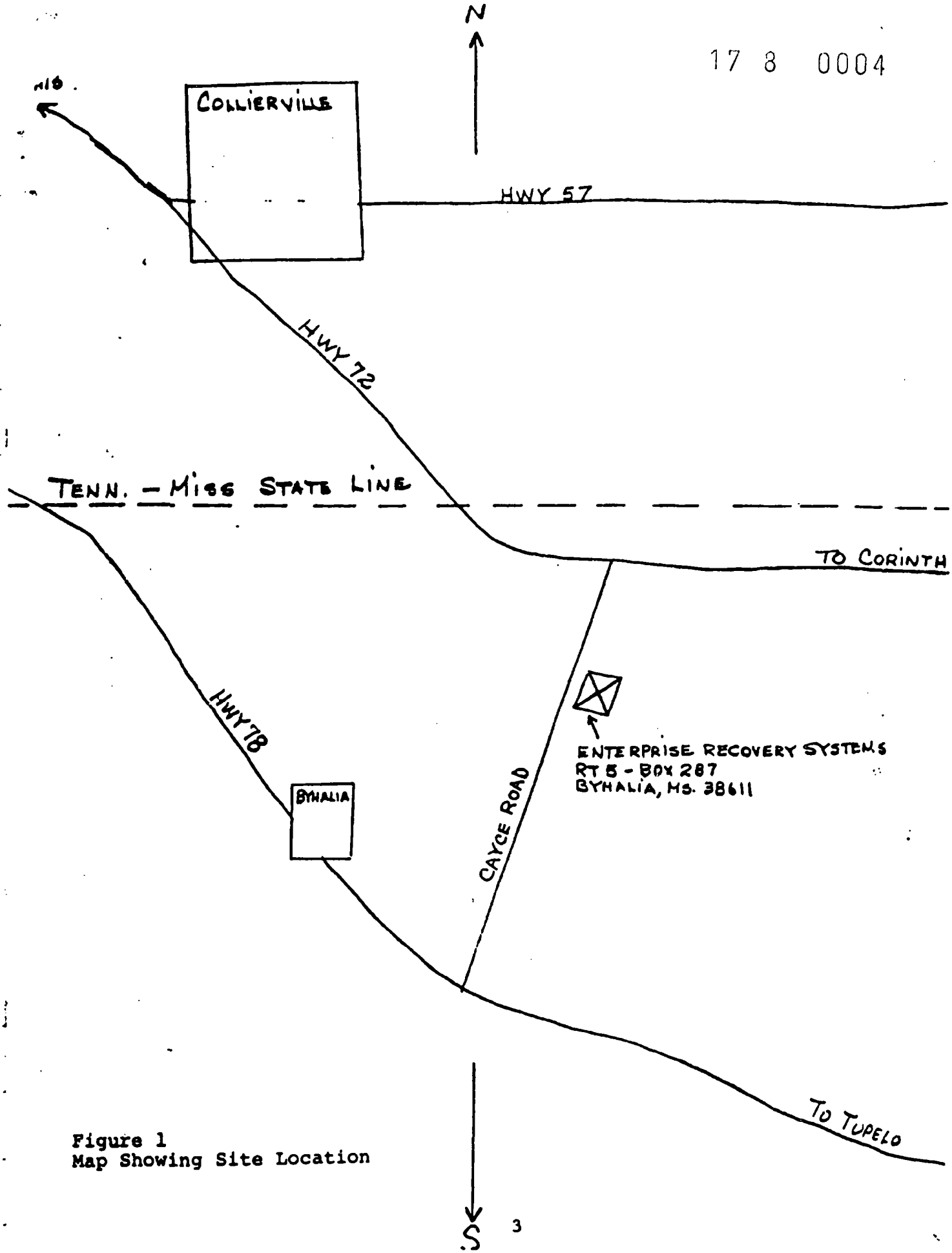


Figure 1
Map Showing Site Location

The determination of the status of applicable hazardous waste, air pollution, and water pollution permits is being handled by Quadrex personnel and is outside the scope of this report.

SITE INVESTIGATION

The investigation of ERS for environmental concerns is to include: a site inspection, drilling four bore holes, setting four monitoring wells, and collecting samples of groundwater, surface soil, and surface water. However, this was scaled back due to cost considerations and only one monitoring well was permanently installed. Cost to install, develop and sample the other three wells is estimated at $15,000.

The proposed sampling plan included collecting 4 groundwater samples for priority pollutants, 3 water samples for VOC scan, and 10 soil samples for VOC scan. Again, because of cost limitations, only a portion of this plan was carried out. The following page shows well and sample locations actually completed before Dec. 10th. Additional soil sampling and an interpretative report will add about $10,000 to the environmental survey.

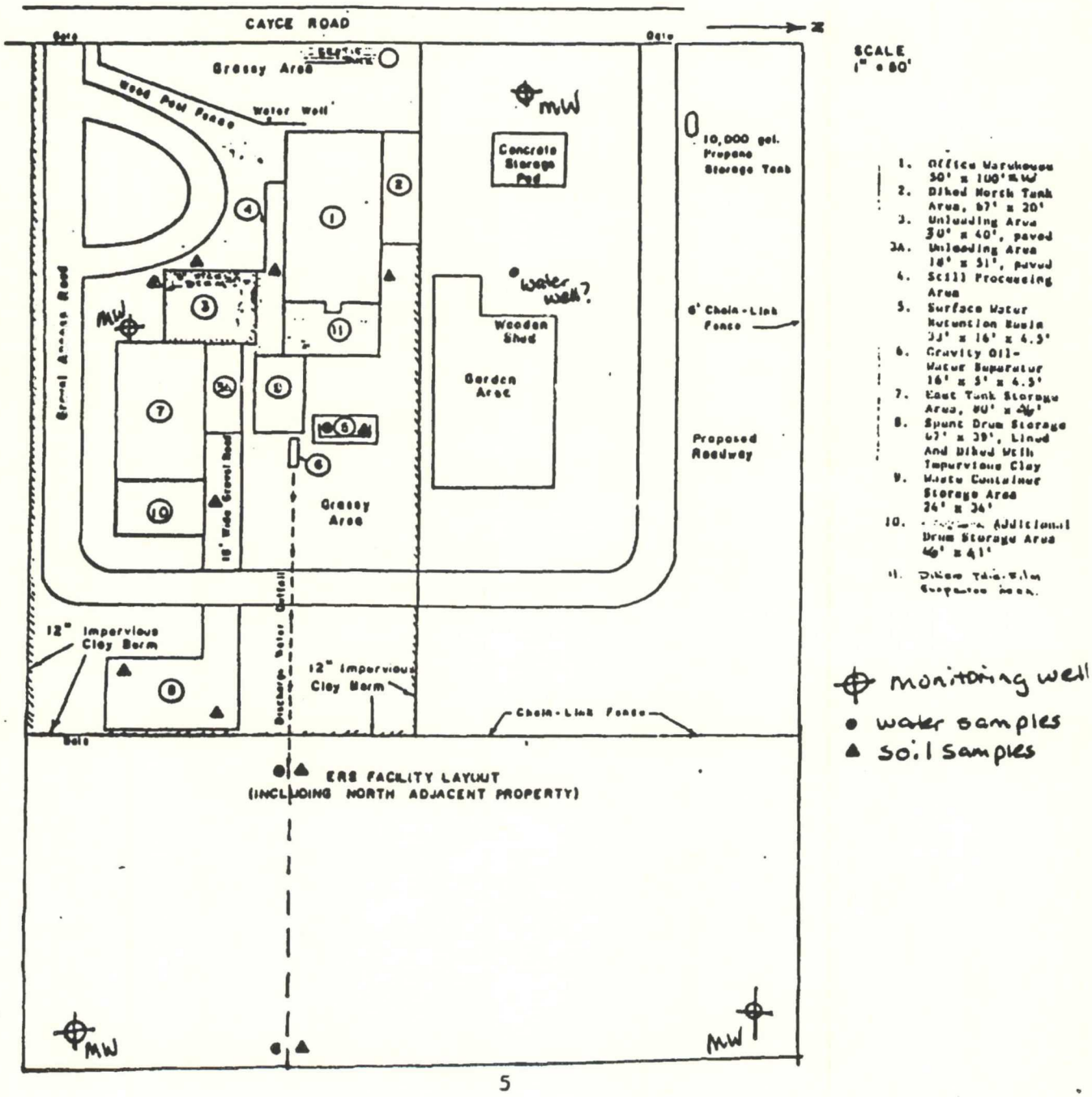
All sample bottles will be prepared with preservatives by Environmental Testing & Consulting Inc. (ETC) laboratory for analysis.

Groundwater Sampling

The groundwater in Monitoring Well Nos. 1-4 will be sampled using the following procedures:

1. The static water level of each well will be measured using a depth gauge.
2. The depth of the well will be measured using the same gauge.
3. Calculations will be made to determine the volume of water in the well, then 4 times this volume will be evacuated with a PVC bailer.
4. The bailer will be gently lowered into the well to just below the water surface to fill. Three septum vials, pre-preserved with HCl; one plastic quart bottle, pre-preserved with NaOH; 1 glass gallon with

Figure 2
Proposed sampling locations



teflon lid, not preserved; and 1 plastic quart, pre-preserved with N_2NO_3, will be filled for analysis. The samples will be analyzed for priority pollutants by ETC. The well water temperature will be measured on site.

Septum vials will be turned upside down to insure no air bubbles. All preserved samples will be turned over several times to insure mixing of sample with preservative.

Bailers will be pre-cleaned with phosphate-free detergent, rinsed with tap water, rinsed with distilled water then dried and wrapped in foil prior to arrival on site.

Water Samples

Water samples shall be collected by submerging septum vials in the water.

Soil Samples

Soil samples will be collected using a pre-cleaned stainless steel hand auger. Soil will be removed with the auger to sample depth, then the next auger of soil will be collected for analysis of TPH and VOC scan. Sample depths shall be 6 inches except at holding pond which shall be equal to ponds depth.

Actual Sampling Procedure

Field work included drilling boreholes and collecting samples was done on November 20 and 21, 1989. All field work was supervised by Mrs. Carol Tsagarakis, Chemical Engineer. She was assisted by Edward L. Williams, Geologist.

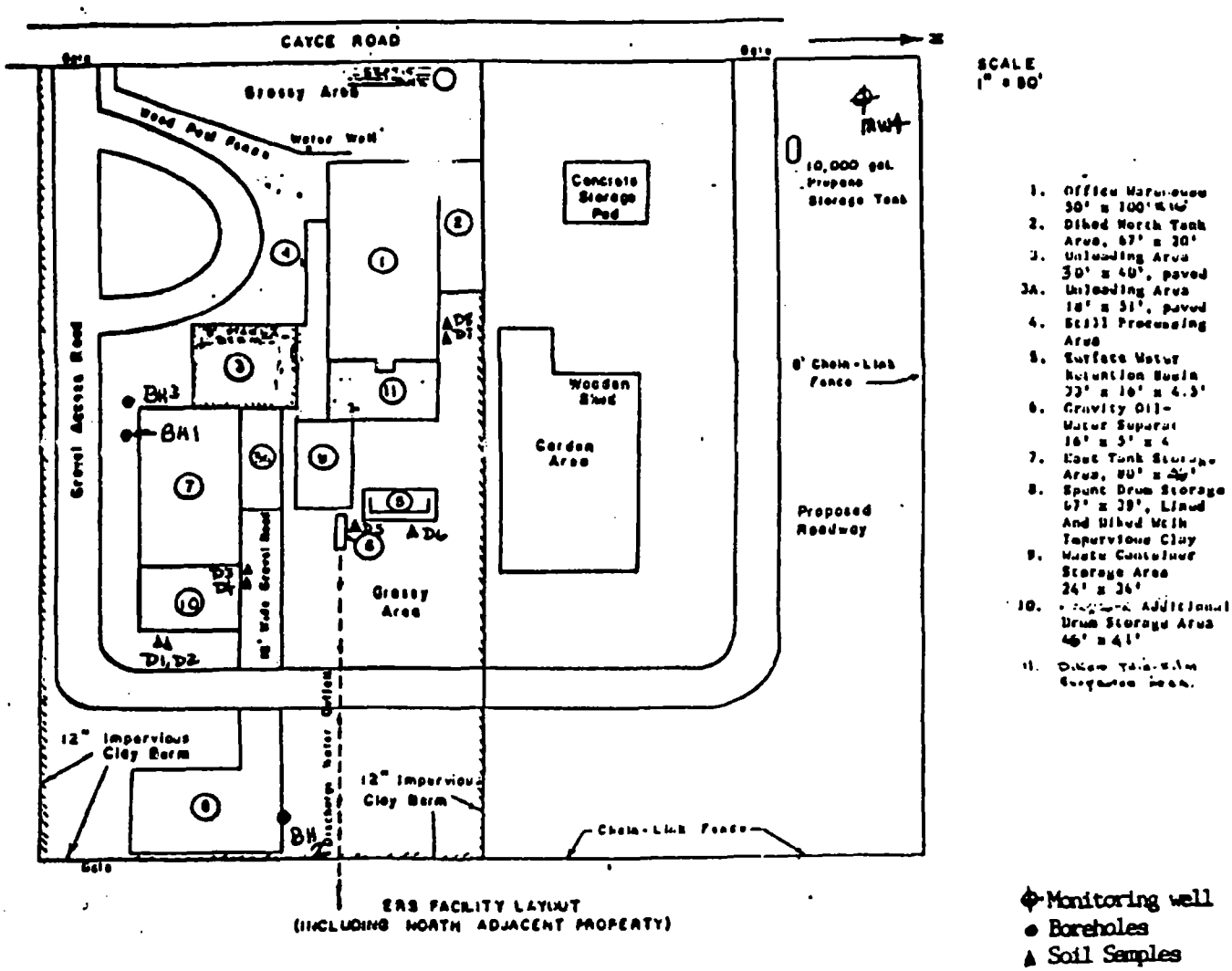
Tri-State Drilling and Testing was hired to drill the boreholes and set the monitoring wells. Boreholes were drilled with a 6.625" O.D. Hollow Stem Auger to depths of 31.5' to 75',

Borehole #1 (BH1) was drilled without sampling to 35 feet. A composite sample, BH1, was collected from the cuttings. Due to the strong odor and

TEC

MSD000693176

ACTUAL PLACEMENT OF BOREHOLES AND SAMPLE LOCATIONS
NOVEMBER 20 - 21, 1989



ERS FACILITY LAYOUT
(INCLUDING NORTH ADJACENT PROPERTY)

Figure 3
Sample locations

lack of groundwater, a Bentonite seal was placed in the hole prior to being backfilled with the cuttings. The sample was analyzed for VOC (Volatile Organic Compounds) and TPH (Total Petroleum Hydrocarbons). The results are given in the Results Section of this report.

Monitoring well #4 (MW4) was then bored to 77.5 feet using continuous sampling. Samples were collected from the middle of each 5' sample. Water was found at 69'6" with the well set at 75'. Groundwater samples were collected before the well was set and without purging the borehole. The water samples were analyzed for VOC scan and TPH. Soil samples from 10', 34, and 58' were analyzed for VOC scan and TPH. Other samples collected are held in reserved by personnel of EFW&A. While the hole was being grouted a noticeably sweet odor was emitted from the hole.

Borehole #2 (BH2) was drilled to a depth of 32.5' using continuous sampling with samples collected from the middle of each 5' sample. Soil samples from 5', 10', 20', and 30' were analyzed for VOC scan. As the auger was being removed from the hole, a noticeably strong, sweet odor was coming from the hole. The odor was similar to that in MW4. BH2 was not backfilled pending identification of odor.

Borehole #3 (BH3) was drilled to 31.5 feet using continuous sample with samples collected from the middle of each 5' sample. At approximately 1 foot a mineral spirit or paint-type odor was noticed in the soil. Soil samples from 4', 9', 14', and 29' were analyzed for VOC scan.

A copy of all well logs is given in Appendix A. The results of analysis is given in the next section of this report.

Soil samples were collected using a hand auger at the following locations and depths. Soil samples were analyzed for VOC and TPH.
Results are given in next section.

Soil Samples

ID	Location	Depth	Comment
D1	behind covered platform	6"	odor similar
D2	behind covered platform	24"	to BH1
D3	next to electrical box	6"	
D4	next to electrical box	24"	
D5	SW corner - holding pond	4.5'	
D6	SE corner - holding pond	4.5'	
D7	near cooling tower	2'	
D8	near cooling tower	6'	

Due to the presence of an odor being emitted from BH2 and MW4, several different Draeger tube readings were taken from each hole in an effort to identify the odor. The results are provided in the next section.

RESULTS

The groundwater samples from MW4 had the following analytical results:

Methylene Chloride	805	ppb
Toluene	85.5	ppb
Tricloroethene	35,000	ppb
1,1-Dichloroethene	946	ppb
Tetrachloroethene	131	ppb
Total Petroleum Hydrocarbons	BDL	

A copy of the analytical results is provided in Appendix B.

Twenty-one soil samples were analyzed for Volatile Organic Compounds (VOC) scan and Total Petroleum Hydrocarbons (TPH); a composite sample from BH1, 4 samples from BH2, 5 samples from BH3, 3 samples from MW4, and 8 samples collected with a hand auger. On the following page is a table of all the positive analytical results.

BH1 is located next to the tank farm. The results of the VOC scan and TPH are:

Ethyl benzene	4190	ppb
Methlyene Chloride	149	ppb
Styrene	5060	ppb
Toluene	6880	ppb
Trichloroethene	7840	ppb
Xylenes	17,290	ppb
TPH	220	ppm

MW4 is located in the corner of the property near Cayce Road and away from the facility. Samples were analyzed from 10, 34, and 58 feet. All VOC samples were below detection limit. The 10 foot sample had a TPH of 131 ppm.

ENTERPRISE RECOVERY SERVICES FACILITY
Results of analysis 11/20 - 22/89 soil samples
as reported by Environmental Testing and Consulting, Inc.

Location & ID	Ethyl benzene	Methylene Chloride	Styrene	Toluene	Trichloro-ethene	Xylenes	Acetone	MethylEthyl Ketone	MethylIsobutyl Ketone	1,1-Dichloro-ethene	Tetrachloro-ethene
BH1-comp	4190	149	5060	6880	7840	17,290				—	—
BH2-5	—	—	—	—	—	—				—	—
BH2-10	—	—	—	73.9j	—	44.4j				—	—
BH2-20	—	—	—	81.6	—	46.9j				—	—
BH2-30	—	—	—	50.1j	—	—				—	—
BH3-1	375	—	—	233	—	384	4300	1700	2800	—	—
BH3-4	53.6j	328	—	67.4j	—	41.1j	20200	7540	4700	—	—
BH3-9	—	—	—	—	—	—	37000	13000	16500	—	—
BH3-14	—	—	—	—	—	—				—	—
BH3-29	—	—	—	—	—	—				—	—
MW4-10	—	—	—	—	—	—				—	—
MW4-34	—	—	—	—	—	—				—	—
MW4-58	—	—	—	—	—	—				—	—
D1-6	—	107	—	147	809	—				—	—
D2-24	—	—	—	—	—	—				—	—
D3-6	1200	—	—	1180	—	3820				—	—
D4-24	13650	—	—	35000	—	51900				—	—
D5-4.5	—	—	—	—	—	—				—	—
D6-4.5	—	—	—	—	—	—				—	—
[illegible]	—	—	—	—	—	—				—	—
D8-6	—	—	—	—	—	—				—	—
DL	80	80	80	80	80	80				80	80

Note: — is below detection limit
j indicates an estimated concentration, technically below detection limit
DL is detection limit

17 8 0012

BH2 is located where the former empty drum storage area was located. The results of the VOC scan is:

	Toluene (ppb)	Xylenes (ppb)
BH2-5 feet	---	---
BH2-10 feet	73.9j	44.4j
BH2-20 feet	81.6	46.9j
BH2-30 feet	50.1j	---

j = estimated value which is below detection limit

BH3 is located at the corner of the tank farm. Samples were collected from 1, 4, 9, 14, and 29 feet. The results for the samples at 14 and 29 feet were below detection limit. The results of the other samples for VOC scan are:

Table for BH3

Material	1 ft.	4 ft.	9 ft.
Ethyl benzene	375	53.6j	—
Methylene Chloride	—	328	—
Toluene	233	67.4j	—
Xylenes	384	41.1j	—
Acetone	4300	20,200	37,000
Methyl Ethyl Ketone	1700	7,540	13,000
Methyl Isobutyl Ketone	2800	4,700	16,500

Soil samples were collected with a hand auger at several locations on the property. Samples D2, D5, D6, D7, and D8 had VOC scan below detection limits while D2, D3, D4, D6, and D7 had TPH below detection limits. Sample D1 results showed Methylene Chloride 107 ppb, Toluene 147 ppb, Trichloroethene 809 ppb, and TPH 133 ppm. D3 and D4 showed results respectively of Ethyl benzene 1200 ppb and 13,650, Toluene 1,180 ppb and 35,000 ppb, Xylenes 3,828 ppb and 51,900 ppb. D5 had a TPH result of 24.5 ppm while D8's was 38.2 ppm.

Air Sampling

The open boreholes of MW4 and BH2 emitted a sweet smelling odor. Dräger tubes were used to identify the odor. Below is a table of Dräger tube indications.

Dräger Tube indications

Hole	Dräger Tube	Strokes	Indication
BH2	Trichloroethylene	1	>100 ppm
MW4	Trichloroethylene	1	>100 ppm
BH2	Acid Test	1	very weak acidic
BH2	Methylene Chloride	10	>300 ppm
MW4	Methylene Chloride	10	>300 ppm
BH2	Hydrocarbons (qualitative tube)	>60	presence in unknown strength
BH2	Vinyl Chloride	5	positive indication, but disregarded due to sensitivity to Trichloroethylene interference
MW4	Vinyl Chloride	5	

Indications from the Dräger Tubes are that both boreholes, BH2 and MW4, have Trichloroethylene and Methylene Chloride being emitted to the air.

CONCLUSION AND RECOMMENDATIONS

Due to insufficient data, the conclusions are that the site is probably contaminated and will need additional investigation. The objective of the additional investigation should be to identify the contamination plume and should include:

1. Place additional monitoring wells.
2. Analyze groundwater for trichloroethylene, perchloroethylene, methylene chloride, acetone, and other site specific chemicals.
3. Sample neighbors drinking water wells and identify well depths.
4. Samples discharge water and creek bed.

TEC

MSD000693176

ON-SITE INSPECTION

Inspector: Carol Tsagarakis Date: 11/6/89

Property Location: Cayce Road, Byhalia, MS

This property is presently:

___Undeveloped: (a) ____Agricultural (b) ____ Dumpsite

(c) ____Landfill (d) ____ Abandoned

(e) ____Other

_X_Developed: _X_ Industrial (SIC)_____

____Commercial

____Manufacturing (SIC) _____

____Residential

List (on a separate page if necessary) any ADJACENT PROPERTIES from which hazardous material contamination may have affected subject property

List (on a separate page if necessary) any known PAST USES of the property that may have resulted in contamination of subject/adjacent properties.

ON-SITE INSPECTION REVEALED THE FOLLOWING:	YES	NO
1.Stressed or denuded vegetation or unusual barren areas		X
2.Unusual coloration or odors in water		X
3.Storage drums	X	
4.Above or under-ground storage tanks	X	
5.Evidence of petroleum or oil products	X	
6.Evidence of PCBs (electrical transformers, capacitors)		X

	YES	NO
7. Existing structures (If yes, answer a-c)	X	
a. evidence of chemical spills/leaks (stains on floor, discolored paint)	X	
b. evidence of asbestos		X
c. source of air emission	X	

Other observations/comments: See attached report for additional information.

TEC

APPENDIX A

WELL LOGS

.-2 11/21/89 Quadrex(Enterprise Recovery Systems)

Sample	Interval (ft)	Facies (ft)	Stratigraphic Column	Description
1	0-2.5	0-16.5		
2	2.5-7.5			Gray Clay
3	7.5-12.5			
4	12.5-17.5	16.5-32.5		
5	17.5-22.5			Orange Sand
6	22.5-27.5			
7	27.5-32.5			

TEC

11/21/89 Quadre. Enterprise Recovery Syste.)

Sample	Interval (ft)	Facies (ft)	Stratigraphic Column	Description
1	0-1.5	0-15.5		
2	1.5-6.5			Gray/Brown Silty Clay
3	6.5-11.5			
4	11.5-16.5	15.5-26.5		
5	16.5-21.5			Red Sand
6	21.5-26.5	26.5-31.5		
7	26.5-31.5			Gray Clayey Sand

Sample	Interval (ft)	Facies (ft)	Stratigraphic Column	Description
1	0-2.5	0-11.0		Brown Clayey Silt
2	2.5-7.5			
3	7.5-12.5	11.0-16.0		Red Clayey Silt
4	12.5-17.5			
5	17.5-22.5			
6	22.5-27.5			
7	27.5-32.5	32.5-77.5		White Sand
8	32.5-37.5			
9	37.5-42.5			
10	42.5-47.5			
11	47.5-52.5			
12	52.5-57.5			
13	57.5-62.5			
14	62.5-67.5			
15	67.5-72.5			
16	72.5-77.5			

TEC

APPENDIX B

ANALYTICAL RESULTS

CLIENT NAME: EFWA

CHAIN OF CUSTODY RECORD

SITE: ERS

SAMPLERS: (Signature) Carol Spagnuolo

ID STA.NO	DAY DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. of CONTAINERS	VOC	pH					REMARKS
BH2-5	Tue 11/21	[illegible]		X		1	✓						Regular Turnaround
BH2-10	Tue 11/21			X		1	✓						
BH2-20	Tue 11/21			X		1	✓						
BH2-30	Tue 11/21			X		1	✓						
BH3-4	Tue 11/21			X		1	✓						
BH3-9	Tue 11/21			X		1	✓						
BH3-14	Tue 11/21			X		1	✓						
BH3-29	Tue 11/21			X		1	✓						
D1	Tue 11/21			X	6 inches	1	✓	✓					
D2	Tue 11/21			X	24 inches	1	✓	✓					
D3	Tue 11/21			X	6 inches	1	✓	✓					
D4	Tue 11/21			X	24 inches	1	✓	✓					
D5	Tue 11/21			X	4 1/2 feet	1	✓	✓					
D6	Tue 11/21			X	4 1/2 feet	1	✓	✓					
D7	Tue 11/21			X	2 feet	1	✓	✓					
D8	Tue 11/21			X	6 feet	1	✓	✓					

Relinquished by: (Sign.)	Day/Date	Time	Received by: (Signature)	Relinquished by: (Sign.)	Day/Date	Time	Received by: (S
C Spagnuolo	Wed 11/22	3:42 PM					
Relinquished by: (Sign.)	Day/Date	Time	Received by: (Signature)	Relinquished by: (Sign.)	Day/Date	Time	Received by: (S
Relinquished by: (Sign.)	Day/Date	Time	Received for Laboratory by	Day/Date	Time	Remarks	

17 8 0023

CLIENT NAME: EFW+A

CHAIN OF CUSTODY RECORD

SITE: ERS

SAMPLERS: (Signature) C Tsagaralis

ID STA.NO	DAY DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. of CONTAINERS	VOC	TPH					REMARKS
MW4-10	Mon 11/20			X		1	✓	✓					
MW4-34	Mon 11/20			X		1	✓	✓					
MW4-58	Mon 11/20			X		1	✓	✓					
BH3-1	Tue 11/21			X		1	✓	✓					

Relinquished by: (Sign.)	Day/Date	Time	Received by: (Signature)	Relinquished by: (Sign.)	Day/Date	Time	Received by: (S
C Tsagaralis	Wed 11/22	3:42pm					
Relinquished by: (Sign.)	Day/Date	Time	Received by: (Signature)	Relinquished by: (Sign.)	Day/Date	Time	Received by: (S
Relinquished by: (Sign.)	Day/Date	Time	Received for Laboratory by	Day/Date	Time	Remarks	

17 8 0024

ENVIRONMENTAL TESTING AND CONSULTING, INC.

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : WATER

DATE ANALYZED : 12/05/89
METHOD (SW-846): 8240

PROJECT # :
ANALYST : RR

FILE NAME : 1122-002.DOC
SAMPLE # : 1122-002

SAMPLE ID : MW-4

COMPOUND	SAMPLE RESULTS UNITS:(ug/l)	METHOD DETECTION LIMIT:(ug/l)
Benzene	BDL	10.0
Bromodichloromethane	BDL	10.0
Bromoform	BDL	10.0
Bromomethane	BDL	20.0
Carbon Tetrachloride	BDL	10.0
Chlorobenzene	BDL	10.0
Chlorodibromomethane	BDL	10.0
Chloroethane	BDL	20.0
2-Chloroethyl vinyl ether	BDL	10.0
Chloroform	BDL	10.0
Chloromethane	BDL	20.0
1,2-Dichlorobenzene	BDL	10.0
1,3-Dichlorobenzene	BDL	10.0
1,4-Dichlorobenzene	BDL	10.0
1,1-Dichloroethane	BDL	10.0
1,2-Dichloroethane	BDL	10.0
1,1-Dichloroethene	946	10.0
trans-1,2-Dichloroethene	BDL	10.0
1,2-Dichloropropane	BDL	10.0
cis-1,3-Dichloropropene	BDL	10.0
trans-1,3-Dichloropropene	BDL	10.0
Ethylbenzene	BDL	10.0
Methylene Chloride	805	10.0
Styrene	BDL	10.0
1,1,2,2-Tetrachloroethane	BDL	10.0
Tetrachloroethene	131	10.0
Toluene	85.5	10.0
1,1,1-Trichloroethane	BDL	10.0
1,1,2-Trichloroethane	BDL	10.0
Trichloroethene	35,000	10.0
Trichlorofluoromethane	BDL	10.0
Vinyl Chloride	BDL	20.0
Xylenes (total)	BDL	10.0

BDL - BELOW DETECTION LIMIT

TEC

ENVI NMENTAL TESTING AND CONSU ING, INC.

ORGANIC ANALYSIS DATA SHEET
TOTAL PETROLEUM HYDROCARBONS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
PROJECT # : _____
ANALYST : CW

SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : WATER

FILE NAME : 1122-002.DOC
SAMPLE # : 1122-002

DATE ANALYZED : 11/28/89
METHOD (SW-846): 8015
(SM 16) 3510

ETC #	SAMPLE ID(S)	SAMPLE RESULTS UNITS:(mg/L)	METHOD DETECTION LIMIT:(mg/L)
#1	MW-4	BDL	1.00

BDL - BELOW DETECTION LIMIT

ENVI NMENTAL TESTING AND CONSU ING, INC.

ORGANIC ANALYSIS DATA SHEET
TOTAL PETROLEUM HYDROCARBONS

17 8 0027

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : CW

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005

DATE ANALYZED : 12/01/89
METHOD (SW-846): 503E
(SM 16) 3550

ETC #	SAMPLE ID	SAMPLE RESULTS UNITS:(mg/kg)	METHOD DETECTION LIMIT:(mg/kg)
#9	D1-06	133	10.0
#10	D2-24	BDL	10.0
#11	D3-06	BDL	10.0
#12	D4-24	BDL	10.0
#13	D5-04.5	24.5	10.0
#14	D6-04.5	BDL	10.0
#15	D7-02	BDL	10.0
#16	D8-06	38.2	10.0
#17	BH1-COMP	220	10.0
#18	MW4-10	131	10.0
#19	MW4-34	BDL	10.0
#20	MW4-58	BDL	10.0
#21	BH3-01	BDL	10.0

BDL - BELOW DETECTION LIMIT

TEC

ENVIRONMENTAL TESTING AND CONSULTING, INC.

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS

17 8 0028

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-17

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : BH1-COMP

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	4,190	80.0
Methylene Chloride	149	80.0
Styrene	5,060	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	6,880	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	7,840	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	17,290	80.0

BDL - BELOW DETECTION LIMIT

ENVI NMENTAL TESTING AND CONSU ING, INC.

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS

17 8 0029

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-1

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : BH2-5

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	BDL	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

TEC

ENVIRONMENTAL TESTING AND CONSULTING, INC.

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS

17 8 0030

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-1

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : BH2-5

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	20[illegible]
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	BDL	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

ENV ONMENTAL TESTING AND CONS TING, INC.

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS

17 8 0031

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-2

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : BH2-10

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	73.9 j	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	44.4 j	80.0

j - ESTIMATED VALUE. RESULT BELOW METHOD DETECTION LIMIT.
BDL - BELOW DETECTION LIMIT

TEC

ENVII MENTAL TESTING AND CONSUI NG, INC.

17 8 0032

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-3

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : BH2-20

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	81.6	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	46.9 j	80.0

j - ESTIMATED VALUE. RESULT BELOW METHOD DETECTION LIMIT.
BDL - BELOW DETECTION LIMIT

ENVI..ONMENTAL TESTING AND CONSU .ING, INC.

ORGANIC ANALYSIS DATA SHEET 17 8 0033
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-4

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : BH2-30

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	50.1 j	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

j - ESTIMATED VALUE. RESULT BELOW METHOD DETECTION LIMIT.
BDL - BELOW DETECTION LIMIT

Matt L Pur

TEC

ENVIR MENTAL TESTING AND CONSUL NG, INC.

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
TENTATIVELY IDENTIFIED COMPOUNDS

17 8 0034

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES

PROJECT # :

ANALYST : RR

SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

FILE NAME : 1122-005.DOC

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID	CAS NUMBER	COMPOUND NAME	ESTIMATED CONCENTRATION (ug/kg)
1122-005-1			
BH3-4	67-64-1	ACETONE	20,200
	78-93-3	METHYL ETHYL KETONE	7,540
	108-10-1	METHYL ISOBUTYL KETONE	4,700
1122-005-6			
BH3-9	67-64-1	ACETONE	37,000
	78-93-3	METHYL ETHYL KETONE	13,000
	108-10-1	METHYL ISOBUTYL KETONE	16,500
1122-005-21			
BH3-01	67-64-1	ACETONE	4,300
	78-93-3	METHYL ETHYL KETONE	1,700
	108-10-1	METHYL ISOBUTYL KETONE	2,800

ENV. ONMENTAL TESTING AND CONS ING, INC.

ORGANIC ANALYSIS DATA SHEET 17 8 0035
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-21

SAMPLE ID : BH3-1

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	375	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	233	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	384	80.0

BDL - BELOW DETECTION LIMIT

TEC

ENVI[illegible]NMENTAL TESTING AND CONSU[illegible]NG, INC.

ORGANIC ANALYSIS DATA SHEET 17 8 0036
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-5

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : BH3-4

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	53.6 j	80.0
Methylene Chloride	328	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	67.4 j	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	41.1 j	80.0

j - ESTIMATED VALUE. RESULT BELOW METHOD DETECTION LIMIT.
BDL - BELOW DETECTION LIMIT

Nett L Pus

EN\ ONMENTAL TESTING AND CONS TING, INC.

ORGANIC ANALYSIS DATA SHEET 17 8 0037
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
PROJECT # : _____
ANALYST : RR

SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-6

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : BH3-9

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	BDL	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

TEC

ENVIR IENTAL TESTING AND CONSUL: 'G, INC.

ORGANIC ANALYSIS DATA SHEET 17 8 0038
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-7

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : BH3-14

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	BDL	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

ENVI 'NMENTAL TESTING AND CONSU 'ING, INC.

ORGANIC ANALYSIS DATA SHEET 17 8 0039
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-8

SAMPLE ID : BH3-29

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	BDL	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

MSD 00069317 6 TEC

ENVIRONMENTAL TESTING AND CONSULTING, INC.

ORGANIC ANALYSIS DATA SHEET 17 8 0040
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-18
SAMPLE ID : MW4-10

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	BDL	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

ENV[illegible]ONMENTAL TESTING AND CONS[illegible]TING, INC.

ORGANIC ANALYSIS DATA SHEET 17 8 0041
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-19

SAMPLE ID : MW4-34

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	BDL	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

TEC

MSD 00069317

ENVIRONMENTAL TESTING AND CONSULTING, INC.

17 8 0042

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-20

SAMPLE ID : MW4-58

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	BDL	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

ENVI ONMENTAL TESTING AND CONSU ING, INC.

ORGANIC ANALYSIS DATA SHEET 17 8 0043
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-9

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : D1-6

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	107	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	147	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	809	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

TEC

NSD000693176

ENVIRONMENTAL TESTING AND CONSULTING, INC.

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS

17 8 0044

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-10

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : D2-24

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	BDL	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

Matt Lee

ENVI NMENTAL TESTING AND CONSU :NG, INC.

17 8 0045

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-11

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : D3-6

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	1,200	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	1,180	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	3,820	80.0

BDL - BELOW DETECTION LIMIT

Nitt S Ring

TEC

NSD 00069317

ENVIRONMENTAL TESTING AND CONSULTING, INC.

ORGANIC ANALYSIS DATA SHEET 17 8 0046
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-12

SAMPLE ID : D4-24

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	13,650	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	35,000	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	51,900	80.0

BDL - BELOW DETECTION LIMIT

ENVI ONMENTAL TESTING AND CONSU ING, INC.

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS

17 8 0047

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-13

SAMPLE ID : D5-4.5

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	BDL	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

TEC

ENVIRONMENTAL TESTING AND CONSULTING, INC.

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS

17 8 0.048

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-14

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : D6-4.5

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	BDL	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

ENVI NMENTAL TESTING AND CONSU ING, INC.

17 8 0049

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-15

SAMPLE ID : D7-2

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	BDL	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

TEC

MSD000693176

ENVIRONMENTAL TESTING AND CONSULTING, INC.

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS

17 8 0050

CLIENT NAME : E.F. WILLIAMS & ASSOCIATES
SITE ID(S) : ERS
SAMPLE DATE : 11/21/89
DATE ARRIVED : 11/22/89
MATRIX : SOIL

PROJECT # :
ANALYST : RR

FILE NAME : 1122-005.DOC
SAMPLE # : 1122-005-16

DATE ANALYZED : 12/02/89
METHOD (SW-846): 8240

SAMPLE ID : D8-6

COMPOUND	SAMPLE RESULTS UNITS:(ug/kg)	METHOD DETECTION LIMIT:(ug/kg)
Acrolien	BDL	800
Acrylonitrile	BDL	800
Benzene	BDL	80.0
Bromodichloromethane	BDL	80.0
Bromoform	BDL	80.0
Bromomethane	BDL	200
Carbon Tetrachloride	BDL	80.0
Chlorobenzene	BDL	80.0
Chlorodibromomethane	BDL	80.0
Chloroethane	BDL	200
2-Chloroethyl vinyl ether	BDL	200
Chloroform	BDL	80.0
Chloromethane	BDL	200
1,2-Dichlorobenzene	BDL	80.0
1,3-Dichlorobenzene	BDL	80.0
1,4-Dichlorobenzene	BDL	80.0
1,1-Dichloroethane	BDL	80.0
1,2-Dichloroethane	BDL	80.0
1,1-Dichloroethene	BDL	80.0
trans-1,2-Dichloroethene	BDL	80.0
1,2-Dichloropropane	BDL	80.0
cis-1,3-Dichloropropene	BDL	80.0
trans-1,3-Dichloropropene	BDL	80.0
Ethylbenzene	BDL	80.0
Methylene Chloride	BDL	80.0
Styrene	BDL	80.0
1,1,2,2-Tetrachloroethane	BDL	80.0
Tetrachloroethene	BDL	80.0
Toluene	BDL	80.0
1,1,1-Trichloroethane	BDL	80.0
1,1,2-Trichloroethane	BDL	80.0
Trichloroethene	BDL	80.0
Trichlorofluoromethane	BDL	80.0
Vinyl Chloride	BDL	200
Xylenes (total)	BDL	80.0

BDL - BELOW DETECTION LIMIT

17 8 0051

APPENDIX C

DREAGER TUBE INFORMATION

TEC

RSD000693176

Dräger-Röhrchen Trichlorethylen 2/a

Gebrauchsanweisung 234-28541 · 2. Ausgabe · Juni 1984

1 Allgemeines und Anwendungsbereich
Bestimmung von Trichlorethylen ($CHCl : CCl_2$) in Luft. Die Röhrchen sind zusammen mit der Dräger-Gaspumpe zu verwenden. Zur Handhabung vgl. Abschnitt 4 dieser Gebrauchsanweisung und Gebrauchsanweisung 4341.

Wichtig:
Es ist nicht zulässig, diese Röhrchen mit Pumpen anderer Hersteller zu kombinieren, da es dann zu erheblichen Anzeigefehlern kommen kann. Eine solche Kombination verstieße gegen bestehende Richtlinien.

2 Beschreibung
Vgl. Abbildung.
Öffnungszeit (Dauer eines Pumpenhubes bis zur vollen Spannung der Sperrkette): 16 bis 30 Sekunden.

Operating Instructions 234-28541e · 2nd Edition · June 1984

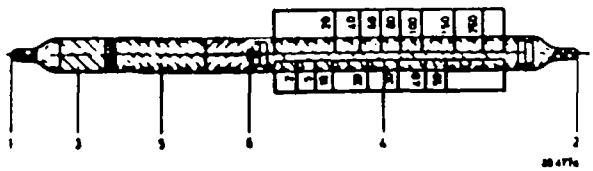
1 General and Application
Determination of trichloroethylene ($CHCl : CCl_2$) in air. The tubes are to be used in conjunction with the Dräger Gas Detector Pump. For use, see Section 4 of the Operating Instructions and Instructions for Use 4341.

Important:
It is not permissible to combine the tubes with pumps made by other manufacturers, as this may cause considerable errors in indication. Such a combination would offend against relevant regulations.

2 Description
See illustration.
Opening time (duration of one pump stroke until the limit chain is completely taut): 16 to 30 seconds.

17 8 0052

1 und 2 zugeschmolzene Spitzen
3 Schreibfläche
4 Anzeigeschicht (hellgrau) mit Binchekalen
Zahlenwerte = ppm Trichlorethylen
5 Oxidationsschicht (gelb)
6 Pfeil (soll bei der Prüfung zur Pumpe weisen)



1 and 2 fused tips
3 writing surface
4 indicating layer (light grey) with calibrated scales, numerical values = ppm trichloroethylene
5 oxidation layer (yellow)
6 arrow (must point towards pump during measurement)

3 Meßbereich (20°C, 1013 mbar)
Bei n = 6 Hüben 2 bis 60 ppm Trichlorethylen
Bei n = 3 Hüben 20 bis 250 ppm Trichlorethylen
1 ppm Trichlorethylen ≙ 5,46 mg/m³
1 mg/m³ ≙ 0,18 ppm Trichlorethylen } 20°C, 1013 mbar

4 Prüfung und Beurteilung des Ergebnisses
4.1 Pumpe vor jeder Meßreihe mit ungeöffnetem Röhrchen auf Dichtheit prüfen.
4.2 Spitzen des Röhrchens abbrechen.
4.3 Röhrchen dicht in den Pumpenkopf einsetzen (Pfeil weist zur Pumpe).
4.4 Die zu untersuchende Luft zunächst mit n = 3 Hüben durch das Röhrchen saugen. Trichlorethylen verfärbt die Anzeigeschicht orange. Die gesamte Länge der Verfärbung ist das Maß für die Konzentration. Auf der 3-Hub-Skala Konzentration in ppm ablesen. Liegt der Wert über 60 ppm, so ist die Prüfung beendet. Werden weniger als 60 ppm abgelesen, so ist die Prüfung mit 2 weiteren (also insgesamt 5) Hüben fortzusetzen. Trichlorethylen-Konzentration in ppm jetzt auf der 5-Hub-Skala ablesen.

5 Bemerkungen
Die Dräger-Röhrchen Trichlorethylen sind nur einmal verwendbar, auch dann, wenn die Luft kein Trichlorethylen enthalten hat. Bei positiver Anzeige sind die Verfärbungen mehrere Tage haltbar; Röhrchen hierzu mit Gummikappen verschließen.

6 Einfluß der Umgebungsbedingungen auf das Meßergebnis
6.1 Temperatur
Die Röhrchen können in einem Temperaturbereich von 10°C bis 40°C verwendet werden.
6.2 Feuchtigkeit
Im Bereich von 6 bis 16 mg H_2O pro Liter hat die Feuchtigkeit keinen Einfluß auf die Anzeige.
6.3 Luftdruck
Zur Korrektur des Druckeinflusses ist die Anzeige mit dem folgenden Faktor zu multiplizieren:

$$\text{Korrekturfaktor} = \frac{1013}{\text{tatsächlicher Luftdruck (in mbar)}}$$

7 Spezifität (Querempfindlichkeit)
Die Anzeige des Trichlorethylens beruht auf der Spaltung des Trichlorethylens in der Oxidationsschicht (Chromat); das freigesetzte Chlor wird in der Anzeigeschicht (Reagens: o-Tolidin) gemessen.

8 Vorgesehene Verbrauchszeit
Verbrauchszeit und Lagertemperatur
(vgl. die Angaben auf der Banderole)

9 Wichtige Eigenschaften des Trichlorethylens
MAK-Wert (Bundesrepublik Deutschland 1985): 50 ppm (260 mg/m³)
Untere Zündgrenze: 7,9 Vol.% (bei 20°C)
Zündtemperatur: 410°C
Dampfdruck: 80 mbar (bei 20°C)
Flüchtigkeit (Sättigungskonzentration in Luft): 432 mg/Liter (bei 20°C)
Molekülmasse: 131,39
Dichte (flüssig): 1,47 g/cm³ (bei 20°C)
Schmelzpunkt: −86°C
Siedepunkt: 87,2°C

10 Hinweise
Auf Wunsch des Benutzers liefern wir die folgenden Informationen:
a) Die für die Kalibrierung der Prüfröhrchen verwendete Methode.
b) Den Einfluß von Testbedingungen (einschließlich Reaktionsablauf) auf die Umsetzung und auf die Zuverlässigkeit der Anzeige, sofern uns diese Effekte bekannt sind.

11 Filtersemschutz
Falls Filtersemschutz erforderlich und zulässig, dann Filter mit dem Kennbuchstaben A verwenden.

Unsere Tabelle 4340 enthält alphabetisch geordnet die mit Dräger-Röhrchen meßbaren Gase und Dämpfe, wichtige physikalische und toxikologische Daten der Gase und Dämpfe sowie Literaturhinweise.
Bitte, fordern Sie diese Tabelle bei uns an.

Achtung!
Verbrauchte Röhrchen nicht achtlos fortwerfen, damit sie nicht in Kinderhände gelangen!

Inhalt ätzt!

3 Range of Measurement (20°C, 1013 mbar)
With n = 6 strokes, 2 to 60 ppm trichloroethylene
With n = 3 strokes, 20 to 250 ppm trichloroethylene
1 ppm trichloroethylene ≙ 5.46 mg/m³
1 mg/m³ ≙ 0.18 ppm trichloroethylene } 20°C, 1013 mbar

4 Test and Evaluation of the Result
4.1 Before each series of measurements, check the pump for leaks using an unopened tube.
4.2 Break off the tips of the tube.
4.3 Insert the tube tightly in the pump head (arrow points towards the pump).
4.4 First suck the air sample through the tube with n = 3 strokes. Trichloroethylene turns the indicating layer orange. The total length of the discoloration is a measure of the concentration. Read off the concentration in ppm on the 3-stroke scale. If the value is above 60 ppm, the test is completed. If it is below 60 ppm, continue the test with further 2 strokes (a total of 5). Now read-off the trichloroethylene concentration in ppm on the 5-stroke scale.

5 Remarks
Dräger Trichloroethylene tubes can be used only once, even if the air sample did not contain any trichloroethylene. In the case of a positive indication, the discoloration lasts for several days, if the tubes are sealed with rubber caps.

6 Influence of Ambient Conditions on the Result of Measurement
6.1 Temperature
The tubes can be used in a temperature range of from 10°C to 40°C.
6.2 Humidity
Between 6 and 16 mg H_2O per litre, humidity has no influence on the indication.
6.3 Atmospheric Pressure
For pressure correction, multiply the tube reading by the following conversion factor:

$$\text{Conversion factor} = \frac{1013}{\text{actual atmospheric pressure (in mbar)}}$$

7 Specificity (Cross-Sensitivity)
The trichloroethylene indication is based on cleavage of the trichloroethylene in the oxidation layer (chromate); the chlorine liberated is measured in the indicating layer (reagent: o-tolidine).

8 Shelf Life
See expiration date and storage temperature, on the label of the box.

9 Important Properties of Trichloroethylene
Threshold limit value (USA 1985): 50 ppm (260 mg/m³)
Lower explosive limit: 7.9 vol.% (at 20°C)
Ignition temperature: 410°C
Vapour pressure: 80 mbar (at 20°C)
Saturation concentration in air: 432 mg/litre (at 20°C)
Molecular mass: 131.39
Density (liquid): 1.47 g/cm³ (at 20°C)
Melting point: −86°C
Boiling point: 87.2°C

10 Information
At the request of the tube user, we will supply the following information:
a) The methods used for calibration of the detector tubes
b) The effects (including reactions) on the operation and accuracy of the gas detector tube unit caused by specific environmental conditions described by the user, if these effects are known to us.

11 Filter Respiratory Protection
Should filter protection be necessary and acceptable, filters with the code letter A should be used.

Our table 4340e contains in alphabetical order the gases and vapours measurable with Dräger tubes, important physical and toxicological data of the gases and vapours as well as many references to literature.
The table will be sent to you on request.

Caution
Do not allow the used tubes to fall into the hands of children.

The contents are corrosive!

1 Allgemeines und Anwendungsbereich

Mit DRÄGER-Säure-Test-Röhrchen Spuren von sauer reagierenden Verbindungen in Luft qualitativ an (z.B. Salzsäure, Salpe Essigsäure, Ameisensäure).
Die Röhrchen sind zusammen mit d ÄGER-Gasspürpumpe, Modell 31, zu verwenden. Zur Handhabung der DRÄGER-Gasspürpumpe vgl. Abschnitt 4 dieser Gebrauchsanweisung und Gebrauchsanweisung 4341.

Wichtig:
Es ist nicht zulässig, diese Röhrchen mit Pumpen anderer Hersteller zu kombinieren, da es dann zu erheblichen Anzeigefehlern kommen kann. Eine solche Kombination verstieße gegen bestehende Richtlinien.

1 General and application

The DRÄG d test tube qualitatively detects traces of acid compounds in air (e.g. hydroc acid, nitric cetic acid, formic acid).
The Tubes be used in conjunction with the DRÄGER gas detector pump, Model 31. For see Section 4 of these Operating Instructions and Instructions for Use 4341 e.

Important
These Tubes must not be used with pumps supplied by other manufacturers, since this could le considerable errors in indication. Such a combination would infringe the regulations in force.

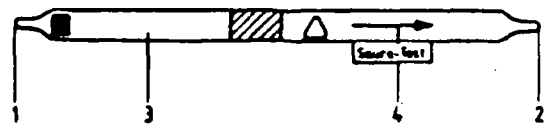
2 Beschreibung

Vgl. Abbildung
Öffnungszeit (Dauer eines Pumpenhubes bis zur vollen Spannung der Spannstäbe): 1 bis 4 Sekunden

2 Description

See illustration
Opening time (duration of one pump stroke until the line chain is completely taut). 1 to 4 seco

17 8 0053



1 und 2 zugeschmolzene Spitzen
3 Anzeigeschicht (blau-violett)
4 Abdeckung
5 Pfeil (soll bei der Prüfung zur Pumpe weisen)

1 and 2 fused tips
3 indicating layer (bluish violet)
4 cover film
5 arrow (must point towards pump during tes

3 Anzeigeempfindlichkeit

Die folgende Zusammenstellung gibt einige sauer reagierende Substanzen an, welche bei n = 1 Hub eine Verfärbung von ca. 5 mm Länge ergeben:

Konzentration	Substanz	Farbanzeige
5 ppm (mL/m³)	Ameisensäure	gelb
5 ppm (mL/m³)	Essigsäure	gelb
10 ppm (mL/m³)	Salpetersäure	rose-gelb
10 ppm (mL/m³)	Salzsäure	rose-gelb

3 Sensitivity of indication

Some acid substances which give a discoloration of length app. 5 mm with n = 1 pump stroke listed below:

Concentration	Substance	Colour of indication
5 ppm (mL/m³)	Formic acid	Yellow
5 ppm (mL/m³)	Acetic acid	Yellow
10 ppm (mL/m³)	Nitric acid	Pinkish yellow
10 ppm (mL/m³)	Hydrochloric acid	Pinkish yellow

4 Prüfung und Beurteilung des Ergebnisses

4.1 Pumpe vor jeder Meßreihe mit ungeöffneten Röhrchen auf Dichtheit prüfen.
4.2 Spitzen des DRÄGER-Röhrchens abbrechen.
4.3 DRÄGER-Röhrchen dicht in den Pumpenkopf einsetzen (Pfeil weist zur Pumpe).
4.4 Zu untersuchende Luft mit n = 1 Hub durch das Röhrchen saugen. Sauer reagierende Substanzen verfärben die Anzeigeschicht von blau-violett nach rose/gelb.
Einige Beispiele für die Anzeigeempfindlichkeit sind unter Punkt 3 aufgeführt.

4 Test and evaluation of the result

4.1 Before each series of measurements, check the pump for leaks using an unopened DRÄG Tube.
4.2 Break off the tips of the DRÄGER Tube.
4.3 Insert the DRÄGER Tube tightly in the pump head (arrow points towards the pump).
4.4 Suck the air sample through the tube with 1 pump stroke. Acid substances change the colou the indicating layer from bluish violet to pink/yellow.
Some examples of the sensitivity of indication are given in Section 3.

5 Bemerkungen

Nach negativem Prüfergebnis können die Röhrchen am selben Tag bis zu dreimal benutzt werden. Anzeige sofort auswerten, da sich die Verfärbung im Laufe der Zeit etwas ändert.

5 Remarks

Following a negative test result, the Tube can be used again up to 3 times on the same day. Evalu the indication immediately since the discoloration changes somewhat in the course of time.

6 Einfluß der Umgebungsbedingungen auf das Meßergebnis

6.1 Temperatur
Die DRÄGER-Röhrchen können in einem Temperaturbereich von 0°C bis 40°C verwendet werden.
6.2 Feuchtigkeit
Im Bereich von 3 bis 15 mg H_2O pro Liter hat die Feuchtigkeit keinen Einfluß auf die Anzeige.

6 Influence of ambient conditions on the result of measurement

6.1 Temperature
The DRÄGER Tubes can be used in a temperature range of from 0 to 40°C.
6.2 Humidity
Between 3 and 15 mg H_2O per litre, humidity has no influence on the indication.

7 Spezifität (Querempfindlichkeit)

Die Anzeige beruht auf Farbreaktion mit einem Säureindikator.

7 Specificity (cross-sensitivity)

The indication is based on the colour reaction with an acid indicator.

8 Vorgesehene Verbrauchszeit

Verbrauchsdatum und Lagertemperatur vgl. die Angaben auf der Banderole.

8 Shelf life

For expiry date and storage temperature, see date on package strip.

TEC

9 Hinweis

Auf Wunsch des Benutzers liefern wir die folgenden Informationen:
a) Die für die Kalibrierung der Prüfröhrchen verwendete Methode.
b) Den Einfluß von Testbedingungen (einschließlich Reaktionsablauf) auf die Umsetzung und auf die Zuverlässigkeit der Anzeige, sofern uns diese Effekte bekannt sind.

9 Information

At the request of the Tube user, we will supply the following information:
a) The methods used for calibration of the detector tubes.
b) The effects (including reactions) on the operation and accuracy of the gas detector tube u caused by specific environmental conditions described by the user, if these effects are known us.

MSD000693 1/6

Methylene Chloride 100/a (67 24601)

17 8 . 0054

Range of measurement	00 to 2,000 ppm methylene chloride (dichloromethane)
Number of strokes of the DRÄGER gas detector pump	n = 10
Relative standard deviation	15 to 10%

Description

Scale tube • greenish brown conversion layer, reagent: chromate • white indicating layer, reagent: iodine pentoxide, selenium dioxide and fuming sulphuric acid • colour change to brownish green.

Reaction principle

(in the conversion layer)

$CH_2Cl_2 + CrO_4^{2-} \rightarrow$ Cleavage products

Methylene chloride

(in the indicating layer)

$$\text{Cleavage products} + I_2O_5 \xrightarrow{SeO_2 + H_2S_2O_7} \text{Iodine (colour: brownish green)}$$

Cross-sensitivity

In addition to methylene chloride, other halogenated hydrocarbons and organic compounds (e.g. petroleum) and carbon monoxide are indicated.

Extension of the range of measurement

0 to 1,000 ppm CH_2Cl_2 with n = 20 strokes.

GEBRAUCHSANWEISUN· ·28031 · 5. Ausgabe · März 1984

1 Allgemeines und Anwendungsbereich

Bestimmung von Vinylchlorid CH_2:CHCl (Monochlorethylen) in Luft.
Die Röhrchen sind zusammen mit der DRÄGER-Gaspumpe zu verwenden. Zur Handhabung vgl. Abschnitt 4 dieser Gebrauchsanweisung und Gebrauchsanweisung 4341

2 Beschreibung

Vgl. Abbildung
Öffnungszeit (Dauer eines Pumpenhubes bis zur vollen Spannung der Spannfeder): 7 bis 14 Sekunden.

OPERA· INSTRUCTIONS 234-28031e · 5th Edition · March 1

1 General and Application

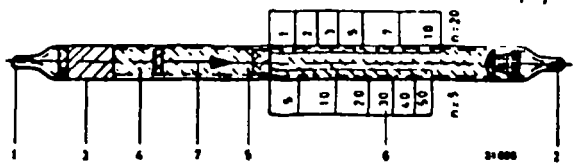
Determination of vinyl chloride CH_2 CHCl (monochloroethylene) in air
The tubes are to be used in conjunction with the DRÄGER Gas Detector Pump. For use see se 4 of these Operating Instructions and Instructions for Use 4341 e

2 Description

See illustration.
"Opening period" (duration of one pump stroke until the final chem is completely taut): 7 t seconds.

17 8 0055

1 und 2 zugeschmolzene Spitzen
3 Schreibfläche
4 Oxidationsschicht (braunorange)
5 Reinigungsschicht
6 Anzeigeschicht (weiß) mit Strichskalen; Zahlenwerte = ppm Vinylchlorid
7 Pfeil (soll bei der Prüfung zur Pumpe weisen)



1 und 2 fused tips
3 writing surface
4 oxidation layer (brown-orange)
5 cleaning layer
6 indicating layer (white) with scales numerical values = ppm vinyl chlo
7 arrow (must point towards the pur during the test)

3 Meßbereich (20°C, 1013 mbar; entsprechend 20°C, 760 Torr)

Bei 5 Hüben 5 bis 50 ppm Vinylchlorid.
Bei 20 Hüben 1 bis 10 ppm Vinylchlorid.
1 ppm Vinylchlorid ≙ 2,60 mg/m³ } 20°C, 1013 mbar
1 mg/m³ ≙ 0,38 ppm Vinylchlorid

4 Prüfung und Beurteilung des Ergebnisses

4.1 Pumpe vor jeder Meßreihe mit ungeöffnetem Röhrchen auf Dichtheit prüfen.
4.2 Spitzen des DRÄGER-Röhrchens abbrechen.
4.3 DRÄGER-Röhrchen dicht in den Pumpenkopf einsetzen (Pfeil weist zur Pumpe).
4.4 Die zu untersuchende Luft ist mit der entsprechenden Anzahl von Hüben (5 oder 20) durch das DRÄGER-Röhrchen zu saugen.
Vinylchlorid verfärbt die Anzeigeschicht schwach gelborange. Die gesamte Länge der Verfärbung ist das Maß für die Konzentration.
Zahlenwerte = ppm Vinylchlorid.
4.5 Hinweis
Der Anfang der Anzeigeschicht kann sich – je nach Prüfbedingungen – rötlich verfärben. Die Zuverlässigkeit des Meßergebnisses wird dadurch nicht beeinflußt. Auszuwerten ist die gesamte Länge der Verfärbung (d.h. rötlich + schwach gelborange).

5 Bemerkungen

Anzeige sofort auswerten, da sich die Länge der Verfärbung im Laufe der Zeit etwas ändert.
Die Röhrchen sind auch nach negativem Prüfergebnis nicht wieder verwendbar.

6 Einfluß der Umgebungsbedingungen auf das Meßergebnis

6.1 Temperatur
Die DRÄGER-Röhrchen können in einem Temperaturbereich von 15 bis 30°C verwendet werden.
6.2 Feuchtigkeit
Im Bereich von 3 bis 12 mg H_2O pro Liter hat die Feuchtigkeit keinen Einfluß auf die Anzeige.
6.3 Luftdruck
Zur Korrektur des Druckeinflusses ist die Anzeige mit folgendem Faktor zu multiplizieren:

$$\text{Korrekturfaktor} = \frac{1013}{\text{tatsächlicher Luftdruck (in mbar)}}$$

7 Spezifität (Querempfindlichkeit)

Die Anzeige des Vinylchlorids beruht auf der Spaltung des Vinylchlorids in der Oxidationsschicht des Röhrchens; das freigesetzte Chlor wird in der Anzeigeschicht (Reagenz: o-Tolidin) gemessen. Farbumschlag von weiß nach schwach gelborange.
Perchlorethylen, Trichlorethylen und 1,1-Dichlorethylen werden mit etwa doppelter Empfindlichkeit wie Vinylchlorid angezeigt.
Chlorid und Salzsäure werden in der Vorschicht absorbiert und stören daher nicht die Anzeige des Vinylchlorids.
In Gegenwart von Dämpfen organischer Lösemittel wird ein Teil des Oxidationsmittels verbraucht, es wird dann möglicherweise weniger Vinylchlorid angezeigt, als vorhanden ist.

Konzentration	Vinylchlorid (VC) Anzeige
10 ppm Ethylen + 10 ppm VC	10 ppm (n = 5)*
100 ppm Ethylen + 10 ppm VC	1 ppm
10 ppm Butadien + 10 ppm VC	10 ppm
100 ppm Butadien + 10 ppm VC	1 ppm
10 ppm Heptan + 10 ppm VC	10 ppm
100 ppm Heptan + 10 ppm VC	3 ppm
100 ppm Aceton + 10 ppm VC	10 ppm
100 ppm Methanol + 10 ppm VC	10 ppm
* n = 20:	
10 ppm Ethylen + 10 ppm VC	3 ppm
100 ppm Ethylen + 10 ppm VC	<1 ppm

8 Vorgesehene Verbrauchszeit

Vgl. Angaben auf der Banderole.

9 Toxische Eigenschaften

Hierzu die offiziellen Richtlinien beachten.

10 Hinweis

Auf Wunsch des Benutzers liefern wir die folgenden Informationen:
a) Die für die Kalibrierung der Prüfröhrchen verwendete Methode.
b) Den Einfluß von Testbedingungen (einschließlich Reaktionsablauf) auf die Umsetzung und auf die Zuverlässigkeit der Anzeige, sofern uns diese Effekte bekannt sind.

Unsere Tabelle 4340 enthält alphabetisch geordnet die mit DRÄGER-Röhrchen meßbaren Gase und Dämpfe, wichtige physikalische und toxikologische Daten der Gase und Dämpfe sowie Literaturhinweise.

Bitte fordern Sie diese Tabelle bei uns an.

Achtung!

Verbrauchte DRÄGER-Röhrchen nicht achtlos fortwerfen, damit sie nicht in Kinderhände gelangen!

Inhalt ätzt!

3 Range of Measurement (20°C, 1013 mbar; corresponding to 20°C, 760 mm Hg)

With 5 strokes: 5 to 50 ppm vinyl chloride.
With 20 strokes: 1 to 10 ppm vinyl chloride.
1 ppm vinyl chloride ≙ 2,60 mg/m³ } 20°C, 1013 mbar
1 mg/m³ ≙ 0,38 ppm vinyl chloride

4 Test and Evaluation of the Result

4.1 Before each series of measurements, test the pump for leaks using an unopened tube.
4.2 Break-off the tips of the DRÄGER Tube.
4.3 Insert the DRÄGER Tube tightly in the pump head (arrow points towards the pump).
4.4 Suck the air sample through the DRÄGER Tube with the corresponding number of strokes (5 or 20). In the presence of vinyl chloride the white indicating layer turns pale-y orange over a varying length. The total length of the discoloration is a measure of the chloride concentration. Numerical values = ppm vinyl chloride.
4.5 Note: Depending on the test conditions the beginning of the indicating layer can have a re discoloration. This will not influence the reliability of the result. The total length discoloration (i.e. reddish and pale-yellow-orange) has to be evaluated.

5 Remarks

Evaluate indication immediately, since the length of the discoloration changes somewhat course of time. The tubes cannot be used again even after a negative test result.

6 Influence of Ambient Conditions

6.1 Temperature
The DRÄGER Tubes can be used in a temperature range from 15 to 30°C.
6.2 Humidity
Between 3 and 12 mg H_2O per liter humidity has no influence on the indication.
6.3 Atmospheric Pressure
For pressure correction multiply the tube reading by the following conversion factor:

$$\text{Conversion factor} = \frac{1013}{\text{actual atmospheric pressure (in mbar)}}$$

7 Specificity (Cross Sensitivity)

Indication is based on the cleavage of the vinyl chloride in the oxidizing layer of the tube; theseh liberated is measured in the indicating layer (reagent: o-tolidine). Color change from white to yellow-orange. Perchloroethylene, trichloroethylene, and 1,1-dichloroethylene are indicated about twice the sensitivity of vinyl chloride.
Chlorine and hydrogen chloride are absorbed in the pre-layer and therefore do not affect the chloride indication.
In the presence of organic solvent vapours part of the oxidizing agent is consumed, the indic then possibly shows less vinyl chloride than present.

Concentration	Vinyl chloride (VC) indication
10 ppm ethylene + 10 ppm VC	10 ppm (n = 5)*
100 ppm ethylene + 10 ppm VC	1 ppm
10 ppm butadiene + 10 ppm VC	10 ppm
100 ppm butadiene + 10 ppm VC	1 ppm
10 ppm heptane + 10 ppm VC	10 ppm
100 ppm heptane + 10 ppm VC	3 ppm
100 ppm acetone + 10 ppm VC	10 ppm
100 ppm methanol + 10 ppm VC	10 ppm
* n = 20:	
10 ppm ethylene + 10 ppm VC	3 ppm
100 ppm ethylene + 10 ppm VC	<1 ppm

8 Shelf life

See label on the box.

9 Toxicity Data

See official publications.

10 Information

We assure, that upon request of the Tube user, we will furnish the following information:
a) The calibration methods employed.
b) The effects (including reactions) on the operation and accuracy of the gas detector tub caused by specific environmental conditions described by the user, if the effects are kno us.

Our table 4340 e contains in alphabetical order the gases and vapours measurable with DRÄ Tubes, important physical and toxicological data of the gases and vapours as well as references to literature.

These tables will be sent to you on request.

Caution!

Do not allow DRÄGER Tubes to fall into the hands of children!

Contents are corrosive!

TEC

DRÄGERWERK · AG · LÜBECK · GERMANY

MSD000693176

1 Allgemeines und Anwendungsbereich

Messung der Dämpfe (in Luft) von Kohlen- [illegible]stoff-Gemischen (KW) des Siedebereiches von etwa 50° bis 200 °C, z. B. Extraktionsbenzine, Vergaserkraftstoffe.
Bei Flüssiggasen, Dräger-Röhrchen KW 0,1 %/b verwenden. Bei Benzolgehalten der KW-Gemische über 50 % wird die Messung ungenau.
Zur Handhabung der Gasspürpumpe und der Dräger-Röhrchen vgl. Gebrauchsanweisung 4341.

Wichtig:
Es ist nicht zulässig, diese Röhrchen mit Pumpen anderer Hersteller zu kombinieren, da es dann zu erheblichen Anzeigefehlern kommen kann. Eine solche Kombination verstieße gegen bestehende Richtlinien.

2 Beschreibung

Vgl. Abbildung.
Öffnungszeit (Dauer eines Pumpenhubes bis zur vollen Spannung der Sperrkette): 7 bis 14 Sekunden.

1 und 2 zugeschmolzene Spitzen
3 Schreibfläche
4 Anzeigeschicht (gelb)
5 Vergleichsschicht (braun)
6 Pfeil (soll bei Prüfung zur Pumpe weisen)
7 und 8 Abdeckung

1 and 2 fused tips
3 writing surface
4 indicating layer (yellow)
5 comparison layer (brown)
6 arrow (must point towards the pump during the test)
7 and 8 covering film

3 Meßbereich

Etwa 2 bis 23 mg Benzindampf pro Liter Luft. Bei einem angenommenen durchschnittlichen Molekulargewicht von 110 entspricht das etwa 0,06 Vol.-% bis 0,7 Vol.-%. Kleinere Konzentrationen als 2 mg/L lassen sich nur qualitativ abschätzen.

4 Prüfung und Beurteilung des Prüfergebnisses

Saugen zu prüfende Luft durch das Röhrchen und zähle dabei die Hübe (n), bis Farbton und Farbintensität der Anzeigeschicht (4) etwa übereinstimmen mit der Vergleichsschicht (5). Die KW-Konzentration ergibt sich aus der Formel

$$c\ (mg/L) = \frac{70}{n}$$

Diese Formel ergibt sich als Mittel aus Meßergebnissen mit einer größeren Anzahl verschiedener Handelsbenzine im Siedebereich von 50° bis 200 °C. Infolge der üblichen Schwankungen solcher technischer Benzine muß bei der Anwendung dieser Formel mit Streuungen gerechnet werden, die bei Konzentrationen über 10 mg/L bis 26 %, bei Konzentrationen unter 10 mg/L bis 36 % betragen können. (Streuung bezogen auf den Istwert). Man ermittelt z. B. folgende Werte:

Hubzahl (n) bis zur Farbgleichheit	mg KW pro L	Vol.-% * ca.	Streubereich Vol.-%
24	3	0,07	± 0,08
16	4,5	0,1	± 0,04
12	6	0,13	± 0,06
7	10	0,22	± 0,06
5	14	0,31	± 0,08
3	23	0,51	± 0,13

* Für ein angenommenes mittleres Molekulargewicht von 110. Bezugstemperatur 25 °C; 1013 mbar.

4.1 Anmerkung

Sind Siedebereiche oder Zusammensetzung des vorliegenden KW genauer bekannt, so kann mit dem Dräger-Röhrchen KW 2 auch genauer gemessen werden. Es gilt für die sogenannten (benzolhaltigen) »Superbenzine« die Berechnungsformel:

$$c\ (mg/L) = \frac{80}{n}$$

Für Extraktionsbenzine (Siedebereich bis etwa 100 °C) gilt die Formel:

$$c\ (mg/L) = \frac{60}{n}$$

für Kerosindämpfe:

$$c\ (mg/L) = \frac{90}{n}$$

5 Bemerkungen

Nach negativem Prüfbefund kann das Röhrchen am selben Tage ein zweites Mal benutzt werden.
Färbungen sind einige Zeit haltbar, vorausgesetzt, daß die Röhrchen nach der Prüfung vor Feuchtigkeit geschützt werden (Gummikappen). Feuchtigkeit würde ringförmige (rote) Färbungen hervorrufen, die eine spätere Beurteilung nicht mehr zulassen.

6 Einfluß der Temperatur auf das Meßergebnis

Die Eichdaten gelten für eine Umgebungstemperatur von 0° bis 25 °C (Temperatur von Röhrchen und Prüfgas).

7 Spezifität

Die Anzeige beruht auf der Reaktion der Benzin-KW mit einem Selendioxid-Schwefelsäure-Reagens (aufgrund des SO_3-Dampfdruckes im Anzeigepräparat entweichen bei der Prüfung aus der Pumpe geringe Mengen eines weißen Schwefelsäure-Nebels). Die Reaktion ist weitgehend spezifisch für KW. Die üblichen Schwankungen in der Zusammensetzung handelsüblicher Produkte spielen für die Anzeige keine Rolle. Die Eichdaten gelten aber nur für KW im Siedebereich zwischen 50° und 200 °C. Der Aromatengehalt der Gemische darf 50 % nicht wesentlich übersteigen. Die Vergleichsschicht des Röhrchens ist abgestimmt auf technische Benzine üblicher Zusammensetzung (Benzine oder Gemische mit Aromaten). Geringe Farbabweichungen sind jedoch möglich.
Reine aromatische KW rufen rötliche Färbungen hervor, die zonenweise in der Anzeigeschicht fortschreiten. In diesem Fall sind die Eichangaben nicht anwendbar.
CO stört die KW-Messung nicht.

8 Vorgesehene Verbrauchszeit

Verbrauchsdatum und Lagertemperatur vgl. die Angaben auf der Banderole.

Achtung!
Verbrauchte Röhrchen nicht achlos fortwerfen, damit sie nicht in Kinderhände gelangen!
Inhalt ätzt!

