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Preliminary Site Characterization - Final Report

by

D. Clark

Westinghouse Savannah River Company
Savannah River Site
Aiken, South Carolina 29808

L. B. Smith
Westinghouse Savannah River Company
SC USA

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REPORT

Submitted to:
WESTINGHOUSE SAVANNAH RIVER COMPANY
Aiken, South Carolina

WSRC-TR-94-0385

PRELIMINARY SITE CHARACTERIZATION

FINAL REPORT

Contract No. AA46327 P
Task No. 41

December 1993

Prepared by:

Metcalf & Eddy

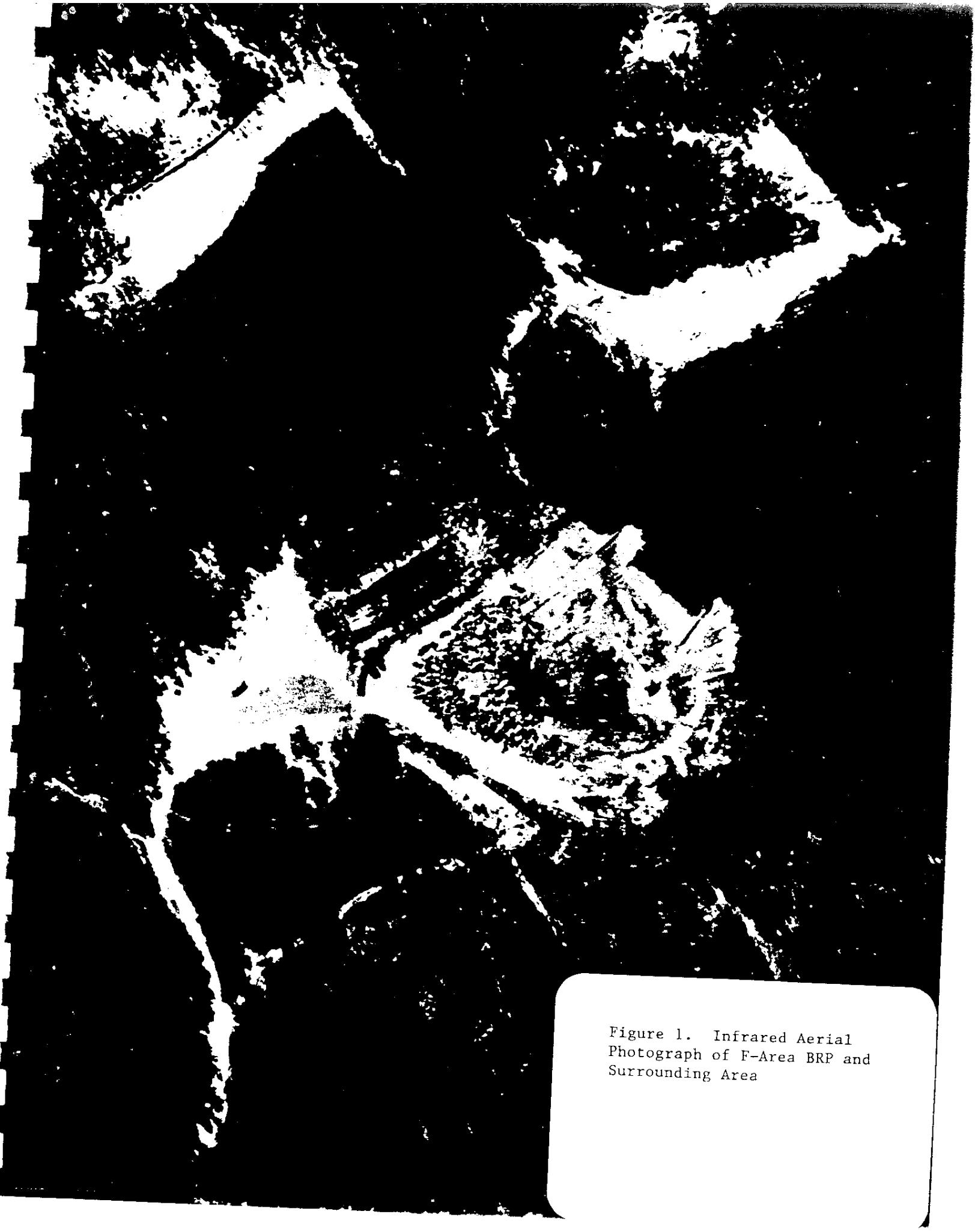

Figure 1. Infrared Aerial Photograph of F-Area BRP and Surrounding Area

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1.0 INTRODUCTION

This report summarizes the ecological unit reconnaissance conducted at the F-Area Burning/ Rubble Pit(s) RCRA/CERCLA Unit (F-Area BRP) on August 30 and 31, 1993 as part of the RFI/RI baseline risk assessment for the waste unit. The baseline risk assessment will assess the potential endangerment to human health and the environment associated with the unit and will be used to evaluate remediation criteria, if needed. The information presented in this report will be used in subsequent stages of the ecological risk assessment to refine the conceptual site model, assist in the selection of contaminants of concern, identify potential ecological receptors, and evaluate trophic relationships and other exposure pathways.

The unit reconnaissance survey was conducted in accordance with Specification No. E-18272, Rev. 1 dated August 5, 1993, and the Draft "Ecological Risk Assessment Program Plan for Evaluation of Waste Sites on the Savannah River Site" (WSRC, 1992). The objectives of the site reconnaissance were to:

- Assess the general characteristics of on-unit biological communities including mammals, birds, reptiles, amphibians, and any aquatic communities present.
- Determine the location, extent, and characteristics of on-unit ecological resources, such as forested areas and wetlands, that could serve as important wildlife habitat or provide other ecological functions.
- Identify any overt effects of contamination on biological communities.

The field investigations included mapping and describing all wetland and terrestrial habitats; recording wildlife observations of birds, mammals, and reptiles; and investigating ecological resources in nearby downgradient and downstream areas which could be affected by mobile contaminants or future remedial actions. In preparation for the field investigation, existing unit information including aerial photographs and reports were reviewed to help identify and describe ecological resources at the waste unit. The reports included:

- *Phase II, Revision 2 RCRA Facility Investigation/Remedial Investigation for the F-Area Burning/Rubble Pits (231-F and 231-1F) and Rubble Pit (231-2F)*(WSRC, 1992)
- *Environmental Information Document - Burning/Rubble Pits* (E.I. du Pont de Nemours, 1987)

In addition, as part of the unit reconnaissance, a Unit Reconnaissance Field Data Sheet (FDS) was completed. This FDS addressed general waste unit characteristics, topography, past waste disposal practices, water bodies, vegetation, and wildlife. The FDS was developed by WSRC and adapted for use at the F-Area BRP. The data on the FDS will support both the ecological and human health risk assessments. The Unit Reconnaissance FDS for the F-Area BRP is

presented in Appendix A. Wetland data sheets for a small wetland area found near the waste unit were completed in accordance with the *Corps of Engineers Wetlands Delineation Manual* (U.S. Army Corps of Engineers, 1987). These wetland data sheets are included in Appendix B.

This unit reconnaissance report contains a description of the waste unit and descriptions of wetland and terrestrial vegetation identified near the waste unit. Previous characterizations, such as those conducted as part of the Work Plan preparation and by the U.S. Forest Service, are summarized. The vegetation descriptions are organized according to the vegetation cover types described in *Vegetation of the Savannah River Site: Major Community Types* (Workman and McLeod, 1990). In addition, this report outlines all wildlife observations made during the unit reconnaissance and a summary of previous similar surveys conducted at the unit.

2.0 UNIT DESCRIPTION

The F-Area BRP consists of three pits numbered 231-F, 231-1F, and 231-2F (see Figure 2, pg. 6). The two F-Area burning/rubble pits (231-F and 231-1F) are contiguous pits; the rubble pit (231-2F) is separate. An undisturbed clay berm, approximately 20 feet wide, separates the two burning/rubble pits.

Records indicates that the F-Area burning/rubble pits were first excavated in 1951. Facility records indicate that pit 231-F was approximately 275 feet long, 62 feet wide, and 10 feet deep. The approximate volume of pit 231-F was determined to be 170,000 cubic feet. Records indicate that pit 231-1F was approximately 325 feet long, 89 feet wide and 10 feet deep with a volume of approximately 289,000 cubic feet. Paper, plastics, wood, telephone poles, rubber, rags, cardboard, oil, degreasers, and drummed solvents were deposited in the pits. These wastes were usually burned on a monthly basis.

Burning in the pits stopped in October of 1973. A layer of soil was placed over the burned remains and the pits were filled with paper, wood, concrete, empty galvanized steel barrels, and cans. When the pits were filled to capacity in 1981, a layer of soil was placed over the contents and the surface was graded, compacted, and mounded. (WSRC, 1992)

Records indicate the following general and unit specific information concerning the rubble pit 231-2F. Unlined rubble pits at SRS were reportedly used from 1973 to 1983. The depth of the F-Area Rubble Pit is unknown; no record of pit depth was available. SRS records indicate that pit 231-2F was approximately 50 feet long and 258 feet wide, and that concrete, lumber, cement, fence and telephone poles, rip rap, brick, tile, wallboard, paneling, metal scrap and shavings, drums, electrical conduit, furniture, and firehose may have been disposed in the pit. No radioactive or hazardous materials are reported to have been disposed at the unit. After the last use of the F-Area Rubble Pit in 1983, the area was backfilled and seeded.

