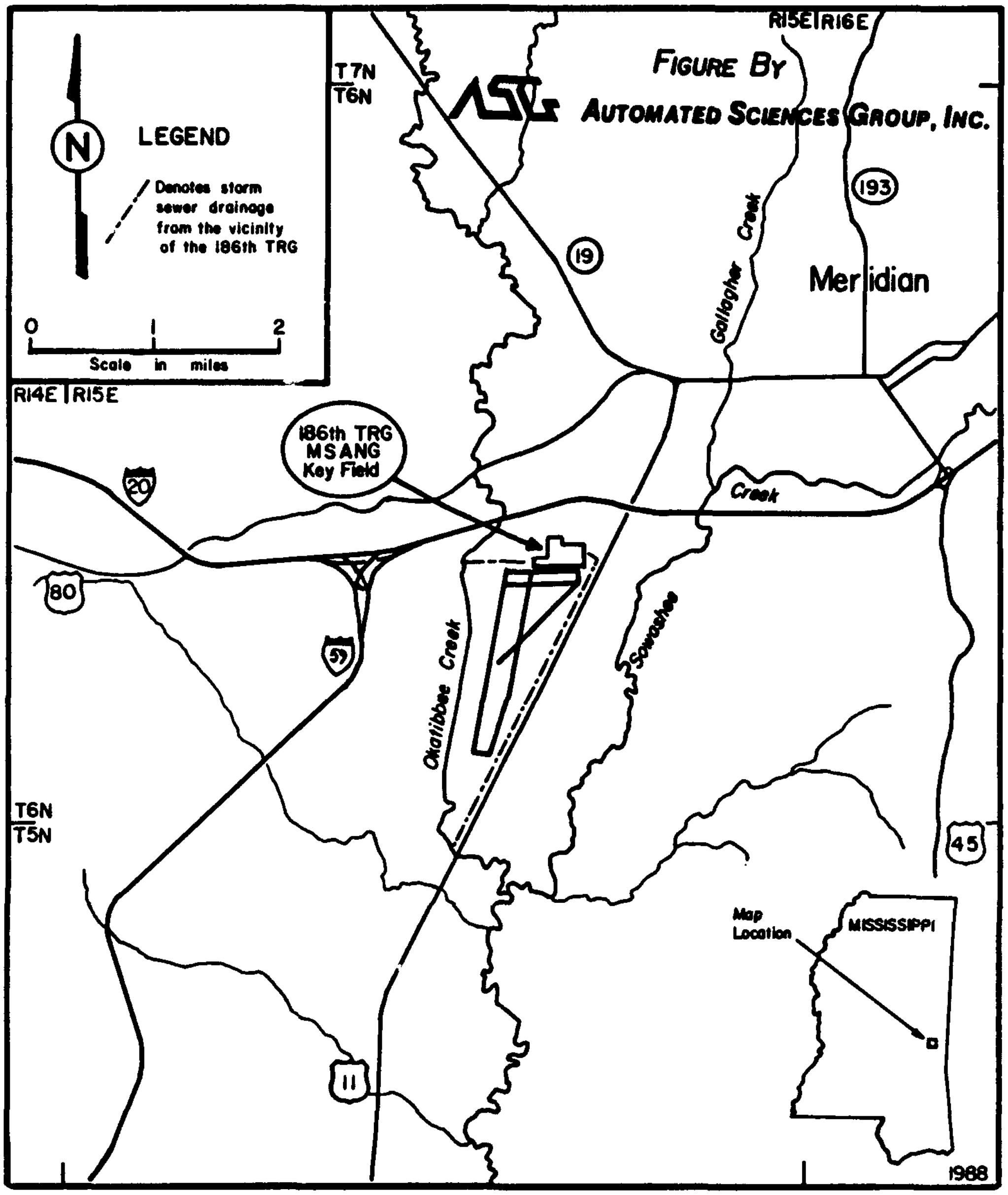
INSTALLATION RESTORATION PROGRAM

PRELIMINARY ASSESSMENT

186th Tactical Reconnaissance Group
Mississippi Air National Guard
Meridian Airport, Key Field
Meridian, Mississippi

HAZWRAP SUPPORT CONTRACTOR OFFICE
Oak Ridge, Tennessee 37831
Operated by MARTIN MARIETTA ENERGY SYSTEMS, INC.
For the U.S. DEPARTMENT OF ENERGY under contract DE-AC05-840R21400



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OF THE
MISSISSIPPI AIR NATIONAL GUARD
186TH TACTICAL RECONNAISSANCE GROUP (TRG)
KEY FIELD
MERIDIAN, MISSISSIPPI

OCTOBER 1988

PREPARED FOR:
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WASHINGTON, D.C. 20310

PREPARED BY:
HAZWRAP SUPPORT CONTRACTOR OFFICE
OAK RIDGE, TENNESSEE 37831
OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE DEPARTMENT OF ENERGY UNDER CONTRACT DE-AC05-87OR21642

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EXECUTIVE SUMMARY

A. INTRODUCTION

The Automated Sciences Group, Inc. (ASG) was retained by the HAZWRAP Support Contractor Office (SCO) in June 1988 to conduct the Preliminary Assessment (PA) phase of the Installation Restoration Program (IRP) of the 186th Tactical Reconnaissance Group (TRG), Mississippi Air National Guard (MSANG), Key Field, Meridian, Mississippi (hereinafter referred to as the Base), under contract DE-AC05-87OR21642. The Preliminary Assessment included the following:

- o An onsite visit that included interviews with 18 past and present Base employees conducted by ASG personnel during 20-24 June 1988.
- o The acquisition and analysis of pertinent information and records on industrial chemical usage and past waste generation and disposal at the Base.
- o The acquisition and analysis of available geologic, hydrologic, meteorologic, and environmental data from pertinent federal, state, and local agencies.
- o The identification of sites on the Base that may be potentially contaminated with hazardous materials/wastes.
- o Recommendations for follow-on activities.

B. MAJOR FINDINGS

The major operations of the Base that have used and disposed of hazardous materials/wastes include aircraft maintenance; aerospace ground equipment (AGE) maintenance; ground vehicle maintenance; petroleum, oil, and lubricant (POL) management and distribution; and fire department training.

The operations involve such activities as corrosion control, nondestructive inspection (NDI), fuel cell maintenance, engine maintenance, hydraulics, structural repair, and wheel and tire maintenance. Waste oils, recovered fuels, paint wastes, spent cleaners, acids, strippers, and solvents were generated and disposed of by these activities.

Interviews with 18 past and present Base personnel, analysis of pertinent information and records, and a field survey resulted in the identification of nine potentially contaminated disposal and/or spill sites at the Base. All of these sites are potentially contaminated with hazardous materials/wastes resulting from Air National Guard (ANG) operations. A Hazard Assessment Score (HAS) utilizing the U.S. Air Force Hazard Assessment Rating Methodology (HARM) was assigned to all of the potential sites for contamination. There were nine sites identified (Site Location Maps on pp. IV-6 and IV-7) as follows:

- Site No. 1 - Fire Training Area No. 1, west of the fence between Buildings 114 and 4011
- Site No. 2 - Fire Training Area No. 2, T-33 Aircraft at the end of abandoned runway and east of Impoundment Area No. 2
- Site No. 3 - Fire Training Area No. 3, F-101 Aircraft, west of Site No. 2
- Site No. 4 - Fire Training Area No. 4, southwest of Site No. 2
- Site No. 5 - Storm Drain at Outfall "Q"
- Site No. 6 - Storm Drain at Outfall "U"
- Site No. 7 - Chemical Decontamination Agent, north of Instrument Runway and west of Army depot
- Site No. 8 - Outdoor Vehicle Maintenance Area No. 1, west side of 7th Avenue between Buildings 3301 and 401
- Site No. 9 - Outdoor Vehicle Maintenance Area No. 2, northernmost pecan tree, east of Building 705 and south of Building 803

C. CONCLUSIONS

Sites 1 through 9 were identified as potentially contaminated and are considered to have the potential for contaminant migration. The locations of these sites can be seen on Figure 7 (p. IV-6) and Figure 8 (p. IV-7).

Site No. 1 - Fire Training Area No. 1 (HAS-62)

This on-base Site, west of the fence between Buildings 114 and 4011, was a flat, earthen area used for fire-fighter training from approximately 1955 to 1960. The Base was the sole operator of this Site. Training was generally done six times per year. An estimated 250 gallons of JP-4 and other flammables were burned during each fire training exercise. No multiple burns were conducted during these exercises. Assuming that up to 70% of the flammables were destroyed, a potential total of 2250 gallons of waste may have remained either to evaporate or to percolate into the ground during the 5 years that this Fire Training Area (FTA) was in use. This Site is being considered because of the possibility that a portion of the flammables remained to infiltrate the soil or to run off into surface drainage ditches.

Site No. 2 - Fire Training Area No. 2 (HAS-66)

This off-base Site, at the west end of the abandoned runway and east of Impoundment Area No. 2, consists of an unlined, open, slightly depressed, earthen area. The Base was the sole operator of this Site. This Site was utilized for fire-fighter training exercises from approximately 1960 to 1980. Training was generally done on a quarterly basis over a 2-day period using an estimated 600 gallons of JP-4 and other flammables during each fire training day. A T-33 aircraft was used as a fire training aid at this location. Assuming that up to 70% of the flammables were destroyed, a potential total of 28,800 gallons of waste may have remained either to evaporate or to percolate into the ground during the 20 years that the FTA was in use. This Site is being considered due to the possibility that a portion of the flammables remained to infiltrate the soil or to run off into surface drainage ditches.

Site No. 3 - Fire Training Area No. 3 (HAS-60)

This off-base Site, approximately 100 feet west of Site No. 2, has been used by the MSANG for fire training from approximately 1980 to the present. The Base has been the sole operator of this Site. This Site consists of an unlined, earthen area. An F-101 aircraft has been used in fire-fighter training near this area. Training is generally done on a quarterly basis using an estimated 250 gallons of JP-4 and other flammables during each fire training exercise. Assuming that up to 70% of the flammables were destroyed, a potential total of 2400 gallons of waste may have remained either to evaporate or to percolate into the ground during the eight years that this FTA was in use. This Site is being considered because a portion of the flammables may have remained to infiltrate the soil or to run off into surface drainage ditches.

Site No. 4 - Fire Training Area No. 4 (HAS-56)

This off-base Site, southwest of Site No. 2, consists of an unlined, earthen area that has been used for fire training exercises from approximately 1977 to the present. The Base has been the sole operator of this Site. Training is generally done on a semiannual basis using an estimated 150 gallons of JP-4 and other flammables during each fire training exercise. Assuming that up to 70% of the flammables were destroyed, a potential total of 990 gallons of waste may have remained either to evaporate or to percolate into the ground during the 11 years that this FTA was in use. This Site is being considered due to the possibility that a portion of the flammables remained to infiltrate the soil or to run off into surface drainage ditches.

Site No. 5 - Storm Drain at Outfall "Q" (HAS-68)

Outfall "Q" of the Base storm drainage system is located between Building 4011 and the northern end of the Instrument Runway. This storm drainage ditch has its origin outside of the Base boundaries, and there is the possibility that off-base contamination may be present in this ditch before it enters the Base. This ditch may also collect any potential on-base contamination that may enter the Base storm drainage system because there are a number of Base facilities that are connected to this drainage system as it flows south from Building 803 and west from Building 101. During the mid-1970s, a 4000-gallon JP-4 fuel spill occurred during a nighttime refueling of a C-141. This spill was flushed into this drainage ditch which is approximately 50 feet from the Parking Apron. Also, the Oil/Water Separator (OWS) that services Building 4011 occasionally overfills during heavy rainfall events. The oil/water mixture in the OWS goes over the top of the skimmer baffles and flows out into the storm drainage system. There is evidence of environmental stress at this Site. Because of these factors, this area presents a potential threat to the local environment.

Site No. 6 - Storm Drain at Outfall "U" (HAS-68)

Outfall "U" of the Base storm drainage system is located on the west side of the POL Service Road and southeast of Building 503. The storm drainage ditch at Outfall "U" has its origin outside of the Base boundaries, and there is the possibility that off-base contamination may be present in this ditch before it enters the Base. This drainage ditch may also collect any potential on-base contamination that may enter the Base storm drainage system because there are a number of Base facilities that are connected to this drainage system as it flows east from Building 101. During the 1960s, the residues from the stripping operations on approximately 20 RF-84s in Building 101 were flushed into this storm ditch. Stripping operations were also performed in Building 103 with the residues entering this ditch. An estimated 10 gallons of Turco Stripper (yellow color) were used for each aircraft. A wash rack is now located in Building 103, but this building had no Oil/Water Separator prior to 1974. All residues from this operation entered the storm drainage ditch. Because of these factors, this area presents a potential threat to the local environment.