1 General and [illegible]ation

Measuring vap[illegible] of hydrocarbon mixtures (HC) in the air, with in the boiling range of 200 °C, e. g. extraction benzines, carburetor fuel. For liquid gases, use Dräger tub 0.1 %/b. Inaccurate readings will be the result of HC mixtures containing 50 % or benzene.
For the use of Dräger tubes and Gas Detector, refer also to Operating Instructions 434

Important:
It is not permissible to combine the tubes with pumps made by other manufacturers, sin may cause considerable errors in indication. Such a combination would offend against r regulations.

17 8 0056

2 Description

Refer to illustration.
»Opening period« (time needed for the release of the compressed bellows, ending wh arrestor chain is fully tensioned): 7 to 14 seconds

3 Measuring Range

Approximately 2 to 23 mg benzine vapour/litre of air. At a molecular weight average of 1 corresponds to about 0.06 % by volume to 0.7 % by volume. Concentrations less mg/litre can only be estimated on a qualitative basis.

4 Test and Evaluation of the Result

Draw the air sample through the tube, counting the number of strokes (n) needed for the and intensity of the indicating layer (4) to correspond to the comparison layer (5). T concentration can then be calculated from the formula

$$c\ (mg/litre) = \frac{70}{n}$$

This formula is derived as the mean of results achieved with a large number of d commercial benzines within the boiling range of 50° to 200 °C. As a result of normal diffe in such industrial hydrocarbons, some divergences are to be expected when applyi formula, with concentrations above 10 mg/litre – divergence up to 26 %, with concent below 10 mg/litre – divergence up to 36 % (divergence related to the actual value). For e the following values can be obtained:

No. of strokes (n) to produce matching colour	mg HC/litre	% by vol. approx.*	Range of diver % by vol.
24	3	0.07	± 0.08
16	4.5	0.1	± 0.04
12	6	0.13	± 0.06
7	10	0.22	± 0.06
5	14	0.31	± 0.08
3	23	0.51	± 0.13

* Taking a molecular weight of 110 as average. Related to 25 °C, 1013 mbar.

4.1 Notes for Testing

If the boiling range or composition of the particular hydrocarbon are accurately known, a readings can then be obtained with the Dräger tube KW 2. For »Super« petrols (co benzene), the following formula would apply:

$$c\ (mg/litre) = \frac{80}{n}$$

For extraction benzines (boiling range to approximately 100 °C) the formula would be

$$c\ (mg/litre) = \frac{60}{n}$$

and for kerosene vapours

$$c\ (mg/litre) = \frac{90}{n}$$

5 Remarks

After a negative reaction, the tube may be used a second time on the same da last for some time, providing the tubes are airtightly sealed with rubber ca[illegible] Humidity would produce red rings of discolouration which would invalidate the evaluat

6 Influence of the Temperature on the Measurement

The calibration of the tube is valid when both tube and gas sample are within 0° to 25°

7 Specificity

The indication is based on the reaction of the benzine HC with a selenium dioxide – sulf reagent (due to the pressure of SO_3 vapour in the indicating agent, small quantities of sulphuric acid mist escape from the pump during testing). The reaction is largely specific The usual fluctuations in the composition of commercial products do not influence the in The calibrated data however, only relate to HC within the boiling range of approximately 200 °C. The aromatic content of the mixtures should not exceed 50 %. The comparison the tube is intended for industrial benzines of normal composition (benzines or mixtu aromatics).
Slight differences in colour are possible. Purely aromatic HC produce red discolo (progressing in zones) in the indicating layer, in this case the calibration cannot be u does not influence the measurement of HC.

8 Shelf Life

See expiration date and storage temperature on label of the box.

Caution
Do not allow used tubes to fall into the hands of children.
Contents are corrosive.

ED 2163075/87 · 90 22 122

Printed in the Federal Republic of

Die Richtlinien bitte die neben auf die Packung aufgedruckte Chargennummer angeben.

In all inquiries please state the batch number stamped on the outside of the box.

From EPA RCRA FILES

17 8 0057

National Association of Solvent Recyclers

ENTERPRISE RECOVERY SYSTEM

P. O. Box 635
Collierville, Tennessee 38027
Phone (601) 851-7378
FAX (601) 851-7064

TEC

RECEIVED
JUN 14 1991
Dept. of Environmental Quality
Bureau of Pollution Control

June 12, 1991

Mr. Toby Cook, P.E.
Hazardous Waste Division
Mississippi Department ofNatural Resources
Bureau of Pollution Control
P.O. Box 10385
Jackson, MS 39289-0385

Dear Toby:

In compliance with your request concerning the Quadrex site inspection, ERS is forwarding the enclosed "Preliminary Environmental Survey" performed by E.F. Williams & Associates, Inc.

Even though the Mississippi DEQ and representatives have always responded professionally in matters concerning ERS, we ask that this especially pertain to this survey, due to its content and nature. At this time publicity or rumor will have an adverse effect on the fragile financial condition of this company. The fact that the survey is preliminary indicates that further investigation is needed. Contact will be made to E.F. Williams concerning an "Environmental Assessment Plan" by next week in hopes of making a timely approach to the matter.

ERS anticipates DEQ input after its review of the survey. At this time we will discuss avenues of approach to possible problems that may exist. No doubt, this will involve time frames and financial feasibilities.

It is ERS's intent to cooperate with the DEQ to the best of our ability on this matter.

Sincerely,

Ron Stephens, ERS

TEC

cc: Dewayne Headrick
cc: Louis Crawford, P.E.
cc: Wm. Steve Spengler, P.E.

MSD000693176

17 8 0058

RECEIVED
EPA/REGION IV
JUN 26 1 10 PM '91
ENGINEERING SECTION

Reference 19
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176

U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION IV, ATHENS, GEORGIA

MEMORANDUM

DATE: DEC 04 1990

SUBJECT: Transmittal of RCRA Sampling Investigation Report for Enterprise Recovery Systems, Inc., Byhalia, Mississippi, EPA ID No. MSD000693176; ESD Project No. 90-894

FROM: Bruce Ferguson BCF
Hazardous Waste Section
Environmental Compliance Branch
Environmental Services Division

TO: Doug McCurry, Chief
Waste Engineering Section
RCRA and Federal Facilities Branch
Waste Management Division

THRU: William R. Bokey, Chief
Hazardous Waste Section
Environmental Compliance Branch
Environmental Services Division

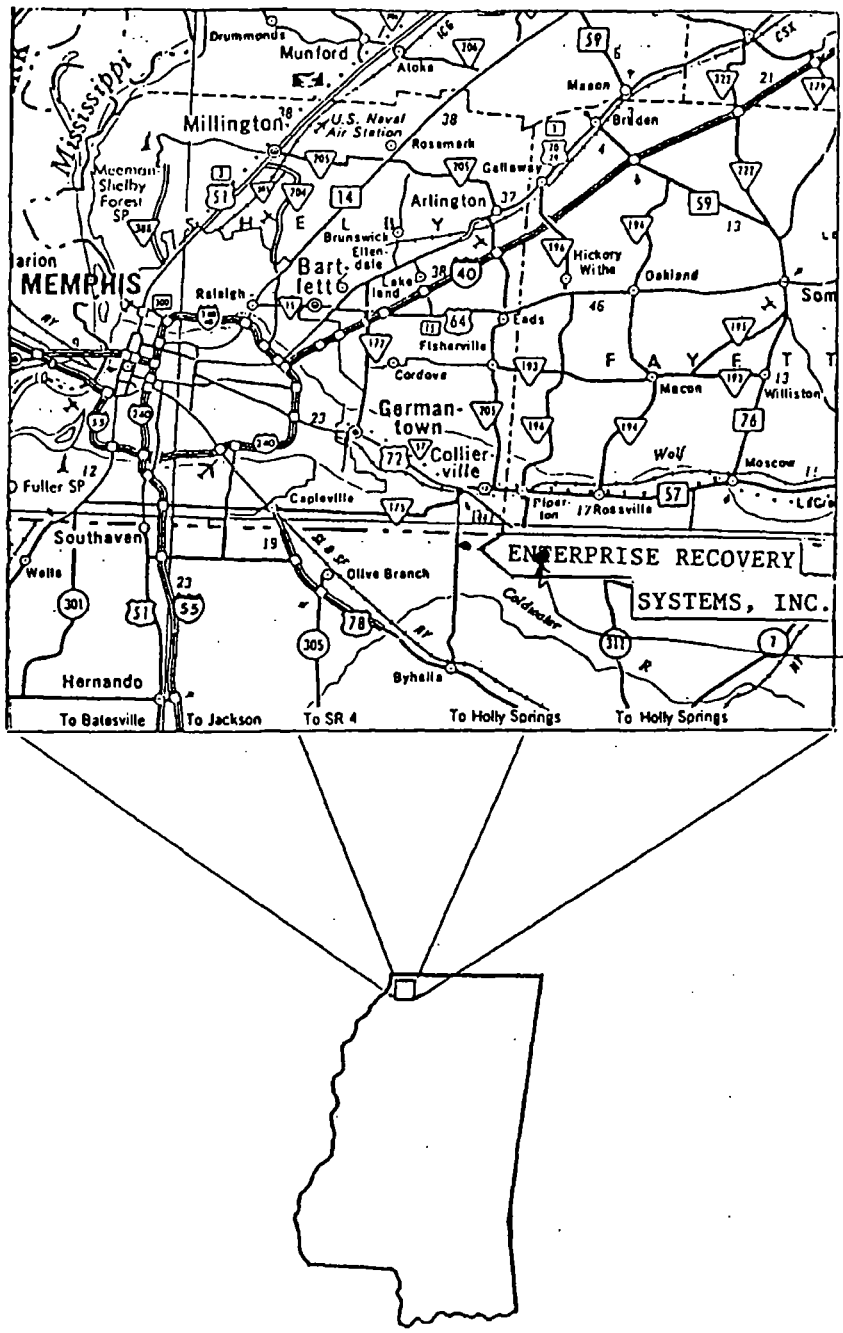
Attached is a copy of the report for the sampling investigation conducted by ESD at the subject facility on September 25, 1990. Please see that a copy of this report is sent to:

Mr. Steve Kellett
Plant Coordinator
Enterprise Recovery Systems, Inc.
P.O. Box ~~567~~ 635
Collierville, TN 38017

Please call me at FTS 250-3317, if there are any questions regarding this report.

cc: Finger/Wright
Bokey/Cosgrove
Carroll/Bennett
Knight
Dickinson/Brittain

DOCKET NO ERS 110



site is really here.

FIGURE 1
FACILITY LOCATION MAP
ENTERPRISE RECOVERY SYSTEMS, INC.
BYHALIA, MISSISSIPPI
SEPTEMBER 1990

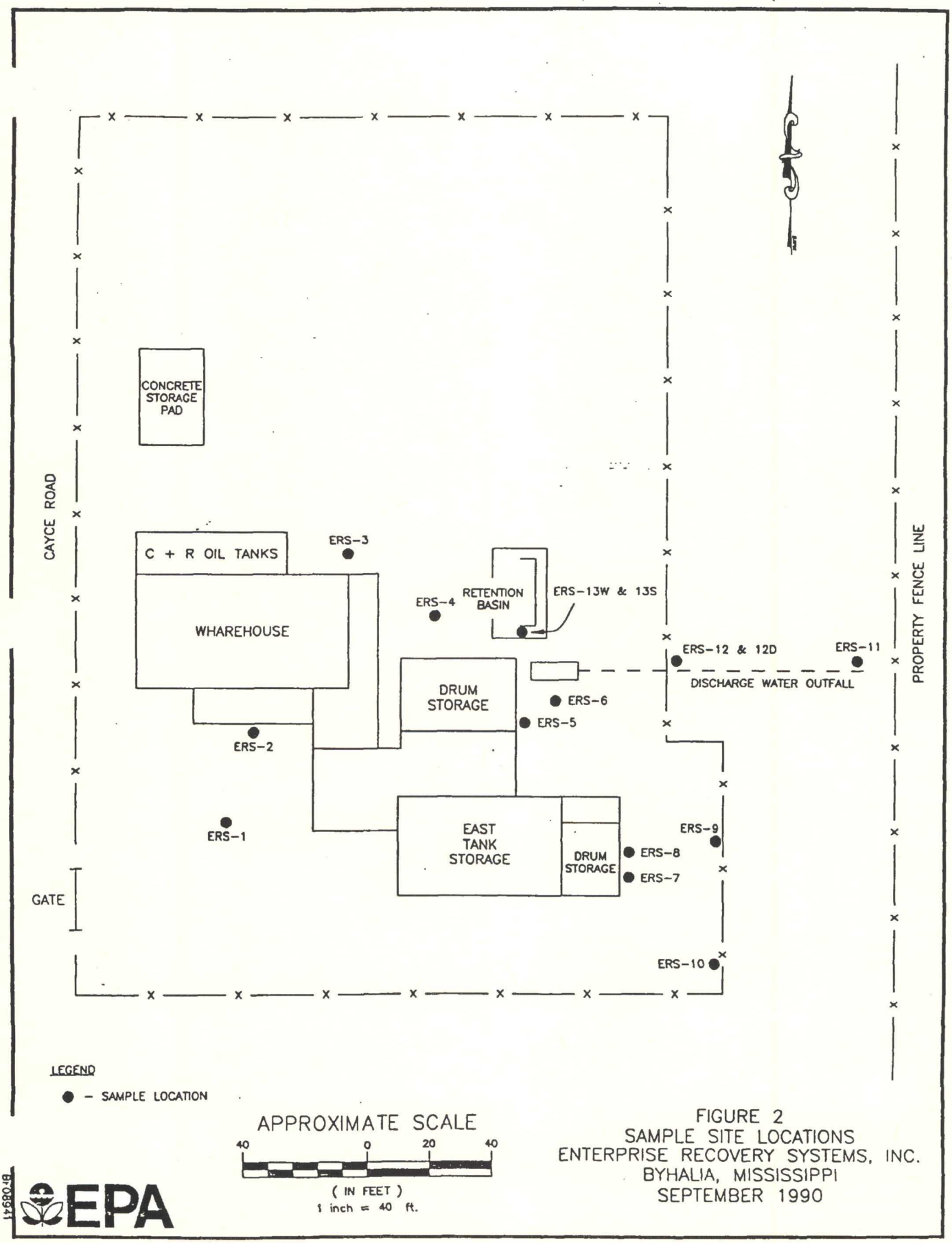


FIGURE 2
SAMPLE SITE LOCATIONS
ENTERPRISE RECOVERY SYSTEMS, INC.
BYHALIA, MISSISSIPPI
SEPTEMBER 1990

RCRA SAMPLING INVESTIGATION
ENTERPRISE RECOVERY SYSTEMS, INC.
BYHALIA, MISSISSIPPI
EPA ID NO. MSD000693176
ESD PROJECT NO. 90-894
SEPTEMBER 1990

INTRODUCTION

On September 25, 1990, Bruce Ferguson, Sharon Matthews, and Terry Thomas, US-EPA, Region 4, Environmental Services Division (ESD), Hazardous Waste Section, conducted a RCRA sampling investigation at the Enterprise Recovery Systems, Inc. (ERS) facility located at Byhalia, Mississippi. The sampling was requested by the Waste Engineering Section for RFI Phase II confirmatory sampling at solid waste management units (SWMUs) at ERS. Steve Kellett, Plant Coordinator, assisted ESD personnel and received split samples for ERS.

BACKGROUND

Enterprise Recovery Systems, Inc. is located on Cayce Road about one quarter mile off U.S. Highway 72 just inside the Mississippi state line southeast of Collierville, Tennessee (Figure 1). The solvent recovery operation began in 1975 as C & R Products Company and changed to ERS in 1978. ERS processes waste chlorinated solvents for recovery and resale. Most of the waste solvents are received in drums; however, the facility is capable of receiving the waste solvents in bulk tank trucks.

SUMMARY

Extractable organic compounds were detected in eleven of the fourteen soil/sediment samples collected. Purgeable organic compounds were detected in twelve of the soil samples and the one pond sediment sample. One purgeable and seven extractable organic compounds were detected in the pond water sample collected.

SAMPLING AND METHODOLOGY

All samples were collected and handled in accordance with the Engineering Support Branch Standard Operating Procedures and Quality Control Manual (April 1986). Soil/sediment samples were collected from fourteen designated SWMUs at ERS (Figure 2). Sample depths ranged from the surface to four feet (Table 1). A surface water sample was collected from the retention pond (SWMU-9d). Samples were analyzed according to the Laboratory Operations and Quality Control Manual (September 1990). All samples were analyzed for extractable and purgeable organics. Photographs were taken at each sampling site and are included in the Appendix A.

RESULTS

Eleven of the fourteen soil/sediment samples collected contained from one to seven extractable organic compounds. Extractable organic compounds were not detected in three of the fourteen samples collected. Of the fifteen extractable organic compounds detected, none except the petroleum product were present in more than one sample. Purgeable organic compounds were detected in thirteen of the fourteen soil/sediment samples collected. These samples contained from one to twelve compounds. Of sixteen purgeable organic compounds detected, one to ten were present in the various samples. Analytical data summaries are given in Tables 2 and 3. The complete analytical data sheets are included in Appendix B. Letters to the right of some of the reported analytical data values are footnotes indicating the following; J - estimated value; N - presumptive evidence of the presence of the material; -- material analyzed for but not detected.

Extractable Organic Compounds (EOCs)

EOCs were detected in eleven of the fourteen soil/sediment samples collected. Seven of these eleven samples contained only presumptive evidence of the presence of a petroleum product, and the following data discussion does not include this EOC.

Sample ERS-1 (SWMU-9c)- contained chlordane, endrin, and endrin ketone at concentrations of 500JN, 1000JN, and 1000JN ug/kg, respectively.

Sample ERS-5 (SWMU-16)- seven EOCs were detected with concentrations ranging from 100JN ug/kg for dihyrotrimethylphenylindene to 800JN ug/kg for methylpyrrlidinone.

Sample ERS-6 (SWMU-9e)- contained benzyl butyl phthalate, bis(2-ethylhexyl) phthalate, and dihydrotrimethylphenylindene (2-isomers) at concentrations of 4300, 3700, and 700JN ug/kg, respectively.

Sample ERS-11 (SWMU-9f) benzo(B and/or K)fluoranthene was detected at a concentration of 160J ug/kg.

Sample ERS-13W(SWMU-9d) seven EOCs were detected in the water sample from the retention pond. These ranged in concentration from 2JN ug/l for acetylmorpholine to 70J ug/l for three unidentified compounds.

Purgeable Organic Compounds (POCs)

POCs were detected in all except one of the samples collected from the SWMUs.

Sample ERS-1 (SWMU-9c)- contained cis-1,2-dichloroethene, tetrachloroethene, and trichloroethene at concentrations of 8.7J, 8.4J, and 18J, ug/kg respectively.

Sample ERS-2 (SWMU -4)- contained ten POCs ranging in concentrations from 260J ug/kg for ethyl benzene to 13,000J ug/kg for acetone.

Sample ERS-3 (SWMU-9b)- five POCs were detected at concentrations from 31J ug/kg for 1,1-dichloroethane to 25,000J ug/kg for 1,1,1-trichloroethane.

Sample ERS-4 (SWMU-22)- tetrachloroethene was detected at a concentration of 10J ug/kg.

Sample ERS-5 (SWMU-16)- acetone, cis-1,2-dichloroethene, and methyl ethyl ketone were detected at concentrations of 320J, 5.9J, and 53J ug/kg, respectively.

Sample ERS-6 (SWMU-9e)- trichloroethene was detected at a concentration of 9.5J ug/kg.

Sample ERS-7 (SWMU-21)- contained 1,1,1-trichloroethane, cis-1,2-dichloroethene, and trichloroethene at concentrations of 5.4J, 5.8J, and 10J ug/kg, respectively.

Sample ERS-8 (SWMU-21)- contained cis-1,2-dichloroethene at a concentration of 4.7J ug/kg.

Sample ERS-9 (SWMU-15)- contained four POCs ranging in concentrations of 13J ug/kg for tetrachloroethene to 430J ug/kg for cis-1,2-dichloroethene.

Sample ERS-11 (SWMU-9f)-contained dioxane at a concentration of 100JN ug/kg.

Sample ERS-12 (SWMU-9f)-eleven POCs were detected at concentrations ranging from 440J ug/kg for O-xylene to 43,000J ug/kg for acetone.

Sample ERS-12D (Duplicate of ERS-12) twelve POCs were detected at concentrations ranging from 74J ug/kg for (M- and/or P-)xylene to 46,000J ug/kg for acetone. Analytical results from this sample and sample ERS-12 are comparable.

Sample ERS-13S (SWMU-9d)cis-1,2-dichloroethene and vinyl chloride were detected at concentrations of 530 ug/kg and 130J ug/kg, respectively.

Sample ERS-13W (SWMU-9d) cis-1,2-dichloroethene was detected at a concentration of 6.7 ug/l.

TABLE 1
SAMPLE LOCATION DESCRIPTIONS
ENTERPRISE RECOVERY SYSTEMS
BYHALIA, MISSISSIPPI

SAMPLE #	SWMU #	SWMU NAME	SAMPLE LOCATION & DESCRIPTION
ERS-1	9c	Runoff Pipes	@ 3 ft from concrete culvert pipe in center of parking lot, west of storage tanks, surface to 6", no noticeable odor
ERS-2	4	Distillation Unit 1	@ 1 ft from south edge of concrete pad at center near drum, surface, slight sweet organic odor, light gray clay
ERS-3	9b	Runoff Ditches	Midway in ditch at northeast corner of main building, surface sample
ERS-4	22 & 5	East grassy area, Wastewater Dist. Units 2 & 3	Low area, equidistant between retention pond and concrete slab, surface to 6", light brown sandy clay
ERS-5	16	Waste Container Storage Area	Immediately adjacent to sump, 3-4' depth, light gray clay, slight sweet organic odor
ERS-6	9e	Oil Water Separator	Near northwest corner of unit, 4' depth, light brown sandy clay, no noticeable odor
ERS-7	21	Drum Storage Area	Along wall @ 8' from south-east corner, surface beneath gravel, light brown sandy clay, no noticeable odor
ERS-8	21	Drum Storage Area	Along wall @ 16' from south-east corner, 12-18" depth beneath gravel, brownish gray sandy clay, slight septic odor
ERS-9	15	Former Sludge Tank Area	@ 8' from center of east fence, 6-12" depth beneath gravel, dry gummy cohesive material on top of gray clay

TABLE 1 (Cont.)

ERS-10	10	Former Empty Drum Storage Area	In corner @ 15' from south fence & 20' from east fence, surface to 6" depth, light brown sandy clay, no noticeable odor
ERS-11	9f	Outfall Ditch	East end of outfall ditch @ 5' from property fence, surface, brown sandy clay, no noticeable odor
ERS-12	9f	Outfall Ditch	In ditch near pipe @ 20' east of east fence, surface, moist gray clay, slight sweet organic odor
ERS-12D	9f	Outfall Ditch	Duplicate of ERS-12
ERS-13W	9d	Retention Pond	Retention pond water
ERS-13S	9d	Retention Pond	Retention pond sediment

TABLE 2
ANALYTICAL DATA SUMMARY (SOIL/SED)
ENTERPRISE RECOVERY SYSTEMS
BYHALIA, MISSISSIPPI
SEPTEMBER 1990

	ERS-TBS TRIP BLANK 09/25/90 1630	ERS-1 SWMU-9C PIPE 09/25/90 0945	ERS-2 SWMU-4 DISTUNIT 09/25/90 1010	ERS-3 SWMU-9B DITCH 09/25/90 1030	ERS-4 SWMU-22 GRASAREA 09/25/90 1055	ERS-5 SWMU-16 CONTSTOR 09/25/90 1130	ERS-6 SWMU-9E OIL SEP 09/25/90 1205	ERS-7 SWMU-21 DRUMSTOR 09/25/90 1330	ERS-8 SWMU-21 DRUMSTOR 09/25/90 1350	ERS-9 SWMU-15 SLDGTANK 09/25/90 1415	ERS-10 SWMU-10 DRUMSTOR 09/25/90 1435	ERS-11 SWMU-9F DISDITCH 09/25/90 1500	ERS-12 SWMU-9F DISDITCH 09/25/90 1530	ERS-12D SWMU-9FD DITCHDUP 09/25/90 1535	ERS-13S SWMU-9D PONDSED 09/25/90 1600
EXTRACTABLE ORGANIC COMPOUNDS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
(3-AND/OR 4-) METHYLPHENOL	NA	--	--	--	--	410J	--	--	--	--	--	--	--	--	--
2-METHYLPHENOL	NA	--	--	--	--	170J	--	--	--	--	--	--	--	--	--
BENZO(B AND/OR K) FLUORANTHENE	NA	--	--	--	--	--	--	--	--	--	--	160J	--	--	--
BENZOIC ACID	NA	--	--	--	--	470J	--	--	--	--	--	--	--	--	--
BENZYL BUTYL PHTHALATE	NA	--	--	--	--	--	4300	--	--	--	--	--	--	--	--
BIS(2-ETHYLHEXYL) PHTHALATE	NA	--	--	--	--	--	3700	--	--	--	--	--	--	--	--
PHENOL	NA	--	--	--	--	360J	--	--	--	--	--	--	--	--	--
(Tetramethylbutyl) phenol	--	--	--	--	--	400JN	--	--	--	--	--	--	--	--	--
Chlordane	--	500JN	--	--	--	--	--	--	--	--	--	--	--	--	--
Dihydrotrimethyl phenylindene	--	--	--	--	--	100JN	--	--	--	--	--	--	--	--	--
Dihydrotrimethyl phenylindene (2-isomers)	--	--	--	--	--	--	700JN	--	--	--	--	--	--	--	--
Endrin	--	1000JN	--	--	--	--	--	--	--	--	--	--	--	--	--
Endrin ketone	--	1000JN	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylpyrrlidinone	--	--	--	--	--	800JN	--	--	--	--	--	--	--	--	--
Petroleum product	--	N	N	N	N	--	--	N	--	--	--	N	N	N	N

TABLE 2 (con't)
ANALYTICAL DATA SUMMARY (SOIL/SED)
ENTERPRISE RECOVERY SYSTEMS
BYHALIA, MISSISSIPPI
SEPTEMBER 1990

	ERS-TBS TRIP BLANK 09/25/90 1630	ERS-1 SWMU-9C PIPE 09/25/90 0945	ERS-2 SWMU-4 DISTUNIT 09/25/90 1010	ERS-3 SWMU-9B DITCH 09/25/90 1030	ERS-4 SWMU-22 GRASAREA 09/25/90 1055	ERS-5 SWMU-16 CONTSTOR 09/25/90 1130	ERS-6 SWMU-9E OIL SEP 09/25/90 1205	ERS-7 SWMU-21 DRUMSTOR 09/25/90 1330	ERS-8 SWMU-21 DRUMSTOR 09/25/90 1350	ERS-9 SWMU-15 SLDGTANK 09/25/90 1415	ERS-10 SWMU-10 DRUMSTOR 09/25/90 1435	ERS-11 SWMU-9F DISDITCH 09/25/90 1500	ERS-12 SWMU-9F DISDITCH 09/25/90 1530	ERS-12D SWMU-9FD DITCHDUP 09/25/90 1535	ERS-13S SWMU-9D PONDSED 09/25/90 1600
PURGEABLE ORGANIC COMPOUNDS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
(M- AND/OR P-)XYLENE	--	--	1400	--	--	--	--	--	--	--	--	--	--	74J	--
1,1,1-TRICHLOROETHANE	--	--	--	25000J	--	--	--	5.4J	--	60J	--	--	7000J	6400J	--
1,1-DICHLOROETHANE	--	--	--	31J	--	--	--	--	--	--	--	--	5200J	8100J	--
ACETONE	--	--	13000J	--	--	320J	--	--	--	--	--	--	43000J	46000J	--
CIS-1,2-DICHLOROETHENE	--	8.7J	1200	580	--	5.9J	--	5.8J	4.7J	430J	--	--	2000	2800	530
ETHYL BENZENE	--	--	260J	--	--	--	--	--	--	--	--	--	--	--	--
METHYL BUTYL KETONE	--	--	--	--	--	--	--	--	--	--	--	--	--	690J	--
METHYL ETHYL KETONE	--	--	7700J	--	--	53J	--	--	--	--	--	--	9100J	40000J	--
METHYL ISOBUTYL KETONE	--	--	2000J	--	--	--	--	--	--	--	--	--	2500J	--	--
O-XYLENE	--	--	360J	--	--	--	--	--	--	--	--	--	440J	400J	--
TETRACHLOROETHENE (TETRACHLOROETHYLENE)	--	8.4J	280J	3600J	10.0J	--	--	--	--	13J	--	--	480J	370J	--
TOLUENE	--	--	1300	--	--	--	--	--	--	--	--	--	960	600J	--
TRICHLOROETHENE (TRICHLOROETHYLENE)	--	18J	3200J	2400	--	--	9.5J	10J	--	390	--	--	--	--	--
VINYL CHLORIDE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	130J
Dioxane	--	--	--	--	--	--	--	--	--	--	--	100JN	2000JN	10000JN	--
Isopropanol	--	--	--	--	--	--	--	--	--	--	--	--	1000JN	5000JN	--

****

FOOTNOTES
NA - NOT ANALYZED
J - ESTIMATED VALUE
N - PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
-- - MATERIAL WAS ANALYZED FOR BUT NOT DETECTED

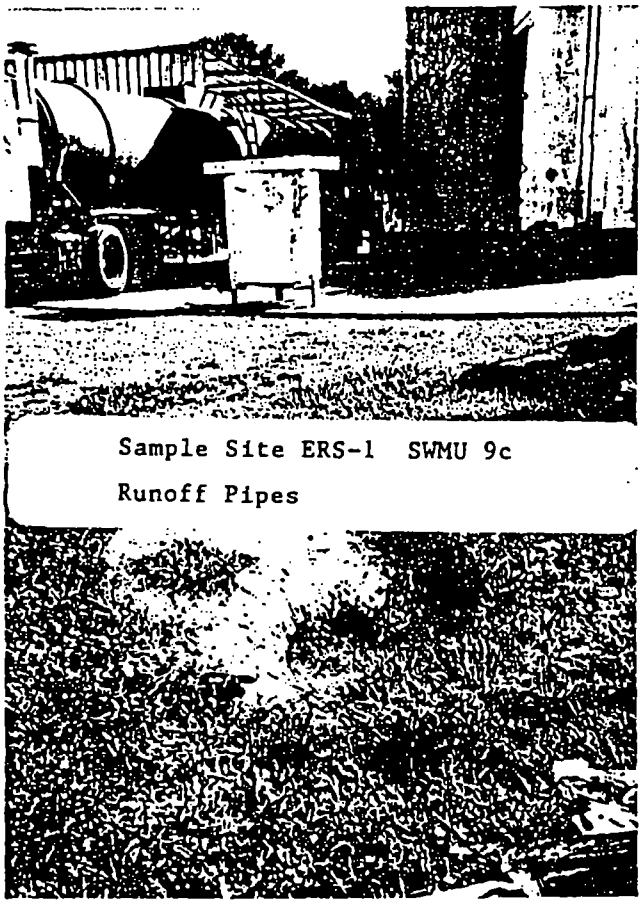
TABLE 3
ANALYTICAL DATA SUMMARY (POND WATER)
ENTERPRISE RECOVERY SYSTEMS
BYHALIA, MISSISSIPPI
SEPTEMBER 1990

	ERS-TBW TRIP BLANK 09/25/90 1620	ERS-13W SWMU-9D RET POND 09/25/90 1550
EXTRACTABLE ORGANIC COMPOUNDS	UG/L	UG/L
BENZOIC ACID	NA	3.2J
3 UNIDENTIFIED COMPOUNDS	--	70J
ACETYLMORPHOLINE	--	2JN
DODECANOIC ACID, METHYL ESTER	--	4JN
HEXADECANOIC ACID	--	6JN
METHYLHEPTADECANOIC ACID, METHYL ESTER	--	10JN
PHTHALIC ANHYDRIDE	--	3JN
PURGEABLE ORGANIC COMPOUNDS	UG/L	UG/L
CIS-1,2-DICHLOROETHENE	--	6.7

****

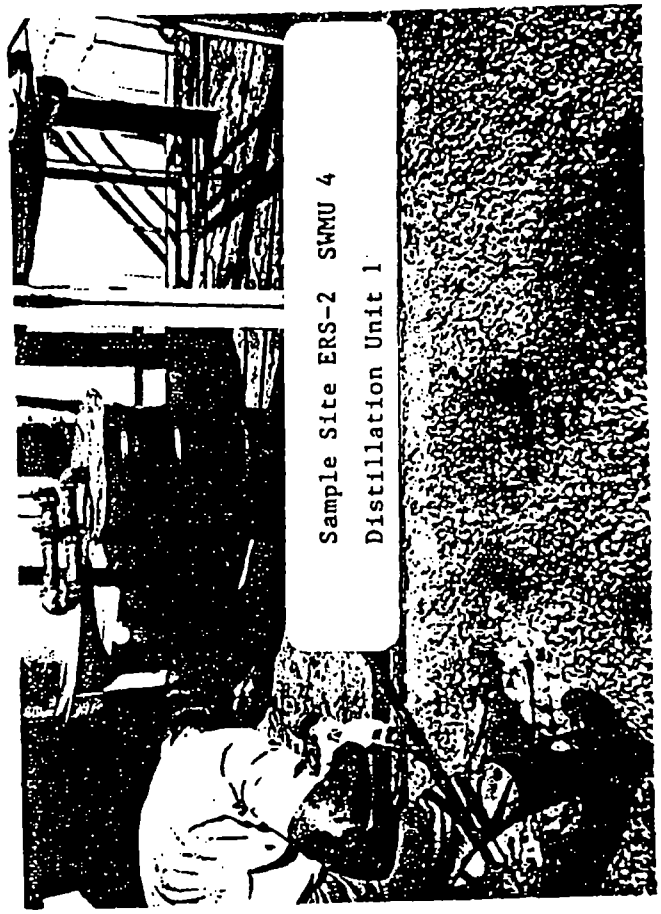
FOOTNOTES
NA - NOT ANALYZED
J - ESTIMATED VALUE
N - PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
-- - MATERIAL WAS ANALYZED FOR BUT NOT DETECTED

APPENDIX A



Sample Site ERS-1 SWMU 9c

Runoff Pipes



Sample Site ERS-2 SWMU 4

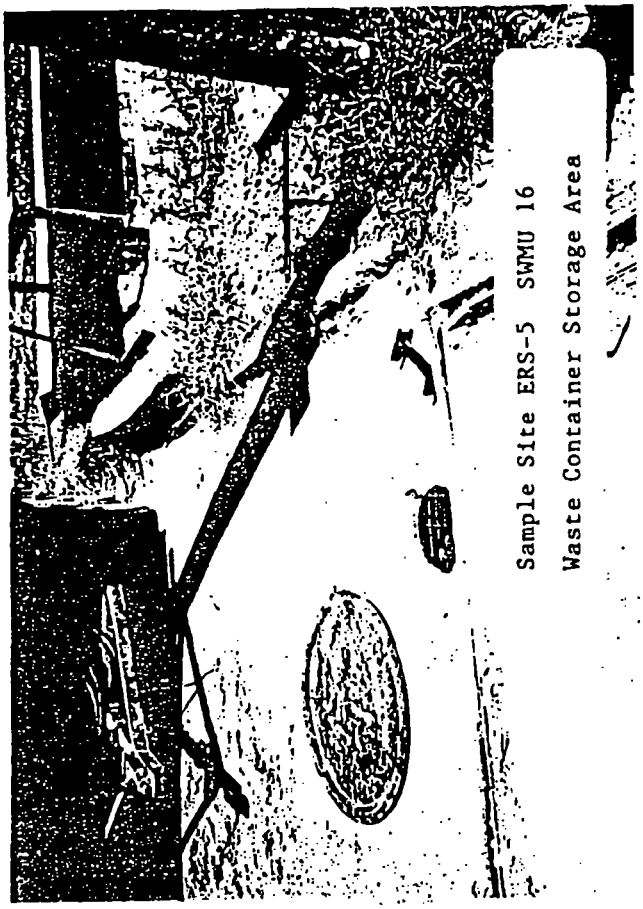
Distillation Unit 1

Sample Site ERS-3 SWMU 9b

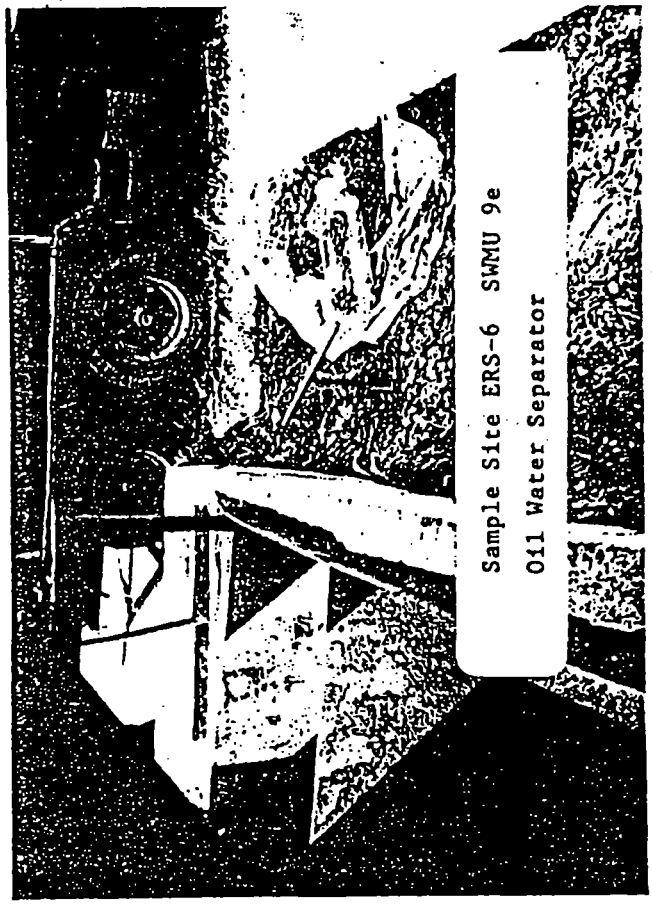
Runoff Ditches

Sample Site ERS-4 SWMU 22 & 5

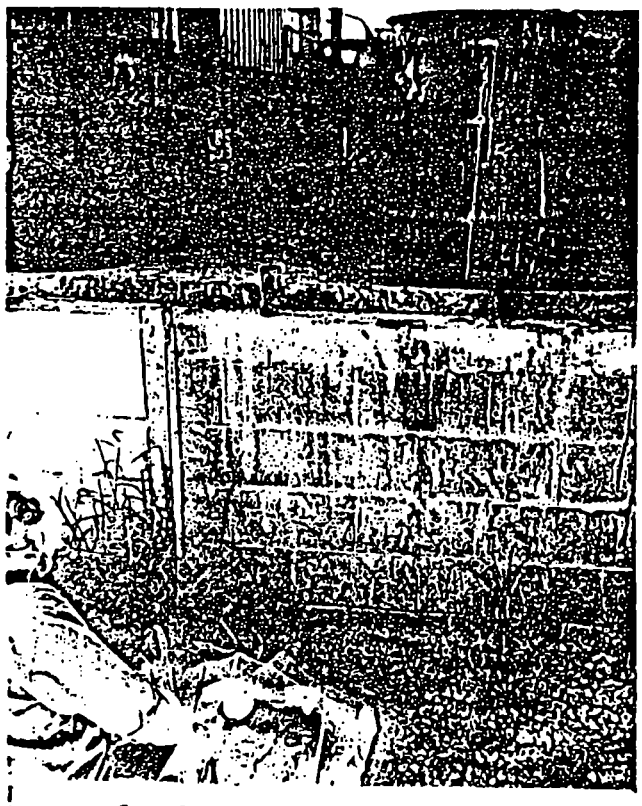
East Grassy Area, Dist. Units 2 & 3



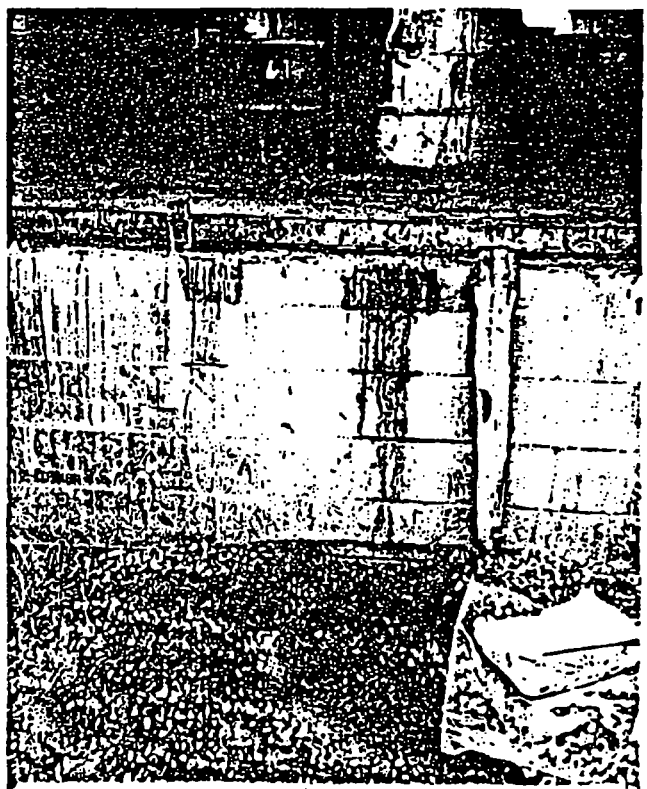
Sample Site ERS-5 SWMU 16
Waste Container Storage Area



Sample Site ERS-6 SWMU 9e
Oil Water Separator



Sample Site ERS-7 SWMU 21
Drum Storage Area



Sample Site ERS-8 SWMU 21
Drum Storage Area

Sample Site ERS-9 SWMU 15

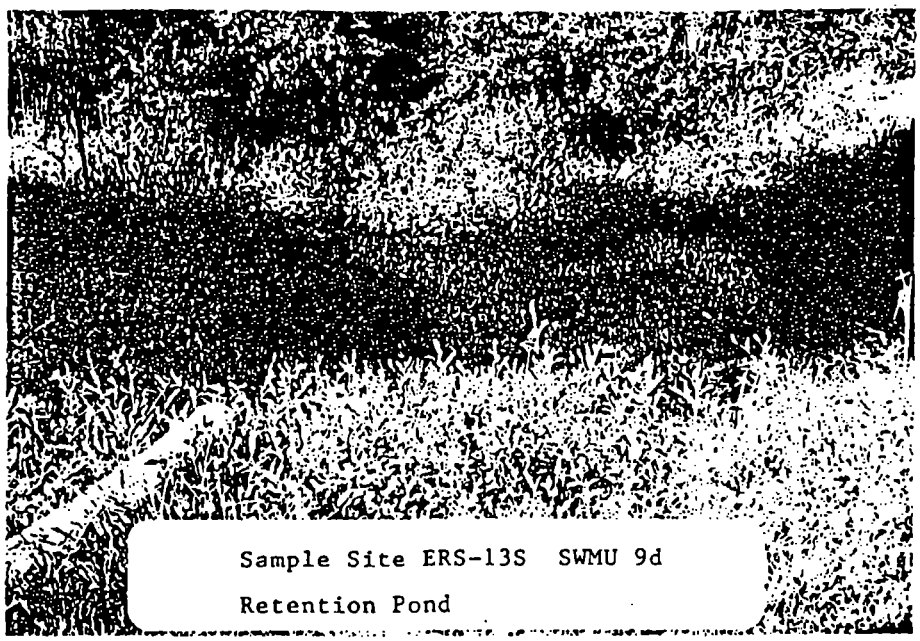
Former Sludge Tank Area

Sample Site ERS-11 SWMU 9f

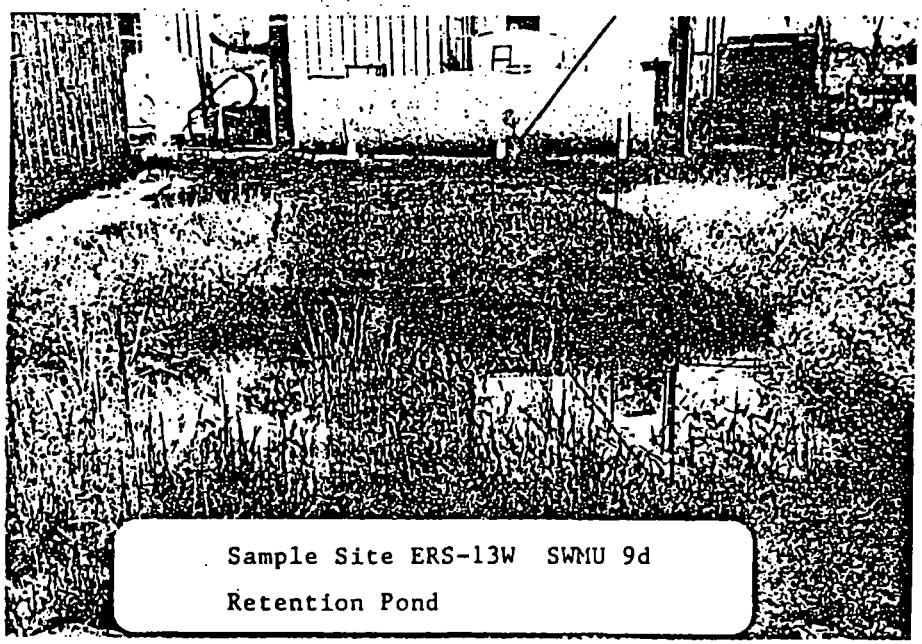
Outfall Ditch

Sample Sites 12 & 12D SWMU 9f

Outfall Ditch



Sample Site ERS-13S SWMU 9d
Retention Pond



Sample Site ERS-13W SWMU 9d
Retention Pond

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50648 SAMPLE TYPE: SEDIMBLK
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-TBS TRIP BLANK

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1630 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS	UG/KG	ANALYTICAL RESULTS
40U	CHLOROMETHANE	40U	CIS-1,3-DICHLOROPROPENE
40U	VINYL CHLORIDE	400U	METHYL ISOBUTYL KETONE
40U	BROMOMETHANE	40U	TOLUENE
40U	CHLOROETHANE	40U	TRANS-1,3-DICHLOROPROPENE
40U	TRICHLOROFLUOROMETHANE	40U	1,1,2-TRICHLOROETHANE
40U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)	40U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
400U	ACETONE	40U	1,3-DICHLOROPROPANE
400U	CARBON DISULFIDE	400U	METHYL BUTYL KETONE
40U	METHYLENE CHLORIDE	40U	DIBROMOCHLOROMETHANE
40U	TRANS-1,2-DICHLOROETHENE	40U	CHLOROBENZENE
40U	1,1-DICHLOROETHANE	40U	1,1,1,2-TETRACHLOROETHANE
400U	VINYL ACETATE	40U	ETHYL BENZENE
40U	CIS-1,2-DICHLOROETHENE	40U	(M- AND/OR P-)XYLENE
40U	2,2-DICHLOROPROPANE	40U	O-XYLENE
400U	METHYL ETHYL KETONE	40U	STYRENE
40U	BROMOCHLOROMETHANE	40U	BROMOFORM
40U	CHLOROFORM	40U	BROMOBENZENE
40U	1,1,1-TRICHLOROETHANE	40U	1,1,2,2-TETRACHLOROETHANE
40U	1,1-DICHLOROPROPENE	40U	1,2,3-TRICHLOROPROPANE
40U	CARBON TETRACHLORIDE	40U	O-CHLOROTOLUENE
40U	1,2-DICHLOROETHANE	40U	P-CHLOROTOLUENE
40U	BENZENE	40U	1,3-DICHLOROBENZENE
40U	TRICHLOROETHENE(TRICHLOROETHYLENE)	40U	1,4-DICHLOROBENZENE
40U	1,2-DICHLOROPROPANE	40U	1,2-DICHLOROBENZENE
40U	DIBROMOMETHANE	10.0	PERCENT MOISTURE
40U	BROMODICHLOROMETHANE		

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/11/90

PROJECT NO. 90-894 SAMPLE NO. 50632 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-1 AT RUNOFF PIPE SWMU 9C

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 0945 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
49U	CHLOROMETHANE
49U	VINYL CHLORIDE
49U	BROMOMETHANE
49U	CHLOROETHANE
49U	TRICHLOROFLUOROMETHANE
49U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
490U	ACETONE
490U	CARBON DISULFIDE
49U	METHYLENE CHLORIDE
49U	TRANS-1,2-DICHLOROETHENE
49U	1,1-DICHLOROETHANE
490U	VINYL ACETATE
8.7J	CIS-1,2-DICHLOROETHENE
49U	2,2-DICHLOROPROPANE
490U	METHYL ETHYL KETONE
49U	BROMOCHLOROMETHANE
49U	CHLOROFORM
49U	1,1,1-TRICHLOROETHANE
49U	1,1-DICHLOROPROPENE
49U	CARBON TETRACHLORIDE
49U	1,2-DICHLOROETHANE
49U	BENZENE
18J	TRICHLOROETHENE(TRICHLOROETHYLENE)
49U	1,2-DICHLOROPROPANE
49U	DIBROMOMETHANE
49U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
49U	CIS-1,3-DICHLOROPROPENE
490U	METHYL ISOBUTYL KETONE
49U	TOLUENE
49U	TRANS-1,3-DICHLOROPROPENE
49U	1,1,2-TRICHLOROETHANE
8.4J	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
49U	1,3-DICHLOROPROPANE
490U	METHYL BUTYL KETONE
49U	DIBROMOCHLOROMETHANE
49U	CHLOROBENZENE
49U	1,1,1,2-TETRACHLOROETHANE
49U	ETHYL BENZENE
49U	(M- AND/OR P-)XYLENE
49U	O-XYLENE
49U	STYRENE
49U	BROMOFORM
49U	BROMOBENZENE
49U	1,1,2,2-TETRACHLOROETHANE
49U	1,2,3-TRICHLOROPROPANE
49U	O-CHLOROTOLUENE
49U	P-CHLOROTOLUENE
49U	1,3-DICHLOROBENZENE
49U	1,4-DICHLOROBENZENE
49U	1,2-DICHLOROBENZENE
14.1	PERCENT MOISTURE

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 10/18/90

** PROJECT NO. 90-894 SAMPLE NO. 50632 SAMPLE TYPE: SOIL PROG ELEM: RCRA COLLECTED BY: B FERGUSON **
** SOURCE: ENTERPRISE REC. SYS. CITY: BYHALIA ST: MS **
** STATION ID: ERS-1 AT RUNOFF PIPE SWMU 9C COLLECTION START: 09/25/90 0945 STOP: 00/00/00 **

UG/KG	ANALYTICAL RESULTS
4000U	BIS(2-CHLOROETHYL) ETHER
4000U	BIS(2-CHLOROISOPROPYL) ETHER
4000U	N-NITROSODI-N PROPYLAMINE
4000U	HEXACHLOROETHANE
4000U	NITROBENZENE
4000U	ISOPHORONE
4000U	BIS(2-CHLOROETHOXY) METHANE
4000U	1,2,4-TRICHLOROBENZENE
4000U	NAPHTHALENE
4000U	4-CHLOROANILINE
4000U	HEXACHLOROBUTADIENE
4000U	2-METHYLNAPHTHALENE
4000U	HEXACHLOROCYCLOPENTADIENE (HCCP)
4000U	2-CHLORONAPHTHALENE
4000U	2-NITROANILINE
4000U	DIMETHYL PHTHALATE
4000U	ACENAPHTHYLENE
4000U	2,6-DINITROTOLUENE
4000U	3-NITROANILINE
4000U	ACENAPHTHENE
4000U	DIBENZOFURAN
4000U	2,4-DINITROTOLUENE
4000U	DIETHYL PHTHALATE
4000U	FLUORENE
4000U	4-CHLOROPHENYL PHENYL ETHER
4000U	4-NITROANILINE
4000U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
4000U	4-BROMOPHENYL PHENYL ETHER
4000U	HEXACHLOROBENZENE (HCB)
4000U	PHENANTHRENE
4000U	ANTHRACENE
4000U	DI-N-BUTYLPHTHALATE

UG/KG	ANALYTICAL RESULTS
4000U	FLUORANTHENE
4000U	PYRENE
4000U	BENZYL BUTYL PHTHALATE
4000U	3,3'-DICHLOROBENZIDINE
4000U	BENZO(A)ANTHRACENE
4000U	CHRYSENE
4000U	BIS(2-ETHYLHEXYL) PHTHALATE
4000U	DI-N-OCTYLPHTHALATE
4000U	BENZO(B AND/OR K)FLUORANTHENE
4000U	BENZO-A-PYRENE
4000U	INDENO (1,2,3-CD) PYRENE
4000U	DIBENZO(A,H)ANTHRACENE
4000U	BENZO(GHI)PERYLENE
4000U	PHENOL
4000U	2-CHLOROPHENOL
8100U	BENZYL ALCOHOL
4000U	2-METHYLPHENOL
4000U	(3-AND/OR 4-)METHYLPHENOL
4000U	2-NITROPHENOL
4000U	2,4-DIMETHYLPHENOL
8100U	BENZOIC ACID
4000U	2,4-DICHLOROPHENOL
4000U	4-CHLORO-3-METHYLPHENOL
4000U	2,4,6 TRICHLOROPHENOL
4000U	2,4,5-TRICHLOROPHENOL
8100U	2,4-DINITROPHENOL
8100U	4-NITROPHENOL
4000U	2,3,4,6-TETRACHLOROPHENOL
8100U	2-METHYL-4,6-DINITROPHENOL
8100U	PENTACHLOROPHENOL
14.1	PERCENT MOISTURE

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

10/18/90

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

** PROJECT NO. 90-894 SAMPLE NO. 50632 SAMPLE TYPE: SOIL PROG ELEM: RCRA COLLECTED BY: B FERGUSON **
** SOURCE: ENTERPRISE REC. SYS. CITY: BYHALIA ST: MS **
** STATION ID: ERS-1 AT RUNOFF PIPE SWMU 9C COLLECTION START: 09/25/90 0945 STOP: 00/00/00 **

ANALYTICAL RESULTS UG/KG

500JN	Chlordane
1000JN	Endrin ketone
1000JN	Endrin
N	Petroleum product

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/17/90

** PROJECT NO. 90-894 SAMPLE NO. 50633 SAMPLE TYPE: SOIL
** SOURCE: ENTERPRISE REC. SYS.
** STATION ID: ERS-2 DIST UNIT 1 SWMU4
** PROG ELEM: RCRA COLLECTED BY: B FERGUSON
** CITY: BYHALIA ST: MS
** COLLECTION START: 09/25/90 1010 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
570U	CHLOROMETHANE
570U	VINYL CHLORIDE
570U	BROMOMETHANE
570U	CHLOROETHANE
570U	TRICHLOROFLUOROMETHANE
570U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
13000J	ACETONE
5700U	CARBON DISULFIDE
570U	METHYLENE CHLORIDE
570U	TRANS-1,2-DICHLOROETHENE
570U	1,1-DICHLOROETHANE
5700U	VINYL ACETATE
1200	CIS-1,2-DICHLOROETHENE
570U	2,2-DICHLOROPROPANE
7700J	METHYL ETHYL KETONE
570U	BROMOCHLOROMETHANE
570U	CHLOROFORM
570U	1,1,1-TRICHLOROETHANE
570U	1,1-DICHLOROPROPENE
570U	CARBON TETRACHLORIDE
570U	1,2-DICHLOROETHANE
570U	BENZENE
3200J	TRICHLOROETHENE(TRICHLOROETHYLENE)
570U	1,2-DICHLOROPROPANE
570U	DIBROMOMETHANE
570U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
570U	CIS-1,3-DICHLOROPROPENE
2000J	METHYL ISOBUTYL KETONE
1300	TOLUENE
570U	TRANS-1,3-DICHLOROPROPENE
570U	1,1,2-TRICHLOROETHANE
280J	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
570U	1,3-DICHLOROPROPANE
5700U	METHYL BUTYL KETONE
570U	DIBROMOCHLOROMETHANE
570U	CHLOROBENZENE
570U	1,1,1,2-TETRACHLOROETHANE
260J	ETHYL BENZENE
1400	(M- AND/OR P-)XYLENE
360J	O-XYLENE
570U	STYRENE
570U	BROMOFORM
570U	BROMOBENZENE
570U	1,1,2,2-TETRACHLOROETHANE
570U	1,2,3-TRICHLOROPROPANE
570U	O-CHLOROTOLUENE
570U	P-CHLOROTOLUENE
570U	1,3-DICHLOROBENZENE
570U	1,4-DICHLOROBENZENE
570U	1,2-DICHLOROBENZENE
11.9	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NA1-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50633 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-2 DIST UNIT 1 SWMU4

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1010 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
28000U	BIS(2-CHLOROETHYL) ETHER
28000U	BIS(2-CHLOROISOPROPYL) ETHER
28000U	N-NITROSODI-N-PROPYLAMINE
28000U	HEXACHLOROETHANE
28000U	NITROBENZENE
28000U	ISOPHORONE
28000U	BIS(2-CHLOROETHOXY) METHANE
28000U	1,2,4-TRICHLOROBENZENE
28000U	NAPHTHALENE
28000U	4-CHLOROANILINE
28000U	HEXACHLOROBUTADIENE
28000U	2-METHYLNAPHTHALENE
28000U	HEXACHLOROCYCLOPENTADIENE (HCCP)
28000U	2-CHLORONAPHTHALENE
28000U	2-NITROANILINE
28000U	DIMETHYL PHTHALATE
28000U	ACENAPHTHYLENE
28000U	2,6-DINITROTOLUENE
28000U	3-NITROANILINE
28000U	ACENAPHTHENE
28000U	DIBENZOFURAN
28000U	2,4-DINITROTOLUENE
28000U	DIETHYL PHTHALATE
28000U	FLUORENE
28000U	4-CHLOROPHENYL PHENYL ETHER
28000U	4-NITROANILINE
28000U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
28000U	4-BROMOPHENYL PHENYL ETHER
28000U	HEXACHLOROBENZENE (HCB)
28000U	PHENANTHRENE
28000U	ANTHRACENE
28000U	DI-N-BUTYLPHTHALATE

UG/KG	ANALYTICAL RESULTS
28000U	FLUORANTHENE
28000U	PYRENE
28000U	BENZYL BUTYL PHTHALATE
28000U	3,3'-DICHLOROBENZIDINE
28000U	BENZO(A)ANTHRACENE
28000U	CHRYSENE
28000U	BIS(2-ETHYLHEXYL) PHTHALATE
28000U	DI-N-OCTYLPHTHALATE
28000U	BENZO(B AND/OR K)FLUORANTHENE
28000U	BENZO-A-PYRENE
28000U	INDENO (1,2,3-CD) PYRENE
28000U	DIBENZO(A,H)ANTHRACENE
28000U	BENZO(GHI)PERYLENE
28000U	PHENOL
28000U	2-CHLOROPHENOL
56000U	BENZYL ALCOHOL
28000U	2-METHYLPHENOL
28000U	(3-AND/OR 4-)METHYLPHENOL
28000U	2-NITROPHENOL
28000U	2,4-DIMETHYLPHENOL
56000U	BENZOIC ACID
28000U	2,4-DICHLOROPHENOL
28000U	4-CHLORO-3-METHYLPHENOL
28000U	2,4,6-TRICHLOROPHENOL
28000U	2,4,5-TRICHLOROPHENOL
56000U	2,4-DINITROPHENOL
56000U	4-NITROPHENOL
28000U	2,3,4,6-TETRACHLOROPHENOL
56000U	2-METHYL-4,6-DINITROPHENOL
56000U	PENTACHLOROPHENOL
11.9	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

10/16/90

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

*** ***
** PROJECT NO. 90-894 SAMPLE NO. 50633 SAMPLE TYPE: SOIL PROG ELEM: RCRA COLLECTED BY: B FERGUSON **
** SOURCE: ENTERPRISE REC. SYS. CITY: BYHALIA ST: MS **
** STATION ID: ERS-2 DIST UNIT 1 SWMU4 COLLECTION START: 09/25/90 1010 STOP: 00/00/00 **
** **
*** ***

ANALYTICAL RESULTS UG/KG

N Petroleum product

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50634 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-3 RUNOFF DITCH SWMU 9B

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1030 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
100U	CHLOROMETHANE
100U	VINYL CHLORIDE
100U	BROMOMETHANE
100U	CHLOROETHANE
100U	TRICHLOROFLUOROMETHANE
100U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
1000U	ACETONE
1000U	CARBON DISULFIDE
100U	METHYLENE CHLORIDE
100U	TRANS-1,2-DICHLOROETHENE
31J	1,1-DICHLOROETHANE
1000U	VINYL ACETATE
580	CIS-1,2-DICHLOROETHENE
100U	2,2-DICHLOROPROPANE
1000U	METHYL ETHYL KETONE
100U	BROMOCHLOROMETHANE
100U	CHLOROFORM
25000J	1,1,1-TRICHLOROETHANE
100U	1,1-DICHLOROPROPENE
100U	CARBON TETRACHLORIDE
100U	1,2-DICHLOROETHANE
100U	BENZENE
2400	TRICHLOROETHENE(TRICHLOROETHYLENE)
100U	1,2-DICHLOROPROPANE
100U	DIBROMOMETHANE
100U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
100U	CIS-1,3-DICHLOROPROPENE
1000U	METHYL ISOBUTYL KETONE
100U	TOLUENE
100U	TRANS-1,3-DICHLOROPROPENE
100U	1,1,2-TRICHLOROETHANE
3600J	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
100U	1,3-DICHLOROPROPANE
1000U	METHYL BUTYL KETONE
100U	DIBROMOCHLOROMETHANE
100U	CHLOROBENZENE
100U	1,1,1,2-TETRACHLOROETHANE
100U	ETHYL BENZENE
100U	(M- AND/OR P-)XYLENE
100U	O-XYLENE
100U	STYRENE
100U	BROMOFORM
100U	BROMOBENZENE
100U	1,1,2,2-TETRACHLOROETHANE
100U	1,2,3-TRICHLOROPROPANE
100U	O-CHLOROTOLUENE
100U	P-CHLOROTOLUENE
100U	1,3-DICHLOROBENZENE
100U	1,4-DICHLOROBENZENE
100U	1,2-DICHLOROBENZENE
19.4	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 10/16/90

** PROJECT NO. 90-894 SAMPLE NO. 50634 SAMPLE TYPE: SOIL PROG ELEM: RCRA COLLECTED BY: B FERGUSON
** SOURCE: ENTERPRISE REC. SYS. CITY: BYHALIA ST: MS
** STATION ID: ERS-3 RUNOFF DITCH SWMU 98 COLLECTION START: 09/25/90 1030 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
28000U	BIS(2-CHLOROETHYL) ETHER
28000U	BIS(2-CHLOROISOPROPYL) ETHER
28000U	N-NITROSODI-N-PROPYLAMINE
28000U	HEXACHLOROETHANE
28000U	NITROBENZENE
28000U	ISOPHORONE
28000U	BIS(2-CHLOROETHOXY) METHANE
28000U	1,2,4-TRICHLOROBENZENE
28000U	NAPHTHALENE
28000U	4-CHLOROANILINE
28000U	HEXACHLOROBUTADIENE
28000U	2-METHYLNAPHTHALENE
28000U	HEXACHLOROCYCLOPENTADIENE (HCCP)
28000U	2-CHLORONAPHTHALENE
28000U	2-NITROANILINE
28000U	DIMETHYL PHTHALATE
28000U	ACENAPHTHYLENE
28000U	2,6-DINITROTOLUENE
28000U	3-NITROANILINE
28000U	ACENAPHTHENE
28000U	DIBENZOFURAN
28000U	2,4-DINITROTOLUENE
28000U	DIETHYL PHTHALATE
28000U	FLUORENE
28000U	4-CHLOROPHENYL PHENYL ETHER
28000U	4-NITROANILINE
28000U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
28000U	4-BROMOPHENYL PHENYL ETHER
28000U	HEXACHLOROBENZENE (HCB)
28000U	PHENANTHRENE
28000U	ANTHRACENE
28000U	DI-N-BUTYLPHTHALATE

UG/KG	ANALYTICAL RESULTS
28000U	FLUORANTHENE
28000U	PYRENE
28000U	BENZYL BUTYL PHTHALATE
28000U	3,3'-DICHLOROBENZIDINE
28000U	BENZO(A)ANTHRACENE
28000U	CHRYSENE
28000U	BIS(2-ETHYLHEXYL) PHTHALATE
28000U	DI-N-OCTYLPHTHALATE
28000U	BENZO(B AND/OR K)FLUORANTHENE
28000U	BENZO-A-PYRENE
28000U	INDENO (1,2,3-CD) PYRENE
28000U	DIBENZO(A,H)ANTHRACENE
28000U	BENZO(GHI)PERYLENE
28000U	PHENOL
28000U	2-CHLOROPHENOL
55000U	BENZYL ALCOHOL
28000U	2-METHYLPHENOL
28000U	(3-AND/OR 4-)METHYLPHENOL
28000U	2-NITROPHENOL
28000U	2,4-DIMETHYLPHENOL
55000U	BENZOIC ACID
28000U	2,4-DICHLOROPHENOL
28000U	4-CHLORO-3-METHYLPHENOL
28000U	2,4,6-TRICHLOROPHENOL
28000U	2,4,5-TRICHLOROPHENOL
55000U	2,4-DINITROPHENOL
55000U	4-NITROPHENOL
28000U	2,3,4,6-TETRACHLOROPHENOL
55000U	2-METHYL-4,6-DINITROPHENOL
55000U	PENTACHLOROPHENOL
19.4	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

10/16/90

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 90-894 SAMPLE NO. 50634 SAMPLE TYPE: SOIL PROG ELEM: RCRA COLLECTED BY: B FERGUSON
SOURCE: ENTERPRISE REC. SYS. CITY: BYHALIA ST: MS
STATION ID: ERS-3 RUNOFF DITCH SWMU 9B COLLECTION START: 09/25/90 1030 STOP: 00/00/00

ANALYTICAL RESULTS UG/KG

N Petroleum product

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/11/90

PROJECT NO. 90-894 SAMPLE NO. 50635 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-4 E. GRASSY AREA SWMU 22

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1055 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS	UG/KG	ANALYTICAL RESULTS
46U	CHLOROMETHANE	46U	CIS-1,3-DICHLOROPROPENE
46U	VINYL CHLORIDE	460U	METHYL ISOBUTYL KETONE
46U	BROMOMETHANE	46U	TOLUENE
46U	CHLOROETHANE	46U	TRANS-1,3-DICHLOROPROPENE
46U	TRICHLOROFLUOROMETHANE	46U	1,1,2-TRICHLOROETHANE
46U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)	10.0J	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
460U	ACETONE	46U	1,3-DICHLOROPROPANE
460U	CARBON DISULFIDE	460U	METHYL BUTYL KETONE
46U	METHYLENE CHLORIDE	46U	DIBROMOCHLOROMETHANE
46U	TRANS-1,2-DICHLOROETHENE	46U	CHLOROBENZENE
46U	1,1-DICHLOROETHANE	46U	1,1,1,2-TETRACHLOROETHANE
460U	VINYL ACETATE	46U	ETHYL BENZENE
46U	CIS-1,2-DICHLOROETHENE	46U	(M- AND/OR P-)XYLENE
46U	2,2-DICHLOROPROPANE	46U	O-XYLENE
460U	METHYL ETHYL KETONE	46U	STYRENE
46U	BROMOCHLOROMETHANE	46U	BROMOFORM
46U	CHLOROFORM	46U	BROMOBENZENE
46U	1,1,1-TRICHLOROETHANE	46U	1,1,2,2-TETRACHLOROETHANE
46U	1,1-DICHLOROPROPENE	46U	1,2,3-TRICHLOROPROPANE
46U	CARBON TETRACHLORIDE	46U	O-CHLOROTOLUENE
46U	1,2-DICHLOROETHANE	46U	P-CHLOROTOLUENE
46U	BENZENE	46U	1,3-DICHLOROBENZENE
46U	TRICHLOROETHENE(TRICHLOROETHYLENE)	46U	1,4-DICHLOROBENZENE
46U	1,2-DICHLOROPROPANE	46U	1,2-DICHLOROBENZENE
46U	DIBROMOMETHANE	9.9	PERCENT MOISTURE
46U	BROMODICHLOROMETHANE		

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50635 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-4 E. GRASSY AREA SWMU 22

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1055 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
7000U	BIS(2-CHLOROETHYL) ETHER
7000U	BIS(2-CHLOROISOPROPYL) ETHER
7000U	N-NITROSODI-N-PROPYLAMINE
7000U	HEXACHLOROETHANE
7000U	NITROBENZENE
7000U	ISOPHORONE
7000U	BIS(2-CHLOROETHOXY) METHANE
7000U	1,2,4-TRICHLOROBENZENE
7000U	NAPHTHALENE
7000U	4-CHLOROANILINE
7000U	HEXACHLOROBUTADIENE
7000U	2-METHYLNAPHTHALENE
7000U	HEXACHLOROCYCLOPENTADIENE (HCCP)
7000U	2-CHLORONAPHTHALENE
7000U	2-NITROANILINE
7000U	DIMETHYL PHTHALATE
7000U	ACENAPHTHYLENE
7000U	2,6-DINITROTOLUENE
7000U	3-NITROANILINE
7000U	ACENAPHTHENE
7000U	DIBENZOFURAN
7000U	2,4-DINITROTOLUENE
7000U	DIETHYL PHTHALATE
7000U	FLUORENE
7000U	4-CHLOROPHENYL PHENYL ETHER
7000U	4-NITROANILINE
7000U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
7000U	4-BROMOPHENYL PHENYL ETHER
7000U	HEXACHLOROBENZENE (HCB)
7000U	PHENANTHRENE
7000U	ANTHRACENE
7000U	DI-N-BUTYLPHTHALATE

UG/KG	ANALYTICAL RESULTS
7000U	FLUORANTHENE
7000U	PYRENE
7000U	BENZYL BUTYL PHTHALATE
7000U	3,3'-DICHLOROBENZIDINE
7000U	BENZO(A)ANTHRACENE
7000U	CHRYSENE
7000U	BIS(2-ETHYLHEXYL) PHTHALATE
7000U	DI-N-OCTYLPHTHALATE
7000U	BENZO(B AND/OR K)FLUORANTHENE
7000U	BENZO-A-PYRENE
7000U	INDENO (1,2,3-CD) PYRENE
7000U	DIBENZO(A,H)ANTHRACENE
7000U	BENZO(GHI)PERYLENE
7000U	PHENOL
7000U	2-CHLOROPHENOL
14000U	BENZYL ALCOHOL
7000U	2-METHYLPHENOL
7000U	(3-AND/OR 4-)METHYLPHENOL
7000U	2-NITROPHENOL
7000U	2,4-DIMETHYLPHENOL
14000U	BENZOIC ACID
7000U	2,4-DICHLOROPHENOL
7000U	4-CHLORO-3-METHYLPHENOL
7000U	2,4,6-TRICHLOROPHENOL
7000U	2,4,5-TRICHLOROPHENOL
14000U	2,4-DINITROPHENOL
14000U	4-NITROPHENOL
7000U	2,3,4,6-TETRACHLOROPHENOL
14000U	2-METHYL-4,6-DINITROPHENOL
14000U	PENTACHLOROPHENOL
9.9	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA. 10/16/90

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 90-894 SAMPLE NO. 50635 SAMPLE TYPE: SOIL PROG ELEM: RCRA COLLECTED BY: B FERGUSON
SOURCE: ENTERPRISE REC. SYS. CITY: BYHALIA ST: MS
STATION ID: ERS-4 E. GRASSY AREA SWMU 22 COLLECTION START: 09/25/90 1055 STOP: 00/00/00

ANALYTICAL RESULTS UG/KG

N Petroleum product

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/11/90

PROJECT NO. 90-894 SAMPLE NO. 50636 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-5 WASTE CONT. STOR. SWMU 16

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1130 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
50U	CHLOROMETHANE
50U	VINYL CHLORIDE
50U	BROMOMETHANE
50U	CHLOROETHANE
50U	TRICHLOROFLUOROMETHANE
50U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
320J	ACETONE
500U	CARBON DISULFIDE
50U	METHYLENE CHLORIDE
50U	TRANS-1,2-DICHLOROETHENE
50U	1,1-DICHLOROETHANE
500U	VINYL ACETATE
5.9J	CIS-1,2-DICHLOROETHENE
50U	2,2-DICHLOROPROPANE
53J	METHYL ETHYL KETONE
50U	BROMOCHLOROMETHANE
50U	CHLOROFORM
50U	1,1,1-TRICHLOROETHANE
50U	1,1-DICHLOROPROPENE
50U	CARBON TETRACHLORIDE
50U	1,2-DICHLOROETHANE
50U	BENZENE
50U	TRICHLOROETHENE(TRICHLOROETHYLENE)
50U	1,2-DICHLOROPROPANE
50U	DIBROMOMETHANE
50U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
50U	CIS-1,3-DICHLOROPROPENE
500U	METHYL ISOBUTYL KETONE
50U	TOLUENE
50U	TRANS-1,3-DICHLOROPROPENE
50U	1,1,2-TRICHLOROETHANE
50U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
50U	1,3-DICHLOROPROPANE
500U	METHYL BUTYL KETONE
50U	DIBROMOCHLOROMETHANE
50U	CHLOROBENZENE
50U	1,1,1,2-TETRACHLOROETHANE
50U	ETHYL BENZENE
50U	(M- AND/OR P-)XYLENE
50U	O-XYLENE
50U	STYRENE
50U	BROMOFORM
50U	BROMOBENZENE
50U	1,1,2,2-TETRACHLOROETHANE
50U	1,2,3-TRICHLOROPROPANE
50U	O-CHLOROTOLUENE
50U	P-CHLOROTOLUENE
50U	1,3-DICHLOROBENZENE
50U	1,4-DICHLOROBENZENE
50U	1,2-DICHLOROBENZENE
17.2	PERCENT MOISTURE

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD. ATHENS. GA.

EXTRACTABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50636 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-5 WASTE CONT. STOR. SWMU 16

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1130 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
790U	BIS(2-CHLOROETHYL) ETHER
790U	BIS(2-CHLOROISOPROPYL) ETHER
790U	N-NITROSODI-N-PROPYLAMINE
790U	HEXACHLOROETHANE
790U	NITROBENZENE
790U	ISOPHORONE
790U	BIS(2-CHLOROETHOXY) METHANE
790U	1,2,4-TRICHLOROBENZENE
790U	NAPHTHALENE
790U	4-CHLOROANILINE
790U	HEXACHLOROBUTADIENE
790U	2-METHYLNAPHTHALENE
790U	HEXACHLOROCYCLOPENTADIENE (HCCP)
790U	2-CHLORONAPHTHALENE
790U	2-NITROANILINE
790U	DIMETHYL PHTHALATE
790U	ACENAPHTHYLENE
790U	2,6-DINITROTOLUENE
790U	3-NITROANILINE
790U	ACENAPHTHENE
790U	DIBENZOFURAN
790U	2,4-DINITROTOLUENE
790U	DIETHYL PHTHALATE
790U	FLUORENE
790U	4-CHLOROPHENYL PHENYL ETHER
790U	4-NITROANILINE
790U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
790U	4-BROMOPHENYL PHENYL ETHER
790U	HEXACHLOROBENZENE (HCB)
790U	PHENANTHRENE
790U	ANTHRACENE
790U	DI-N-BUTYLPHTHALATE

UG/KG	ANALYTICAL RESULTS
790U	FLUORANTHENE
790U	PYRENE
790U	BENZYL BUTYL PHTHALATE
790U	3,3'-DICHLOROBENZIDINE
790U	BENZO(A)ANTHRACENE
790U	CHRYSENE
790U	BIS(2-ETHYLHEXYL) PHTHALATE
790U	DI-N-OCTYLPHTHALATE
790U	BENZO(B AND/OR K)FLUORANTHENE
790U	BENZO-A-PYRENE
790U	INDENO (1,2,3-CD) PYRENE
790U	DIBENZO(A,H)ANTHRACENE
790U	BENZO(GHI)PERYLENE
360J	PHENOL
790U	2-CHLOROPHENOL
1600U	BENZYL ALCOHOL
170J	2-METHYLPHENOL
410J	(3-AND/OR 4-)METHYLPHENOL
790U	2-NITROPHENOL
790U	2,4-DIMETHYLPHENOL
470J	BENZOIC ACID
790U	2,4-DICHLOROPHENOL
790U	4-CHLORO-3-METHYLPHENOL
790U	2,4,6-TRICHLOROPHENOL
790U	2,4,5-TRICHLOROPHENOL
1600U	2,4-DINITROPHENOL
1600U	4-NITROPHENOL
790U	2,3,4,6-TETRACHLOROPHENOL
1600U	2-METHYL-4,6-DINITROPHENOL
1600U	PENTACHLOROPHENOL
17.2	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD. ATHENS. GA.

10/16/90

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 90-894 SAMPLE NO. 50636 SAMPLE TYPE: SOIL
PROG ELEM: RCRA COLLECTED BY: B FERGUSON
SOURCE: ENTERPRISE REC. SYS.
CITY: BYHALIA ST: MS
STATION ID: ERS-5 WASTE CONT. STOR. SWMU 16
COLLECTION START: 09/25/90 1130 STOP: 00/00/00

ANALYTICAL RESULTS UG/KG

800JN	Methylpyrrlidinone
400JN	(Tetramethylbutyl)phenol
100JN	Dihydrotrimethylphenylindene

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/11/90

PROJECT NO. 90-894 SAMPLE NO. 50637 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-6 OIL WATER SEP SWMU 9E

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1205 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
54U	CHLOROMETHANE
54U	VINYL CHLORIDE
54U	BROMOMETHANE
54U	CHLOROETHANE
54U	TRICHLOROFLUOROMETHANE
54U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
540U	ACETONE
540U	CARBON DISULFIDE
54U	METHYLENE CHLORIDE
54U	TRANS-1,2-DICHLOROETHENE
54U	1,1-DICHLOROETHANE
540U	VINYL ACETATE
54U	CIS-1,2-DICHLOROETHENE
54U	2,2-DICHLOROPROPANE
540U	METHYL ETHYL KETONE
54U	BROMOCHLOROMETHANE
54U	CHLOROFORM
54U	1,1,1-TRICHLOROETHANE
54U	1,1-DICHLOROPROPENE
54U	CARBON TETRACHLORIDE
54U	1,2-DICHLOROETHANE
54U	BENZENE
9.5J	TRICHLOROETHENE(TRICHLOROETHYLENE)
54U	1,2-DICHLOROPROPANE
54U	DIBROMOMETHANE
54U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
54U	CIS-1,3-DICHLOROPROPENE
540U	METHYL ISOBUTYL KETONE
54U	TOLUENE
54U	TRANS-1,3-DICHLOROPROPENE
54U	1,1,2-TRICHLOROETHANE
54U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
54U	1,3-DICHLOROPROPANE
540U	METHYL BUTYL KETONE
54U	DIBROMOCHLOROMETHANE
54U	CHLOROBENZENE
54U	1,1,1,2-TETRACHLOROETHANE
54U	ETHYL BENZENE
54U	(M- AND/OR P-)XYLENE
54U	O-XYLENE
54U	STYRENE
54U	BROMOFORM
54U	BROMOBENZENE
54U	1,1,2,2-TETRACHLOROETHANE
54U	1,2,3-TRICHLOROPROPANE
54U	O-CHLOROTOLUENE
54U	P-CHLOROTOLUENE
54U	1,3-DICHLOROBENZENE
54U	1,4-DICHLOROBENZENE
54U	1,2-DICHLOROBENZENE
23.0	PERCENT MOISTURE

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50637 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-6 OIL WATER SEP SWMU 9E

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1205 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
780U	BIS(2-CHLOROETHYL) ETHER
780U	BIS(2-CHLOROISOPROPYL) ETHER
780U	N-NITROSODI-N-PROPYLAMINE
780U	HEXACHLOROETHANE
780U	NITROBENZENE
780U	ISOPHORONE
780U	BIS(2-CHLOROETHOXY) METHANE
780U	1,2,4-TRICHLOROBENZENE
780U	NAPHTHALENE
780U	4-CHLOROANILINE
780U	HEXACHLOROBUTADIENE
780U	2-METHYLNAPHTHALENE
780U	HEXACHLOROCYCLOPENTADIENE (HCCP)
780U	2-CHLORONAPHTHALENE
780U	2-NITROANILINE
780U	DIMETHYL PHTHALATE
780U	ACENAPHTHYLENE
780U	2,6-DINITROTOLUENE
780U	3-NITROANILINE
780U	ACENAPHTHENE
780U	DIBENZOFURAN
780U	2,4-DINITROTOLUENE
780U	DIETHYL PHTHALATE
780U	FLUORENE
780U	4-CHLOROPHENYL PHENYL ETHER
780U	4-NITROANILINE
780U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
780U	4-BROMOPHENYL PHENYL ETHER
780U	HEXACHLOROBENZENE (HCB)
780U	PHENANTHRENE
780U	ANTHRACENE
780U	DI-N-BUTYLPHTHALATE

UG/KG	ANALYTICAL RESULTS
780U	FLUORANTHENE
780U	PYRENE
4300	BENZYL BUTYL PHTHALATE
780U	3,3'-DICHLOROBENZIDINE
780U	BENZO(A)ANTHRACENE
780U	CHRYSENE
3700	BIS(2-ETHYLHEXYL) PHTHALATE
780U	DI-N-OCTYLPHTHALATE
780U	BENZO(B AND/OR K)FLUORANTHENE
780U	BENZO-A-PYRENE
780U	INDENO (1,2,3-CD) PYRENE
780U	DIBENZO(A,H)ANTHRACENE
780U	BENZO(GHI)PERYLENE
780U	PHENOL
780U	2-CHLOROPHENOL
1600U	BENZYL ALCOHOL
780U	2-METHYLPHENOL
780U	(3-AND/OR 4-)METHYLPHENOL
780U	2-NITROPHENOL
780U	2,4-DIMETHYLPHENOL
1600U	BENZOIC ACID
780U	2,4-DICHLOROPHENOL
780U	4-CHLORO-3-METHYLPHENOL
780U	2,4,6-TRICHLOROPHENOL
780U	2,4,5-TRICHLOROPHENOL
1600U	2,4-DINITROPHENOL
1600U	4-NITROPHENOL
780U	2,3,4,6-TETRACHLOROPHENOL
1600U	2-METHYL-4,6-DINITROPHENOL
1600U	PENTACHLOROPHENOL
23.0	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.   10/16/90

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

*** ***

** PROJECT NO. 90-894 SAMPLE NO. 50637 SAMPLE TYPE: SOIL PROG ELEM: RCRA COLLECTED BY: B FERGUSON **
** SOURCE: ENTERPRISE REC. SYS. CITY: BYHALIA ST: MS **
** STATION ID: ERS-6 OIL WATER SEP SWMU 9E COLLECTION START: 09/25/90 1205 STOP: 00/00/00 **

*** ***

ANALYTICAL RESULTS UG/KG

700JN Dihydrotrimethylphenylindene (2-isomers)

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50638 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-7 DURM STOR. AREA SWMU 21

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1330 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
45U	CHLOROMETHANE
45U	VINYL CHLORIDE
45U	BROMOMETHANE
45U	CHLOROETHANE
45U	TRICHLOROFLUOROMETHANE
45U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
450U	ACETONE
450U	CARBON DISULFIDE
90U	METHYLENE CHLORIDE
45U	TRANS-1,2-DICHLOROETHENE
45U	1,1-DICHLOROETHANE
450U	VINYL ACETATE
5.8J	CIS-1,2-DICHLOROETHENE
45U	2,2-DICHLOROPROPANE
450U	METHYL ETHYL KETONE
45U	BROMOCHLOROMETHANE
45U	CHLOROFORM
5.4J	1,1,1-TRICHLOROETHANE
45U	1,1-DICHLOROPROPENE
45U	CARBON TETRACHLORIDE
45U	1,2-DICHLOROETHANE
45U	BENZENE
10J	TRICHLOROETHENE(TRICHLOROETHYLENE)
45U	1,2-DICHLOROPROPANE
45U	DIBROMOMETHANE
45U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
45U	CIS-1,3-DICHLOROPROPENE
450U	METHYL ISOBUTYL KETONE
45U	TOLUENE
45U	TRANS-1,3-DICHLOROPROPENE
45U	1,1,2-TRICHLOROETHANE
45U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
45U	1,3-DICHLOROPROPANE
450U	METHYL BUTYL KETONE
45U	DIBROMOCHLOROMETHANE
45U	CHLOROBENZENE
45U	1,1,1,2-TETRACHLOROETHANE
45U	ETHYL BENZENE
45U	(M- AND/OR P-)XYLENE
45U	O-XYLENE
45U	STYRENE
45U	BROMOFORM
45U	BROMOBENZENE
45U	1,1,2,2-TETRACHLOROETHANE
45U	1,2,3-TRICHLOROPROPANE
45U	O-CHLOROTOLUENE
45U	P-CHLOROTOLUENE
45U	1,3-DICHLOROBENZENE
45U	1,4-DICHLOROBENZENE
45U	1,2-DICHLOROBENZENE
6.5	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

10/16/90

EXTRACTABLE ORGANICS DATA REPORT

PROJECT NO. 90-894 SAMPLE NO. 50638 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-7 DURM STOR. AREA SWMU 21

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1330 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
13000U	BIS(2-CHLOROETHYL) ETHER
13000U	BIS(2-CHLOROISOPROPYL) ETHER
13000U	N-NITROSODI-N-PROPYLAMINE
13000U	HEXACHLOROETHANE
13000U	NITROBENZENE
13000U	ISOPHORONE
13000U	BIS(2-CHLOROETHOXY) METHANE
13000U	1,2,4-TRICHLOROBENZENE
13000U	NAPHTHALENE
13000U	4-CHLOROANILINE
13000U	HEXACHLOROBUTADIENE
13000U	2-METHYLNAPHTHALENE
13000U	HEXACHLOROCYCLOPENTADIENE (HCCP)
13000U	2-CHLORONAPHTHALENE
13000U	2-NITROANILINE
13000U	DIMETHYL PHTHALATE
13000U	ACENAPHTHYLENE
13000U	2,6-DINITROTOLUENE
13000U	3-NITROANILINE
13000U	ACENAPHTHENE
13000U	DIBENZOFURAN
13000U	2,4-DINITROTOLUENE
13000U	DIETHYL PHTHALATE
13000U	FLUORENE
13000U	4-CHLOROPHENYL PHENYL ETHER
13000U	4-NITROANILINE
13000U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
13000U	4-BROMOPHENYL PHENYL ETHER
13000U	HEXACHLOROBENZENE (HCB)
13000U	PHENANTHRENE
13000U	ANTHRACENE
13000U	DI-N-BUTYLPHTHALATE

REMARKS

UG/KG	ANALYTICAL RESULTS
13000U	FLUORANTHENE
13000U	PYRENE
13000U	BENZYL BUTYL PHTHALATE
13000U	3,3'-DICHLOROBENZIDINE
13000U	BENZO(A)ANTHRACENE
13000U	CHRYSENE
13000U	BIS(2-ETHYLHEXYL) PHTHALATE
13000U	DI-N-OCTYLPHTHALATE
13000U	BENZO(B AND/OR K)FLUORANTHENE
13000U	BENZO-A-PYRENE
13000U	INDENO (1,2,3-CD) PYRENE
13000U	DIBENZO(A,H)ANTHRACENE
13000U	BENZO(GHI)PERYLENE
13000U	PHENOL
13000U	2-CHLOROPHENOL
26000U	BENZYL ALCOHOL
13000U	2-METHYLPHENOL
13000U	(3-AND/OR 4-)METHYLPHENOL
13000U	2-NITROPHENOL
13000U	2,4-DIMETHYLPHENOL
26000U	BENZOIC ACID
13000U	2,4-DICHLOROPHENOL
13000U	4-CHLORO-3-METHYLPHENOL
13000U	2,4,6-TRICHLOROPHENOL
13000U	2,4,5-TRICHLOROPHENOL
26000U	2,4-DINITROPHENOL
26000U	4-NITROPHENOL
13000U	2,3,4,6-TETRACHLOROPHENOL
26000U	2-METHYL-4,6-DINITROPHENOL
26000U	PENTACHLOROPHENOL
6.5	PERCENT MOISTURE

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

10/16/90

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 90-894 SAMPLE NO. 50638 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-7 DURM STOR. AREA SWMU 21

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1330 STOP: 00/00/00

ANALYTICAL RESULTS UG/KG

N Petroleum product

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/11/90

PROJECT NO. 90-894 SAMPLE NO. 50639 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-8 DRUM STOR. AREA SWMU 21

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1350 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS	UG/KG	ANALYTICAL RESULTS
46U	CHLOROMETHANE	46U	CIS-1,3-DICHLOROPROPENE
46U	VINYL CHLORIDE	460U	METHYL ISOBUTYL KETONE
46U	BROMOMETHANE	46U	TOLUENE
46U	CHLOROETHANE	46U	TRANS-1,3-DICHLOROPROPENE
46U	TRICHLOROFLUOROMETHANE	46U	1,1,2-TRICHLOROETHANE
46U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)	46U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
460U	ACETONE	46U	1,3-DICHLOROPROPANE
460U	CARBON DISULFIDE	460U	METHYL BUTYL KETONE
46U	METHYLENE CHLORIDE	46U	DIBROMOCHLOROMETHANE
46U	TRANS-1,2-DICHLOROETHENE	46U	CHLOROBENZENE
46U	1,1-DICHLOROETHANE	46U	1,1,1,2-TETRACHLOROETHANE
460U	VINYL ACETATE	46U	ETHYL BENZENE
4.7J	CIS-1,2-DICHLOROETHENE	46U	(M- AND/OR P-)XYLENE
46U	2,2-DICHLOROPROPANE	46U	O-XYLENE
460U	METHYL ETHYL KETONE	46U	STYRENE
46U	BROMOCHLOROMETHANE	46U	BROMOFORM
46U	CHLOROFORM	46U	BROMOBENZENE
46U	1,1,1-TRICHLOROETHANE	46U	1,1,2,2-TETRACHLOROETHANE
46U	1,1-DICHLOROPROPENE	46U	1,2,3-TRICHLOROPROPANE
46U	CARBON TETRACHLORIDE	46U	O-CHLOROTOLUENE
46U	1,2-DICHLOROETHANE	46U	P-CHLOROTOLUENE
46U	BENZENE	46U	1,3-DICHLOROBENZENE
46U	TRICHLOROETHENE(TRICHLOROETHYLENE)	46U	1,4-DICHLOROBENZENE
46U	1,2-DICHLOROPROPANE	46U	1,2-DICHLOROBENZENE
46U	DIBROMOMETHANE	15.6	PERCENT MOISTURE
46U	BROMODICHLOROMETHANE		

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD. ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50639 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-8 DRUM STOR. AREA SWMU 21

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1350 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
810U	BIS(2-CHLOROETHYL) ETHER
810U	BIS(2-CHLOROISOPROPYL) ETHER
810U	N-NITROSODI-N-PROPYLAMINE
810U	HEXACHLOROETHANE
810U	NITROBENZENE
810U	ISOPHORONE
810U	BIS(2-CHLOROETHOXY) METHANE
810U	1,2,4-TRICHLOROBENZENE
810U	NAPHTHALENE
810U	4-CHLOROANILINE
810U	HEXACHLOROBUTADIENE
810U	2-METHYLNAPHTHALENE
810U	HEXACHLOROCYCLOPENTADIENE (HCCP)
810U	2-CHLORONAPHTHALENE
810U	2-NITROANILINE
810U	DIMETHYL PHTHALATE
810U	ACENAPHTHYLENE
810U	2,6-DINITROTOLUENE
810U	3-NITROANILINE
810U	ACENAPHTHENE
810U	DIBENZOFURAN
810U	2,4-DINITROTOLUENE
810U	DIETHYL PHTHALATE
810U	FLUORENE
810U	4-CHLOROPHENYL PHENYL ETHER
810U	4-NITROANILINE
810U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
810U	4-BROMOPHENYL PHENYL ETHER
810U	HEXACHLOROBENZENE (HCB)
810U	PHENANTHRENE
810U	ANTHRACENE
810U	DI-N-BUTYLPHTHALATE

UG/KG	ANALYTICAL RESULTS
810U	FLUORANTHENE
810U	PYRENE
810U	BENZYL BUTYL PHTHALATE
810U	3,3'-DICHLOROBENZIDINE
810U	BENZO(A)ANTHRACENE
810U	CHRYSENE
810U	BIS(2-ETHYLHEXYL) PHTHALATE
810U	DI-N-OCTYLPHTHALATE
810U	BENZO(B AND/OR K)FLUORANTHENE
810U	BENZO-A-PYRENE
810U	INDENO (1,2,3-CD) PYRENE
810U	DIBENZO(A,H)ANTHRACENE
810U	BENZO(GHI)PERYLENE
810U	PHENOL
810U	2-CHLOROPHENOL
1600U	BENZYL ALCOHOL
810U	2-METHYLPHENOL
810U	(3-AND/OR 4-)METHYLPHENOL
810U	2-NITROPHENOL
810U	2,4-DIMETHYLPHENOL
1600U	BENZOIC ACID
810U	2,4-DICHLOROPHENOL
810U	4-CHLORO-3-METHYLPHENOL
810U	2,4,6-TRICHLOROPHENOL
810U	2,4,5-TRICHLOROPHENOL
1600U	2,4-DINITROPHENOL
1600U	4-NITROPHENOL
810U	2,3,4,6-TETRACHLOROPHENOL
1600U	2-METHYL-4,6-DINITROPHENOL
1600U	PENTACHLOROPHENOL
15.6	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/17/90

PROJECT NO. 90-894 SAMPLE NO. 50640 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-9 FORMER SLUDGE TANK SWMU 15

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1415 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
100U	CHLOROMETHANE
100U	VINYL CHLORIDE
100U	BROMOMETHANE
100U	CHLOROETHANE
100U	TRICHLOROFLUOROMETHANE
100U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
1000U	ACETONE
1000U	CARBON DISULFIDE
200U	METHYLENE CHLORIDE
100U	TRANS-1,2-DICHLOROETHENE
100U	1,1-DICHLOROETHANE
1000U	VINYL ACETATE
430J	CIS-1,2-DICHLOROETHENE
100U	2,2-DICHLOROPROPANE
1000U	METHYL ETHYL KETONE
100U	BROMOCHLOROMETHANE
100U	CHLOROFORM
60J	1,1,1-TRICHLOROETHANE
100U	1,1-DICHLOROPROPENE
100U	CARBON TETRACHLORIDE
100U	1,2-DICHLOROETHANE
100U	BENZENE
390	TRICHLOROETHENE(TRICHLOROETHYLENE)
100U	1,2-DICHLOROPROPANE
100U	DIBROMOMETHANE
100U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
100U	CIS-1,3-DICHLOROPROPENE
1000U	METHYL ISOBUTYL KETONE
100U	TOLUENE
100U	TRANS-1,3-DICHLOROPROPENE
100U	1,1,2-TRICHLOROETHANE
13J	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
100U	1,3-DICHLOROPROPANE
1000U	METHYL BUTYL KETONE
100U	DIBROMOCHLOROMETHANE
100U	CHLOROBENZENE
100U	1,1,1,2-TETRACHLOROETHANE
100U	ETHYL BENZENE
100U	(M- AND/OR P-)XYLENE
100U	O-XYLENE
100U	STYRENE
100U	BROMOFORM
100U	BROMOBENZENE
100U	1,1,2,2-TETRACHLOROETHANE
100U	1,2,3-TRICHLOROPROPANE
100U	O-CHLOROTOLUENE
100U	P-CHLOROTOLUENE
100U	1,3-DICHLOROBENZENE
100U	1,4-DICHLOROBENZENE
100U	1,2-DICHLOROBENZENE
18.0	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50640 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-9 FORMER SLUDGE TANK SWMU 15

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1415 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
780U	BIS(2-CHLOROETHYL) ETHER
780U	BIS(2-CHLOROISOPROPYL) ETHER
780U	N-NITROSODI-N-PROPYLAMINE
780U	HEXACHLOROETHANE
780U	NITROBENZENE
780U	ISOPHORONE
780U	BIS(2-CHLOROETHOXY) METHANE
780U	1,2,4-TRICHLOROBENZENE
780U	NAPHTHALENE
780U	4-CHLOROANILINE
780U	HEXACHLOROBUTADIENE
780U	2-METHYLNAPHTHALENE
780U	HEXACHLOROCYCLOPENTADIENE (HCCP)
780U	2-CHLORONAPHTHALENE
780U	2-NITROANILINE
780U	DIMETHYL PHTHALATE
780U	ACENAPHTHYLENE
780U	2,6-DINITROTOLUENE
780U	3-NITROANILINE
780U	ACENAPHTHENE
780U	DIBENZOFURAN
780U	2,4-DINITROTOLUENE
780U	DIETHYL PHTHALATE
780U	FLUORENE
780U	4-CHLOROPHENYL PHENYL ETHER
780U	4-NITROANILINE
780U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
780U	4-BROMOPHENYL PHENYL ETHER
780U	HEXACHLOROBENZENE (HCB)
780U	PHENANTHRENE
780U	ANTHRACENE
780U	DI-N-BUTYLPHTHALATE

UG/KG	ANALYTICAL RESULTS
780U	FLUORANTHENE
780U	PYRENE
780U	BENZYL BUTYL PHTHALATE
780U	3,3'-DICHLOROBENZIDINE
780U	BENZO(A)ANTHRACENE
780U	CHRYSENE
780U	BIS(2-ETHYLHEXYL) PHTHALATE
780U	DI-N-OCTYLPHTHALATE
780U	BENZO(B AND/OR K)FLUORANTHENE
780U	BENZO-A-PYRENE
780U	INDENO (1,2,3-CD) PYRENE
780U	DIBENZO(A,H)ANTHRACENE
780U	BENZO(GHI)PERYLENE
780U	PHENOL
780U	2-CHLOROPHENOL
1600U	BENZYL ALCOHOL
780U	2-METHYLPHENOL
780U	(3-AND/OR 4-)METHYLPHENOL
780U	2-NITROPHENOL
780U	2,4-DIMETHYLPHENOL
1600U	BENZOIC ACID
780U	2,4-DICHLOROPHENOL
780U	4-CHLORO-3-METHYLPHENOL
780U	2,4,6-TRICHLOROPHENOL
780U	2,4,5-TRICHLOROPHENOL
1600U	2,4-DINITROPHENOL
1600U	4-NITROPHENOL
780U	2,3,4,6-TETRACHLOROPHENOL
1600U	2-METHYL-4,6-DINITROPHENOL
1600U	PENTACHLOROPHENOL
18.0	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50641 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-10 FORMERE.O. STOR. SWMU 10

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1435 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
56U	CHLOROMETHANE
56U	VINYL CHLORIDE
56U	BROMOMETHANE
56U	CHLOROETHANE
56U	TRICHLOROFLUOROMETHANE
56U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
560U	ACETONE
560U	CARBON DISULFIDE
56U	METHYLENE CHLORIDE
56U	TRANS-1,2-DICHLOROETHENE
56U	1,1-DICHLOROETHANE
560U	VINYL ACETATE
56U	CIS-1,2-DICHLOROETHENE
56U	2,2-DICHLOROPROPANE
560U	METHYL ETHYL KETONE
56U	BROMOCHLOROMETHANE
56U	CHLOROFORM
56U	1,1,1-TRICHLOROETHANE
56U	1,1-DICHLOROPROPENE
56U	CARBON TETRACHLORIDE
56U	1,2-DICHLOROETHANE
56U	BENZENE
56U	TRICHLOROETHENE(TRICHLOROETHYLENE)
56U	1,2-DICHLOROPROPANE
56U	DIBROMOMETHANE
56U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
56U	CIS-1,3-DICHLOROPROPENE
560U	METHYL ISOBUTYL KETONE
56U	TOLUENE
56U	TRANS-1,3-DICHLOROPROPENE
56U	1,1,2-TRICHLOROETHANE
56U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
56U	1,3-DICHLOROPROPANE
560U	METHYL BUTYL KETONE
56U	DIBROMOCHLOROMETHANE
56U	CHLOROBENZENE
56U	1,1,1,2-TETRACHLOROETHANE
56U	ETHYL BENZENE
56U	(M- AND/OR P-)XYLENE
56U	O-XYLENE
56U	STYRENE
56U	BROMOFORM
56U	BROMOBENZENE
56U	1,1,2,2-TETRACHLOROETHANE
56U	1,2,3-TRICHLOROPROPANE
56U	O-CHLOROTOLUENE
56U	P-CHLOROTOLUENE
56U	1,3-DICHLOROBENZENE
56U	1,4-DICHLOROBENZENE
56U	1,2-DICHLOROBENZENE
18.4	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50641 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-10 FORMERE.O. STOR. SWMU 10

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1435 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
690U	BIS(2-CHLOROETHYL) ETHER
690U	BIS(2-CHLOROISOPROPYL) ETHER
690U	N-NITROSODI-N-PROPYLAMINE
690U	HEXACHLOROETHANE
690U	NITROBENZENE
690U	ISOPHORONE
690U	BIS(2-CHLOROETHOXY) METHANE
690U	1,2,4-TRICHLOROBENZENE
690U	NAPHTHALENE
690U	4-CHLOROANILINE
690U	HEXACHLOROBUTADIENE
690U	2-METHYLNAPHTHALENE
690U	HEXACHLOROCYCLOPENTADIENE (HCCP)
690U	2-CHLORONAPHTHALENE
690U	2-NITROANILINE
690U	DIMETHYL PHTHALATE
690U	ACENAPHTHYLENE
690U	2,6-DINITROTOLUENE
690U	3-NITROANILINE
690U	ACENAPHTHENE
690U	DIBENZOFURAN
690U	2,4-DINITROTOLUENE
690U	DIETHYL PHTHALATE
690U	FLUORENE
690U	4-CHLOROPHENYL PHENYL ETHER
690U	4-NITROANILINE
690U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
690U	4-BROMOPHENYL PHENYL ETHER
690U	HEXACHLOROBENZENE (HCB)
690U	PHENANTHRENE
690U	ANTHRACENE
690U	DI-N-BUTYLPHTHALATE

UG/KG	ANALYTICAL RESULTS
690U	FLUORANTHENE
690U	PYRENE
690U	BENZYL BUTYL PHTHALATE
690U	3,3'-DICHLOROBENZIDINE
690U	BENZO(A)ANTHRACENE
690U	CHRYSENE
690U	BIS(2-ETHYLHEXYL) PHTHALATE
690U	DI-N-OCTYLPHTHALATE
690U	BENZO(B AND/OR K)FLUORANTHENE
690U	BENZO-A-PYRENE
690U	INDENO (1,2,3-CD) PYRENE
690U	DIBENZO(A,H)ANTHRACENE
690U	BENZO(GHI)PERYLENE
690U	PHENOL
690U	2-CHLOROPHENOL
1400U	BENZYL ALCOHOL
690U	2-METHYLPHENOL
690U	(3-AND/OR 4-)METHYLPHENOL
690U	2-NITROPHENOL
690U	2,4-DIMETHYLPHENOL
1400U	BENZOIC ACID
690U	2,4-DICHLOROPHENOL
690U	4-CHLORO-3-METHYLPHENOL
690U	2,4,6-TRICHLOROPHENOL
690U	2,4,5-TRICHLOROPHENOL
1400U	2,4-DINITROPHENOL
1400U	4-NITROPHENOL
690U	2,3,4,6-TETRACHLOROPHENOL
1400U	2-METHYL-4,6-DINITROPHENOL
1400U	PENTACHLOROPHENOL
18.4	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50642 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-11 END OUTFALL DITCH SWMU 9F

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1500 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
69U	CHLOROMETHANE
69U	VINYL CHLORIDE
69U	BROMOMETHANE
69U	CHLOROETHANE
69U	TRICHLOROFLUOROMETHANE
69U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
690U	ACETONE
690U	CARBON DISULFIDE
69U	METHYLENE CHLORIDE
69U	TRANS-1,2-DICHLOROETHENE
69U	1,1-DICHLOROETHANE
690U	VINYL ACETATE
69U	CIS-1,2-DICHLOROETHENE
69U	2,2-DICHLOROPROPANE
690U	METHYL ETHYL KETONE
69U	BROMOCHLOROMETHANE
69U	CHLOROFORM
69U	1,1,1-TRICHLOROETHANE
69U	1,1-DICHLOROPROPENE
69U	CARBON TETRACHLORIDE
69U	1,2-DICHLOROETHANE
69U	BENZENE
69U	TRICHLOROETHENE(TRICHLOROETHYLENE)
69U	1,2-DICHLOROPROPANE
69U	DIBROMOMETHANE
69U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
69U	CIS-1,3-DICHLOROPROPENE
690U	METHYL ISOBUTYL KETONE
69U	TOLUENE
69U	TRANS-1,3-DICHLOROPROPENE
69U	1,1,2-TRICHLOROETHANE
69U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
69U	1,3-DICHLOROPROPANE
690U	METHYL BUTYL KETONE
69U	DIBROMOCHLOROMETHANE
69U	CHLOROBENZENE
69U	1,1,1,2-TETRACHLOROETHANE
69U	ETHYL BENZENE
69U	(M- AND/OR P-)XYLENE
69U	O-XYLENE
69U	STYRENE
69U	BROMOFORM
69U	BROMOBENZENE
69U	1,1,2,2-TETRACHLOROETHANE
69U	1,2,3-TRICHLOROPROPANE
69U	O-CHLOROTOLUENE
69U	P-CHLOROTOLUENE
69U	1,3-DICHLOROBENZENE
69U	1,4-DICHLOROBENZENE
69U	1,2-DICHLOROBENZENE
27.8	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

10/16/90

MISCELLANEOUS PURGEABLE ORGANICS - DATA REPORT

PROJECT NO. 90-894 SAMPLE NO. 50642 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-11 END OUTFALL DITCH SWMU 9F

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1500 STOP: 00/00/00

ANALYTICAL RESULTS UG/KG

100JN Dioxane

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50642 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-11 END OUTFALL DITCH SWMU 9F

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1500 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
960U	BIS(2-CHLOROETHYL) ETHER
960U	BIS(2-CHLOROISOPROPYL) ETHER
960U	N-NITROSODI-N-PROPYLAMINE
960U	HEXACHLOROETHANE
960U	NITROBENZENE
960U	ISOPHORONE
960U	BIS(2-CHLOROETHOXY) METHANE
960U	1,2,4-TRICHLOROBENZENE
960U	NAPHTHALENE
960U	4-CHLOROANILINE
960U	HEXACHLOROBUTADIENE
960U	2-METHYLNAPHTHALENE
960U	HEXACHLOROCYCLOPENTADIENE (HCCP)
960U	2-CHLORONAPHTHALENE
960U	2-NITROANILINE
960U	DIMETHYL PHTHALATE
960U	ACENAPHTHYLENE
960U	2,6-DINITROTOLUENE
960U	3-NITROANILINE
960U	ACENAPHTHENE
960U	DIBENZOFURAN
960U	2,4-DINITROTOLUENE
960U	DIETHYL PHTHALATE
960U	FLUORENE
960U	4-CHLOROPHENYL PHENYL ETHER
960U	4-NITROANILINE
960U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
960U	4-BROMOPHENYL PHENYL ETHER
960U	HEXACHLOROBENZENE (HCB)
960U	PHENANTHRENE
960U	ANTHRACENE
960U	DI-N-BUTYLPHTHALATE

REMARKS

UG/KG	ANALYTICAL RESULTS
960U	FLUORANTHENE
960U	PYRENE
960U	BENZYL BUTYL PHTHALATE
960U	3,3'-DICHLOROBENZIDINE
960U	BENZO(A)ANTHRACENE
960U	CHRYSENE
960U	BIS(2-ETHYLHEXYL) PHTHALATE
960U	DI-N-OCTYLPHTHALATE
160J	BENZO(B AND/OR K)FLUORANTHENE
960U	BENZO-A-PYRENE
960U	INDENO (1,2,3-CD) PYRENE
960U	DIBENZO(A,H)ANTHRACENE
960U	BENZO(GHI)PERYLENE
960U	PHENOL
960U	2-CHLOROPHENOL
1900U	BENZYL ALCOHOL
960U	2-METHYLPHENOL
960U	(3-AND/OR 4-)METHYLPHENOL
960U	2-NITROPHENOL
960U	2,4-DIMETHYLPHENOL
1900U	BENZOIC ACID
960U	2,4-DICHLOROPHENOL
960U	4-CHLORO-3-METHYLPHENOL
960U	2,4,6-TRICHLOROPHENOL
960U	2,4,5-TRICHLOROPHENOL
1900U	2,4-DINITROPHENOL
1900U	4-NITROPHENOL
960U	2,3,4,6-TETRACHLOROPHENOL
1900U	2-METHYL-4,6-DINITROPHENOL
1900U	PENTACHLOROPHENOL
27.8	PERCENT MOISTURE

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

10/16/90

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

```
** PROJECT NO. 90-894    SAMPLE NO. 50642  SAMPLE TYPE: SOIL        PROG ELEM: RCRA  COLLECTED BY: B FERGUSON          **
** SOURCE: ENTERPRISE REC. SYS.                                     CITY: BYHALIA                ST: MS                 **
** STATION ID: ERS-11 END OUTFALL DITCH SWMU 9F                     COLLECTION START: 09/25/90  1500   STOP: 00/00/00    **
**
```

ANALYTICAL RESULTS UG/KG

N Petroleum product

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/17/90

PROJECT NO. 90-894 SAMPLE NO. 50643 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-12 BEGIN OUTFALL DITCH SWMU 9F

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1530 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
780U	CHLOROMETHANE
780U	VINYL CHLORIDE
780U	BROMOMETHANE
780U	CHLOROETHANE
780U	TRICHLOROFLUOROMETHANE
780U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
43000J	ACETONE
7800U	CARBON DISULFIDE
780U	METHYLENE CHLORIDE
780U	TRANS-1,2-DICHLOROETHENE
5200J	1,1-DICHLOROETHANE
7800U	VINYL ACETATE
2000	CIS-1,2-DICHLOROETHENE
780U	2,2-DICHLOROPROPANE
9100J	METHYL ETHYL KETONE
780U	BROMOCHLOROMETHANE
780U	CHLOROFORM
7000J	1,1,1-TRICHLOROETHANE
780U	1,1-DICHLOROPROPENE
780U	CARBON TETRACHLORIDE
780U	1,2-DICHLOROETHANE
780U	BENZENE
780U	TRICHLOROETHENE(TRICHLOROETHYLENE)
780U	1,2-DICHLOROPROPANE
780U	DIBROMOMETHANE
780U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
780U	CIS-1,3-DICHLOROPROPENE
2500J	METHYL ISOBUTYL KETONE
960	TOLUENE
780U	TRANS-1,3-DICHLOROPROPENE
780U	1,1,2-TRICHLOROETHANE
480J	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
780U	1,3-DICHLOROPROPANE
7800U	METHYL BUTYL KETONE
780U	DIBROMOCHLOROMETHANE
780U	CHLOROBENZENE
780U	1,1,1,2-TETRACHLOROETHANE
780U	ETHYL BENZENE
780U	(M- AND/OR P-)XYLENE
440J	O-XYLENE
780U	STYRENE
780U	BROMOFORM
780U	BROMOBENZENE
780U	1,1,2,2-TETRACHLOROETHANE
780U	1,2,3-TRICHLOROPROPANE
780U	O-CHLOROTOLUENE
780U	P-CHLOROTOLUENE
780U	1,3-DICHLOROBENZENE
780U	1,4-DICHLOROBENZENE
780U	1,2-DICHLOROBENZENE
35.5	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

10/17/90

MISCELLANEOUS PURGEABLE ORGANICS - DATA REPORT

PROJECT NO. 90-894 SAMPLE NO. 50643 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-12 BEGIN OUTFALL DITCH SWMU 9F

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1530 STOP: 00/00/00

ANALYTICAL RESULTS UG/KG

1000JN	Isopropanol
2000JN	Dioxane

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD. ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50643 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-12 BEGIN OUTFALL DITCH SWMU 9F

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1530 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
200000U	BIS(2-CHLOROETHYL) ETHER
200000U	BIS(2-CHLOROISOPROPYL) ETHER
200000U	N-NITROSODI-N-PROPYLAMINE
200000U	HEXACHLOROETHANE
200000U	NITROBENZENE
200000U	ISOPHORONE
200000U	BIS(2-CHLOROETHOXY) METHANE
200000U	1,2,4-TRICHLOROBENZENE
200000U	NAPHTHALENE
200000U	4-CHLOROANILINE
200000U	HEXACHLOROBUTADIENE
200000U	2-METHYLNAPHTHALENE
200000U	HEXACHLOROCYCLOPENTADIENE (HCCP)
200000U	2-CHLORONAPHTHALENE
200000U	2-NITROANILINE
200000U	DIMETHYL PHTHALATE
200000U	ACENAPHTHYLENE
200000U	2,6-DINITROTOLUENE
200000U	3-NITROANILINE
200000U	ACENAPHTHENE
200000U	DIBENZOFURAN
200000U	2,4-DINITROTOLUENE
200000U	DIETHYL PHTHALATE
200000U	FLUORENE
200000U	4-CHLOROPHENYL PHENYL ETHER
200000U	4-NITROANILINE
200000U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
200000U	4-BROMOPHENYL PHENYL ETHER
200000U	HEXACHLOROBENZENE (HCB)
200000U	PHENANTHRENE
200000U	ANTHRACENE
200000U	DI-N-BUTYLPHTHALATE

UG/KG	ANALYTICAL RESULTS
200000U	FLUORANTHENE
200000U	PYRENE
200000U	BENZYL BUTYL PHTHALATE
200000U	3,3'-DICHLOROBENZIDINE
200000U	BENZO(A)ANTHRACENE
200000U	CHRYSENE
200000U	BIS(2-ETHYLHEXYL) PHTHALATE
200000U	DI-N-OCTYLPHTHALATE
200000U	BENZO(B AND/OR K)FLUORANTHENE
200000U	BENZO-A-PYRENE
200000U	INDENO (1,2,3-CD) PYRENE
200000U	DIBENZO(A,H)ANTHRACENE
200000U	BENZO(GHI)PERYLENE
200000U	PHENOL
200000U	2-CHLOROPHENOL
400000U	BENZYL ALCOHOL
200000U	2-METHYLPHENOL
200000U	(3-AND/OR 4-)METHYLPHENOL
200000U	2-NITROPHENOL
200000U	2,4-DIMETHYLPHENOL
400000U	BENZOIC ACID
200000U	2,4-DICHLOROPHENOL
200000U	4-CHLORO-3-METHYLPHENOL
200000U	2,4,6-TRICHLOROPHENOL
200000U	2,4,5-TRICHLOROPHENOL
400000U	2,4-DINITROPHENOL
400000U	4-NITROPHENOL
200000U	2,3,4,6-TETRACHLOROPHENOL
400000U	2-METHYL-4,6-DINITROPHENOL
400000U	PENTACHLOROPHENOL
35.5	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.   10/16/90

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

** PROJECT NO. 90-894 SAMPLE NO. 50643 SAMPLE TYPE: SOIL   PROG ELEM: RCRA COLLECTED BY: B FERGUSON **
** SOURCE: ENTERPRISE REC. SYS.   CITY: BYHALIA   ST: MS **
** STATION ID: ERS-12 BEGIN OUTFALL DITCH SWMU 9F   COLLECTION START: 09/25/90 1530 STOP: 00/00/00 **

ANALYTICAL RESULTS UG/KG

N Petroleum product

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

10/16/90

PURGEABLE ORGANICS DATA REPORT

PROJECT NO. 90-894 SAMPLE NO. 50644 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-12D SWMU 9FD

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1535 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
730U	CHLOROMETHANE
730U	VINYL CHLORIDE
730U	BROMOMETHANE
730U	CHLOROETHANE
730U	TRICHLOROFLUOROMETHANE
730U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
46000J	ACETONE
7300U	CARBON DISULFIDE
1500U	METHYLENE CHLORIDE
730U	TRANS-1,2-DICHLOROETHENE
8100J	1,1-DICHLOROETHANE
730U	VINYL ACETATE
2800	CIS-1,2-DICHLOROETHENE
730U	2,2-DICHLOROPROPANE
40000J	METHYL ETHYL KETONE
730U	BROMOCHLOROMETHANE
730U	CHLOROFORM
6400J	1,1,1-TRICHLOROETHANE
730U	1,1-DICHLOROPROPENE
730U	CARBON TETRACHLORIDE
730U	1,2-DICHLOROETHANE
730U	BENZENE
730U	TRICHLOROETHENE(TRICHLOROETHYLENE)
730U	1,2-DICHLOROPROPANE
730U	DIBROMOMETHANE
730U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
730U	CIS-1,3-DICHLOROPROPENE
7300U	METHYL ISOBUTYL KETONE
600J	TOLUENE
730U	TRANS-1,3-DICHLOROPROPENE
730U	1,1,2-TRICHLOROETHANE
370J	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
730U	1,3-DICHLOROPROPANE
690J	METHYL BUTYL KETONE
730U	DIBROMOCHLOROMETHANE
730U	CHLOROBENZENE
730U	1,1,1,2-TETRACHLOROETHANE
730U	ETHYL BENZENE
74J	(M- AND/OR P-)XYLENE
400J	O-XYLENE
730U	STYRENE
730U	BROMOFORM
730U	BROMOBENZENE
730U	1,1,2,2-TETRACHLOROETHANE
730U	1,2,3-TRICHLOROPROPANE
730U	O-CHLOROTOLUENE
730U	P-CHLOROTOLUENE
730U	1,3-DICHLOROBENZENE
730U	1,4-DICHLOROBENZENE
730U	1,2-DICHLOROBENZENE
31.9	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA. 10/16/90

MISCELLANEOUS PURGEABLE ORGANICS - DATA REPORT

PROJECT NO. 90-894 SAMPLE NO. 50644 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-12D SWMU 9FD

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1535 STOP: 00/00/00

ANALYTICAL RESULTS UG/KG

5000JN	Isopropanol
10000JN	Dioxane
N	Petroleum product

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50644 SAMPLE TYPE: SOIL
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-12D SWMU 9FD

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1535 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
190000U	BIS(2-CHLOROETHYL) ETHER
190000U	BIS(2-CHLOROISOPROPYL) ETHER
190000U	N-NITROSODI-N-PROPYLAMINE
190000U	HEXACHLOROETHANE
190000U	NITROBENZENE
190000U	ISOPHORONE
190000U	BIS(2-CHLOROETHOXY) METHANE
190000U	1,2,4-TRICHLOROBENZENE
190000U	NAPHTHALENE
190000U	4-CHLOROANILINE
190000U	HEXACHLOROBUTADIENE
190000U	2-METHYLNAPHTHALENE
190000U	HEXACHLOROCYCLOPENTADIENE (HCCP)
190000U	2-CHLORONAPHTHALENE
190000U	2-NITROANILINE
190000U	DIMETHYL PHTHALATE
190000U	ACENAPHTHYLENE
190000U	2,6-DINITROTOLUENE
190000U	3-NITROANILINE
190000U	ACENAPHTHENE
190000U	DIBENZOFURAN
190000U	2,4-DINITROTOLUENE
190000U	DIETHYL PHTHALATE
190000U	FLUORENE
190000U	4-CHLOROPHENYL PHENYL ETHER
190000U	4-NITROANILINE
190000U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
190000U	4-BROMOPHENYL PHENYL ETHER
190000U	HEXACHLOROBENZENE (HCB)
190000U	PHENANTHRENE
190000U	ANTHRACENE
190000U	DI-N-BUTYLPHTHALATE

UG/KG	ANALYTICAL RESULTS
190000U	FLUORANTHENE
190000U	PYRENE
190000U	BENZYL BUTYL PHTHALATE
190000U	3,3'-DICHLOROBENZIDINE
190000U	BENZO(A)ANTHRACENE
190000U	CHRYSENE
190000U	BIS(2-ETHYLHEXYL) PHTHALATE
190000U	DI-N-OCTYLPHTHALATE
190000U	BENZO(B AND/OR K)FLUORANTHENE
190000U	BENZO-A-PYRENE
190000U	INDENO (1,2,3-CD) PYRENE
190000U	DIBENZO(A,H)ANTHRACENE
190000U	BENZO(GHI)PERYLENE
190000U	PHENOL
190000U	2-CHLOROPHENOL
380000U	BENZYL ALCOHOL
190000U	2-METHYLPHENOL
190000U	(3-AND/OR 4-)METHYLPHENOL
190000U	2-NITROPHENOL
190000U	2,4-DIMETHYLPHENOL
380000U	BENZOIC ACID
190000U	2,4-DICHLOROPHENOL
190000U	4-CHLORO-3-METHYLPHENOL
190000U	2,4,6-TRICHLOROPHENOL
190000U	2,4,5-TRICHLOROPHENOL
380000U	2,4-DINITROPHENOL
380000U	4-NITROPHENOL
190000U	2,3,4,6-TETRACHLOROPHENOL
380000U	2-METHYL-4,6-DINITROPHENOL
380000U	PENTACHLOROPHENOL
31.9	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD. ATHENS, GA.

10/16/90

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

** PROJECT NO. 90-894 SAMPLE NO. 50644 SAMPLE TYPE: SOIL PROG ELEM: RCRA COLLECTED BY: B FERGUSON **
** SOURCE: ENTERPRISE REC. SYS. CITY: BYHALIA ST: MS **
** STATION ID: ERS-12D SWMU 9FD COLLECTION START: 09/25/90 1535 STOP: 00/00/00 **

ANALYTICAL RESULTS UG/KG

N Petroleum product

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50646 SAMPLE TYPE: SEDIM
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-13S RETENTION POND SED SWMU 9D

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1600 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
89U	CHLOROMETHANE
130J	VINYL CHLORIDE
89U	BROMOMETHANE
89U	CHLOROETHANE
89U	TRICHLOROFLUOROMETHANE
89U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
890U	ACETONE
890U	CARBON DISULFIDE
89U	METHYLENE CHLORIDE
89U	TRANS-1,2-DICHLOROETHENE
89U	1,1-DICHLOROETHANE
890U	VINYL ACETATE
530	CIS-1,2-DICHLOROETHENE
89U	2,2-DICHLOROPROPANE
890U	METHYL ETHYL KETONE
89U	BROMOCHLOROMETHANE
89U	CHLOROFORM
89U	1,1,1-TRICHLOROETHANE
89U	1,1-DICHLOROPROPENE
89U	CARBON TETRACHLORIDE
89U	1,2-DICHLOROETHANE
89U	BENZENE
89U	TRICHLOROETHENE(TRICHLOROETHYLENE)
89U	1,2-DICHLOROPROPANE
89U	DIBROMOMETHANE
89U	BROMODICHLOROMETHANE

UG/KG	ANALYTICAL RESULTS
89U	CIS-1,3-DICHLOROPROPENE
890U	METHYL ISOBUTYL KETONE
89U	TOLUENE
89U	TRANS-1,3-DICHLOROPROPENE
89U	1,1,2-TRICHLOROETHANE
89U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
89U	1,3-DICHLOROPROPANE
890U	METHYL BUTYL KETONE
89U	DIBROMOCHLOROMETHANE
89U	CHLOROBENZENE
89U	1,1,1,2-TETRACHLOROETHANE
89U	ETHYL BENZENE
89U	(M- AND/OR P-)XYLENE
89U	O-XYLENE
89U	STYRENE
89U	BROMOFORM
89U	BROMOBENZENE
89U	1,1,2,2-TETRACHLOROETHANE
89U	1,2,3-TRICHLOROPROPANE
89U	O-CHLOROTOLUENE
89U	P-CHLOROTOLUENE
89U	1,3-DICHLOROBENZENE
89U	1,4-DICHLOROBENZENE
89U	1,2-DICHLOROBENZENE
44.0	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 10/16/90

PROJECT NO. 90-894 SAMPLE NO. 50646 SAMPLE TYPE: SEDIM
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-13S RETENTION POND SED SWMU 9D

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1600 STOP: 00/00/00

UG/KG	ANALYTICAL RESULTS
47000U	BIS(2-CHLOROETHYL) ETHER
47000U	BIS(2-CHLOROISOPROPYL) ETHER
47000U	N-NITROSODI-N-PROPYLAMINE
47000U	HEXACHLOROETHANE
47000U	NITROBENZENE
47000U	ISOPHORONE
47000U	BIS(2-CHLOROETHOXY) METHANE
47000U	1,2,4-TRICHLOROBENZENE
47000U	NAPHTHALENE
47000U	4-CHLOROANILINE
47000U	HEXACHLOROBUTADIENE
47000U	2-METHYLNAPHTHALENE
47000U	HEXACHLOROCYCLOPENTADIENE (HCCP)
47000U	2-CHLORONAPHTHALENE
47000U	2-NITROANILINE
47000U	DIMETHYL PHTHALATE
47000U	ACENAPHTHYLENE
47000U	2,6-DINITROTOLUENE
47000U	3-NITROANILINE
47000U	ACENAPHTHENE
47000U	DIBENZOFURAN
47000U	2,4-DINITROTOLUENE
47000U	DIETHYL PHTHALATE
47000U	FLUORENE
47000U	4-CHLOROPHENYL PHENYL ETHER
47000U	4-NITROANILINE
47000U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
47000U	4-BROMOPHENYL PHENYL ETHER
47000U	HEXACHLOROBENZENE (HCB)
47000U	PHENANTHRENE
47000U	ANTHRACENE
47000U	DI-N-BUTYLPHTHALATE

UG/KG	ANALYTICAL RESULTS
47000U	FLUORANTHENE
47000U	PYRENE
47000U	BENZYL BUTYL PHTHALATE
47000U	3,3'-DICHLOROBENZIDINE
47000U	BENZO(A)ANTHRACENE
47000U	CHRYSENE
47000U	BIS(2-ETHYLHEXYL) PHTHALATE
47000U	DI-N-OCTYLPHTHALATE
47000U	BENZO(B AND/OR K)FLUORANTHENE
47000U	BENZO-A-PYRENE
47000U	INDENO (1,2,3-CD) PYRENE
47000U	DIBENZO(A,H)ANTHRACENE
47000U	BENZO(GHI)PERYLENE
47000U	PHENOL
47000U	2-CHLOROPHENOL
94000U	BENZYL ALCOHOL
47000U	2-METHYLPHENOL
47000U	(3-AND/OR 4-)METHYLPHENOL
47000U	2-NITROPHENOL
47000U	2,4-DIMETHYLPHENOL
94000U	BENZOIC ACID
47000U	2,4-DICHLOROPHENOL
47000U	4-CHLORO-3-METHYLPHENOL
47000U	2,4,6-TRICHLOROPHENOL
47000U	2,4,5-TRICHLOROPHENOL
94000U	2,4-DINITROPHENOL
94000U	4-NITROPHENOL
47000U	2,3,4,6-TETRACHLOROPHENOL
94000U	2-METHYL-4,6-DINITROPHENOL
94000U	PENTACHLOROPHENOL
44.0	PERCENT MOISTURE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

10/16/90

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 90-894 SAMPLE NO. 50646 SAMPLE TYPE: SEDIM
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-13S RETENTION POND SED SWMU 9D

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1600 STOP: 00/00/00

ANALYTICAL RESULTS UG/KG

N Petroleum product

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/03/90

PROJECT NO. 90-894 SAMPLE NO. 50645 SAMPLE TYPE: SURFACEWA
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-13W RETENTION POND WATER SWMU9D

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1550 STOP: 00/00/00

UG/L	ANALYTICAL RESULTS
5.0U	CHLOROMETHANE
5.0U	VINYL CHLORIDE
5.0U	BROMOMETHANE
5.0U	CHLOROETHANE
5.0U	TRICHLOROFLUOROMETHANE
5.0U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)
50U	ACETONE
12U	CARBON DISULFIDE
5.0U	METHYLENE CHLORIDE
5.0U	TRANS-1,2-DICHLOROETHENE
5.0U	1,1-DICHLOROETHANE
12U	VINYL ACETATE
6.7	CIS-1,2-DICHLOROETHENE
5.0U	2,2-DICHLOROPROPANE
50U	METHYL ETHYL KETONE
5.0U	BROMOCHLOROMETHANE
5.0U	CHLOROFORM
5.0U	1,1,1-TRICHLOROETHANE
5.0U	1,1-DICHLOROPROPENE
5.0U	CARBON TETRACHLORIDE
5.0U	1,2-DICHLOROETHANE
5.0U	BENZENE
5.0U	TRICHLOROETHENE(TRICHLOROETHYLENE)
5.0U	1,2-DICHLOROPROPANE
5.0U	DIBROMOMETHANE
5.0U	BROMODICHLOROMETHANE

UG/L	ANALYTICAL RESULTS
5.0U	CIS-1,3-DICHLOROPROPENE
12U	METHYL ISOBUTYL KETONE
5.0U	TOLUENE
5.0U	TRANS-1,3-DICHLOROPROPENE
5.0U	1,1,2-TRICHLOROETHANE
5.0U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
5.0U	1,3-DICHLOROPROPANE
12U	METHYL BUTYL KETONE
5.0U	DIBROMOCHLOROMETHANE
5.0U	CHLOROBENZENE
5.0U	1,1,1,2 TETRACHLOROETHANE
5.0U	ETHYL BENZENE
5.0U	(M- AND/OR P-)XYLENE
5.0U	O-XYLENE
5.0U	STYRENE
5.0U	BROMOFORM
5.0U	BROMOBENZENE
5.0U	1,1,2,2-TETRACHLOROETHANE
5.0U	1,2,3-TRICHLOROPROPANE
5.0U	O-CHLOROTOLUENE
5.0U	P-CHLOROTOLUENE
5.0U	1,3-DICHLOROBENZENE
5.0U	1,4-DICHLOROBENZENE
5.0U	1,2-DICHLOROBENZENE

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

PURGEABLE ORGANICS DATA REPORT 10/03/90

** PROJECT NO. 90-894 SAMPLE NO. 50647 SAMPLE TYPE: BLKWA
** SOURCE: ENTERPRISE REC. SYS.
** STATION ID: ERS-TOW TRIP BLANK

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1620 STOP: 00/00/00

UG/L	ANALYTICAL RESULTS	UG/L	ANALYTICAL RESULTS
5.0U	CHLOROMETHANE	5.0U	CIS-1,3-DICHLOROPROPENE
5.0U	VINYL CHLORIDE	12U	METHYL ISOBUTYL KETONE
5.0U	BROMOMETHANE	5.0U	TOLUENE
5.0U	CHLOROETHANE	5.0U	TRANS-1,3-DICHLOROPROPENE
5.0U	TRICHLOROFLUOROMETHANE	5.0U	1,1,2-TRICHLOROETHANE
5.0U	1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)	5.0U	TETRACHLOROETHENE(TETRACHLOROETHYLENE)
50U	ACETONE	5.0U	1,3-DICHLOROPROPANE
12U	CARBON DISULFIDE	12U	METHYL BUTYL KETONE
5.0U	METHYLENE CHLORIDE	5.0U	DIBROMOCHLOROMETHANE
5.0U	TRANS-1,2-DICHLOROETHENE	5.0U	CHLOROBENZENE
5.0U	1,1-DICHLOROETHANE	5.0U	1,1,1,2 TETRACHLOROETHANE
12U	VINYL ACETATE	5.0U	ETHYL BENZENE
5.0U	CIS-1,2-DICHLOROETHENE	5.0U	(M- AND/OR P-)XYLENE
5.0U	2,2-DICHLOROPROPANE	5.0U	O-XYLENE
50U	METHYL ETHYL KETONE	5.0U	STYRENE
5.0U	BROMOCHLOROMETHANE	5.0U	BROMOFORM
5.0U	CHLOROFORM	5.0U	BROMOBENZENE
5.0U	1,1,1-TRICHLOROETHANE	5.0U	1,1,2,2-TETRACHLOROETHANE
5.0U	1,1-DICHLOROPROPENE	5.0U	1,2,3-TRICHLOROPROPANE
5.0U	CARBON TETRACHLORIDE	5.0U	O-CHLOROTOLUENE
5.0U	1,2-DICHLOROETHANE	5.0U	P-CHLOROTOLUENE
5.0U	BENZENE	5.0U	1,3-DICHLOROBENZENE
5.0U	TRICHLOROETHENE(TRICHLOROETHYLENE)	5.0U	1,4-DICHLOROBENZENE
5.0U	1,2-DICHLOROPROPANE	5.0U	1,2-DICHLOROBENZENE
5.0U	DIBROMOMETHANE		
5.0U	BROMODICHLOROMETHANE		

REMARKS ***REMARKS***

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD, ATHENS, GA.

EXTRACTABLE ORGANICS DATA REPORT 10/11/90

PROJECT NO. 90-894 SAMPLE NO. 50645 SAMPLE TYPE: SURFACEWA
SOURCE: ENTERPRISE REC. SYS.
STATION ID: ERS-13W RETENTION POND WATER SWMU9D

PROG ELEM: RCRA COLLECTED BY: B FERGUSON
CITY: BYHALIA ST: MS
COLLECTION START: 09/25/90 1550 STOP: 00/00/00

UG/L	ANALYTICAL RESULTS
10U	BIS(2-CHLOROETHYL) ETHER
10U	BIS(2-CHLOROISOPROPYL) ETHER
10U	N-NITROSODI-N-PROPYLAMINE
10U	HEXACHLOROETHANE
10U	NITROBENZENE
10U	ISOPHORONE
10U	BIS(2-CHLOROETHOXY) METHANE
10U	1,2,4-TRICHLOROBENZENE
10U	NAPHTHALENE
10U	4-CHLOROANILINE
10U	HEXACHLOROBUTADIENE
10U	2-METHYLNAPHTHALENE
10U	HEXACHLOROCYCLOPENTADIENE (HCCP)
10U	2-CHLORONAPHTHALENE
10U	2-NITROANILINE
10U	DIMETHYL PHTHALATE
10U	ACENAPHTHYLENE
10U	2,6-DINITROTOLUENE
10U	3-NITROANILINE
10U	ACENAPHTHENE
10U	DIBENZOFURAN
10U	2,4-DINITROTOLUENE
10U	DIETHYL PHTHALATE
10U	FLUORENE
10U	4-CHLOROPHENYL PHENYL ETHER
10U	4-NITROANILINE
10U	N-NITROSODIPHENYLAMINE/DIPHENYLAMINE
10U	4-BROMOPHENYL PHENYL ETHER
10U	HEXACHLOROBENZENE (HCB)
10U	PHENANTHRENE
10U	ANTHRACENE
10U	DI-N-BUTYLPHTHALATE

UG/L	ANALYTICAL RESULTS
10U	FLUORANTHENE
10U	PYRENE
10U	BENZYL BUTYL PHTHALATE
10U	3,3'-DICHLOROBENZIDINE
10U	BENZO(A)ANTHRACENE
10U	CHRYSENE
10U	BIS(2-ETHYLHEXYL) PHTHALATE
10U	DI-N-OCTYLPHTHALATE
10U	BENZO(B AND/OR K)FLUORANTHENE
10U	BENZO-A-PYRENE
10U	INDENO (1,2,3-CD) PYRENE
10U	DIBENZO(A,H)ANTHRACENE
10U	BENZO(GHI)PERYLENE
10U	PHENOL
10U	2-CHLOROPHENOL
20U	BENZYL ALCOHOL
10U	2-METHYLPHENOL
10U	(3-AND/OR 4-)METHYLPHENOL
10U	2-NITROPHENOL
10U	2,4-DIMETHYLPHENOL
3.2J	BENZOIC ACID
10U	2,4-DICHLOROPHENOL
10U	4-CHLORO-3-METHYLPHENOL
10U	2,4,6-TRICHLOROPHENOL
10U	2,4,5-TRICHLOROPHENOL
20U	2,4-DINITROPHENOL
20U	4-NITROPHENOL
10U	2,3,4,6-TETRACHLOROPHENOL
20U	2-METHYL-4,6-DINITROPHENOL
20U	PENTACHLOROPHENOL

REMARKS

REMARKS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.

SAMPLE AND ANALYSIS MANAGEMENT SYSTEM
EPA-REGION IV ESD. ATHENS. GA.

10/11/90

MISCELLANEOUS EXTRACTABLE COMPOUNDS - DATA REPORT

PROJECT NO. 90-894 SAMPLE NO. 50645 SAMPLE TYPE: SURFACEWA PROG ELEM: RCRA COLLECTED BY: B FERGUSON
SOURCE: ENTERPRISE REC. SYS. CITY: BYHALIA ST: MS
STATION ID: ERS-13W RETENTION POND WATER SWMU9D COLLECTION START: 09/25/90 1550 STOP: 00/00/00

ANALYTICAL RESULTS UG/L

2JN	ACETYLMORPHOLINE
3JN	PHTHALIC ANHYDRIDE
4JN	DODECANOIC ACID, METHYL ESTER
6JN	HEXADECANOIC ACID
10JN	METHYLHEPTADECANOIC ACID, METHYL ESTER
7OJ	3 UNIDENTIFIED COMPOUNDS

FOOTNOTES
*A-AVERAGE VALUE *NA-NOT ANALYZED *NAI-INTERFERENCES *J-ESTIMATED VALUE *N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
*K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN *L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
*U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT.
*R-QC INDICATES THAT DATA UNUSABLE. COMPOUND MAY OR MAY NOT BE PRESENT. RESAMPLING AND REANALYSIS IS NECESSARY FOR VERIFICATION.

Request #10
RCRA Investigations

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

10082900

JAN 1 6 1992

4WD-RCRAFFB

Mr. James T. McCafferty, III
Holcomb, Dunbar, Connell, Chaffin & Willard
Attorneys At Law
120 North Congress Street
Post Office Box 2990
Suite 900, Eastover Bank Building
Jackson, Mississippi 39207-2990

RE: Freedom of Information Act (FOIA) Request Number 4-RIN-0033-92

Dear Mr. McCafferty:

This is in response to your Freedom of Information Act (FOIA) request for information concerning Enterprise Recovery Systems, Inc. from Region IV files.

Please find enclosed the requested material.

Fees are waived as de minimis.

Should you have any questions, please call Ms. Lael Butler at (404) 347-3433.

Sincerely yours,

James S. Kutzman

James S. Kutzman, P.E.
Associate Director
Office of RCRA and Federal Facilities
Waste Management Division

Enclosure

get RCRA files on ERS facilities & find out if any RCRA enforcement actions were planned or carried out.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

ACTION MEMORANDUM

DATE: SEP 23 1992

SUBJECT: Request for a Removal Action at the Enterprise Recovery Systems Site, City of Byhalia, Marshall County, Mississippi

FROM: Robert N. Rosen, On-Scene Coordinator RNR
Emergency Response and Removal Branch

TO: Joseph R. Franzmathes
Director
Waste Management Division

Site ID #: 0Q

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the proposed time critical removal action described herein for the Enterprise Recovery Systems site, Route 5, Box 287 Cayce Road, Byhalia, Marshall County, Mississippi.

This request for removal action is based upon an August 11, 1992, verbal request from the Mississippi Department of Environmental Quality (DEQ) for consideration of appropriate action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended, 42 U.S.C. 9604(a), at the Enterprise Recovery Systems site. The proposed action will have a project ceiling of $673,000 of which $500,000 is for mitigation contracting.

This site is not on the National Priorities List (NPL) and there are no nationally significant or precedent setting issues associated with the response.

II. SITE CONDITIONS AND BACKGROUND

This removal action is time critical. Hazardous substances are presently stored in an abandoned building and in outdoor, covered sheds and are exposed to weather extremes. There is a high potential for uncontrolled release to the air, soil and groundwater due to the poor condition of drums and tanks containing the materials.

10300456

Printed on Recycled Paper

A. SITE DESCRIPTION

1. Removal Site Evaluation

Enterprise Recovery Systems (facility ID number MSD000693176) is an abandoned solvent recycling facility located one-half mile south of U.S. Highway 72 on Cayce Road in northern Marshall County, Mississippi. Enterprise had been in the solvent recycling business as a RCRA-permitted facility since 1984, and had conducted related business activities as early as 1978. Enterprise ceased operations in October, 1991 when their insurer canceled insurance coverage after significant soil and groundwater contamination was found at the site.

Upon receiving the verbal request for assistance from the Mississippi DEQ, EPA conducted a removal assessment of the site. Through hazard category (hazcat) testing, EPA was able to determine that hazardous substances were staged in drums, tanks and in laboratory chemicals stored within the building. The facility operations manager had previously identified some of the substances in the storage tanks and their approximate quantities to a DEQ inspector during an October, 1991 inspection. During a December, 1991 inspection by DEQ, the facility owner confirmed the contents and approximate quantities of substances stored in drums. Substances stored in the tanks include 1,1,1-trichloroethane and trichloroethylene. Solvents typically stored or processed on site include acetone, methylene chloride, methyl ethyl ketone, toluene and xylene.

EPA also collected samples from the wells of ten homes surrounding the site. The analytical results have not yet been received, but testing was performed to supplement prior testing conducted by the DEQ. In their analysis, DEQ found levels of the volatile organic compounds (VOCs) trichloroethylene, 1,1-dichloroethylene, and methylene chloride above the federal removal action levels for contaminated drinking water. EPA analytical results are expected to confirm DEQ results and to continue tracking the rising contaminant trends reported by DEQ.

In December 1989, an environmental assessment of soil and groundwater was conducted by an environmental engineering firm for potential buyers of the Enterprise facility. This inquiry revealed extensive VOC contamination at the site and the buyers withdrew their interest. As part of the proposed removal activities at this site, EPA will conduct additional soil sampling to determine the level and extent of soil contamination.

To date, there has not yet been an investigation of contamination in the waste water retention pond. However, the tank and drum storage areas drain to this pond, and ultimately into Nonconnah

Creek. Water and sludge sampling will thus be addressed in this Action Memorandum in order to determine level and extent of contamination of the retention pond.

2. Physical Location

The Enterprise Recovery Systems site is in rural Marshall county in northwestern Mississippi. The site is located midway between Byhalia, Mississippi and Collierville, Tennessee on rural Cayce Road which runs between U.S. Highways 72 and 78. Both towns have populations under 10,000. The land surrounding the site is primarily farm and fields with a residential population less than 100 within a one-half mile radius of the site. However, the majority of the homes are located within 200 yards of the site.

Nonconnah Creek headwaters flow alongside the property's northern and eastern boundaries and the site is within the recharge area for the Kosciusko Aquifer.

3. Site Characteristics

The Enterprise site is situated on an eight acre wooded parcel. A single story sheet metal building houses an office, warehouse, and processing area. Other features include two distinct storage tank areas, a small retention pond, and several outdoor drum storage areas. Access to the building is controlled by locked doors and windows and the property is fenced.

The facility ceased operations in October, 1991. The inventory of hazardous substances from that date remain on site in tanks, drums, and laboratory items. The solvents typically stored or processed on site are: trichloroethylene, 1,1,1-trichloroethane, methylene chloride, perchloroethylene, acetone, methyl ethyl ketone, toluene, xylene, ethyl acetate, blended solvents and mineral spirits. While operating, Enterprise was actively involved in purchasing spent commercial solvents and recycling them for resale or as part of a fuels-blending operation.

4. Release or Threatened Release into the Environment

The EPA removal assessment confirmed that laboratory and drummed materials exhibit characteristics of hazardous wastes such as ignitability. Approximately 200 drums are stored at the site. The majority of the drums have D001 labels, which signify an ignitable hazardous waste, or F001 and F003 labels, signifying spent halogenated and non-halogenated solvents which are a listed hazardous waste. Through hazcat testing, EPA identified flammable and combustible substances in drums and laboratory containers. Facility inventory records corroborate these findings.

Facility inventory sheets identify the contents of several of the storage tanks as waste 1,1,1-trichloroethane, and waste trichloroethylene, both hazardous substances under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The estimated total volume of hazardous substances stored in the tanks is approximately 65,000 gallons.

Sampling of soils and groundwater conducted by two independent contractors confirmed contamination of soils and groundwater at the site. Contaminants of concern in the soils include: ethyl benzene, styrene, methylene chloride, toluene, trichloroethylene, xylene, acetone, methyl ethyl ketone, methyl isobutyl ketone and 1,1-dichloroethane. Levels of contamination documented were: acetone - 37,000 ppb; methyl ethyl ketone - 13,000 ppb; ethyl benzene - 13,650 ppb; toluene - 35,000 ppb and xylene - 51,900 ppb.

Contaminants of concern in the groundwater beneath the site and in the drinking water wells of private residences include: trichloroethylene (TCE), 1,1-dichloroethylene and 1,1,1-trichloroethane. Present levels of TCE (358 ppb) in the private wells exceed the removal action levels established for this compound. Levels at the on-site monitoring wells exceed 4100 ppb for 1,1,1-trichloroethane and 1800 ppb for 1,1-dichloroethylene.

Enterprise has a history of hazardous substances releases as well as fire and explosions which dates back to 1978. The historic release(s) to soils and groundwater are documented in the levels of contamination identified through soil and water sampling. Some of these events may have contributed to current soil and groundwater contamination. A significant threat of release is presented by the storage of approximately 200 55-gallon drums, approximately 65,000 gallons inside the storage tanks, and the approximately 50 laboratory containers. A large number of drums show evidence of leakage and many drums are deteriorating due to age and exposure to weather. The storage tanks show signs of scaling and pitting corrosion, as well as evidence of past leaks within the dike storage area.