3.0 ECOLOGICAL RESOURCES

3.1 General Site Conditions

The sections below describe unit conditions and general observations made on August 30 and 31, 1993 during the unit reconnaissance. The central focus of the unit is an approximately 4 acre barren area comprised of the former burning/rubble pits and adjacent disturbed areas that are/were used for access and unit operations. This barren area is characterized by protruding metal and plastic wastes, ash from previous burning activities, tree piles, and dirt roadways at the periphery. Vegetation in this area is in an early stage of succession and is composed of low shrubs, sedges, and wildflowers.

The surrounding areas are predominantly pine and upland hardwood forest. Pine forest areas are dominated by longleaf (*Pinus palustris*) and loblolly (*Pinus taeda*) pine in the overstory; holly (*Ilex opaca*), farkleberry or tree sparkleberry (*Vaccinium arboreum*), and sweetgum (*Liquidambar styraciflua*) in the understory; and yellow jessamine (*Gelsemium sempervirens*) in the herbaceous layer. Hardwood areas are dominated by mockernut hickory (*Carya tomentosa*), with a similar understory and herbaceous layer. Figure 1 is an infrared aerial photograph of the F-Area BRP and surrounding areas. The red areas are pine forest and the brown areas are hardwood forest areas. Descriptions and locations of the habitat around the waste unit are provided in this report. Appendix C contains the Savannah River Forest Service compartment management maps denoting timber management areas and locations of other resources.

3.1.1 Soils

Previous surface soil surveys at the F-Area BRP identified predominantly Udorthents and Blanton sands with intergraded Lakeland soils. These soil series were confirmed in April 1993 by a WSRC soil scientist during a site visit in preparation for the Phase II RFI/RI Field Investigation.

Udorthents are difficult to identify since they are the result of construction work and pit filling and include areas predominantly composed of more than one soil type. The absence of the upper part of the original soil horizon is characteristic of Udorthents. Typically, the surface layer of Udorthent soil is sandy clay loam to sandy loam, coarsely mottled in shades of red, brown, yellow and gray. Udorthents have a low content of organic matter and a low available water capacity. Acidity is high and permeability is low to moderate in Udorthent soils. These soils are not suited to row crops or timber production. Extreme variability within short distances requires careful onsite evaluation. These soils are fairly suited to openland wildlife. (SCS, 1990)

The Blanton sand series occurs in broad upland swales and on low-lying ridges. The surface layer of the Blanton soil series is typically a dark grayish brown sand grading in color to yellow and very pale brown with depth. These sands have a very low available water content and low organic matter content. Acidity increases with depth. Permeability is moderate. This soil is poorly suited for crops due to very low available water capacity, low organic matter content, rapid leaching, and low fertility. However, this soil is suited to timber production, preferably

loblolly pine and longleaf pine. These soils are fairly suited to openland and woodland wildlife (SCS, 1990).

Figure 2 provides a generalized soil map showing the distribution of the Udorthents and Blanton sands in relation to the waste unit. The Blanton sands occur on localized uplands which dictate drainage around the immediate area.

3.1.2 Surface Topography and Drainage Patterns

Drainage from most of the unit, including much of the former waste disposal areas, flows overland to the north through a concrete culvert and into an intermittent stream that ultimately flows into Upper Three Runs Creek approximately 1800 feet downstream. This intermittent stream was not flowing during the unit reconnaissance and appears to function mainly as a drainage outlet for the waste unit during periods of heavy prolonged rainfall. The stream had, apparently due to erosional forces, formed a gully ranging from a few feet in depth up to about twenty feet in depth at its confluence with other Upper Three Runs Creek tributaries. Downgradient areas of this tributary appear to be subsurface fed.

One of the tributaries was traced upstream and was found to originate at outfall F-001, approximately 2000 feet southeast of the F-Area BRP. The primary effluents to outfall F-001 are nonprocess cooling water, cooling tower blowdown, and stormwater from F-Area Separations. The average flow at this outfall in 1992 was 0.109 million gallons per day (0.17 cubic feet per second) (SRS, 1993). The discharge from F-001 flows to Upper Three Runs Creek which then flows to the Savannah River.

Drainage from the south side of the waste unit and adjacent areas flows overland toward Road C, into a small isolated palustrine wetland area, and toward the west into a large gully or "canyon", both of which are ultimately within the drainage basin of Upper Three Runs Creek. Figure 3 shows the location and direction of drainage and the formation of drainage swales that could provide conduits for the transport of contaminants to downgradient areas.

Based on the localized surficial influence of the waste unit, and the close proximity of other waste units and major facilities, the boundaries of the waste unit for consideration in the ecological risk assessment are geographically limited. In addition to the barren area of the former waste disposal pits, the study area will extend south to the edge of another old field habitat, west to the edge of a waste railroad tie pile, north to the confluence of the intermittent stream with a tributary of Upper Three Runs Creek, and east into pine forest beyond rubble pit 231-2F. The area extends to the north due to the influence of unit drainage and groundwater flow on areas to the north of the waste unit. The basemap developed for this report (Figure 2) encompasses all these areas, and with the exception of the oblong-shaped area that extends to the north, delineates the boundaries of the ecological risk assessment study area.

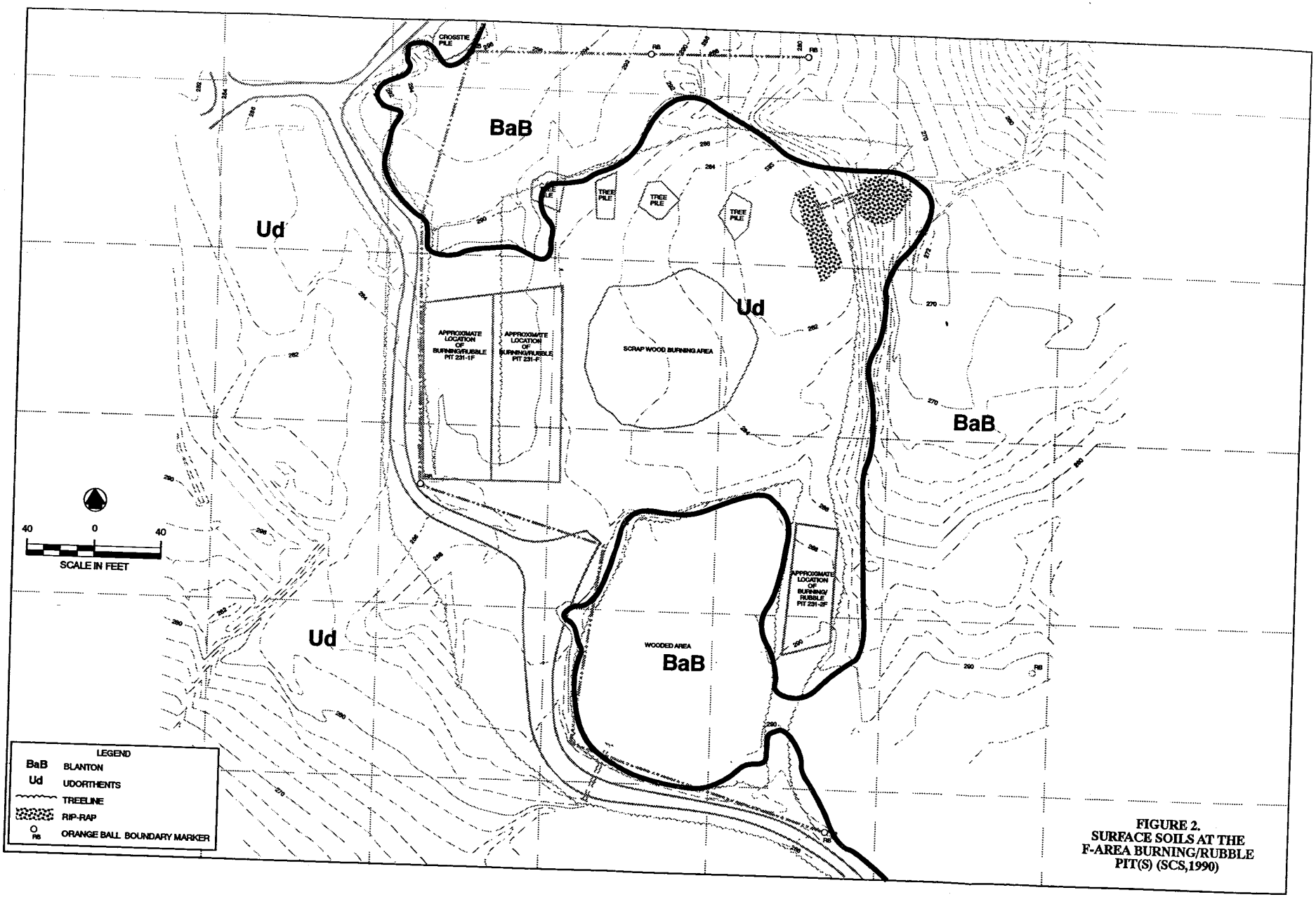

FIGURE 2.
SURFACE SOILS AT THE F-AREA BURNING/RUBBLE PIT(S) (SCS,1990)