Site No. 7 - Chemical Decontaminant Agent (HAS-53)

In the mid-1970s, the Base had 110 gallons of a chemical decontamination agent known as DS-2 stored in two 55-gallon steel drums. This highly corrosive material could pose a significant fire hazard if it came into contact with a strong oxidizer. This material has a high toxicity rating. The drums containing this material were buried in an area north of the Instrument Runway and west of the Army Depot. This off-base area has the potential to cause a threat to the environment.

Site No. 8 - Outside Vehicle Maintenance Area (HAS-56)

This on-base Site is located on the west side of 7th Avenue between Buildings 3301 and 401. This area was used to service motor vehicles and/or refueling units from approximately 1969 to 1975. An estimated 300 gallons of waste products per year from these operations were allowed to drain onto the ground. Assuming that up to 50% of these materials volatilized, an estimated 900 gallons of waste products may have remained to percolate into the ground at this Site over the 6 years that this practice was utilized. The only evidence of environmental stress at this Site was minor stained spots on the grass/soil of this area. This Site is being considered due to the possibility that these waste products may pose a threat to the local environment.

Site No. 9 - Outside Vehicle Maintenance Area No. 2 (HAS-56)

This on-base Site is located adjacent to the northernmost pecan tree in the open area east of Building 705 and south of Building 803. This area was used to service the sumps of the JP-4 refueling units from approximately 1969 to 1975. At least two times per year, an estimated 400 gallons of water/JP-4 fuel mixture were drained out of the sumps of each of the five refueling units that the Base had at the time. An estimated 24,000 gallons of water/JP-4 fuel were allowed to drain onto and into the ground at this Site. Assuming that the mixture was 98% water, a potential total of 480 gallons of JP-4 may have remained to percolate into the soil at the Site over the 6 years that this practice was utilized. This practice has the potential to cause a threat to the local environment.

D. RECOMMENDATIONS

Initial investigative stages of the IRP Site Inspection are recommended for all the sites. These sites have been identified as being potentially contaminated with hazardous materials/wastes and that migration of these materials to the ground-water supplies is possible.

I. INTRODUCTION

A. BACKGROUND

The 186th Tactical Reconnaissance Group (TRG) and the 238th Combat Communications Squadron, Mississippi Air National Guard (MSANG), are located at Key Field, Meridian, Lauderdale County, Mississippi, (hereinafter referred to as the Base). The airport is a city-owned facility situated adjacent to the southwest city limits of Meridian and has been used by the Base since 1947. The airport was used by the Army Air Corp from 1939 until 1947. Over the years the types of military aircraft based and serviced there varied and included both piston- and turbine-powered aircraft. Both past and present operations have involved the use of potentially hazardous materials and the disposal of wastes. Because of the use of these materials and the disposal of the resultant wastes, the National Guard Bureau (NGB) has implemented its Installation Restoration Program (IRP).

The Department of Defense (DOD) Installation Restoration Program (IRP) is a comprehensive program designed to:

- identify and fully evaluate suspected problems associated with past hazardous waste disposal and/or spill sites on DOD installations, and

- control hazards to human health, welfare, and the environment that may have resulted from these past practices.

During June 1980, DOD issued a Defense Environmental Quality Program Policy Memorandum (DEQPPM 80-6) requiring identification of past hazardous waste disposal sites on DOD installations. The policy was issued in response to the Resource Conservation and Recovery Act of 1976 (RCRA) and in anticipation of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, Public Law 96-510), commonly known as "Superfund". In August 1981, the President delegated certain authority specified under CERCLA to the Secretary of Defense via Executive Order

(EO) 12316. As a result of EO 12316, DOD revised the IRP by issuing DEQPPM 81-5 on 11 December 1981 that reissued and amplified all previous directives and memoranda.

Although the DOD IRP and the USEPA Superfund programs were essentially the same, differences in the definition of program phases and lines of authority resulted in some confusion between DOD and state/federal regulatory agencies. These difficulties were rectified via passage of the Superfund Amendments and Reauthorization Act (SARA, PL-99-499) of 1986. On 23 January 1987, Presidential Executive Order (EO) 12580 was issued. EO 12580 effectively revoked EO 12316 and implemented the changes promulgated by SARA.

The most important changes effected by SARA included the following:

Section 120 of SARA provides that federal facilities, including those in DOD, are subject to all the provisions of CERCLA/SARA concerning site assessment, evaluation under the National Contingency Plan (NCP) [40 CFR 300], listing on the National Priorities List (NPL), and removal/remedial actions. DOD must therefore comply with all the procedural and substantive requirements (guidelines, rules, regulations, and criteria) promulgated by the USEPA under Superfund authority.

Section 211 of SARA also provides continuing statutory authority for DOD to conduct its IRP as part of the Defense Environmental Restoration Program (DERP). This was accomplished by adding Chapter 160, Sections 2701-2707 to Title 10 United States Code (10 USC 160).

SARA also stipulated that terminology used to describe or otherwise identify actions carried out under the IRP shall be substantially the same as the terminology of the regulations and guidelines issued by the USEPA under their Superfund authority.

As a result of SARA, the operational activities of the IRP are currently defined and described as follows:

Preliminary Assessment (PA) - A Records Search is conducted that is designed to identify and evaluate past disposal and/or spill sites that might pose a potential and/or actual hazard to public health, welfare, or the environment.

Site Inspection/Remedial Investigation/Feasibility Study (SI/RI/FS) - The SI consists of field activities designed to confirm the presence or absence of contamination at the sites identified as a result of the PA. The RI consists of field activities designed to quantify the types and extent of contamination present, including migration pathways.

If applicable, a public health evaluation is performed to analyze the collected data. Field tests are required which may necessitate the installation of monitoring wells or the collection and analyses of water, soil, and/or sediment samples. Careful documentation and quality control procedures, in accordance with the CERCLA/SARA guidelines, ensure the validity of data. Hydrogeologic studies are conducted to determine the underlying strata, ground-water flow rates, and direction of contamination migration. The findings from these studies result in the selection of one or more of the following options:

- No further action - Investigations do not indicate harmful levels of contamination and do not pose a significant threat to human health or the environment. The site does not warrant further IRP action, and a Decision Document (DD) will be prepared to close out the site.

- Long-term monitoring - Evaluations do not detect sufficient contamination to justify costly remedial actions. Long-term monitoring may be recommended to detect the possibility of future problems.

- o Feasibility Study - Investigations confirm the presence of contamination that may pose a threat to human health and/or the environment, and some form of remedial action is indicated. The FS is therefore designed and developed to identify and select the most appropriate remedial action. The FS may include individual sites, groups of sites, or all sites on an installation. Remedial alternatives are chosen according to engineering and cost feasibility, state/federal regulatory requirements, public health effects, and environmental impacts. The end result of the FS is the selection of the most appropriate remedial action by the ANG with concurrence by state and/or federal regulatory agencies.

Remedial Design/Remedial Action (RD/RA) - The RD involves formulation and approval of the engineering designs required to implement the selected remedial action. The RA is the actual implementation of the remedial alternative. It refers to the accomplishment of measures to eliminate the hazard or, at a minimum, reduce it to an acceptable limit. Covering a landfill with an impermeable cap, pumping and treating contaminated ground water, installing a new water distribution system, and in situ biodegradation of contaminated soils are examples of remedial measures that might be selected. In some cases, after the remedial actions have been completed, a long-term monitoring system may be installed as a precautionary measure to detect any contaminant migration or to document the efficiency of remediation.

Research and Development (R&D) - R&D activities are not always applicable for an IRP site, but may be necessary if there is a requirement for additional research and development of control measures. R&D tasks may be initiated for sites that can not be characterized or controlled through the application of currently available, proven technology. It can also, in some instances, be used for sites deemed suitable for evaluating new technologies.

Immediate Action Alternatives - At any point, it may be determined that a former waste disposal site poses an immediate threat to public health or the environment, thus necessitating prompt removal of the contaminant. Immediate actions, such as limiting access to the site, capping or removing contaminated soils and/or providing an alternate water supply may suffice as effective control measures. Sites requiring immediate removal action maintain IRP status in order to determine the need for additional remedial planning or long-term monitoring. Removal measures or other appropriate remedial actions may be implemented during any phase of an IRP project.

B. PURPOSE

The purpose of this IRP Preliminary Assessment is to identify and evaluate potential sites associated with past waste handling procedures, disposal sites, and spill sites on the Base. To assess the potential for the migration of contaminants, ASG visited the Base, reviewed existing environmental information, analyzed Base records concerning the use and generation of hazardous materials/wastes, and conducted interviews with past and present Base personnel who were familiar with past hazardous materials management activities. Relevant information collected and analyzed as a part of the PA included the history of the Base with special emphasis on the history of the shop operations and their past hazardous materials/waste management procedures; the local geologic, hydrologic, and meteorologic conditions that may affect migration of potential contaminants; local land use, public utilities, and zoning requirements that affect the potential for exposure to contaminants; and the ecological settings that indicate environmentally sensitive habitats or evidence of environmental stress.

C. Scope

The scope of this PA is limited to spills, leaks, or disposal procedures on the Base or on property for which the Air National Guard was the sole user, and includes:

- an onsite visit;
- the acquisition of pertinent information and records on hazardous materials use and past hazardous waste generation/disposal practices at the Base in order to establish the source and characteristics of hazardous wastes or spills;
- the acquisition of available geologic, hydrologic, meteorologic, land use and zoning, critical habitat, and utility data from various federal, state of Mississippi, and local agencies in order to establish potential pathways and receptors of hazardous wastes or spills;
- a review and analysis of all information obtained; and
- the preparation of a report.

The onsite visit, interviews with past and present Base personnel, and meetings with local agency personnel were conducted during the period 20-24 June 1988. The ASG effort was conducted by the following individuals:

- Mr. David R. Styers, Chemist/Civil Engineer/Health Physicist;
- Mr. T. Ward Dilworth, Geologist/Civil Engineer; and
- Mr. William L. Condra, Senior Environmental Engineer.

Resumes are included as Appendix A.

Individuals from the Base and ANG Support Center who assisted in the preliminary assessment include:

- Mr. Don Williams, Project Officer, ANGSC/DER;
- LTC John W. Watts, 186 TRG/DE, MSANG;
- CPT Jeffrey C. Follett, 186 TRG/DE, MSANG; and
- Other selected members of the MSANG.

The Point of Contact at the Base was CPT Jeffrey C. Follett.

D. Methodology

A flow chart of the IRP Preliminary Assessment methodology is presented in Figure 1. This Preliminary Assessment methodology, to the greatest extent possible, ensures a comprehensive collection and review of pertinent site specific information and is utilized in the identification and assessment of potentially contaminated hazardous waste spill/disposal sites.

The PA began with a site visit to the Base to identify all shop operations or activities on the Base that may have utilized hazardous materials or generated hazardous wastes. Next, an evaluation of past and present hazardous materials/wastes handling procedures at the identified locations was made to determine whether environmental contamination may have occurred. The evaluation of past practices was facilitated by extensive interviews with 18 past and present Base personnel who had an average of 25 years familiarity with the various operating procedures at the Base. These interviews were also utilized to define the areas on the Base where any waste materials, either intentionally or inadvertently, may have been used, spilled, stored, disposed of, or released to the environment in order to establish the source and characteristics of hazardous wastes or spills.