The primary hazardous substances of concern are listed in the table that follows:

HAZARDOUS SUBSTANCES - ENTERPRISE RECOVERY SYSTEMS

Substance	Statutory Code *	Hazard Code
Acetone	4	Flammable Liq
Methylene Chloride	2,4	ORM-A
Methyl Ethyl Ketone	4	Flammable Liq
Toluene	1,2,4	Flammable Liq
1,1,1-Trichloroethane	2,4	ORM-A
Trichloroethylene	1,2,4	ORM-A
Xylene	1,4	Flammable Liq

* Statutory source for designation as a listed hazardous substance under CERCLA is: 1 - Clean Water Act, Section 311(b)(4); 2 - Clean Water Act, Section 307(a); 3 - Clean Air Act, Section 112 and; 4 - Resource Conservation and Recovery Act, (RCRA), Section 3001.

The potential health effects from the hazardous substances identified are presented in the toxicological chart which follows.

SUMMARY OF POTENTIAL TOXICOLOGICAL EFFECTS OF SELECTED COMPOUNDS

	Eye, skin, or respiratory system irritant	Toxic by inhalation, ingestion, or contact	Central nervous system damage	Kidney damage	Liver damage	Carcinogenic
ACETONE	X	X		X	X	
METHYLENE CHLORIDE		X				X
METHYL ETHYL KETONE	X	X	X	X	X	
TOLUENE	X	X	X	X		
1,1,1-TRICHLOROETHANE	X	X	X	X	X	
TRICHLOROETHYLENE	X	X	X	X	X	X
XYLENE	X	X				

5. NPL Status

This site has been referred to the Site Assessment Section (SAS) for site investigation. Removal assessment sampling results will be shared with SAS in order to prepare a Hazard Ranking System rating for the site. The Agency for Toxic Substances and Disease Registry (ATSDR) has made a preliminary evaluation of health risks to the residents near the facility, based on the well water analytical results obtained by Mississippi DEQ. ATSDR recommended that one household completely cease the use of their well and obtain an alternative water supply. ATSDR will further evaluate health risks based on the pending analytical results on ten wells that were sampled by EPA as part of their preliminary assessment.

6. Maps, Pictures and Other Graphic Representations

A map of the site location is attached.

B. OTHER ACTIONS TO DATE

1. Previous Actions

On September 9 and 10, 1992, EPA carried out a removal assessment as described above. The purpose of the assessment was to obtain samples from ten residential wells near the facility both to confirm analytical results obtained by contractors and DEQ, and to establish a baseline for further health evaluations by EPA and ATSDR. Results of the well sampling are expected shortly. Prior to the sampling event, EPA personnel walked from door to door to obtain permission to sample wells and to inform the residents about the potential contamination of their wells. A written notice was also sent to all targeted residents informing them of the sampling date. The notice included the name and telephone number of an EPA contact person for residents wishing further information.

Additionally, EPA conducted hazcat testing to confirm that the materials stored on site were hazardous substances, as identified by site inventory records and drum and tank labels. Results from the hazcat tests confirm that the materials stored at the site are hazardous waste materials.

2. Current Actions

EPA is currently evaluating drinking water supply alternatives for the affected households, pending receipt of sampling analysis.

C. STATE AND LOCAL AUTHORITIES' ROLE

1. State and Local Actions to Date

The Mississippi DEQ, prompted by a history of problems at the site, conducted a facility inspection on July 23, 1991. As a result of their findings, an order was issued to the facility in December 1991, to provide drinking water to affected residents, submit a work plan to assess and remediate soil and groundwater contamination, implement the work plan, submit a closure plan and schedule and to cease all operations.

The facility ceased operations in October 1991 when their insurance liability coverage was terminated by the insurer. In response to the facility's action, the DEQ conducted further soil and groundwater assessments at the site and verified that there was significant contamination of both media. Their assessment was halted as the level and extent of contamination exceeded their financial ability to remediate the site. The DEQ order has been appealed by Enterprise Recovery Systems and the state is taking no further action until EPA has determined what action it will take.

Local activities include the recent formation of a rural water company. The North Marshall County Water Association was established in order to build and maintain a municipal water supply for the residents of northern Marshall County. The association is presently accepting bids for construction of a well, water storage tank, treatment center, and water distribution system. Work is expected to begin in the fall of 1992, with water mains in place and serving the affected residents by the summer of 1993. This project should alleviate the need for EPA to provide a long-term drinking water alternative for the affected residents.

2. Potential for Continued State/Local Support

Neither the state nor local government has the resources currently available to perform the necessary removal action at this site. Thus, these entities will act in a support role throughout the duration of this proposed removal.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

A. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

The Enterprise Recovery Systems site satisfies the following criteria set forth in Section 300.415(b)(2) of the National Contingency Plan (NCP).

(ii) Actual or potential contamination of drinking water supplies or sensitive ecosystems;

Actual contamination of drinking water supplies has been documented at three private residential wells located adjacent to the facility, as well as from monitoring wells placed on facility grounds. The contaminants are those solvents routinely stored and processed at the facility, or the break-down components of those solvents. The facility is located in the recharge area of the Kosciusko Aquifer and the headwaters of Nonconnah Creek. Further contamination of this aquifer is threatened by the potential for release from abandoned drums and tanks at the facility.

(iii) Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release;

Hazardous substances are currently stored in drums, tanks and laboratory containers at the site. Materials have been essentially abandoned since the facility ceased operations in October 1991. Numerous drums show signs of past leakage as well as ongoing deterioration of the metal drums. There are also significant areas of staining on the concrete surrounding the two drum storage areas. The storage tanks show evidence of pitting and scaling corrosion, as well as evidence of past leaks within the containment area.

(iv) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;

Soil samples obtained from various locations on the Enterprise property show high levels of contamination from hazardous substances. The geologic units encountered at the site are characterized by very fine to course grained sands in a formation approximately 100 feet thick beneath the site. This structure permits relatively rapid, unobstructed migration of water and contaminants from site soils and groundwater. The direction of hydrologic flow has been identified and is generally northwesterly, in the direction of the majority of the homes near the facility.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health or welfare or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. PROPOSED ACTIONS

1. Proposed Action Description

The actions necessary to complete the clean-up of this site include: provide alternative water supply to affected residents, contingent on results of well sampling; compatibility analysis of drummed and tank materials to develop a sample bulking scheme; bulk tank and drum materials according to bulking plan, then sample for disposal analysis; conduct soil sampling to determine level and extent of soil contamination; lab packing of laboratory items; contract for disposal of bulked waste streams; transportation and disposal of bulked materials and lab pack items; excavation, transportation and disposal of soils if contamination is verified; and connect residents to proposed rural water system and permanently close their current wells.

All bulked materials will be disposed of in accordance with EPA's off site disposal policy. It is expected that all materials will be disposed of off-site and on-site treatment will be limited to solidification and bulking. Excavation of the contaminated soil and disposal in a RCRA-permitted landfill will mitigate the public health threat posed by further drinking water contamination.

Post-removal site control will be discussed with state and local authorities and may be limited to maintaining site security, which is presently a perimeter fence and locked gate.

Following approval of this Action Memorandum, site activities can begin. The following paragraphs summarize the proposed site tasks and estimated time frame for their completion.

Task 1 - Complete all drum and tank sampling. Use subcontract laboratory or mobile lab trailer to conduct compatibility analysis of materials. This will provide waste stream characterization and development of bulking scheme, minimizing number of individual waste streams and subsequent disposal analysis requirements. Inventory all laboratory items and submit bids for lab packing and disposal. Prepare sampling plan to address site soils. Provide alternative water supplies contingent on sampling results. Time frame 15 working days.

Task 2 - Bulk all drum and tank wastes according to bulking plan. Desludge tanks as necessary. Sample all bulked waste streams for disposal analysis and submit samples to contract lab, considering recycling as an alternative to disposal. Conduct soil sampling according to sampling plan and submit samples for analysis. Time frame 10 working days.

Task 3 - Upon receiving the results of disposal analysis, prepare waste profile sheets for disposal facility acceptance, contract and ship all materials. Award lab packing and disposal contract. Upon receiving results of soil analysis, excavate as required and sample for disposal analysis. Time frame 10 working days.

Task 4 - Upon receiving soil disposal analysis, contract and dispose of contaminated soils. Decontaminate or demolish tanks, fill and grade where soil has been excavated. Time frame 5 working days.

Task 5 - Connect residences to rural water supply trunk line, close private wells. Time frame 10 working days.

The duration of the on-site activities is estimated to require approximately 50 working days or 10 work weeks, not counting delays due to inclement weather, analytical results, disposal acceptance and shipping windows. The removal action is not expected to exceed twelve (12) months.

2. Contribution to Remedial Performance

This site is not currently on the NPL and no long-term remedial action is currently planned. However, those actions planned in this Action Memorandum are consistent with the requirement of Section 104 (a)(2) of CERCLA.

3. Description of Alternative Technologies

It is anticipated that recycling, where appropriate and practical, and off-site treatment will be the technologies pursued during this removal action.

4. Applicable or Relevant and Appropriate Requirements (ARARs)

ARARs within the scope of this project, including RCRA and the CERCLA regulations that pertain to the disposal of hazardous wastes, will be met to the extent practicable.

5. Project Schedule

Task 1 - 15 working days
Task 2 - 10 working days
Task 3 - 10 working days
Task 4 - 5 working days
Task 5 - 10 working days

Total estimated project schedule 50 working days or 10 work weeks

7. Estimated Costs

A summary of the estimated costs for the proposed removal action is presented below.

Extramural Costs:

Regional Allowance Costs: Total Cleanup Contractor Costs (This cost category includes OSC estimates for: ERCS, subcontractors, and a 20% contingency.)	$500,000
Other Extramural Costs Not Funded From the Regional Allowance: Total TAT, including multiplier costs	$ 30,000
Subtotal, Extramural Costs	$530,000
Extramural Costs Contingency (20% of Subtotal, Extramural Costs; round to nearest thousand)	$106,000
TOTAL, EXTRAMURAL COSTS	$636,000
Intramural Costs:	
Intramural Direct Costs	$ 12,000
Intramural Indirect Costs	$ 25,000
TOTAL, INTRAMURAL COSTS	$ 37,000
TOTAL, REMOVAL PROJECT CEILING	**$673,000**

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

The hazardous substances discussed in previous sections of this Action Memorandum remain on-site. Delays in conducting the proposed removal action will result in the continued threat to the public health, welfare and the environment in the event of a release. Additionally, soil contaminants will continue to migrate into the groundwater, causing an increase in the level of well contamination.

In the event action is delayed or not taken, a worst-case scenario would involve a fire which could start as a result of vandalism. The outcome would be an uncontrolled release of solvents into the soil and groundwater, and toxic vapors into the atmosphere with resultant exposure to the proximate population and environment. Another scenario would be the accidental

release of solvents, some of which are carcinogenic, into the soils and groundwater as a result of drum or tank deterioration.

VII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues related to this site or potential removal action.

VIII. ENFORCEMENT

See Enforcement Addendum

IX. RECOMMENDATION

This decision document represents the selected removal action for the Enterprise Recovery Systems site, in Byhalia, Mississippi, developed in accordance with CERCLA as amended and not inconsistent with the NCP. This decision is based on the Administrative Record for the site.

Conditions at the site meet the NCP Section 300.415 (b)(2) criteria for a removal and I recommend your approval of the proposed removal action. The estimated costs of $500,000 for mitigation contracting are within the Regional Advice of Allowance for FY-92.

Approved: /s/ RICHARD D. GREEN DEPUTY FOR Date: SEP 23 1992
Joseph R. Franzmathes, Director
Waste Management Division

Disapproved: _____ Date: _____
Joseph R. Franzmathes, Director
Waste Management Division

cc: Robert J. Rogers
Mississippi Department of
Environmental Quality

Rosen 9/22/92 Norman 9/22/92 Lair 9/22/92 Green 9/23/92

release of solvents, some of which are carcinogenic, into the soils and groundwater as a result of drum or tank deterioration.

VII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues related to this site or potential removal action.

VIII. ENFORCEMENT

See Enforcement Addendum

IX. RECOMMENDATION

This decision document represents the selected removal action for the Enterprise Recovery Systems site, in Byhalia, Mississippi, developed in accordance with CERCLA as amended and not inconsistent with the NCP. This decision is based on the Administrative Record for the site.

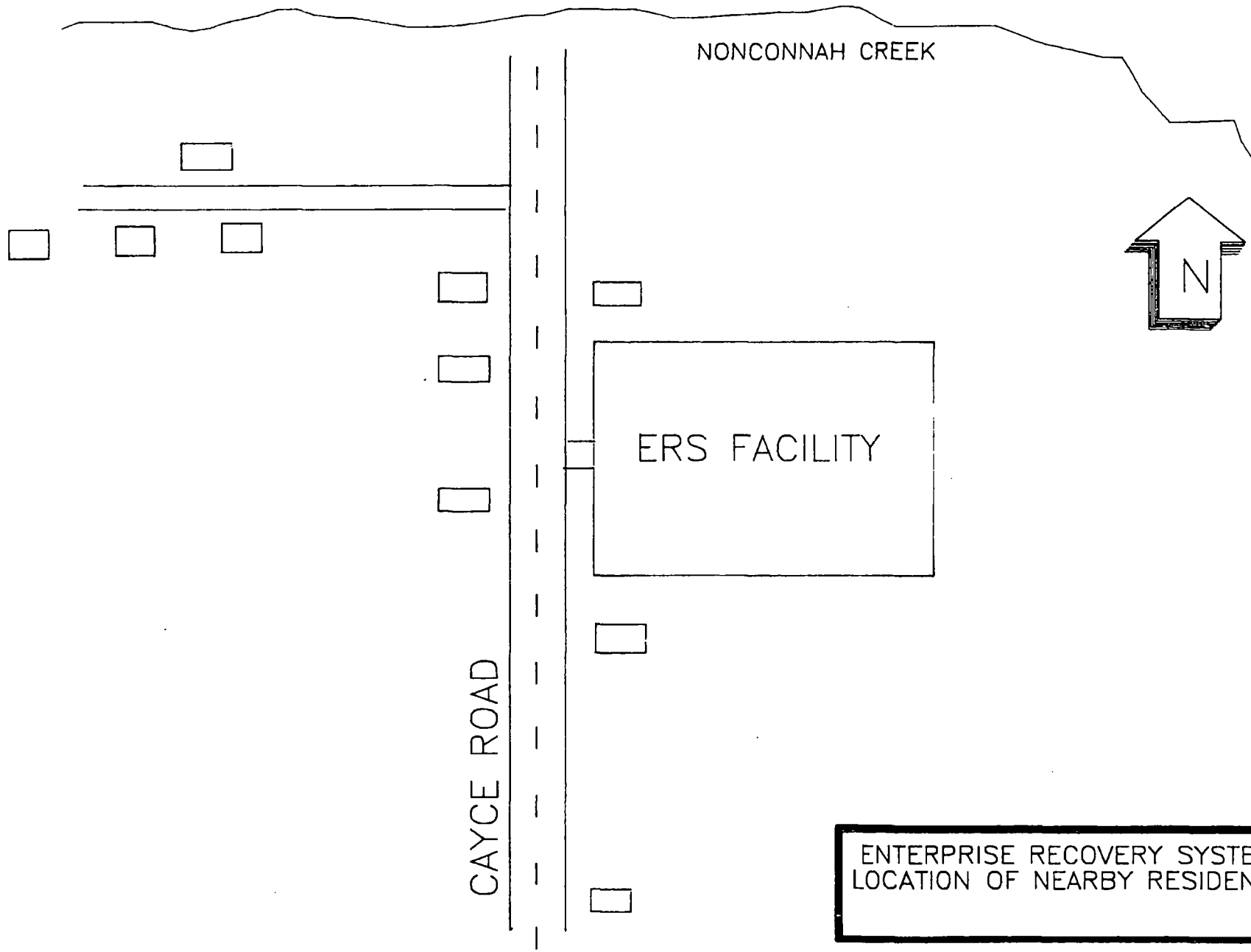
Conditions at the site meet the NCP Section 300.415 (b)(2) criteria for a removal and I recommend your approval of the proposed removal action. The estimated costs of $500,000 for mitigation contracting are within the Regional Advice of Allowance for FY-92.

Approved: Richard D. Green /for Date: 9/23/92

Disapproved: _____ Date: _____

Joseph R. Franzmathes, Director
Waste Management Division

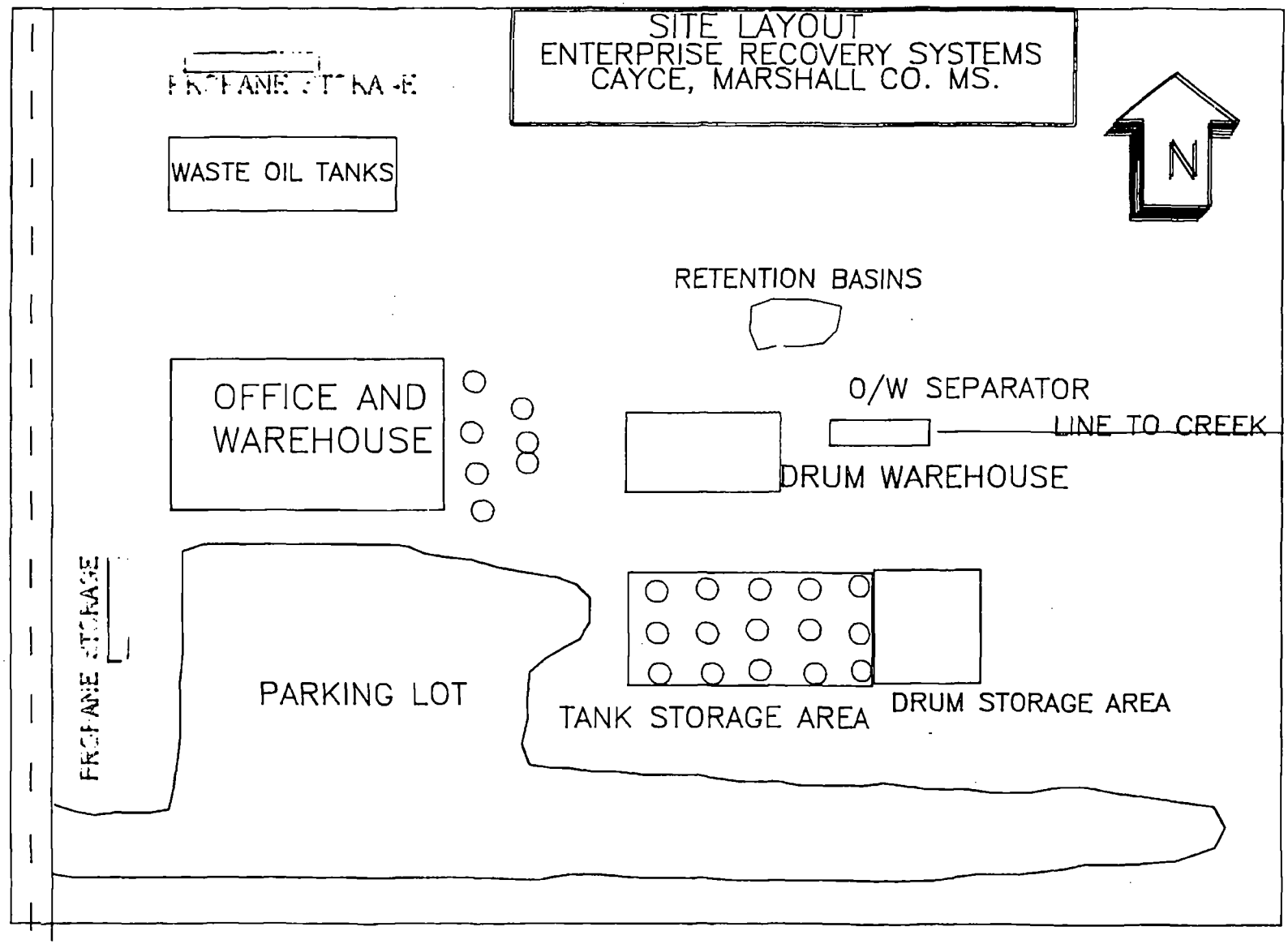
cc: Robert J. Rogers
Mississippi Department of
Environmental Quality



ENTERPRISE RECOVERY SYSTEMS
LOCATION OF NEARBY RESIDENTS

ATTACHMENT - SITE MAP

14



ATTACHMENT - SITE MAP

15

ENFORCEMENT ADDENDUM - ENFORCEMENT SENSITIVE

Enterprise Recovery Systems - September 1992

EPA is in the processing of reviewing a Notice Letter which will be issued to the owner of the facility. The Agency anticipates the owner will provide a list of companies and/or individuals who may themselves be liable or who may have information which could help identify other PRPs, in which event, EPA will issue Information Request Letters and Notice Letters as appropriate.

A Unilateral Administrative Order has been prepared and will be issued to the facility owner. This order requires the facility owner to carry out essentially the same actions outlined within the DEQ order. However, it is highly unlikely the facility owner will be able to comply with this order, given his history of noncompliance.

A title search is being conducted to determine past history of site ownership, or any liens or mortgages which may have been placed on the property. If appropriate, a financial status assessment will be performed on any companies or individuals identified by the title search.

Reference 21
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

EPA DELIVERY ORDER FOR EMERGENCY RESPONSE CLEANUP SERVICES

(This delivery order is issued subject to all terms and conditions of the contract identified in Block 2.)

1. DATE OF ORDER	2. CONTRACT NUMBER	3. ORDER NUMBER
See item #13.	68-S1-4005	4005-F4- 015

4. TIME OF INITIAL ORDER *(If initial order was verbal) (Specify Time Zone)*	5. DELIVERY ORDER CEILING AMOUNT *(Obligated Amount)*
N/A. ☐ AM ☐ PM	$500,000.00

6. ACCOUNTING AND APPROPRIATION DATA

Appropriation Number	Document Control No.	Account Number	Object Class
68-20X8145	DH0154	2TFA4ADE0Q	25.35

7a. ISSUED TO: CONTRACTOR *(Name, Address, and ZIP Code)*

Four Seasons Industrial Services, Inc.
3107 South Elm-Eugene Street
Post Office Box 16590
Greensboro, NC 27416

8a. ISSUED BY: ORDERING OFFICE *(Name, Address, and ZIP Code)*

U.S. EPA - Region IV
Emergency Response & Removal Branch
345 Courtland St., N.E.
Atlanta, GA 30365

7b. PROGRAM MANAGER *(Name and Phone Number)*: Jim Knowles (919) 273-2718

8b. EPA REGION/USCG DISTRICT: Region IV

8c. ZONE: 2

7c. RESPONSE MANAGER *(Name and Phone Number)*: To be determined.

8d. ON-SCENE COORDINATOR *(Name and Phone Number)*: Robert N. Rosen (404) 347-3931

9. RESPONSE LOCATION *(Site Name and/or Address and ZIP Code)*

Enterprise Recovery Systems
Route 5, Box 287 Cayce Road
Byhalia, MS

10. CONTRACTOR REQUIRED ON SITE *(Date and Time) (Specify Time Zone)*: November 10, 1992 8:00 ☒ AM ☐ PM

11. REQUIRED WORK COMPLETION DATE: August 15, 1993

12. STATEMENT OF WORK

The Contractor shall furnish the necessary personnel, materials, services, facilities, and otherwise do all things necessary for or incident to the performance of the work set forth below:

1. Mobilize required personnel and equipment to site at date indicated in block 10.
2. Conduct daily health and safety meetings while at site.
3. Develop waste bulking scheme based upon chemical compatibilities.
4. Conduct sampling and required analysis to support disposal of drummed and tank wastes and contaminated soils.
5. Arrange for transport and disposal of all wastes.
6. Provide on-going and consistent support for transport and disposal.
7. Submit daily work summaries and all cost management support documents promptly.
8. Perform other incidental removal actions within the delivery order statement of work as directed by the OSC.

10300629

13. ORDERING OFFICER

NAME/TITLE	SIGNATURE	DATE
Walter Cedrick Walker Contracting Officer	Walter Cedrick Walker	9-25-92

EPA Form 1900-59 (11-83) CONTRACTING OFFICER

Reference 22
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176

FOUR SEASONS
INDUSTRIAL SERVICES, INC.

P.O. Box 16590 • 3107 South Elm-Eugene St. • Greensboro, NC 27416-0590 • 919-273-2718
Fax Number 919-274-5798

Date: 11/4/92

To: Bob Rosen

Title/Department: OSC

Fax Phone Number: 404-347-4464

No. Pages (Including Cover): 4

From: Keith Burch

Title/Department: Remedial Dept.

Message:

If you do not receive this telecopy in its entirety, please call:

Name:

Phone Number: (919) 273-2718

10300495

PROJECT MEMORANDUM

Enterprise Recovery Systems Site
Four Seasons ERCS Group
DO: 4005-F4-015

TO: Bob Rosen (EPA-OSC)

FROM: Keith Burch (ERCS-RM)

DATE: November 4, 1992

SUBJECT: Recommended Phase I Work Plan
For Enterprise Recovery Site

Relative to this Phase of the project, I am proposing the following resource list:

Personnel:

(1) Response Manager
(1) Operational Safety Officer (billed at tech rate)
(3) Technicians

Equipment:

(1) Stocked Emergency Response Van
(1) Stocked Service Truck
(1) Pickup Truck
(1) Office Trailer (Rental)
(1) Forklift w/ personnel basket (rental)
(1) Tractor & Bushhog (rental if desired)
(1) PID
(1) CGI
(1) Breathing Air Cart with regulators attached
(1) Air Compressor (Rental)
(1) Pumping Equipment
Miscellaneous

Materials and Supplies:

PPE (Level B and Level C Gear)
Tool Assortments
Sorbents
Sampling Equipment and supplies
Miscellaneous

Pursuant to our recent site visit and conversations, I have prepared this Work Plan to outline the anticipated order of activities to accomplish Phase I of this project. As I understand the objectives, we will complete all sampling necessary to effect waste profiling and ultimate disposal. The following sequence of events is expected:

1992-11-04 05:07 9192745798 FOUR SEASONS INC 009 P02

1) MOBILIZATION

2) SITE SETUP
- crew debriefing
- health & safety plan review & signing
- site tour
- trailer, trash & porta jon delivery and setup
- county permitting and power company activation
- electrician service
- equipment staging and setup
- equipment rental as necessary
- copier and fax machine delivery & setup
- ERCS computer setup
- various clearing activity as required
- telephone service establishment
- local emergency contacts and notifications
- various tasks as directed or as time allows

3) PUMP OUT PRODUCT IN TANK DIKE
- repair leaking dike
- locate tank leak and repair if possible
- stage drums (if used) for sampling

4) FACILITY INVENTORY & RESTAGING
- move inside drums and strays to existing drum storage areas
- straighten up as necessary
- get empty count
- lab chemical inventory (* note that repacking of these materials will not occur until a disposal facility is selected. Packaging requirements will be specific to the TSDF).

5) NUMBERING AND LOGGING
- apply unique numbers to all containers to be sampled
- fill out initial logsheet information (i.e. drum type, labelling, etc.)

6) DRUM SAMPLING
- container opening
- sampling and logging

7) TANK EVALUATION
- gain sampling access to tanks
- determine tank levels, layering, etc.

8) TANK SAMPLING

9) ENVIRONMENTAL SAMPLING
- scope per OSC direction

1992-11-04 05:08 9192745798 FOUR SEASONS INC P03

10) MISCELLANEOUS
- per OSC direction
- clearing work (bushhog and weedeater if required)

11) DECON

12) DEMOBILIZATION

This first phase of field work is anticipated to be completed within 2 weeks. Upon return to Four Seasons Headquarters, compatibility analyses, sample bulking and disposal profile analyses will be initiated and completed. Once the compatibilities are completed, I will provide a sample bulking proposal and associated proposed analytical parameters for your review.

If you have any questions or modifications concerning this proposed work plan, please call.

cc: *Jim Noles, FSIS Program Director*
Vic Young, Roy F. Weston TAT

E:WPLAN1

1992-11-04 05:09 9192745798 FOUR SEASONS INC P04

WESTON 1575 Northside Dr., N.W., Suite 325, Bldg. 300, Atlanta, GA 30318 404-352-4147

TECHNICAL ASSISTANCE TEAM FOR EMERGENCY RESPONSE REMOVAL AND PREVENTION
EPA CONTRACT 68-WO-0036

MEMORANDUM

TO: Bob Rosen, OSC
EPA, Region IV

FROM: Vic Young
TAT, Region IV

THRU: Donnissa L. Duvic
TATL, Region IV

SUBJECT: Interim Report, Enterprise Recovery Systems
Cayce, Marshall County, Mississippi
TDD# 04-9210-0131-4137
TAT# 04-F-00989

DATE: 10 April 1993

10300536

SITUATION

This report is to satisfy the requirements of Technical Direction Document (TDD)# 04-9210-0131, issued to the Roy F. Weston, Incorporated Technical Assistance Team (TAT), Memphis, Tennessee satellite office, by Region IV of the United States Environmental Protection Agency (EPA).

The general requirements of the TDD, issued by On-Scene Coordinator (OSC) Bob Rosen, were to conduct a soil sampling investigation on 01 March 1993, and a water sampling investigation on 16 March 1993, at the site of a former solvent recycler facility in Cayce, Marshall County, Mississippi (Figure 1-3).

SUMMARY OF SOIL SAMPLING

On Wednesday 01 March 1993, TAT members Young and Benson collected a total of eighteen surface soil samples and one water sample from an area around the Enterprise Recovery Systems (ERS) facility (Figure 4). The nineteen samples included one duplicate and one sample collected from the Smith residence as a background sample from offsite.

Samples 1,4,5,6, and 20 (which was a duplicate of sample 6), were collected on the south side of the facility and did not indicate any significant contamination (Figure 4). Soil sample 3 was collected at the outside corner of the aboveground storage tank farm. The analytical data from sample 3 indicated 4,200 µg/L xylenes, and lesser amounts of toluene and ethylbenzene.

Soil samples 7,8, and 9 were collected in an area of surface soil discoloration around and emanating from the drum warehouse and tank farm area. Analytical data indicated 2,700 - 16,000 µg/L 1,1,1-trichloroethane, 190-2,200 µg/L ethylbenzene, 296-2,150 µg/L toluene, 909-9,400 µg/L trichloroethylene, and up to 20,000 µg/L xylenes. All three soil samples were discolored, as was nearby vegetation (photo 1 and 2). Soil samples 15 and 16 were collected approximately 150 feet downgradient from the stained soils and were void of volatiles and any discoloration.

Soil samples 10,11,12, and 13 were collected on the northside of the facility and were obtained primarily to characterize potential contamination from areas around the small drum warehouse, from aboveground storage tanks on the concrete apron, and from the three large storage tanks on the north side of the office warehouse (Figure 4). Of those four samples, only sample 10 contained any volatiles.

Samples 14 and 18 were collected from sludge and water in a small holding pond behind the drum warehouse. Volatiles were not detected in either sample.

Soil sample 17 was collected from the dry creek bed that drains from the northeastern sector of the site out to Nonconnah Creek. No volatiles were indicated by the analytical data in this area. In addition to the volatile analysis, each sample was tested for the 25 target metals. None of the samples indicated metal levels significantly higher than the offsite background sample.

SUMMARY OF RESIDENTIAL WATER SAMPLING

On 16 March 1993, TAT members Young, Benson, and Ken Whitten from the Mississippi Department of Environmental Quality (MSDEQ), collected drinking water samples for volatile analysis from nine residential wells adjacent to the ERS facility and collected water samples for volatile analysis from three monitoring wells on the ERS grounds. Figure 5 shows the location of the residences and the corresponding sample numbers.

All drinking water wells that were sampled had been previously tested within the last twelve months except for sample 10, taken from the well of Mrs. Grace Salmon (Figure 5). During this sampling trip the water was tested for volatiles only. ETC, Incorporated, a laboratory located in Memphis, Tennessee, conducted the analyses.

Of the nine wells sampled, three (samples 2,3, and 5) indicated measurable levels of 1,1,1-trichloroethane, trichloroethylene, and 1,1-dichloroethylene. Sample 2 was collected from the Crum residence and indicated 16 µg/L trichloroethane, 33 µg/L trichloroethylene, and approximately 4 µg/L dichloroethylene (Figure 6). From data provided by previous sampling trips the Crum trichloroethylene values are somewhat lower than the July 1992 sampling trip, but equal to the other trips, while the trichloroethane values are relatively constant (Figure 6). Sample 3 from the Cook residence indicated a 9 µg/L level of 1,1,1 - trichloroethane and 16 µg/L of trichloroethylene. Both compounds have stayed within a very narrow range except for the July 1992 sampling trip. The Watkins/Reed/Boyce well tested 77 µg/L trichloroethylene and 11 µg/L trichloroethane, both values were lower than the July and September 1992 sampling trips. Figure 12 shows the trichloroethane and trichloroethylene values with the x-axis representing six sampling trips conducted by the state and federal EPA. The y-axis represents the analytical results in µg/L.

SUMMARY OF MONITORING WELL SAMPLING

In addition to drinking water sampling, OSC Rosen also directed the TAT to collect groundwater samples from three monitoring wells onsite to aid in determining the extent, origin, and levels of contamination. The monitoring wells were last sampled in March-April 1992.

The TAT chose MW-3, MW-4, and MW-8 since all three were downgradient of the probable source of contamination and at least two, MW-3 and MW-8, could be tested for volatiles from the same location at different screen depths (100-110 and 67-77 feet, respectively). MW-3 and MW-4 were chosen because they represented wells in an upgradient-downgradient position (Figure 7).

Each of the three monitoring wells was purged of three well volumes (88 trips), prior to the samples being collected with teflon bailers and sent to ETC, Incorporated for volatile analysis. MW-3 and MW-4 screens were set between 100-110 feet, while the MW-8 screen was set between 67-77 feet.

While testing the wells, the TAT noted a high pH in MW-4, ranging between 10.8 - 11.0, while the two others wells had a pH ranging between 5.5 - 5.8. The TAT suspected the high pH was due to the effect of bentonite or grout from the well development process coming into direct contact with the aquifer. A check of the State of Mississippi drilling records indicated that this well was drilled and developed differently than the other wells. MW-4 was drilled to 80 feet with a 10 inch hole and then deepened to 114 (Figure 8). As a result, there was grout from 71.4 feet (the potentiometric surface) to 80 feet, that was in direct contact with the aquifer. This was probably enough grout and bentonite to raise the pH to the levels that were observed. A quick check of the pH from all of the other sampled monitoring and residential wells

indicated that the regional pH range was between 5.5 and 5.8.

Analytical results from MW-3 indicated 1,100 µg/L 1,1,1-tricholeroethane, 261 µg/L trichloroethylene, and 35 µg/L 1,1-dichloroethane during the 16 March sampling trip. During the March-April 1992 sampling trip the well had 273 µg/L 1,1,1-trichloroethane, 67 µg/L trichloroethylene, and 10 µg/L dichloroethane. The concentrations for all three compounds were three to four times higher during the March 1993 sampling event than they had been in the previous sampling event in March 1992.

Analytical data from MW-8 revealed nondetectable levels of 1,1,1-trichloroethane, 138,000 µg/L trichloroethylene, and 3,960 µg/L dichlorethene during the March 1993 sampling trip, which was higher for trichloroethylene and dichloroethene than the previous trip. Note that MW-3 and MW-8 are laterally within 10 feet of each other, however, the MW-3 screens are from 100-110 feet while the MW-8 screens are between 67-77 feet.

MW-4 had trichloroethylene levels of 295 µg/L, 84 µg/L of 1,1,1-trichloroethane, and 27 µg/L of dichloroethene. All values tested were significantly higher with regard to the March-April 1992 sampling trip.

CONCLUSION

Soils

It appeared there is a relationship to the presence of volatiles in the surface soil and the presence of discolored soil at the ERS site. The discolored soil at sample locations 7, 8, and 9 were from a relatively recent spill which is probably why the volatiles were present in these quantities. Sample 3 did show relatively high levels of xylenes and toluenes, however, no obvious staining or chlorinated organic solvents were present.

Drinking Water

Only the three residents (Crum, Cook, and Watkins) that had volatiles detected from earlier sampling trips, had volatile contaminants in their drinking water during the March 1993 sampling event.

The trichloroethylene levels have varied significantly during the twenty months of sampling at the three residential well locations. The July 1992 peak is somewhat anomalous to the remaining sampling dates and cannot be easily explained. Based on the drinking water data, it is recommended that the residential well sampling be continued, and possibly increase the sample frequency.

Monitoring Wells

The volatile totals for all monitoring wells sampled had increased significantly from March 1992, to the most recent March 1993

sampling trip. Since the sampling procedures used during the March 1993 trip were duplicated as closely as possible to the March 1992 trip, it is felt that the increase in the trichloro- compound concentrations are most likely a function of concentration changes in the volatiles of the actual aquifer onsite.

The question was raised by the MSDEQ and the OSC about the potential for the "immediate" migration of the volatiles from onsite and the adjacent residential wells, to an area approximately 1500 feet east, where approximately ten residences are located along an east-west road (Figure 7).

The direction of groundwater flow has been established as flowing in a northwesterly direction from the site. The TAT acquired water table data from residential wells provided by the State of Mississippi and combined it with monitoring well data to gain a more detailed picture of the water table. Figure 9 shows the potentiometric surface for the main drinking water aquifer in the area. It indicates the highest head is on the southeastern portion of the ERS facility and the lowest at the Watkins/Boyce/Reed residence (Note the Watkins home has the highest trichloroethane/trichloroethylene values of any residential well in the area). A model for the combined trichloroethane/ trichloroethylene levels greater than 250 ug/l from the March-April 1992 sampling trip would indicate that the only areas affected are the monitoring wells downgradient from the site and the Watkins residence (Figure 10). A similar model showing areas greater than 100 ug/l during the March 1993 trip also would indicate that the contaminant plume is quite narrow and probably runs perpendicular to the potentiometric surface map.

Without water table information from the additional residences it would be difficult to predict the direction of the plume past the Watkins residence. Even if the plume reached the houses, the contaminants are DNAPL's (Dense Nonaqueous Phase Liquids) and the well screens are less than 100 feet, and the first confining unit is below 300 feet. Consequently, the volatiles may pass under the homes and not contaminate their drinking water

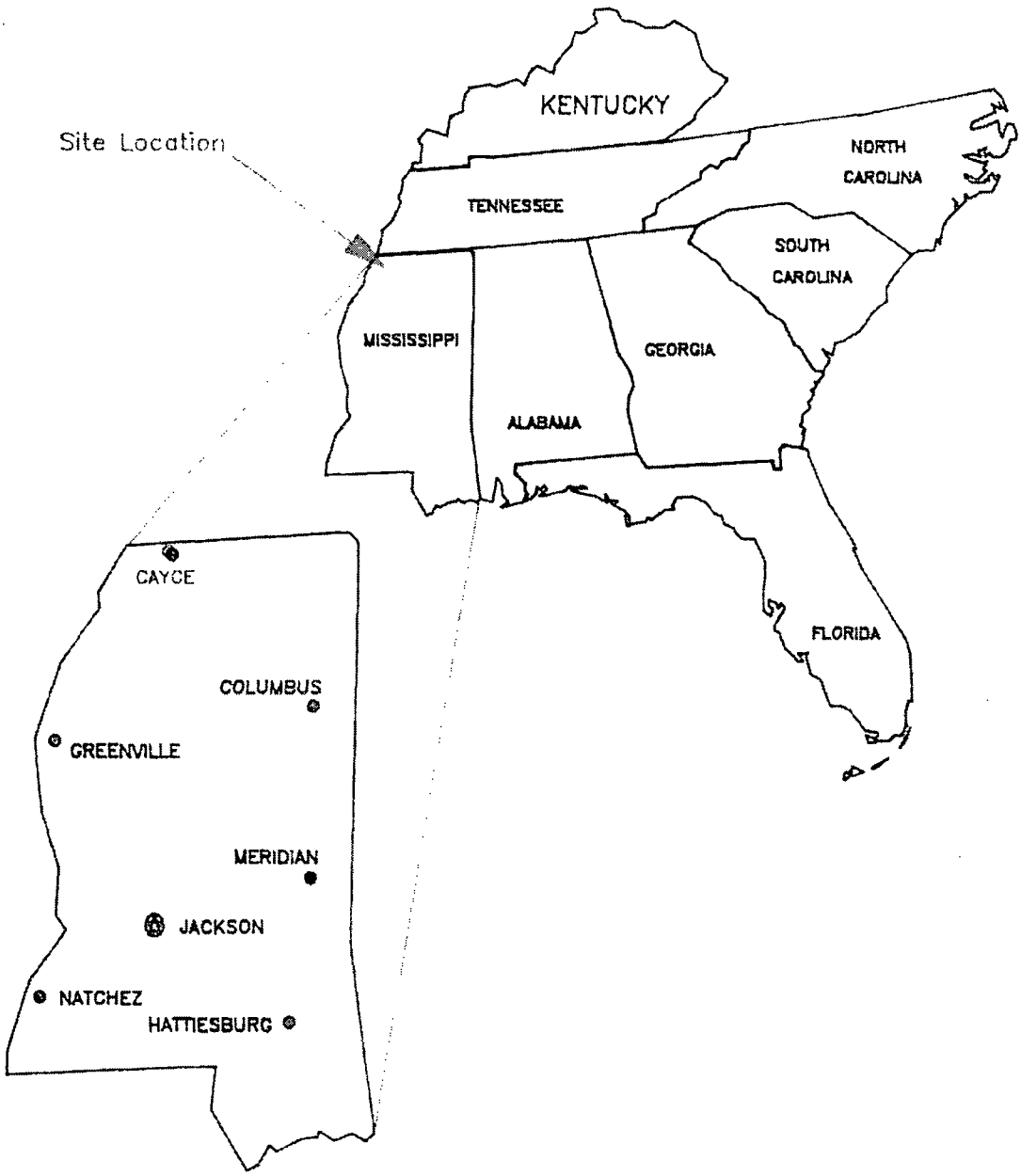
The TAT sampled one home on the south side of the street in November of 1992, and found it to be free of any volatiles. However, considering the concentration of volatiles at the Watkins residence, and the fact that the levels do not appear to be retreating, additional sampling should be considered.

ATTACHMENTS

Figure 1 - General Location Map
Figure 2 - Site Location Map
Figure 3 - Site Diagram
Figure 4 - Surface Soil Contamination Map
Figure 5 - Location of Residential and Monitoring Wells
Figure 6 - Trichloro Compound levels in Wells
Figure 7 - Additional Residences Map
Figure 8 - Well Diagram
Figure 9 - Potentiometric Surface Map
Figure 10 - Model For Trichloro - Compound Movement
Figure 11 - Model for Trichloro - Compound Movement
Figure 12 - Trichloroethane/Trichloroethylene levels vs time
Figure 13 - Monitoring Well Trichloro- Compound Levels
Attachment A - Photographs
Attachment B - Chronological Log
Attachment C - Table of Witnesses
Attachment D - Site Safety Plan
Attachment E - Chain of Custody
Attachment F - Soil Analytical
Attachment G - Water Analytical

Figure 1

General Location Map

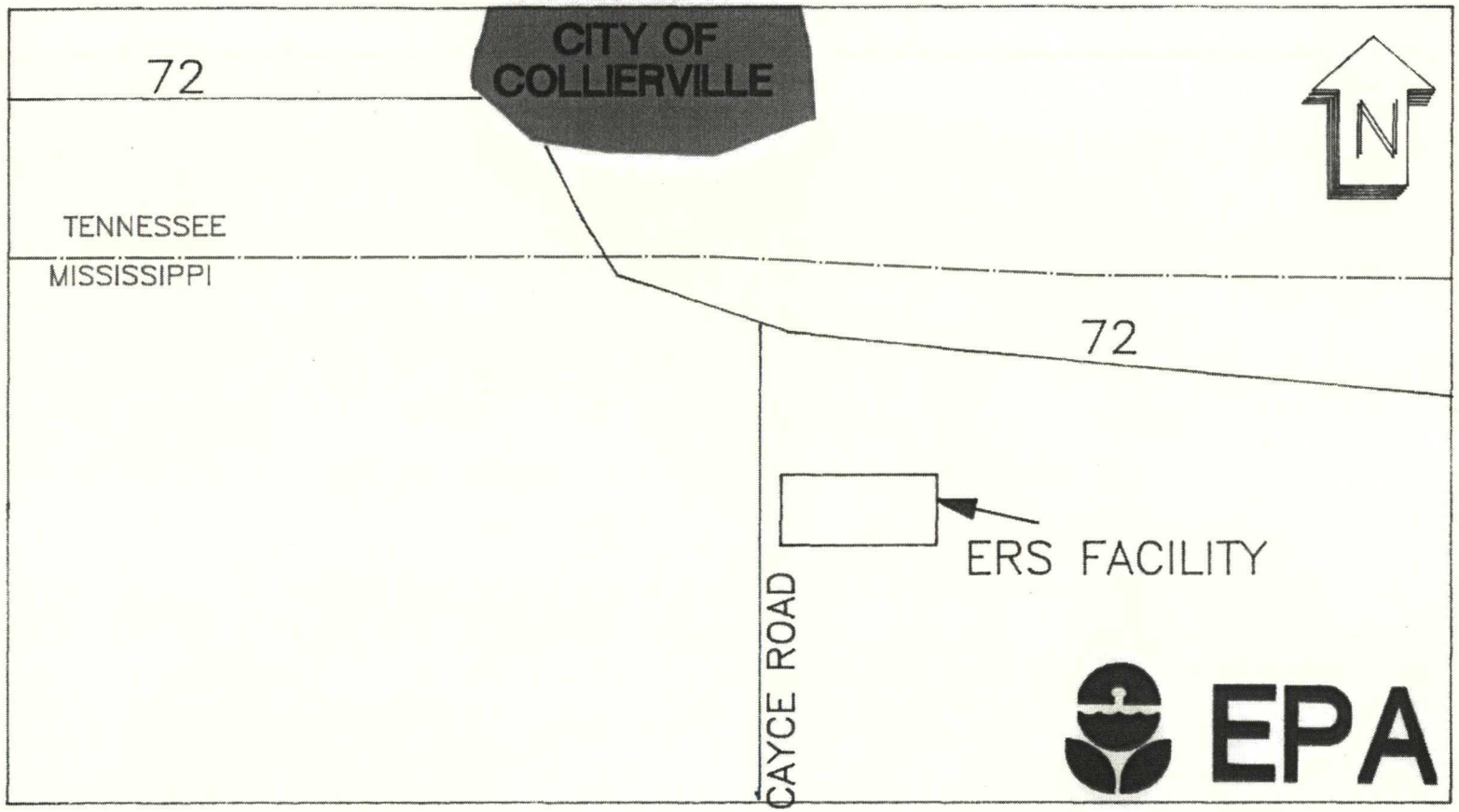


E.P.A. Region IV
Weston T.A.T. Activity Location
TDD# 0492100131
ENTERPRISE RECOVERY SYSTEMS
CAYCE, MARSHALL COUNTY, MISSISSIPPI

EPA

Figure 2

Site Location Map



ROY F. WESTON Region IV TAT

ACTIVITY DESCRIPTION: SITE LOCATION

SITE LOCATION Cayce, Marshall County, Ms.

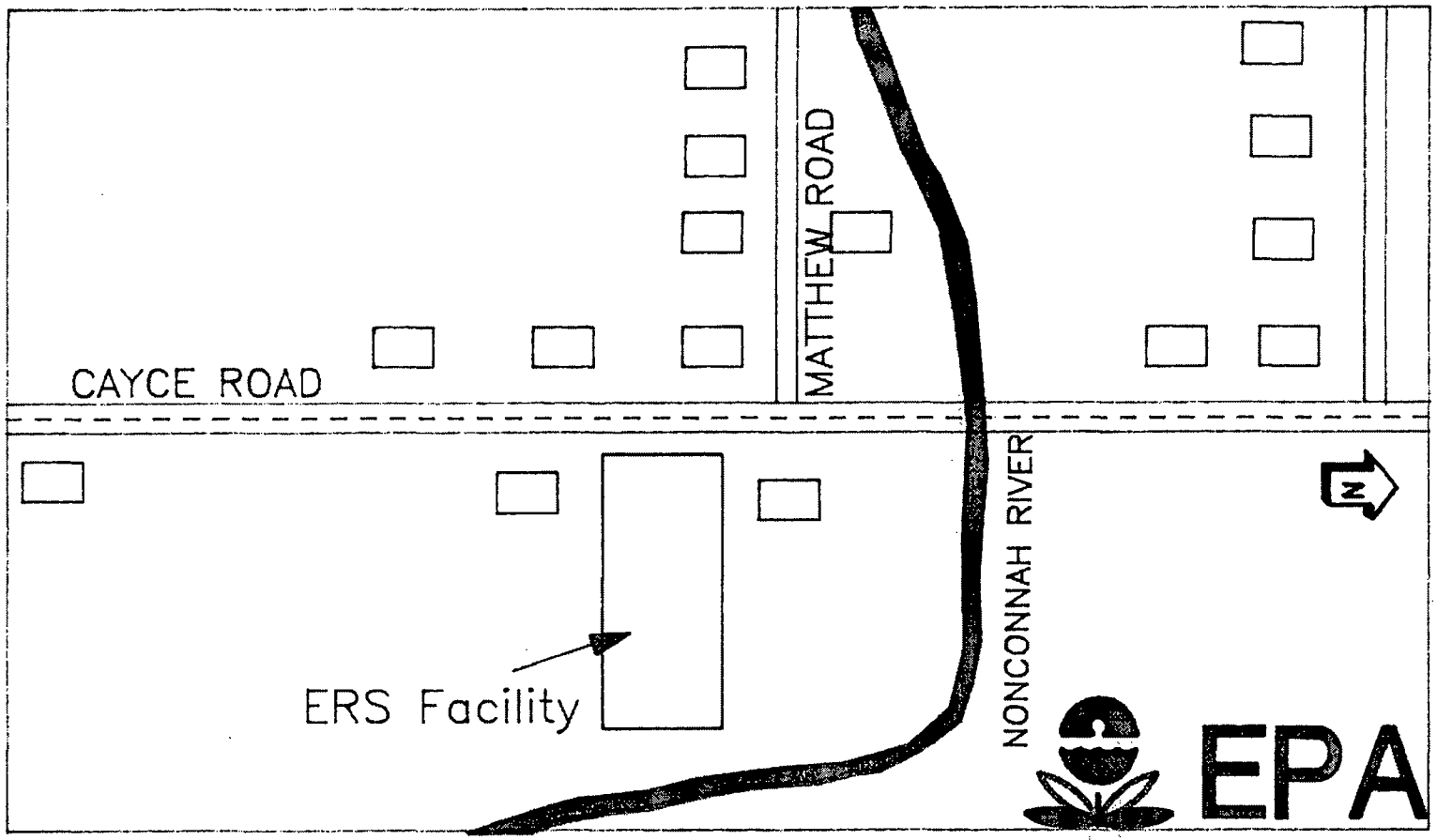
SITE: Enterprise Recovery Systems

TDD NO.: 0492100131

DATE: 12 MARCH 1993

Figure 3

Site Diagram



ROY F. WESTON Region IV TAT

ACTIVITY DESCRIPTION: SITE DIAGRAM

SITE LOCATION CAYCE, MARSHALL COUNTY, MS.

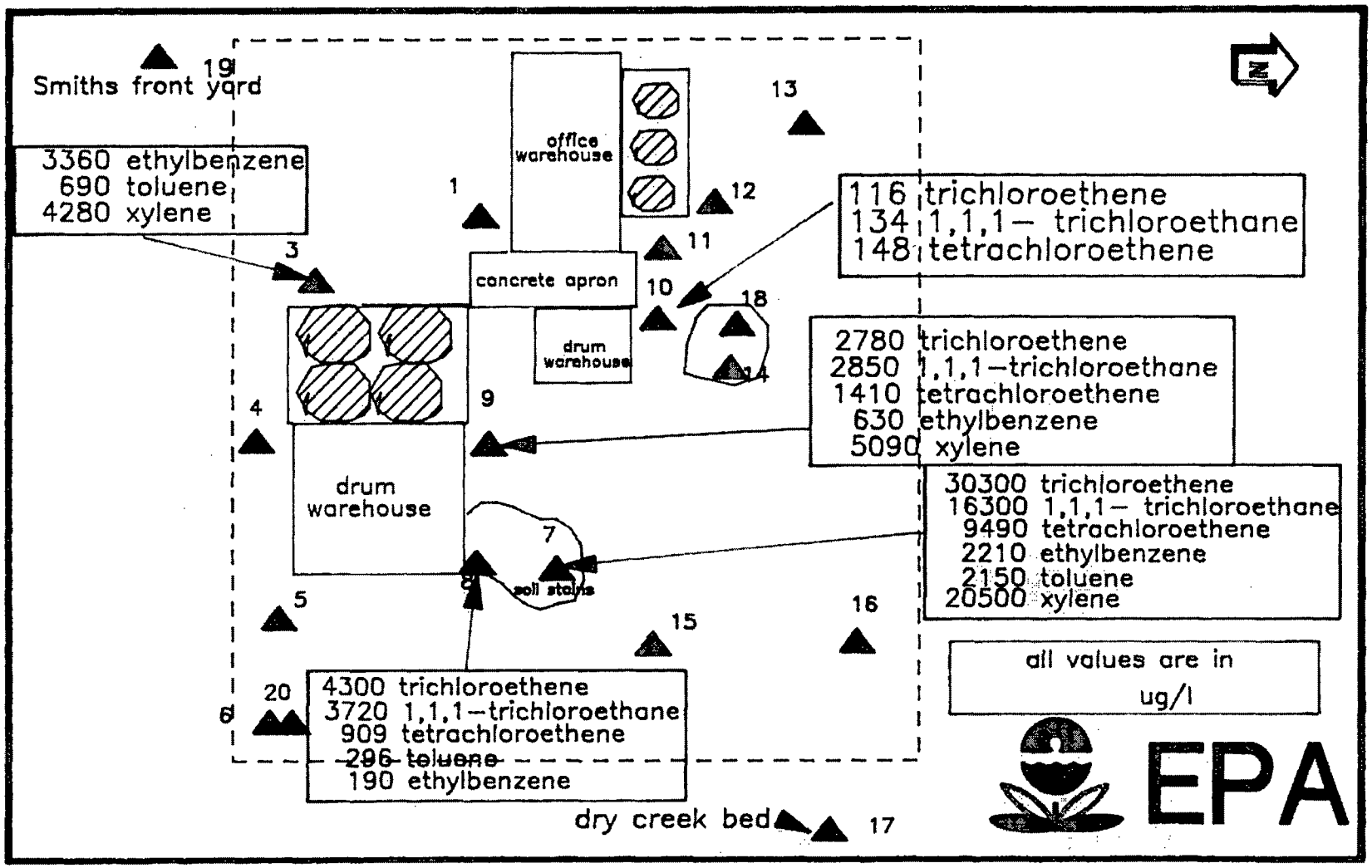
SITE: ENTERPRISE RECOVERY SYSTEMS

TDD NO.: 0492100131

DATE: 11 APRIL 1993

Figure-4

Surface Soil Contamination Map



ROY F. WESTON Region IV TAT

ACTIVITY DESCRIPTION: SURFACE SOIL CONTAMINATION MAP

CAYCE, MARSHALL COUNTY, MS.

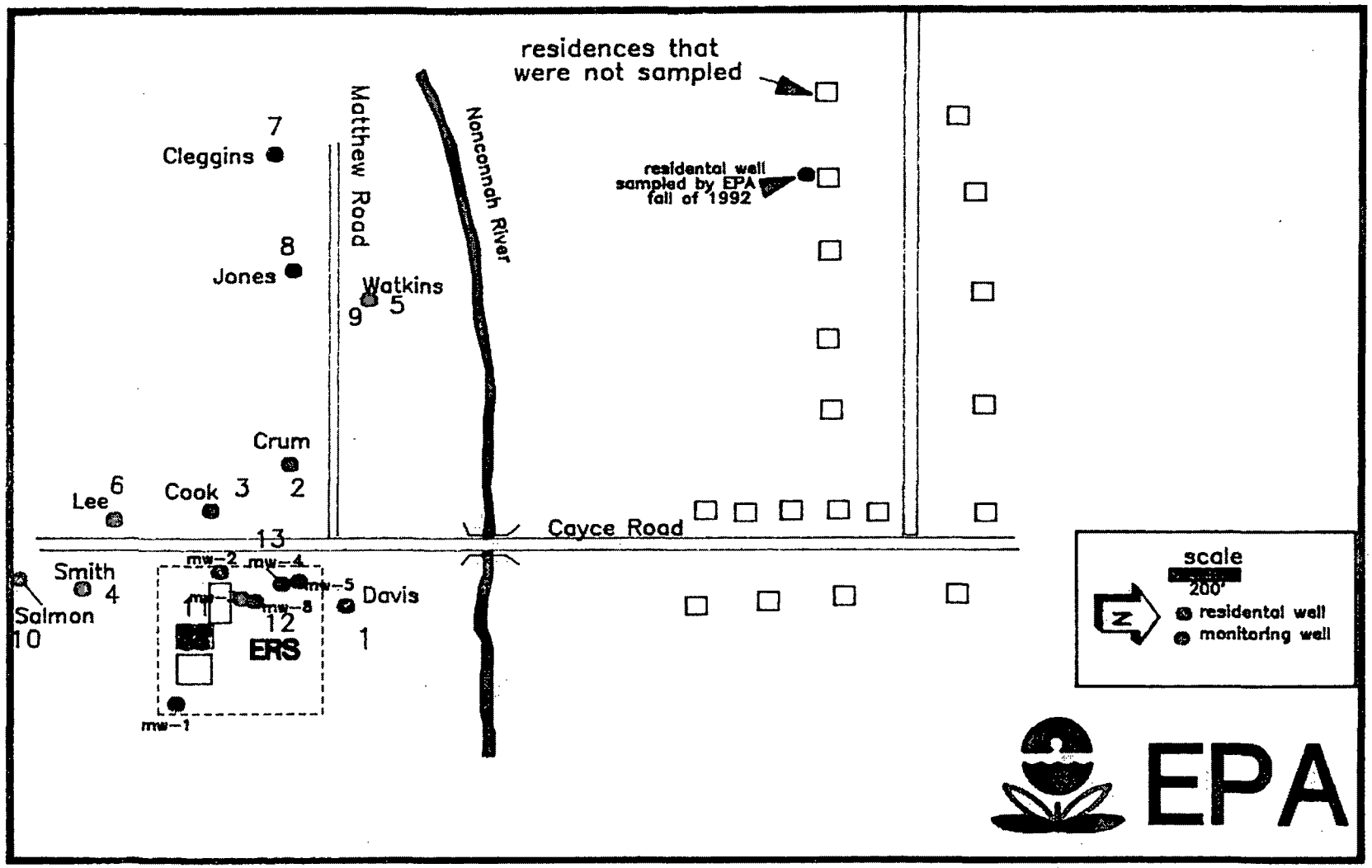
SITE: ENTERPRISE RECOVERY SYSTEMS

TDD NO.: 0492100131

DATE: 08 APRIL 1993

Figure 5

Location of Residential and Monitoring Wells



ROY F. WESTON Region IV TAT

ACTIVITY DESCRIPTION: WATER SAMPLE LOCATIONS

CAYCE, MARSHALL COUNTY, MS.

SITE: ENTERPRISE RECOVERY SYSTEMS

TDD NO.: 0492100131

DATE: 24 MARCH 1993

Figure 6

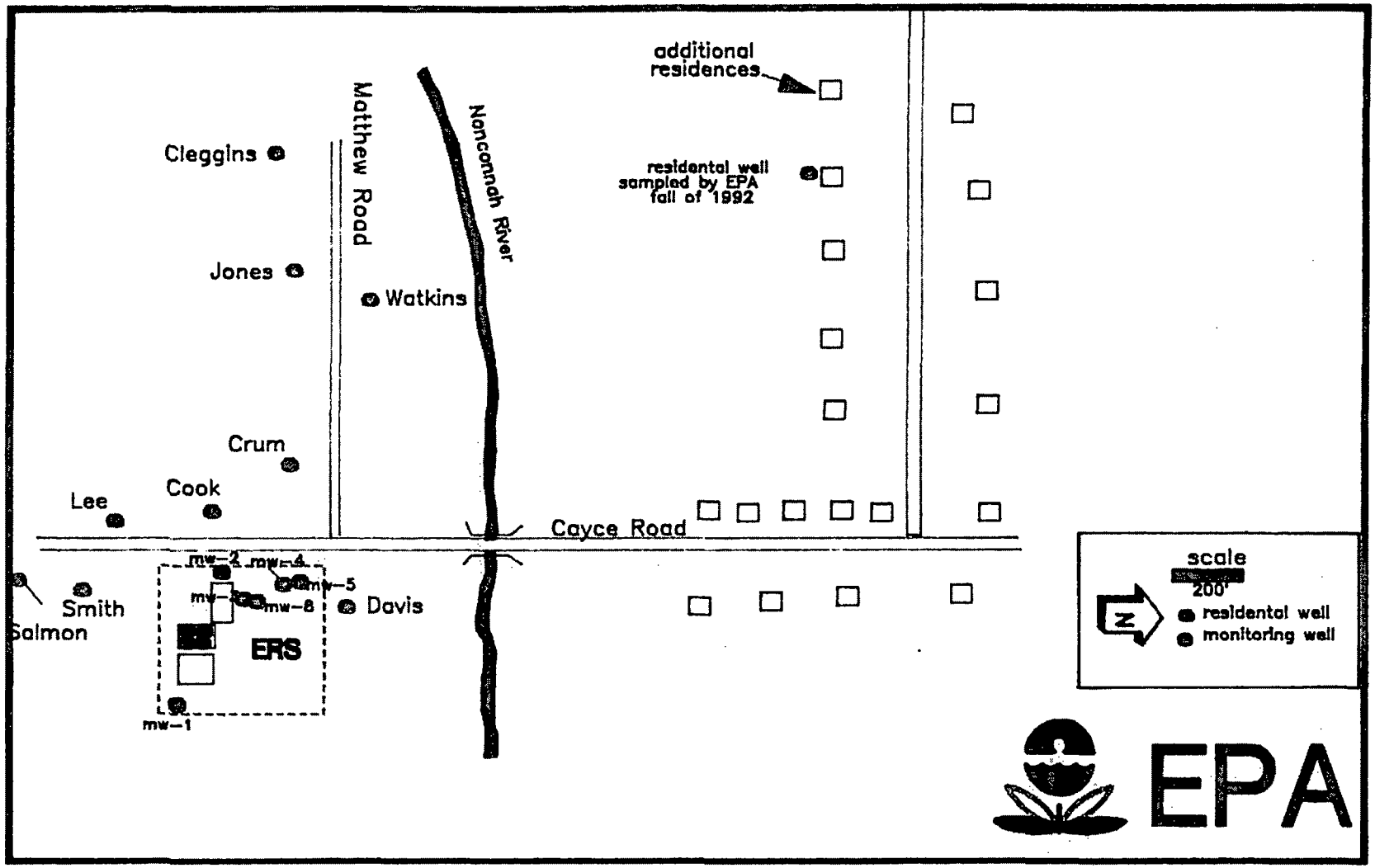
Trichloro Compound Levels in Wells

TRICHLOROETHYLENE AND 1,1,1-TRICHLOROETHANE VARIATIONS
ENTERPRISE RECOVERY SYSTEMS, CONTAMINATED DRINKING WATER WELLS

		JUL 1991	SEPT 1991	OCT 1991	NOV 1991	JUL 1992	SEPT 1992	MAR 1993	
	TRICHLOROETHYLENE	20	21-38			107	30	33	
CRUM	1,1,1-TRICHLOROETHANE	12	12-15			14	14	16	
	TRICHLORO'S ADDED	32	33-53			121	44	49	
	TRICHLOROETHYLENE			13		39	10	16	
COOK	1,1,1-TRICHLOROETHANE			11		7	8.8	9	
	TRICHLORO'S ADDED			24		46	18.8	25	
				all values are in ug\L					
	TRICHLOROETHYLENE				92	358	100	77-83	
WATKINS	1,1,1-TRICHLOROETHANE				17	17	17	11-12	
	TRICHLORO'S ADDED				109	378	117	88-95	

Figure 7

Additional Residences Map



ROY F. WESTON Region IV TAT

ACTIVITY DESCRIPTION: SITE LOCATION MAP

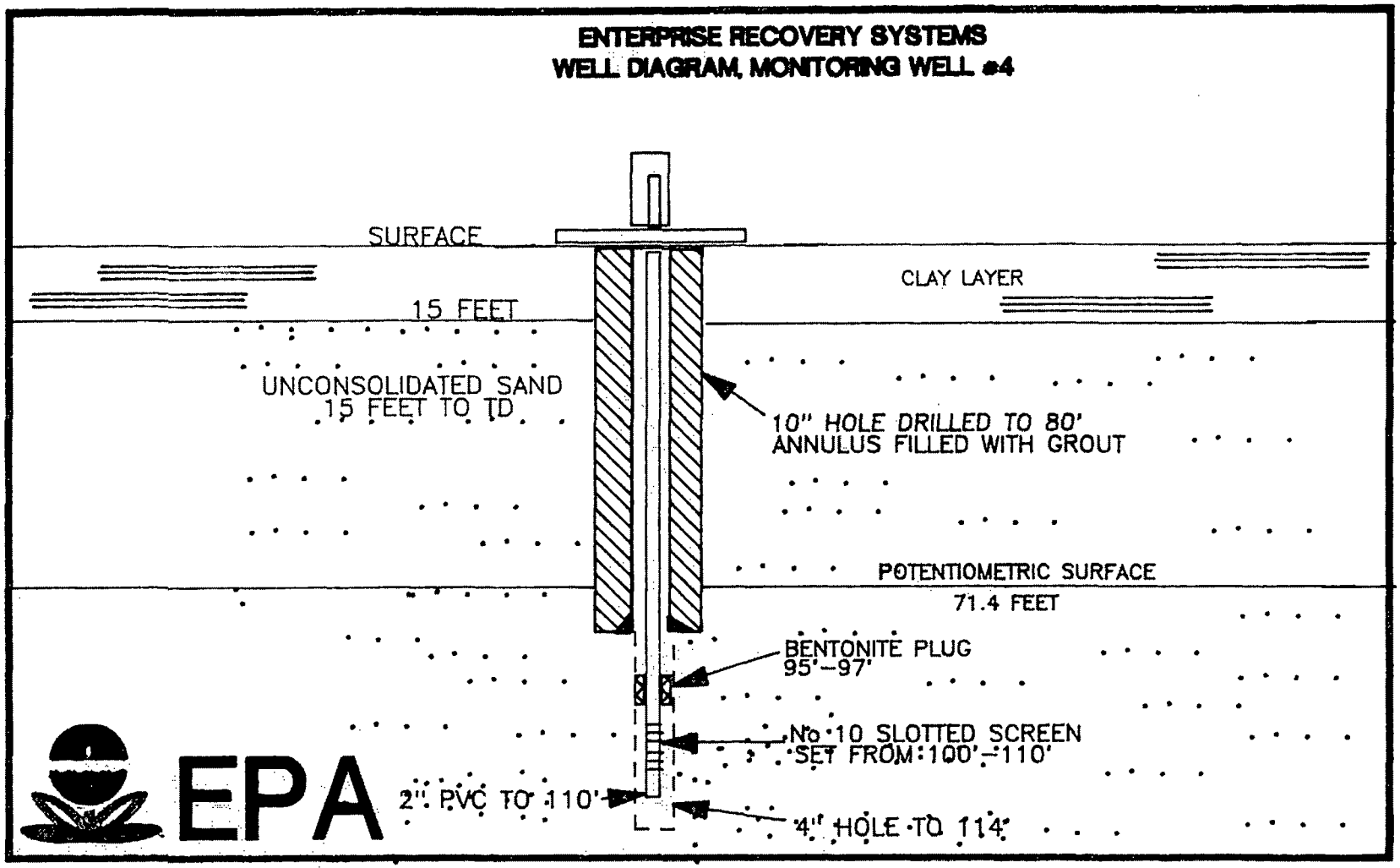
CAYCE, MARSHALL COUNTY, MS.

SITE: ENTERPRISE RECOVERY SYSTEMS

TDD NO.: 0492100131

DATE: 24 MARCH 1993

Figure 8
Well Diagram



ROY F. WESTON Region IV TAT

ACTIVITY DESCRIPTION: well diagram– not to scale

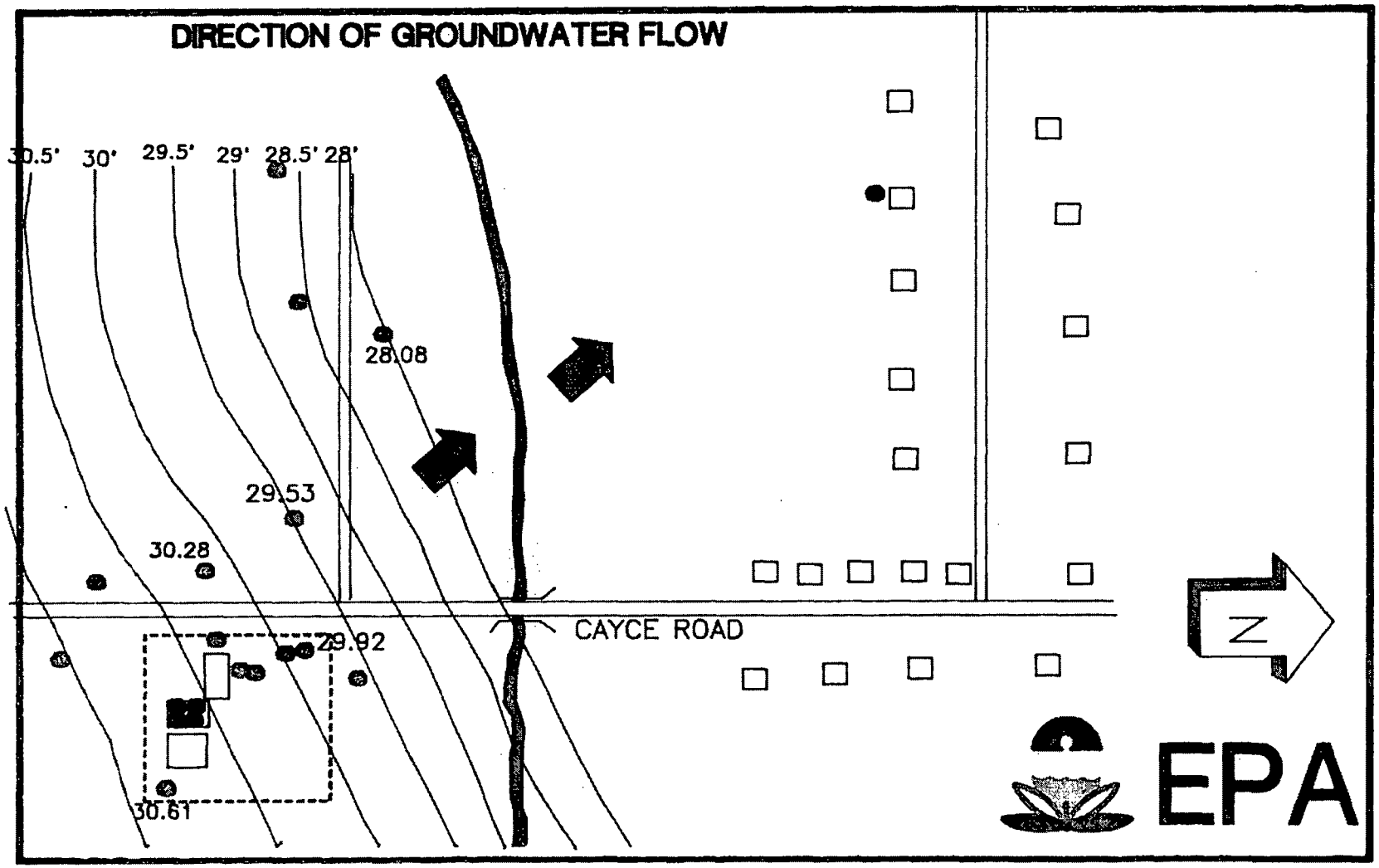
Cayce, Marshall County, Mississippi

SITE: Enterprise Recovery Systems

TDD NO.: 0492100131

DATE: 23 March 1993

Figure 9
Potentiometric Surface Map



ROY F. WESTON Region IV TAT

ACTIVITY DESCRIPTION: POTENTIOMETRIC MAP

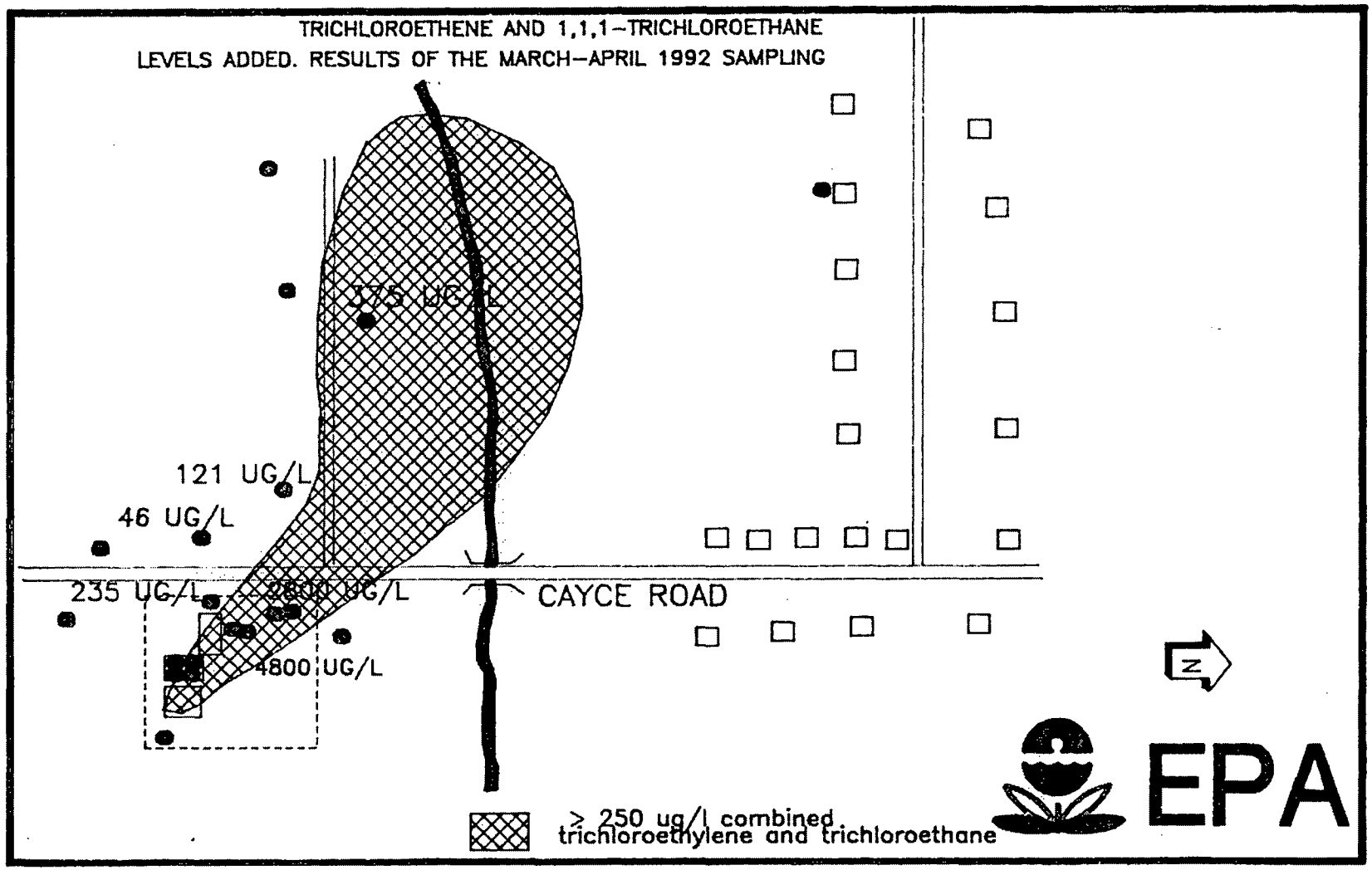
CAYCE, MARSHALL COUNTY, MS.