3451/02-4400

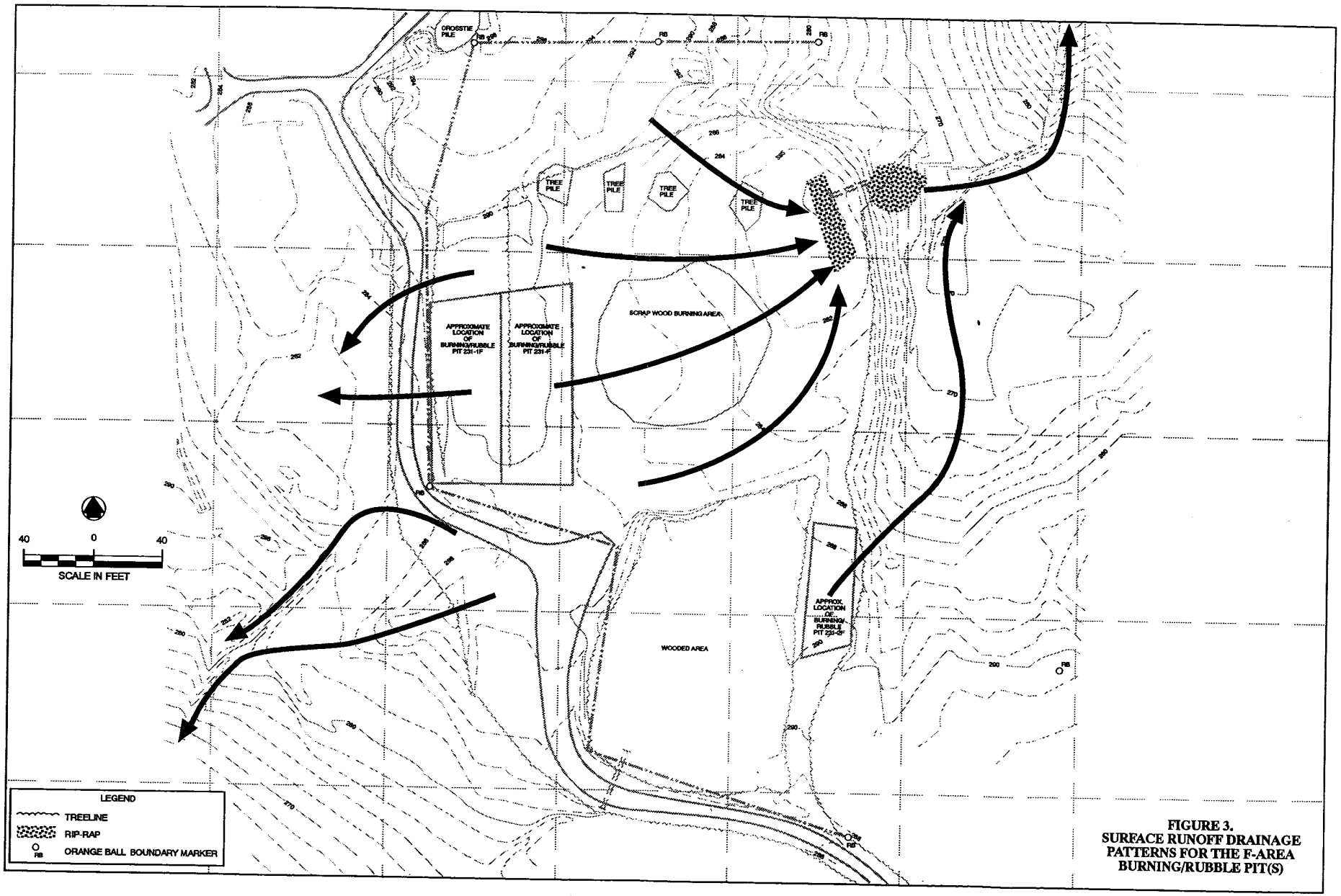

FIGURE 3.
SURFACE RUNOFF DRAINAGE PATTERNS FOR THE F-AREA BURNING/RUBBLE PIT(S)

3451M03-4400

3.1.3 Anthropogenic Features

A prominent anthropogenic feature of the adjacent area is an approximately 1.5 acre railroad tie pile. This pile is located approximately 400 feet to the west of the F-Area BRP, adjacent to the railroad tie pile. This area had steep earthen banks on its northern edge and was apparently excavated to accommodate the railroad tie pile. There is a strong odor of wood preservative near the pile.

3.2 Wetland Determination and Characterization

As described above, part of the drainage from the site flows into a small isolated palustrine wetland area. This area, depicted on Figure 4, is approximately 250 feet to the south of the former disposal area. For this wetland area, a field determination and characterization was conducted and the wetland area was located on a recent survey map by measuring distances from known locations. The wetland was desiccated due to the recent drought conditions; however, the area was characterized by wetland vegetation and is likely an ephemeral pond during rainy conditions. There were signs of standing water in the lowest areas. This area was flooded during the unit reconnaissance conducted by WSRC as part of the preparation of the RFI/RI Work Plan (WSRC, 1992). Dominant species identified in the sapling layer, at that time, were wool-grass (*Scirpus cyprinus*), river birch (*Betula nigra*), and black willow (*Salix nigra*). Other species observed included sweetgum (*Liquidambar styraciflua*), loblolly pine (*Pinus taeda*), and greenbrier (*Smilax bona-nox*).

This wetland area was likely formed due to human activity. There are mounds of dirt to the south and downgradient of the wetland that have probably caused the impoundment of water. This material appears to be either excavated material or the remnants of an old access road or fire barrier. This wetland appears to be of relatively low functional significance due to its small size (0.25 acres), intermittent nature, and low diversity of plant species.

The wetland determination conducted for this area is summarized on the wetland data forms attached to this report in Appendix B. Soil augering in the top 18 inches indicated the wetland is not characterized by hydric soil (See Photo #1, Appendix D). The wetland vegetation identified in this area is listed in Table 1. The shrub and sapling layer was dominated by river birch, black willow, and sweetgum. The herbaceous layer was almost exclusively cyperus (*Cyperus* sp.) and wool-grass (see Photo #2, Appendix D).

3.3 Terrestrial Habitat Characterization

The areas surrounding the F-Area BRP are predominantly pine and upland hardwood forest. Pine forest areas are dominated by longleaf and loblolly pine in the overstory; holly, farkleberry, and sweetgum in the understory; and yellow jessamine in the herbaceous layer. Hardwood areas were dominated by mockernut hickory, with a similar understory and herbaceous layer. Figure 5 depicts the distribution of terrestrial habitats in the vicinity of the F-Area BRP.

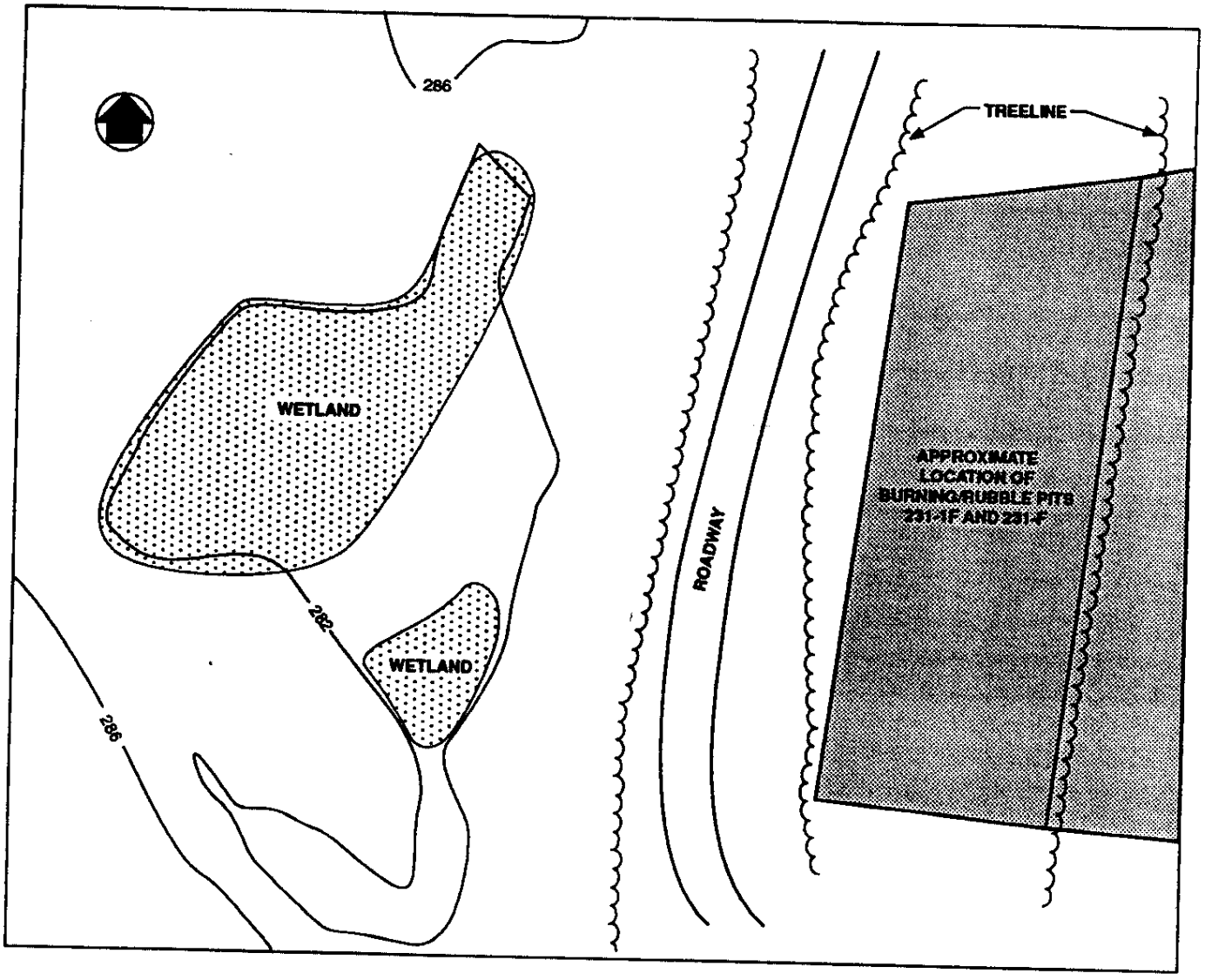

FIGURE 4. ISOLATED PALUSTRINE WETLAND ADJACENT TO BURNING/RUBBLE PITS 231-1F AND 231-F

Table 1. Plant Species Identified in Palustrine Scrub-Shrub Wetland Habitat

Shrubs and Saplings	
River birch	*Betula nigra*
Black willow	*Salix nigra*
Sweetgum	*Liquidambar styraciflua*
Longleaf pine	*Pinus palustris*
Flowering dogwood	*Cornus florida*
Herbs	
Wool-grass	*Scirpus cyperinus*
Cyperus	*Cyperus* sp.
Marsh fleabane	*Pluchea camphorata*
Plumegrass	*Erianthus* sp.