Historical records contained in the Base files were collected and reviewed to supplement the information obtained from interviews. Using the information outlined, a tentative list of past waste spill/disposal/storage

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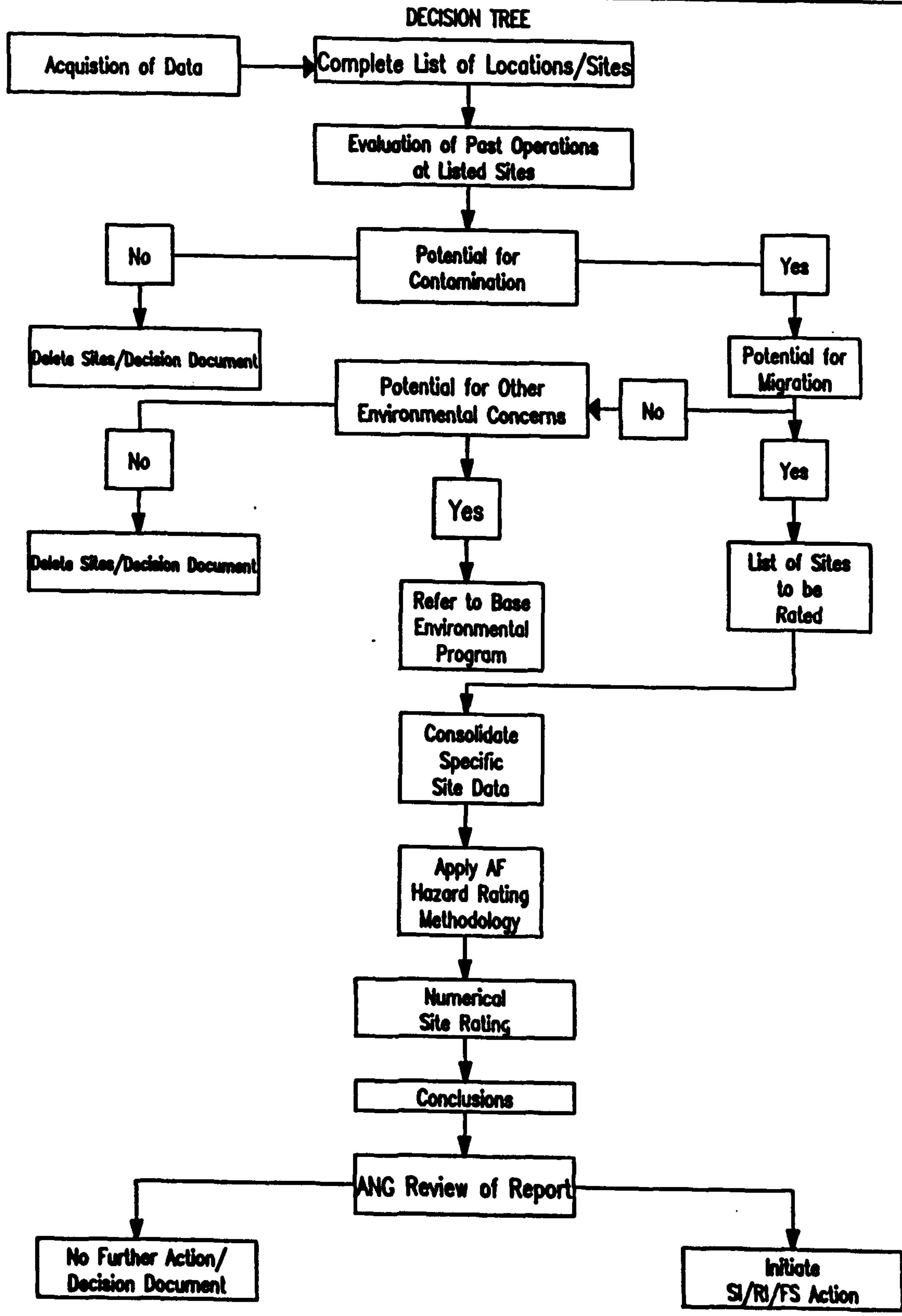
Figure 1
Methodology Flow Chart



sites on the Base was compiled for further evaluation. A general survey tour of the identified spill/disposal/storage sites, the Base, and the surrounding area was conducted to determine the presence of visible contamination and to help assess the potential for contaminant migration. Particular attention was given to locating nearby drainage ditches, surface water bodies, residences, and wells in order to establish potential pathways for migration.

Detailed geologic, hydrologic, meteorologic, developmental (land use and zoning), and environmental data for the area of study were also obtained from appropriate federal, state, and local agencies as identified in Appendix B for the purpose of establishing potential receptors of hazardous wastes or spills. Following a detailed analysis of all the information obtained, all of the sites were identified as potentially contaminated with hazardous materials resulting from Base operations. The potential for contaminant migration exists at all sites. Where sufficient information was available, sites were numerically scored by utilizing the Air Force Hazard Assessment Rating Methodology (HARM). A description of HARM is presented in Appendix C. Hazardous Assessment Rating Forms for the nine potentially contaminated sites are presented in Appendix D. Appendix E contains a listing of the storage tanks presently within the leased boundaries of the Base. Appendix F contains soil data from subsurface investigations that occurred on the Base.

II. INSTALLATION DESCRIPTION

A. LOCATION

The 186th TRG and the 238th Combat Communications Squadron of the MSANG are located at the Key Field Municipal Airport, approximately four miles southwest of the center of Meridian, Mississippi, in Lauderdale County (see Figure 2 for site location and Figure 3 for the immediate surrounding area). The Base occupies 74 acres in the northeast portion of the airport complex and is surrounded by industrial and commercial establishments on the north and the east. The airfield and surrounding area are zoned for heavy industry. Figure 4 shows the Air National Guard property studied for this Preliminary Assessment.

B. ORGANIZATION AND HISTORY OF OPERATIONS

Mississippi received its first Air National Guard unit when the 153rd Observation Squadron was organized on 27 September 1939. It was reorganized as the 153rd Fighter Squadron on 12 September 1946. In 1947 Key Field, Meridian, Mississippi, became the home field for the 153rd Fighter Squadron. On 1 December 1952, the 153rd was redesignated as the 153rd Tactical Reconnaissance Squadron. In October 1962, the present 186th TRG was organized at Key Field.

The 238th Combat Communications Squadron was initially organized in 1948 as the 207th Tow Target Squadron. It was redesignated as the 238th Communications Flight in 1958 with the mission of providing air traffic control. In 1978, the 238th was reorganized in its present designation with the mission of providing combat communications support.

Over the years, many types of aircraft have been flown out of the 186th TRG's home field. The P-47, powered by aviation gasoline, was flown by the 153rd Fighter Squadron from 1946 until 1952. The R-51 (1952-1954) was the last AVGAS-powered aircraft to be used by the 153rd Tactical Reconnaissance Squadron. In 1954, the 153rd Tactical Reconnaissance Squadron received the first of a series of jet fuel-powered aircraft. These included the RF-80 (1954-1956), the RF-84 (1956-1970), and the RF-101 (1970-1976). The present 186th TRG flies the RF-4C that it received in 1976.

The MSANG at Key Field, Meridian, Mississippi, has conducted their fire-fighter training in various locations on and off the Base since 1955 during which the Base was the sole operator of the FTAs. Fire training exercises were usually conducted on a quarterly basis. The first FTA was used from 1955 until 1960 and was located on-base in an area west of the fence between Buildings 4011 and 114 and north of the Parking Apron (see Figure 7 on p. IV-6). The second FTA, off-base and located at the west end of the Abandoned Runway and east of Impoundment Area No. 2, was used from 1960 until 1980. The third FTA, off-base and located an estimated 100 feet west of FTA No.2, has been used from 1980 until the present. The last FTA, off-base and located southwest of FTA No. 2, has been used from 1977 until the present. Figure 8 (p. IV-7) shows the locations of the last three FTAs. In all FTAs, flammable liquids such as spent solvents, waste oils, and JP-4 fuel were used with a water base being applied prior to each burn.

Presently, the 186th Tactical Reconnaissance Group and the 238th Combat Communications Squadron employ 1286 military personnel and 311 technicians.

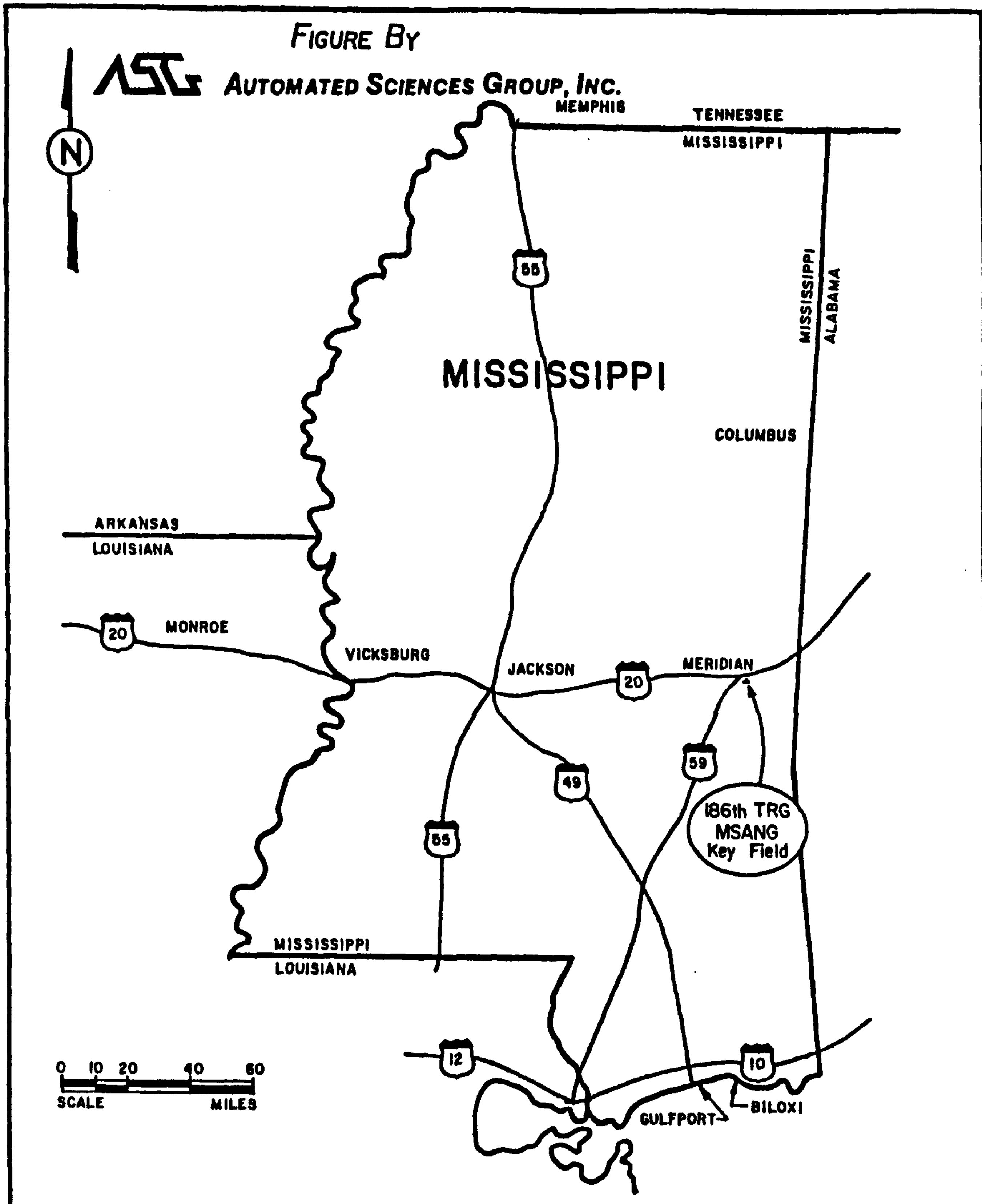


Figure 2. Map of Mississippi Showing Approximate Location of the 186th TRG, Mississippi Air National Guard, Key Field, Meridian, Mississippi (1988).