SITE: ENTERPRISE RECOVERY SYSTEMS

TDD NO.: 0492100131

DATE: 24 MARCH 1993

Figure 10
Model for Trichloro- Compound Movement



ROY F. WESTON Region IV TAT

ACTIVITY DESCRIPTION: VOLATILE CONTAMINATION

CAYCE, MARSHALL COUNTY, MS.

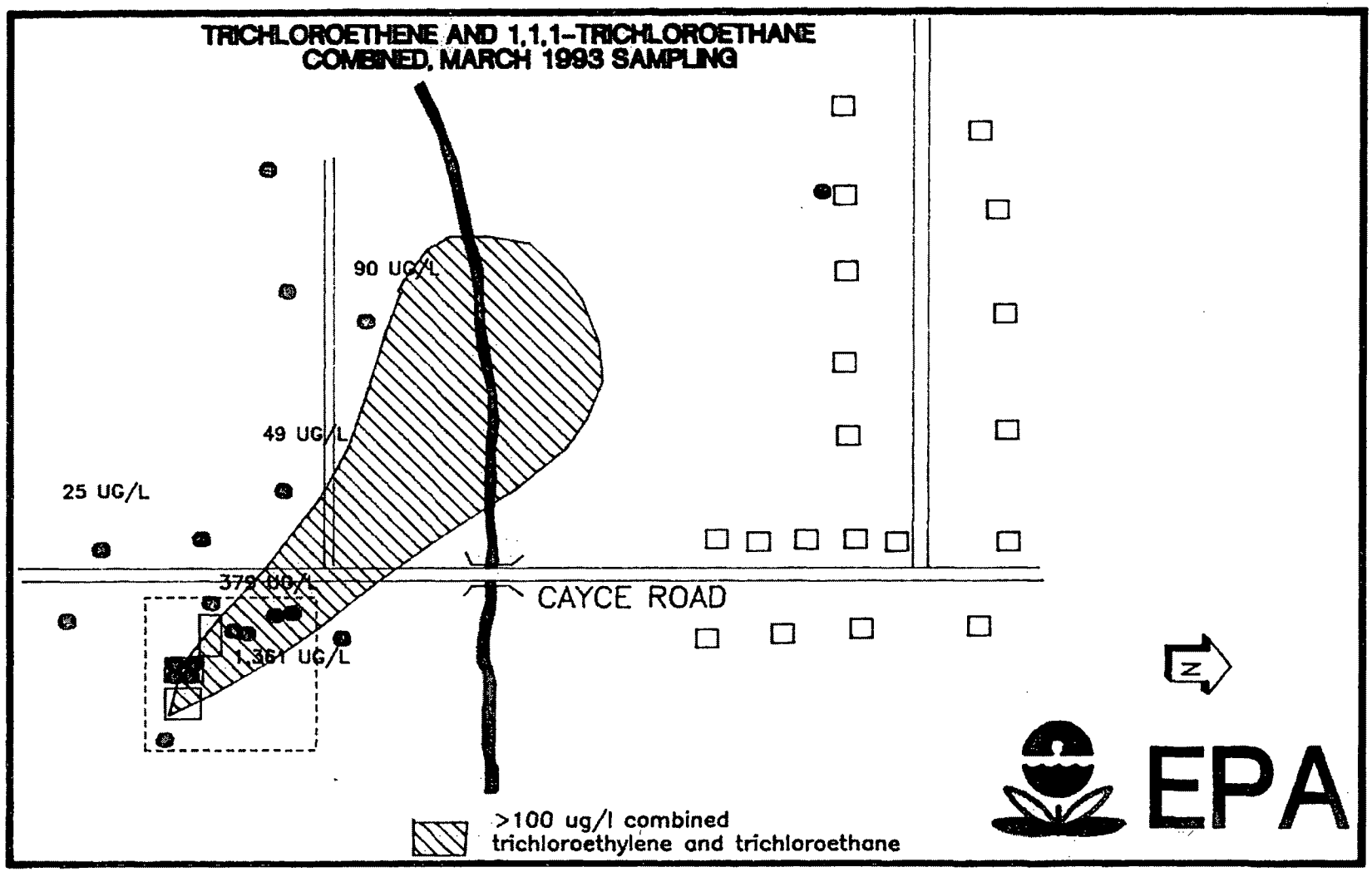
SITE: ENTERPRISE RECOVERY SYSTEMS

TDD NO.: 0492100131

DATE: 04 APRIL 1993

Figure 11

Model for Trichloro- Compound Movement



ROY F. WESTON Region IV TAT

ACTIVITY DESCRIPTION: VOLATILE CONTAMINATION

CAYCE, MARSHALL COUNTY, MS.

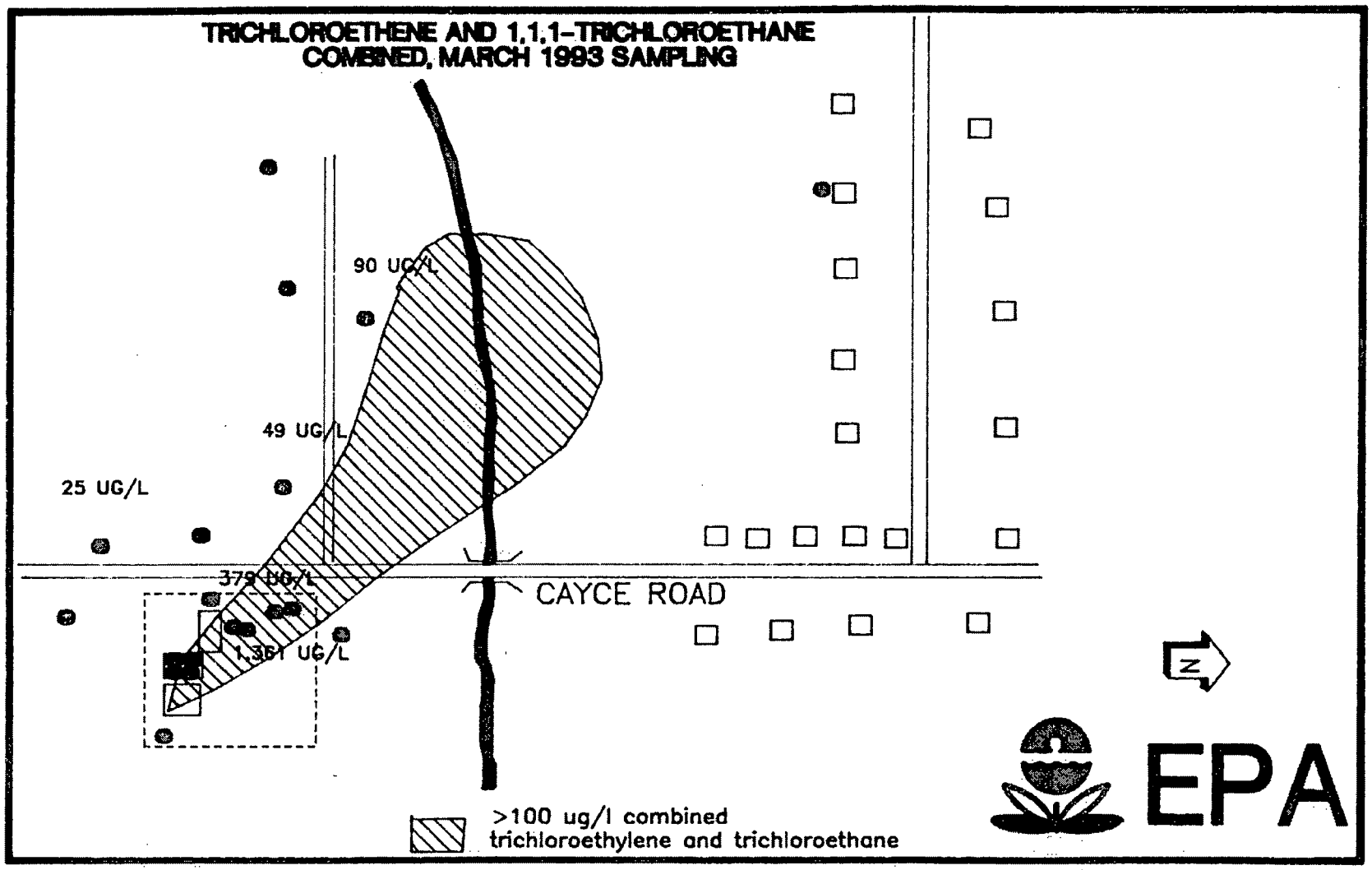
SITE: ENTERPRISE RECOVERY SYSTEMS

TDD NO.: 0492100131

DATE: 04 APRIL 1993

Figure 11

Model for Trichloro- Compound Movement



ROY F. WESTON Region IV TAT

ACTIVITY DESCRIPTION: VOLATILE CONTAMINATION

CAYCE, MARSHALL COUNTY, MS.

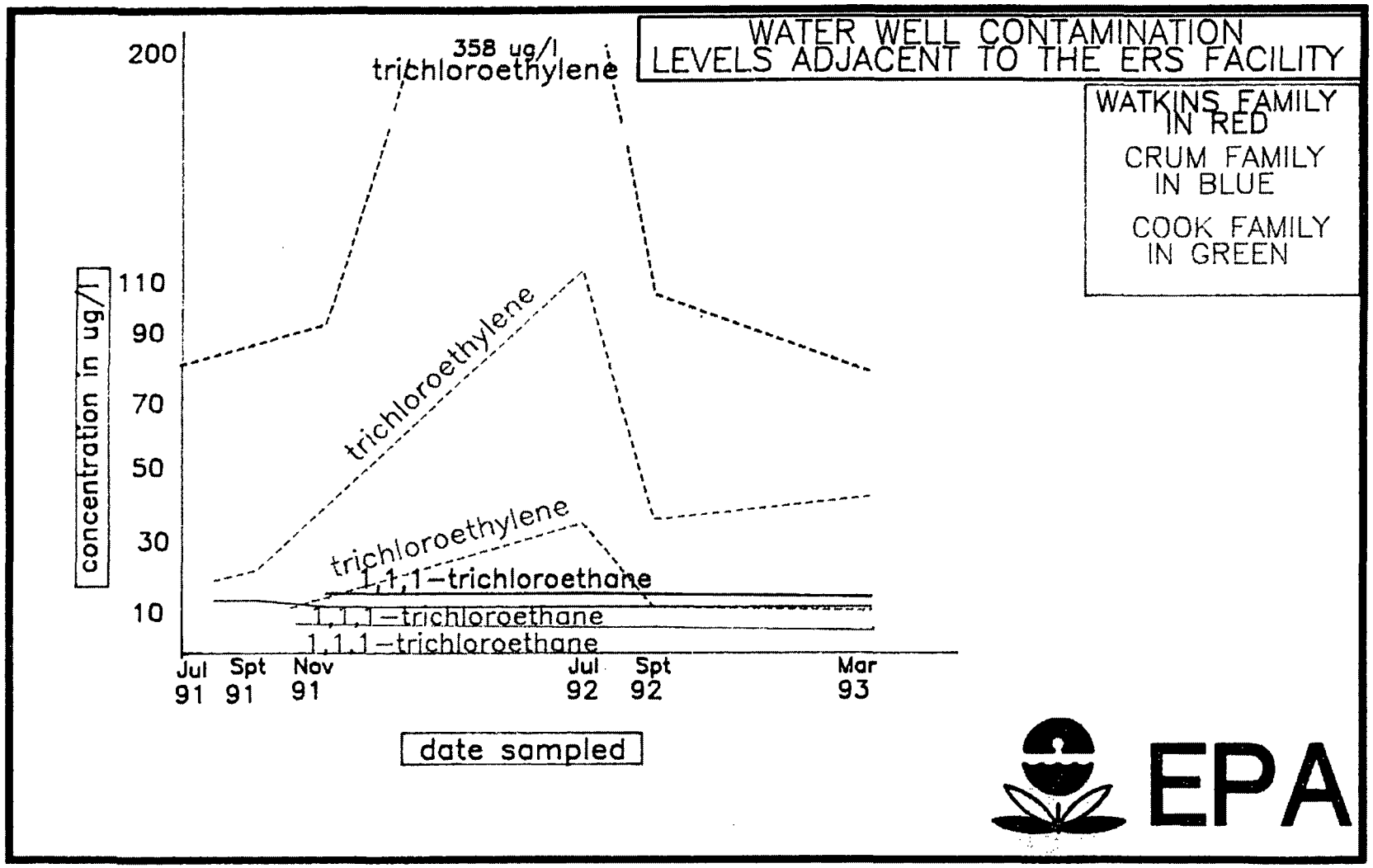
SITE: ENTERPRISE RECOVERY SYSTEMS

TDD NO.: 0492100131

DATE: 04 APRIL 1993

Figure 12

Trichloroethane/Trichloroethylene Levels VS Time



ROY F. WESTON Region IV TAT

ACTIVITY DESCRIPTION: CONTAMINANT LEVELS VERSUS TIME

CAYCE, MARSHALL COUNTY, MS.

SITE: ENTERPRISE RECOVERY SITE

TDD NO.: 0492100131

DATE: 08 MARCH 1993

Figure 13

Monitoring Well Trichloro - Compound Levels

TABLE COMPARING MONITORING WELL SAMPLING
AT ENTERPRISE RECOVERY SYSTEMS
DURING A 12 MONTH PERIOD

		1992 Sampling	1993 Sampling	Percent Change
MW-3	1,1 Dichloroethane	26	35	+34%
	Trichloroethane	273	1100	+402%
	Trichloroethylene	67	261	+389%
MW-4	1,1 Dichloroethane	37	27	-32%
	Trichloroethane	ND	84	
	Trichloroethylene	62	295	+475%
MW-8	1,1 Dichloroethane	270	3960	+1466%
	Trichloroethane	4106	ND	
	Trichloroethylene	518	138000	+26,000%

All Values Are in ug/l

ATTACHMENT B

Chronological Log

COLOR THAN THE BLACK FLUID THAT WAS PRESENT.
TAT ALSO NOTED SIGNIFICANT MOISTURE AROUND
SEVERAL DRUMS IN BUILDING WAREHOUSE #1.
WE SHOULD KEEP AN EYE ON THIS. THEIR
DID NOT APPEAR TO BE AN OBVIOUS LEAK. —
END TUESDAY DEC 1 1992 Vic Young
BEGIN TUESDAY, MARCH 16, 1993 —
ARRIVE ONSITE AT 0900 HOURS, VIC YOUNG,
BENSON, RANDY BARNHARDT, AND MSDEQ KEN
WHITTEN. —
0940 BEGIN SAMPLING VOAS, WILL TURN ON
FAUCETS BEGIN AT 1000. —
SAMPLE #1, DAVIS 1030 HOURS
SAMPLE #2, CRUM 1040 HOURS
SAMPLE #3, COOK 1118 HOURS
SAMPLE #4, SMITH 1124 HOURS
SAMPLE #5 DUPLICATE OF WATKINS 1044
SAMPLE #6 LEE 1120 HOURS
SAMPLE #7 CLEGGINS 1053 HOURS
SAMPLE #8 JONES 1052 HOURS
SAMPLE #9 WATKINS 1044 HOURS
SAMPLE #10 SALMON 1020 HOURS
SAMPLE #11 MW-3
SAMPLE #12 MW-8
SAMPLE #13 MW-4
PH IS BETWEEN 10.5 AND 11.0
MONITORING WELL #4 WATER LEVEL IS 70'.
NO READINGS ON OVA OR CGI. —
FINISH #4 AT 1130 HOURS LEAVE FOR LUNCH
1300 HOURS BEGIN WORK ON MW-3 AND MONITORING
WELL-8. —

Vic Young

THAT WAS PRESENT.
MOISTURE AROUND
DAMEHOUSE #1.
I THIS. THEIR
HOUSE LEAK. —
1992 Vic Young
1993 ——
HOURS, VIC YOUNG,
AND MSDEQ KEN
——
, WILL TURN ON
——
HOURS
HOURS
3 HOURS
4 HOURS
TKINS 1044
0 HOURS
3 HOURS
2 HOURS
4 HOURS
0 HOURS

11.0
LEVEL IS 70'.
GI. ——
LEAVE FOR LUNCH
MW-3 AND MONITORING
——
——
——
Vic Young

MW-3 - 71.4'
MW-8 - 71.2'
1300 HOURS BEGIN ——
1420 HOURS END ——
END WEDNESDAY MARCH 17, 1993 Vic Young
THE FOLLOWING ARE THE SITE NOTES REWRITTEN
FROM 1 MARCH 1993 SAMPLING TRIP TO ERS.
BEGIN 1 MARCH 1993 ——
ARRIVE IN OFFICE 0700 HOURS ——
0730 ADJUST EQUIP, CALIBRATE ——
0830 HOURS PREPARE TB. ——
1000 ARRIVE ONSITE ——
1100 HOURS DO AIR MONITORING ——
1155 HOURS COLLECT SAMPLE 1 NO SAMPLE 2
1228 HOURS " " 3' ——
1234 " " " 5'
1255 " " " 8'
1312 " " " 6' } DUP
1315 " " " 20 }
1318 " " " 12
1435 " " " 7
1445 " " " 10
1448 " " " 4
1500 " " " 9
1500 " " " 11
1513 " " " 13
1530 " " " 15
1540 " " " 16
1550 " " " 17
1600 " " " 18
1615 " " " 19
SAMPLE 19 WAS COLLECTED IN FRONT
OF THE SMITH'S RESIDENCE. Vic Young

ATTACHMENT C

Table of Witnesses

Table of Witnesses

Bob Rosen
USEPA Region IV, OSC
345 Courtland street NE
Atlanta, Georgia 30365
1-404-347-3931

Vic Young
Weston , TAT
3003 Airways Blvd.
Memphis, Tn.
1-901-398-6071

Ken Whitten
MSDEQ
PO Box 10385
Jackson, Ms.
1-601-961-5171

ATTACHMENT D

Site Safety Plan

WESTON MAJOR PROGRAMS DIVISION
HEALTH AND SAFETY PLAN
EMERGENCY RESPONSE / SITE INVESTIGATION

TDD No. 049208 0013 **Site Name:** Enterprise Recovery Systems (ERS)

Site Address: Street No. Box 287 Cayce Road (Lt 5)

City Cayce

County/State Marshall County, MS

Site Contact / Phone No.: Bob Rogers MSDEQ 601-961-5171
Jim T. Nixon MSRCRA 601-961-5095

Directions to Site:(Att.Map) Hwy 72 East, 1/4 mile south of TN/MS line. Rgt on Cayce Rd, 1/2 mile on left.

Historical/Current Site Information:
Operations ceased on 31 Oct 91 due to cancellation of insurance. MSRCRA performed Inspection which revealed 200 drums in warehouse, labeled for disposal w/ ERS as generator and 16 tanks of various solvents. Wtr samples indicate ppb levels of TCE, 111 Trichlor and 1,1 Dichlor.

Incident Type:
( ) Air Release -
( ) Spill -
( ) Fire -
(✓) HW Site - Former solvent recycler

Location Class : ( ) Industrial ( ) Commercial ( ) Urban/Residential (✓) Rural

USEPA Contact: Bob Rosen **Date of Initial Site Activities:** 19 Aug 92
Original HASP: Yes ✓ **Modification Number:**
Lead TAT: V. Young **Site Health & Safety Coordinator:** G.L. Slavin

Response Activities/Duration (fill in as applicable)

Emergency Response:
( ) Perimeter Recon.
( ) Site Entry
( ) Visual Documentation:
( ) Multi-media Sampling:
( ) Decontamination:

Assessment:
(✓) Perimeter Recon.
(✓) Site Entry
(✓) Visual Documentation:
( ) Multi-media Sampling:
( ) Decontamination:

one day

Physical Safety Hazards to Personnel

(✓) Heat ( ) Cold ( ) Precipitation ( ) Confined Space ( ) Terrain
( ) Walking/Working Surfaces ( ) Fire & Explosion ( ) Oxygen Deficiency
( ) Underground Utilities ( ) Overhead Utilities ( ) Heavy Equipment
(✓) Unknowns in Drums, Tanks, Containers ( ) Ponds, Lagoons, Impoundments
( ) Rivers, Streams ( ) Pressurized Containers, Systems ( ) Noise
( ) Illumination ( ) Nonionizing Radiation ( ) Ionizing Radiation

Biological Hazards to Personnel

( ) Infectious/Medical/Hospital Waste ( ) Non-domesticated Animals (✓) Insects
(✓) Poisonous Plants/Vegetation ( ) Raw Sewage (✓) Goat droppings

Training Requirements

(✓) 40 Hour General Site Worker Course with three days supervised experience.
( ) 24 Hour Course for limited, specific tasks with one day supervised experience.
( ) 24 Hour Course for Level D Site with one day supervised experience.
(✓) 8 Hour Annual Refresher Health and Safety Training.
( ) 8 Hour Management/Supervisor Training in addition to basic training course.
( ) Site Specific Health and Safety Training.
( ) Pre-entry training for emergency response skilled support personnel.

Medical Surveillance Requirements

(✓) Baseline initial physical examination with physician certification.
(✓) Annual medical examination with physician certification.
( ) Site Specific medical monitoring protocol (Radiation, Pesticide, PCB, Metals).
( ) Asbestos Worker medical protocol.
( ) Exempt from medical surveillance:_____.
(✓) Examination required in event of chemical exposure or trauma.

SITE ENTRY AND ACTION CRITERIA

	LEVEL	ACTION
Radiation	Background	Continue
	Background - 1 mr/hr or 3X Background	Proceed with CAUTION at direction of radiation physicist
	+ 1 mr/hr or 3X Background	Exit
Oxygen	19.5 % - 25.0 %	Continue
	Less than 19.5 %	SCBA required, CGI not reliable
	Greater than 25.0 %	Exit
Combustible Gas	Less than 10 % LEL	Continue
	10 % - 25 % LEL	Proceed with CAUTION
	Greater than 25 % LEL	Exit
Organic Vapor	up to 75% of most hazardous constituent PEL	Level D
	up to 75% of most hazardous constituent IDLH	Level C or B
Particulates	up to 75% of most hazardous constituent PEL	Level D
	up to 75% of most hazardous constituent IDLH	Level C or B

For unknowns, Engineering controls will be used to minimize contamination to the maximum extent possible.

These criteria are guidelines against which to make entry and action decisions. They are not guarentees of safety and are intended only for use by fully trained and qualified personnel.

Chemical Hazards To Personnel

Chemical Contaminant Trichloroethylene

PEL		ppm or mg/m3
TLV	50	ppm or mg/m3
IDLH	1000	ppm or mg/m3
Carcinogen	✓	Yes
		No
Physical Form		Solid
	✓	Liquid
		Gas
Color	colorless	
Odor	sweet	
Flashpoint	90 (non flam)	Degrees F or C
Flammable Limits	10.5	% UEL
	8.0	% LEL
Route of Exposure	✓	Inhalation
	✓	Skin Absorption
	✓	Eye / Skin Contact
	✓	Ingestion

Vapor Pressure	1.5 at 80°F = 1 lb/sq ~~mm/Hg~~	
Vapor Density	.034 at 80°F =	(Air = 1)
Specific Gravity	1.46	(Water = 1)
Solubility	.110 at 70°F =	
Incompatible Materials	no reaction	
Ion Potential	9.45	eV

Instruments for Detection		
	✓	PID w/ 10.2 Probe
	✓	FID
		CGI
		Rad meter
		pH meter
	✓	Detector Tube
		RAM / Mini-RAM
		Other:

Symptoms of Acute Exposure		
		Confusion
		Convulsions
		Dizziness
		Drowsiness
		Giddiness
	✓	Headache
	✓	Irritation to eyes, nose or throat
		Lightheadedness
	✓	Nausea
	✓	Respiratory Problems
		Seizure
		Sweating (excessive)
	✓	Vision Disturbance
		Weakness
		Other

Loss of consciousness

First Aid Treatment		
	✓	Irrigate Eyes w/ Water for 15 minutes
	✓	Flush Skin w/ Water for 15 minutes
	✓	Remove Contaminated Clothing
	✓	Get Medical Attention
	✓	Move to Fresh Air
	✓	Provide Respiratory Support
		Other

Data Source		
	✓	CHRIS
	✓	NIOSH
		Sax
		HSDB
		Other:

Chemical Hazards To Personnel

Chemical Contaminant Dichloromethane (methylene chloride)

PEL		ppm or mg/m3
TLV	100	ppm or mg/m3
IDLH	5000	ppm or mg/m3
Carcinogen	✓	Yes
		No
Physical Form		Solid
	✓	Liquid
		Gas
Color	colorless	
Odor	sweet	
Flashpoint	non flam	Degrees F or C
Flammable Limits	19	% UEL
	12	% LEL
Route of Exposure	✓	Inhalation
		Skin Absorption
	✓	Eye / Skin Contact
	✓	Ingestion

Vapor Pressure	9.2 lb/in² at 80°F	mmHg
Vapor Density	.135 at 80°F	(Air = 1)
Specific Gravity	1.322	(Water = 1)
Solubility	1.3% at 68°F	
Incompatible Materials	None	
Ion Potential	11.32	eV

Instruments for Detection	
✓	PID w/ 11.7 Probe
✓	FID
	CGI
	Rad meter
	pH meter
	Detector Tube
	RAM / Mini-RAM
	Other:

Symptoms of Acute Exposure	
	Confusion
	Convulsions
	Dizziness
✓	Drowsiness
	Giddiness
	Headache
✓	Irritation to eyes, nose or throat
✓	Lightheadedness
✓	Nausea
	Respiratory Problems
	Seizure
	Sweating (excessive)
	Vision Disturbance
✓	Weakness
	Other

numbness of limbs

First Aid Treatment	
✓	Irrigate Eyes w/ Water for 15 minutes
✓	Flush Skin w/ Water for 15 minutes
✓	Remove Contaminated Clothing
✓	Get Medical Attention
✓	Move to Fresh Air
✓	Provide Respiratory Support
	Other

Data Source	
✓	CHRIS
✓	NIOSH
	Sax
	HSDB
	Other:

Chemical Hazards To Personnel

Chemical Contaminant	Trichloroethane (methyl chloroform)

PEL		ppm or mg/m3
TLV	350	ppm or mg/m3
IDLH	1000	ppm or mg/m3
Carcinogen	✓	Yes
		No
Physical Form		Solid
	✓	Liquid
		Gas
Color	colorless	
Odor	sweet	
Flashpoint	NAvail	Degrees F or C
Flammable Limits	16	% UEL
	7	% LEL
Route of Exposure	✓	Inhalation
	✓	Skin Absorption
	✓	Eye / Skin Contact
	✓	Ingestion

Vapor Pressure	3.3 lb/sq 2 @ 90° ~~mmHg~~	
Vapor Density	.07	(Air = 1)
Specific Gravity	1.31	(Water = 1)
Solubility	.70 @ 68.02°F	
Incompatible Materials	water → releases HCl slowly	
Ion Potential	11	eV

Instruments for Detection		
	✓	PID w/ 11.7 Probe
	✓	FID
		CGI
		Rad meter
		pH meter
		Detector Tube
		RAM / Mini-RAM
		Other:

Symptoms of Acute Exposure		
		Confusion
		Convulsions
	✓	Dizziness
		Drowsiness
		Giddiness
		Headache
	✓	Irritation to eyes, nose or throat
		Lightheadedness
	✓	Nausea
	✓	Respiratory Problems
		Seizure
		Sweating (excessive)
		Vision Disturbance
		Weakness
		Other

First Aid Treatment		
	✓	Irrigate Eyes w/ Water for 15 minutes
	✓	Flush Skin w/ Water for 15 minutes
	✓	Remove Contaminated Clothing
	✓	Get Medical Attention
	✓	Move to Fresh Air
	✓	Provide Respiratory Support
		Other

Data Source		
	✓	CHRIS
	✓	NIOSH
		Sax
		HSDB
		Other:

Chemical Hazards To Personnel

Chemical Contaminant 1,1 Dichloroethylene (Vinylidene chloride)

PEL		ppm or mg/m3
TLV	10	ppm or mg/m3
IDLH	Not Avail	ppm or mg/m3
Carcinogen	✓	Yes
		No
Physical Form		Solid
	✓	Liquid
		Gas
Color	colorless	
Odor	sweet	
Flashpoint	0°F	Degrees F or C
Flammable Limits	16	% UEL
	7.3	% LEL
Route of Exposure	✓	Inhalation
	✓	Skin Absorption
	✓	Eye / Skin Contact
	✓	Ingestion

Vapor Pressure	80°F → 12.3 mm/Hg
Vapor Density	80°F → 2.07 (Air = 1)
Specific Gravity	1.21 (Water = 1)
Solubility	68°F → .5
Incompatible Materials	Cu and Al cause polymerization
Ion Potential	0.3 eV

Instruments for Detection	
	PID w/ Probe
	FID
	CGI
	Rad meter
	pH meter
	Detector Tube
	RAM / Mini-RAM
	Other:

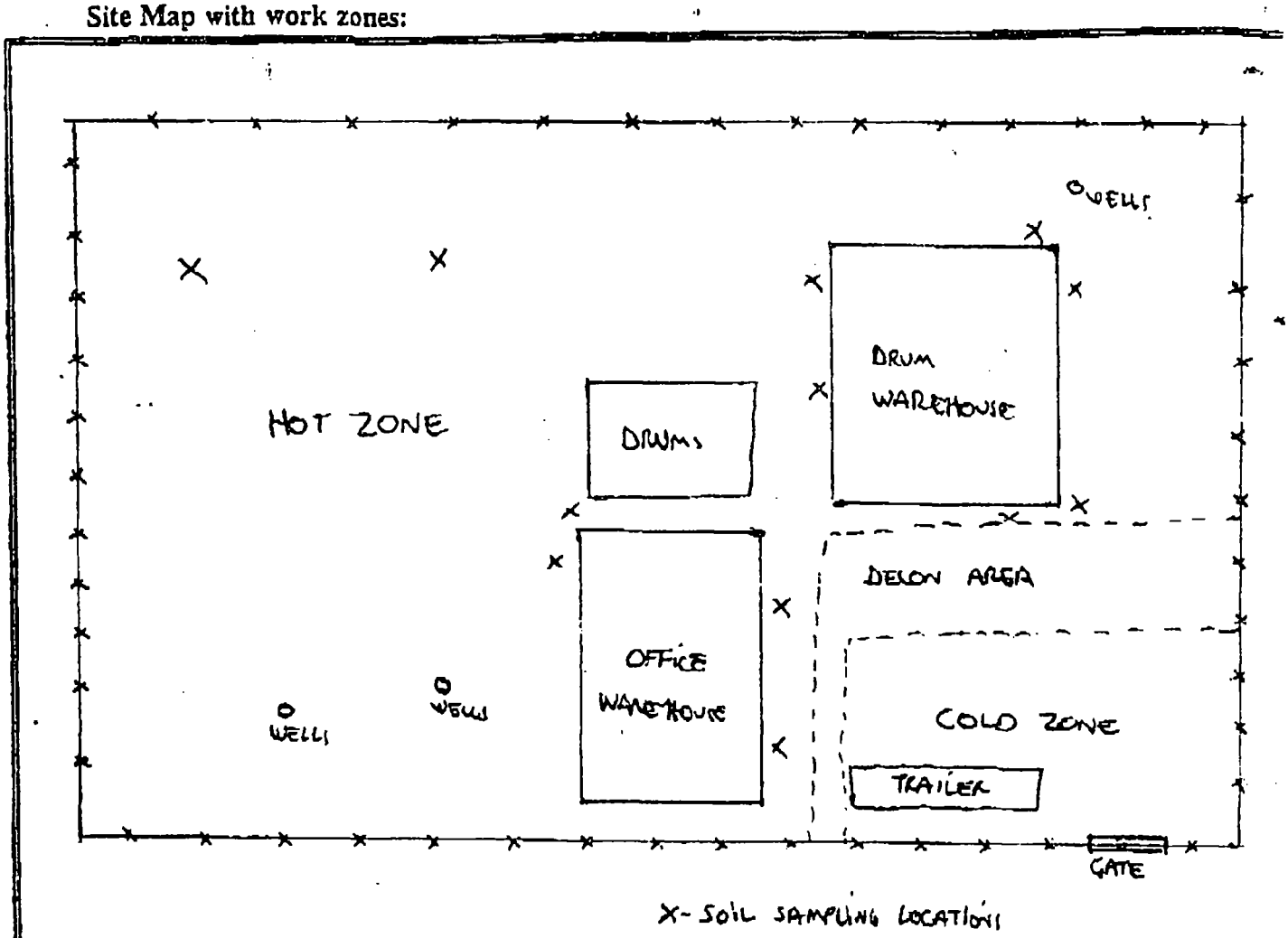
Symptoms of Acute Exposure	
	Confusion
	Convulsions
✓	Dizziness
	Drowsiness
	Giddiness
	Headache
✓	Irritation to eyes, nose or throat
	Lightheadedness
	Nausea
	Respiratory Problems
	Seizure
	Sweating (excessive)
	Vision Disturbance
	Weakness
	Other

High levels cause anesthesia

First Aid Treatment	
✓	Irrigate Eyes w/ Water for 15 minutes
✓	Flush Skin w/ Water for 15 minutes
✓	Remove Contaminated Clothing
✓	Get Medical Attention
✓	Move to Fresh Air
✓	Provide Respiratory Support
	Other

Data Source	
✓	CHRIS
✓	NIOSH
	Sax
	HSDB
	Other:

Site Map with work zones:



FOR SOIL SAMPLING AND MONITORING WELL SAMPLING

Decontamination Procedures

( ) Wet Decontamination - using: _____
(✓) Dry Decontamination

Description of Site Specific Decontamination Plan: PPE would be bagged and left on-site.

Adequacy of decontamination determined by: HSO

TASK TO BE PERFORMED/AIR MONITORING REQUIRED	ANTICIPATED LEVEL OF PROTECTION	TYPE OF CHEMICAL PROTECTIVE COVERALL	INNER GLOVE OUTER GLOVE BOOT COVER	TYPE OF APR CARTRIDGE OR CANISTER
Assessment of outside areas	D w/ OVA monitoring 4PPM → C	tyvek for C.	latex (K2) booties no contact	GMC-H for C
Buildings (well vent)	D w/ OVA monitoring 4PPM → C.	"	"	"
Buildings (not vent)	B standard → D/C	tyvek, ~~SCBA~~	latex K2 booties no contact	SCBA or GMC-H
Admin photodocument	D see above 3. item			

Frequency and Types of Air Monitoring: (✓) Continuous ( ) Routine - _____ ( ) Periodic - _____

DIRECT READING INSTRUMENTS	COMBUSTIBLE GAS/OXYGEN METER (1)	RADIATION SURVEY METER/PROBE (2)	~~PHOTOIONIZATION DETECTOR/PROBE~~ (3) Mini Ram	FLAME IONIZATION DETECTOR (4)	CHEM. DETECTOR TUBE (5)
ID NUMBER	668099	639233	898379	639236	686670
CAL. DATE	17Aug92	18Aug92		18Aug92	18Aug92
TAT MEMBER	Shaira	Shaira		Shaira	Shaira
ACTION LEVEL	≥ 20% LEL ≤19.5%, ≥23% O_2 - LEAVE	3X BACKGRND - CAUTION; 1 MR/HR-LEAVE	~~UNKNOWNS 0-5 UNITS:"C" 5-500:"B"~~	UNKNOWNS 0-5 UNITS:"C" 5-500:"B"	PEL/TLV COMPARE W/PF

Emergency Phone Numbers

Emergency Contact	Location	Phone Number	Notified
Hospital	Germantown Comm Methodist Hwy 72 Germantown, TN	901-754-6418	
Ambulance	Marshall Co. Ambulance	601-252-5999	
Police	Marshall Co Sheriff	601-252-1311	
Fire Dept.	Cayce Volunteer	601-851-7698	

Chemical Trauma Capability? (✓) Yes ( ) No If no, closest backup:_____ Phone:_____ *911

Directions to Hospital (attach map) - Route verified by: G L Shaw Date: 19/Aug/92
72 W to Germantown, Hosp on left at 72 - Germantown Rd.

Additional Emergency Phone Contacts

Contact	Phone Number
WESTON 24 hr. Hotline	215-524-1925 215-524-1926
WESTON Medical Emergency Service	513-421-3063
Chemtrec	800-424-9300
ATSDR	404-639-0615
ATF (explosives information)	800-424-9555
National Response Center	800-424-8802
National Poison Control Center	800-942-5969

HASP prepared by: G. L. Shaw Date: 18/Aug/92
Pre-Response/Entry Approval by: (verbal) Scott Dunbar Date: 18/Aug/92
Verbal Approval/Modification to Original HASP by:_____ Date: __/__/__

Size of Site: 2 acres Terrain flat, high grass Weather partly cloud, 80°F, no wind
Distance to Nearest: Residence 100 ft School N/A Hospital 7 miles
Public Building 1/2 mile Other ——
Evacuation: ( ) Yes (✓) No By Whom: ____
Nearest Waterway: Nonconnah Creek Distance from Site: 100 yds

Condition	Observed	Potential	None	Comments/Observations
Surface Water Contamination		✓		drums in bad condition
Ground Water Contamination	✓			MSRCRA data
Drinking Water Contamination	✓			MSRCRA data
Air Release			✓	
Soil Contamination	✓			discolored areas
Stressed Vegetation		✓		
Dead Animal Species		✓		

Actions Taken On-Site:
Perimeter Monitoring: (✓) Yes ( ) No
Site Entry by TAT: (✓) Yes ( ) No

Tasks Conducted	Level of Protection/Specific PPE Used
Photo documentation site assessment Air monitoring	D
~~CGI READINGS, NEG.~~ PHOTO DOCUMENTATION AIR MONITORING WELL SAMPLING, SOIL SAMPLING	C, TYVEK

Air Monitoring Summary Log

Date: 5/19/92

Data Collected by: Slavia

Data to be summarized by a "Range of readings,i.e.,- Low to High" and/or "Average" by location.

Station/Location	~~CGI/O2 Meter~~ O2/CGI	Radiation Meter	~~PID/Probe~~ Mini Ram	FID/OVA	~~Detector Tube~~
BG	21%/0	.01 mR/h	.00 mg/m³	.5 units	
site entrance	21%/0	.01	.00	.75	
tank farm	21%/0	.01	.00	1-2	
Drum warehouse 1	21%/0	.01	.00	1-2	
Drum warehouse 2	21%/0	.01	.00	1-2	
	All drums in well ventilated buildings. (open structures.				

Summary/Comments: continuous air monitoring → reading in OVA never reached more than 1 1/2 units over background.

Monitoring Summary Log

Date: 3/16/93

Data Collected by: Vic Young

Data to be summarized by a "Range of readings,i.e.,- Low to High" and/or "Average" by location.

Station/Location	CGI/O_2 Meter	Radiation Meter	PID/Probe	FID/OVA	Detector Tube
BACKGROUND	21% O_2 / 0			1-2 units	
READINGS	21% O_2 / 0			1-2 units	

Summary/Comments: NOTHING WAS NOTED ABOVE AVERAGE

Hazardous Waste Site and Environmental Sampling Activities

Off Site: ( ) Yes (X) No
On Site: ( ) Yes (X) No

Describe types of samples and methods used to obtain samples: _____

Was Laboratory notified of Potential Hazard Level Of Samples? ( ) Yes ( ) No

Note: The nature of the work assignment may require the use of the following procedures/programs which will be included as Attachments to this HASP as applicable: Emergency Response Plan, Confined Space Entry Procedures, Spill Containment Program.

Disclaimer: This Health and Safety Plan (HASP) was prepared for work to be conducted under the Technical Assistance Team (TAT) Contract 68-WO-0036 for Zone I. Use of this HASP by WESTON and its subcontractors is intended to fulfill the OSHA requirements found in 29 CFR 1910.120. Items not specifically covered in this HASP are included by reference to 29 CFR 1910 and 1926.

The signatures below indicate that the individuals have read and understood this Health and Safety Plan.

Michael Taylor — Michael Taylor — EPA — 10 SEP 92

PRINTED NAME	SIGNATURE	AFFILIATION	DATE
Gregory L. Shaia	Gregory L. Shaia	WESTON-TAT	19 Aug 92
Robert N Rosen	Robert N Rosen	EPA	19 Aug 92
Vic Young	Vic Young	WESTON-TAT	19 AUG 92
Scott P Bradford	Scott P Bradford	Weston TAT	19 Aug 92
Eddy Bourzeis	Eddy Bourzeis	EPA-TAT	10 Sep 92

Final Submission of HASP by:	Gregory L. Shaia 20 Aug 92	Date
Post Response Review by:	Randy Barnhart Interim	5/3/93
Post Response Approval by:		
TAT HSO Review by:		

COMMENTS/FOLLOWUP

Randy Barnhart — Randy Barnhart — Weston-TAT — 16 March 93

SITE SAFETY PLAN AMENDMENT # 1 : SOIL SAMPLING

SITE NAME: ERS

DATE: MARCH 1, 1993

TYPE OF AMENDMENT: SOIL SAMPLING

REASON FOR AMENDMENT: NEED TO COLLECT SOIL SAMPLES AT SITE

ALTERNATE SAFEGUARD PROCEDURES: LEVEL C PPE, PERIMETER AIR MONITORING, SOP DECON

REQUIRED CHANGES IN PPE: TYVEK AND RESPIRATORS FOR THE INITIAL ENTRY, DOWNGRADE TO TYVEK AFTER AIR MONITORING.

[illegible] 3-1
Weston Lead TAT Member (Date)

[illegible] 3-1-93
Weston RSO (Date)

SITE SAFETY PLAN AMENDMENT # 2 **:** GROUNDWATER MONITORING

SITE NAME: ERS

DATE: MARCH 16, 1993

TYPE OF AMENDMENT: GROUNDWATER SAMPLING

REASON FOR AMENDMENT: NEED TO COLLECT DRINKING WATER AND GROUNDWATER SAMPLES FROM 13 LOCATIONS ON AND OFFSITE.

ALTERNATE SAFEGUARD PROCEDURES: LEVEL C PPE, PERIMETER AIR MONITORING W/ OVA AND CGI, UNLOCK WELL CAP; ADDITIONAL AIR MONITORING, CONTINUOUS AIR MONITORING AT EACH WELL AFTER EACH RUN. TWO TAT'S ONSITE, WATER SPENT WILL BE CONTAINED ONSITE, SOP DECON.

REQUIRED CHANGES IN PPE: TYVEK AND RESPIRATORS FOR THE INITIAL ENTRY, DOWNGRADE TO TYVEK WITH FAVORABLE AIR MONITORING

Weston Lead TAT Member — 3-15-93 (Date)

VERBAL BY SCOTT DONDAK — 3-15-93 (Date)
Weston RSO

SITE SAFETY PLAN AMENDMENT # 1 : 0492100131

SITE NAME: ERS

DATE: 1 MARCH 1993

TYPE OF AMENDMENT: SOIL AND WATER SAMPLING

REASON FOR AMENDMENT: WE SET UP SAFETY PLAN FOR SITE INVESTIGATION AND REMOVAL, PLUS HAZCATTING OF DRUMS; IT DID NOT INCLUDE THE SAMPLING OF SOILS.

ALTERNATE SAFEGUARD PROCEDURES: WE WILL MONITOR PERIMETER IN LEVEL C WITH OVA WITH PRIMARY CONTAMINANT TCE. TAT VISITS SITE ON A WEEKLY BASIS, SO THERE SHOULD BE NO NEW PROBLEMS. ANY DOOR OF TCE AND WE WILL HAVE TO REEVALUATE FOR UPGRADING.

REQUIRED CHANGES IN PPE: ALL WORK WILL BE DONE IN LEVEL C, RESPIRATORS, GLOVES, TYVEK.

Vic Young — Weston Lead TAT Member — 3-1-93 (Date)

[signature] — Weston RSO — 3/1/93 (Date)

ATTACHMENT E

Chain of Custody

1993 03 31 01:09 919 274 5798 FOUR SEASONS ENCOR 002 P28

U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4 TAT

CHAIN OF CUSTODY RECORD

ENVIRONMENTAL SERVICES DIVISION
COLLEGE STATION ROAD
ATHENS, GEORGIA 30613

FOUR SEASONS

PROJ. NO.

PROJECT NAME: ENTERPRISE RECOVERY SITE

SAMPLERS (Signature): Vic Young / Dennis Benson

Oxidation Parameters Desired ( ) - Indicates Separate Containers

STA. NO	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Water/Wastewater: (Gal G (not org. Pest) (EP) (hard))	Water/Wastewater: 40 ml vial (VOA)	Water/Wastewater: 250 ml G (TOX)	Water/Wastewater: P (Bod, TSS, Cl, Pt, Sol, etc)	Water/Wastewater: R G (phase) (O&G) (pest)	Water/Wastewater: R P (met. hard) (Tot, COD, N, P, etc)	Water/Wastewater: 0.5-1 L P (EP)	Water/Wastewater: 1 gal or R P (CN)	Water/Wastewater: 8 oz G (not org. pest. hard) (met) (EP)	Water/Wastewater: 4 oz G (VOA)	Water/Wastewater: P oz G (CN, Cl, N, P, COD, etc)	Water/Wastewater: 8 oz G (not org. pest. hard) (VOA)	Water/Wastewater: 8 oz G (EP) (met, CN, Cl, EP, HP, RTU)	Water/Wastewater: Soil Sed/Bldg	Water/Wastewater: Waste	Water/Wastewater: Misc	REMARKS/TAG NUMBERS
✓ ERS-1	3-16	1030		X	ERS-1	3		3															14616 - 14617 - 14618
✓ ERS-2	3-16	1040		X	ERS-2	3		3															14628 - 14629 - 14630
✓ ERS-3	3-16	1120		X	ERS-3	3		3															14601 - 14602 - 14603
✓ ERS-4	3-16	1124		X	ERS-4	3		3															14619 - 14620 - 14622
✓ ERS-5	3-16	1044		X	ERS-5	3		3															14604 - 14605 - 14606
✓ ERS-6	3-16	1122		X	ERS-6	3		3															14610 - 14611 - 14612
✓ ERS-7	3-16	1053		X	ERS-7	3		3															14631 - 14632 - 14633
✓ ERS-8	3-16	1052		X	ERS-8	3		3															14613 - 14614 - 14615
✓ ERS-9	3-16	1042		X	ERS-9	3		3															14607 - 14608 - 14609
✓ ERS-10	3-16	1020		X	ERS-10	3		3															14622 - 14623 - 14624
✓ ERS-TB	3-16	0830		X	ERS-TB	3		3															14625 - 14626 - 14627
✓ ERS-11	3-17	1300		X	ERS-11	3		3															14652 - 14653 - 14654
✓ ERS-12	3-17	1405		X	ERS-12	3		3															14646 - 14647 - 14648
✓ ERS-13	3-17	1055		X	ERS-13	3		3															14649 - 14650 - 14651

Relinquished by: (Signature)	Date/Time	Received by (Signature)	Relinquished by (Signature)	Date/Time	Received by (Signature)	Remarks
Vic Young	3/17 4:35			3/17/93 4:35	Angela G. Jones	VOA'S
Relinquished by: (Signature)	Date/Time	Received by (Signature)	Relinquished by (Signature)	Date/Time	Received by: (Signature)	

DISTRIBUTION: Original and Pink copies accompany sample shipment to laboratory. Pink copy retained by laboratory; Yellow copy retained by samplers; Blue copy extra copy as needed

T4-4125

U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4 TAT

CHAIN OF CUSTODY RECORD

ENVIRONM
COLLEGE
ATHENS, G

PROJ. NO.

PROJECT NAME: ENTERPRISE RECOVERY SITE

SAMPLERS (Signature): [illegible]

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Circle/add Parameters Desired ( ) - Indicates Separate Containers	(Gal G (ext org. Pest) (EP) (herb)	40 ml vial (VOA)	250 ml G (TOX)	P (Bod, TSS, Cl, Fl, So4, etc)	1LG (phenol) (O&G) (pest)	1LP (met, hard) (Toc, COD, N, P, etc)	0.5-1LP (S⁻)	½ gal or 1LP (CN)	8 oz G (ext org. pest, herb) (met) (EP)	4 oz G (VOA)	P or G (CN, S⁻, N, P, COD, etc)	8 oz G (ext org. pest, herb, VOA)	8 oz G (EP) (met, CN, S⁻, FP) (FP, BTU)	
ERS-1	3-16	1030		X	ERS-1	3			3												14616
ERS-2	3-16	1040		X	ERS-2	3			3												14623
ERS-3	3-16	1120		X	ERS-3	3			3												14601
ERS-4	3-16	1124		X	ERS-4	3			3												14611
ERS-5	3-16	1044		X	ERS-5	3			3												14604
ERS-6	3-16	1122		X	ERS-6	3			3												14610
ERS-7	3-16	1053		X	ERS-7	3			3												14631
ERS-8	3-16	1052		X	ERS-8	3			3												14613
ERS-9	3-16	1042		X	ERS-9	3			3												14607
ERS-10	3-16	1020		X	ERS-10	3			3												14622
ERS-TB	3-16	0930		X	ERS-TB	3			3												14635
ERS-11	3-17	1300		X	ERS-11	3			3												14652
ERS-12	3-17	1405		X	ERS-12	3			3												14641
ERS-13	3-17	1055		X	ERS-13	3			3												14647

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Remarks
[illegible]	3/17 4:35			3/17/93 4:35	[illegible]	VOA's
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	

DISTRIBUTION. Original and Pink copies accompany sample shipment to laboratory. Pink copy retained by laboratory; Yellow copy retained by samplers; Blue copy extra copy as needed.

T

U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4 TAT
SOILS

CHAIN OF CUSTODY RECORD

ENVIRONME
COLLEGE S
ATHENS, GE

PROJ. NO.	PROJECT NAME
	ENTERPRISE RECOVERY SYSTEMS

SAMPLERS (Signature) Victor R Young

Circle/add Parameters Desired ( ) - Indicates Separate Containers

Water/Wastewater | Soil/Sed/Sldg | Waste

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	(Gal G (ext org, Pest) (EP) (herb)	40 ml vial (VOA)	250 ml G (TOX)	P (Bod, TSS, Cl, Fl, So4, etc)	ILG (pheno) (O&G) (pest)	ILP (met, hard) (Toc, COD, N, P, etc)	0.5-ILP (S⁻)	½ gal or ILP (CN)		8 oz G (ext org, pest, herb) (met) (EP)	4 oz G (VOA)	P or G (CN, S⁻, N, P, COD, etc)	8 oz G (ext org, pest, heru, VOA)	8 oz G (EP) (met, CN, S⁻, FP) (FP, BTU)								
1	3-1-93	1155		X	ERS-1	2										1	1												
3	3-1-93	1228		X	ERS-3	2										1	1												
4	3-1-93	1448		X	ERS-4	2										1	1												
5	3-1-93	1234		X	ERS-5	2										1	1												
6	3-1-93	1312		X	ERS-6	2										1	1												
7	3-1-93	1435		X	ERS-7	2										1	1												
8	3-1-93	1255		X	ERS-8	2										1	1												
9	3-1-93	1500		X	ERS-9	2										1	1												
10	3-1-93	1445		X	ERS-10	2										1	1												
11	3-1-93	1500		X	ERS-11	2										1	1												
12	3-1-93	1319		X	ERS-12	2										1	1												
13	3-1-93	1513		X	ERS-13	2										1	1												
14	3-1-93	1610		X	ERS-14	2										1	1												
15	3-1-93	1530		X	ERS-15	2										1	1												

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Remarks
Victor Young						META
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	VOA
				3/2/93 1124	[illegible]	

DISTRIBUTION: Original and Pink copies accompany sample shipment to laboratory, Pink copy retained by laboratory; Yellow copy retained by samplers; Blue copy extra copy as needed.

T4

U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4 TAT

SOILS

CHAIN OF CUSTODY RECORD

ENVIRO
COLLEC
ATHENS

PROJ. NO.	PROJECT NAME
	ENTERPRISE RECOVERY SYSTEMS

SAMPLERS (Signature): Vin Young

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	(Gal G (ext org. Pest) (EP) (herb)	40 ml Vial (VOA)	250 ml G (TOX)	P (Bod, TSS, Cl, Fl, SO4, etc)	ILG (pheno) (O&G) (pest)	ILP (met, herb) (Soc-COD-N-P-etc)	0.5-ILP (S=)	½ gal or ILP (CN)	8 oz G (ext org. pest, herb) (met) (EP)	4 oz G (VOA)	P or G (CN, S=, N, P, COD, etc)	8 oz G (ext org. pest, herb, VOA)	8 oz G (EP) (met, CN, S=, FP) (FP, BTU)
							Water/Wastewater								Soil/Sed/Sldg		Waste		
16	3-1-93	1540		X	ERS-16	2									1	1			
17	3-1-93	1550		X	ERS-17	2									1	1			
18	3-1-93	1600		X	ERS-18	4		3			1								
19	3-1-93	1615		X	ERS-19	2									1	1			
20	3-1-93	1315		X	ERS-20	2									1	1			
TB	3-1-93	0900		X	TB	4		3			1								

Circle/add Parameters Desired ( ) - Indicates Separate Containers

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Remarks
Vin Young						METALS VOAS
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
				3/4/93 1124	D. Lawrence	

DISTRIBUTION: Original and Pink copies accompany sample shipment to laboratory. Pink copy retained by laboratory; Yellow copy retained by samplers; Blue copy extra copy as needed.

SOILS

ENVIRONMENTAL TESTING AND CONSULTING, INC.

MEMPHIS, TN

GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-1
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.BOC
SAMPLE # : 0302-015-1
PERCENT SOLIDS: 91%

PROJECT # :
ANALYST : LS

DATE ANALYZED : 03/03/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	13	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	52.9	50.0	106	70-120
Toluene-d8	44.3	50.0	89	81-117
4-Bromofluorobenzene	43.8	50.0	87	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT

LABORATORY MANAGER

ENVIRONMENTAL TESTING & CONSULTING, INC.
2924 Walnut Grove Road • Memphis, TN 38111 • (901) 327-2750 • FAX (901) 327-6334
Founded 1972

March 15, 1993

Mr. Keith Burch
Four Seasons Industrial Services
P.O. Box 16590
Greensboro, NC 27416-0590

REF: ANALYTICAL TESTING
SAMPLE DATE: 03/01/93
SITE ID: ENTERPRISE RECOVERY SYSTEMS
(SOIL/AQUEOUS)

Dear Mr. Burch:

The above referenced site has been analyzed per your instructions. The tests were performed in our laboratory (#02027) in accordance with Standard Methods, 17th Edition and The Solid Waste Manual, SW-846. The results are shown on the attached result sheets.

Please call our office if you have any questions.

Sincerely,

Randall H. Thomas
Vice President

jw

Attachment

0302015

Environmental Testing & Consulting, Inc.

2924 Walnut Grove Road - Memphis, TN 38111 - Phone (901)327-2750

FOUR SEASONS INDUSTRIAL SERVICES

INTERNAL RECOVERY STUDIES - 3/1/93

SOIL SAMPLES

Tests	Results (Dry Weight ppm)								Detection Limit (ppm)	Method Number	Date Analyzed	Analyst
Sample ID:	1	3	4	5	6	7	8	9				
Aluminum	7798	3572	2240	5541	6405	2801	2885	2856	2.5	7020	03/14/93	[illegible]
Antimony	<2.00	<1.89	<2.27	<1.96	<2.18	<1.75	<1.90	<2.25	1.75	7040	03/12/93	[illegible]
Arsenic	8.68	16.4	7.49	12.9	17.5	10.6	6.46	7.69	0.2	7061	03/11/93	[illegible]
Barium	72.3	128	164	118	70.6	14.8	208	173	0.75	7080	03/15/93	[illegible]
Beryllium	0.543	0.433	0.617	0.728	0.653	0.225	0.381	0.578	0.125	7090	03/14/93	[illegible]
Cadmium	1.05	1.14	5.03	<0.056	<0.062	<0.050	1.74	6.06	0.05	7130	03/11/93	[illegible]
Calcium	1971	4654	295	1119	899	11977	57693	168127	0.075	7140	03/15/93	[illegible]
Chromium	38.9	95.8	41.5	13.2	12.4	18.3	36.1	81.4	0.5	7190	03/11/93	[illegible]
Cobalt	6.86	7.31	7.79	5.88	8.71	2.15	4.63	6.42	0.75	7200	03/12/93	[illegible]
Copper	320	79.6	208	9.79	11.5	14.8	139	189	0.25	7210	03/11/93	[illegible]
Iron	26882	14388	6285	16176	13895	16453	11892	12000	0.5	7380	03/12/93	[illegible]
Lead	62.2	257	135	19.3	19.0	13.5	93.9	163	1.25	7420	03/11/93	[illegible]
Magnesium	588	490	435	437	274	288	1061	1476	0.025	7450	03/14/93	[illegible]
Manganese	446	322	380	807	1231	96.4	293	462	0.25	7460	03/11/93	[illegible]
Mercury	0.048	0.058	0.089	0.028	0.037	<0.021	0.064	0.261	0.020	7471	03/13/93	[illegible]
Nickel	18.3	10.8	19.5	5.03	4.66	5.00	19.6	45.6	0.5	7521	03/12/93	[illegible]
Potassium	250	183	155	138	200	157	153	190	0.125	7610	03/11/93	[illegible]
Selenium	0.239	0.702	0.338	0.273	0.415	<0.215	<0.226	<0.267	0.2	7741	03/10/93	[illegible]
Silver	1.43	1.08	0.97	<0.28	0.93	5.25	12.0	0.64	0.25	7760	03/11/93	[illegible]
Sodium	46.8	84.2	45.4	69.4	49.4	33.8	74.8	131	0.85	7770	03/10/93	[illegible]
Thallium	<2.86	<2.71	<3.25	<2.80	<3.11	<2.50	<2.72	<3.21	2.5	7840	03/12/93	[illegible]
Vanadium	26.0	16.8	21.1	22.1	24.9	19.3	13.6	11.8	5.0	7910	03/15/93	[illegible]
Zinc	1734	192	341	93.5	314	54.8	234	481	0.125	7950	03/14/93	[illegible]
% Moisture	14.5	11.8	25.8	18.4	20.8	6.94	11.4	15.0	-	2540-B	03/03/93	[illegible]

0302-015

Environmental Testing & Consulting, Inc.
2924 Walnut Grove Road - Memphis, TN 38111 - Phone (901)327-2750

FOUR SEASONS INDUSTRIAL SERVICES

ENTERPRISE ECONOMY SERVICES - 3/1/93

SOIL SAMPLES

Tests / Sample ID:	10	11	12	13	14	15	16	17	Detection Limit (ppm)	Method Number	Date Analyzed	Analyst
	Results (Dry Weight ppm)											
Aluminum	5710	4547	5144	3930	5717	4820	7954	8168	2.5	7020	03/14/93	BB
Antimony	<2.09	<2.14	<1.91	<2.01	<3.18	<2.26	<2.24	<2.03	1.75	7040	03/12/93	BB
Arsenic	11.1	9.98	12.5	15.4	6.34	22.5	14.3	10.7	0.2	7061	03/11/93	JF
Barium	109	31.3	61.0	49.6	54.9	12.6	60.1	53.9	0.75	7080	03/15/93	BB
Beryllium	0.179	0.313	0.408	0.373	0.488	0.291	0.581	0.203	0.125	7090	03/14/93	BB
Cadmium	1.26	0.947	<0.054	<0.057	1.41	<0.065	<0.066	<0.058	0.05	7130	03/11/93	BB
Calcium	2601	2473	1298	961	2119	715	539	221	0.875	7140	03/15/93	BB
Chromium	23.0	19.6	11.2	13.2	21.3	14.2	22.7	11.2	0.5	7190	03/11/93	BB
Cobalt	8.37	8.53	6.53	5.76	9.98	8.41	23.6	3.49	0.75	7200	03/12/93	BB
Copper	58.3	40.9	7.89	6.31	41.2	6.47	8.94	7.85	0.25	7210	03/11/93	BB
Iron	17610	13872	14645	14313	11797	16983	23991	13574	0.5	7380	03/12/93	BB
Lead	35.3	53.8	11.2	16.1	27.7	15.5	208	7.27	1.25	7420	03/11/93	BB
Magnesium	478	426	321	287	458	285	297	320	0.025	7450	03/14/93	BB
Manganese	652	883	539	611	123	783	1623	419	0.25	7460	03/11/93	BB
Mercury	0.042	0.052	0.026	0.025	0.054	<0.026	0.027	0.021	0.020	7471	03/13/93	SB
Nickel	12.3	8.56	4.90	3.73	15.3	3.56	5.07	6.10	0.5	7520	03/12/93	BB
Potassium	221	218	172	190	318	217	201	183	0.125	7610	03/11/93	BB
Selenium	<0.241	<0.248	0.586	0.282	1.28	0.403	0.463	0.292	0.2	7741	03/10/93	JF
Silver	<0.30	<0.31	<0.27	<0.29	<0.45	<0.32	<0.32	<0.29	0.25	7760	03/11/93	BB
Sodium	49.3	40.9	35.6	37.0	45.8	43.7	40.3	128	0.05	7770	03/10/93	BB
Thallium	<2.99	<3.06	<2.72	<2.83	<4.54	<3.23	<3.19	<2.91	2.5	7840	03/12/93	BB
Vanadium	25.7	28.7	24.8	23.2	28.0	25.9	41.8	23.5	5.0	7910	03/15/93	BB
Zinc	142	120	62.6	61.4	239	50.1	50.5	46.8	0.125	7950	03/14/93	BB
% Moisture	16.9	19.3	22.1	21.3	48.1	24.0	21.8	17.2	-	2540-B	03/03/93	TG

0382-015

Environmental Testing & Consulting, Inc.

2924 Walnut Grove Road - Memphis, TN 38111 - Phone (901)327-2750

FOUR SEASONS INDUSTRIAL SERVICES

HYDROCARBON RECOVERY SYSTEMS - 3/1/93

SOIL SAMPLES

Tests	Results (Dry Weight ppm)		Detection Limit (ppm)	Method Number	Date Analyzed	Analyst
Sample ID:	19	20				
Aluminum	7427	5012	2.5	7020	03/14/93	BB
Antimony	<2.20	<1.88	1.75	7040	03/12/93	BB
Arsenic	12.3	16.3	0.2	7061	03/11/93	JF
Barium	67.7	55.7	0.75	7080	03/15/93	BB
Beryllium	0.374	0.456	0.125	7090	03/14/93	BB
Cadmium	<0.063	<0.054	0.05	7130	03/11/93	BB
Calcium	551	1134	0.075	7140	03/15/93	BB
Chromium	12.6	17.7	0.5	7190	03/11/93	BB
Cobalt	10.4	8.04	0.75	7200	03/12/93	BB
Copper	8.81	9.92	0.25	7210	03/11/93	BB
Iron	15766	15678	0.5	7380	03/12/93	BB
Lead	23.6	16.3	1.25	7420	03/11/93	BB
Magnesium	371	386	0.025	7450	03/14/93	BB
Manganese	1363	930	0.25	7460	03/11/93	BB
Mercury	0.045	0.034	0.020	7471	03/13/93	SH
Nickel	7.24	2.95	0.5	7520	03/12/93	BB
Potassium	278	146	0.125	7610	03/11/93	BB
Selenium	0.956	0.326	0.2	7741	03/10/93	JF
Silver	<0.31	<0.27	0.25	7760	03/11/93	BB
Sodium	34.3	40.7	0.05	7770	03/10/93	BB
Thallium	<3.15	<2.68	2.5	7840	03/12/93	BB
Vanadium	29.0	27.6	5.0	7910	03/15/93	BB
Zinc	63.3	240	0.125	7950	03/14/93	BB
% Moisture	21.0	21.1	-	2540-B	03/03/93	TG

0382-015

Environmental Testing & Consulting, Inc.