3.3.1 Pine Forest Habitat

Dense pine forest habitat are found primarily in areas west of the F-Area BRP (Figure 5). In these areas, the U.S Forest Service (Irwin, 1993) identified loblolly pine, Japanese honeysuckle (*Lonicera japonica*), downy serviceberry (*Amelanchier arborea*), raspberry (*Rubus* sp.), grapevine (*Vitis* sp.), white oak (*Quercus* sp.), hackberry (*Celtis* sp.), common persimmon (*Diospyros virginiana*), milk pea (*Galactia* sp.), pine pink (*Stipulicida setecea*), sensitive brier (*Schrankia microphylla*), cat-bells (*Baptisia perfoliata*), *Sericocarpus* sp., and bracken fern (*Pteridium aquilinium*).

The species identified in the pine forest habitat during the August 1993 unit reconnaissance are listed in Table 2.

3.3.2 Upland Hardwood Forest Habitat

Localized areas of oak-hickory forest were identified to the north, east, and south of the F-Area BRP. Dominant and associated species in the adjacent upland hardwood stands identified by the U.S. Forest Service (Irwin, 1993) included loblolly pine, mockernut hickory, hawthorne, sour-gum (*Nyssa sylvatica*), flowering dogwood (*Cornus florida*), common waxmyrtle (*Myrica cerifera*), black oak (*Quercus velutina*), and sweetgum.

The species identified in the upland hardwood forest during the August 1993 unit reconnaissance are listed in Table 3.

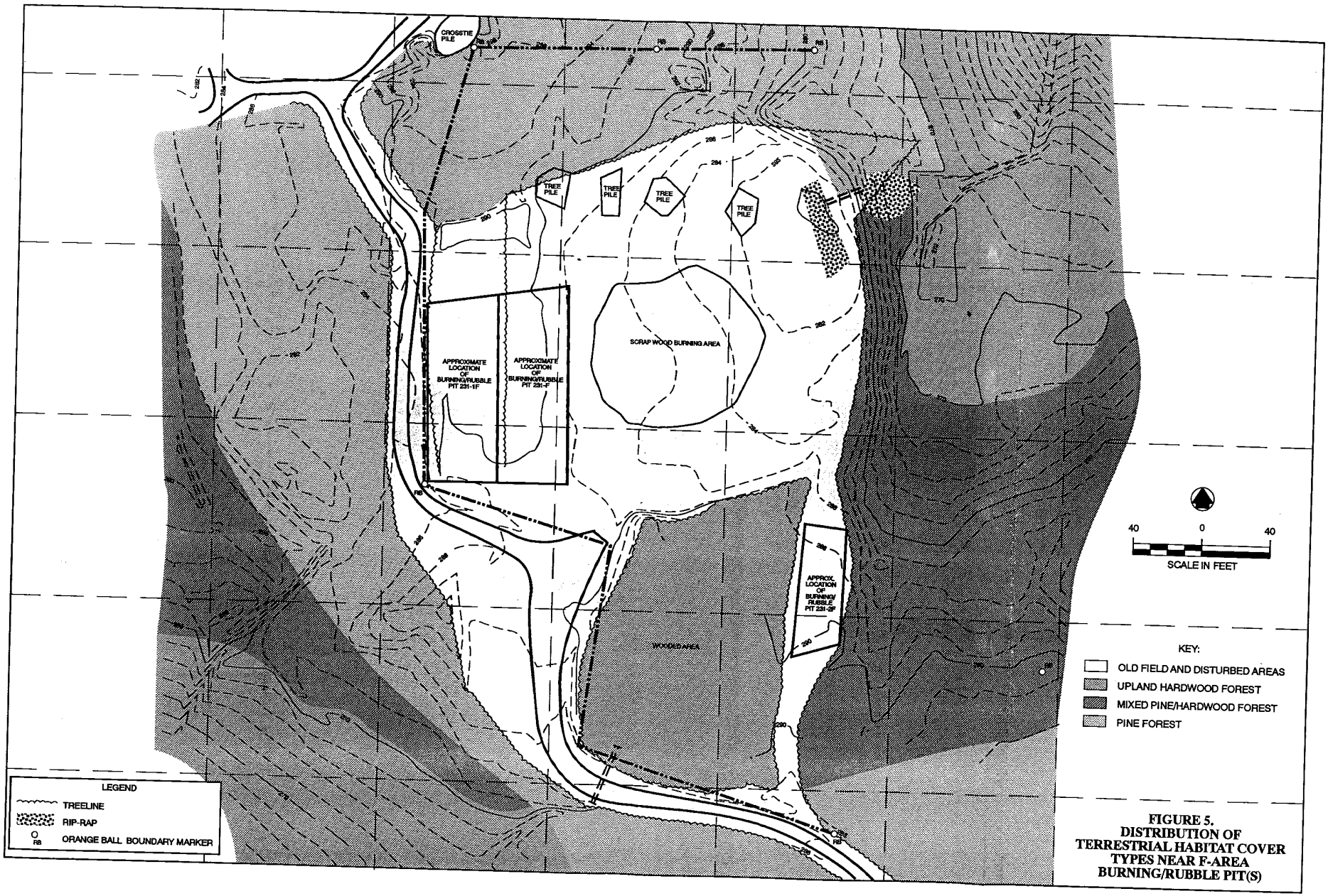

FIGURE 5.
DISTRIBUTION OF TERRESTRIAL HABITAT COVER TYPES NEAR F-AREA BURNING/RUBBLE PIT(S)

3451/J04-44OO

Table 2. Plant Species Identified in Pine Forest Habitat

Overstory	
Longleaf pine	*Pinus palustris*
Loblolly pine	*Pinus taeda*
Shrubs and Saplings	
American Holly	*Ilex opaca*
Turkey oak	*Quercus laevis*
Hawthorne	*Crataegus* sp.
Farkleberry/Tree Sparkleberry	*Vaccinium arboreum*
Sweetgum	*Liquidambar styraciflua*
Oak	*Quercus* sp.
Common waxmyrtle	*Myrica cerifera*
Groundcover	
Yellow jessamine	*Gelsemium sempervirens*
Spurred Butterfly Pea	*Centrosema virginianum*
Prickly pear	*Opuntia humifusa*
Muscadine grape	*Vitis rotundifolia*
Reindeer moss	*Cladonia* sp.
Cat-bells	*Baptisia perfoliata*
British soldiers	*Cladonia* sp.

3.3.3 Mixed Pine-Hardwood Habitat

Localized mixed pine-oak-hickory areas were identified throughout the area. A mixed pine-hardwood forest was identified by WSRC near pit 231-2F. WSRC (1992) identified the following species in the overstory of this area: loblolly pine, sweetgum, southern red oak, black cherry (*Prunus serotina*), and flowering dogwood. Dominants in the herbaceous layer included poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), yellow jessamine, and ebony spleenwort (*Asplenium platyneuron*).

The plant species identified in the mixed pine-hardwood areas during the August 1993 unit reconnaissance are listed in Table 4.

Table 3. Plant Species Identified in Upland Hardwood Forest Habitat

Overstory	
Mockernut hickory	*Carya tomentosa*
Pignut hickory	*Carya glabra*
Blackjack oak	*Quercus marilandica*
Understory	
Laurel oak	*Quercus laurifolia*
Farkleberry/Tree Sparkleberry	*Vaccinium arboreum*
Turkey oak	*Quercus laevis*
Southern red oak	*Quercus falcata*
Sweetgum	*Liquidambar styraciflua*
Flowering dogwood	*Cornus florida*
Longleaf pine	*Pinus palustris*
Loblolly pine	*Pinus taeda*
Common waxmyrtle	*Myrica cerifera*
Scrubby post oak	*Quercus margaretta*
Sour-gum	*Nyssa sylvatica*
Hawthorne	*Crataegus flava*
Muscadine Grape	*Vitis rotundifolia*
Groundcover	
Glaucous greenbrier	*Smilax glauca*
Prickly pear	*Opuntia humifusa*
Yellow jessamine	*Gelsemium sempervirens*

3.3.4 Old Field Habitat

Old field vegetation consisting of low shrubs and wildflowers covers the surface of the previously disturbed waste unit area and adjacent disturbed areas (see Photo #3, Appendix D). Due to buried waste and intermittent disturbance, successional advancement in this area may be inhibited. Past vegetation surveys of the disturbed waste unit area were conducted by the U.S. Forest Service (Irwin, 1993). Dominant and associated plant species identified included bush clover (*Lespedeza cuneata*), clover (*Trifolium* sp.), dock (*Rumex* sp.), passionflower (*Passiflora incarnata*), fleabane (*Erigeron* sp.), hoary vervain (*Verbena stricta*), paspalumgrass (*Paspalum dilatatum*), and panicgrass (*Panicum* sp.). Woody species in the waste pit area included loblolly pine, black cherry, chickasaw plum (*Prunus augustifolia*), and winged sumac (*Rhus copallina*).