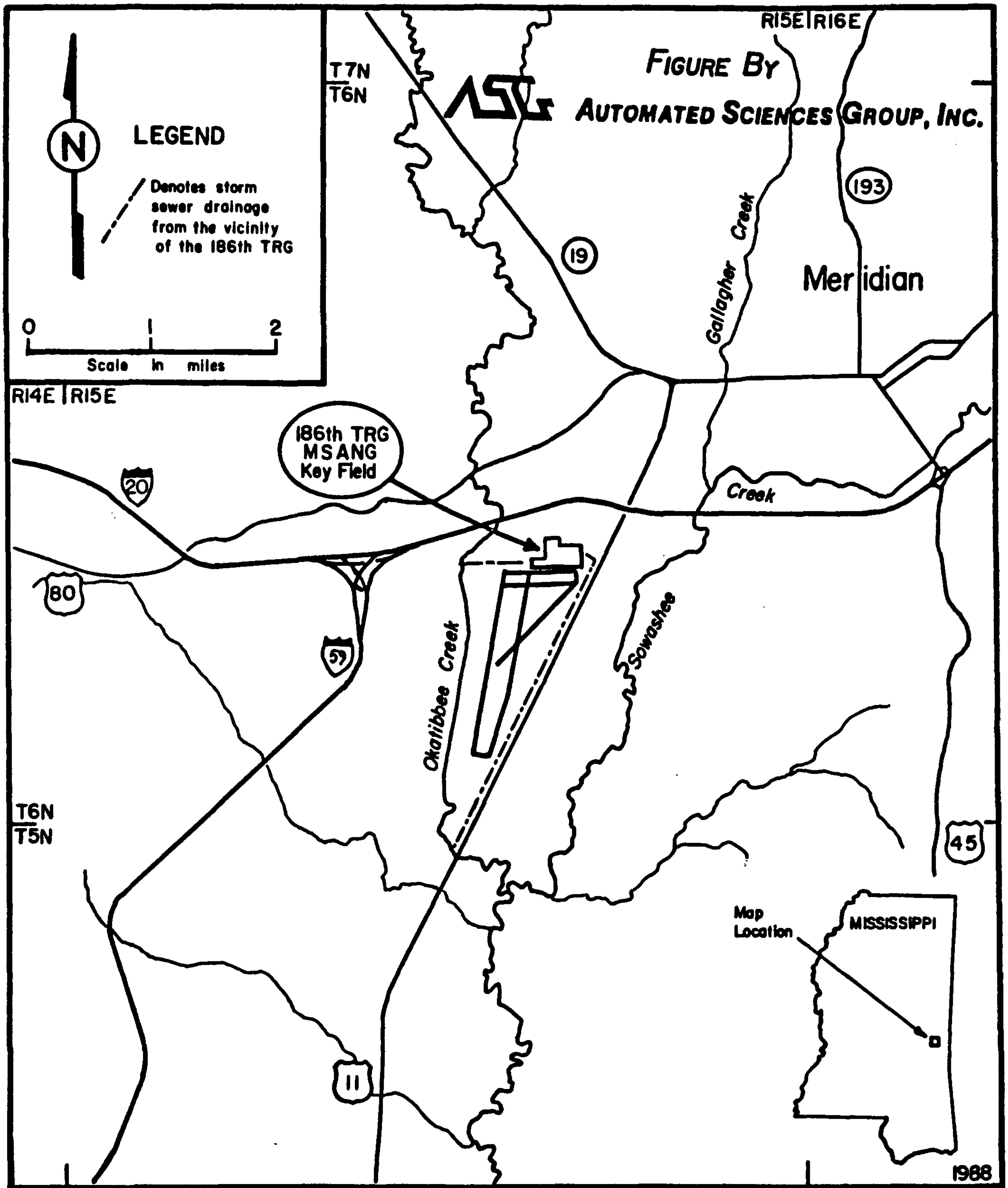


Figure 3. Site Location Map of the 186th TRG, Mississippi Air National Guard, Key Field, Meridian, Mississippi (1988).

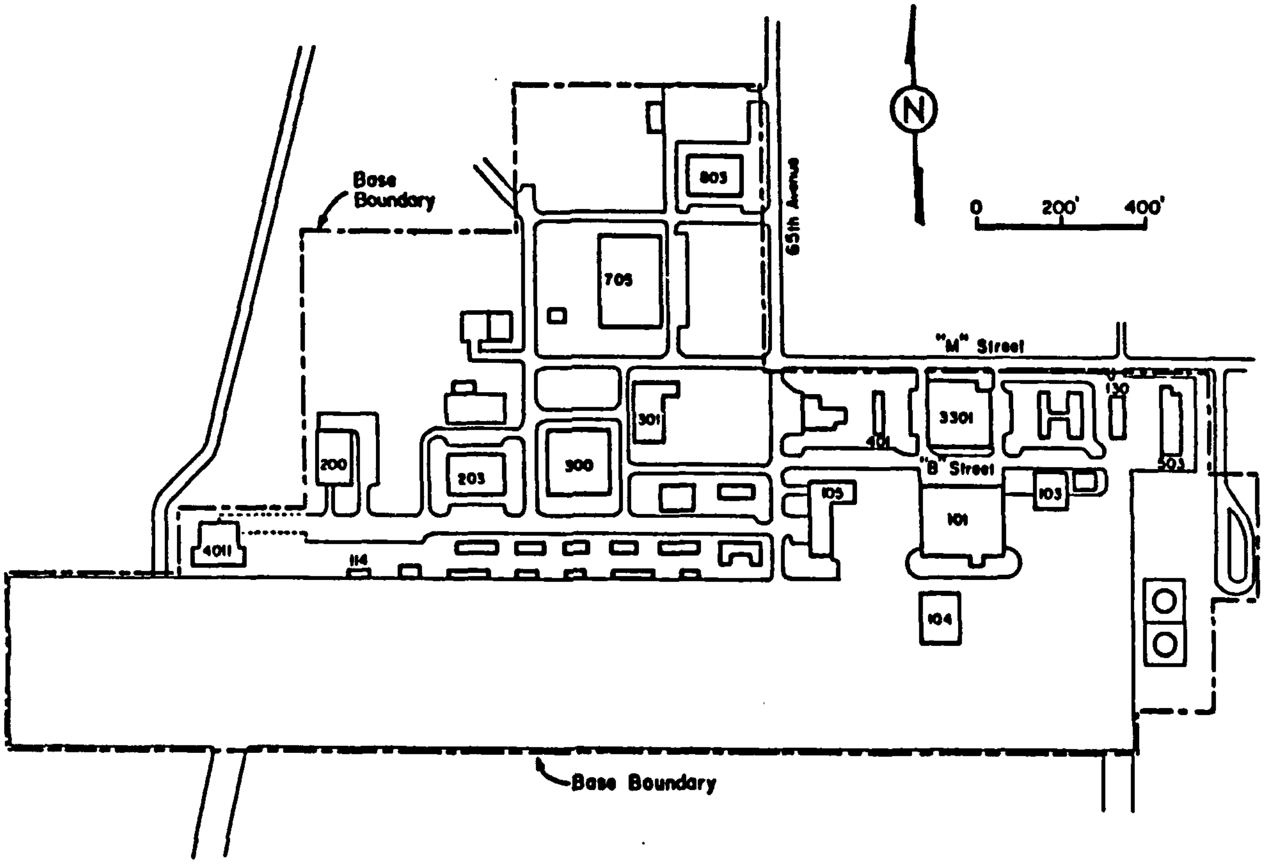


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Figure 4. Base Boundary Map for the 186th TRG, Mississippi Air National Guard, Key Field, Meridian, Mississippi (1988).

III. ENVIRONMENTAL SETTING

A. METEOROLOGY

The annual mean temperature for Key Field in Meridian, Mississippi, is recorded as 64.0°F. The maximum monthly average occurs in July as 92.5°F and the minimum monthly average is 34.2°F in January. The average daily change in temperature is about 25°F year-round.

Annual precipitation values do not vary appreciably in Mississippi, and the area around Key Field is no exception. The average annual precipitation for the Meridian Airport at Key Field is recorded as 53.3 inches. A precipitation data station located approximately 12 miles south-southwest of the Base records 56.28 inches per year on the average, while another station six miles east-northeast records 54.38 inches of annual precipitation.

The annual precipitation value of 53.3 inches for Meridian Airport was recorded for the National Climatic Center at National Oceanic and Atmospheric Administration (NOAA) station No. 22-5776 located on airport property. According to the Water Atlas of the United States (1973), Plate 12, the average annual evaporation from open water surfaces is 43.75 inches. In using the method outlined in the Federal Register (47 FR 31224, 16 July 1982), the annual net precipitation for the Base is 9.55 inches. Rainfall intensity based on the 1-year, 24-hour rainfall (47 FR 31235, 16 July 1982, Figure 8) is 3.5 inches.

B. GEOLOGY

According to The National Atlas of the United States of America, Key Field is located on the Gulf-Atlantic Rolling Plain subdivision of the Gulf Atlantic physiographic province. The state of Mississippi is situated on the eastern portion of the Mississippi Embayment. The sedimentary beds of the northern portion of the state dip to the west toward the axis of the embayment. In central Mississippi these strata dip southwesterly and in the southeastern portion of the state they dip southward toward the Gulf of

Mexico. The rate of dip varies from 10- to 40-feet per mile and generally increases in the southern portions of the state.

Most of Lauderdale County is a mature, dissected upland known as the North Central Hills. Topography varies from undulating broad plateau areas between major stream systems to rugged, dissected uplands that are characterized by steep-sided slopes and narrow ridges. The major streams have fairly broad valleys with associated floodplains that are bordered by one or more low terraces. The elevation at the Base is 320 feet above mean sea level (MSL) and varies less than 10 feet within the boundaries of the Base. The higher ground around the airfield reaches over 400 feet above MSL within two miles of the Base.

The area around the Base is generally underlain by the upper portion of the Wilcox Group of late Paleocene and early Eocene age. The Wilcox Group includes the Nanafalia, Tuscahoma, and the Hatchetigbee Formations in ascending order, with the Hatchetigbee as the youngest. The base of the Nanafalia is referred to as the Fearn Springs Member of the Nanafalia Formation. The base of the Hatchetigbee is called the Bashi Marl Member of the Hatchetigbee Formation. The sediments that compose the Wilcox Group are exposed in a curving belt extending from Lauderdale County, in which the Base is located, to Tippah County in north Mississippi on the Tennessee state line. There are no major faults cutting through these formations in the vicinity of the Base. No large scale structural deformations are known to have occurred in the area.

The Base is underlain by the Hatchetigbee as illustrated by Figure 5, Geologic Cross-Section of the Area Around Key Field, Meridian, Mississippi. The Hatchetigbee formation is about 200 feet thick and is composed of sands, silts, shales, and lignites deposited in nonmarine, coastal plain environments. Table 1 describes the stratigraphy under the Base.

The Soil Survey of Lauderdale County Mississippi (1983) lists the soil type under and around the Base as Urban Land with the following broad descriptions.

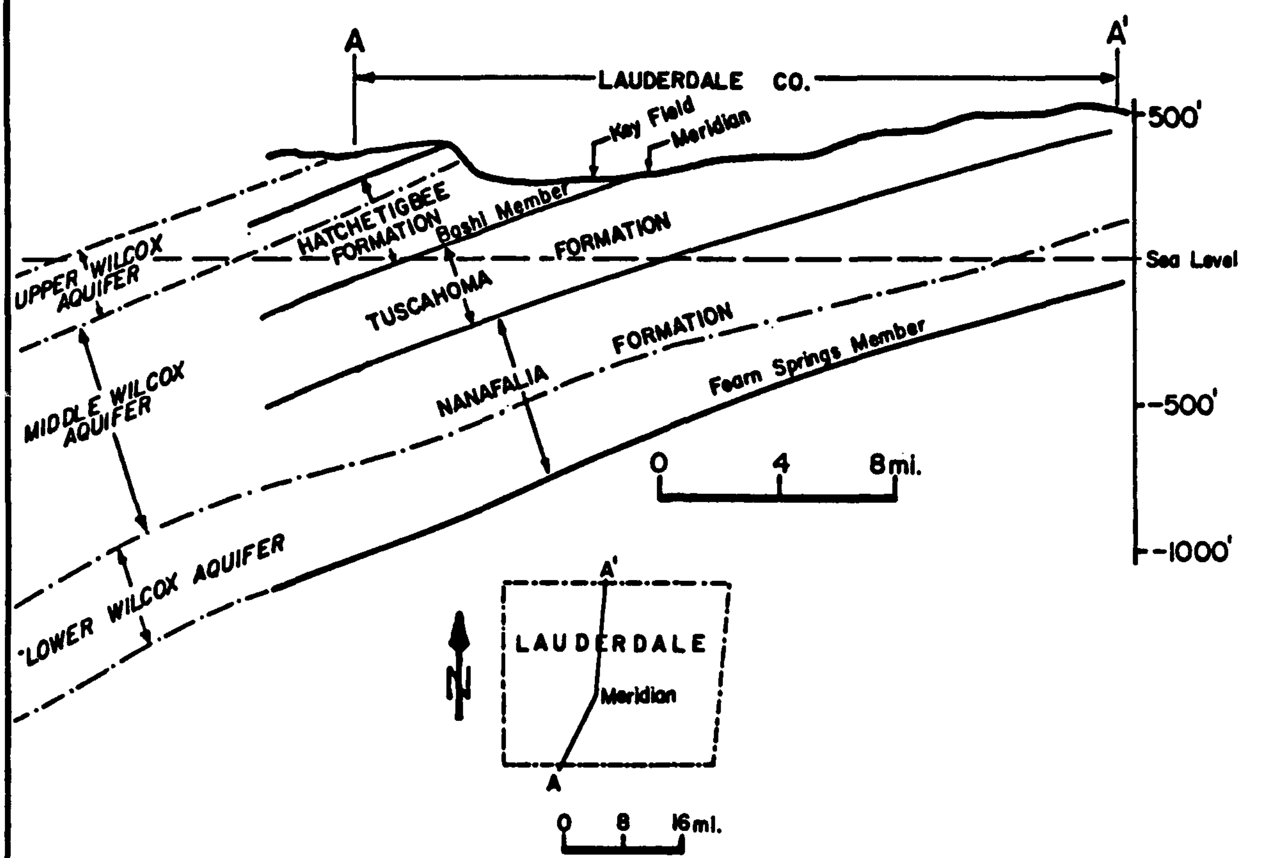

FIGURE BY

ASG AUTOMATED SCIENCES GROUP, INC.