2504 Walnut Grove Road - Memphis, TN 38111 - Phone (901)327-2750

FOUR SEASONS INDUSTRIAL SERVICES

GROUNDWATER RECOVERY SYSTEMS - 1/1/93

WEEKLY SAMPLES

Tests	Results (ppm)		Detection Limit (ppm)	Method Number	Date Analyzed	Analyst
Sample ID:	[illegible]	[illegible]				
Aluminum	<0.1	<0.1	0.1	7020	03/14/93	BB
Antimony	<0.07	<0.07	0.07	7040	03/12/93	BB
Arsenic	<0.002	<0.002	0.002	7061	03/11/93	JF
Barium	<0.03	<0.03	0.03	7080	03/15/93	BB
Beryllium	<0.005	<0.005	0.005	7090	03/14/93	BB
Cadmium	<0.002	<0.002	0.002	7130	03/11/93	BB
Calcium	17.7	0.61	0.003	7140	03/15/93	BB
Chromium	<0.02	<0.02	0.02	7190	03/11/93	BB
Cobalt	<0.03	0.14	0.03	7200	03/12/93	BB
Copper	<0.01	<0.01	0.01	7210	03/11/93	BB
Iron	0.32	0.05	0.02	7380	03/12/93	BB
Lead	<0.05	<0.05	0.05	7420	03/11/93	BB
Magnesium	0.830	<0.001	0.001	7450	03/14/93	BB
Manganese	0.03	<0.01	0.01	7460	03/11/93	BB
Mercury	<0.001	<0.001	0.001	7471	03/09/93	SH
Nickel	0.02	<0.02	0.02	7520	03/12/93	BB
Potassium	1.66	0.42	0.005	7610	03/11/93	BB
Selenium	<0.002	<0.002	0.002	7741	03/18/93	JF
Silver	<0.01	<0.01	0.01	7760	03/13/93	BB
Sodium	1.27	1.39	0.002	7770	03/18/93	BB
Thallium	<0.1	<0.1	0.1	7840	03/12/93	BB
Vanadium	<0.2	<0.2	0.2	7910	03/15/93	BB
Zinc	<0.005	0.320	0.005	7950	03/14/93	BB

4382-025

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-8
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-7
PERCENT SOLIDS: 91%

PROJECT # :
ANALYST : LS

DATE ANALYZED : 03/04/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	1,000
Acrolein	ND	1,000
Acrylonitrile	ND	1,000
Benzene	ND	100
Bromodichloromethane	ND	100
Bromoform	ND	100
Bromomethane	ND	100
Carbon Disulfide	ND	1,000
Carbon Tetrachloride	ND	100
Chlorobenzene	ND	100
Chlorodibromomethane	ND	100
Chloroethane	ND	100
2-Chloroethyl vinyl ether	ND	1,000
Chloroform	ND	100
Chloromethane	ND	100
1,2-Dichlorobenzene	ND	100
1,3-Dichlorobenzene	ND	100
1,4-Dichlorobenzene	ND	100
1,1-Dichloroethane	ND	100

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	100
1,1-Dichloroethene	ND	100
trans-1,2-Dichloroethene	ND	100
1,2-Dichloropropane	ND	100
cis-1,3-Dichloropropene	ND	100
trans-1,3-Dichloropropene	ND	100
Ethylbenzene	190	100
2-Hexanone (MBK)	ND	1,000
4-Methyl-2-pentanone (MIBK)	ND	1,000
Methylene Chloride	ND	200
Methyl Ethyl Ketone (MEK)	ND	1,000
Styrene	ND	100
1,1,2,2-Tetachloroethane	ND	100
Tetrachloroethene	909	100
Toluene	296	100
1,1,1-Trichloroethane	3,720	100
1,1,2-Trichloroethane	ND	100
Trichloroethene	4,370	100
Trichlorofluoromethane	ND	100
Vinyl Acetate	ND	1,000
Vinyl Chloride	ND	100
Xylenes	1,840	100

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	49.1	50.0	98	70-120
Toluene-d8	49.3	50.0	99	81-117
4-Bromofluorobenzene	46.9	50.0	94	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT

LABORATORY MANAGER

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-9
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-6
PERCENT SOLIDS: 86%

PROJECT # :
ANALYST : LS

DATE ANALYZED : 03/04/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	1,000
Acrolein	ND	1,000
Acrylonitrile	ND	1,000
Benzene	ND	100
Bromodichloromethane	ND	100
Bromoform	ND	100
Bromomethane	ND	100
Carbon Disulfide	ND	1,000
Carbon Tetrachloride	ND	100
Chlorobenzene	ND	100
Chlorodibromomethane	ND	100
Chloroethane	ND	100
2-Chloroethyl vinyl ether	ND	1,000
Chloroform	ND	100
Chloromethane	ND	100
1,2-Dichlorobenzene	ND	100
1,3-Dichlorobenzene	ND	100
1,4-Dichlorobenzene	ND	100
1,1-Dichloroethane	ND	100

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	100
1,1-Dichloroethene	ND	100
trans-1,2-Dichloroethene	ND	100
1,2-Dichloropropane	ND	100
cis-1,3-Dichloropropene	ND	100
trans-1,3-Dichloropropene	ND	100
Ethylbenzene	630	100
2-Hexanone (MBK)	ND	1,000
4-Methyl-2-pentanone (MIBK)	ND	1,000
Methylene Chloride	ND	200
Methyl Ethyl Ketone (MEK)	ND	1,000
Styrene	ND	100
1,1,2,2-Tetachloroethane	ND	100
Tetrachloroethene	1,410	100
Toluene	391	100
1,1,1-Trichloroethane	2,850	100
1,1,2-Trichloroethane	ND	100
Trichloroethene	2,760	100
Trichlorofluoromethane	ND	100
Vinyl Acetate	ND	1,000
Vinyl Chloride	ND	100
Xylenes	5,090	100

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	50.6	50.0	101	70-120
Toluene-d8	50.8	50.0	102	81-117
4-Bromofluorobenzene	47.5	50.0	95	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT

LABORATORY MANAGER

SAMPLE ID : ERS-10
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-9
PERCENT SOLIDS: 85%

DATE ANALYZED : 03/04/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	13	5

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	148	5
Toluene	ND	5
1,1,1-Trichloroethane	134	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	116	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	51.4	50.0	103	70-120
Toluene-d8	43.7	50.0	87	81-117
4-Bromofluorobenzene	41.8	50.0	84	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

Extended Page

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS PROJECT # :
SITE ID : ENTERPRISE RECOVERY SYS. ANALYST : LA

DATE ANALYZED : 03/04/93

Extended Page

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-11
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-10
PERCENT SOLIDS: 81%

PROJECT # :
ANALYST : LS

DATE ANALYZED : 03/04/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	5j	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	12	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	50.5	50.0	101	70-120
Toluene-d8	46.9	50.0	92	81-117
4-Bromofluorobenzene	40.3	50.0	81	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT
j - ESTIMATED VALUE

LABORATORY MANAGER

FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-2
PERCENT SOLIDS: 86%

RESULTS[1]

COMPOUND	UNITS: (ppb)	PQL
Acetone	ND	1,000
Acrolein	ND	1,000
Acrylonitrile	ND	1,000
Benzene	ND	100
Bromodichloromethane	ND	100
Bromoform	ND	100
Bromomethane	ND	100
Carbon Disulfide	ND	1,000
Carbon Tetrachloride	ND	100
Chlorobenzene	ND	100
Chlorodibromomethane	ND	100
Chloroethane	ND	100
2-Chloroethyl vinyl ether	ND	1,000
Chloroform	ND	100
Chloromethane	ND	100
1,2-Dichlorobenzene	ND	100
1,3-Dichlorobenzene	ND	100
1,4-Dichlorobenzene	ND	100
1,1-Dichloroethane	ND	100

RESULTS[1]

COMPOUND	UNITS: (ppb)	PQL
1,2-Dichloroethane	ND	100
1,1-Dichloroethene	ND	100
trans-1,2-Dichloroethene	ND	100
1,2-Dichloropropane	ND	100
cis-1,3-Dichloropropene	ND	100
trans-1,3-Dichloropropene	ND	100
Ethylbenzene	3,360	100
2-Hexanone (MBK)	ND	1,000
4-Methyl-2-pentanone (MIBK)	ND	1,000
Methylene Chloride	ND	200
Methyl Ethyl Ketone (MEK)	ND	1,000
Styrene	ND	100
1,1,2,2-Tetachloroethane	ND	100
Tetrachloroethene	ND	100
Toluene	691	100
1,1,1-Trichloroethane	ND	100
1,1,2-Trichloroethane	ND	100
Trichloroethene	ND	100
Trichlorofluoromethane	ND	100
Vinyl Acetate	ND	1,000
Vinyl Chloride	ND	100
Xylenes	4,280	100

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	49.3	50.0	99	70-120
Toluene-d8	46.2	50.0	92	81-117
4-Bromofluorobenzene	48.5	50.0	97	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT

LABORATORY MANAGER

PERCENT SOLIDS: 80%

COMPOUND	RESULTS[1] UNITS: (ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS[1] UNITS: (ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	5j	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	8	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	52.1	50.0	104	70-120
Toluene-d8	40.9	50.0	82	81-117
4-Bromofluorobenzene	38.0	50.0	76	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT
j - ESTIMATED VALUE

MAR 17 '93 13:58 E T C MPHS TN 901 327 6334 P.14

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-6
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-4
PERCENT SOLIDS: 87%

PROJECT # :
ANALYST : LS

DATE ANALYZED : 03/03/93

METHOD (SW-846) : 8240

RESULTS[1]

RESULTS[1]

Extended Page

COMPOUND	UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	41	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: mg/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	50.3	50.0	101	70-120
Toluene-d8	45.5	50.0	91	81-117
4-Bromofluorobenzene	41.4	50.0	83	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : EES-3
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : MMLMF MA

PROJECT # :
ANALYST : LS

DATE ANALYZED : 03/03/93

METHOD (SW-846) : 8240

Extended page

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-4
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.BOC
SAMPLE # : 0302-015-3
PERCENT SOLIDS: 8%

PROJECT # :
ANALYST : LS

DATE ANALYZED : 03/03-04/93

METHOD (SW-846) : 8240

PERCENT SOLIDS: 80%

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	51	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	8	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	52.1	50.0	104	70-120
Toluene-d8	40.9	50.0	82	81-117
4-Bromofluorobenzene	38.0	50.0	76	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT
j - ESTIMATED VALUE

MAR 17 '93 13:58 ETC MEMPHIS TN 901 327 6334 P.14

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-5
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-4
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/03/93
METHOD (SW-846) : 8240
PERCENT SOLIDS: 87%

RESULTS[1] RESULTS[1]

Extended Page

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-7
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-6
PERCENT SOLIDS: 93%

PROJECT # :
ANALYST : JS

DATE ANALYZED : 03/04-05/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	1,000
Acrolein	ND	1,000
Acrylonitrile	ND	1,000
Benzene	ND	100
Bromodichloromethane	ND	100
Bromoform	ND	100
Bromomethane	ND	100
Carbon Disulfide	ND	1,000
Carbon Tetrachloride	ND	100
Chlorobenzene	ND	100
Chlorodibromomethane	ND	100
Chloroethane	ND	100
2-Chloroethyl vinyl ether	ND	1,000
Chloroform	ND	100
Chloromethane	ND	100
1,2-Dichlorobenzene	ND	100
1,3-Dichlorobenzene	ND	100
1,4-Dichlorobenzene	ND	100
1,1-Dichloroethane	ND	100

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	100
1,1-Dichloroethene	253	100
trans-1,2-Dichloroethene	ND	100
1,2-Dichloropropane	ND	100
cis-1,3-Dichloropropene	ND	100
trans-1,3-Dichloropropene	ND	100
Ethylbenzene	2,210	100
2-Hexanone (MBK)	ND	1,000
4-Methyl-2-pentanone (MIBK)	ND	1,000
Methylene Chloride	ND	200
Methyl Ethyl Ketone (MEK)	ND	1,000
Styrene	ND	100
1,1,2,2-Tetachloroethane	ND	100
Tetrachloroethene	9,490	100
Toluene	2,150	100
1,1,1-Trichloroethane	16,300	100
1,1,2-Trichloroethane	253	100
Trichloroethene	10,300	100
Trichlorofluoromethane	ND	100
Vinyl Acetate	ND	1,000
Vinyl Chloride	ND	100
Xylenes	20,500	100

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	50.5	50.0	101	70-120
Toluene-d8	50.1	50.0	100	81-117
4-Bromofluorobenzene	49.2	50.0	98	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-6
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.BOC
SAMPLE # : 0302-015-5
PERCENT SOLIDS: 84%

PROJECT # :
ANALYST : LS

DATE ANALYZED : 03/03/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	51.5	50.0	103	70-120
Toluene-d8	44.9	50.0	90	81-117
4-Bromofluorobenzene	45.9	50.0	91	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-12
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-11
PERCENT SOLIDS: 80%

PROJECT # :
ANALYST : JS

DATE ANALYZED : 03/04/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	12	5
Trichloroethene	ND	5
Trichlorofluoromethane	6	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	51.9	50.0	104	70-120
Toluene-d8	48.8	50.0	98	81-117
4-Bromofluorobenzene	41.2	50.0	92	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-13
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-12
PERCENT SOLIDS: 81%

PROJECT # :
ANALYST : LS

DATE ANALYZED : 03/05/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	8	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	5j	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	52.8	50.0	106	70-120
Toluene-d8	44.9	50.0	90	81-117
4-Bromofluorobenzene	41.9	50.0	84	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-14
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-13
PERCENT SOLIDS: 54%

PROJECT # :
ANALYST : JS

DATE ANALYZED : 03/05-09/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	9	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	45.9	50.0	92	70-120
Toluene-d8	47.0	50.0	94	81-117
4-Bromofluorobenzene	38.5	50.0	77	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-15
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-14
PERCENT SOLIDS: 75%

PROJECT # :
ANALYST : LG

DATE ANALYZED : 03/05/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	53.7	50.0	107	70-120
Toluene-d8	46.1	50.0	92	81-117
4-Bromofluorobenzene	44.2	50.0	88	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-16
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.BOC
SAMPLE # : 0302-015-15
PERCENT SOLIDS: 77%

PROJECT # :
ANALYST : LS

DATE ANALYZED : 03/05/93

METHOD (SW-846) : 8260

COMPOUND	RESULTS[1] UNITS: (ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS[1] UNITS: (ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	8	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	5j	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	50.2	50.0	100	70-120
Toluene-d8	45.4	50.0	91	81-117
4-Bromofluorobenzene	39.8	50.0	80	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-17
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-16
PERCENT SOLIDS: 84%

PROJECT # :
ANALYST : LS

DATE ANALYZED : 03/09-10/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	42.0	50.0	84	70-120
Toluene-d8	48.1	50.0	96	81-117
4-Bromofluorobenzene	42.8	50.0	86	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-18
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : AQUEOUS
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-17

PROJECT # :
ANALYST : LG

DATE ANALYZED : 03/03/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethane	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	10	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	9	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	52.1	50.0	104	76-114
Toluene-d8	44.9	50.0	90	88-110
4-Bromofluorobenzene	48.1	50.0	96	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-19
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.BOC
SAMPLE # : 0302-015-18
PERCENT SOLIDS: 80%

PROJECT # :
ANALYST : IS

DATE ANALYZED : 03/09-10/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	52.0	50.0	104	70-120
Toluene-d8	48.8	50.0	98	81-117
4-Bromofluorobenzene	43.5	50.0	87	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : ERS-20
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : SOIL
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-19
PERCENT SOLIDS: 83%

PROJECT # :
ANALYST : LS

DATE ANALYZED : 03/09-10/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS[1] UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	ND	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	50.5	50.0	101	70-120
Toluene-d8	49.8	50.0	100	81-117
4-Bromofluorobenzene	46.9	50.0	94	74-121

PQL - PRACTICAL QUANTITATION LIMIT
ND - NONE DETECTED
1 - RESULTS REPORTED AS DRY WEIGHT

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
SITE ID : ENTERPRISE RECOVERY SYS.
SAMPLE ID : YR
SAMPLE DATE : 03/01/93
DATE ARRIVED : 03/02/93
MATRIX : AQUEOUS
FILE NAME : 0302-015.DOC
SAMPLE # : 0302-015-20

PROJECT # :
ANALYST : LE

DATE ANALYZED : 03/03/93

METHOD (SW-846) : 8240

COMPOUND	RESULTS UNITS:(ppb)	PQL	COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50	1,2-Dichloroethane	ND	5
Acrolein	ND	50	1,1-Dichloroethene	ND	5
Acrylonitrile	ND	50	trans-1,2-Dichloroethene	ND	5
Benzene	ND	5	1,2-Dichloropropane	ND	5
Bromodichloromethane	ND	5	cis-1,3-Dichloropropene	ND	5
Bromoform	ND	5	trans-1,3-Dichloropropene	ND	5
Bromomethane	ND	5	Ethylbenzene	ND	5
Carbon Disulfide	ND	50	2-Hexanone (MBK)	ND	50
Carbon Tetrachloride	ND	5	4-Methyl-2-pentanone (MIBK)	ND	50
Chlorobenzene	ND	5	Methylene Chloride	ND	10
Chlorodibromomethane	ND	5	Methyl Ethyl Ketone (MEK)	ND	50
Chloroethane					

ENVIRONMENTAL TESTING & CONSULTING, INC.
2924 Walnut Grove Road • Memphis, TN 38111 • (901) 327-2750 • FAX (901) 327 6334
Founded 1972

March 26, 1993

WATER

Mr. Keith Burch
Four Seasons Industrial Services
P.O. Box 16590
Greensboro, NC 27416-0590

REF: ANALYTICAL TESTING
SAMPLE DATE: 03/16/93 & 03/17/93
SITE ID: ENTERPRISE RECOVERY SYSTEMS (AQUEOUS)

Dear Mr. Burch:

The above referenced site has been analyzed per your instructions. The tests were performed in our laboratory (#02027) in accordance with The Solid Waste Manual, SW-846. The results are shown on the attached Organic Analysis Data Sheets.

Please call our office if you have any questions.

Sincerely,

Randall H. Thomas
Vice President

lb

Attachment

0317-039

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/19-22/93
SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : ERS-1
SAMPLE DATE : 03/16/93
DATE ARRIVED : 03/17/93
METHOD (SW-846) : 8240
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-1

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	11B	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	46.6	50.0	93	76-114
Toluene-d8	46.0	50.0	92	88-110
4-Bromofluorobenzene	43.9	50.0	88	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/19/93

SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : ERS-2
SAMPLE DATE : 03/16/93
DATE ARRIVED : 03/17/93
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-2

METHOD (SW-846) : 8240

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	4j	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	5jB	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	16	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	33	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	51.1	50.0	102	76-114
Toluene-d8	46.6	50.0	93	88-110
4-Bromofluorobenzene	43.5	50.0	87	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/19/93
SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : ERS-3
SAMPLE DATE : 03/16/93
DATE ARRIVED : 03/17/93
METHOD (SW-846) : 8240
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-3

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	2j	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	5jB	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	9	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	16	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	49.9	50.0	100	76-114
Toluene-d8	46.1	50.0	92	88-110
4-Bromofluorobenzene	43.4	50.0	87	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/19/93
SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : RES-4
SAMPLE DATE : 03/16/93
DATE ARRIVED : 03/17/93
METHOD (SW-846) : 8240
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-4

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	5jB	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	49.7	50.0	99	76-114
Toluene-d8	46.3	50.0	93	88-110
4-Bromofluorobenzene	43.5	50.0	87	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/19-22/93
SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : ERS-5
SAMPLE DATE : 03/16/93
DATE ARRIVED : 03/17/93
METHOD (SW-846) : 8240
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-5

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	7	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	11B	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	11	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	77	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	49.6	50.0	99	76-114
Toluene-d8	46.9	50.0	94	88-110
4-Bromofluorobenzene	44.9	50.0	90	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/20-22/93
SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : ERS-6
SAMPLE DATE : 03/16/93
DATE ARRIVED : 03/17/93
METHOD (SW-846) : 8240
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-6

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	8 jB	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	49.9	50.0	100	76-114
Toluene-d8	45.3	50.0	91	88-110
4-Bromofluorobenzene	44.1	50.0	88	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/20/93

SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : ERS-7
SAMPLE DATE : 03/16/93
DATE ARRIVED : 03/17/93
METHOD (SW-846) : 8240
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-7

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	5jB	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	50.1	50.0	100	76-114
Toluene-d8	46.1	50.0	92	88-110
4-Bromofluorobenzene	42.9	50.0	86	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/22/93
SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : ERS-8
SAMPLE DATE : 03/16/93
DATE ARRIVED : 03/17/93
METHOD (SW-846) : 8240
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-8

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	8 jB	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	50.4	50.0	101	76-114
Toluene-d8	46.9	50.0	94	88-110
4-Bromofluorobenzene	45.9	50.0	92	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/22/93
SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : ERS-9
SAMPLE DATE : 03/16/93
DATE ARRIVED : 03/17/93
METHOD (SW-846) : 8240
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-9

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	7	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	8 jB	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethane	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	12	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	83	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	50.2	50.0	100	76-114
Toluene-d8	46.9	50.0	94	88-110
4-Bromofluorobenzene	45.1	50.0	90	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/22/93
SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : ERS-10
SAMPLE DATE : 03/16/93
DATE ARRIVED : 03/17/93
METHOD (SW-846) : 8240
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-10

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	11B	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	47.7	50.0	95	76-114
Toluene-d8	50.3	50.0	101	88-110
4-Bromofluorobenzene	44.3	50.0	89	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/22/93

SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : ERS-TB
SAMPLE DATE : 03/16/93
DATE ARRIVED : 03/17/93
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-11

METHOD (SW-846) : 8240

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	2j	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	11B	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	46.7	50.0	93	76-114
Toluene-d8	49.5	50.0	99	88-110
4-Bromofluorobenzene	44.8	50.0	90	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/22-23/93

SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : ER8-11
SAMPLE DATE : 03/17/93
DATE ARRIVED : 03/17/93
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-12

METHOD (SW-846) : 8240

MW-3

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	35	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	108	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	6	5
Toluene	ND	5
1,1,1-Trichloroethane	1,100	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	261	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	49.2	50.0	98	76-114
Toluene-d8	48.1	50.0	96	88-110
4-Bromofluorobenzene	44.5	50.0	89	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN.
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/23-24/93
SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : ERS-12
SAMPLE DATE : 03/17/93
DATE ARRIVED : 03/17/93
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-13
METHOD (SW-846) : 8240

MW-8

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	37	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	176	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	122	5
1,1-Dichloroethene	3,960	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	303B	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	917	5
Toluene	137	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	51	5
Trichloroethene	138,000	5
Trichlorofluoromethane	30	5
Vinyl Acetate	ND	50
Vinyl Chloride	10	5
Xylenes (total)	14	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	54.5	50.0	109	76-114
Toluene-d8	49.3	50.0	99	88-110
4-Bromofluorobenzene	52.9	50.0	106	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/23-24/93

SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : ERS-13
SAMPLE DATE : 03/17/93
DATE ARRIVED : 03/17/93
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0317-039-14

MW-4

METHOD (SW-846) : 8240

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	27	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	7jB	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetrachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	84	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	295	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	48.7	50.0	97	76-114
Toluene-d8	48.9	50.0	98	88-110
4-Bromofluorobenzene	51.7	50.0	103	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
B - DETECTED IN BLANK
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
CASE NARRATIVE
VOLATILE ORGANICS

CLIENT NAME : _FOUR SEASONS
PROJECT # : _____
ANALYST : _LS_____

SITE : _ENTERPRISE RECOVERY SYS

FILE NAME : _0317-039.NAR
METHOD (SW-846) : _8240__

CHAIN-OF-CUSTODY RECORD

All Chain of Custody records were complete.

HOLDING TIMES

Sample Analysis : All samples analyzed within 14 days.

CALIBRATION

BFB Daily Tune : All criteria met.
Initial Calibration : All criteria met.
Daily Continuing Calibration : All criteria met.

SAMPLE ANALYSIS

Surrogate Recovery : All recoveries within QC Acceptance criteria.

Summary : The following samples required dilution: ERS-11 (1:10)
ERS-12 (1:100)

QUALITY CONTROL

Matrix Spike / Matrix Spike Dup
MS and MSD contained 1 out of 20 analytes outside spike recovery QC limits.
See Laboratory Control Sample for system verification.

Laboratory Control Sample
All QC Recovery Criteria met.

Method Blanks
Methylene Chloride detected above Practical Quantitation Limit.
All positive sample results for Methylene Chloride qualified with B - DETECTED IN BLANK.

LABORATORY MANAGER

3A
WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
METHOD 8240

Lab Name: Environmental Testing and Consulting, Inc
Method Name: V10218V.M
System ID: V1

QC Data File Path/Sequence ID: C:\CHEMPC\DATA\V1032201\
QC Data File ID: 1101007.D

Matrix Spike ID: 0317-039-11 MS SS10M L1 B1
MS Date/Time Analyzed: 03/22/93 08:37 PM
MS Data File Path/Sequence ID: C:\CHEMPC\DATA\V1032201\
MS Data File ID: 1201008.D

COMPOUND	SPIKE Added (ug/L)	SAMPLE Conc (ug/L)	MS Conc (ug/L)	RPD % Diff	MS % Rec #	QC Limits	
1,1-Dichloroethene CCC	100.0	BDL	139.4	23 *	139	61	145
Benzene	100.0	BDL	120.2	14	120	76	127
Trichloroethene	100.0	BDL	91.2	5	91	71	120
Toluene CCC	100.0	0.1	94.7	2	95	76	125
Chlorobenzene SPCC	100.0	BDL	98.4	1	98	75	130

Matrix Spike Duplicate ID: 0317-039-11 MSD SS10M L1 B1
MSD Date/Time Analyzed: 03/22/93 09:15 PM
MSD Data File Path/Sequence ID: C:\CHEMPC\DATA\V1032201\
MSD Data File ID: 1301009.D

COMPOUND	SPIKE Added (ug/L)	SAMPLE Conc (ug/L)	MSD Conc (ug/L)		MSD % Rec #	QC Limits	
1,1-Dichloroethene CCC	100.0	BDL	110.7		111	61	145
Benzene	100.0	BDL	104.8		105	76	127
Trichloroethene	100.0	BDL	95.5		95	71	120
Toluene CCC	100.0	0.1	96.3		96	76	125
Chlorobenzene SPCC	100.0	BDL	99.8		100	75	130

\# Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 1 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

COMMENTS:

0317-039.11Q

Lisa Savage 3/23/93

3/25/93

FORM III VOA-1

1993-03-31 01:03 919 924 5798 FULR SEASONS-FNCOR 002 P18

3B
VOLATILE LABORATORY CONTROL SAMPLE
METHOD 624/8240

Lab Name: Environmental Testing and Consulting, Inc.
Method Name: V10216V.M
System ID: V1
LCS Date/Time Analyzed: 03/19/93 04:49 PM
Data File Path/Sequence ID: C:\CHEMPC\DATA\V1031901\

Compound	LCS Level ppb	LCS Found ppb	LCS % Rec #		% Recovery Low ppb	High ppb
Chloromethane SPCC	20	18.6	93		0	273
Vinyl Chloride CCC	20	18.1	90		0	251
Bromomethane	20	19.2	96		0	242
Chloroethane	20	18.1	91		14	230
Trichlorofluoromethane	20	20.2	101		17	181
Acrolein	100	102.9	103		3	152
1,1-Dichloroethene CCC	20	20.9	105		0	234
Methylene Chloride	20	23.1	116		0	221
Acrylonitrile	100	108.3	108		49	157
trans-1,2-Dichloroethene	20	20.6	103		54	156
1,1-Dichloroethane SPCC	20	20.2	101		59	155
Chloroform CCC	20	21.9	109		51	138
1,1,1-Trichloroethane	20	22.2	111		52	162
Carbon Tetrachloride	20	20.3	102		70	140
Benzene	20	22.1	111		37	151
1,2-Dichloroethane	20	21.8	109		49	155
Trichloroethene	20	22.3	112		71	157
1,2-Dichloropropane CCC	20	21.4	107		0	210
Bromodichloromethane	20	22.1	111		35	155
2-Chloroethylvinylether	20	19.7	98		0	305
cis-1,3-Dichloropropene	20	21.1	105		0	227
Toluene CCC	20	22.2	111		47	150
trans-1,3-Dichloropropene	20	21.1	105		17	183
1,1,2-Trichloroethane	20	22.3	111		52	150
Tetrachloroethene	20	22.7	113		64	148
Dibromochloromethane	20	21.6	108		53	149
Chlorobenzene SPCC	40	43.6	109		37	160
Ethylbenzene CCC	20	22.0	110		37	162
Bromoform SPCC	20	21.1	105		45	169
1,1,2,2-Tetrachloroethane SPCC	20	22.1	111		46	157
1,3-Dichlorobenzene	40	47.8	119		59	156
1,4-Dichlorobenzene	40	48.1	120		18	190
1,2-Dichlorobenzene	40	50.0	125		18	190

\# Column to be used to flag LCS Found (ppb)
* Value outside Q-Table Limits

Lisa Savage 3/23/93 4/25/93

VLCS01.XLS

FORM III VOA-DCS

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
METHOD 8240

Lab Name	Environmental Testing and Consulting, Inc
Method Name	V10216V.M
System ID	V1
QC Data File Path/Sequence ID	C:\CHEMPC\DATA\V1031901\
QC Data File ID	1101011.D
Matrix Spike ID	0317-039-03 MS SS10M L1 B1
MS Date/Time Analyzed	03/19/93 09:53 PM
MS Data File Path/Sequence ID	C:\CHEMPC\DATA\V1031901\
MS Data File ID	1201012.D

COMPOUND	SPIKE Added (ug/L)	SAMPLE Conc (ug/L)	MS Conc (ug/L)	RPD % Diff	#	MS % Rec	#	QC Limits	
1,1-Dichloroethene CCC	100.0	2.4	92.1	42	*	90		61	145
Benzene	100.0	BDL	109.1	25	*	109		76	127
Trichloroethene	100.0	15.8	108.4	3		93		71	120
Toluene CCC	100.0	0.2	95.3	3		95		76	125
Chlorobenzene SPCC	100.0	BDL	101.8	2		102		75	130

Matrix Spike Duplicate ID	0317-039-03 MSD SS10M L1 B1
MSD Date/Time Analyzed	03/19/93 10:30 PM
MSD Data File Path/Sequence ID	C:\CHEMPC\DATA\V1031901\
MSD Data File ID	1301013.D

COMPOUND	SPIKE Added (ug/L)	SAMPLE Conc (ug/L)	MSD Conc (ug/L)		MSD % Rec	#	QC Limits	
1,1-Dichloroethene CCC	100.0	2.4	60.9		59	*	61	145
Benzene	100.0	BDL	84.6		85		76	127
Trichloroethene	100.0	15.8	110.8		95		71	120
Toluene CCC	100.0	0.2	98.5		98		76	125
Chlorobenzene SPCC	100.0	BDL	104.1		104		75	130

\# Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits /See LCS 0319.

RPD: 2 out of 5 outside limits
Spike Recovery: 1 out of 10 outside limits

COMMENTS:

Lisa Savage 3/23/93

3/25/93

0317-039.03Q

FORM III VOA-1

3B
VOLATILE LABORATORY CONTROL SAMPLE
METHOD 624/8240

Lab Name: Environmental Testing and Consulting, Inc.
Method Name: V10216V.M
System ID: V1
LCS Date/Time Analyzed: 03/22/93 02:33 PM
Data File Path/Sequence ID: C:\CHEMPC\DATA\V1032201\

Compound	LCS Level ppb	LCS Found ppb	LCS % Rec #		% Recovery Low ppb	High ppb
Chloromethane SPCC	20	15.6	78		0	273
Vinyl Chloride CCC	20	18.5	93		0	251
Bromomethane	20	18.3	92		0	242
Chloroethane	20	17.9	89		14	230
Trichlorofluoromethane	20	19.8	99		17	181
Acrolein	100	100.7	101		3	152
1,1-Dichloroethene CCC	20	20.3	102		0	234
Methylene Chloride	20	26.2	131		0	221
Acrylonitrile	100	91.0	91		49	157
trans-1,2-Dichloroethene	20	19.7	98		54	156
1,1-Dichloroethane SPCC	20	18.9	95		59	155
Chloroform CCC	20	20.1	100		51	138
1,1,1-Trichloroethane	20	19.3	96		52	162
Carbon Tetrachloride	20	19.2	96		70	140
1,2-Dichloroethane	20	20.0	100		49	155
Benzene	20	21.5	107		37	151
Trichloroethene	20	20.6	103		71	157
1,2-Dichloropropane CCC	20	21.9	109		0	210
Bromodichloromethane	20	20.6	103		35	155
2-Chloroethylvinylether	20	16.8	84		0	305
cis-1,3-Dichloropropene	20	19.9	100		0	227
Toluene CCC	20	22.6	113		47	150
trans-1,3-Dichloropropene	20	19.2	96		17	183
1,1,2-Trichloroethane	20	22.1	110		52	150
Tetrachloroethene	20	23.2	116		64	148
Dibromochloromethane	20	21.5	108		53	149
Chlorobenzene SPCC	40	42.9	107		37	160
Ethylbenzene CCC	20	20.0	100		37	162
Bromoform SPCC	20	19.8	99		45	169
1,1,2,2 Tetrachloroethane SPCC	20	21.5	108		46	157
1,3-Dichlorobenzene	40	46.1	115		59	156
1,4-Dichlorobenzene	40	44.7	112		18	190
1,2-Dichlorobenzene	40	46.7	117		18	190

\# Column to be used to flag LCS Found (ppb)
* Value outside Q-Table Limits

Lisa Savage 3/23/93 3/25/93

VLCS01.XLS

FORM III VOA-DCS

1993-03-31 01:05 919 274 5298 FOUR SEASONS-ENCOR 002 P21

3B
VOLATILE LABORATORY CONTROL SAMPLE
METHOD 624/8240

Lab Name: Environmental Testing and Consulting, Inc.
Method Name: V20311V.M
System ID: V2
LCS Date/Time Analyzed: 03/23/93 04:31 PM
Data File Path/Sequence ID: C:\CHEMPC\DATA\V2032301\

Compound	LCS Level ppb	LCS Found ppb	LCS % Rec #		% Recovery Low ppb	% Recovery High ppb
Chloromethane SPCC	20	17.3	86		0	273
Vinyl Chloride CCC	20	18.4	92		0	251
Bromomethane	20	18.9	95		0	242
Chloroethane	20	19.0	95		14	230
Trichlorofluoromethane	20	19.3	96		17	181
Acrolein	100	95.6	96		3	162
1,1-Dichloroethene CCC	20	22.9	114		0	234
Methylene Chloride	20	31.3	157		0	221
Acrylonitrile	100	82.4	82		49	157
trans-1,2-Dichloroethene	20	19.0	95		54	156
1,1-Dichloroethane SPCC	20	18.5	93		59	155
Chloroform CCC	20	19.0	95		51	138
1,1,1-Trichloroethane	20	20.0	100		52	162
Carbon Tetrachloride	20	18.8	94		70	140
1,2-Dichloroethane	20	18.2	91		49	155
Benzene	20	18.7	93		37	151
Trichloroethene	20	19.3	97		71	157
1,2-Dichloropropane CCC	20	18.6	93		0	210
Bromodichloromethane	20	18.6	93		35	155
2-Chloroethylvinylether	20	19.2	96		0	305
cis-1,3-Dichloropropene	20	18.4	92		0	227
Toluene CCC	20	19.3	96		47	150
trans-1,3-Dichloropropene	20	18.0	90		17	183
1,1,2-Trichloroethane	20	18.9	94		52	150
Tetrachloroethene	20	19.7	99		64	148
Dibromochloromethane	20	18.2	91		53	149
Chlorobenzene SPCC	40	39.5	99		37	160
Ethylbenzene CCC	20	20.5	102		37	162
Bromoform SPCC	20	18.5	92		45	169
1,1,2,2-Tetrachloroethane SPCC	20	19.5	97		46	157
1,3-Dichlorobenzene	40	43.0	108		59	156
1,4-Dichlorobenzene	40	43.3	108		18	190
1,2-Dichlorobenzene	40	42.7	107		18	190

\# Column to be used to flag LCS Found (ppb)
* Value outside Q-Table Limits

Lisa Savage 3/25/93

3/25/93

FORM III VOA-DCS

VLCS01.XLS

3B
VOLATILE LABORATORY CONTROL SAMPLE
METHOD 624/8240

Lab Name: Environmental Testing and Consulting, Inc.
Method Name: V20311V.M
System ID: V2
LCS Date/Time Analyzed: 03/24/93 06:07 PM
Data File Path/Sequence ID: C:\CHEMPC\DATA\V2032401\

Compound	LCS Level ppb	LCS Found ppb	LCS % Rec	#	% Recovery Low ppb	% Recovery High ppb
Chloromethane SPCC	20	19.5	98		0	273
Vinyl Chloride CCC	20	18.2	91		0	251
Bromomethane	20	18.8	94		0	242
Chloroethane	20	17.0	85		14	230
Trichlorofluoromethane	20	20.1	100		17	181
Acrolein	100	103.0	103		3	152
1,1-Dichloroethene CCC	20	21.8	109		0	234
Methylene Chloride	20	25.3	127		0	221
Acrylonitrile	100	107.4	107		49	157
trans-1,2-Dichloroethene	20	19.2	96		54	156
1,1-Dichloroethane SPCC	20	19.0	95		59	155
Chloroform CCC	20	19.8	90		51	138
1,1,1-Trichloroethane	20	20.3	101		52	162
Carbon Tetrachloride	20	19.4	97		70	140
1,2-Dichloroethane	20	18.8	94		49	155
Benzene	20	21.0	105		37	151
Trichloroethene	20	20.4	102		71	157
1,2-Dichloropropane CCC	20	19.3	97		0	210
Bromodichloromethane	20	18.6	93		35	155
2-Chloroethylvinylether	20	19.5	97		0	305
cis-1,3-Dichloropropene	20	18.6	93		0	227
Toluene CCC	20	20.1	100		47	150
trans-1,3-Dichloropropene	20	18.4	92		17	183
1,1,2-Trichloroethane	20	19.5	98		52	150
Tetrachloroethene	20	21.0	105		64	148
Dibromochloromethane	20	18.4	92		53	149
Chlorobenzene SPCC	40	41.6	104		37	160
Ethylbenzene CCC	20	21.1	105		37	162
Bromoform SPCC	20	18.6	93		45	169
1,1,2,2-Tetrachloroethane SPCC	20	20.9	105		46	157
1,3-Dichlorobenzene	40	44.1	110		59	156
1,4 Dichlorobenzene	40	43.2	108		18	190
1,2-Dichlorobenzene	40	43.4	109		18	190

\# Column to be used to flag LCS Found (ppb)
* Value outside Q-Table Limits

Lisa Savage 3/25/93

3/25/93

FORM III VOA-DCS

V2032401.LCS

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/19/93

SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : METHOD BLANK
SAMPLE DATE : N/A
DATE ARRIVED : N/A
METHOD (SW-846) : 8240
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0319-BLK(1)

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	3j	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	43.1	50.0	86	76-114
Toluene-d8	46.1	50.0	92	88-110
4-Bromofluorobenzene	45.5	50.0	91	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/22/93
SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : METHOD BLANK
SAMPLE DATE : N/A
DATE ARRIVED : N/A
METHOD (SW-846) : 8240
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0322-BLK(1)

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	91	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	42.9	50.0	86	76-114
Toluene-d8	46.5	50.0	93	88-110
4-Bromofluorobenzene	43.1	50.0	86	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/23/93
SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : METHOD BLANK
SAMPLE DATE : N/A
DATE ARRIVED : N/A
METHOD (SW-846) : 8240
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0323-BLK(1)

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	2j	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	50.1	50.0	100	76-114
Toluene-d8	49.1	50.0	98	88-110
4-Bromofluorobenzene	56.7	50.0	113	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
j - ESTIMATED VALUE

LABORATORY MANAGER

ENVIRONMENTAL TESTING AND CONSULTING, INC.
MEMPHIS, TN
GC/MS FRACTION - VOLATILE COMPOUNDS

CLIENT NAME : FOUR SEASONS
PROJECT # :
ANALYST : LS
DATE ANALYZED : 03/24/93

SITE ID : ENTERPRISE RECOVERY SITE
SAMPLE ID : METHOD BLANK
SAMPLE DATE : N/A
DATE ARRIVED : N/A
MATRIX : AQUEOUS
FILE NAME : 0317-039.DOC
SAMPLE # : 0324-BLK(1)

METHOD (SW-846) : 8240

COMPOUND	RESULTS UNITS:(ppb)	PQL
Acetone	ND	50
Acrolein	ND	50
Acrylonitrile	ND	50
Benzene	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	5
Carbon Disulfide	ND	50
Carbon Tetrachloride	ND	5
Chlorobenzene	ND	5
Chlorodibromomethane	ND	5
Chloroethane	ND	5
2-Chloroethyl vinyl ether	ND	50
Chloroform	ND	5
Chloromethane	ND	5
1,2-Dichlorobenzene	ND	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,1-Dichloroethane	ND	5

COMPOUND	RESULTS UNITS:(ppb)	PQL
1,2-Dichloroethane	ND	5
1,1-Dichloroethene	ND	5
trans-1,2-Dichloroethene	ND	5
1,2-Dichloropropane	ND	5
cis-1,3-Dichloropropene	ND	5
trans-1,3-Dichloropropene	ND	5
Ethylbenzene	ND	5
2-Hexanone (MBK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
Methylene Chloride	2j	10
Methyl Ethyl Ketone (MEK)	ND	50
Styrene	ND	5
1,1,2,2-Tetachloroethane	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
1,1,1-Trichloroethane	ND	5
1,1,2-Trichloroethane	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	5
Vinyl Acetate	ND	50
Vinyl Chloride	ND	5
Xylenes (total)	ND	5

Units: ug/L

SURROGATE STANDARDS	RESULT	EXP	%REC	QC LIMITS % RECOVERY
1,2-Dichloroethane-d4	48.0	50.0	96	76-114
Toluene-d8	49.3	50.0	99	88-110
4-Bromofluorobenzene	57.6	50.0	115	86-115

PQL - PRACTICAL QUANTITATION LIMIT
ND - NOT DETECTED
j - ESTIMATED VALUE

LABORATORY MANAGER

Reference 24
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176

Environmental and Safety Designs, Inc.

Memphis, TN • Nashville, TN • Raleigh, NC • Pensacola, FL

5724 Summer Trees Dr. • P.O. Box 341315 • Memphis, TN 38184-1315

November 15, 1993

Mr. Bob Rosen
U.S. EPA Region IV
On-Scene Coordinator
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dear Mr. Rosen:

I am pleased to submit the enclosed monthly progress report on behalf of the PRP Group for the Enterprise Recovery Systems site in Byhalia, Mississippi. If you have any questions or comments please call me at (901) 372-7962.

Sincerely,

Environmental and Safety Designs, Inc.

Jeff Bennett
Project Coordinator

Enclosure

cc: Ms. Elizabeth Davis, EPA Region IV

ER & RC

NOV 16 2 22 PM '93

SUPERFUND

10300590

Telephone: 901-372-7962 • Facsimile: 901-372-2454

ENTERPRISE RECOVERY SYSTEMS SITE
MONTHLY PROGRESS REPORT
NOVEMBER 15, 1993

The following report is submitted in compliance with the Administrative Order on Consent. This report should not be regarded as an exhaustive account of activities on or related to the Site.

PERIOD COVERED: **To November 12, 1993**

I. SIGNIFICANT DEVELOPMENTS DURING PERIOD

A. Actions Performed

The PRP group has contracted Rust Remedial Services (RRS) to perform the necessary removal activities at the site including the dismantling of the waste storage facilities. Mike Estess is the site project manager for RRS. The PRP group has also retained Jeff Bennett with EnSafe to serve as Project Coordinator for the site who will serve as the primary contact for the PRP Group in communicating with the OSC. RRS prepared a Draft Workplan for the site on September 27, 1993 which was approved by the OSC.

RRS began work on the site on September 30, 1993. Initial work included securing the site, brush removal, installation of office trailer and utilities, staging equipment, and establishment of the decon area, exclusion zones and support zones as described in the Health and Safety Plan. RRS reviewed the analytical data from samples collected by the EPA contractor from the materials in the tanks on the site and performed their own fingerprint analyses and compatibility testing and segregated the material into the following three profiles: 1) fuel blending - low chlorides; 2) fuel blending - high chlorides; and 3) incineration.

Fuel blending materials from the tanks on the site were consolidated in PVC storage tanks surrounded by an earthen berm and the first shipment of bulk liquids was transported from the site on October 29. All liquid wastes eligible for fuel blending (approximately 22,300 gallons) have been transported to the Chemical Waste Management (CWM) fuel blending facility in Emelle, Alabama. Approximately 35,000 gallons of bulk liquids have been shipped to Rhone-Poulenc in Baton Rouge, Louisiana for incineration. A copy of all manifests is included as Attachment A.

Final approvals of the profiles for the materials stored in drums have been received and preparations are being made to begin processing the 300 drums present on site for disposal.

All stormwater collected in the containment area has been collected in two frac tanks at the site. Currently these tanks contain approximately 30,000 gallons of

stormwater.

The PRP Group is providing the local residences whose private water supply wells have been affected with bottled water. The Group will continue to provide this service until the residences can be connected to a municipal water system which is expected to occur in January or February 1994. The PRP Group will pay the connection costs. The affected private wells are to be closed and abandoned.

B. Problems Encountered

RRS originally proposed sending the wastes profiled for incineration to the CWM facility in Port Arthur, Texas; however, due to compliance problems at the facility, it cannot accept hazardous waste generated at a CERCLA facility. In order to proceed with the removal of bulk liquids, alternative sites were proposed by RRS. Following discussions with the PRP Technical Committee, it was agreed that the waste would be sent to the Rhone-Poulenc facility in Baton Rouge, Louisiana after being re-manifested by CWM in Emelle.

Bob Rosen, the OSC, was notified of the change in facilities and indicated no problems with the change. The EPA RCRA contact for Region VI, Ron Shannon, was contacted to determine the compliance status of the Rhone-Poulenc facility. They are currently authorized to accept CERCLA hazardous waste and according to Mr. Shannon they have a good compliance history. Their last inspection was in April 1993.

The first two loads of materials sent to CWM for fuel blending were rejected at the facility for containing too much water, each load contained in excess of 85% water. These loads were re-manifested at the CWM facility and shipped to Rhone-Poulenc for incineration.

II. ANALYTICAL DATA RECEIVED DURING PERIOD

The only analytical work performed during this period was additional fingerprinting performed by RRS and profile analyses conducted by CWM.

III. DEVELOPMENTS ANTICIPATED DURING NEXT PERIOD

A. Schedule of Actions to be Performed

Activities at the site are currently in compliance with the schedule presented in the workplan with removal activities expected to be completed by mid-December. The following activities will be conducted during the next reporting period:

1) 30,000 gallons of stormwater collected at the site will be profiled for disposal at a local POTW or sent to Rhone-Poulenc for incineration.

2) Waste materials in 300 drums at the site will also be processed for disposal. Material from 170 of the drums will be bulk composited and disposed. Disposal of the drums and the associated wastes should begin by November 15.

3) Dismantling of the storage facilities and disposal of the tank sludges should begin the week of November 15.

4) Submittal of the Final Workplan on November 15.

The soil investigation will begin at the site after completion of the removal action. A sampling plan will be submitted to the OSC prior to the initiation of any sampling activities. The sampling plan will include a schedule for the sampling activities.

B. Anticipated Problems

No significant problems are anticipated during the next reporting period.

C. Planned Resolutions of Past or Anticipated Problems

None

ATTACHMENT A
HAZARDOUS WASTE MANIFESTS

Enterprise Recovery Services (ERS) Facility
Off-Site Waste Shippments

DATE	PROFILE	MANIFEST	VOLUME	COMMENTS
10/28/93	BK3543	CWMA 702494	5000 gls	85% water, incineration
10/28/93	BK3543	CWMA 702496	5000 gls	85% water, incineration
10/31/93	BK3544	CWMA 728260	5000 gls	High BTU, fuel
10/31/93	BK3544	CWMA 728261	5000 gls	High BTU, fuel
11/02/93	BK3544	CWMA 702498	5000 gls	High BTU, fuel
11/03/93	BK3543	CWMA 702499	2300 gls	High BTU, fuel
11/08/93	BK3545	CWMA 728266	5000 gls	Water, incineration
11/08/93	BK3545	CWMA 728269	5000 gls	Water, incineration
11/09/93	BK3545	CWMA 728270	5000 gls	Water, incineration
11/09/93	BK3545	CWMA 728272	5000 gls	Water, incineration
11/10/93	BK3545	CWMA 728273	3300 gls	Water, incineration
11/10/93	BK3545	CWMA 728275	4100 gls	Water, incineration
11/12/93	BK3544	CWMA 728277	5000 gls	High BTU, fuel

TRK # 85 TRL # 560

HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MSD000693176 Manifest Document No.: 00001

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
ENTERPRISE RECOVERY SYSTEMS SITE PRP GROUP
RT. 5 BOX 287
BYHAILA, MS 38611

4. Generator's Phone (601) 851-7367

A. State Manifest Document Number: CWMA 702494

B. State Generator's ID:

5. Transporter 1 Company Name: ROBBIE D. WOODS TRUCKING

6. US EPA ID Number: ALD067138891

C. State Transporter's ID:

D. Transporter's Phone: 205-744-8440

7. Transporter 2 Company Name:

8. US EPA ID Number:

E. State Transporter's ID:

F. Transporter's Phone:

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
Emelle Facility
Alabama Highway 17 at Mile Marker 163
Emelle, Alabama 35459

10. US EPA ID Number: ALD000622464

G. State Facility's ID:

H. Facility's Phone: 205/652-9721

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. R.Q. WASTE FLAMMABLE LIQUID, N.O.S., CLASS 3 UN1993, (D001) Disposal Approval # ____ CWM Profile # BK3543	001	TT	6000	Gal	D001, D035 D039, D040
b. Disposal Approval # ____ CWM Profile # ____					
c. Disposal Approval # ____ CWM Profile # ____					
d. Disposal Approval # ____ CWM Profile # ____					

J. Additional Descriptions for Materials Listed Above
RUST REMEDIAL SERVICES JOB # 531490

State of Generation: MISSISSIPPI

K. Handling Codes for Wastes Listed Above
a. b.
b. d.

15. Special Handling Instructions and Additional Information IN CASE OF EMERGENCY OR MANIFEST DESCREPANCIES, PLEASE CONTACT GEORGE PONDER OR MIKE ESTESS (RUST REMEDIAL SERVICES) AT 601-851-7367

Purchase Order #

Work Order #

EMERGENCY CONTACT: GEORGE PONDER OR MIKE ESTESS

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment, OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month Day Year
George W. Ponder III for Group	George W. Ponder III PRP Rep Group	10 28 93

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year
LANCE MYRICK	Lance Myrick	10 28 93

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month Day Year

GENERATOR

TRANSPORTER

FACILITY

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

STATE OF ALABAMA (Must Accompany Shipment)

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM

EMR-BK3583

Generator Name: ENTERPRISE RECOVERY SYSTEMS

Manifest Doc. No.: 00001

CWM Profile Number: BK3583

State Manifest No: CWMA 702494

1. Check ONE: This is a X Nonwastewater Wastewater
2. If this waste is subject to any California List restrictions enter the letter from below (either A, B.1, or B.2) next to each restriction that is applicable:
   A HOCs, PCBs, Acid, Metals, Cyanides
3. Identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subdivision, or check NONE if the waste code has no subdivision. Also check which treatment standards apply. Spent solvent and California List treatment standards are listed on the following page. If F039, multi-source leachate applies, these standards must be attached by the generator. If the specified treatment technology of "Deactivation, and meet F039" is identified for D001 and D002, underlying hazardous constituent standard(s) must also be attached.

REF #	4. US EPA HAZARDOUS WASTE CODE(S)	5. SUBDIVISION ENTER THE SUBDIVISION DESCRIPTION. IF NOT APPLICABLE, SIMPLY CHECK NONE		6. APPLICABLE TREATMENT STANDARDS			7. HOW MUST THE WASTE BE MANAGED?
				6.A - PERFORMANCE-BASED: CHECK AS APPLICABLE		6.B - SPECIFIED TECHNOLOGY: IF APPLICABLE ENTER THE 40 CFR 268.42 TABLE 1 TREATMENT CODE(S)	ENTER LETTER FROM BELOW
		DESCRIPTION	NONE	268.41(a)	268.43(a)	268.42(a)	
1	D001	All Descriptions based on 40 C FR 261.21(a). Sub Cat 192				INCIN FBUBR	A
2	D039		X				B
3	D039		X				B
4	D040		X				B
5							

To identify F039 or D001, D002 underlying hazardous constituent standards, use the "F039/Underlying Hazardous constituent form" provided and check here N

Additional USEPA waste code(s) and subdivision(s) are provided on the supplemental sheet (CWM-2001-R): N

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, ,D or E) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate certification as provided below.

A. RESTRICTED WASTE REQUIRES TREATMENT
This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.42, or RCRA Section 3004(d).
For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

B.1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)
"I certify under penalty of the law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION FOR INCINERATED ORGANICS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or Part 265 Subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE
This waste is subject to a national capacity variance, or a case-by-case extension. Enter the effective date of prohibition in column 7 above.
For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT
"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above. "I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth on 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certifications, including the possibility of a fine and imprisonment."

E. WASTE IS NOT CURRENTLY SUBJECT TO PART 268 RESTRICTIONS
This waste is a newly identified waste that is not currently subject to any 40 CFR Part 268 restrictions.

I hereby certify that all information submitted in this and all associated documents is complete and accurate, to the best of my knowledge and information.

Signature [signature] Title CWM RCRA Sch. Comm Date 10-28-93

1990 Chemical Waste Management, Inc. - 5783 - Form CWM-2001-R

OF PRP Group
ERS Site

TRK # 22 TRL # LT 119

HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

Use print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved, OMB No. 2050-0039, Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MSD000693176 Manifest Document No.: 00002

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
ENTERPRISE RECOVERY SYSTEMS SITE PRP GROUP
RT. 5 BOX 287
BYHALIA, MS 38611

4. Generator's Phone (601) 851-7367

A. State Manifest Document Number: CWMA 702496

B. State Generator's ID

5. Transporter 1 Company Name: ROBBIE D. WOODS TRUCKING
6. US EPA ID Number: ALD067138891

C. State Transporter's ID

D. Transporter's Phone: 205-744-8440

7. Transporter 2 Company Name
8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
Emelle Facility
Alabama Highway 17 at Mile Marker 163
Emelle, Alabama 35459

10. US EPA ID Number: ALD000622464

G. State Facility's ID

H. Facility's Phone: 205/652-9721

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. R.Q. WASTE FLAMMABLE LIQUID, N.O.S., CLASS 3, UN1993, (D001) Disposal Approval # CWM Profile # BK3543	001	TT	5000	Gal	D001, D035 D039, D040
b. Disposal Approval # CWM Profile #					
c. Disposal Approval # CWM Profile #					
d. Disposal Approval # CWM Profile #					

J. Additional Descriptions for Materials Listed Above
RUST REMEDIAL SERVICES JOB # 531490

State of Generation: MISSISSIPPI

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
IN CASE OF EMERGENCY OR MANIFEST DESCREPANCIES, PLEASE CONTACT GEORGE PONDER OR MIKE ESTESS (RUST REMEDIAL SERVICES) AT 601-851-7367

Purchase Order #

Work Order # 37855

EMERGENCY CONTACT: GEORGE PONDER OR MIKE ESTESS

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: George W. Ponder III Chmn RCAI Sub Commr ERS ARP GYOZY
Signature: George W. Ponder
Month Day Year: 10 28 93

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Randy Gunter
Signature: Randy Gunter
Month Day Year: 10 28 93

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

GENERATOR

TRANSPORTER

FACILITY

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete. STATE OF ALABAMA (Must Accompany Shipment)

LUHZEHE/SCHEDULING 10:205-552-5185 OCT 28 93 10:10 PM PAGE 1

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM

EHE-BK3543

Generator Name: ENTERPRISE RECOVERY SYSTEMS Manifest Doc. No.: 00002

CWI Profile Number: BK3543 State Manifest No: CWMA702496

1. Check ONE: This is a X Nonwastewater Wastewater
2. If this waste is subject to any California list restrictions enter the letter from below (either A, B.1, or B.2) next to each restriction that is applicable:
   A HOCs, PCBs, Acid, Metals, Cyanides
3. Identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subdivision, or check NONE if the waste code has no subdivision. Also check which treatment standards apply. Spent solvent and California list treatment standards are listed on the following page. If F039, multi-source leachate applies, those standards must be attached by the generator. If the specified treatment technology of "deactivation, and meet F039" is identified for D001 and D002, underlying hazardous constituent standard(s) must also be attached.

NRF #	4. US EPA HAZARDOUS WASTE CODE(S)	5. SUBDIVISION ENTER THE SUBDIVISION DESCRIPTION. IF NOT APPLICABLE, SIMPLY CHECK NONE		6. APPLICABLE TREATMENT STANDARDS			7. HOW MUST THIS WASTE BE MANAGED?
				6.A - PERFORMANCE-BASED: CHECK AS APPLICABLE		6.B - SPECIFIED TECHNOLOGY: IF APPLICABLE ENTER THE 40 CFR 268.42 TABLE 1 TREATMENT CODE(S)	ENTER LETTER FROM BELOW
		DESCRIPTION	NONE	268.41(a)	268.43(a)	268.42(a)	
1	D001	All descriptions based on 40 C FR 261.21(a). Sub Cat 192				INCIN FSUBS	A
2	D039		X				B
3	D038		X				B
4	D040		X				B
5							

To identify F039 or D001, D001 underlying hazardous constituent standards, use the "F039/Underlying Hazardous constituent form" provided and check here N

Additional USEPA waste code(s) and subdivision(s) are provided on the supplemental sheet (CWI-2001-K): N

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, ,D or E) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate certification as provided below.

A. RESTRICTED WASTE REQUIRED TREATMENT
This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.17, or RCRA Section 3004(d).
For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

B.1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)
"I certify under penalty of the law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION FOR INCINERATED ORGANICS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or Part 265 Subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE
This waste is subject to a national capacity variance, or a case-by-case extension. Enter the effective date of prohibition in column 7 above.
For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT
"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above. "I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth on 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certifications, including the possibility of a fine and imprisonment."

E. WASTE IS NOT CURRENTLY SUBJECT TO PART 268 RESTRICTIONS
This waste is a newly identified waste that is not currently subject to any 40 CFR Part 268 restrictions.

I hereby certify that all information submitted in this and all attached documents is complete and accurate, to the best of my knowledge and information.

Signature [signature] Title Chem RCRA Sub-Cmp Date 10-28-93

1990 Chemical Waste Management, Inc. - 5/93 - Form CWI-2001-K

FMS Site PRP Group

HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

ase print or type. (Form designed for use on elite (12-pitch) typewriter.) TRK #85 TRL #560 Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MSD000693176 Manifest Document No. 00003

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
ENTERPRISE RECOVERY SYSTEMS SITE PRP Group
Rt 5 Box 287
Byhalia, MS. 38611

4. Generator's Phone (601) 851-7367

A. State Manifest Document Number CWMA 728260

B. State Generator's ID

5. Transporter 1 Company Name: Robbie D. Woods Trucking
6. US EPA ID Number: ALD067138891

C. State Transporter's ID

D. Transporter's Phone 205-744-8440

7. Transporter 2 Company Name
8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
Emelle Facility
Alabama Highway 17 at Mile Marker 163
Emelle, Alabama 35459

10. US EPA ID Number: ALD000622464

G. State Facility's ID

H. Facility's Phone 205/652-9721

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. R.Q. WASTE FLAMMABLE LIQUID, N.O.S., CLASS 3, UN 1993 (D001)					D001, D035, D039
Disposal Approval # ____ CWM Profile # 8K3544	001	TT	5000	GAL.	
b.					
Disposal Approval # ____ CWM Profile # ____					
c.					
Disposal Approval # ____ CWM Profile # ____					
d.					
Disposal Approval # ____ CWM Profile # ____					

J. Additional Descriptions for Materials Listed Above
RUST REMEDIAL SERVICES JOB #531490

State of Generation MISSISSIPPI

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information IN CASE OF EMERGENCY OR MANIFEST DESCREPANCIES, PLEASE CONTACT GEORGE PONDER OR MIKE ESTESS (RUST REMEDIAL SERVICES) AT: 601-851-7367

Purchase Order #

Work Order # 37917 EMERGENCY CONTACT: GEORGE PONDER

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: George W Ponder Chmn RCR Sub Comm of ERS PRP Group
Signature: George W Ponder
Month Day Year: 10 31 93

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: LANCE MYrick
Signature: Lance Myrick
Month Day Year: 10 31 93

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

GENERATOR

TRANSPORTER

FACILITY

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

STATE OF ALABAMA (Must Accompany Shipment)

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM

EXR-BK3544

Generator Name: ENTERPRISE RECOVERY SYSTEMS

Manifest Doc. No.: 00003

CWI Profile Number: BK3544

State Manifest No.: CWA 728260

1. Check ONE: This is a X Nonwastewater Wastewater
2. If this waste is subject to any California List restrictions enter the letter from below (either A, B.1, or B.2) next to each restriction that is applicable:
   A HOCs, PCBs, Acid, Metals, Cyanides
3. Identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subdivision, or check NONE if the waste code has no subdivision. Also check which treatment standards apply. Spent solvent and California list treatment standards are listed on the following page. If F039, multi-source leachate applies, those standards must be attached by the generator. If the specified treatment technology of "Deactivation, and meet F039" is identified for D001 and D003, underlying hazardous constituent standard(s) must also be attached.

NUM	4. USEPA HAZARDOUS WASTE CODE(S)	5. SUBDIVISION ENTER THE SUBDIVISION DESCRIPTION. IF NOT APPLICABLE, SIMPLY CHECK NONE		6. APPLICABLE TREATMENT STANDARDS 6.A - PERFORMANCE-BASED: CHECK AS APPLICABLE		6.B - SPECIFIED TECHNOLOGY: IF APPLICABLE ENTER THE 40 CFR 268.42 TABLE 1 TREATMENT CODE(S)	7. HOW MUST THE WASTE BE MANAGED? ENTER LETTER FROM BELOW
		DESCRIPTION	NONE	268.41(a)	268.43(a)	268.42(a)	
1	D001	All descriptions based on 40 C FR 261.21(a). Sub Cat 192				IGNIT FNRWB	A
2	D035		X				E
3	D039		X				E
4	D040		X				E
5							

To identify F039 or D001, D003 underlying hazardous constituent standards, use the "F039/Underlying Hazardous constituent form" provided and check here N

Additional USEPA waste code(s) and subdivision(s) are provided on the supplemental sheet (CWI-2001-B): N

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, D or E) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate certification as provided below.

A. RESTRICTED WASTE REQUIRES TREATMENT
This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.32, or RCRA Section 3004(d).
For Hazardous Debris: "This hazardous debris is subject to the Alternative treatment standards of 40 CFR Part 268.45."

B.1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.2 RESTRICTED WASTE FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)
"I certify under penalty of the law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION FOR INCINERATED ORGANICS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or Part 265 Subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE
This waste is subject to a national capacity variance, or a case-by-case extension. Enter the effective date of prohibition in column 7 above.
For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT
"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above. "I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth on 40 CFR 268.32 or RCRA Section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certifications, including the possibility of a fine and imprisonment."

E. WASTE IS NOT CURRENTLY SUBJECT TO PART 268 RESTRICTIONS
This waste is a newly identified waste that is not currently subject to any 40 CFR Part 268 restrictions.

I hereby certify that all information submitted in this and all associated documents is complete and accurate, to the best of my knowledge and information.

Signature [signature] Title Chem RCRA Sub Comm of ERS Sub PRP Comp Date 10-31-93

HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Trk. 22 Trl. 119

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. WSD000693176 Manifest Document No. 00005

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
ENTERPRISE RECOVERY SYSTEMS Site PRP Group
Rt 5 Box 287
Byhalia, MS. 38611

4. Generator's Phone (601) 851-7367

A. State Manifest Document Number: CWMA 728261

B. State Generator's ID

5. Transporter 1 Company Name: Robbie D. Woods Trucking

6. US EPA ID Number: ALD067178891

C. State Transporter's ID

D. Transporter's Phone: 205-744-8440

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC
Emelle Facility
Alabama Highway 17 at Mile Marker 163
Emelle, Alabama 35459

10. US EPA ID Number: ALD000622464

G. State Facility's ID

H. Facility's Phone: 205/652-9721

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ WASTE FLAMMABLE Liquid, N.O.S., CLASS 3, UN 1993 (D001) Disposal Approval # CWM Profile # BK3544	001	TT	5000	GAL	D001, D035, D039
b. Disposal Approval # CWM Profile #					
c. Disposal Approval # CWM Profile #					
d. Disposal Approval # CWM Profile #					

J. Additional Descriptions for Materials Listed Above
RUST REMEDIAL SERVICES JOB # 531490

State of Generation: MISSISSIPPI

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information: IN CASE OF EMERGENCY OR MANIFEST DESCREPANCIES PLEASE CONTACT GEORGE PONDER OR MIKE ESTESS (RUST REMEDIAL SERVICES) AT: 601-851-7367

Purchase Order #

Work Order # 37917

EMERGENCY CONTACT: GEORGE PONDER

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: George W. Ponder III CHMN of RCRA Sub-Comm-7 ERS Site PRP Group

Signature: George W. Ponder III

Month Day Year: 10 31 93

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Randy Gunter

Signature: Randy Gunter

Month Day Year: 10 31 93

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name

Signature

Month Day Year

GENERATOR

TRANSPORTER

FACILITY

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

STATE OF ALABAMA (Must Accompany Shipment)

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM

EHR-BK3544

Generator Name: ENTERPRISE RECOVERY SYSTEMS Manifest Doc. No.: 00004

CWI Profile Number: BK3544 State Manifest No: CAMA 728261

1. Check ONE: This is a X Nonwastewater Wastewater
2. If this waste is subject to any California list restrictions enter the letter from below (either A, B.1, or B.2) next to each restriction that is applicable:
   A HOCs, PCBs, Acid, Metals, Cyanides
3. Identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subdivision, or check NONE if the waste code has no subdivision. Also check which treatment standards apply. Spent solvent and California list treatment standards are listed on the following page. If F039, multi-source leachate applies, those standards must be attached by the generator. If the specified treatment technology of "Deactivation, and meet F039" is identified for D001 and D002, underlying hazardous constituent standard(s) must also be attached.

REF #	4. US EPA HAZARDOUS WASTE CODE(S)	5. SUBDIVISION ENTER THE SUBDIVISION DESCRIPTION. IF NOT APPLICABLE, SIMPLY CHECK NONE		6. APPLICABLE TREATMENT STANDARDS			7. HOW MUST THE WASTE BE MANAGED? ENTER LETTER FROM BELOW
				6.A - INFORMANCE-BASED: CHECK AS APPLICABLE		6.B - SPECIFIED TECHNOLOGY: IF APPLICABLE ENTER THE 40 CFR 268.42 TABLE 1 TREATMENT CODE(S)	
		DESCRIPTION	NONE	268.41(a)	268.41(b)	268.42(a)	
1	D001	All descriptions based on 40 C FR 261.21(a). Sub Cat 102				INCIN FSUBS	A
2	D035		X				E
3	D039		X				E
4	D040		X				E
5							

To identify F039 or D001, D002 underlying hazardous constituent standards, use the "F039/Underlying Hazardous constituent form" provided and check here N

Additional USEPA waste code(s) and subdivision(s) are provided on the supplemental sheet (CWI-2001-B): N

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, ,D or E) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate certification as provided below.

A. RESTRICTED WASTE REQUIRES TREATMENT
This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.32, or RCRA Section 3004(d).
For Hazardous Debris: "This hazardous debris is subject to the Alternative treatment standards of 40 CFR Part 268.45."

B.1 RESTRICTED WASTE TREATED TO INFORMANCE STANDARDS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)
"I certify under penalty of the law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION FOR INCINERATED ORGANICS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or Part 265 Subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE
This waste is subject to a national capacity variance, or a case-by-case extension. Enter the effective date of prohibition in column 7 above.
For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT
"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above. "I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth on 40 CFR 268.32 or RCRA Section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certifications, including the possibility of a fine and imprisonment."

E. WASTE IS NOT CURRENTLY SUBJECT TO PART 268 RESTRICTIONS
This waste is a newly identified waste that is not currently subject to any 40 CFR Part 268 restrictions.

I hereby certify that all information submitted in this and all associated documents is complete and accurate, to the best of my knowledge and information.

Signature [illegible] Title Chem RCRA Sub Coord Date 10-31-93

ETS Sal'RP [illegible]

TRK # 85 TRL # 560

HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

Print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved, OMB No. 2050-0039, Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MSD000693176 Manifest Document No. 00005

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
ENTERPRISE RECOVERY SYSTEMS SITE PRP GROUP
RT. 5 BOX 287
BYHAILA, MS 38611

4. Generator's Phone (601) 851-7367

A. State Manifest Document Number CWMA 702498

B. State Generator's ID

5. Transporter 1 Company Name: ROBBIE D. WOODS TRUCKING

6. US EPA ID Number: ALD067138891

C. State Transporter's ID

D. Transporter's Phone 205-744-8440

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
Emelle Facility
Alabama Highway 17 at Mile Marker 163
Emelle, Alabama 35459

10. US EPA ID Number: ALD000622464

G. State Facility's ID

H. Facility's Phone 205/652-9721

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. R.Q. WASTE FLAMMABLE LIQUID, N.O.S., CLASS 3, UN1993, (D001) Disposal Approval # CWM Profile # BK35404	001	TT	5000	Gal	D001, D035, D039, D040
b. Disposal Approval # CWM Profile #					
c. Disposal Approval # CWM Profile #					
d. Disposal Approval # CWM Profile #					

J. Additional Descriptions for Materials Listed Above
RUST REMEDIAL SERVICES JOB # 531490

State of Generation MISSISSIPPI

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information IN CASE OF EMERGENCY OR MANIFEST DESCREPANCIES, PLEASE CONTACT GEORGE PONDER OR MIKE ESTESS (RUST REMEDIAL SERVICES) AT 601-851-7367

Purchase Order #

Work Order # 37918 EMERGENCY CONTACT: GEORGE PONDER OR MIKE ESTESS

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment, OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: George W. Ponder — Chmn RCRA Sub Commer Ensite PRP Group
Signature: George W Ponder III
Month Day Year: 11 19 93

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: LANCE MYRICK
Signature: Lance Myrick
Month Day Year: 11 02 93

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

GENERATOR / TRANSPORTER / FACILITY

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

STATE OF ALABAMA (Must Accompany Shipment)

LWH:EHE:SCHEDULING ID:205-652-8185 OCT 28 93 LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM EHR-BK1588

Generator Name: ENTERPRISE RECOVERY SYSTEMS Manifest Doc. No.: 00005

CWI Profile Number: BK1588 State Manifest No: CWMA 702498

1. Check ONE: This is a X Nonwastewater Wastewater
2. If this waste is subject to any California list restrictions enter the letter from below (either A, B.1, or B.2) next to each restriction that is applicable:
   A HOCs, PCBs, Acid, Metals, Cyanides
3. Identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subdivision, or check NONE if the waste code has no subdivision. Also check which treatment standards apply. Spent solvent and California list treatment standards are listed on the following page. If F039, multi-source leachate applies, those standards must be attached by the generator. If the specified treatment technology of "Deactivation, and meet F039" is identified for D001 and D002, underlying hazardous constituent standard(s) must also be attached.

REF #	4. US EPA HAZARDOUS WASTE CODE(S)	5. SUBDIVISION ENTER THE SUBDIVISION DESCRIPTION. IF NOT APPLICABLE, SIMPLY CHECK NONE		6. APPLICABLE TREATMENT STANDARDS			7. HOW MUST THE WASTE BE MANAGED? ENTER LETTER FROM BELOW
				6.A - PERFORMANCE-BASED: CHECK AS APPLICABLE		6.B - SPECIFIED TECHNOLOGY: IF APPLICABLE ENTER THE 40 CFR 268.42 TABLE 1 TREATMENT CODE(S)	
		DESCRIPTION	NONE	268.41(a)	268.43(a)	268.42(a)	
1	D001	All descriptions based on 40 C FR 261.21(a). Sub Cat 102				INCIN FSUBS	A
2	D035		X				E
3	D039		X				E
4	D040		X				E
5							

To identify F039 or D001, D002 underlying hazardous constituent standards, use the "F039/Underlying Hazardous constituent form" provided and check here N

Additional USEPA waste code(s) and subdivision(s) are provided on the supplemental sheet (CWI-2001-B): N

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, D or E) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate certification as provided below.

A. RESTRICTED WASTE REQUIRES TREATMENT
This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.32, or RCRA Section 3004(d).
For Hazardous Debris: "This hazardous debris is subject to the Alternative treatment standards of 40 CFR Part 268.45."

B.1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)
"I certify under penalty of the law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION FOR INCINERATED ORGANICS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or Part 265 Subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE
This waste is subject to a national capacity variance, or a case-by-case extension. Enter the effective date of prohibition in column 7 above.
For Hazardous Debris: "This hazardous debris is subject to the Alternative treatment standards of 40 CFR Part 268.45."

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT
"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above. "I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth on 40 CFR 268.32 or RCRA Section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certifications, including the possibility of a fine and imprisonment."

E. WASTE IS NOT CURRENTLY SUBJECT TO PART 268 RESTRICTIONS
This waste is a newly identified waste that is not currently subject to any 40 CFR Part 268 restrictions.

I hereby certify that all information submitted in this and all associated documents is complete and accurate, to the best of my knowledge and information.

Signature [signature] Title Gen Mgr RRA Sch-Comm Date 11-02-93

CF Technical Services
[illegible]

TRR # 95 TRL # 560

HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

Print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. M S D 0 0 0 6 9 3 1 7 6 Manifest Document No. 0 0 6

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
ENTERPRISE RECOVERY SYSTEMS SITE PRP GROUP
RT. 5 BOX 287
BYHALIA, MS 38611

A. State Manifest Document Number CWMA 702499

B. State Generator's ID

4. Generator's Phone (601) 851-7367

5. Transporter 1 Company Name: ROBBIE D. WOODS TRUCKING

6. US EPA ID Number: A L D 0 6 7 1 3 8 8 9 1

C. State Transporter's ID

D. Transporter's Phone 205-744-8440

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
Emelle Facility
Alabama Highway 17 at Mile Marker 163
Emelle, Alabama 35459

10. US EPA ID Number: A L D 0 0 0 6 2 2 4 6 4

G. State Facility's ID

H. Facility's Phone 205/652-9721

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. R.Q. WASTE FLAMMABLE LIQUID, N.O.S., CLASS 3, UN1993, (D001) Disposal Approval # ____ CWM Profile # BR3543	001	TT	23010	Gal	D001, D039, D040
b. Disposal Approval # ____ CWM Profile # ____					
c. Disposal Approval # ____ CWM Profile # ____					
d. Disposal Approval # ____ CWM Profile # ____					

J. Additional Descriptions for Materials Listed Above
RUST REMEDIAL SERVICES JOB # 531496
State of Generation MISSISSIPPI

K. Handling Codes for Wastes Listed Above
a. b. c. d.

15. Special Handling Instructions and Additional Information IN CASE OF EMERGENCY OR MANIFEST DESCREPANCIES, PLEASE CONTACT ~~GEORGE PONDER~~ OR MIKE ESTESS (RUST REMEDIAL SERVICES) AT 601-851-7367

Purchase Order #

Work Order # 37928 EMERGENCY CONTACT: ~~GEORGE PONDER OR~~ MIKE ESTESS

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month Day Year
Jeff Bennett, Agent for PRP Group	Jeff Bennett	1 1 10 3 9 3

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year
LANCE MYRICK	Lance Myrick	1 1 10 3 9 3

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month Day Year

GENERATOR — TRANSPORTER — FACILITY

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

STATE OF ALABAMA (Must Accompany Shipment)

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM

EME-BK3543

Generator Name: ENTERPRISE RECOVERY SYSTEMS Manifest Doc. No.: 000006

CWM Profile Number: BK3543 State Manifest No: CWMA 702 499

1. Check ONLY this if a X Nonwastewater Wastewater
2. If this waste is subject to any California list restrictions enter the letter from below (either A, B.1, or B.2) next to each restriction that is applicable:
   A HOCs, PCBs, Acid, Metals, Cyanides
3. Identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subdivision, or check NONE if the waste code has no subdivision. Also check which treatment standards apply. Spent solvent and California list treatment standards are listed on the following page. If F039, multi-source leachate applies, these standards must be attached by the generator. If the specified treatment technology of "Deactivation, and meet F039" is identified for D001 and D002, underlying hazardous constituent standard(s) must also be attached.

RRF #	4. US EPA HAZARDOUS WASTE CODE(S)	5. SUBDIVISION ENTER THE SUBDIVISION DESCRIPTION. IF NOT APPLICABLE, SIMPLY CHECK NONE		6. APPLICABLE TREATMENT STANDARDS			7. HOW MUST THE WASTE BE MANAGED? ENTER LETTER FROM BELOW
				6.A - PERFORMANCE-BASED: CHECK AS APPLICABLE		6.B - SPECIFIED TECHNOLOGY: IF APPLICABLE ENTER THE 40 CFR 268.42 TABLE 1 TREATMENT CODE(S)	
		DESCRIPTION	NONE	268.41(a)	268.43(a)	268.42(a)	
1	D001	All descriptions based on 40 C FR 261.21(a). Sub Cat 192				INCIN FSUBS	A
2	D035		X				E
3	D039		X				E
4	D040		X				E
5							

To identify F039 or D001, D002 underlying hazardous constituent standards, use the "F039/Underlying Hazardous constituent form" provided and check here N

Additional USEPA waste code(s) and subdivision(s) are provided on the supplemental sheet (CWM-2001-R): N

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, ,D or E) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate certification as provided below.

A. RESTRICTED WASTE REQUIRES TREATMENT
This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.37, or RCRA Section 3004(d).
For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

B.1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)
"I certify under penalty of the law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION FOR HALOGENATED ORGANICS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or Part 265 Subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE
This waste is subject to a national capacity variance, or a case-by-case extension. Enter the effective date of prohibition in column 7 above.
For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT
"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above. "I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth on 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certifications, including the possibility of a fine and imprisonment."