Table 4. Plant Species Identified in Mixed Pine and Hardwood Forest Habitat

Overstory	
Longleaf pine	*Pinus palustris*
Mockernut hickory	*Carya tomentosa*
Laurel oak	*Quercus laurifolia*
Southern red oak	*Quercus falcata*
Shrubs and Saplings	
Hawthorne	*Crataegus flava*
Winged sumac	*Rhus copallina*
Pokeweed	*Phytolacca americana*
Muscadine grape	*Vitis rotundifolia*
Southern red oak	*Quercus falcata*
Laurel oak	*Quercus laurifolia*
Herbs	
Aloe Yucca	*Yucca aloifolia*
Sassafras	*Sassafras albidum*
Prickly pear cactus	*Opuntia humifusa*
Yellow jessamine	*Gelsemium sempervirens*
Sassafras	*Sassafras albidum*
Hog peanut	*Amphicarpa bracteata*
Berry	*Rubus* sp.
Water oak	*Quercus* nigra

Plant species identified near the BRPs during preparation of the Work Plan (WSRC, 1992) included American plum (*Prunus americana*), winged sumac, bush clover (*Lespedeza* sp.), blackberry (*Rubus* sp.), and centipede grass (*Eremochloa ophiuroides*). Species observed near BRP 231-F and 231-1F included hawthorne, passionflower, common persimmon, common waxmyrtle (*Myrica cerifera*), cattlebox (*Crotalaria spectabilis*), and *Vaccinium* sp..

Table 5 lists the species identified on the burning/rubble pits 231-F and 231-1F during the August 1993 unit reconnaissance.

Table 5. Plant Species Identified in Old Field Habitat

Bush clover	*Lespedeza cuneata*
Bitterweed	*Helenium amarum*
Moss phlox	*Phlox subulata*
Creeping bush clover	*Lespedeza repens*
Horseweed	*Erigeron canadense*
Goldenrod	*Solidago odora*
Passionflower	*Passiflora incarnata*
Showy Rattlebox	*Crotolaria spectabilis*
Common waxmyrtle	*Myrica cerifera*
Broomsedge	*Andropogon ternarius*
Trumpet creeper	*Campsis radicans*
Greenbrier	*Smilax* sp.
Partridge-pea	*Cassia fasciculata*
Asiatic day flower	*Commelina communis*
Paspalum	*Paspalum* sp.
Spotted wintergreen (Pipsissewa)	*Chimaphila maculata*
Hog peanut	*Amphicarpa bracteata*
Winged sumac	*Rhus copallina*
Purple gerardia	*Agalinis purpurea*
St. Andrews Cross	*Hypericum hypericoides*
Goldenrod	*Solidago* sp.
Dogfennel	*Eupatorium compositafolium*
Panicgrass	*Panicum* sp.
Blazing star	*Liatris* sp.
Verbena	*Verbena* sp.
Poison oak	*Rhus toxicodendron*
Hairy portulaca	*Portulaca* sp.
Bonamia	*Bonamia patens*
Pineweed	*Hypericum gentianoides*
Hairy golden aster	*Chrysopsis camporium*
Goldenrod	*Solidago odora*
Rabbit tobacco	*Gnaphalium obtusifolia*

3.3.5 Bottomland Hardwood Forest Habitat

During the 1993 unit reconnaissance in areas to the north of the F-Area BRP, a bottomland hardwood forest habitat was identified. This area is not contiguous with the study areas and is hydrologically upgradient of the F-Area BRP; however, this area may provide habitat for species

that likely occur at F-Area BRP, and a brief description has been provided. Table 6 lists the dominant plant species identified in this forested wetland area during the August 1993 unit reconnaissance.

Table 6. Plant Species Identified in Bottomland Hardwood Forest Habitat

Red maple	*Acer rubrum*
Tulip-tree	*Liriodendron tulipifera*
Sweetgum	*Liquidambar styraciflua*
Poison ivy	*Rhus radicans*
Virginia creeper	*Partenocissus quinquefolia*
Flowering dogwood	*Cornus florida*
Smartweed	*Polygonum* sp.
American elm	*Ulmus americana*

3.4 Wildlife Observations

Wildlife observations were recorded on both days of the survey. These observations included all species that were seen, heard, or observed by sign. Several general walkovers were conducted during the course of the survey for the purposes of observing resident and transient wildlife.

3.4.1 Bird Observations

A bird survey was conducted during the early morning hours (approximately 0630 to 0930) of August 31, 1993, together with WSRC personnel, by walking the perimeter roads on the unit where light and visibility facilitated bird sighting and identification. Special attention was given to snags of dead trees and the wetland area which may serve as habitat areas. A total of 19 species of birds were observed on, flying over, or adjacent to the waste unit during the August 1993 survey. These species are listed in Table 7.

Birds identified during the U.S. Forest Service T&E species survey included Northern bobwhite (*Colinus virginianus*), Carolina wren (*Thryothorus ludovicianus*), Indigo bunting (*Passerina cyanea*), Barn swallow (*Hirundo rustica*), Chimney swift (*Chaetura pelagica*), Northern cardinal (*Cardinalis cardinalis*), Orchard oriole (*Icterus spurius*), Wood thrush (*Hylocichla mustelina*), Tufted titmouse (*Parus bicolor*), and Mourning dove (*Zenaida macroura*). Relatively few bird species were observed in the Forest Service survey and the current unit reconnaissance survey due to the time of year in which the surveys were conducted.

Table 7. Bird Species Identified During the August 1993 F-Area BRP Site Reconnaissance

Common Name	Scientific Name
Carolina wren	*Thryothorus ludovicianus*
Blue jay	*Cyanocitta cristata*
Mourning dove	*Zenaida macroura*
Gray catbird	*Dumetella carolinensis*
Northern cardinal	*Cardinalis cardinalis*
Eastern pewee	*Contopus virens*
Blue-gray gnatcatcher	*Pilioptila caerulea*
Common bobwhite	*Colinus virginianus*
Wild turkey	*Meleagris gallopavo*
Turkey vulture	*Cathartes aura*
Carolina chickadee	*Panus carolinensis*
Summer tanager	*Piranga rubra*
American Crow	*Corvus brachyrhynchos*
Ruby-throated hummingbird	*Archilochus colubris*
Tufted titmouse	*Parus bicolor*
Yellow-throated vireo	*Vireo flavifrons*
White-eyed vireo	*Vireo griseus*
Buzzard hawk	*Buteo* sp.
Mockingbird	*Mimus polyglottos*

Tracks of wild turkey (*Maleagris gallopavo*) were frequently observed on the sandy roads throughout the area, especially to the west and around the large pile of railroad ties (see Photo #4, Appendix D).

Several snags of dead trees adjacent to the wetland area and the railroad tie pile were observed to have suspected woodpecker cavities. Although none were observed to have any activity, these may be occupied by the numerous species of woodpecker that inhabit the area.

3.4.2 Mammal Observations

Although few direct observations of mammals were made, numerous signs of mammal activity were found as described below. Mammal species identified are listed in Table 8.

Numerous tracks of white-tailed deer (*Odocoileus virginianus*) were observed in the open sandy areas adjacent to the BRP. White-tailed deer are very common on SRS.

Table 8. Mammal Species Identified During the August 1993 F-Area BRP Site Reconnaissance

Common Name	Scientific Name
Eastern cottontail	*Sylvilagus floridanus mallurus*
Virginia opossum	*Didelphis virginiana virginiana*
White-tailed deer	*Odocoileus virginianus virginianus*
Gray squirrel	*Sciurus carolinensis carolinensis*
Feral swine	*Sus scrofa*
Raccoon	*Procyon lotor*

A skeleton of a Virginia opossum (*Didelphis virginiana*) was found just to the north of the former disposal area near the drainage culvert. The skeleton was intact and was identified by its well developed sagittal crest (see Photo #5, Appendix D).

Several burrows were observed in the former BRP and in the tree piles. These are likely burrows of species of Insectivora such as the Southern short-tailed shrew (*Blarina carolinensis*) or least shrew (*Cryptotis parva parva*).

Leaf nests of the gray squirrel (*Sciurus carolinensis*) were observed in several areas of the site.

Signs of digging were observed frequently, especially at the north edge of the disposal area and in the hardwood forest area directly to the north of the waste unit. These diggings may be a result of foraging activities of a gray fox (*Urocyon cinereoargenteus*) or feral swine (*Sus scrofa*).

Several scat were observed but were not positively identified. One was fresh and had numerous partially digested red berries. Another found on the concrete culvert at the north edge of the BRP was old and dried and appeared to have a significant fur content.

Tracks of feral swine (*Sus scrofa*) and raccoon (*Procyon lotor*) were observed adjacent to a tributary of Upper Three Runs Creek. This area was located upgradient of the waste unit and is not considered part of the study area.

3.4.3 Reptile Observations

Several reptiles were observed including green anole (*Anolis carolinensis*) and five-lined skink (*Eumeces fasciatus*). These species were commonly observed in sandy areas adjacent to the old field and near the waste railroad ties.

3.4.4 Additional Wildlife Observations

Through conversations with the remedial investigation crew, we learned that several wildlife observations were made by the drill crews and technical oversight staff. These observations cannot be confirmed but included wild turkey, a toad (probably a Southern toad), and a black snake which could have been one of several snake species on SRS that can be completely black.

Invertebrates were observed throughout the unit. These observations included snails, horseflies, cicadas, bumblebees, deerflies, and ants.

3.4.5 Threatened and Endangered Species

No threatened, endangered, or sensitive species of plants or animals were observed during the unit reconnaissance. This is consistent with previous findings of the U.S. Forest Service and South Carolina Heritage Trust that no threatened or endangered plant species are known to occur near the F-Area BRP (WSRC, 1992). No T&E species were observed during a unit survey conducted by the Forest Service (Irwin, 1993). Further, the Forest Service determined the study area to be of relatively low wildlife habitat significance, with little potential for occurrences of T&E species. The closest colony of red-cockaded woodpecker (*Picoides borealis*) is approximately 8 miles away and current vegetation at the F-Area BRP precludes the area as potential red-cockaded woodpecker habitat (Irwin, 1993).