Figure 5. Geologic Cross-Section of the Area Around Key Field, Meridian, Mississippi (1988).

Table 1

Stratigraphic Relationships, Lithologic and Hydrologic Descriptions of Major Geologic Formations In and Around Meridian, Mississippi

AGE	DEPOSIT/FORMATION	LITHOLOGIC AND HYDROLOGIC DESCRIPTIONS
EOCENE	Wilcox Group:	
	o Hatchetigbee (Bashi Marl Member at base of Hatchetigbee)	Interbedded gray and tan clay and silt; bluish-gray, fossiliferous, glauconitic, fine-grained sand and greensand marl--locally indurated forming marlstone boulders. Locally up to 50 feet in thickness. This is the most recent deposit listed here.
	o Tuscahoma	Bluish-gray, micaceous, fine-grained sand and light-gray clayey silt; dark-brown to black lignitic clay and lignite; gray, fine-grained sand, brown to gray lignitic clay lignite; light-gray silt and silty clay. Up to 230 feet thick. Permeabilities have been measured at 0.042 feet per second (ft/s) in Newton County (to the west of Lauderdale County).
	o Nanafalia (Fearn Springs Member at base of Nanafalia)	Nanafalia is characterized by interbedded buff, cross-bedded, micaceous, fine-grained sand; gray plastic clay; lignite; laminated sand, silt, and clay. Up to 230 feet thick. Fearn Springs Member is described as gray and tan, fine-grained sand, coarse grains at base; tan and gray, micaceous silt and clay. Up to 65 feet thick. Permeabilities for the Nanafalia portion of the lower Wilcox aquifer have been measured as 0.071 ft/s in the vicinity of Meridian, Mississippi.

Sources: Keady (1962) and Boswell, et al. (1970)

TH09288B/40

- Urban land consists of areas of reworked or altered soils in the city of Meridian and the Naval Air Station. About 90% of the surface area is covered by buildings, streets, railroad facilities, parking lots, military facilities, and runways.

- Digging, mixing, and moving the soils for the purpose of building and installing structures have so altered the soils that they cannot be classified at the series level. Most of the urban land is on uplands, where the unaltered soils are loamy and clayey. These soils are well drained and strongly acidic or very strongly acidic. On the uplands, runoff is medium to rapid and erosion is a moderate hazard.

- Some Urban land is in areas of well-drained to somewhat poorly-drained terrace and bottom land soils that are moderately acidic to very strongly acidic. Runoff is slow to medium and erosion is a slight hazard in these areas.

The county soil survey reports that no other soil types occur on the Base. Appendix F contains copies of some recent soil investigations (soil borings) on the Base. These investigations depict a soil profile that generally consists of intermittent stratas of clay (CL, CH)[1], silty clay (CL, CH) and sandy clay (CH). These materials extended to depths of 14 feet in Boring (1) and to 7.0 to 10.5 feet in Borings (2) through (5). At these depths, a water-bearing clayey sand (SM) was encountered that ranged in thickness from 2.5 feet in Boring (1), 6.5 feet in Borings (4) and (5), and 10 feet in Boring (3). These water-bearing sands were superimposed on a strata of very hard clayey silt (MH-CH) locally referred to as the Wilcox Formation[2]. This Wilcox was encountered in all borings except Boring (2) where the water-bearing sand extended to the termination of the boring at the 20 foot depth. Data containing more specific information from these investigations are given in Appendix F.

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[1] Abbreviations are according to the Unified Soil Classification System (U.S.C.S.). The U.S.C.S is described in Section 3.2 (p. 49 ff.) of R.D. Holtz and W.D. Kovacs (1981).

[2] This is probably part of the Hatchetigbee Formation which forms the upper portion of the Wilcox Group.

C. HYDROLOGY

A discussion of the hydrology at the Base is necessary to provide a framework for the possible pathways along which contaminants could travel. This subject is divided into two parts, surface water and ground water. This information is intended to be an aid in conceptualizing a pathways model to be used in the determination of possible waste migration.

Another purpose for considering the Base hydrology is to assist in the determination of the possible reception of any contamination that could migrate along existing pathways.

1. Surface Water

Flood data for the Base were taken from the Flood Insurance Rate Map (FIRM) for the city of Meridian, Mississippi, Lauderdale County. This map was generated by the National Flood Insurance Program and was obtained from a local engineering firm, Engineering Plus. This map indicates that the Base does lie within a floodplain associated with a 100-year flood.

The Base is located between two major drainage features. Okatibbee Creek flows along the western border of Key Field and Sowashee Creek runs generally parallel and within one mile of the eastern border of Key Field. Both flow southward with Sowashee Creek emptying into Okatibbee Creek about 1 mile south of the southern end of the main instrument runway or 2.6 miles south of the Base. The average discharge for Okatibbee Creek has been recorded as 287 cubic feet per second[3] at a gauging station less than 1 mile north-northwest of the Base. The drainage area at this gauging station is 239 square miles. A gauging station on the Sowashee Creek, a few miles upstream of its confluence with the Okatibbee, registered an average flow rate of 56 cubic feet per second with a drainage basin of 52 square miles[4]. In the vicinity of the Base, these two streams are basically used for

[3] T. N. Shows, 1970, p.138.

[4] Ibid

cooling water, irrigation, and partially for dilution of wastes. Fishing and recreational uses of these streams are very limited. These two streams can be seen in Figure 3 (p.II-4). The drainage from the Base to these streams is also shown in Figure 3.

Surface water drainage on the Base and its fringe areas are shown in Figure 6. This figure locates the major drainage pathways through ditches and storm sewers so as to locate possible or likely pathways for contaminant migration. It should be noted that some of the storm drainage ditches on the Base are influenced by off-base activities since they originate off the Base property. These ditches are shown in Figure 6.

2. Ground Water

Although the base of the lower Wilcox aquifer is an estimated 900 to 1000 feet below the Base[5], the lower Wilcox Aquifer is the principal source of ground water for industrial and public water supplies in Lauderdale County. The Base obtains its water from the city of Meridian's public water supply system. The thickness of this aquifer is estimated to be about 250 feet in the vicinity of the Base, and it, like the other aquifers in the area, conforms to the stratigraphy and structure of the Wilcox Group which dips to the south-southwest at approximately 25 to 30 feet per mile. Many of the nearby wells tap the lower Wilcox.

Most of the aquifers below the lower Wilcox are saline in Lauderdale County. Although minor aquifers occur in the middle and upper portions of the Wilcox Group, the next shallower aquifer of practical interest would be the Meridian-upper Wilcox aquifer that begins to crop out south and west of the Base and does not underlie the Base. The middle Wilcox includes the upper Nanafalia, the Tuscahoma, and the lower Hatchetigbee formations. It contains locally important aquifers and is sometimes used in areas where the Meridian-upper Wilcox is not sufficient to meet water demands.

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[5] E. H. Boswell, et al, 1970, Figure 12, p.24

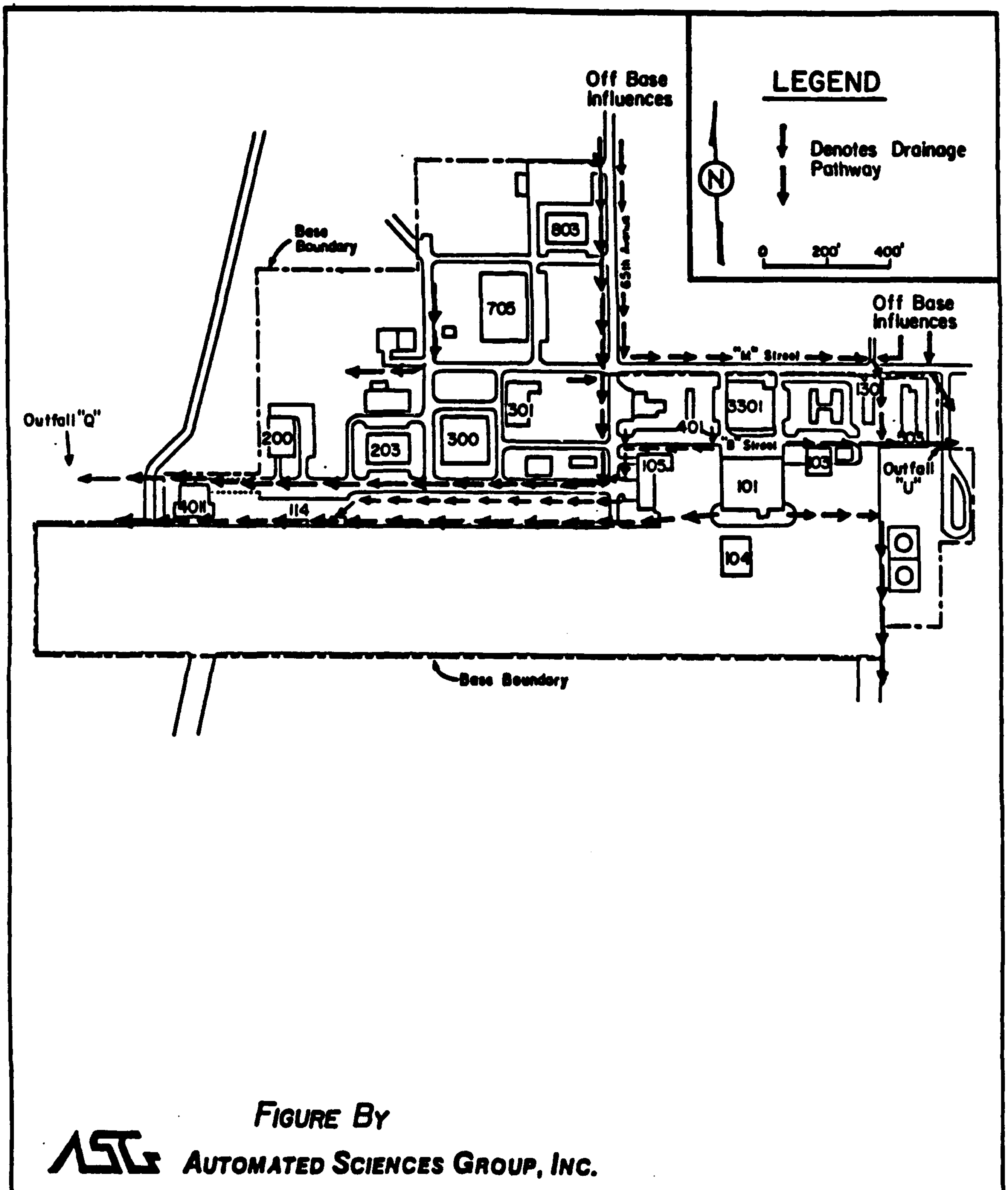

Figure 6. Surface Water Drainage of the 186th TRG, Mississippi Air National Guard, Key Field, Meridian, Mississippi (1988).