E. WASTE IS NOT CURRENTLY SUBJECT TO PART 268 RESTRICTIONS
This waste is a newly identified waste that is not currently subject to any 40 CFR Part 268 restrictions.

I hereby certify that all information submitted in this and all associated documents is complete and accurate, to the best of my knowledge and information.

Signature Jeff Bennett Title Proj. Coordinator Date 11-3-93

TRK # 103 Trailer # 561

HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MS D 010 016 931 760 09 03 — Manifest Document No.

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Enterprise Recovery Systems Site PRP Group
Rt. 5 Box 287
Athalia, MS 38611

4. Generator's Phone (601) 851-7367

A. State Manifest Document Number GWMA 728268

B. State Generator's ID

5. Transporter 1 Company Name: Robbie D. Wood

6. US EPA ID Number: AL D 067 138 891

C. State Transporter's ID

D. Transporter's Phone 205-744-8440

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
Emelle Facility
Alabama Highway 17 at Mile Marker 163
Emelle, Alabama 35459

10. US EPA ID Number: AL D 000 626 244

G. State Facility's ID

H. Facility's Phone 205/652-9721

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. R.Q. Waste Flammable Liquid, N.O.S., Class 3, (D001, Toluene, Acetone) UN1993, III Disposal Approval # ____ CWM Profile # BK 3545	011	TT	5000	Gal	D001, D008, D011, D035, D039, D040
b. Disposal Approval # ____ CWM Profile # ____					
c. Disposal Approval # ____ CWM Profile # ____					
d. Disposal Approval # ____ CWM Profile # ____					

J. Additional Descriptions for Materials Listed Above
Rust Remedial Services Job # 53/496

State of Generation Mississippi

K. Handling Codes for Wastes Listed Above
a. b. c. d.

15. Special Handling Instructions and Additional Information
In Case of Emergency or Manifest Descrepancies, Please Contact Jeff Bennett or Mike Estess (Rust Remedial Services) At 601-851-7367

Purchase Order #

Work Order # 38664

EMERGENCY CONTACT: Jeff Bennett 901-372-7962

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Jeff Bennett as agent for ERS PRP Group — Signature: Jeff Bennett — Month Day Year: 1/10/93

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: LYNN ANDERSON — Signature: Lynn Anderson — Month Day Year: 1/10/93

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name — Signature — Month Day Year

GENERATOR — TRANSPORTER — FACILITY

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

STATE OF ALABAMA (Must Accompany Shipment)

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM

Generator Name: Enterprise Recovery Manifest Doc. No.: 00007

CWM Profile Number: BK3541 5 State Manifest No.: CWMA 728068

1. Is this waste a non wastewater or a wastewater? (See 40 CFR 268.2) Check ONE: [X] Non-Wastewater [ ] Wastewater
2. If this waste is subject to any California List restrictions enter the letter from below (either A, B1, or B2) next to each restriction that is applicable. ____HOCs, ____PCBs, ____Acid, ____Metals, ____Cyanides.
3. Identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subcategory, or check NONE if the waste code has no subcategory. Also check which treatment standards apply. Spent solvent and California List treatment standards are listed on the back of this form. If F039, multi-source leachate applies, those standards must be attached by the generator.

Line #	4. US EPA HAZARDOUS WASTE CODE(S)	5. SUBCATEGORY ENTER THE SUBCATEGORY DESCRIPTION IF NOT APPLICABLE SIMPLY CHECK NONE		6. APPLICABLE TREATMENT STANDARDS			7. HOW MUST THE WASTE BE MANAGED ENTER THE LETTER FROM BELOW
				6.a - PERFORMANCE BASED: CHECK AS APPLICABLE		6.b - SPECIFIED TECHNOLOGY: IF APPLICABLE ENTER THE 40 CFR 268.42 TABLE 1 TREATMENT CODE(S)	
		DESCRIPTION	NONE	268.41(a)	268.43(a)	268.42(a)	
1	D001	Ignitable liquid		>10% TOC		INCIN	A
2	D008		✓	✓			A
3	D011		✓	✓			A
4	D035		✓				B
5	D039		✓				B
6	D040		✓				B
7							
8							
9							
10							

To list additional USEPA waste code(s) and subcategory(s), use the supplemental sheet provided (CWM-2001-B) and check here: [ ]

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, or D) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate certification as provided below.

A. RESTRICTED WASTE REQUIRES TREATMENT

This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.32, or RCRA Section 3004(d)

B.1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment."

B.2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)

"I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION - FOR INCINERATED ORGANICS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or Part 265 Subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE

This waste is subject to a national capacity variance, a treatability variance, or a case-by-case extension. Enter the effective date of prohibition in column 7 above.

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT

"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above. "I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth on 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certification, including the possibility of a fine and imprisonment."

I hereby certify that all information submitted in this and all associated documents is complete and accurate, to the best of my knowledge and information.

Signature: [signature] Title: Proj Coordinator Date: 11/8/93

© 1990 Chemical Waste Management, Inc. - 7/12/90 - Form CWM-2001 A

TRK# 60 TRAiler # 519

HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

lease print or type. *(Form designed for use on elite (12-pitch) typewriter.)*

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MSD006931760000 — Manifest Document No.

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
ENTERPRISE RECOVERY SYSTEMS SITE PRP GROUP
RT. BOX 287
BYHALIA, MS 38611

4. Generator's Phone (601) 851-7367

A. State Manifest Document Number: GWMA 728269

B. State Generator's ID

5. Transporter 1 Company Name: ROBBIE D. WOOD TRUCKING

6. US EPA ID Number: ALD067138891

C. State Transporter's ID

D. Transporter's Phone: 205-744-8440

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
Emelle Facility
Alabama Highway 17 at Mile Marker 163
Emelle, Alabama 35459

10. US EPA ID Number: ALD000622464

G. State Facility's ID

H. Facility's Phone: 205/652-9721

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ. WASTE FLAMMABLE LIQUID, N.O.S., CLASS 3, UN1993, III, (D001, Toulene, Acetone) Disposal Approval # ____ CWM Profile # BK3545	01011	TM	150100	Gal	D001, D008, D011, D035, D040
b. Disposal Approval # ____ CWM Profile # ____					
c. Disposal Approval # ____ CWM Profile # ____					
d. Disposal Approval # ____ CWM Profile # ____					

J. Additional Descriptions for Materials Listed Above: Rust Remedial Services Job # 531498

State of Generation: Mississippi

K. Handling Codes for Wastes Listed Above: a. b. c. d.

15. Special Handling Instructions and Additional Information: IN Case of Emergency or Manifest Descrepancies, Please Contact Jeff Bennett or Mike Estess (Rust Remedial Services) At 601-851-7367

Purchase Order #

Work Order # 38664

EMERGENCY CONTACT: Jeff Bennett 901-372-7962

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Jeff Bennett for ERS PRP Group — Signature: Jeff Bennett — Month Day Year: 1/1/1989

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Aubrey Blair — Signature: Aubrey Blair — Month Day Year: 1/1/1989

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name — Signature — Month Day Year

GENERATOR — TRANSPORTER — FACILITY

EPA Form 8700 22 (Rev. 9-86) Previous edition is obsolete.

STATE OF ALABAMA (Must Accompany Shipment)

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM

Generator Name: Enterprise Recovery Manifest Doc. No.: 0 0 0 0 8

CWM Profile Number: B K 3 5 4 5 State Manifest No.: CWMA 728269

1. Is this waste a non wastewater or a wastewater? (See 40 CFR 268.2) Check ONE: [X] Non-Wastewater [ ] Wastewater
2. If this waste is subject to any California List restrictions enter the letter from below (either A, B1, or B2) next to each restriction that is applicable. ____HOCs, ____PCBs, ____Acid, ____Metals, ____Cyanides.
3. Identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subcategory, or check NONE if the waste code has no subcategory. Also check which treatment standards apply. Spent solvent and California List treatment standards are listed on the back of this form. If F039, multi-source leachate applies, those standards must be attached by the generator.

Line	4. US EPA HAZARDOUS WASTE CODE(S)	5. SUBCATEGORY ENTER THE SUBCATEGORY DESCRIPTION IF NOT APPLICABLE SIMPLY CHECK NONE		6. APPLICABLE TREATMENT STANDARDS 6.a - PERFORMANCE-BASED: CHECK AS APPLICABLE		6.b - SPECIFIED TECHNOLOGY: IF APPLICABLE ENTER THE 40 CFR 268.42 TABLE 1 TREATMENT CODE(S)	7. HOW MUST THE WASTE BE MANAGED ENTER THE LETTER FROM BELOW
		DESCRIPTION	NONE	268.41(a)	268.43(a)	268.42(a)	
1	D001	Ignitable liquid	≥10% TOC			INCIN	A
2	D008		✓	✓			A
3	D011		✓	✓			A
4	D035		✓				E
5	D039		✓				E
6	D040		✓				E
7							
8							
9							
10							

To list additional USEPA waste code(s) and subcategory(s), use the supplemental sheet provided (CWM-2001-B) and check here: [ ]

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, or D) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate certification as provided below:

A. RESTRICTED WASTE REQUIRES TREATMENT

This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.32, or RCRA Section 3004(d)

B.1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment."

B.2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)

"I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION - FOR INCINERATED ORGANICS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or Part 265 Subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE

This waste is subject to a national capacity variance, a treatability variance, or a case-by-case extension. Enter the effective date of prohibition in column 7 above.

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT

"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above. I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth on 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certification, including the possibility of a fine and imprisonment."

I hereby certify that all information submitted in this and all associated documents is complete and accurate, to the best of my knowledge and information.

Signature: Jeff Bennett Title: Proj. Coordinator Date: 11-8-93

© 1990 Chemical Waste Management, Inc. - 7/17/90 - Form CWM-2001-A

TRK # 345 TRAILER # LT 121

HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

Please print or type. *(Form designed for use on elite (12-pitch) typewriter.)* Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MSD000693176 Manifest Document No. 00009

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Enterprise Recovery Systems Site PRP Group
RT.5 Box 287
Byhalia, MS. 38611

4. Generator's Phone 601 851-7367

A. State Manifest Document Number CWMA 728270

B. State Generator's ID

5. Transporter 1 Company Name C.M. Penn And Sons INC.

6. US EPA ID Number LAD034190215

C. State Transporter's ID 233-5044

D. Transporter's Phone 800-[illegible]

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
Emelle Facility
Alabama Highway 17 at Mile Marker 163
Emelle, Alabama 35459

10. US EPA ID Number ALD000622464

G. State Facility's ID

H. Facility's Phone 205/652-9721

11. US DOT Description *(Including Proper Shipping Name, Hazard Class, and ID Number)*	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. R.Q. Waste Flammable Liquid, N.O.S., Class 3, UN1993, III, (D001, Toulene, Acetone) Disposal Approval # CWM Profile # BK 3545	001	TT	5000	Gal	D001, D008, D011, D035, D039, D040
b. Disposal Approval # CWM Profile #					
c. Disposal Approval # CWM Profile #					
d. Disposal Approval # CWM Profile #					

J. Additional Descriptions for Materials Listed Above Landfill regulated
Rust Remedial Services Job # 531490
State of Generation Mississippi

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information In Case of emergency or Manifest Descrepancies, Please Contact Jeff Bennett or Mike Estess (Rust Remedial Services) At 601-851-7367
Purchase Order #
Work Order # 38976
EMERGENCY CONTACT: Jeff Bennett 901-372-7962

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment, OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month Day Year
Harry S. Kemp ERS PRP Rep.	[signature]	11 09 93

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year
Robby Hill	Robby Hill	11 09 93

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month Day Year

GENERATOR

TRANSPORTER

FACILITY

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

STATE OF ALABAMA (Must Accompany Shipment)

LAND DISPOSAL NOTIFICATION AND CERTIFICATION FORM

Generator Name: Enterprise Recovery Manifest Doc. No.: 00009

CWM Profile Number: BK3545

State Manifest No.: CWMA 728270

1. Is this waste a non wastewater or a wastewater? (See 40 CFR 268.2) Check ONE: ☒ Non-Wastewater ☐ Wastewater
2. If this waste is subject to any California List restrictions enter the letter from below (either A, B1, or B2) next to each restriction that is applicable. ____HOCs, ____PCBs, ____Acid, ____Metals, ____Cyanides.
3. Identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subcategory, or check NONE if the waste code has no subcategory. Also check which treatment standards apply. Spent solvent and California List treatment standards are listed on the back of this form. If F039, multi-source leachate applies, those standards must be attached by the generator.

Row	4. USEPA HAZARDOUS WASTE CODE(S)	5. SUBCATEGORY ENTER THE SUBCATEGORY DESCRIPTION IF NOT APPLICABLE SIMPLY CHECK NONE		6. APPLICABLE TREATMENT STANDARDS			7. HOW MUST THE WASTE BE MANAGED ENTER THE LETTER FROM BELOW
				6.a - PERFORMANCE-BASED CHECK AS APPLICABLE		6.b - SPECIFIED TECHNOLOGY IF APPLICABLE ENTER THE 40 CFR 268.42 TABLE 1 TREATMENT CODE(S)	
		DESCRIPTION	NONE	268.41(a)	268.43(a)	268.42(a)	
1	D001	Ignitable liquid	≥10% TOC			INCIN	A
2	D008		✓	✓			A
3	D011		✓	✓			A
4	D035		✓				E
5	D039		✓				E
6	D040		✓				E
7							
8							
9							
10							

To list additional USEPA waste code(s) and subcategory(s), use the supplemental sheet provided (CWM-2001-B) and check here: ☐

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, or D) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate certification as provided below.

A. RESTRICTED WASTE REQUIRES TREATMENT

This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.32, or RCRA Section 3004(d)

B.1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment."

B.2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)

"I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION - FOR INCINERATED ORGANICS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or Part 265 Subpart O or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE

This waste is subject to a national capacity variance, a treatability variance, or a case-by-case extension. Enter the effective date of prohibition in column 7 above.

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT

"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above. "I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth on 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certification, including the possibility of a fine and imprisonment."

I hereby certify that all information submitted in this and all associated documents is complete and accurate, to the best of my knowledge and information.

Signature [signature] Title ERS TRP Rep. Date 11-09-93

© 1990 Chemical Waste Management, Inc. - 7/17/90 - Form CWM 2001-A

TRK# 451 Trailer # LT173

HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MSD000693176 — Manifest Document No.: 00010

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Enterprise Recovery Systems site PRP Group
Rt. 5 Box 287
Byhalia, MS 38611

4. Generator's Phone (601) 851-7367

A. State Manifest Document Number: CWMA 728272

B. State Generator's ID:

5. Transporter 1 Company Name: C.M. Penn and Sons INC.

6. US EPA ID Number: LAD034190215

C. State Transporter's ID:

D. Transporter's Phone: 800-233-5044

7. Transporter 2 Company Name:

8. US EPA ID Number:

E. State Transporter's ID:

F. Transporter's Phone:

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
Emelle Facility
Alabama Highway 17 at Mile Marker 163
Emelle, Alabama 35459

10. US EPA ID Number: ALD000622464

G. State Facility's ID:

H. Facility's Phone: 205/652-9721

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. R.Q. Waste Flammable Liquid, N.O.S., Class 3, UN 1993, III (D001, Toulene, Acetone) Disposal Approval # ____ CWM Profile # BK3545	001	TT	05000	Gal	D001, D008, D011, D035, D039, D040
b. Disposal Approval # ____ CWM Profile # ____					
c. Disposal Approval # ____ CWM Profile # ____					
d. Disposal Approval # ____ CWM Profile # ____					

J. Additional Descriptions for Materials Listed Above: Landbar Regulated Rust Remedial Services Job # 531496

State of Generation: Mississippi

K. Handling Codes for Wastes Listed Above: a. b. c. d.

15. Special Handling Instructions and Additional Information: IN Case of Emergency or Manifest Descrepancies, Please Contact Jeff Bennett or Mike Estess (Rust Remedial Services) At. 601-851-7367

Purchase Order #

Work Order # 38976

EMERGENCY CONTACT: Harry S. Kemp 901-533-8959 ~~Jeff Bennett 901-372-7962~~

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Harry S. Kemp PRP ERS Rep. — Signature: [signature] — Month Day Year: 11 09 93

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Dale Fletcher — Signature: Dale Fletcher — Month Day Year: 11 09 93

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name: — Signature: — Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name: — Signature: — Month Day Year:

GENERATOR / TRANSPORTER / FACILITY

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

STATE OF ALABAMA (Must Accompany Shipment)

Generator Name: Enterprise Recovery Systems Manifest Doc. No.: 0 0 0 1 0

CWM Profile Number: B K 3 5 4 5 State Manifest No.: CWMA 728272

1. Is this waste a non-wastewater or a wastewater? (See 40 CFR 268.2) Check ONE: X Non-Wastewater ☐ Wastewater

2. If this waste is subject to any California List restrictions enter the letter from below (either A, B1, or B2) next to each restriction that is applicable: _____ HOCs, _____ PCBs _____ Acid, _____ Metals, _____ Cyanides.

3. Identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subdivision, or check NONE if the waste code has no subdivision. Also check which treatment standards apply. Spent solvent and California List treatment standards are listed on the back of this form. If F039, multi-source leachate applies, those standards must be attached by the generator. If the specified treatment technology of "Deactivation, and meet F039" is identified for D001 and D002, the underlying hazardous constituent standard(s) must also be attached.

REF #	4. US EPA HAZARDOUS WASTE CODE(S)	5. SUBDIVISION: ENTER THE SUBDIVISION DESCRIPTION IF NOT APPLICABLE SIMPLY CHECK NONE		6. APPLICABLE TREATMENT STANDARDS: 6a - PERFORMANCE BASED: CHECK AS APPLICABLE		6b - SPECIFIED TECHNOLOGY: IF APPLICABLE ENTER THE 40 CFR 268.42-TABLE 1 TREATMENT CODE(S)	7. HOW MUST THE WASTE BE MANAGED? ENTER THE LETTER FROM BELOW
		DESCRIPTION	NONE	268.41(a)	268.43(a)	268.42(a)	
1	D001	Ignitible Liquid IND10%				Incln, Bubs	A
2	D008		X	X			A
3	D011		X	X			A
4	D035		X				E
5	D039		X				E
6	D040		X				E
7							
8							
9							
10							

To identify F039 or D001 D002 underlying hazardous constituent standards, use the "F039 Underlying Hazardous Constituent Form" provided (CWM-2004) and check here: ☐
To list additional USEPA waste code(s) and subdivision(s), use the supplemental sheet provided (CWM-2011-B) and check here: ☐

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, D or E) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate certification as provided below.

A. RESTRICTED WASTE REQUIRES TREATMENT

This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.32, or RCRA Section 3004(d).

☐ For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

B.1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment."

B.2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)

"I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION - FOR INCINERATED ORGANICS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or Part 265 Subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE

This waste is subject to a national capacity variance, a treatability variance, or a case-by-case extension. Enter the effective date of prohibition in column 7 above.

☐ For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT

"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above." "I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certification, including the possibility of a fine and imprisonment."

E. WASTE IS NOT CURRENTLY SUBJECT TO PART 268 RESTRICTIONS

This waste is a newly identified waste that is not currently subject to any 40 CFR Part 268 restrictions.

I hereby certify that all information submitted in this and all attached documents is complete and accurate, to the best of my knowledge and information.

Title: ERS PRP Rep. Date: 11-09-93

TRK# 103 Trailer # 561

HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MISD010106913 Manifest Document No. 1716000 1

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Enterprice Recovery Systems PRP Group
Rt. 5 Box 287
Byhalia, MS 38611

4. Generator's Phone (601) 851-7367

A. State Manifest Document Number: CWMA 728273

B. State Generator's ID

5. Transporter 1 Company Name: Robbie D. Wood Trucking

6. US EPA ID Number: ALD061738189

C. State Transporter's ID

D. Transporter's Phone: 205-744-8440

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
Emelle Facility
Alabama Highway 17 at Mile Marker 163
Emelle, Alabama 35459

10. US EPA ID Number: ALD006224644

G. State Facility's ID

H. Facility's Phone: 205/652-9721

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit	Waste No.
a. R.Q. Waste Flammable Liquid, N.O.S., Class 3, UN 1993, III (D001, Toulene, Acetone) Disposal Approval # ____ CWM Profile # Bk3545	0101	TT	03300 ~~05000~~	Gal	D001, D008, D035, D039, D040
b. Disposal Approval # ____ CWM Profile # ____					
c. Disposal Approval # ____ CWM Profile # ____					
d. Disposal Approval # ____ CWM Profile # ____					

J. Additional Descriptions for Materials Listed Above
Land Ban Regulated
Rust Remedial Services Job # 53140
State of Generation: Mississippi

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information: In case of Emergency or Manifest Descrepancies, Please Contact Harry Kemp or Mike Estess (Rust Remedial services) At 601-851-7367

Purchase Order #

Work Order # 38882

EMERGENCY CONTACT: Harry Kemp 901-533-9959

16 GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Harry S. Kemp ERS PRP Rep — Signature: [signature] — Month Day Year: 11 1 10 93

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: LYNN ANDERSON — Signature: Lynn Anderson — Month Day Year: 11 1 10 93

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

GENERATOR — TRANSPORTER — FACILITY

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

STATE OF ALABAMA (Must Accompany Shipment)

Generator Name: Enterprise Recovery Systems Manifest Doc. No.: 0 0 0 1

CWM Profile Number: B K 3 5 4 5 BK3545 #1 State Manifest No.: CWMA 728273

1. Is this waste a non-wastewater or a wastewater? (See 40 CFR 268.2) Check ONE: ☒ Non-Wastewater ☐ Wastewater
2. If this waste is subject to any California List restrictions enter the letter from below (either A, B1, or B2) next to each restriction that is applicable: _____ HOCs, _____ PCBs _____ Acid, _____ Metals, _____ Cyanides.
3. Identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subdivision, or check NONE if the waste code has no subdivision. Also check which treatment standards apply. Spent solvent and California List treatment standards are listed on the back of this form. If F039, multi-source leachate applies, those standards must be attached by the generator. If the specified treatment technology of "Deactivation, and meet F039" is identified for D001 and D002, the underlying hazardous constituent standard(s) must also be attached.

REF #	4. US EPA HAZARDOUS WASTE CODE(S)	5. SUBDIVISION ENTER THE SUBDIVISION DESCRIPTION IF NOT APPLICABLE SIMPLY CHECK NONE		6. APPLICABLE TREATMENT STANDARDS 6.a - PERFORMANCE BASED: CHECK AS APPLICABLE		6.b - SPECIFIED TECHNOLOGY: IF APPLICABLE ENTER THE 40 CFR 268.42 TABLE 1 TREATMENT CODE(S)	7. HOW MUST THE WASTE BE MANAGED? ENTER THE LETTER FROM BELOW
		DESCRIPTION	NONE	268.41(a)	268.42(a)	268.42(a)	
1	D001	Ignitable Liquid TRD 10%				Incin, Bulk	A
2	D008		X	X			A
3	D011		X	X			A
4	D035		X				E
5	D039		X				E
6	D040		X				E
7							
8							
9							
10							

To identify F039 or D001, D002 underlying hazardous constituent standards, use the "F039 Underlying Hazardous Constituent Form" provided (CWM-2004) and check here: ☐
To list additional USEPA waste code(s) and subdivision(s), use the supplemental sheet marked (CWM-500-B) and check here: ☐

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, D or E) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate certification as provided below.

A. RESTRICTED WASTE REQUIRES TREATMENT

This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.32, or RCRA Section 3004(d).

☐ For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

B.1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment."

B.2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)

"I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION - FOR INCINERATED ORGANICS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or Part 265 Subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE

This waste is subject to a national capacity variance, a treatability variance, or a case-by-case extension. Enter the effective date of prohibition in column 7 above.

☐ For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT

"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above." "I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certification, including the possibility of a fine and imprisonment."

E. WASTE IS NOT CURRENTLY SUBJECT TO PART 268 RESTRICTIONS

This waste is a newly identified waste that is not currently subject to any 40 CFR Part 268 restrictions.

I hereby certify that all information submitted in this and all associated documents is complete and accurate, to the best of my knowledge and information.

Signature [signature] Title ERS PRP Rep. Date 11-10-93

TRK # 60 Trailer # 514

HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MSD000693176 Manifest Document No. 00012

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Enterprise Recovery Systems Site PRP Group
Rt. 5 Box 287
Bylalia, MS 38611

4. Generator's Phone (601) 851-7367

A. State Manifest Document Number: GWMA 728275

B. State Generator's ID

5. Transporter 1 Company Name: Robbie D. Wood Trucking

6. US EPA ID Number: ALD067138891

C. State Transporter's ID

D. Transporter's Phone: 205-744-8440

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
Emelle Facility
Alabama Highway 17 at Mile Marker 163
Emelle, Alabama 35459

10. US EPA ID Number: ALD000622464

G. State Facility's ID

H. Facility's Phone: 205/652-9721

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. R.Q. Waste Flammable Liquid, N.O.S., Class 3, U.N. 1993, III (D001, Toulene, Acetone) Disposal Approval # CWM Profile # BK3546	0011	TT	4,100 gls ~~5000~~	1184 Gal	D001, D008, D011, D035, D039, D040
b. Disposal Approval # CWM Profile #					
c. Disposal Approval # CWM Profile #					
d. Disposal Approval # CWM Profile #					

J. Additional Descriptions for Materials Listed Above
Land Ban Regulated
Rust Remedial Services Job # 531490
State of Generation: Mississippi

K. Handling Codes for Wastes Listed Above
a. b.
c. d.

15. Special Handling Instructions and Additional Information In Case of Emergency or Manifest Descrepancies, Please Contact Harry Kemp or Mike Estess (Rust Remedial Services) At 601-851-7367

Purchase Order #

Work Order # 38692 EMERGENCY CONTACT: Harry Kemp 901-533-8959

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Harry J. Kemp ERS PRP Rep Signature: [signature] Month Day Year: 11 10 93

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: Aubrey Blair Signature: Aubrey Blair Month Day Year: 11 10 93

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name Signature Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name Signature Month Day Year

GENERATOR

TRANSPORTER

FACILITY

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

STATE OF ALABAMA (Must Accompany Shipment)

Generator Name: Enterprise Recovery Systems

Manifest Doc. No.: 101011 12

CWM Profile Number: BK3545

State Manifest No.: CWMA 728275

1. Is this waste a non-wastewater or a wastewater? (See 40 CFR 268.2) Check ONE: [X] Non-Wastewater [ ] Wastewater
2. *If this waste is subject to any California List restrictions enter the letter from below (either A, B1, or B2) next to each restriction that is applicable:* _____ HOCs, _____ PCBs, _____ Acid, _____ Metals, _____ Cyanides.
3. Identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subdivision, or check NONE if the waste code has no subdivision. Also check which treatment standards apply. Spent solvent and California List treatment standards are listed on the back of this form. If F039, multi-source leachate applies, those standards must be attached by the generator. If the specified treatment technology of "Deactivation, and meet F039" is identified for D001 and D002, the underlying hazardous constituent standard(s) must also be attached.

REF #	4. US EPA HAZARDOUS WASTE CODE(S)	5. SUBDIVISION ENTER THE SUBDIVISION DESCRIPTION IF NOT APPLICABLE SIMPLY CHECK NONE		6. APPLICABLE TREATMENT STANDARDS 6.a - PERFORMANCE BASED: CHECK AS APPLICABLE		6.b - SPECIFIED TECHNOLOGY: IF APPLICABLE ENTER THE 40 CFR 268.42 TABLE 1 TREATMENT CODE(S)	7. HOW MUST THE WASTE BE MANAGED? ENTER THE LETTER FROM BELOW
		DESCRIPTION	NONE	268.41(a)	268.43(a)	268.42(a)	
1	D001	Ignitible Liquid 32x310%				Tracks, Bulbs	A
2	D008		X	X			A
3	D011		X	X			A
4	D035		X				E
5	D036		X				E
6	D040		X				E
7							
8							
9							
10							

To identify F039 or D001, D002 underlying hazardous constituent standards, use the "F039 Underlying Hazardous Constituent Form" provided (CWM-2004) and check here: [ ]
To list additional USEPA waste code(s) and subdivision(s), use the supplemental sheet marked (CWM-501-B) and check here: [ ]

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, D or E) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate certification as provided below.

A. RESTRICTED WASTE REQUIRES TREATMENT

This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.32, or RCRA Section 3004(d).

[ ] For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

B.1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment."

B.2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)

"I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION - FOR INCINERATED ORGANICS

"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or Part 265 Subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE

This waste is subject to a national capacity variance, a treatability variance, or a case-by-case extension. Enter the effective date of prohibition in column 7 above.

[ ] For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT

"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above." "I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certification, including the possibility of a fine and imprisonment."

E. WASTE IS NOT CURRENTLY SUBJECT TO PART 268 RESTRICTIONS

This waste is a newly identified waste that is not currently subject to any 40 CFR Part 268 restrictions.

I hereby certify that all information submitted in this and all associated documents is complete and accurate, to the best of my knowledge and information.

Title: ERS PRR Rep. Date: 11-10-93

TRK# 345 Trailer 535

HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

Please print or type. *(Form designed for use on elite (12-pitch) typewriter.)* Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: MSD000693176 — Manifest Document No.: 00013

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Enterprise Recovery Systems Site PRP Group
Rt. 5 Box 287
Byhalia, MS 38611

4. Generator's Phone (601) 851-7367

A. State Manifest Document Number: CWMA 728277

B. State Generator's ID:

5. Transporter 1 Company Name: Robbie D. Wood

6. US EPA ID Number: ALD067138891

C. State Transporter's ID:

D. Transporter's Phone: 205-744-8440

7. Transporter 2 Company Name:

8. US EPA ID Number:

E. State Transporter's ID:

F. Transporter's Phone:

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
Emelle Facility
Alabama Highway 17 at Mile Marker 163
Emelle, Alabama 35459

10. US EPA ID Number: ALD000622464

G. State Facility's ID:

H. Facility's Phone: 205/652-9721

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. R.Q. Waste Flammable Liquid, N.O.S., Class 3, UN1993, II (D001, Toulene, Acetone) Disposal Approval # ____ CWM Profile # BK35484	001	TT	5000	Gal	D001, D035, D039, D040
b. Disposal Approval # ____ CWM Profile # ____					
c. Disposal Approval # ____ CWM Profile # ____					
d. Disposal Approval # ____ CWM Profile # ____					

J. Additional Descriptions for Materials Listed Above
Rust Job # 531490
Land Ban Regulated
State of Generation: Mississippi

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
In Case of Emergency or Manifest Descrepancies, Please Contact Harry Kemp or Mike Estess (Rust Remedial Services) At 601-851-7367
Purchase Order #
Work Order # 39195
EMERGENCY CONTACT: Harry Kemp 901-533-8959

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Harry S. Kemp ERS PRP Rep. — Signature: [signature] — Month Day Year: 11 12 93

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Robby Hill — Signature: Robby Hill — Month Day Year: 11 12 93

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: — Signature: — Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: — Signature: — Month Day Year:

GENERATOR / TRANSPORTER / FACILITY

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

STATE OF ALABAMA (Must Accompany Shipment)

Generator Name: ENTERPRISE RECOVERY SYSTEMS Manifest Doc. No.: 00013

CWM Profile Number: BK3544 State Manifest No: CWMA 7282767 11-12-93

1. Check ONE: This is a X Nonwastewater Wastewater
2. If this waste is subject to any California List restrictions enter the letter from below (either A, B.1, or B.2) next to each restriction that is applicable:
   A HOCs, PCBs, Acid, Metals, Cyanides
3. Identify ALL USEPA hazardous waste codes that apply to this waste shipment, as defined by 40 CFR 261. For each waste code, identify the corresponding subdivision, or check NONE if the waste code has no subdivision. Also check which treatment standards apply. Spent solvent and California List treatment standards are listed on the following page. If F039, multi-source leachate applies, those standards must be attached by the generator. If the specified treatment technology of "Deactivation, and meet F039" is identified for D001 and D002, underlying hazardous constituent standard(s) must also be attached.

REF #	4. US EPA HAZARDOUS WASTE CODE(S)	5. SUBDIVISION ENTER THE SUBDIVISION DESCRIPTION. IF NOT APPLICABLE, SIMPLY CHECK NONE		6. APPLICABLE TREATMENT STANDARDS			7. HOW MUST THE WASTE BE MANAGED? ENTER LETTER FROM BELOW
				6.a - PERFORMANCE-BASED: CHECK AS APPLICABLE		6.b - SPECIFIED TECHNOLOGY: IF APPLICABLE ENTER THE 40 CFR 268.42 TABLE 1 TREATMENT CODE(S)	
		DESCRIPTION	NONE	268.41(a)	268.43(a)	268.42(a)	
1	D001	All descriptions based on 40 C FR 261.21(a). Sub Cat 192				INCIN FSUBS	A
2	D035		X				E
3	D039		X				E
4	D040		X				E
5							

To identify F039 or D001, D002 underlying hazardous constituent standards, use the "F039/Underlying Hazardous constituent form" provided and check here N
Additional USEPA waste code(s) and subdivision(s) are provided on the supplemental sheet (CWM-2001-B): N

HOW MUST THE WASTE BE MANAGED? In column 7 above, enter the letter (A, B1, B2, B3, C, ,D or E) below that describes how the waste must be managed to comply with the land disposal regulations (40 CFR 268.7). Please understand that if you enter the letter B1, B2, B3, or D, you are making the appropriate Certification as provided below.

A. RESTRICTED WASTE REQUIRES TREATMENT
This waste must be treated to the applicable treatment standards set forth in 40 CFR Part 268 Subpart D, 268.32, or RCRA Section 3004(d).
For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

B.1 RESTRICTED WASTE TREATED TO PERFORMANCE STANDARDS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the treatment process has been operated and maintained properly so as to comply with the performance levels specified in 40 CFR part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d) without impermissible dilution of the prohibited waste. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.2 RESTRICTED WASTES FOR WHICH THE TREATMENT STANDARD IS EXPRESSED AS A SPECIFIED TECHNOLOGY (AND THE WASTE HAS BEEN TREATED BY THAT TECHNOLOGY)
"I certify under penalty of the law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

B.3 GOOD FAITH ANALYTICAL CERTIFICATION FOR INCINERATED ORGANICS
"I certify under penalty of law that I have personally examined and am familiar with the treatment technology and operation of the treatment process used to support this certification and that, based upon my inquiry of those individuals immediately responsible for obtaining this information, I believe that the nonwastewater organic constituents have been treated by incineration in units operated in accordance with 40 CFR Part 264 Subpart O or Part 265 Subpart O, or by combustion in fuel substitution units operating in accordance with applicable technical requirements, and I have been unable to detect the nonwastewater organic constituents despite having used best good faith efforts to analyze for such constituents. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

C. RESTRICTED WASTE SUBJECT TO A VARIANCE
This waste is subject to a national capacity variance, or a case-by-case extension. Enter the effective date of prohibition in column 7 above.
For Hazardous Debris: "This hazardous debris is subject to the alternative treatment standards of 40 CFR Part 268.45."

D. RESTRICTED WASTE CAN BE LAND DISPOSED WITHOUT FURTHER TREATMENT
"I have determined that this waste meets all applicable treatment standards set forth in 40 CFR Part 268 Subpart D, and all applicable prohibition levels set forth in Section 268.32 or RCRA Section 3004(d), and therefore, can be land disposed without further treatment. A copy of all applicable treatment standards and specified treatment methods is maintained at the treatment, storage and disposal facility named above. "I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth on 40 CFR 268.32 or RCRA section 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false certifications, including the possibility of a fine and imprisonment."

E. WASTE IS NOT CURRENTLY SUBJECT TO PART 268 RESTRICTIONS
This waste is a newly identified waste that is not currently subject to any 40 CFR Part 268 restrictions.

I hereby certify that all information submitted in this and all associated documents is complete and accurate, to the best of my knowledge and information.

Signature Title ERS PRP Rep. Date 11-12-93

Project Note

Date: June 27, 2006	Enterprise Recovery Systems Byhalia, Marshall County, Mississippi EPA ID Number: MSD000693176

Organization:
TN & Associates, Inc.,
Reg. 4 EPA START Contract
Name: Keely Meadows Signature: Keely Meadows

Subject: Current Property Owner Information for Enterprise Recovery Systems Property

After reading in the file material that the current property owner is Ronald Maxwell, a search was done in Marshall County, Mississippi for his name. One Ronald Maxwell was found for the owner of property on Cayce Road. Since no street number was provided for Cayce Road, a review of the acreage was done. The acreage of the property found in the search was 7.6 acres and the acreage of the Enterprise site was listed in previous file material as 8 acres. Based on the information above, it is concluded that Ronald Maxwell is the current property owner.

RESPONSE REQUIRED
(x) None ( ) Phone call ( ) Memo ( ) Letter ( ) Report

cc: (x) File ( ) Project Manager ( ) Principal Investigator ( ) Other (specify)

Delta Computer Systems, Inc.

Property Link

MARSHALL COUNTY, MS

Current Date **3/ 6/2006** Records Last Updated **3/ 3/2006**

PROPERTY DETAIL

OWNER MAXWELL RONALD E
1745 MYRNA

MEMPHIS TN 38117

ACRES : 7.60
LAND VALUE : 24300
IMPROVEMENTS : 28730
TOTAL VALUE: 53030
ASSESSED : 7955

PARCEL 185K-22-11700
ADDRESS CAYCE RD

TAX INFORMATION

YEAR 2005	TAX DUE	PAID	BALANCE
COUNTY	665.12	665.12	0.00
CITY	0.00	0.00	0.00
SCHOOL	281.13	281.13	0.00
TOTAL	946.25	946.25	0.00

LAST PAYMENT DATE 12 / 8 / 2005

MISCELLANEOUS INFORMATION

EXEMPT CODE
HOMESTEAD CODE
TAX DISTRICT 2020
PPIN 011721
SECTION 22
TOWNSHIP 01
RANGE 04

LEGAL FARM 12 POPLAR PIKES FARMS S/D PHASE I
DBOOK 323 PG 368 12/26/2001

Book 323 **Page** 368

View Appraisal Record

Back

Home | Search | Real Property | Appraisals | Terms of Use | Privacy Policy | Contact Us | Help

Reference 26
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176

The Revised Hazard Ranking System: Evaluating Sites After Waste Removals

When to Consider a Removal
Scoring Hazardous Waste Quanity
Determining Quantity of Hazardous Substances Remaining
Scoring Other Factors
Management Implications
Questions and Answers

The U.S. Environmental Protection Agency (EPA) has revised the Hazard Ranking System (HRS) in response to the Superfund Amendments and Reauthorization Act of 1986 (SARA). The HRS is the primary mechanism for placing sites on the National Priorities List (NPL). Under the original HRS promulgated under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), a site was scored based on conditions that existed prior to any removal actions. Under the revised HRS, waste removals may be considered under certain circumstances. The term "waste removal", as used in this fact sheet, refers to the physical removal from the site of hazardous substances or wastes containing hazardous substances. The waste removal policy is designed to provide an incentive for rapid response actions by potentially responsible parties (PRPs), reducing risks to the public and the environment and allowing for more timely and cost-effective cleanups.

This fact sheet provides information for EPA Regional staff, States, and PRPs. It defines the concept of "qualifying removal," explains how to score sites where qualifying removals have been conducted, and discusses some of the management implications of the removal policy. In addition, this fact sheet provides examples of how to score sites where removals have occurred.

WHEN TO CONSIDER A REMOVAL

In the preamble to the HRS final rule (54 FR 51567, December 14,1990), EPA established three requirements that must be met for the results of a removal to be considered in scoring a site for the NPL (Figure 1). This fact sheet pertains only to removal actions that meet all three requirements, that is, "qualifying removals." Procedures for evaluating sites where other types of response actions have occurred are being developed.

Removal of Waste

The first requirement is that all waste subject to the removal must be physically removed from the site. This requirement ensures that removals do not simply move the waste and its associated risks to another portion of the same site. A removal action (or removal) conducted by Superfund's emergency response program does not necessarily involve physical

removal of wastes from the site.

FIGURE 1
Requirements for Considering Removal Actions

- The removal action must physically remove waste from the site.
- The removal action must have occurred prior to the cutoff date applicable to the site.
- The removed waste must be disposed or destroyed at a facility permitted under RCRA or TSCA or by the NRC.

For example, Superfund removal actions, as defined in CERCLA section 101(23), may include stabilizing or containing waste on-site through engineering controls or limiting exposure potential by erecting fences or providing alternate water supplies. These types of actions do not constitute a qualifying removal for HRS purposes.

A qualifying removal for HRS purposes does not have to remove all the waste at a site or even all the waste in a particular source. Partial removal of waste from a site (meeting all three requirements) will be considered in scoring the site; however, a complete removal generally results in the maximum score reduction.

Timing

The second requirement is that the removal must have occurred prior to the cutoff date applicable to the site. The HRS preamble states that EPA will only consider removals conducted prior to the site inspection (SI). Because of differences in site assessment activities for different types of sites (e.g., EPA-lead, State-lead, Federal facilities), criteria for determining the appropriate cutoff date under this rule differ among sites.

Non-Federal Facility Sites. An SI for non-Federal facility sites begins with development of a workplan, which often includes the sampling strategy for the site. EPA believes that it would disrupt SIs to consider the results of removal actions conducted after this point because to do so could require revising sampling plans, resampling, or rescoring the site. Therefore, the SI cutoff date generally is the date that development of a workplan for the SI begins or whatever date is analogous to workplan development (Figure 2). If no such date is available (i.e., no workplan or analogous event), the cutoff date is the earliest documented date for Superfund SI activities at the site. For example, this date may include, but is not limited to, the date when a Superfund SI report, collating previously collected analytical data, is drafted. The cutoff date is not based on the date of a State or PRP site investigation conducted independently of CERCLA/SARA; the cutoff is based on the date these data are collated for Superfund SI purposes. Consult *Guidance for Performing Site Inspections Under CERCLA* (in preparation) for additional information.

Federal Facility Sites. Federal facility sites undergo a different site assessment process than private sites. Assessments and evaluations of Federal facility sites are expected to be conducted within 18 months of placement on the Federal Facility Sites: 18 months after placement on Federal facilities docket.

FIGURE 2

Determining Cutoff Date

Non-Federal Facility Sites: Date that development of workplan for first SI began or analogous date, such as:

- SI start date in CERCLIS;
- Date of technical directive document or memorandum (TDD or TDM) issued for work assignment to develop SI workplan; or
- Date of an SI reconnaissance to develop SI workplan.

If no such date is available, the cutoff date is the earliest documented date of Superfund SI activities at the site.

Federal Facility Sites: 18 months after placement on Federal facilities docket.

Sites with Multiple SIs. For sites with more than one SI, the cutoff date for most sites will be keyed to the first SI; however, the Agency may establish a later cutoff date under certain circumstances:

- If a second SI implementing a completely new sampling strategy is conducted, the Agency may consider basing the cutoff date on workplan development for the second SI. Considering removals in these cases is not likely to unduly disrupt the site assessment process.
- For sites where the first SI was conducted more than 4 years prior to HRS scoring, the Agency may consider, on a case-by-case basis, changing the cutoff date to a later date. (CERCLA Section 116, added by SARA, mandates that EPA conduct site assessment work within 4 years.)

However, the transition to the revised HRS may mean that some site evaluations will exceed 4 years because sites will require follow-up sampling. Follow-up sampling will not be used to determine a new cutoff date even if more than 4 years have elapsed since the first cutoff date because the bulk of sampling generally will have been conducted previously.

Proper Destruction or Disposal

The third requirement for a qualifying removal is that all waste removed must be disposed or destroyed at a facility permitted under the Resource Conservation and Recovery Act (RCRA) or the Toxic Substance Control Act (TSCA) or by the Nuclear Regulatory Commission (NRC). This requirement encourages proper disposal of the removed wastes and discourages simply moving waste and associated hazards to another location.

SCORING HAZARDOUS WASTE QUANTITY

Hazardous waste quantity (HWQ) is scored as follows for sites where waste has been removed:

- Do not count the amount of waste removed in any qualifying removal when scoring HWQ. (Certain minimum HWQ factor values may apply, however.)
- Score HWQ as if the waste was not removed for all non-qualifying

removals.

For partial qualifying removals, the scorer generally may subtract the amount of waste removed from the total amount of waste deposited in a source, if the same tier can be used for scoring. That is, the, total (pre-removal) and removed HWQs must be determined using the same HWQ tier. For example, if HWQ for a source is scored using Tier B (hazardous wastestream quantity), but only Tier C (volume) of the removed waste is known, the HWQ for the removed waste cannot be subtracted from the HWQ for the entire source. If both the source and removed waste are scored using Tier C, HWQ for the removed waste can be subtracted. In addition, where HWQ is estimated as the once-filled volume and the total volume of waste deposited is known to be many times this volume (e.g., surface impoundments), the amount of waste removed cannot be subtracted.

The accuracy of scoring sites with qualifying removals depends on being able to determine with reasonable confidence the quantity of hazardous substances remaining in sources at the site and the quantity already released into the environment. Consequently, minimum factor values (MFV) for HWQ apply in the absence of sufficient information to adequately determine the quantity remaining and the quantity released. Figure 3 explains how to determine appropriate minimum HWQ factor values for migration pathways (i.e., ground water, surface water, and air pathways).

HWO for Migration Pathways

Tier A (hazardous constituent quantity) of the HWQ evaluation involves determining the quantity of CERCLA hazardous substances remaining in the sources and in releases to the environment. To score HWQ completely using Tier A, the total mass of all CERCLA hazardous substances in all sources and in releases from the sources to the environment for that pathway must be known or estimated with reasonable confidence. If Tier B (hazardous wastestream quantity), C (volume), or D (area) is evaluated for any source for the pathway, the HWQ factor value for that migration pathway is subject to minimum values.

For migration pathways, a pathway-specific minimum factor value applies to all sites where hazardous constituent quantity cannot be adequately determined. At sites where no qualifying removal has taken place and there are no Level I or II targets in a given pathway, the HWQ factor for that pathway is subject to a minimum value of 10; if there are Level I or II targets, the minimum value is 100. At sites where a qualifying removal has occurred, the minimum HWQ factor value for a given migration pathway depends on several considerations:

- If a target in that migration pathway is subject to Level I or II concentrations, the minimum HWQ factor value for that pathway is 100.
- If no targets in that migration pathway are subject to Level I or Level 11 concentrations, then:

  -- If the HWQ factor value would be 100 or greater without considering the removal, then the minimum HWQ factor value for that pathway is 100.

If the HWQ factor value would be less than 100 without considering the removal, then the minimum HWQ factor value for that pathway is 10.

The minimum HWQ factor value of 10 (i.e., final bullet above) ensures that a site will not receive a higher score simply because a removal has been conducted. Under no circumstances will a party be penalized for conducting a qualifying removal.

HWQ for Soil Exposure Pathway

HWQ is evaluated differently for the soil exposure pathway than for the migration pathways. In the soil exposure pathway, HWQ is always based on conditions at the time of the SI. Only the first 2 feet of areas of observed contamination plus tanks, drums, and other container sources are included in evaluating HWQ. The HWQ factor is subject to a minimum value of 10 (if hazardous constituent quantity cannot be adequately determined), regardless of whether there has been a qualifying removal. Section 5.1.2.2 of the HRS rule provides further information on evaluating HWQ for the soil exposure pathway.

DETERMINING QUANTITY OF HAZARDOUS SUBSTANCES REMAINING

EPA's removal policy is meant to encourage the PRP conducting the removal to determine the quantity of CERCLA hazardous substances remaining in sources at the site and the full extent of the associated releases to the environment. If a release to the environment has occurred or is suspected, the PRP must determine with reasonable confidence the total quantity of all CERCLA hazardous substances in releases to all media to receive the maximum reduction in score (i.e., to avoid use of the minimum factor value). This requires determining HWQ for all sources completely using Tier A (Figure 4). As discussed previously, if the total mass of all CERCLA hazardous substances in all sources and in releases to the environment (or in areas of observed contamination for the soil exposure pathway) cannot be adequately determined for a pathway, the HWQ factor for that pathway is subject to minimum values.

At sites where surface soils or wastes have been removed, Regions are encouraged to collect a reasonable number of additional soil and/or subsurface samples to verify the PRP's evaluation of hazardous constituent quantity for the remaining waste. SIs are not intended to address the full extent of contamination at sites; therefore, EPA generally will rely on PRPs to quantify the extent of releases to all media, so that they can receive the maximum possible reduction in HWQ factor value. If subsequent Regional sampling reveals that HWQ is greater than that estimated by the PRP during the removal, the HWQ factor value is calculated based on these new data.

SCORING OTHER FACTORS

For the migration pathways, a number of factors other than HWQ can be affected by the removal of waste and, in some cases, are scored to reflect a qualifying removal (Figure 5).

Likelihood of Release Factors

The results of a qualifying removal may be taken into account in scoring

several factors in the likelihood of release factor category for the source subject to the removal. These factors include:

- observed release (or observed contamination);
- containment; and
- source type.

An observed release to one of the migration pathways documented before or after a qualifying removal can be used to score likelihood of release. That is, a qualifying removal does not negate the fact that the source already has released to the environment. However, areas of observed contamination in the soil exposure pathway are intended to reflect continuing risks at the site. Therefore, soil exposure pathway factors should be documented by sampling that represents conditions at the time of the SI.

Changes in source containment should be considered only when:

- the change results from a qualifying removal;
- no observed release of a hazardous substance associated with that source is established for a given pathway; and
- the containment factor value for the affected source is equal to 0 for that pathway after the removal.

If changes in containment result in a lower -- but non-zero -- containment factor value, then that source is assigned a containment factor that does not reflect the changes that resulted from the qualifying removal. Similarly, changes in source type that result in a non-zero source type factor value are not considered in scoring. Changes that result in a source type factor value of 0 are considered.

Substance-specific Factors

Some substance-specific HRS factors can be affected if a qualifying removal completely eliminates a hazardous substance from a pathway (i.e., all sources of that hazardous substance are completely removed or have containment factor values of 0 and there is no observed release or observed contamination of that substance). These factors include:

- toxicity;
- mobility;
- persistence;
- bioaccumulation potential; and
- gas migration potential.

None of these factors can be based on a hazardous substance that was completely eliminated from a pathway by a qualifying removal. Such a removal must include all sources of that hazardous substance, and no releases of that substance to the environment may have occurred. EPA generally will be unable to obtain such information and will rely on PRPs to produce these data. If a portion of a source is eliminated in a qualifying removal, the remaining portion of that source is assumed to contain the same hazardous substances as the removed portion, unless the PRP can document otherwise (e.g., provide analytical results or manifest data that convincingly demonstrate a given hazardous substance is not present in the remaining portion of the source). For the soil exposure pathway, toxicity should be based only on hazardous substances meeting the criteria for observed contamination at the time of the SI.

Targets Factors

Site-specific target distance limits or distance rings in migration pathways may change if a qualifying removal eliminates a source or changes a source in such a way that it is not available to a pathway (i.e., containment factor value of 0). For a migration pathway:

- If an observed release (or observed contamination) is associated with a source, include that source when measuring target distances, regardless of whether a qualifying removal has occurred or whether the containment factor value is 0.
- If a source is completely eliminated or the characteristics of the source are changed such that the source's containment factor value for a given pathway is 0, and no observed release of a hazardous substance associated with that source to that pathway has occurred, do not include that source in measuring target distances for that pathway.
- If the characteristics of a source are changed, but that source is still available to a given pathway (i.e., non-zero containment factor value), then include that source when measuring target distances for that pathway. For the soil exposure pathway:
- If all or part of an area of observed contamination is removed, do not include the removed area when determining the target distance limits.

EPA generally will not be able to document the complete removal of a source within the normal SI field sampling. EPA will rely on PRPs to provide the additional information that is needed to document complete removal of a source.

MANAGEMENT IMPLICATIONS

Site managers should be aware of the changes in site scores that may occur under the waste removal policy and understand the need to document releases at removal sites. In addition, EPA's removal and site assessment programs must coordinate at sites where the removal program is considering taking action.

Changes in Site Scores

The waste removal policy is intended to provide an incentive for timely and thorough removals by potentially lowering the HRS score for sites where a qualifying removal is conducted. This score lowering may be major or minor, depending on the characteristics of the site and the extent of the removal action:

- Because the HWQ factor values are grouped in two-order-of-magnitude ranges (100, 10,000 and 1,000,000), large changes in the HWQ factor value may occur for two types of sites: (1) sites where very large quantities of waste have been removed and (2) sites where the HWQ factor prior to removal was slightly above the lower boundary of a HWQ range.
- Likelihood of release could be affected for migration pathways where no observed release has been detected and a source is completely eliminated from a pathway by a qualifying removal (or is changed such that the containment factor value now equals 0).
- Large changes in target factor values could occur if surface soil contamination is removed from areas occupied by resident

individuals or if source elimination significantly changes the targets evaluated.

Documenting Releases

At sites where the PRP claims to have completely eliminated a source (including any associated releases), the PRP must confirm this claim through adequate sampling. A source will be evaluated on the basis of SI sampling unless the PRP can produce additional information that documents complete removal. Furthermore, if Regions believe that hazardous constituent quantity for the remaining source and its releases is not adequately determined, the minimum HWQ factor values for removal sites apply. At sites where a PRP has calculated hazardous constituent quantity for a source, Regions are encouraged to conduct sampling, to the extent practicable, to verify this information.

QUESTIONS AND ANSWERS

Q. How are multiple removals at the same site treated?
A. The number of individual removals does not matter as long as each removal considered in scoring is a qualifying removal. All qualifying removals should be considered and all nonqualifying removals should not be considered when calculating the HRS score.

Q. Whose removals are considered?
A. The waste removal policy applies to all sites, regardless of the identity of the party conducting the removal. EPA, State, and PRP removals are subject to the same requirements under the HRS removal policy.

Q. Does the waste removal policy apply to Federal facility sites?
A. Yes. The only difference in applying the removal policy to Federal facilities is the difference in determining the cutoff date.

Q. Are SIs conducted by States under cooperative agreements considered EPA SIs for the purposes of the HRS removal policy?
A. Yes.

Q. If a qualifying removal eliminates the only drums in a group for which data concerning the contents are available, how should substance-specific factors be scored for this source?
A. In the absence of information to the contrary, Regions may assume that the remaining portion of a source contains the same hazardous substances as the removed portion. If a PRP can produce convincing evidence that the hazardous substances in the removed portion of a source are not present in the remaining portion, these substances should not be used to score any substance-specific factors for that source. Regions should not, however, assume that hazardous substances present in one source (e.g., a group of drums) are present in a different source (e.g., a landfill) without supporting information.

Q. Prior to the cutoff date for a site, the PRP removed all of the waste from a pile and transferred it to an on-site containment system that would be assigned a containment factor of 0 for all pathways. Should the pile still be considered a source in scoring the site?
A. Yes. The pile should be considered when scoring this site. This response action did not physically remove waste from the site; therefore, it is not a qualifying removal.

Q. A site had an SI three years ago, but a number of additional samples were taken subsequently to support HRS scoring. Which investigation should be used to assign the cutoff date?
A. Because the overall sampling strategy is developed in the first SI, the cutoff date is based on the first SI.

Q. What if the cutoff date falls in the middle of a waste removal that was conducted over an extended period of time?
A. Those wastes that were removed prior to the cutoff date (in compliance with all three requirements) are not considered in scoring the site.

Q. Can a removal assessment conducted by the EPA removal program be used to determine the cutoff date?
A. No. SIs conducted under the aegis of Superfund's site assessment program are used to determine the cutoff date for qualifying removals.

Project Note

Date: June 21, 2006	Enterprise Recovery Systems Byhalia, Marshall County, Mississippi EPA ID Number: MSD000693176

Organization:
TN & Associates, Inc.,
Reg. 4 EPA START Contract
Name: Keely Meadows Signature: Keely Meadows

Subject: Residential Well Sampling

Residential well sampling was performed by EPA and Weston between July 1991 and May 1994. Not all the letters containing tabularized analytical results were available in the file material. Therefore, the analytical data from the three residential wells sampled in 1991 were obtained from Figure 6 found in the "Interim Report, Enterprise Recovery Systems" dated April 10, 1993.

RESPONSE REQUIRED
(x) None ( ) Phone call ( ) Memo ( ) Letter ( ) Report

cc: (x) File ( ) Project Manager ( ) Principal Investigator ( ) Other (specify)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

April 12, 1993

Mrs. Grady Crum
Rt 5, Box 289 Cayce Rd
Byhalia, MS 38611

Dear Mrs. Crum:

On March 16 and 17, 1993, the U.S. Environmental Protection Agency, Region IV, and its contractor, Roy F. Weston Company, obtained a well water sample from your home and from the homes of nine of your neighbors. The sampling was conducted as part of our continuing investigation and tracking of groundwater contaminants which may have originated at the Enterprise Recovery Systems Site. The well water was analyzed for Volatile Organic Compounds (VOCs) and the results are summarized below.

	----------SAMPLING DATES----------		
	JUL 1992	SEP 1992	MAR 1993
trichloroethylene	107 ppb	30 ppb	33 ppb
1,1,1-trichloroethane	14.6 ppb	14 ppb	16 ppb
1,1-dichloroethylene	3.6 ppb	3.1 ppb	4 ppb (est)

As you can see, the contaminant levels have remained essentially the same since the last sampling in September. Although our labs are very dependable and accurate, results can vary a few points up or down, even if the same sample is tested twice in a row. So, while it may appear that the levels have risen several points since September, this increase is not significant in terms of health and should not cause you any additional concern.

EPA will continue to sample or oversee sampling and analysis of your well water and will notify you of the next sampling date. If you have additional questions or concerns about these results or EPA's sampling process, please contact me at the above EPA address, or call me at: 404-347-3931. Thank you for your cooperation.

Sincerely,

Bob Rosen

Bob Rosen
On-Scene Coordinator
Emergency Response and Removal Branch

Printed on Recycled Paper

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E
ATLANTA, GEORGIA 30365

July 8, 1993

Mrs. Grady Crum
Rt 5, Box 289 Cayce Rd
Byhalia, MS 38611

Dear Mrs. Crum:

On June 18, 1993, the U.S. Environmental Protection Agency, Region IV, and its contractor, Roy F. Weston Company, obtained a well water sample from your home. The sampling was conducted as part of our continuing investigation and tracking of groundwater contaminants which may have originated at the Enterprise Recovery Systems Site. The well water was analyzed for Volatile Organic Compounds (VOCs) and the results are summarized below.

	----------SAMPLING DATES----------			
	JUL 1992	**SEP 1992**	**MAR 1993**	**JUN 1993**
trichloroethylene	107 ppb	30 ppb	33 ppb	30 ppb
1,1,1-trichloroethane	14.6 ppb	14 ppb	16 ppb	14 ppb
1,1-dichloroethylene	3.6 ppb	3.1 ppb	4 ppb(e)	7 ppb

(e) means an estimated value

As you can see, the contaminant levels have remained essentially the same since the last sampling. EPA will continue to sample or oversee sampling and analysis of your well water and will notify you of the next sampling date. If you have additional questions or concerns about these results or EPA's sampling process, please contact me at the above EPA address, or call me at: 404-347-3931. Thank you for your cooperation.

Sincerely,

Bob Rosen

Bob Rosen
On-Scene Coordinator
Emergency Response and Removal Branch

Printed on Recycled Paper

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

November 5, 1993

Mrs. Grady Crum
Rt 5, Box 289 Cayce Rd
Byhalia, MS 38611

Dear Mrs. Crum:

On October 13, 1993, the U.S. Environmental Protection Agency, Region IV, and its contractor, Roy F. Weston Company, supervised well sampling at your home. The sampling was conducted as part of our continuing investigation and tracking of groundwater contaminants which may have originated at the Enterprise Recovery Systems Site. The well water was analyzed for Volatile Organic Compounds (VOCs) and the results are summarized below.

	----------SAMPLING DATES----------			
	SEP 1992	MAR 1993	JUN 1993	OCT 1993
trichloroethylene	30 ppb	33 ppb	30 ppb	44 ppb
1,1,1-trichloroethane	14 ppb	16 ppb	14 ppb	16 ppb
1,1-dichloroethylene	3.1 ppb	4 ppb(e)	7 ppb	5 ppb

(e) means an estimated value

As you can see, the contaminant levels have remained essentially the same since the last sampling. EPA will continue to sample or oversee sampling and analysis of your well water and will notify you of the next sampling date. If you have additional questions or concerns about these results or EPA's sampling process, please contact me at the above EPA address, or call me at: 404-347-3931, extension 6128. Thank you for your cooperation.

Sincerely,

Bob Rosen

Bob Rosen
On-Scene Coordinator
Emergency Response and Removal Branch

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

June 15, 1994

4WD-ERRB

Mrs. Grady Crum
Rt 5, Box 289 Cayce Rd
Byhalia, MS 38611

Dear Mrs. Crum:

On May 18, 1994, the U.S. Environmental Protection Agency, Region IV, and its contractor, Roy F. Weston Company, supervised well sampling at your home. The sampling was conducted as part of our continuing investigation and tracking of groundwater contaminants which may have originated at the Enterprise Recovery Systems Site. The well water was analyzed for Volatile Organic Compounds (VOCs) and the results are summarized below.

	SAMPLING DATES			
	MAR 1993	JUN 1993	OCT 1993	MAY 1994
trichloroethylene	33 ppb	30 ppb	44 ppb	55 ppb
1,1,1-trichloroethane	16 ppb	14 ppb	16 ppb	18 ppb
1,1-dichloroethylene	4 ppb(e)	7 ppb	5 ppb	5 ppb

(e) means an estimated value

As you can see, the contaminant levels have remained essentially the same since the last sampling. EPA will continue to sample or oversee sampling and analysis of your well water and will notify you of the next sampling date. If you have additional questions or concerns about these results or EPA's sampling process, please contact me at the above EPA address, or call me at: 404-347-3931, extension 6128. Thank you for your cooperation.

Sincerely,

Bob Rosen
On-Scene Coordinator
Emergency Response and Removal Branch

10300616

Printed on Recycled Paper

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

April 12, 1993

Mr. George Cook
Rt 5, Box 288 Cayce Rd
Byhalia, MS 38611

Dear Mr. Cook:

On March 16 and 17, 1993, the U.S. Environmental Protection Agency, Region IV, and its contractor, Roy F. Weston Company, obtained a well water sample from your home and from the homes of nine of your neighbors. The sampling was conducted as part of our continuing investigation and tracking of groundwater contaminants which may have originated at the Enterprise Recovery Systems Site. The well water was analyzed for Volatile Organic Compounds (VOCs) and the results are summarized below.

	----------SAMPLING DATES----------		
	JUL 1992	SEP 1992	MAR 1993
trichloroethylene	39.3 ppb	10 ppb	16 ppb
1,1,1-trichloroethane	7.3 ppb	8.8 ppb	9 ppb
1,1-dichloroethylene	1.3 ppb	1.2 ppb	2 ppb (est)

The contaminant level for trichloroethylene increased by a slight, although insignificant amount, while the other levels have remained essentially the same since the last sampling in September. Although our labs are very dependable and accurate, results can vary a few points up or down, even if the same sample is tested twice in a row. The trichloroethylene increase is not significant in terms of health and should not cause you any additional concern.

EPA will continue to sample or oversee sampling and analysis of your well water and will notify you of the next sampling date. Because there was an increase in one of the contaminants, we will resample at a shorter interval. If you have additional questions or concerns about these results or EPA's sampling process, please contact me at the above EPA address, or call me at: 404-347-3931. Thank you for your cooperation.

Sincerely,

Bob Rosen

Bob Rosen
On-Scene Coordinator
Emergency Response and Removal Branch

Printed on Recycled Paper

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

July 8, 1993

Mr. George Cook
Rt 5, Box 288 Cayce Rd
Byhalia, MS 38611

Dear Mr. Cook:

On June 18, 1993, the U.S. Environmental Protection Agency, Region IV, and its contractor, Roy F. Weston Company, obtained a well water sample from your home. The sampling was conducted as part of our continuing investigation and tracking of groundwater contaminants which may have originated at the Enterprise Recovery Systems Site. The well water was analyzed for Volatile Organic Compounds (VOCs) and the results are summarized below.

	----------SAMPLING DATES----------			
	JUL 1992	**SEP 1992**	**MAR 1993**	**JUN 1993**
trichloroethylene	39.3 ppb	10 ppb	16 ppb	17 ppb
1,1,1-trichloroethane	7.3 ppb	8.8 ppb	9 ppb	11 ppb
1,1-dichloroethylene	1.3 ppb	1.2 ppb	2 ppb (e)	

(e) means an estimated value

As you can see, the contaminant levels have remained essentially the same since the last sampling. EPA will continue to sample or oversee sampling and analysis of your well water and will notify you of the next sampling date. If you have additional questions or concerns about these results or EPA's sampling process, please contact me at the above EPA address, or call me at: 404-347-3931. Thank you for your cooperation.

Sincerely,

Bob Rosen

Bob Rosen
On-Scene Coordinator
Emergency Response and Removal Branch

Printed on Recycled Paper

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

November 5, 1993

10300731

Mr. George Cook
Rt 5, Box 288 Cayce Rd
Byhalia, MS 38611

Dear Mr. Cook:

On October 13, 1993, the U.S. Environmental Protection Agency, Region IV, and its contractor, Roy F. Weston Company, supervised well sampling at your home. The sampling was conducted as part of our continuing investigation and tracking of groundwater contaminants which may have originated at the Enterprise Recovery Systems Site. The well water was analyzed for Volatile Organic Compounds (VOCs) and the results are summarized below.

	SAMPLING DATES			
	SEP 1992	MAR 1993	JUN 1993	OCT 1993
trichloroethylene	10 ppb	16 ppb	17 ppb	15 ppb
1,1,1-trichloroethane	8.8 ppb	9 ppb	11 ppb	8 ppb
1,1-dichloroethylene	1.2 ppb	2 ppb(e)	ND	3 ppb

(e) means an estimated value
ND means no contaminant detected

As you can see, the contaminant levels have remained essentially the same since the last sampling. EPA will continue to sample or oversee sampling and analysis of your well water and will notify you of the next sampling date. If you have additional questions or concerns about these results or EPA's sampling process, please contact me at the above EPA address, or call me at: 404-347-3931, extension 6128. Thank you for your cooperation.

Sincerely,

Bob Rosen

Bob Rosen
On-Scene Coordinator
Emergency Response and Removal Branch

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E
ATLANTA, GEORGIA 30365

June 15, 1994

4WD-ERRB

Mr. George Cook
Rt 5, Box 288 Cayce Rd
Byhalia, MS 38611

Dear Mr. Cook:

On May 18, 1994, the U.S. Environmental Protection Agency, Region IV, and its contractor, Roy F. Weston Company, supervised well sampling at your home. The sampling was conducted as part of our continuing investigation and tracking of groundwater contaminants which may have originated at the Enterprise Recovery Systems Site. The well water was analyzed for Volatile Organic Compounds (VOCs) and the results are summarized below.

	SAMPLING DATES			
	MAR 1993	JUN 1993	OCT 1993	MAY 1994
trichloroethylene	16 ppb	17 ppb	15 ppb	17 ppb
1,1,1-trichloroethane	9 ppb	11 ppb	8 ppb	8 ppb
1,1-dichloroethylene	2 ppb(e)	ND	3 ppb	ND

(e) means an estimated value
ND means no contaminant detected

As you can see, the contaminant levels have remained essentially the same since the last sampling. EPA will continue to sample or oversee sampling and analysis of your well water and will notify you of the next sampling date. If you have additional questions or concerns about these results or EPA's sampling process, please contact me at the above EPA address, or call me at: 404-347-3931, extension 6128. Thank you for your cooperation.

Sincerely,

10300618

Bob Rosen
On-Scene Coordinator
Emergency Response and Removal Branch

Printed on Recycled Paper

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

April 12, 1993

Ms. Christine Boyce & Mr. Joe Watkins
Rt 5, Box 289-4 Matthew Lane
Byhalia, MS 38611

Dear Ms. Boyce and Mr. Watkins:

On March 16 and 17, 1993, the U.S. Environmental Protection Agency, Region IV, and its contractor, Roy F. Weston Company, obtained a well water sample from your home and from the homes of nine of your neighbors. The sampling was conducted as part of our continuing investigation and tracking of groundwater contaminants which may have originated at the Enterprise Recovery Systems Site. The well water was analyzed for Volatile Organic Compounds (VOCs) and the results are summarized below.

	----------SAMPLING DATES----------		
	JUL 1992	SEP 1992	MAR 1993
trichloroethylene	358.6ppb	100 ppb	83 ppb
1,1,1-trichloroethane	17.2 ppb	17 ppb	12 ppb
1,1-dichloroethylene	7.4 ppb	7.8 ppb	7 ppb

As you can see, the level of contaminants has remained steady since the last sampling in September. Although our labs are very dependable and accurate, the results can vary a few points up or down, even if the same sample is tested twice in a row. So, while the levels appear to have dropped a few points, it may or may not be conclusive.

EPA will continue to sample or oversee sampling and analysis of your well water and will notify you of the next sampling date. If you have additional questions or concerns about these results or EPA's sampling process, please contact me at the above EPA address, or call me at: 404-347-3931. Thank you for your cooperation.

Sincerely,

Bob Rosen

Bob Rosen
On-Scene Coordinator
Emergency Response and Removal Branch

Printed on Recycled Paper

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

July 8, 1993

Ms. Christine Boyce & Mr. Joe Watkins
Rt 5, Box 289-4 Matthew Lane
Byhalia, MS 38611

Dear Ms. Boyce and Mr. Watkins:

On June 18, 1993, the U.S. Environmental Protection Agency, Region IV, and its contractor, Roy F. Weston Company, obtained a well water sample from your home. The sampling was conducted as part of our continuing investigation and tracking of groundwater contaminants which may have originated at the Enterprise Recovery Systems Site. The well water was analyzed for Volatile Organic Compounds (VOCs) and the results are summarized below.

	----------SAMPLING DATES----------			
	JUL 1992	SEP 1992	MAR 1993	JUN 1993
trichloroethylene	358.6 ppb	100 ppb	77/83 ppb	84 ppb
1,1,1-trichloroethane	17.2 ppb	17 ppb	11/12 ppb	14 ppb
1,1-dichloroethylene	7.4 ppb	7.8 ppb	7/7 ppb	13 ppb

As you can see, the contaminant levels have remained essentially the same since the last sampling. EPA will continue to sample or oversee sampling and analysis of your well water and will notify you of the next sampling date. If you have additional questions or concerns about these results or EPA's sampling process, please contact me at the above EPA address, or call me at: 404-347-3931. Thank you for your cooperation.

Sincerely,

Bob Rosen

Bob Rosen
On-Scene Coordinator
Emergency Response and Removal Branch

Printed on Recycled Paper

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

November 5, 1993

Ms. Christine Boyce & Mr. Joe Watkins
Rt 5, Box 289-4 Matthew Lane
Byhalia, MS 38611

Dear Ms. Boyce and Mr. Watkins:

On October 13, 1993, the U.S. Environmental Protection Agency, Region IV, and its contractor, Roy F. Weston Company, supervised well sampling at your home. The sampling was conducted as part of our continuing investigation and tracking of groundwater contaminants which may have originated at the Enterprise Recovery Systems Site. The well water was analyzed for Volatile Organic Compounds (VOCs) and the results are summarized below.

	----------SAMPLING DATES----------			
	SEP 1992	**MAR 1993**	**JUN 1993**	**OCT 1993**
trichloroethylene	100 ppb	77/83 ppb	84 ppb	78/81 ppb
1,1,1-trichloroethane	17 ppb	11/12 ppb	14 ppb	10 ppb
1,1-dichloroethylene	7.8 ppb	7/7 ppb	13 ppb	7 ppb

As you can see, the contaminant levels have remained essentially the same since the last sampling. EPA will continue to sample or oversee sampling and analysis of your well water and will notify you of the next sampling date. If you have additional questions or concerns about these results or EPA's sampling process, please contact me at the above EPA address, or call me at: 404-347-3931, extension 6128. Thank you for your cooperation.

Sincerely,

Bob Rosen

Bob Rosen
On-Scene Coordinator
Emergency Response and Removal Branch

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

June 15, 1994

4WD-ERRB

Ms. Christine Boyce & Mr. Joe Watkins
Rt 5, Box 289-4 Matthew Lane
Byhalia, MS 38611

Dear Ms. Boyce and Mr. Watkins:

On May 18, 1994, the U.S. Environmental Protection Agency, Region IV, and its contractor, Roy F. Weston Company, supervised well sampling at your home. The sampling was conducted as part of our continuing investigation and tracking of groundwater contaminants which may have originated at the Enterprise Recovery Systems Site. The well water was analyzed for Volatile Organic Compounds (VOCs) and the results are summarized below.