4.0 SUMMARY

The field reconnaissance conducted at F-Area BRP on August 30 and 31, 1993, verified that consistent with existing reports and recent site assessments, the major vegetation cover-types in the area include old field for the surface of the former waste disposal unit and disturbed areas adjacent to dirt roads that transect the area. It also verified that pine, hardwood, and mixed pine-hardwood forested areas surround the waste unit, and a small, isolated, palustrine scrub-shrub wetland to the south of the waste unit.

Although successional advancement in the former disposal area may be inhibited due to the buried waste and intermittent disturbances, there were no overt signs of ecological effects in adjacent habitats.

As with previous surveys, the reconnaissance uncovered no threatened, endangered, or sensitive species of plants or animals in the area of the waste unit. Adjacent pine and hardwood forested areas, together with small wetlands and Upper Three Runs Creek, appear to support a diversity of terrestrial and wetland plants, as well as birds, mammals, and reptiles.

The information presented in this report will support the ecological risk assessment and mitigation planning during the feasibility study.

5.0 REFERENCES

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APPENDIX A

UNIT RECONNAISSANCE FIELD DATA SHEET

SAVANNAH RIVER SITE
Unit Reconnaissance Field Data Sheet
for Ecological/Human Health Risk Assessment

This form was developed by WSRC for use at F-Area Burning Rubble Pit(s)

Unit Name: F-Area Burning Rubble Pit(s)
Unit Location: F-Area Separations Date: 8/30-31/93
Weather Conditions: Sunny, humid, high temp. in middle 90s

Time Arrived: 8/30 0945 8/31 0645 Time Departed: 8/30 1630 8/31 1500
Personnel/Affiliation:
8/30 Peter Boucher and Gary Thornhill, Metcalf & Eddy, Inc.
Susan Dyer, WSRC
8/31 Peter Boucher and Gary Thornhill, Metcalf & Eddy, Inc
Susan Dyer and Laura Haselow, WSRC

Planning Checklist:
Have the Project Manager and Waste Site Custodian been notified of the site reconnaissance? Yes X No
Does HP need to be notified? Yes No X
Is an HP survey required? Yes No X
Survey completed? Yes No

____Binoculars____ Meter tape
____Camera/film____ Photographs
____Collection cont.____ Safety gear
____Dipnet____ Soil survey
____Field notebook____ Topographic map
____Pencil/pen____ Munsell color chart
____Field guides____ Soil auger
____Taxonomic keys____ Other

Contents: A. General Unit Description and Topography
B. Hazardous Waste Unit Characterization
C. Surface Water Bodies
D. Wetlands
E. Terrestrial Vegetation
F. Wildlife
G. Additional Comments
H. Unit Mapping/Photographs

A. General Unit Description and Topography

1. Describe the land use in the unit vicinity [commercial, industrial, rural, undeveloped, etc]: Most of surrounding area is undeveloped pine and hardwood forest areas. Nearby waste pile of junk railroad ties.

2. Describe the general direction of the slope of the land on the unit and in the unit vicinity: Waste unit is generally flat and sloped to the north where topography slopes more steeply in adjacent forested areas toward an Upper Three Runs Creek tributary.

3. Describe any prominent or unique natural features on the unit or in the unit vicinity [indicate on attached site map]: There is an isolated palustrine wetland to the south of the waste unit.

4. List any man-made structures on or adjacent to the unit, and locate them on the unit map: Dirt access roads. Adjacent waste pile of railroad ties.

5. Observation of human activity/exposure potential at the unit, include facility contacts if available, type of activity: Unit occasionally visited by workers, but no direct contact with the waste unit was observed.

6. Describe the soil types at the unit using the USDA SCS Soil Survey of the Savannah River Plant and other available sources: Blanton, Lakeland, Vaucluse soils are present in and adjacent to the pits. The backfill material in the pits is classified as a Udorthent.

B. Hazardous Waste Unit (HWU) Characterization

1. Characterization of HWU use: Pit 231-F: 275 ft x 62 ft x 10 ft (170,000 ft^3) Pit 231-1F: 325 ft x 89 ft x 10 ft (289,000 ft^3) and Pit 231-2F: 508 ft x 258 ft x depth unknown

2. List potential sources of contamination [storage areas, disposal areas, pits, outfalls, etc.] and locate on unit map: There are three former waste disposal areas, 231-F, 231-1F, and 231-2F. Records indicate that paper, plastics, wood telephone poles, rubber, rags, cardboard, oil, degreasers, and drummed solvents were deposited in pits 231-F and 231-1F. Concrete, lumber, cement, fence and telephone poles, rip rap, brick,

tile, wallboard, paneling, metal scrap and shavings, electrical conduit, furniture, and firehose may have been deposited in Pit 231-2F.

3. Describe existing drainage patterns, swales, or ditches, and identify of map: Most of the former waste unit area drains to the north through a concrete culvert. Other areas drain to south through small drainage swales toward south and west.

Page 3 of 8

4. Note any overt signs of contamination such as areas of stressed vegetation (obvious or potential), stained soil or sediment, animal carcasses, or visible debris, and identify on map: Ashes and debris were visible on the surface of the waste unit. Waste pile of railroad ties had strong chemical odor. One animal carcass was found (Virginia opossum).

C. Surface Water Bodies

1. Are any lotic water bodies (streams, rivers) present in the unit vicinity? YES X NO ____

a. Locate on unit map and indicate if intermittent or perennial system(s). Describe location. Stream is intermittent and serves as drainage conduit for most of former waste area.

b. Describe [include approx. stream width/depth, direction of flow, flow rate, substrate (muck, sand, gravel, etc)]: Stream approximately one foot wide at bottom of drainage swale varying in depth from two to twenty feet at confluence with another tributary of Upper Three Runs Creek. Direction of flow would be to the northwest, but no current flow due to recent drought conditions.

c. Description of riparian vegetation along banks: Vegetation at top of bank is upland vegetation associated with upland hardwood forest.

d. Observations of aquatic life [fish, benthic organisms, amphibians, reptiles]: None - Stream was dry

2. Are any lakes, ponds, or other lentic water bodies present? YES ____ NO X

a. Locate lentic surface bodies on map. Describe location.

N/A

b. Describe surrounding watershed [include water body type, substrate(s), land use(s), and any other physical/chemical characteristics possible]: Intermittent stream: watershed was upland hardwood forest habitat.

c. Description and relative areal distribution of aquatic macrophytes and riparian vegetation along shorelines [indicate vegetative coverage on map]:

N/A

d. Observations of aquatic species and wildlife:

N/A

3. Any outfalls/effluents noted? YES X NO ____

a. Describe and locate on map (include outfall # and custodian): Outfall F-001: approximately 2000 feet southeast of the F-Area BRP. Effluents include cooling water, cooling tower blowdown, and stormwater. The average flow at this outfall in 1992 was 0.109 mgd (0.17 cfs) (SRS, 1993).

D. Wetlands

1. Fundamental (U.S. Fish and Wildlife Service) habitat type: Palustrine Scrub-Shrub wetland

2. Are any wetland/floodplain areas located in the unit vicinity? YES X NO ____

a. Locate all wetland areas on unit map. Describe location(s). Isolated palustrine scrub-shrub wetland located approximately 250 feet to the south of BRP.

b. Describe wetland [include type of soil, evidence of hydrology]: Wetland is an impoundment characterized by wetland vegetation. Soils are not hydric. Evidence of flooding.

c. Describe the vegetative cover in wetland area(s) [include names of individual species, woody and herbaceous]. Indicate the relative areal distribution of each cover type on the unit map:

Species	Stratum	% Cover	NWI Status
Betula nigra	Sapling	25	FACW
Salix nigra	Sapling	25	OBL
Liquidambar styraciflua	Sapling	30	FAC+
Pinus palustris	Sapling	10	FACU+
Cornus florida	Sapling	5	FACU
Cyperus sp.	Herb	70	FACW
Scirpus cyperinus	Herb	25	OBL
Pluchea camphorata	Herb	2	FACW
Erianthus sp.	Herb	3	FACW

3. Any outfalls/effluents noted? YES _____ NO X

a. Describe and locate on map: _____

E. Terrestrial Vegetation

1. Fundamental (U.S. Fish and Wildlife Service) habitat type and type of method used to survey plant communities: Waste units have old field vegetation. Surrounding areas are pine forest, upland hardwood forest, and mixed pine and hardwood forest. Surveys were qualitative and were conducted by walking transects through the surface of the waste unit and adjacent areas.

2. Describe the vegetative cover types on the unit [include names of individual species, woody and herbaceous]. Indicate the relative areal distribution of each cover type on the unit map:

Species

Lespedeza sp.
Helenium autumnale
Phlox subulata
Lespedeza repens
Erigeron canadense
Solidago sp.
Passiflora incarnata
Crotolaria spectabilis
Myrica cerifera
Andropogon ternarius

Notes: (average tree height, % canopy cover, % ground cover, locations and descriptions of specialized habitats (i.e. snags, caves, nests, burrows) No trees located on the waste unit. Small burrow holes were observed on the surface of the waste unit.

3. Description of vegetation adjacent to/bordering the unit: The surrounding areas were predominantly pine and upland hardwood forest. Pine forest areas were dominated by longleaf and loblolly pine in the overstory; holly, farkleberry, and sweetgum in the understory; and yellow jessamine in the herbaceous layer. Hardwood areas were dominated by mockernut hickory, with a similar understory and herbaceous layer.