Some of the less important and less extensive aquifers in the surrounding area are found in the upper Nanafalia, Tuscahoma, and lower Hatchetigbee formations. The base of the Tuscahoma is approximately 300 feet below the surface in the Key Field area. The Hatchetigbee outcrops in the area and its base is about 50 to 150 feet from the surface[6]. Very few wells in the area surrounding the Base are screened in the Hatchetigbee. One of the wells owned by the U.S. Fish and Wildlife Agency for use at the fish hatchery 1.6 miles south of the Base is screened in the Hatchetigbee but is now listed as unused by the U.S. Geological Service WATSTORE data base system. The well depth is 50 feet. The other hatchery wells range in depth from 728 feet to 880 feet and tap the lower Wilcox aquifer.

There are probably five or six Hatchetigbee wells located between 2.4 and 3.5 miles southeast, south, and southwest of the Base that are currently designated as domestic wells. The closest of these wells is 2.4 miles southeast of the Base. Its screened interval begins at a depth of 87 feet and presumably remains screened to the bottom of the well at 191 feet below the surface. The other Hatchetigbee wells bottom at depths from 160 to 420 feet below the surface. The tops of the screened intervals for these wells range from 80 to 270 feet below the surface. These wells probably represent the most likely receptacles of possible ground-water contamination from Base activities.

The general ground-water flow direction in the Hatchetigbee aquifer would probably tend toward the south-southwest because this is the direction of dip for the formation. Both Sowashee and Okatibbee Creeks could alter the flow direction of the upper portions of the water table because they usually lie below the water table. The effect of these streams would be to draw ground water toward the creeks. Because there are no known major faults cutting across the Wilcox Group of deposits, vertical migration of possible contaminants is unlikely.

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[6] These aquifers are illustrated on Figure 5, p. III-3.

D. BACKGROUND LEVELS

This section provides some information on common constituents or properties encountered in the surface water and ground water around the Base. This information was obtained primarily from the Water Resources of Mississippi, Bulletin 113 (1970) (reference 17), and Water for Industrial Development for Clark, Jasper, Lauderdale, Newton, Scott, and Smith Counties, Mississippi, (1970) (reference 3).

Table 2 is a presentation of chemical analyses of surface and ground water near the Base.

E. CRITICAL ENVIRONMENTS/ENDANGERED OR THREATENED SPECIES

According to the Mississippi Natural Heritage Program, there are no areas designated as critical habitats or wilderness areas nor are there endangered or threatened species of flora or fauna in the vicinity of the Base. Also, there are no major wetlands within a 1-mile radius of the Base.

Table 2. Chemical Analyses of Okatibbee Creek and a Nearby Well Tapping the Tuscahoma Aquifer.[1]

Parameter[2]	Quality of surface water from Okatibbee Creek[3]	Quality of ground water from Tuscahoma aquifer[4]
Temp. (°C)	—	18.0
Silicon (SiO_2)	9.4	12.0
Iron (Fe)	0.24	0.04
Calcium (Ca)	5.3	3.75
Magnessium (Mg)	2.1	0.6
Sodium (Na)	4.0	75.5
Potassium (K)	2.8	0.95
Bicarbonate (HCO_3)	27.0	180.0
Carbonate (CO_3)	—	4.0
Sulfate (SO_4)	3.0	8.9
Chloride (Cl)	4.8	2.9
Flouride (F)	0.1	0.1
Nitrate (NO_3)	0.1	0.35
DSR[5]	54.0	196.5
Hardness[6]	22.0	12.0
SAR[7]	—	9.72
SEC[8] (umhos/cm @ 25°C)	71.0	323.0
pH	6.2	8.25
Color	20.0	7.5

Sources: Shows, 1970; Boswell, et al, 1970 (references 18, 3).

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[1]There were no data available for the Hatchetigbee aquifer from a nearby well. The Tuscahoma is the next shallowest aquifer.

[2]Units are mg/l unless otherwise noted.

[3]Samples taken by U.S. Geological Service on 25 October 1967 when discharge was 12 cubic feet per second at gauging station one mile north-northwest of the Base.

[4]These values are the average of two sampling events, 22 October 1954 and 23 May 1967. Both samples were taken from the same well by the U.S. Geological Service. The well is located at a fish hatchery located over 1.5 miles south of the Base.

[5]DSR - Dissolved Solids Residue after evaporation at 180°C.

[6]Calcium and Magnesium hardness.

[7]SAR - Sodium Adsorption Ratio.

[8]SEC - Specific Electrical Conductance.

IV. SITE EVALUATION

A. ACTIVITY REVIEW

A review of Base records and interviews with past and present Base employees resulted in the identification of specific operations within each activity in which the majority of industrial chemicals are handled and wastes are generated. Table 3 summarizes the major operations associated with each activity, provides estimates of the quantities of waste currently being generated by these operations, and describes the past and present disposal methods for these wastes. Information on the past disposal practices in the 1940s and 1950s is very limited or nonexistent. The "best-guess" estimate is to assume that any disposal practices used in the 1960s were also used in the 1940s and 1950s. If an operation is not listed in Table 3, then that operation has been determined on a best-estimate basis to produce negligible quantities of wastes ultimately requiring disposal.

B. DISPOSAL/SPILL SITE IDENTIFICATION, EVALUATION, AND HAZARD ASSESSMENT

Interviews with 18 past and present Base personnel who had an average of 25 years of tenure at the Base and subsequent site inspections resulted in the identification of nine sites potentially contaminated with hazardous materials/wastes. If contaminants are found to be present at a site, there would be a potential for migration. All of the sites were scored by using HARM (Appendix C) and recommended for further evaluation. Figures 7 and 8 illustrate the locations of the potential sites. Copies of the completed Hazardous Assessment Rating Forms are found in Appendix D. Also, included in Appendix D is a summary and explanation of the factor rating criteria used to score the sites. Table 4 summarizes the Hazard Assessment Score (HAS) for each of the scored sites.

Table 3. Hazardous Waste Disposal Summary: 186th TRG, Mississippi Air National Guard, Key Field, Meridian, Mississippi

SHOP NAME	LOCATION (Bldg No.)	WASTE MATERIAL	CURRENT WASTE QUANTITY* Gallons/Year	METHODS OF TREATMENT, STORAGE, AND/OR DISPOSAL 1940 1950 1960 1970 1980 1988
Aircraft Maintenance	101	PD-680	430	Storm – FTA/Storm – DRMO
	103	Trichloroethane	Unk	Storm – DRMO
	120	Battery Acid	24	Storm – Neutr
		Carbon Cleaner	Unk	Storm – DRMO
		Paint Strippers	60	Storm – DRMO
		Turbine Oil	Unk	Grnd – FTA – DRMO
		JP-4	Unk	Grnd – Grnd/FTA – DRMO
		Xylene	12	Proc/Grnd – OWS – DRMO
		Sodium Hydroxide	Unk	Storm – Neutr
		PS-661	Unk	Storm/FTA
		Acetic Acid	Unk	Neutr
		Potassium Hydroxide	1	San
		Zyglo Emulsifier	Unk	San
		Mineral Oils	Unk	Unk – DRMO
		7808 Oil	400	Storm – DRMO
		Hydraulic Oil	320	Storm – DRMO
		Engine Oil	45	Grnd – FTA – DRMO
		Motor Oil	360	Grnd – FTA – DRMO
		AVGAS	Unk	Grnd – FTA
		Paint Thinners	260	Proc
		Paint	130	Proc
		Paint Containers	130 cans	Dumpster
Aerospace Ground Equipment Maintenance (AGE)	503	Engine Oil	100	Grnd – FTA – DRMO
		Hydraulic Oil	100	Storm – DRMO
		Paint Strippers	5	Proc
		JP-4	Unk	Storm – Grnd/FTA – DRMO
		PD-680	50	Storm – FTA/Storm – DRMO
		Turbine Oil	60	Grnd – FTA – DRMO

Table 3. (cont)

SHOP NAME	LOCATION (Bldg No.)	WASTE MATERIAL	CURRENT WASTE QUANTITY* Gallons/Year	METHODS OF TREATMENT, STORAGE, AND/OR DISPOSAL 1940 1950 1960 1970 1980 1988
Aerospace Ground Equipment Maintenance (AGE) (Continued)		Motor Oil	300	Grnd; DRMO
		Battery Acid	50	Proc
		Lubrication Oil	410 fl oz.	Grnd-; FTA; DRMO
		7808 Oil	100	Grnd; FTA; DRMO
		Transmission Fluid	5	Storm; DRMO
		Xylene	15	Proc
		Spray Paint	48 cans	Proc
		Paint	25	Proc
		Antifreeze	75	Storm
		Cleaning Solvents	100	Proc
		Trichloroethane	10	Proc
		Paint Containers	73	Dumpster
Vehicle Maintenance (Motor Pool)	3301	Engine Oil/Motor Oil	400	Grnd-; FTA; Sply
	130	PD-680	60	Storm; FTA/Storm; Sply
		JP-4	300	Grnd; FTA/Grnd; DRMO
		Ethylene Glycol	150	San; Sply
		Battery Acid	65	Storm; Neutr
		Lubricating Oil	165	Proc; DRMO
		Hydraulic Oil	100	Grnd-; FTA; Sply
		Transmission Oil	55	Grnd-; FTA; Sply
		Paint Thinner	70	San; Sply
		Bearing Grease	~ 5 lbs	Dumpster
		Cleaning Solvent	165	San/Ows
		Paint Containers	325	Dumpster
		Spray Paint	210 cans	Proc
		Paint	112	Proc
		Xylene	55	Proc
		Antifreeze	100	Storm
		Trichloroethylene	20	Proc

Table 3. (cont)

SHOP NAME	LOCATION (Bldg No.)	WASTE MATERIAL	CURRENT WASTE QUANTITY* Gallons/Year	METHODS OF TREATMENT, STORAGE, AND/OR DISPOSAL 1940 1950 1960 1970 1980 1988
Fuels Management	POL LAB 125	JP-4	1500	|-Grnd-|---------FTA----------|
Non-Destructive Inspection (NDI)	105	Penetrant	300	|------------Proc------------|
		Emulsifier	300	|------------Proc------------|
		Developer	30	|------------San-------------|
		Fixer	30	|-----San--------|--Sil Rec---|
Corrosion Control	103	PD-680	(Aircraft Maintenance)	|-Storm|-FTA/Storm---|--DRMO--|
	104	Thinners	80	|----------Storm-----|--DRMO--|
	122	Paint Strippers	10	|----------Proc--------------|
		Paint Containers	260 cans	|----------Dumpster----------|
		Stripper Residue	~10	|--Grnd-------|-----OWS------|
		Paint	260	|----------Proc--------------|
		Naphtha	Unk	|-Grnd-|--FTA---------|--DRMO--|
Photo Lab	203	Developer	6240	|--------San-----------------|
	205	Fixer	6280	|---San---------|---Sil Rec---|
		Toluene	1	|----------Proc--------------|
		NH-5 Hypoconcentrate	240	|----San---------|---Sil Rec--|

Table 3. (cont)

SHOP NAME	LOCATION (Bldg No.)	WASTE MATERIAL	CURRENT WASTE QUANTITY* Gallons/Year	METHODS OF TREATMENT, STORAGE, AND/OR DISPOSAL 1940 1950 1960 1970 1980 1988
Propulsion Shop	114	PD-680	5	-Storm | --FTA/Storm-- | --DRMO--
	200	Carbon Cleaner	2	----------Storm-- | --DRMO--
		Stripper	65	----------Storm-- | --DRMO--
		7808 Oil	Unk	-Storm | -FTA/Storm-- | --DRMO--
		Hydraulic Oil	Unk	-Storm | -FTA/Storm-- | --DRMO--
		Engine Oil	300	-Storm | --FTA/Storm-- | --DRMO--
		Cleaning Solvent	350	----------Storm-- | --Ows--
		Carbon Remover	5000 lbs	----------San----------
		Sodium Hydroxide	25 lbs	----------Storm-- | --Neutr-
		Toluene	62	----------Proc----------
		JP-4	80	-Grnd- | -Grnd/FTA-- | --DRMO--
		Acetic Acid	80 lbs	----------Neutr----------
		Nitric Acid	55 lbs	----------Neutr----------
		Hydrochloric Acid	500 lbs	----------Neutr----------
		Battery Acid	15	----------Netur----------

Key:
- DRMO - Disposed of through the Defense Reutilization and Marketing Office
- FTA - Fire Training Activities
- Grnd - Disposed of on ground
- Neutr - Neutralized and disposed through sanitary sewer
- Ows - Oil/Water Separator
- San - Disposed of in drains leading to sanitary sewer
- Sil Rec - Silver recovery on base
- Sply - Turned into base supply for recovery/recycle
- Storm - Disposed of in drains leading to storm sewer
- Dumpster - Disposed of in approved trash receptacle
- Proc - Used up in process
- Unk - Quantity Unknown

* This quantity may or may not reflect past practices.