	----------SAMPLING DATES----------			
	MAR 1993	**JUN 1993**	**OCT 1993**	**MAY 1994**
trichloroethylene	77/83 ppb	84 ppb	78/81 ppb	61/74 ppb
1,1,1-trichloroethane	11/12 ppb	14 ppb	10 ppb	7/8 ppb
1,1-dichloroethylene	7/7 ppb	13 ppb	7 ppb	4 ppb(e)

(e) means an estimated value

As you can see, the contaminant levels have remained essentially the same since the last sampling. EPA will continue to sample or oversee sampling and analysis of your well water and will notify you of the next sampling date. If you have additional questions or concerns about these results or EPA's sampling process, please contact me at the above EPA address, or call me at: 404-347-3931, extension 6128. Thank you for your cooperation.

Sincerely,

Bob Rosen

Bob Rosen
On-Scene Coordinator
Emergency Response and Removal Branch

10300617

Printed on Recycled Paper

EPA National Primary Drinking Water Standards

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Acrylamide	TT[8]	Nervous system or blood problems;	Added to water during sewage/wastewater increased risk of cancer treatment	zero
OC	Alachlor	0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops	zero
R	Alpha particles	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation	zero
IOC	Antimony	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	0.006
IOC	Arsenic	0.010 as of 1/23/06	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards, runoff from glass & electronics production wastes	0
IOC	Asbestos (fibers >10 micrometers)	7 million fibers per Liter (MFL)	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits	7 MFL
OC	Atrazine	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops	0.003
IOC	Barium	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	2
OC	Benzene	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills	zero
OC	Benzo(a)pyrene (PAHs)	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines	zero
IOC	Beryllium	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries	0.004
R	Beta particles and photon emitters	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation	zero
DBP	Bromate	0.010	Increased risk of cancer	Byproduct of drinking water disinfection	zero
IOC	Cadmium	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	0.005
OC	Carbofuran	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa	0.04
OC	Carbon tetrachloride	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities	zero
D	Chloramines (as Cl_2)	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort, anemia	Water additive used to control microbes	MRDLG=4[1]

LEGEND

D	Dinsinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Chlordane	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide	zero
D	Chlorine (as Cl_2)	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort	Water additive used to control microbes	MRDLG=4[1]
D	Chlorine dioxide (as ClO_2)	MRDL=0.8[1]	Anemia; infants & young children: nervous system effects	Water additive used to control microbes	MRDLG=0.8[1]
DBP	Chlorite	1.0	Anemia; infants & young children: nervous system effects	Byproduct of drinking water disinfection	0.8
OC	Chlorobenzene	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories	0.1
IOC	Chromium (total)	0.1	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits	0.1
IOC	Copper	TT[7]; Action Level = 1.3	Short term exposure: Gastrointestinal distress. Long term exposure: Liver or kidney damage. People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	Corrosion of household plumbing systems; erosion of natural deposits	1.3
M	*Cryptosporidium*	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
IOC	Cyanide (as free cyanide)	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories	0.2
OC	2,4-D	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops	0.07
OC	Dalapon	0.2	Minor kidney changes	Runoff from herbicide used on rights of way	0.2
OC	1,2-Dibromo-3-chloropropane (DBCP)	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards	zero
OC	o-Dichlorobenzene	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories	0.6
OC	p-Dichlorobenzene	0.075	Anemia; liver, kidney or spleen damage; changes in blood	Discharge from industrial chemical factories	0.075
OC	1,2-Dichloroethane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	zero
OC	1,1-Dichloroethylene	0.007	Liver problems	Discharge from industrial chemical factories	0.007
OC	cis-1,2-Dichloroethylene	0.07	Liver problems	Discharge from industrial chemical factories	0.07
OC	trans-1,2-Dichloroethylene	0.1	Liver problems	Discharge from industrial chemical factories	0.1
OC	Dichloromethane	0.005	Liver problems; increased risk of cancer	Discharge from drug and chemical factories	zero
OC	1,2-Dichloropropane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	zero
OC	Di(2-ethylhexyl) adipate	0.4	Weight loss, live problems, or possible reproductive difficulties	Discharge from chemical factories	0.4
OC	Di(2-ethylhexyl) phthalate	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories	zero
OC	Dinoseb	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables	0.007
OC	Dioxin (2,3,7,8-TCDD)	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories	zero
OC	Diquat	0.02	Cataracts	Runoff from herbicide use	0.02
OC	Endothall	0.1	Stomach and intestinal problems	Runoff from herbicide use	0.1

LEGEND

D Dinsinfectant

DBP Disinfection Byproduct

IOC Inorganic Chemical

M Microorganism

OC Organic Chemical

R Radionuclides

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Endrin	0.002	Liver problems	Residue of banned insecticide	0.002
OC	Epichlorohydrin	TT[8]	Increased cancer risk, and over a long period of time, stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals	zero
OC	Ethylbenzene	0.7	Liver or kidneys problems	Discharge from petroleum refineries	0.7
OC	Ethylene dibromide	0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries	zero
IOC	Fluoride	4.0	Bone disease (pain and tenderness of the bones); Children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories	4.0
M	*Giardia lamblia*	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
OC	Glyphosate	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use	0.7
DBP	Haloacetic acids (HAA5)	0.060	Increased risk of cancer	Byproduct of drinking water disinfection	n/a[6]
OC	Heptachlor	0.0004	Liver damage; increased risk of cancer	Residue of banned termiticide	zero
OC	Heptachlor epoxide	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor	zero
M	Heterotrophic plate count (HPC)	TT[3]	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment	n/a
OC	Hexachlorobenzene	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories	zero
OC	Hexachlorocyclopentadiene	0.05	Kidney or stomach problems	Discharge from chemical factories	0.05
IOC	Lead	TT[7]; Action Level = 0.015	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities; Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits	zero
M	*Legionella*	TT[3]	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems	zero
OC	Lindane	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, gardens	0.0002
IOC	Mercury (inorganic)	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands	0.002
OC	Methoxychlor	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock	0.04
IOC	Nitrate (measured as Nitrogen)	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	10
IOC	Nitrite (measured as Nitrogen)	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	1

LEGEND

D	Dinsinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

	Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Oxamyl (Vydate)	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes	0.2
OC	Pentachlorophenol	0.001	Liver or kidney problems; increased cancer risk	Discharge from wood preserving factories	zero
OC	Picloram	0.5	Liver problems	Herbicide runoff	0.5
OC	Polychlorinated biphenyls (PCBs)	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals	zero
R	Radium 226 and Radium 228 (combined)	5 pCi/L	Increased risk of cancer	Erosion of natural deposits	zero
IOC	Selenium	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines	0.05
OC	Simazine	0.004	Problems with blood	Herbicide runoff	0.004
OC	Styrene	0.1	Liver, kidney, or circulatory system problems	Discharge from rubber and plastic factories; leaching from landfills	0.1
OC	Tetrachloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from factories and dry cleaners	zero
IOC	Thallium	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories	0.0005
OC	Toluene	1	Nervous system, kidney, or liver problems	Discharge from petroleum factories	1
M	Total Coliforms (including fecal coliform and *E. coli*)	5.0%[4]	Not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present[5]	Coliforms are naturally present in the environment as well as feces; fecal coliforms and *E. coli* only come from human and animal fecal waste.	zero
DBP	Total Trihalomethanes (TTHMs)	0.10 0.080 after 12/31/03	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	n/a[6]
OC	Toxaphene	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle	zero
OC	2,4,5-TP (Silvex)	0.05	Liver problems	Residue of banned herbicide	0.05
OC	1,2,4-Trichlorobenzene	0.07	Changes in adrenal glands	Discharge from textile finishing factories	0.07
OC	1,1,1-Trichloroethane	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories	0.20
OC	1,1,2-Trichloroethane	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories	0.003
OC	Trichloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from metal degreasing sites and other factories	zero
M	Turbidity	TT[3]	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness (e.g., whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing micro-organisms such as viruses, parasites and some bacteria. These organisms can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.	Soil runoff	n/a
R	Uranium	30 ug/L as of 12/08/03	Increased risk of cancer, kidney toxicity	Erosion of natural deposits	zero

LEGEND

D	Dinsinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

	Contaminant	MCL or TT1 (mg/L)2	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal
OC	Vinyl chloride	0.002	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories	zero
M	Viruses (enteric)	TT3	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
OC	Xylenes (total)	10	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories	10

NOTES

1 Definitions

- Maximum Contaminant Level Goal (MCLG)—The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
- Maximum Contaminant Level (MCL)—The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
- Maximum Residual Disinfectant Level Goal (MRDLG)—The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- Maximum Residual Disinfectant Level (MRDL)—The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- Treatment Technique (TT)—A required process intended to reduce the level of a contaminant in drinking water.

2 Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million (ppm).

3 EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water, and (2) filter their water or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

- *Cryptosporidium* (as of 1/1/02 for systems serving >10,000 and 1/14/05 for systems serving <10,000) 99% removal.
- *Giardia lamblia*: 99.9% removal/inactivation
- Viruses: 99 99% removal/inactivation
- *Legionella*: No limit, but EPA believes that if *Giardia* and viruses are removed/inactivated, *Legionella* will also be controlled.
- Turbidity: At no time can turbidity (cloudiness of water) go above 5 nephelolometric turbidity units (NTU); systems that filter must ensure that the turbidity go no higher than 1 NTU (0.5 NTU for conventional or direct filtration) in at least 95% of the daily samples in any month. As of January 1, 2002, for systems servicing >10,000, and January 14, 2005, for systems servicing <10,000, turbidity may never exceed 1 NTU, and must not exceed 0.3 NTU in 95% of daily samples in any month.
- .HPC: No more than 500 bacterial colonies per milliliter
- Long Term 1 Enhanced Surface Water Treatment (Effective Date: January 14, 2005), Surface water systems or (GWUDI) systems serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (e.g. turbidity standards, individual filter monitoring, *Cryptosporidium* removal requirements, updated watershed control requirements for unfiltered systems).
- Filter Backwash Recycling: The Filter Backwash Recycling Rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.

4 No more than 5.0% samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or *E. coli* if two consecutive TC-positive samples, and one is also positive for *E. coli* fecal coliforms, system has an acute MCL violation.

5 Fecal coliform and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. These pathogens may pose a special health risk for infants, young children, and people with severely compromised immune systems.

6 Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:

- Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.3 mg/L)
- Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L)

7 Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L.

8 Each water system must certify, in writing, to the state (using third-party or manufacturers certification) that when it uses acrylamide and/or epichlorohydrin to treat water, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows: Acrylamide = 0.05% dosed at 1 mg/L (or equivalent); Epichlorohydrin = 0.01% dosed at 20 mg/L (or equivalent).

LEGEND

D	Dinsinfectant	IOC	Inorganic Chemical	OC	Organic Chemical
DBP	Disinfection Byproduct	M	Microorganism	R	Radionuclides

National Secondary Drinking Water Standards

National Secondary Drinking Water Standards are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards.

Contaminant	Secondary Standard
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 (color units)
Copper	1.0 mg/L
Corrosivity	noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

Office of Water (4606M)
EPA 816-F-03-016
www.epa.gov/safewater
June 2003

Project Note

Date: June 27, 2006	Enterprise Recovery Systems Byhalia, Marshall County, Mississippi EPA ID Number: MSD000693176

Organization:
TN & Associates, Inc.,
Reg. 4 EPA START Contract
Name: Keely Meadows Signature: Keely Meadows

Subject: Water Information on Byhalia, Marshall County, Mississippi

I e-mailed Pat Phillips with Mississippi Department of Environmental Quality regarding water information for Byhalia, Mississippi on February 2, 2006. I provided her with a latitude/longitude for the site location, and she e-mailed me back on February 3, 2006 with water information within a 5-mile radius of the latitude and longitude. She told me that the state does not permit private wells, so there is very little information available. She also said that when a well driller puts in a private well, the state is given a "dummy" latitude and longitude, and those coordinates are usually not updated. After reviewing the file provided, no municipal wells were found within 4 miles of the Enterprise property.

RESPONSE REQUIRED
(x) None ( ) Phone call ( ) Memo ( ) Letter ( ) Report

cc: (x) File ( ) Project Manager ( ) Principal Investigator ( ) Other (specify)

Keely Meadows

From: Pat_Phillips@deq.state.ms.us
Sent: Friday, February 03, 2006 9:00 AM
To: Keely Meadows
Subject: Re: More water information

Attachments: keely.xls

keely.xls (33 KB)

Keely, here are the results of a five mile radial search around 345907 893703. The lat/long of the non-permitted wells, which are almost all of the wells on the spreadsheet, are not accurate, they were given 'dummy' lat/longs in the center of the section in which they are located. Since no municipal wells turned up in the search, I don't have any connections. If you haven't already, you also need to contact David Burt at the USGS. The USGS has well records in their database which we do not have. Also, these are wells for which we have information; there are probably wells in the area for which we have no data at all. I hope this helps. If there is anything else you need, please let me know.

(See attached file: keely.xls)

County	Flp Well Permit Number	Location			Latitude (dms)	Longitude (dms)	Owner Name	Use	Aquifer	Casing Length	Well Depth	Date Drilled
MARSHALL	093A0065	23	01S	04W	345903	893528	KERA PRESTON	DOMESTIC		135	145	08/15/02
MARSHALL	093A0066	24	01S	04W	345903	893423	EDGAR FRANKLIN	DOMESTIC		140	150	08/06/02
MARSHALL	093A0067	25	01S	05W	345809	894048	FORRIS	DOMESTIC		145	155	03/25/03
MARSHALL	093A2002	35	01S	04W	345719	893528	J.M. BROOKS	DOMESTIC		100	110	11/25/75
MARSHALL	093A2003	26	01S	05W	345812	894146	VICTOR JONES, JR.	DOMESTIC		111	121	03/10/77
MARSHALL	093A2004	25	01S	05W	345809	894048	LEN COX	DOMESTIC		158	168	11/11/76
MARSHALL	093A2005	26	01S	05W	345812	894146	HUBBIE NELSON, JR.	DOMESTIC		156	166	02/11/77
MARSHALL	093A2006	36	01S	04W	345720	893425	J. PENNONGTON	DOMESTIC		130	140	05/01/77
MARSHALL	093A2007	23	01S	04W	345903	893528	GENE MOORE	DOMESTIC		130	140	05/17/77
MARSHALL	093A2008	36	01S	04W	345720	893425	WILLIE CANT	DOMESTIC		173	180	05/23/78
MARSHALL	093A2009	22	01S	04W	345904	893632	BILL TEDFORD FARMS	DOMESTIC		128	138	05/01/78
MARSHALL	093A2010	23	01S	05W	345905	894153	MAVIS MCGEE	DOMESTIC		188	195	10/18/78
MARSHALL	093A2012	25	01S	05W	345809	894048	BILL SMITH	DOMESTIC		133	140	08/14/79
MARSHALL	093A2013	30	01S	04W	345812	893948	JOHN ADAIR	DOMESTIC		117	127	06/02/78
MARSHALL	093A2014	36	01S	05W	345716	894050	MIKE NANCE	DOMESTIC		123	133	07/10/78
MARSHALL	093A2015	24	01S	04W	345903	893423	CLINTON HUDSON	DOMESTIC		135	145	10/27/78
MARSHALL	093A2016	30	01S	04W	345812	893948	ROGER JOHNSTON	DOMESTIC		127	137	06/06/79
MARSHALL	093A2017	22	01S	04W	345904	893632	BOBBY HOWELL	DOMESTIC		115	125	01/21/80
MARSHALL	093A2018	30	01S	04W	345812	893948	GARY EUBANKS	DOMESTIC		125	135	06/08/80
MARSHALL	093A2019	30	01S	04W	345812	893948	A.L. MAGERS	DOMESTIC		125	145	07/30/80
MARSHALL	093A2020	22	01S	04W	345904	893632	T.R. CRENSHAW	DOMESTIC		115	135	12/12/80
MARSHALL	093A2021	20	01S	04W	345906	893844	SARA LOONEY	DOMESTIC		135	145	09/03/80
MARSHALL	093A2022	13	01S	04W	345933	893424	J.W. RAMAGE	DOMESTIC		125	135	04/28/81
MARSHALL	093A2023	30	01S	04W	345812	893948	A.L. MAGERS	DOMESTIC		135	145	07/31/80
MARSHALL	093A2024	30	01S	04W	345812	893948	A.L. MAGERS	DOMESTIC		140	150	07/27/80
MARSHALL	093A2025	30	01S	04W	345812	893948	A.L. MAGERS	DOMESTIC		135	145	07/31/80
MARSHALL	093A2026	30	01S	04W	345812	893948	A.L. MAGERS	DOMESTIC		125	135	08/20/80
MARSHALL	093A2027	30	01S	04W	345812	893948	A.L. MAGERS	DOMESTIC		165	185	04/30/81
MARSHALL	093A2028	30	01S	04W	345812	893948	A.L. MAGERS	DOMESTIC		165	185	04/30/81
MARSHALL	093A2029	22	01S	04W	345904	893632	JOE SMITH	DOMESTIC		107	117	08/24/81
MARSHALL	093A2030	26	01S	04W	345811	893530	ALLEN GODWIN	DOMESTIC		100	110	06/10/82
MARSHALL	093A2031	36	01S	05W	345716	894050	DARYL MCGAVIN	DOMESTIC		75	95	10/19/82
MARSHALL	093A2032	24	01S	05W	345905	894051	AL CRANE	DOMESTIC		71	81	12/14/82
MARSHALL	093A2033	25	01S	05W	345809	894048	DARYL MCGAVIN	DOMESTIC		135	145	02/18/83
MARSHALL	093A2034	13	01S	05W	345932	894029	B & C LAND CO.	DOMESTIC		90	100	06/14/83
MARSHALL	093A2035	25	01S	05W	345809	894048	FRANK BURNETT, JR.	DOMESTIC		120	130	06/15/83
MARSHALL	093A2036	24	01S	05W	345905	894051	NATHAN LEMAY	DOMESTIC		96	106	09/06/83
MARSHALL	093A2038	22	01S	04W	345904	893632	WAYNE MAROWERY	DOMESTIC		90	100	01/10/84
MARSHALL	093A2039	22	01S	04W	345904	893632	JOHN TUTOR	DOMESTIC		107	117	01/11/84
MARSHALL	093A2040	22	01S	04W	345904	893632	ED GOSSET	DOMESTIC		110	120	01/26/84
MARSHALL	093A2041	34	01S	04W	345719	893632	GLEN HOMA	DOMESTIC		116	126	04/17/85
MARSHALL	093A2043	36	01S	04W	345720	893425	JOE KEMP	DOMESTIC		119	129	06/10/85
MARSHALL	093A2044	34	01S	04W	345719	893632	JIM NORMAN	DOMESTIC		155	165	06/21/85
MARSHALL	093A2045	22	01S	04W	345904	893632	FLOYD FIELDS	DOMESTIC		104	114	07/24/85
MARSHALL	093A2046	36	01S	04W	345720	893425	ARTIS CAVINESS	DOMESTIC		120	130	07/24/85
MARSHALL	093A2047	22	01S	04W	345904	893632	CLARA REEVES	DOMESTIC		116	126	08/01/85
MARSHALL	093A2048	34	01S	04W	345719	893632	WILLIAM SHACKS	DOMESTIC		108	118	08/02/85
MARSHALL	093A2049	34	01S	04W	345719	893632	MILDRED PARMENTO	DOMESTIC		110	120	08/15/85
MARSHALL	093A2050	21	01S	04W	345905	893747	RICHARD PIERCE	DOMESTIC		105	115	08/29/85
MARSHALL	093A2051	23	01S	05W	345905	894153	CHARLES WIGGS	DOMESTIC		115	125	09/10/85
MARSHALL	093A2052	34	01S	04W	345719	893632	EDDIE HARDIN	DOMESTIC		97	107	12/01/85
MARSHALL	093A2054	23	01S	05W	345905	894153	RUSS KINARD	DOMESTIC		116	126	12/10/85
MARSHALL	093A2055	23	01S	05W	345905	894153	BOBBY DODDS	DOMESTIC		115	125	12/12/85
MARSHALL	093A2056	22	01S	04W	345904	893632	MIKE GARCIA	DOMESTIC		150	160	01/12/86
MARSHALL	093A2057	23	01S	05W	345905	894153	JIM MCCOLLOUGH	DOMESTIC		110	120	01/30/86
MARSHALL	093A2059	23	01S	05W	345905	894153	GRADY YOUNG	DOMESTIC		121	131	03/25/86
MARSHALL	093A2060	23	01S	05W	345905	894153	CHARLES PATTEN	DOMESTIC		115	125	05/19/86
MARSHALL	093A2061	34	01S	04W	345719	893632	GEORGE HOLLES	DOMESTIC		125	135	06/05/86

County	Flp Well	Permit Number	Location			Latitude (dms)	Longitude (dms)	Owner Name	Use	Aquifer	Casing Length	Well Depth	Date Drilled
MARSHALL	093A2063		20	01S	04W	345906	893844	FENERHORN	DOMESTIC		145	155	10/01/86
MARSHALL	093A2065		20	01S	04W	345906	893844	JOHN SIMPSON	DOMESTIC		130	140	04/30/87
MARSHALL	093A2066		34	01S	04W	345719	893632	DAVID GILVESSE	DOMESTIC		95	105	08/20/86
MARSHALL	093A2067		27	01S	04W	345810	893632	JOHN PORTER	DOMESTIC		137	147	08/14/86
MARSHALL	093A2068		23	01S	04W	345903	893528	JIM WALTER CORP.	DOMESTIC		140	150	01/03/89
MARSHALL	093A2069		24	01S	04W	345903	893423	RONALD SCOBEY	DOMESTIC		150	160	06/29/89
MARSHALL	093A2070		35	01S	04W	345719	893528	MARY JONES	DOMESTIC		110	120	10/25/89
MARSHALL	093A2071		33	01S	04W	345718	893746	THOMAS HOSKINS	DOMESTIC		110	120	08/03/89
MARSHALL	093A2073		35	01S	04W	345719	893528	MIKE GLEGGINS	DOMESTIC		100	110	08/04/92
MARSHALL	093B2002		30	01S	03W	345809	893318	FRED GARDNER	DOMESTIC		133	140	07/11/76
MARSHALL	093B2036		30	01S	03W	345809	893318	ROBERTSON	DOMESTIC		147	157	03/22/86
MARSHALL	093B2042		31	01S	03W	345718	893317	FRED RUMFELT	DOMESTIC		155	165	10/10/94
MARSHALL	093B2045		29	01S	03W	345809	893213	MID-SOUTH LAND HOME CENTER	DOMESTIC		140	150	04/13/99
MARSHALL	093B2046		29	01S	03W	345809	893213	MID-SOUTH LAND HOME CENTER	DOMESTIC		135	145	04/16/99
MARSHALL	093B2049		29	01S	03W	345809	893213	CHAMPION HOMES	DOMESTIC		150	160	01/08/02
MARSHALL	093B2050		29	01S	03W	345809	893213	CHAMPION HOMES	DOMESTIC		140	150	06/15/01
MARSHALL	093B2051		29	01S	03W	345809	893213	CHAMPION HOMES	DOMESTIC		150	160	04/10/02
MARSHALL	093B2054		29	01S	03W	345809	893213	CHAMPION HOMES	DOMESTIC		138	148	01/22/02
MARSHALL	093D2010		01	02S	05W	345625	894046	FRANK DOVES	DOMESTIC		135	145	01/01/77
MARSHALL	093E0097		10	02S	04W	345535	893631	CHARLES TODD	DOMESTIC		140	150	01/12/03
MARSHALL	093E0120		11	02S	04W	345535	893526	WALZ, ROBERT	DOMESTIC		135	145	03/08/05
MARSHALL	093E0125		07	02S	04W	345534	893946	ANDERSON HOMES LLC	DOMESTIC		95	105	08/19/05
MARSHALL	093E0126		07	02S	04W	345534	893946	ANDERSON HOMES, LLC	DOMESTIC		90	100	08/17/05
MARSHALL	093E0127		09	02S	04W	345531	893745	HELBURG, PETER	DOMESTIC		135	150	08/26/05
MARSHALL	093E0128		07	02S	04W	345534	893946	ANDERSON HOMES, LLC	DOMESTIC		85	95	08/27/05
MARSHALL	093E0134		07	02S	04W	345534	893946	ANDERSON HOMES, LLC	DOMESTIC		100	110	10/12/05
MARSHALL	093E0135		07	02S	04W	345534	893946	ANDERSON HOMES, LLC	DOMESTIC		100	110	10/08/05
MARSHALL	093E0136		01	02S	04W	345718	893415	CLAYTON, MITCH	DOMESTIC		160	170	10/13/05
MARSHALL	093E2003		03	02S	04W	345625	893631	LANIER THRONE	DOMESTIC		200	207	10/23/75
MARSHALL	093E2005		11	02S	04W	345535	893526	MAMIE ODOM	DOMESTIC		100	110	06/03/76
MARSHALL	093E2008		08	02S	04W	345534	893839	EARL TRAYLOR	DOMESTIC		140	150	08/26/76
MARSHALL	093E2010		10	02S	04W	345535	893631	CHOCIE PARKER	DOMESTIC		105	115	11/26/76
MARSHALL	093E2019		03	02S	04W	345625	893631	SANDY HOLE	DOMESTIC		110	120	04/05/78
MARSHALL	093E2026		12	02S	04W	345535	893422	WILLIAM LOFTON	DOMESTIC		170	190	12/19/78
MARSHALL	093E2034		03	02S	04W	345625	893631	SAM KAY	DOMESTIC		130	140	07/30/79
MARSHALL	093E2058		09	02S	04W	345531	893745	JAMES GREEN	DOMESTIC		128	140	07/21/81
MARSHALL	093E2077		03	02S	04W	345625	893631	C.W. STEWART	DOMESTIC		98	108	03/24/86
MARSHALL	093N2062		22	01S	04W	345904	893632	MIKE COWELL	DOMESTIC		210	220	05/28/88
MARSHALL	093A2074		25	01S	04W	345810	893422	JOE CUNNINGHAM	DOMESTIC		120	130	03/10/99
MARSHALL	093E0115		16	02S	04W	345454	893815	SPENCE, BRAD	IRRIGATION		135	155	11/02/04
MARSHALL	093A0063	MS-GW-14489	28	01S	04W	345830	893807	MARSHALL COUNTY WATER ASSOCIATION INC	WATER ASSOCIATION	LOWER WILCOX	595	644	01/01/93
MARSHALL	093A0064	MS-GW-14978	20	01S	04W	345839	893809	MARSHALL COUNTY WATER ASSOCIATION INC	WATER ASSOCIATION	LOWER WILCOX	600	650	01/01/96

Reference 30
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176

U.S. Census Bureau
American FactFinder

FACT SHEET

Marshall County, Mississippi

View a Fact Sheet for a **race, ethnic, or ancestry group**

Census 2000 Demographic Profile Highlights:

General Characteristics - show more >>	Number	Percent	U.S.		
Total population	34,993			map	brief
Male	17,317	49.5	49.1%	map	brief
Female	17,676	50.5	50.9%	map	brief
Median age (years)	33.9	(X)	35.3	map	brief
Under 5 years	2,462	7.0	6.8%	map	
18 years and over	25,695	73.4	74.3%		
65 years and over	3,877	11.1	12.4%	map	brief
One race	34,777	99.4	97.6%		
White	16,925	48.4	75.1%	map	brief
Black or African American	17,622	50.4	12.3%	map	brief
American Indian and Alaska Native	58	0.2	0.9%	map	brief
Asian	39	0.1	3.6%	map	brief
Native Hawaiian and Other Pacific Islander	5	0.0	0.1%	map	brief
Some other race	128	0.4	5.5%	map	
Two or more races	216	0.6	2.4%	map	brief
Hispanic or Latino (of any race)	425	1.2	12.5%	map	brief
Household population	33,294	95.1	97.2%	map	brief
Group quarters population	1,699	4.9	2.8%	map	
Average household size	2.74	(X)	2.59	map	brief
Average family size	3.19	(X)	3.14	map	
Total housing units	13,252			map	
Occupied housing units	12,163	91.8	91.0%		brief
Owner-occupied housing units	9,786	80.5	66.2%	map	
Renter-occupied housing units	2,377	19.5	33.8%	map	brief
Vacant housing units	1,089	8.2	9.0%	map	

Social Characteristics - show more >>	Number	Percent	U.S.		
Population 25 years and over	21,519				
High school graduate or higher	13,124	61.0	80.4%	map	brief
Bachelor's degree or higher	1,941	9.0	24.4%	map	
Civilian veterans (civilian population 18 years and over)	2,392	9.3	12.7%	map	brief
Disability status (population 5 years and over)	7,424	23.7	19.3%	map	brief
Foreign born	346	1.0	11.1%	map	brief
Male, Now married, except separated (population 15 years and over)	6,527	48.5	56.7%		brief
Female, Now married, except separated (population 15 years and over)	6,426	46.4	52.1%		brief
Speak a language other than English at home (population 5 years and over)	938	2.9	17.9%	map	brief

Economic Characteristics - show more >>	Number	Percent	U.S.		
In labor force (population 16 years and over)	15,168	56.7	63.9%		brief
Mean travel time to work in minutes (workers 16 years and over)	30.8	(X)	25.5	map	brief
Median household income in 1999 (dollars)	28,756	(X)	41,994	map	
Median family income in 1999 (dollars)	33,125	(X)	50,046	map	
Per capita income in 1999 (dollars)	14,028	(X)	21,587	map	
Families below poverty level	1,639	18.0	9.2%	map	brief
Individuals below poverty level	7,282	21.9	12.4%	map	

Housing Characteristics - show more >>	Number	Percent	U.S.

Single-family owner-occupied homes	5,932				brief
Median value (dollars)	67;400	(X)	119,600	map	brief
Median of selected monthly owner costs	(X)	(X)			brief
With a mortgage (dollars)	726	(X)	1,088	map	
Not mortgaged (dollars)	251	(X)	295		

(X) Not applicable.
Source: U.S. Census Bureau, Summary File 1 (SF 1) and Summary File 3 (SF 3)

Project Note

Date: June 20, 2006	Enterprise Recovery Systems Byhalia, Marshall County, Mississippi EPA ID Number: MSD000693176

Organization:
TN & Associates, Inc.,
Reg. 4 EPA START Contract
Name: Keely Meadows Signature: Keely Meadows

Subject: Nearby Population Count for City of Byhalia, MS

Population counts within 1 mile of the Enterprise property were obtained by using LandView 5 according to the 2000 Census data. Although LandView 5 did not find any people within 0.25 miles of the property, location maps found in the file material noted 28 residences across and adjacent to the property. Therefore, the population count for the 0-0.25 mile radius is obtained by multiplying the number of residents (28 homes) by the average persons per household (2.74), yielding a number of 76.72.

RESPONSE REQUIRED
(x) None ( ) Phone call ( ) Memo ( ) Letter ( ) Report

cc: (x) File ( ) Project Manager ( ) Principal Investigator ( ) Other (specify)

POPULATION WORKSHEET	
Enterprise Recovery Systems, Byhalia, Marshall County, Mississippi MSD000693176	
Population Radius	**Population**
0.25 Mile	0
0.50 Mile	332
1 Mile	354
2 Mile	1,050
3 Mile	1,627
4 Mile	4,021
Population Ring*	**Population**
0 to 0.25 Mile	0
0.25 to 0.5 Mile	332
0.5 to 1 Mile	22
1 to 2 Mile	696
2 to 3 Mile	577
3 to 4 Mile	2394

*Population rings were determined by subtracting out the previous area's value from the current population value.

Reference: LandView V - 2000 Census data

Name: Keely Meadows

Signature: Keely Meadows

TN&Associates, Inc.
1220 Kennestone Circle, Ste D
Marietta, GA 30066
(678) 355-5550

LandView Census 2000 Population Estimator

Instructions for using this estimator | Home

Enter Location and Radius

	Latitude	Longitude	Radius (miles)
Decimal degrees	34.985278	89.617500	0.25
or			
deg-min-sec	34 59 7	89 37 3	Calculate Population
hemisphere	◉ North ○ South	◉ West ○ East	

Clear all fields | Refresh Lat/Long from MARPLOT | Print this screen | Show this radius on map

Results (based on Census Block points located within or touching the circle defined by the radius)

Total population: 0 Block count: 0

Housing Units: 0 Area within radius: 0.2 sq. mi.

White alone:	0
Black or African American alone:	0
American Indian and Alaska Native alone:	0
Asian alone:	0
Native Hawaiian and Other Pacific Islander alone:	0
Some other race alone:	0
Two or more races:	0
Hispanic or Latino:	0

LandView Census 2000 Population Estimator

Instructions for using this estimator | Home

Enter Location and Radius

	Latitude	Longitude	Radius (miles)
Decimal degrees	34.985278	89.617500	0.5
— or —			
deg-min-sec	34 59 7	89 37 3	Calculate Population
hemisphere	◉ North ○ South	◉ West ○ East	

Clear all fields | Refresh Lat/Long from MARPLOT | Print this screen | Show this radius on map

Results (based on Census Block points located within or touching the circle defined by the radius)

Total population:	332	Block count:	6
Housing Units:	158	Area within radius:	0.8 sq. mi.

White alone:	276
Black or African American alone:	51
American Indian and Alaska Native alone:	1
Asian alone:	0
Native Hawaiian and Other Pacific Islander alone:	0
Some other race alone:	0
Two or more races:	4
Hispanic or Latino:	20

LandView Census 2000 Population Estimator

Instructions for using this estimator | Home

Enter Location and Radius

	Latitude	Longitude	Radius (miles)
Decimal degrees	34.985278	89.617500	1
or			
deg-min-sec	34 59 7	89 37 3	Calculate Population
hemisphere	◉ North ○ South	◉ West ○ East	

Clear all fields | Refresh Lat/Long from MARPLOT | Print this screen | Show this radius on map

Results (based on Census Block points located within or touching the circle defined by the radius)

Total population:	354	Block count:	8
Housing Units:	171	Area within radius:	3.1 sq. mi.

White alone:	292
Black or African American alone:	57
American Indian and Alaska Native alone:	1
Asian alone:	0
Native Hawaiian and Other Pacific Islander alone:	0
Some other race alone:	0
Two or more races:	4
Hispanic or Latino:	20

LandView Census 2000 Population Estimator

Instructions for using this estimator | Home

Enter Location and Radius

	Latitude	Longitude	Radius (miles)
Decimal degrees	34.985278	89.617500	2
or			
deg-min-sec	34 59 7	89 37 3	Calculate Population
hemisphere	(•) North ( ) South	(•) West ( ) East	

Clear all fields | Refresh Lat/Long from MARPLOT | Print this screen | Show this radius on map

Results (based on Census Block points located within or touching the circle defined by the radius)

Total population:	1,050	Block count:	20
Housing Units:	461	Area within radius:	12.6 sq. mi.

White alone:	853
Black or African American alone:	187
American Indian and Alaska Native alone:	2
Asian alone:	2
Native Hawaiian and Other Pacific Islander alone:	0
Some other race alone:	0
Two or more races:	6
Hispanic or Latino:	27

LandView Census 2000 Population Estimator

Instructions for using this estimator | Home

Enter Location and Radius

	Latitude	Longitude	Radius (miles)
Decimal degrees	34.985278	89.617500	3
or			
deg-min-sec	34 59 7	89 37 3	Calculate Population
hemisphere	◉ North ○ South	◉ West ○ East	

Clear all fields | Refresh Lat/Long from MARPLOT | Print this screen | Show this radius on map

Results (based on Census Block points located within or touching the circle defined by the radius)

Total population:	1,627	Block count:	36
Housing Units:	712	Area within radius:	28.3 sq. mi.

White alone:	1263
Black or African American alone:	351
American Indian and Alaska Native alone:	3
Asian alone:	3
Native Hawaiian and Other Pacific Islander alone:	0
Some other race alone:	0
Two or more races:	7
Hispanic or Latino:	41

LandView Census 2000 Population Estimator

Instructions for using this estimator | Home

Enter Location and Radius

Decimal degrees	Latitude	Longitude	Radius (miles)
	34.985278	89.617500	4
or			
deg-min-sec	34 59 7	89 37 3	Calculate Population
hemisphere	◉ North ○ South	◉ West ○ East	

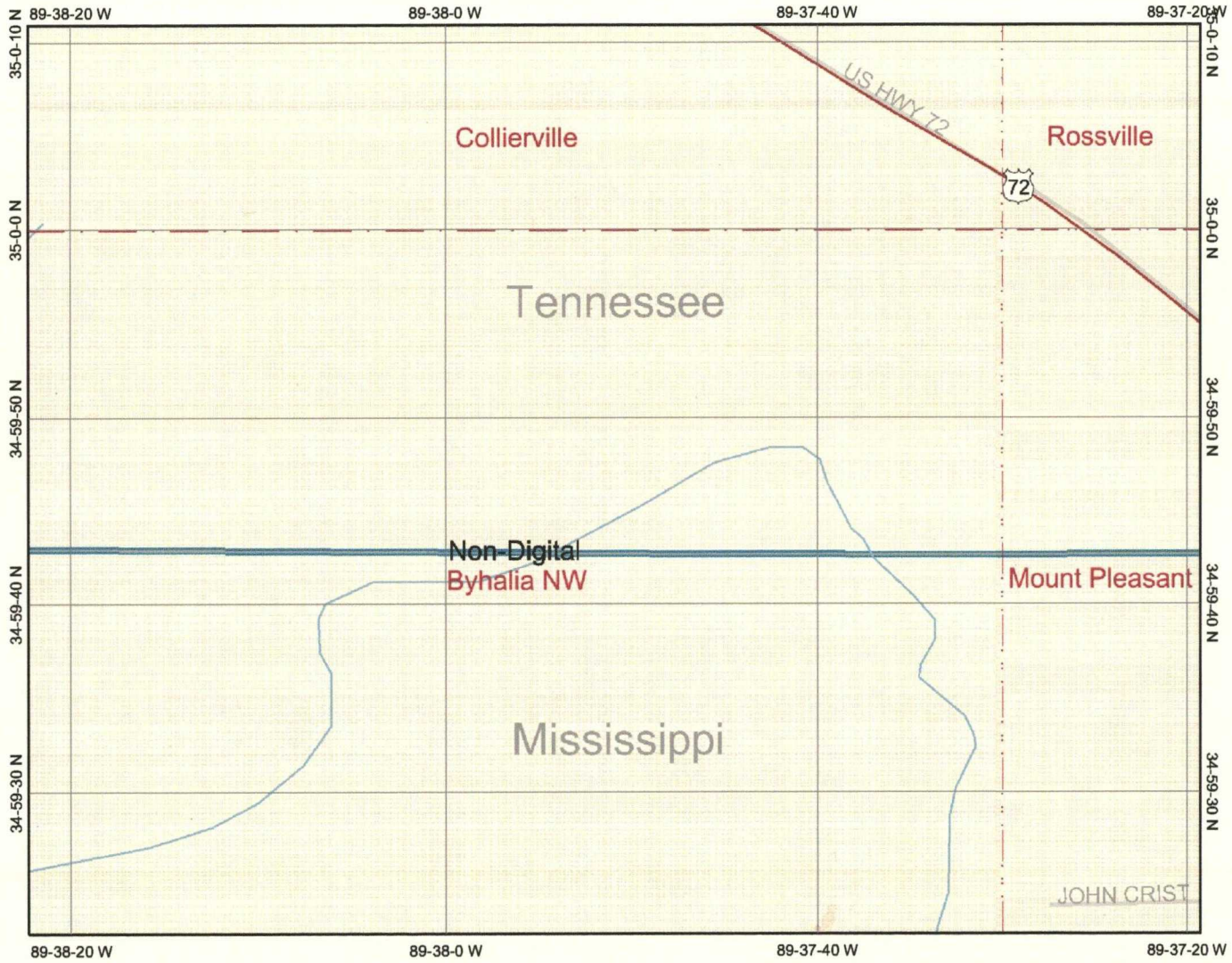
Clear all fields | Refresh Lat/Long from MARPLOT | Print this screen | Show this radius on map

Block points located [illegible] touching the [illegible] the [illegible]

Total population:	4,021	Block count:	64	
Housing Units:	1,673	Area within radius:	50.3	sq. mi.

White alone:	3174
Black or African American alone:	808
American Indian and Alaska Native alone:	3
Asian alone:	4
Native Hawaiian and Other Pacific Islander alone:	0
Some other race alone:	11
Two or more races:	21
Hispanic or Latino:	89

USFWS NWI Wetlands



Map center: 34° 59' 47" N, 89° 37' 51" W

Legend

- Interstate
- Major Roads
- Other Road
- Interstate
- State highway
- US highway
- Roads
- CONUS Cities
- CONUS USGS Quad Index 24K
- Lower 48 Wetland Polygons
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- Lower 48 Available Wetland Data
- Non-Digital
- Digital
- No Data
- Scan
- NHD Waterbodies
- NHD Streams
- Canadian Waterbodies
- CONUS Counties 100K
- Urban Areas 300K
- CONUS States 100K
- South America
- North America

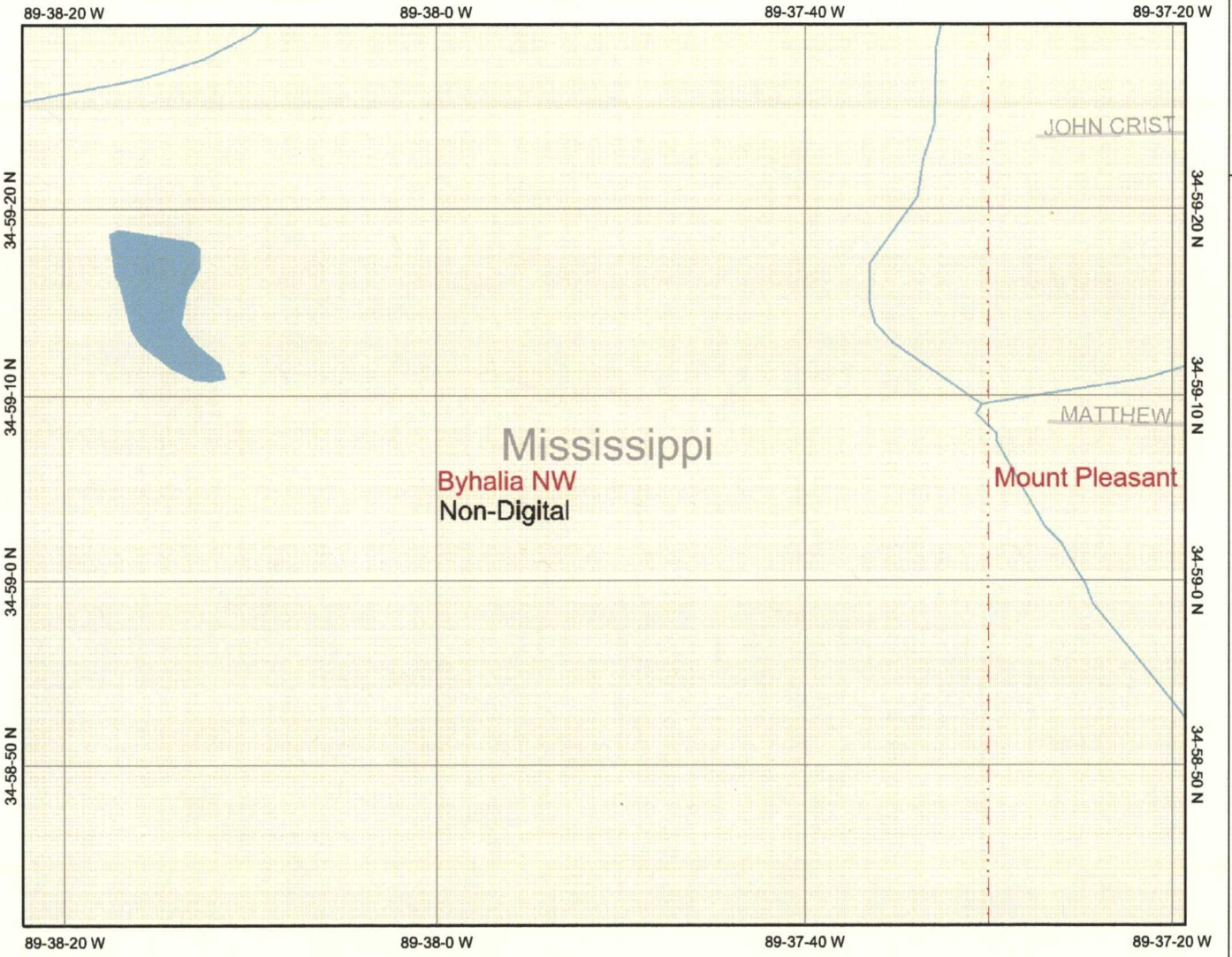
N

Scale: 1:13,992

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Reference 32
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD006693176

USFWS NWI Wetlands



Map center: 34° 59' 6" N, 89° 37' 51" W

Legend

- Interstate
- Major Roads
- Other Road
- Interstate
- State highway
- US highway
- Roads
- CONUS Cities
- CONUS USGS Quad Index 24K
- Lower 48 Wetland Polygons
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- Lower 48 Available Wetland Data
- Non-Digital
- Digital
- No Data
- Scan
- NHD Waterbodies
- NHD Streams
- Canadian Waterbodies
- CONUS Counties 100K
- Urban Areas 300K
- CONUS States 100K
- South America
- North America

N

Scale: 1:13,992

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

USFWS NWI Wetlands

Map center: 34° 59' 7" N, 89° 37' 3" W

Legend

- Interstate
- Major Roads
- Other Road
- Interstate
- State highway
- US highway
- Roads
- CONUS Cities
- CONUS USGS Quad Index 24K
- Lower 48 Wetland Polygons
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- Lower 48 Available Wetland Data
- Non-Digital
- Digital
- No Data
- Scan
- NHD Waterbodies
- NHD Streams
- Canadian Waterbodies
- CONUS Counties 100K
- Urban Areas 300K
- CONUS States 100K
- South America
- North America

N

Scale: 1:13,992

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

USFWS NWI Wetlands

Map center: 34° 59' 6" N, 89° 36' 6" W

Legend

- Interstate
- Major Roads
- Other Road
- Interstate
- State highway
- US highway
- Roads
- CONUS Cities
- CONUS USGS Quad Index 24K
- Lower 48 Wetland Polygons
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- Lower 48 Available Wetland Data
- Non-Digital
- Digital
- No Data
- Scan
- NHD Waterbodies
- NHD Streams
- Canadian Waterbodies
- CONUS Counties 100K
- Urban Areas 300K
- CONUS States 100K
- South America
- North America

N

Scale: 1:13,992

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

USFWS NWI Wetlands

Map center: 34° 59' 6" N, 89° 35' 14" W

Legend

- Interstate
- Major Roads
- Other Road
- Interstate
- State highway
- US highway
- Roads
- CONUS Cities
- CONUS USGS Quad Index 24K
- Lower 48 Wetland Polygons
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- Lower 48 Available Wetland Data
- Non-Digital
- Digital
- No Data
- Scan
- NHD Waterbodies
- NHD Streams
- Canadian Waterbodies
- CONUS Counties 100K
- Urban Areas 300K
- CONUS States 100K
- South America
- North America

N

Scale: 1:13,992

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Reference 33
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176

Water Resources

Data Category: Surface Water **Geographic Area:** Tennessee go

Calendar Year Streamflow Statistics for Tennessee

USGS 07032200 NONCONNAH CREEK NEAR GERMANTOWN, TN

Available data for this site Surface-water: Annual streamflow statistics GO

Shelby County, Tennessee
Hydrologic Unit Code 08010211
Latitude 35°02'59", Longitude 89°49'08" NAD27
Drainage area 68.20 square miles
Gage datum 262.92 feet above sea level NGVD29

Output formats

HTML table of all data
Tab-separated data
Reselect output format

Year	Annual mean streamflow, in ft^3/s	Year	Annual mean streamflow, in ft^3/s	Year	Annual mean streamflow, in ft^3/s
1970	76.5	1980	114	1993	89.6
1971	53.0	1981	34.7	1994	90.3
1972	102	1982	134	1997	139
1973	150	1983	122	1998	96.5
1974	132	1987	94.1	1999	82.6
1975	132	1988	98.3	2000	46.5
1976	66.1	1989	170	2001	156
1977	76.5	1990	157	2002	186
1978	106	1991	174	2003	145
1979	211	1992	68.8		

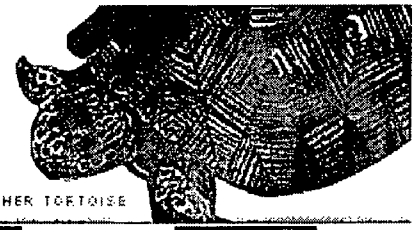
Questions about data Tennessee NWISWeb Data Inquiries Top
Feedback on this website Tennessee NWISWeb Maintainer Explanation of terms

Surface Water data for Tennessee: Calendar Year Streamflow Statistics
http://waterdata.usgs.gov/tn/nwis/annual/calendar_year?

Retrieved on 2006-02-10 14:23:56 EST
Department of the Interior, U.S. Geological Survey
USGS Water Resources of Tennessee
Privacy Statement || Disclaimer || Accessibility || FOIA
1.23 1.23 nadww01

MISSISSIPPI Museum of Natural Science

Research



Natural Heritage Inventory

- General Information
- List of Communities
- Search Plant Database
- Search Animal Database
- Global and State Ranking
- Downloads

Biological Collections

- History of the Collections
- Synopsis of the Holdings
- Search Online Database

Nongame Research

Natural Heritage Inventory: Search Animal Database

This list is not meant as a comprehensive listing of all animal species. Rather the animals listed below are recognized as species of "special concern" for **Marshall county**

* RED text indicates endangered federal status

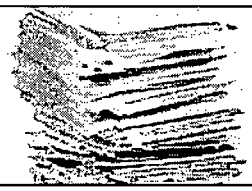
GREEN text indicates threatened federal status

Scientific Name	Common Name	Global Rank	State Rank
CYPRINELLA WHIPPLEI	STEELCOLOR SHINER	G5	S3
ETHEOSTOMA RANEYI	YAZOO DARTER	G2	S2
* NICROPHORUS AMERICANUS	AMERICAN BURYING BEETLE	G2G3	SX
NOTROPIS BOOPS	BIGEYE SHINER	G5	S1
NOTURUS STIGMOSUS	NORTHERN MADTOM	G3	S1

Reference 34
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176

Mississippi Museum of Natural Science © 2002 • 2148 Riverside Drive • Jackson, Mississippi 39202-1353
Phone: 601 354-7303 • Fax: 601 354-7227 • www.mdwfp.com/museum

Reference 35
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176



Got a few resumes to go through?

weatherbase SEARCH · VACATION FINDER · REFERENCE · GLOSSARY · ABOUT

Summary All Data °F °C

Ads by Goooo

Memphis, Tennessee

Elevation: 265 feet Latitude: 35 03N Longitude: 090 00W

Average Temperature

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
°F	62	40	45	53	63	71	79	83	81	74	63	52	44

Average High Temperature

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
°F	72	49	54	62	73	81	89	92	90	84	74	62	52

Average Low Temperature

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
°F	53	32	35	43	52	61	69	73	71	64	52	42	35

Highest Recorded Temperature

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
°F	108	78	81	85	94	99	104	108	103	103	95	85	81

Lowest Recorded Temperature

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
°F	-13	-4	-11	15	29	40	48	57	53	36	25	9	-13

Average Possibility of Sunshine

Years on Record: 35

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
%	64	50	54	56	64	69	74	74	75	69	70	58	50

Average Number of Clear Days

Years on Record: 41

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Days	118	8	8	8	9	8	10	10	11	12	14	10	9

Average Number of Cloudy Days

Years on Record: 41

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Days	151	17	14	17	14	13	9	9	8	10	10	14	16

Forensic W Experts
Wx Records Testimony N Call For Pric
Www.WeatherC

Weather St
Remote indc temperature batteries inc
www.oreck.com

Weather St
Quickly and measure ter humidity, air
www.QAsupplie

Weather Da Services
Custom Pro Solutions Gl Realtime Fo
www.weather-s

Rainfall Dat
Powerful, sr cost. One ye capacity.
www.RainWise.

Advertise on th

Average Number of Partly Cloudy Days

Years on Record: 41

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Days	96	6	6	6	7	10	11	12	12	8	7	6	6

Average Number of Rainy Days

Years on Record: 43

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Days	107	10	9	11	10	9	9	9	8	7	6	9	10

Average Number of Days Above 90F/32C

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Days	66	---	---	---	---	3	14	22	18	8	1	---	---

Average Number of Days Above 70F/21C

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Days	215	1	3	9	20	28	30	31	31	29	22	8	2

Average Number of Days Below 32F/0C

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Days	55	18	12	5	---	---	---	---	---	---	---	6	14

Average Number of Days Below 10F/-12C

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Days	1	1	---	---	---	---	---	---	---	---	---	---	---

Average Precipitation

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
in.	52.4	4.7	4.5	5.2	5.6	4.9	3.9	3.9	3.4	3.2	2.9	4.8	5.3

Most Recorded Rainfall

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
in.	76.8	15.9	10.5	12.1	17.1	11.6	7.5	8.8	9.6	7.6	7.8	10.5	13.8

Least Recorded Rainfall

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
in.	38.5	0.6	1.1	1.5	1.4	0.8	---	0.4	0.4	0.2	---	0.5	1

Average Snowfall

Years on Record: 43

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
in.	5.1	2.3	1.3	0.8	---	---	---	---	---	---	---	0.1	0.6

Average Number of Days With Thunderstorms

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Days	52	2	2	4	6	7	8	8	6	3	2	2	2

Average Number of Days With Fog

Years on Record: 48

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Days	109	13	10	9	7	8	6	7	9	10	9	10	11

Average Morning Relative Humidity

Years on Record: 41

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
%	78	79	78	75	74	77	77	80	81	82	81	79	78

Average Evening Relative Humidity

Years on Record: 41

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
%	54	60	56	52	49	53	53	55	54	53	49	54	60

Average Dew Point

Years on Record: 41

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
°F	50	30	34	40	48	59	66	70	69	62	50	40	33

Heating Degree Days

Years on Record: 30

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Days	3082	784	582	383	127	25	---	---	---	10	131	380	660

Cooling Degree Days

Years on Record: 30

	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Days	2118	---	---	14	64	217	423	546	496	286	72	---	---

Average Wind Speed

Years on Record: 41

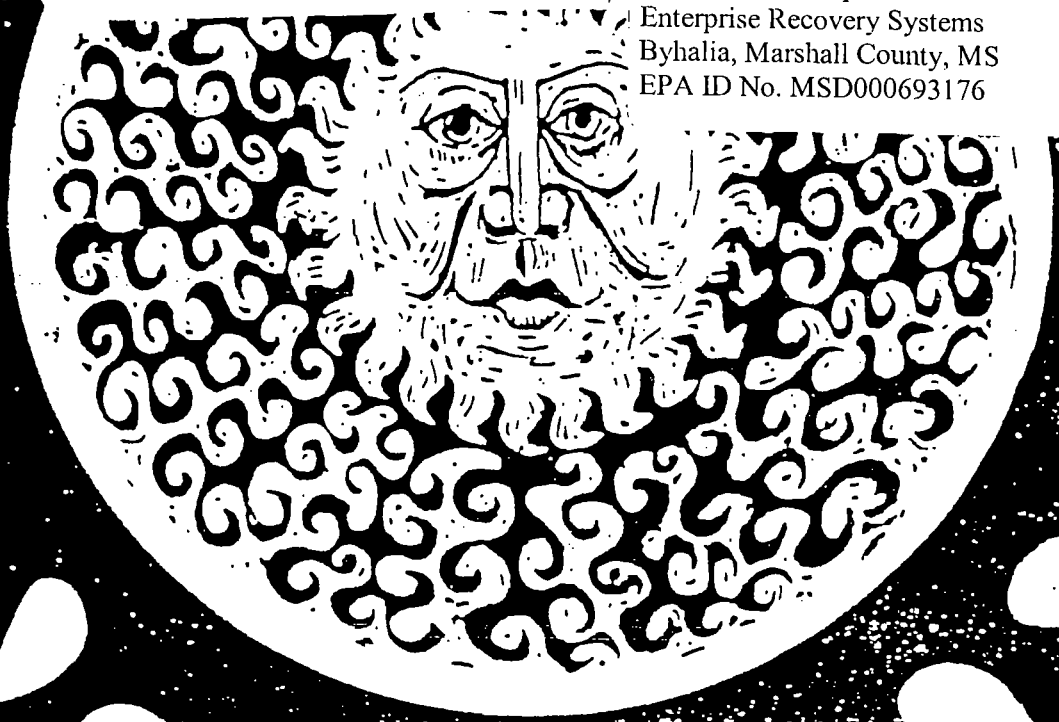
	YEAR	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
mph	9	11	10	11	11	9	8	8	6	9	8	10	10

***Qwikcast**.com* **Weather Forecast**

- Memphis, Tennessee

© Copyright 2006 Canty and Associates LLC
Webmaster

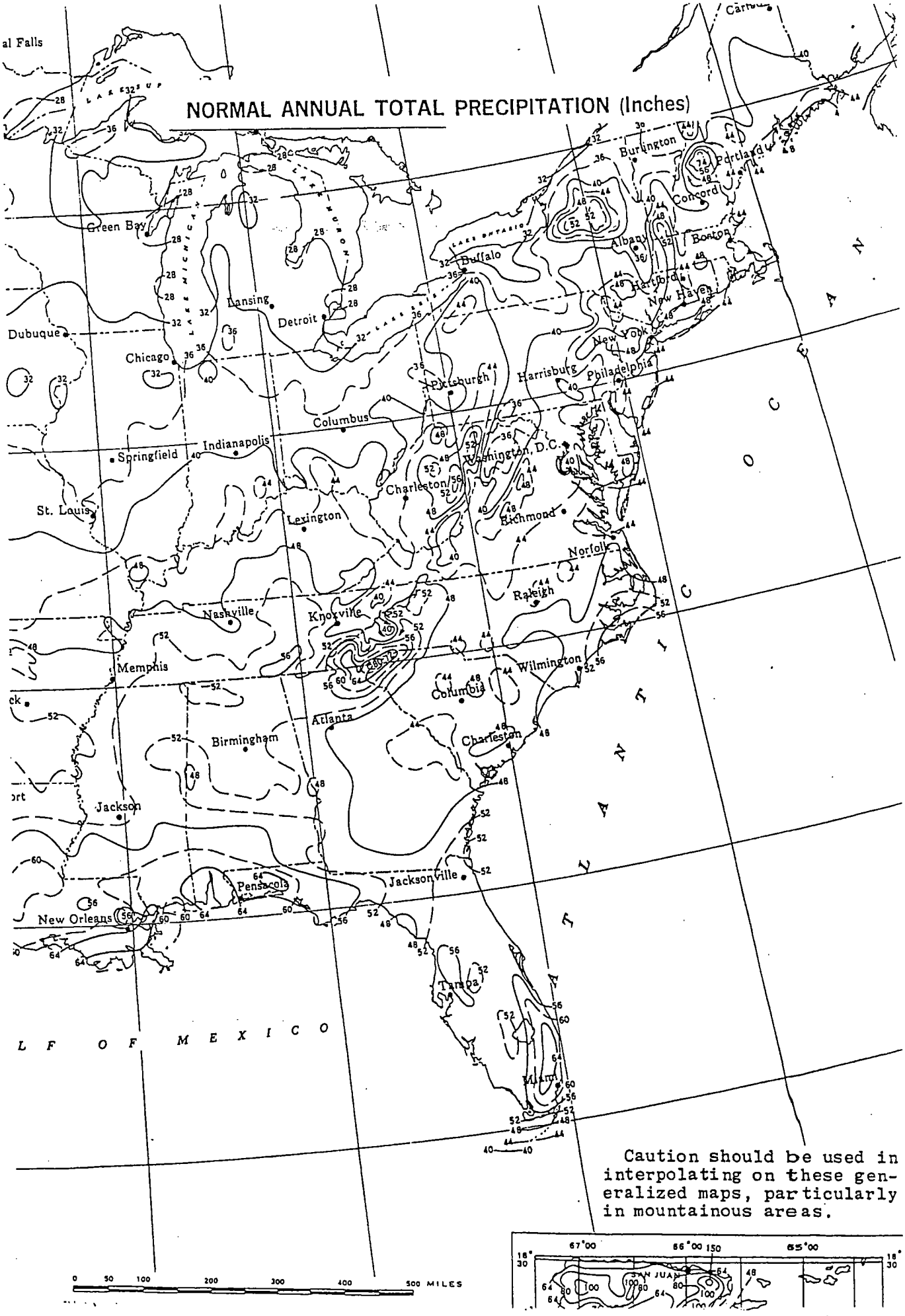
Reference 36
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176



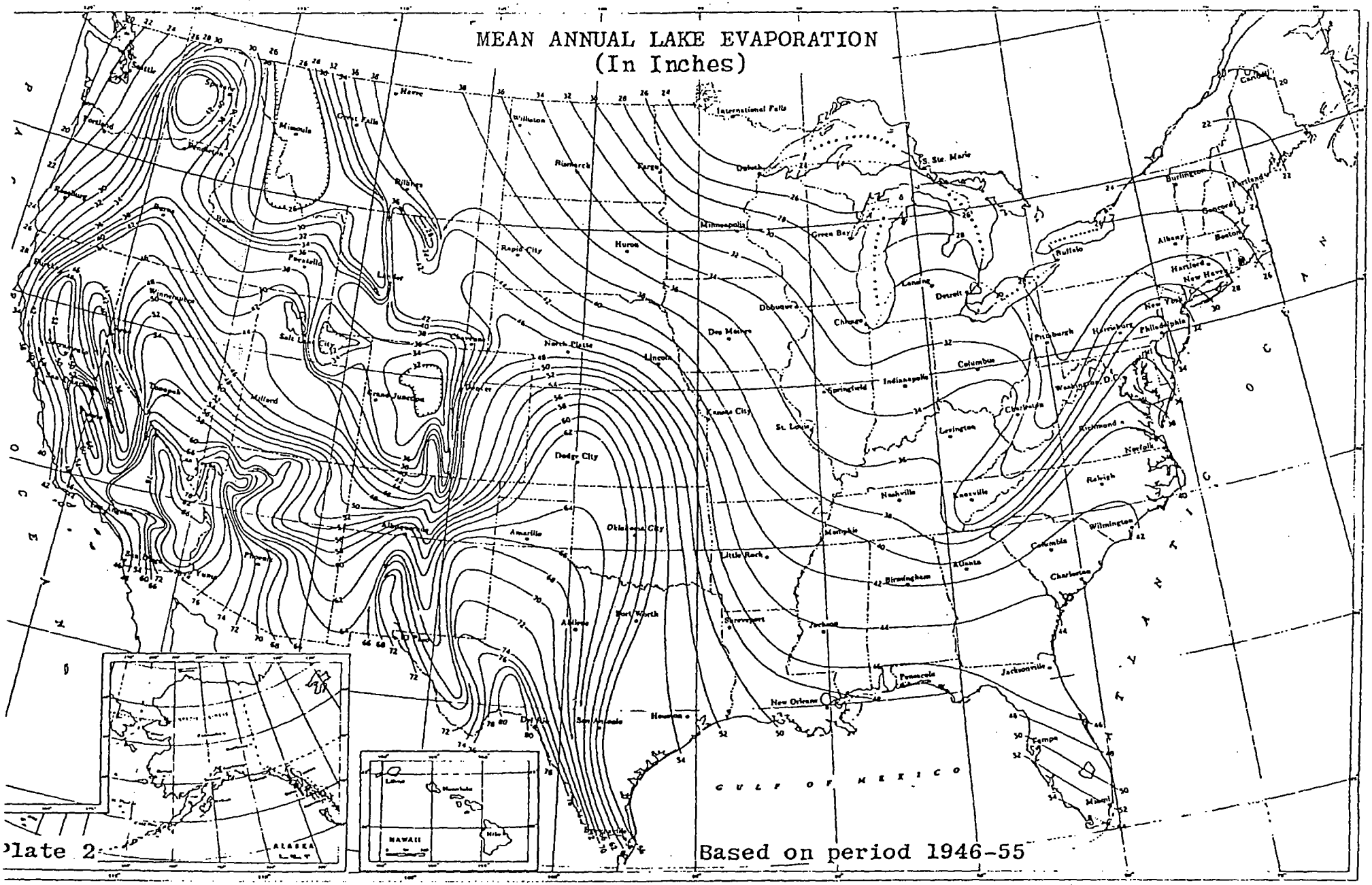
CLIMATIC ATLAS OF THE UNITED STATES

onmental Science Services Administration . Environmenta

NORMAL ANNUAL TOTAL PRECIPITATION (Inches)



Caution should be used in interpolating on these generalized maps, particularly in mountainous areas.


MEAN ANNUAL LAKE EVAPORATION
(In Inches)
Plate 2
Based on period 1946-55
GULF OF MEXICO
ALASKA
HAWAII

U.S. DEPARTMENT OF COMMERCE
Sinclair H. Hodges, Secretary

WEATHER BUREAU
F. W. Reichelderfer, Chief

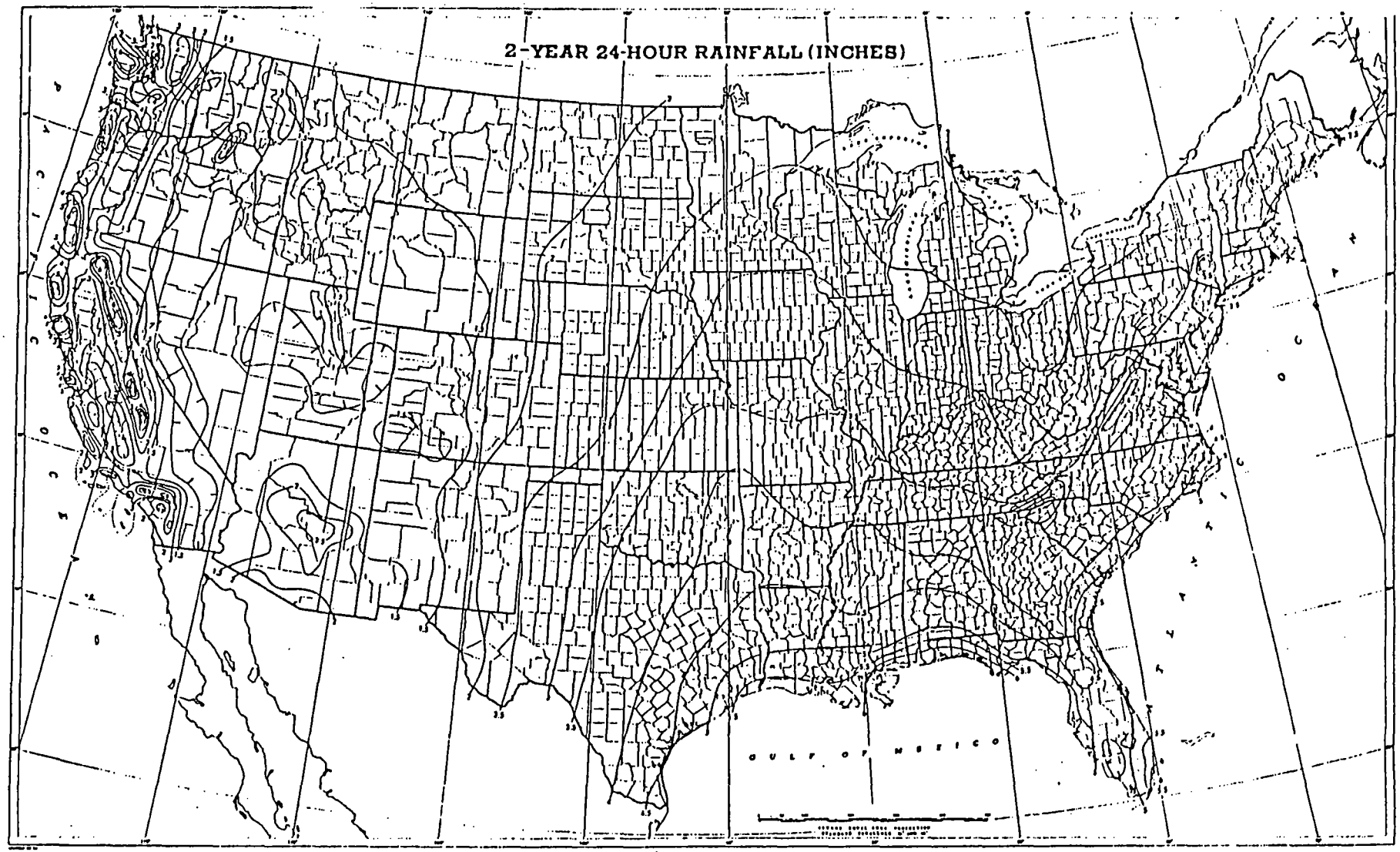
Reference 37
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD006693176

TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STATES

for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years

Prepared by
DAVID M. HERSHFIELD
Cooperative Studies Section, Hydrologic Services Division
for
Engineering Division, Soil Conservation Service
U.S. Department of Agriculture


2-YEAR 24-HOUR RAINFALL (INCHES)
GULF OF MEXICO

Reference 38
Reassessment Report
Enterprise Recovery Systems
Byhalia, Marshall County, MS
EPA ID No. MSD000693176

UNITED STATES ENVIRONMENTAL PROTECTION A

REGION 4

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

File copy

January 10, 1995

4WD-ERRB

Mr. and Mrs. Jerry Smith
Route 5, Box 286 Cayce Road
Byhalia, MS 38611

Dear Mr. and Mrs. Smith:

I am writing this letter to address some of the concerns you have voiced to me regarding the "environmental health" of your property. I understand that you may wish to sell your home someday, and want to know what you can say to prospective buyers. I hope to provide enough information to make you feel comfortable about your home but I need to make it clear that the Environmental Protection Agency (EPA) cannot and does not offer any guarantees. The information I relay may make you more confident and comfortable, but it is not in any respect a guarantee, nor was our investigation designed to identify any and all contamination. As we discussed, there are many private environmental consulting firms able to conduct an environmental audit of the property should it be necessary.

EPA investigated soil and drinking water contamination on your property. Your well was sampled and analyzed for Volatile Organic Compounds (VOCs) on five separate occasions: July 1992, September 1992, March 1993, October 1993 and May 1994. In each test, the results indicated that VOCs were not detected. I do not anticipate seeing a change in your water quality (due to Enterprise site), but it is advisable to have the well tested periodically. If the house has been connected to the municipal water system and the well is only used for car washing, then you could test the well less frequently. Of course, the best protection for you would be to abandon the well and rely solely on the municipal water. This would eliminate water quality concerns for prospective purchasers.

Soil sampling was conducted on your property on three occasions; March 1993, March 1994, and November 1994. In March 1993, the sample was obtained from the front of your property along Cayce Road and was analyzed for VOCs and RCRA metals (pronounced "wreck-rah"). RCRA metals are a category of hazardous metals. In March 1994, EPA obtained samples from along the fence line you share with Enterprise. The three samples were analyzed for VOCs. Finally, in November 1994, three more soil

10300624

samples were obtained from along the fence line and analyzed for RCRA metals and Pesticides. In each sampling event, the results were "non-detectable", meaning the target contaminants were not detected.

What does this mean to you? It means that none of the target contaminants were detected in the areas sampled. There are other target contaminants we could search for, but since they were not found on the Enterprise site, it wasn't feasible to look for them off-site. We also could have obtained more soil samples from more locations, but we took samples from locations where we could reasonably have expected to find contamination. The number of samples, locations and target contaminants were selected based on experience and standard sampling protocols.

The results suggest that there is no significant contamination on your property. Although there is not conclusive proof (conclusive proof could consist of many, many more samples), I'm certain you can appreciate the position we face. We can spend $3,000 to do an adequate search, or $30,000 to conduct a thorough search. However, when the initial search fails to detect contamination, such as in your case, it is difficult to justify spending additional taxpayer money.

My conclusion is that the surface and subsurface features of your area have favored the movement of soil and groundwater contamination towards the north, away from your well and property. If you or future prospective buyers have any additional concerns about the well-being of your property, please feel free to contact me or consider hiring an environmental consultant to analyze additional samples. I feel confident that no significant contamination will be found.

Per your request, I have enclosed the list of the Potentially Responsible Parties (PRPs). Not all companies listed are directly participating in the cleanup, but the majority are. I spoke to an EPA attorney about long-term liability issues. If you should identify contamination in your soil or well, and if that contamination is similar to contaminants found at the Enterprise site, you may have legal recourse against the PRPs or the former owner/operator. Consult a law firm specializing in environmental affairs should the need arise.

Again, if you have any further questions feel free to contact me at 1-800-962-6216, extension 6128.

Sincerely,

Robert N. Rosen
Emergency Response and Removal Branch