F. Wildlife

1. Were any direct observations of wildlife made?: YES X NO

a. List and identify the location of any birds species noted [by direct observation or song]:

Species	Type of Observation
Carolina wren	Visual/call
Blue jay	Call
Mourning dove	Visual/call
Gray catbird	Call
Northern cardinal	Visual/call
Eastern pewee	Call
Blue-gray gnatcatcher	Visual
Common bobwhite	Visual
Wild turkey	Tracks
Turkey vulture	Visual
Carolina chickadee	Visual/call
Summer tanager	Visual
American Crow	Visual
Ruby-throated hummingbird	Visual
Tufted titmouse	Visual
Yellow-throated vireo	Visual
White-eyed vireo	Visual
Buzzard hawk	Visual
Mockingbird	Call

b. List and identify the location of any mammal species noted:

Species	Location	Type of Observation
Eastern cottontail	East of waste unit	Visual
Virginia opossum	North of waste unit	Skeleton
White-tailed deer	Entrance to unit	Tracks
Gray squirrel	Peripheral forests	Leaf nests
Feral swine	Off site	Tracks
Raccoon	Off site	Tracks
Insetivora	On waste unit	Burrows

c. List and identify the location of any other animal species noted: (insects, reptiles, amphibians) Reptiles included green anole and five-lined skink. Insects observed included horseflies, cicadas, bumblebees, deerflies, and ants.

3. Note any observations of species listed as endangered, threatened, or of special concern. (See USFS Memorandum)
None observed

G. Additional Comments - None

H. Unit Mapping/Photographs

Refer to Preliminary Site Characterization Report

Post-Reconnaissance Checklist

Are field notebooks signed/dated by field personnel?
Yes X No _____
Are photos documented in the field notebook?
Yes X No _____
Is the reconnaissance boundary noted on a map/photo?
Yes X No _____
Has field equipment been appropriately cleaned?
Yes X No _____

References and Field Guides

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APPENDIX B

WETLAND DETERMINATION SHEETS

Project Title: F-Area BRP	Project Location: F-Area SRS
Sample Location: Wetland	Date: August 30, 1993

VEGETATION

DOMINANTS BY STRATUM	Dominance Ratio	Percent Dominance	NWI Status
Trees:			
Lianas:			
Saplings:			
Betula nigra		25	FACW
Salix nigra		25	OBL
Liquidambar styraciflua		30	FAC+
Pinus palustris		10	FACU
Cornus florida		5	FACU
Shrubs:			
Seedings & Herbs:			
Cyperus sp.		70	FACW
Scirpus cyperinus		25	OBL
Pluchea camphorata		2	FACW
Erianthus sp.		3	FACW
Mosses and Liverworts:			

Tally:	OBL 2	FACW 4	FAC 1	FACU 2	UPL 0	SUM	9

OBL+FACW+FACx100=	Area Disturbed X Y ____ N Describe: Impounded

SOIL

Depth	Munsell Color (wet) Matrix/Mottle	USDA Texture (wet)	Remarks
0 inch inch inch 18inch	10 YR 5/6 (matrix)	Sandy	
	2.5 YR 4/8 (mottle)	Sandy	

Soil Pedigree:	Permeability
Series and Phase:	Drainage Class:

___ NTCHS List
___ Histic Epipedon
___ Peraquic Moisture Regime
___ Manganese Concretions
___ Organic Soil
___ Sulfitic Material
_X_ Reducing Condition
___ Gleyed
___ Dark Vertical Streaking of Subsurface Horizons
___ OBL and FACW Plants and Wetland/Upland Boundary Abrupt
___ High Organic Content in Surface Horizon
___ Aquic Moisture Regime
___ Wet Spodosols
___ Iron Concretions
___ OBL Plants

HYDROLOGY

___ Recorded Data Indicating Inundations or Saturation for Extended Period During the Growing Season

Source:

__ Inudation (Depth ___)
___ Water Marks
___ Sediment Deposits
___ Surface Scoured Areas
_X_ Stooling
___ Floating Stems
___ Inflated Leaves, Stems, Roots
_X_ Shallow Root Systems

Saturation (Depth ___)
_X_ Oxidized Rhozosphere
_X_ Water Stained Leaves
___ Pheumatophores
___ Adventitious Roots
___ Polymorphic Leaves
___ Aerenchyma
___ Drainage Patterns

___ Drift Lines
___ Drainage Hypertrophied
___ Lenticels
___ Hydric Soils

CONCLUSIONS

_X_ Hydrophytes Prevalent
___ Wetland Hydrology
___ Hydric Soils
_Y_ Wetland?

Wetland Technician(s):

Wetland Scientist(s):

Wetland Technical Specialist:

Project Title: F-Area BPR	Project Location: F-Area SRS
Sample Location: Upland	Date: August 30, 1993

VEGETATION

DOMINANTS BY STRATUM	Dominance Ratio	Percent Dominance	NWI Status
Trees:			
Pinus palustris		50	FACU+
Liquidambar styraciflua		40	FAC+
Cornus florida		10	FACU
Lianas:			
Gelsemium sempervirens		80	FAC
Smilax sp.		20	FAC
Saplings:			
Pinus palustris		50	FACU+
Liquidambar styraciflua		50	FAC+
Shrubs:			
Vaccinium arboreum			FACU
Rubus sp.			FAC
Seedings & Herbs:			
Mosses and Liverworts:			

Tally:	OBL	FACW	FAC 5	FACU 4	UPL	SUM	9
OBL+FACW+FACx100=		Area Disturbed _____ Y _____ N Describe					

SOIL

Depth	Munsell Color (wet) Matrix/Mottle	USDA Texture (wet)	Remarks
0 inch 12inch	10 YR 6/6 (matrix)	Sandy	
12inch 18inch	10 YR 6/8 (matrix)	Sandy	

Soil Pedigree:

Permeability

Series and Phase:

Drainage Class:

___ NTCHS List
___ Histic Epipedon
___ Peraquic Moisture Regime
___ Manganese Concretions
___ Organic Soil
___ Sulfitic Material
___ Reducing Condition
___ Gleyed
___ Dark Vertical Streaking of Subsurface Horizons
___ OBL and FACW Plants and Wetland/Upland Boundary Abrupt
___ High Organic Content in Surface Horizon
___ Aquic Moisture Regime
___ Wet Spodosols
___ Iron Concretions
___ OBL Plants

HYDROLOGY

___ Recorded Data Indicating Inundations or Saturation for Extended Period During the Growing Season

Source:

__ Inudation (Depth ___)
___ Water Marks
___ Sediment Deposits
___ Surface Scoured Areas
___ Stooling
___ Floating Stems
___ Inflated Leaves, Stems, Roots
___ Shallow Root Systems

Saturation (Depth ___)
___ Oxidized Rhozosphere
___ Water Stained Leaves
___ Pheumatophores
___ Adventitious Roots
___ Polymorphic Leaves
___ Aerenchyma
___ Drainage Patterns
___ Drift Lines
___ Drainage Hypertrophied
___ Lenticels
___ Hydric Soils

CONCLUSIONS

_N_ Hydrophytes Prevalent
_N_ Wetland Hydrology
_N_ Hydric Soils
_N_ Wetland?

Wetland Technician(s):

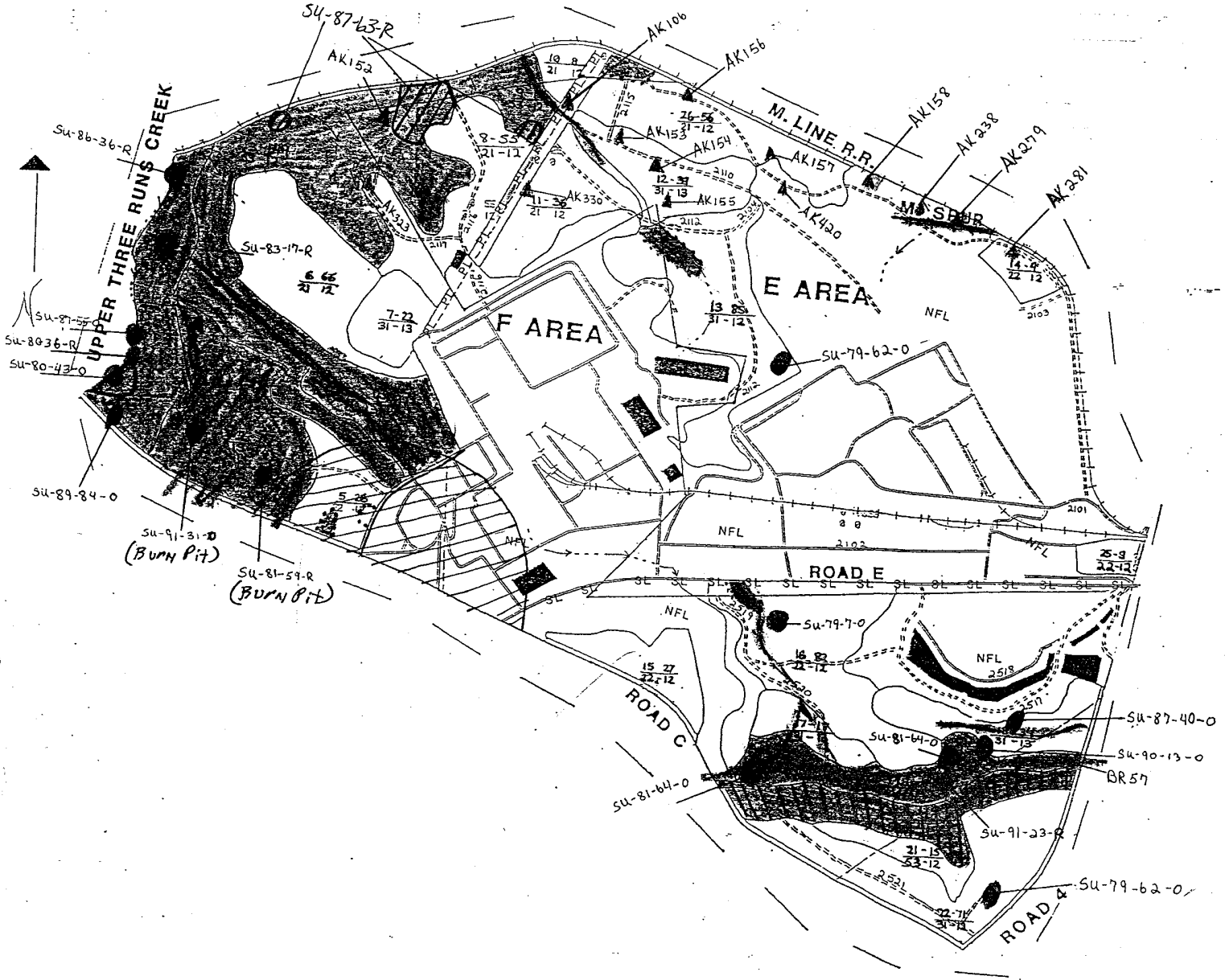
Wetland Scientist(s):