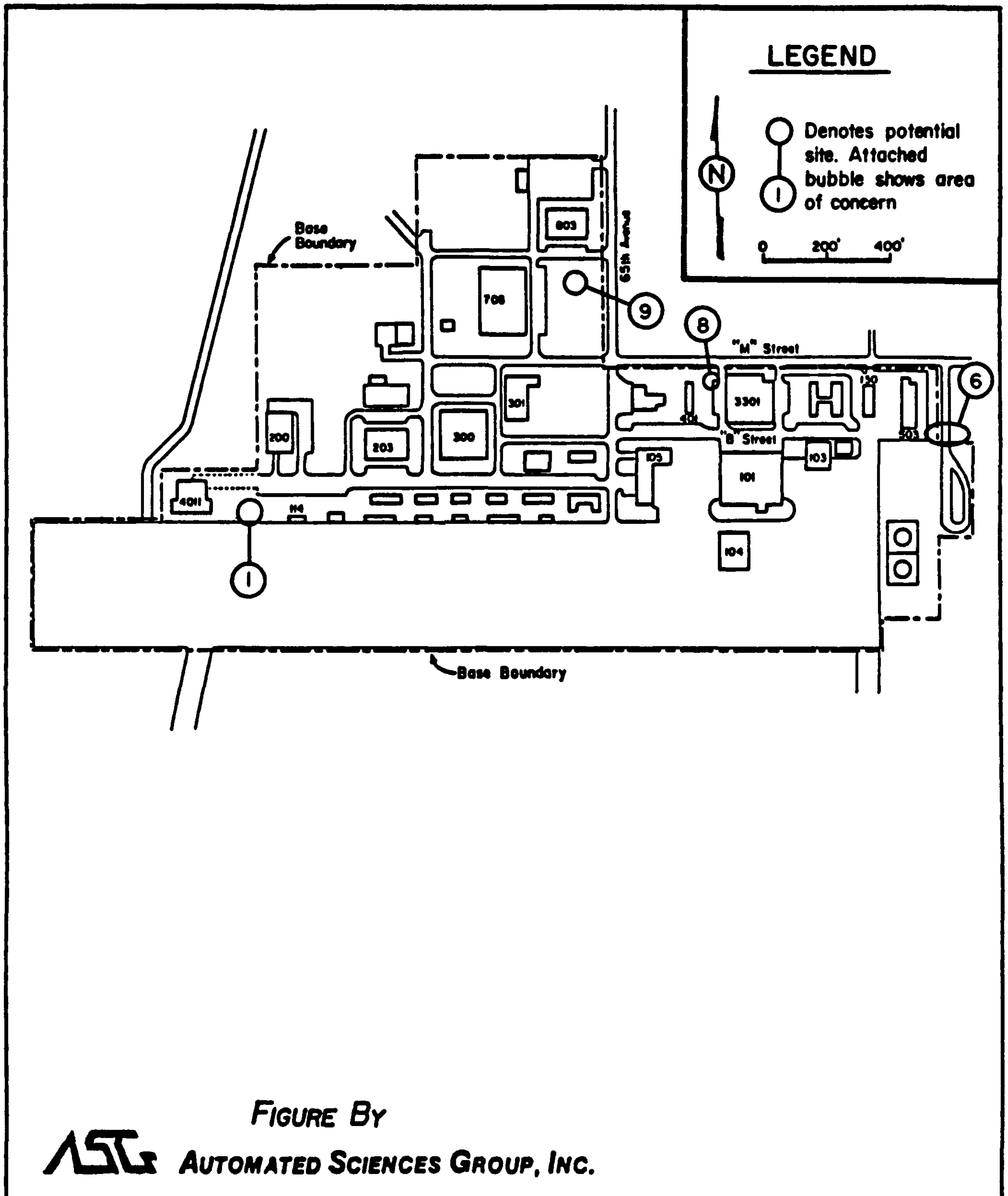

Figure 7. Location of On-Base Potential Sites for the 186th TRG, Mississippi Air National Guard, Key Field, Meridian, Mississippi (1988).

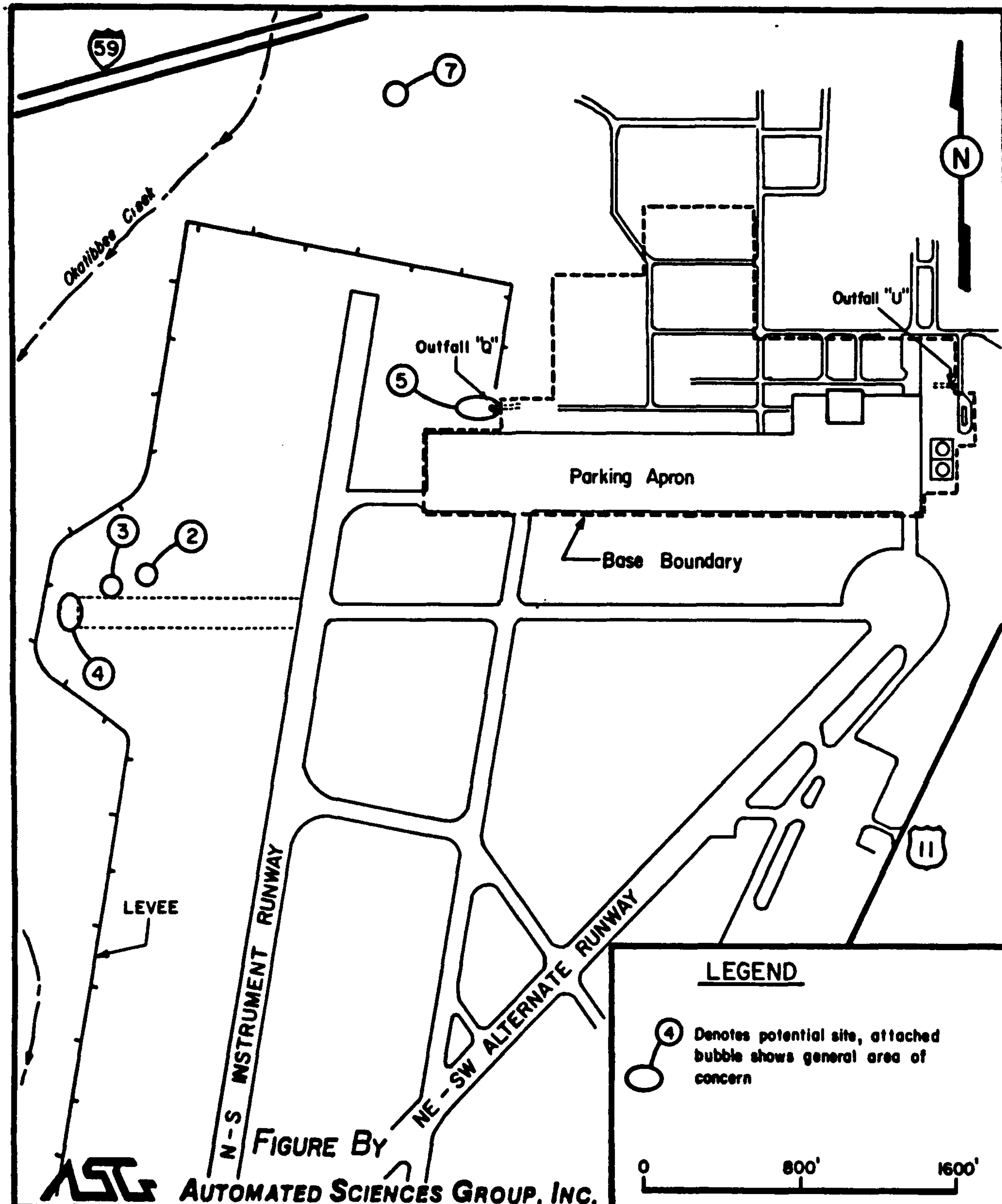

Figure 8. Location Map of Off-Base Potential Sites Used by the 186th TRG, Mississippi Air National Guard, Key Field, Meridian, Mississippi (1988).

Table 4. Site Hazard Assessment Scores (as derived from HARM): 186th TRG, Mississippi Air National Guard, Key Field, Meridian, Mississippi

Site No.	Site Description	Receptor	Waste Characteristics	Pathway	Waste Mgmt. Practices	Overall Score
1	Fire Training Area No. 1	52	72	61	1.0	62
2	Fire Training Area No. 2 (T-33 Wreckage)	47	90	61	1.0	66
3	Fire Training Area No. 3 (F-101 Wreckage)	47	72	61	1.0	60
4	Fire Training Area No. 4	47	54	67	1.0	56
5	Storm Drain at Outfall "Q"	52	72	80	1.0	68
6	Storm Drain at Outfall "U"	52	72	80	1.0	68
7	Chemical Decontaminant Agent	49	48	61	1.0	53
8	Outside Vehicle Maintenance Area No. 1	52	54	61	1.0	56
9	Outside Vehicle Maintenance Area No. 2	52	54	61	1.0	56

The migration pathway of primary concern is the ground-water route, and the most likely potential human receptors are owners of residential wells near the Base. The nearest of these wells is estimated to be 1000 feet south-southwest of the Base. There are other numerous wells slightly more than one mile southeast of the Base and east of Sowashee Creek.

Site No. 1: Fire Training Area No. 1 (HAS-62)

The Base has conducted their fire training exercises in an area west of the fence between Building 4011 and Building 114 and north of the Parking Apron (Figure 7). This on-base Site was used from approximately 1955 to 1960 with the Base being the sole operator of the Site. The training area was a flat, unlined, open, earthen area, and slightly bermed to contain the flammable materials used during training.

Interview information revealed that spent solvents, waste oils, and other flammables in addition to JP-4 fuel were burned in this area. Before the flammables were applied to the FTA, a water base was applied prior to the burn to help retard the infiltration of the flammables into the soil.

Training was generally done six times per year with no multiple burns. On this basis, using 250 gallons of flammable liquids per exercise, it is estimated that 1500 gallons of waste were used per year. Assuming that up to 70%* of the flammables released at the FTA were destroyed, an estimated 450 gallons per year may have remained either to evaporate or to percolate into the ground. A potential total of 2250 gallons of waste may have infiltrated into the ground during the 5-year period this FTA was in use.

Due to the potential threats to the local surface- and ground-water pathways by these potential contaminants, a HAS was applied to this Site.

* The 70% value is an often used average when specific climatic data are not available.

Site No. 2: Fire Training Area No. 2 (HAS-66)

This off-base fire training Site is located at the west end of the Abandoned Runway and east of Impoundment Area No. 2 (Figure 8). This Site is an unlined, open, earthen area, slightly bermed, with a general depth of 12 to 18 inches to contain the flammable materials used during training. This Site was used from approximately 1960 to 1980 with the Base being the sole operator of the Site. A T-33 aircraft was used as a fire training aid at this location.

Interview information revealed that spent solvents, waste oils, and other flammables in addition to JP-4 fuel were burned in this area. Before the flammables were applied to the FTA, a water base was applied prior to the burn to help retard the infiltration of the flammables into the soil.

Training was generally done on a quarterly basis over a 2-day period using an estimated 600 gallons of flammable liquids per training day. On this basis, it is estimated that 4800 gallons of waste were released per year. Assuming that up to 70%* of the flammables released at the FTA were destroyed, an estimated 1440 gallons per year may have remained either to evaporate or to percolate into the ground. A potential total of 28,800 gallons of waste may have infiltrated into the ground during the 20-year period this FTA was in use.

Due to the potential threats to the local surface- and ground-water pathways by these potential contaminants, a HAS was applied to this Site.

Site No. 3: Fire Training Area No. 3 (HAS-60)

This off-base fire training Site is estimated to be 100 feet west of Site No. 2 (Figure 8). It has been used for fire training exercises from approximately 1980 to the present with the Base being the sole operator of

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* See note at bottom of page IV-9

the Site. This area is a flat, open, earthen area. An F-101 aircraft is used as a training aid in this area.