Wetland Technical Specialist:

APPENDIX C

TIMBER COMPARTMENT MANAGEMENT MAPS

COMPARTMENT 49



BASE MAP

- Compartment Boundary
- Stand Boundary
- Primary Road
- Secondary Road
- Woods Road
- Stand No. - Acres
- Forest Type - Cond. Class (40-14 / 21-12)
- Stream
- Powerline (PL)
- Waterline (WL)
- Railroad
- Streamline (SL)
- WIND TOWER BUFFER

KEY AREA & OTHER RESOURCE MAP LEGEND

- Houseplace
- Upland Hardwood Inclusion and stand
- Pine - Hardwood Stand
- Bottomland Hdwd. Stand
- Archeological Site
- Site Use
- Contaminated Area
- Soil Erosion
- Non Forest Land NFL

RARE PLANT POPULATION ////

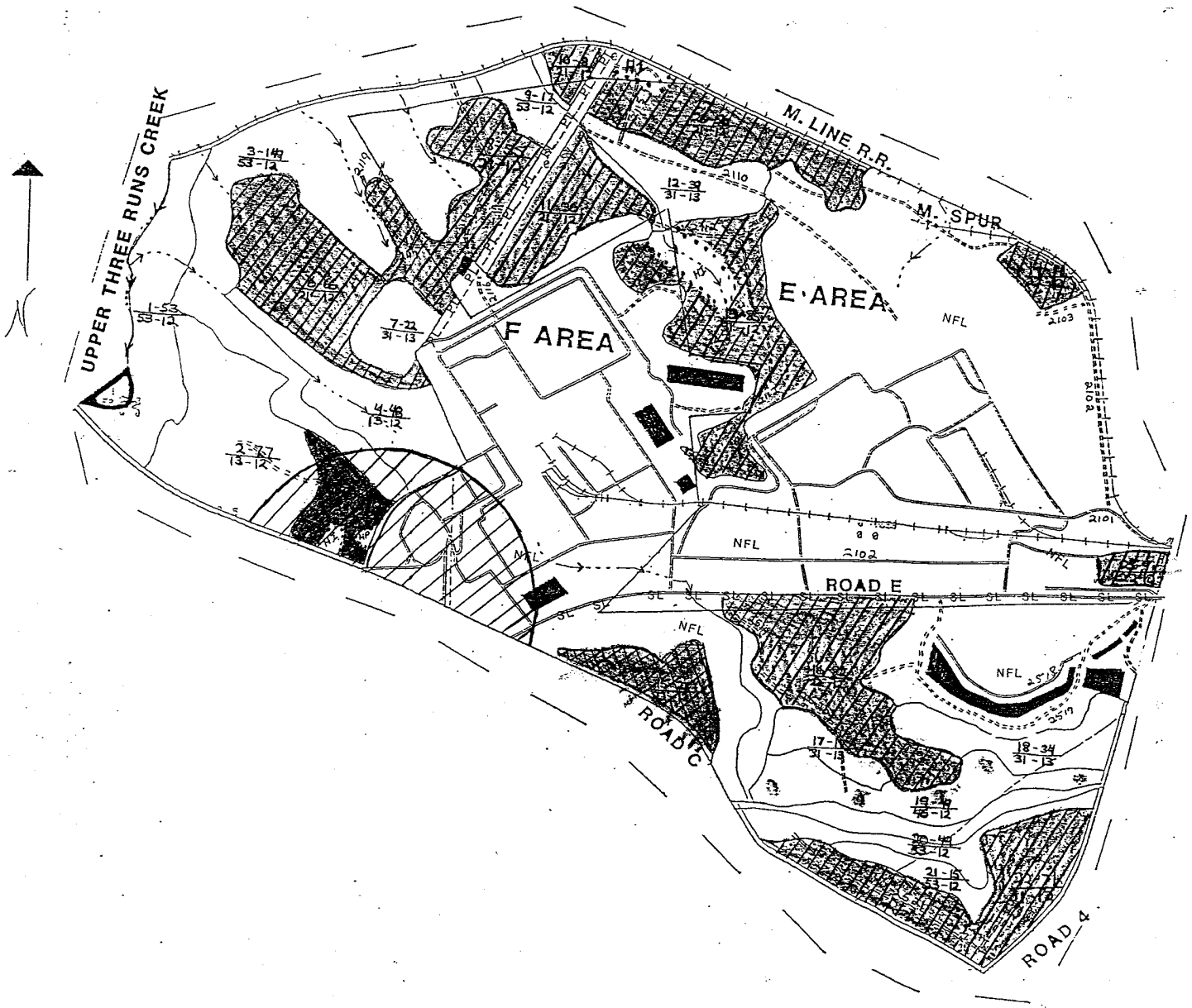
COMPARTMENT 49

BASE MAP

Compartment Boundary
Stand Boundary
Primary Road
Secondary Road
Woods Road
Stand No.- Acres
Forest Type - Cond. Class
Stream
Powerline
Waterline
Railroad
Steamline
Wind Tower Buffer

TIMBER SALE MAP LEGEND

Pine Clearcut
Pine Thinning
Hardwood Inclusion
Houseplace
Group Selection



APPENDIX D

PHOTOGRAPHS

Photo #1. Soils in Palustrine Scrub-Shrub Wetland

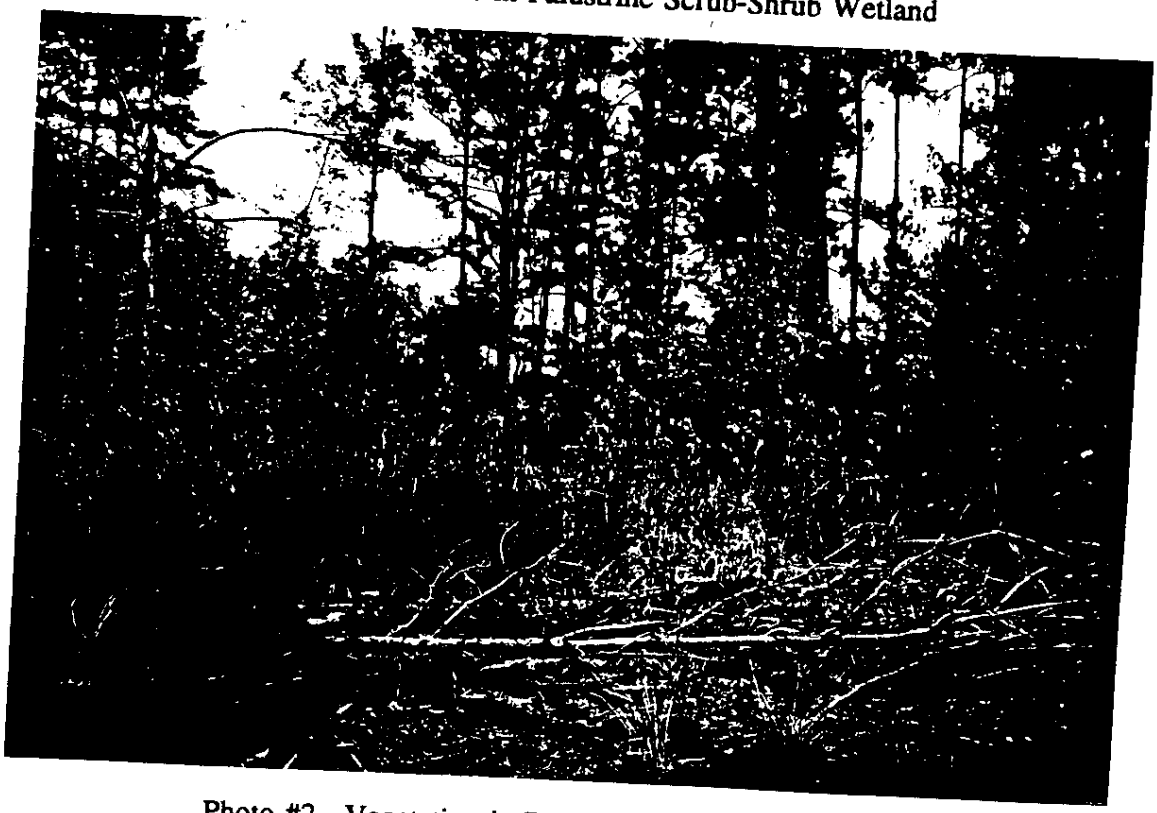


Photo #2. Vegetation in Palustrine Scrub-Shrub Wetland

Photo #5. Skeleton of Virginia Opossum

Photo #5. Skeleton of Virginia Opossum