Interview information revealed that spent solvents, waste oils, and other flammables in addition to JP-4 fuel are burned in this area. Before the flammables are applied to the FTA, a water base is applied prior to the burn to help retard the infiltration of the flammables into the soil.

Training is generally done on a quarterly basis. On the basis of using 250 gallons of flammable liquids per exercise, it is estimated that 1000 gallons of waste are used per year. Assuming that up to 70%* of the flammables released at this FTA are destroyed, 300 gallons per year may remain either to evaporate or to percolate into the ground. A potential total of 2400 gallons of waste may have infiltrated into the ground during the 8-year period this FTA was in use.

Due to the potential threats to the local surface- and ground-water pathways by these potential contaminants, a HAS was applied to the Site.

<u>Site No. 4: Fire Training Area No. 4 (HAS-56)</u>

This off-base Site, southwest of Site No. 2, has been used for fire training exercises from approximately 1977 to the present (Figure 8). The Base has been the sole operator of this Site. This training area is a flat, open, earthen area, and slightly bermed with an estimated general depth of 6 to 12 inches to contain the flammable materials used during training.

Interview information revealed that spent solvents, waste oils, and other flammables in addition to JP-4 fuel are burned in this area. Before the flammables are applied to the FTA, a water base is applied prior to the burn to help retard the infiltration of the flammables into the soil.

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* See note at bottom of page IV-9

Training is generally done on a semiannual basis. An estimated 150 gallons of flammable liquids per burn are used. On this basis, it is estimated that 300 gallons of waste are used per year. Assuming that up to 70%* of the flammables released at the FTA are destroyed, 90 gallons per year may remain either to evaporate or to percolate into the ground. A potential total of 990 gallons of waste may have infiltrated into the ground during the 11-year period this FTA was in use.

Due to the potential threats to the local surface- and ground-water pathways by these potential contaminants, a HAS was applied to this Site.

Site No. 5: Storm Drain at Outfall "Q" (HAS-68)

This off-base Site is located at Outfall "Q" of the Base storm drainage system (Figure 8). Outfall "Q" is located between the Building 4011 and the northern end of the Instrument Runway. The storm drainage ditch has its origin outside of the Base boundaries, and there is the possibility that the runoff in the drainage ditch may be contaminated before it enters the Base since there are several potential off-base sources of contamination. Outfall "Q" could also collect any potential on-base contamination that may enter the Base storm drainage system because there are a number of Base facilities that are connected to this drainage ditch as it flows south from Building 803 and west from Building 101. The effluent from this storm ditch then flows westward until it enters Okatibbee Creek which flows to the south.

During the mid-1970s, a JP-4 fuel spill of approximately 4000 gallons occurred during a night refueling operation of a C-141 aircraft in an area at the north end of the Parking Apron. This spill was water-flushed to the soil/grass surrounding this area with the runoff from this flushing operation entering the storm drainage ditch at outfall "Q" which is approximately 50 feet from the edge of the Parking Apron. Some JP-4 fuel contamination probably reached the storm drainage ditch near Outfall "Q".

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* See note at bottom of page IV-9

An Oil/Water Separator (OWS) was constructed in approximately 1975 to service Building 4011. A 500 gallon holding tank is used to collect the oily-fractions from the OWS. Occasionally, during a heavy rain storm, the OWS will overfill with the oil/water mixture going over the top of the skimmer baffles of the OWS. This mixture then flows into the Base storm drainage ditch.

During the field survey of the Base, visible oily contamination was present on the surface of the water in the drainage ditch. Also, visible vegetation stress was present along the drainage ditch below Outfall "Q". Because of these facts and due to potential threats to the local surface- and ground-water pathways by these potential contaminants, a HAS was applied to this Site.

Site No. 6: Storm Drain at Outfall "U" (HAS-68)

This off-base Site is located at Outfall "U" of the Base storm drainage system (Figure 7). This outfall is located on the west side of the POL Service Road and southeast of Building 503. This storm ditch also has its origin outside of the Base boundaries, and the possibility exists that the runoff in this drainage ditch may be contaminated before it enters the Base since there are several potential off-base sources of contamination. The storm drainage ditch at Outfall "U" could also collect any potential on-base contamination that may enter the Base storm drainage system because there are a number of Base facilities connected to this drainage system as it flows east from Building 101. A dried black material (carbon remover) was noted along the sides and on the bottom of the storm drainage ditch at Outfall "U". The Base uses an estimated 5000 pounds of carbon remover per year. The effluent from this drainage ditch flows to the south and eventually enters Okatibbee Creek.

A wash rack is located in Building 103. Prior to 1974, there was no Oil/Water Separator (OWS) for this facility. A variety of materials was used as cleaning agents. Primarily, industrial grade detergents and Varsol (PD-680) were used; however, on occasion, aviation gasoline was probably used to wash a variety of aircraft. Effluent from this washing operation entered the open storm drainage system.

During the 1960s, stripping of approximately 20 RF-84s occurred in the southeast corner of Building 101. An estimated 10 gallons of Turco Stripper (yellow color) were used for each aircraft. All wastes from the stripping operations were flushed into the storm drainage system. Stripping operations also were performed in Building 103.

During the field survey of the Base, visible contamination was present along the sides of the storm ditch. Because of these facts and due to the potential threats to the local environment by these potential contaminants, a HAS was applied to this Site.

<u>Site No. 7: Chemical Decontamination Agent Burial Site (HAS-53)</u>

In the mid-1970s, the Key Field ANG had 110 gallons of a chemical decontamination agent known as DS-2 stored in two 55-gallon steel drums. This material was a clear liquid containing 70% Diethylenetriamine, 28% ethylene glycol, and 2% sodium hydroxide. ANG Headquarters instructed the Base to dispose of this material since it was highly corrosive and would pose a significant fire hazard if it came in contact with a strong oxidizer. According to <u>Dangerous Properties of Industrial Materials</u> by N. Irving Sax, this material has a toxicity rating of 3-2. The drums containing this material were buried by the Base Civil Engineering personnel in a hole approximately 8 to 10 feet deep in an off-base area north of the Instrument Runway and west of the Army Depot (Figure 8). This area was regraded in approximately 1975.

Due to the potential threats to the local surface- and ground-water pathways by these potential contaminants, a HAS was applied to this Site.

Site No. 8: Outside Vehicle Maintenance Area (HAS-56)

This on-base Site is located on the west side of the 7th Avenue between Buildings 3301 and 401 (Figure 7). This area is a flat, open, earthen area and was used to service motor vehicles and/or refueling units from approximately 1969 to 1975. The waste products from these operations were allowed to drain onto the ground with an estimated 300 gallons of waste products being disposed of in this manner per year for 6 years. Assuming that up to 50% of these materials volatilized, an estimated 900 gallons of waste materials may have remained to percolate into the soil of this area over the 6 years that this practice was utilized.

The only evidence of environmental stress was minor stained spots on the grass/soil of this area. Because of this practice, this area presents a potential threat to the local surface- and ground-water pathways. Therefore, a HAS rating has been applied to this Site.

Site No. 9 - Outside Vehicle Maintenance Area No. 2 (HAS-56)

This on-base Site is located adjacent to the northernmost pecan tree in the open area east of Building 705 and south of Building 803. This area was used to service the sumps of the JP-4 refueling units from approximately 1969 to 1975. At least two times per year, an estimated 400 gallons of water/JP-4 fuel were drained out of the sumps of each of the five refueling units that the Base had at the time. An estimated 24,000 gallons of water/JP-4 fuel were allowed to drain onto and into the ground at this Site. Assuming that the mixture was 98% water, a potential total of 480 gallons of JP-4 may have remained to percolate into the soil at the Site over the 6-year period that this practice was utilized. This practice has the potential to cause a threat to the local environment.

C. OTHER PERTINENT INFORMATION

- A new POL Storage Facility was constructed for the Base in 1986. To prepare the site for this new facility, the old POL Underground

Storage Tanks (USTs) were removed. A total of 12 USTs, with a capacity of 25,000 gallons each, were removed. One of these USTs had a history of leaking. During the removal operations, the soil in the vicinity of these USTs was removed to an off-site location. Based on the absence of any appreciable POL-type odors, this soil did not appear to be contaminated. Clean soil was used as backfill material to prepare the site for the new POL Facility.

- Up until 1970, an estimated 10 gallons of tank cleaning sludge per year were buried on Base in an area near the present POL refueling island. This material was removed and taken off site during the construction of the new POL Storage Facility in 1986. Clean fill was used to prepare this area for the construction of the POL Facility.

- A Water/Hydrant System was installed on the Base by the Army in 1942. This system consisted of a series of eight refueling points along the south edge of the Parking Apron. The pumping equipment to operate this system was located near the present refueling stand of the new POL facility. The Army used this system from 1942 until 1945 to refuel their aircraft with aviation gasoline. The ANG has not used any of the refueling points in their operations but they did use the pumping system as part of their old POL facility. When the new POL facility was built in 1986, the old pumping equipment was removed and the lines between the refueling points and the pumping station were cut and sealed.

- There are six Underground Storage Tanks (USTs) on the Base property for which the ANG is responsible (Appendix E). Five of the six USTs are associated with the holding tanks for the Oil/Water Separators. The remaining UST is associated with the Motor Pool (Building 3301) for MOGAS storage. There is no evidence to indicate that any of these tanks are leaking and all are presently in service.

- There are five Oil/Water Separators (OWS) on the Base (Appendix E). The OWS for the Building 4011 will occasionally overfill as the result of storm runoff from heavy rainfall. Any oily material in the OWS is then flushed into the storm drainage ditch near Outfall "Q". The oil-free fractions of the OWS for the wash rack (Building 103), Building 4011, and the new POL Storage Facility enter the Base's storm drainage ditches. The oil-free fractions of the OWS for Fuel Cell Maintenance (Building 104) and the Engine Shop (Building 200) enter the Base sanitary sewer system.

- Sanitary sewage for the Base is connected to publicly-owned treatment works.

- Presently, there are no landfills or radioactive burial sites on Base, nor have there ever been.

- There are no active water wells on Base.

- There have never been any known leaks of PCB contaminated oils occurring on Base.

- There has not been extensive use or storage of pesticides/herbicides on the Base.

V. CONCLUSIONS

- Information obtained through interviews with 18 past and present Base personnel, review of Base records, and field observations resulted in the identification of nine potentially contaminated disposal/spill/storage sites on Base property or outside Base property but under the responsibility of the Base. There is a potential for contaminant migration at all of these sites.

- All sites have been scored by using the Air Force HARM assessment methodology.

- No direct or indirect evidence of ground-water contamination was discovered at the Base; however, the overall ground-water and geologic environment allows the uppermost aquifers to be susceptible to contamination from surface sources. Geologic characteristics at the Base contributing to this susceptibility include the presence of moderately permeable soil surface and a shallow ground-water table. The water table is generally within 10 feet of the surface.

- The average depth to the static water level in wells tapping confined aquifers is approximately 70 feet, based on a review of 73 well logs for wells in the vicinity of the Base. These wells generally tap the Tuscahoma and Nanafalia aquifers.

- There are two groups of possible receptors of potential ground-water contamination in the vicinity of the Base. These two groups are: the nearby wells that tap the uppermost aquifer (Hatchetigbee) of which the closest is 2.4 mile southeast of the Base, and wells closer to the Base that tap lower aquifer. The closest well tapping the Tuscahoma aquifer (below the Hatchetigbee) is approximately 1000 feet south-southwest of the Base. In the absence of detailed hydrogeologic data concerning the movement of ground water at the Base, the most likely receptors of potential ground-water contamination can only be estimated. Due to the apparent absence of faults cutting across the aquifers, downward migration from overlying to lower aquifers is not likely to be a major pathway of concern. Horizontal or down-dip movement of ground water is more likely to be the predominant direction of subsurface flow. This indicates that the Hatchetigbee screened wells are more likely to receive potential contaminants from the ground water than are the closer Tuscahoma screened wells.

- Surface water flow tends to be to the south-southwest.

* Note: All ground-water flow gradients referred to in this report are assumed from regional flow and geologic information. Actual site-specific gradients beneath the Base are not yet known.

VI. RECOMMENDATIONS

Based on the investigation documented in this PA and the HARM scores the nine identified sites received, it is recommended that further IRP action be implemented.

GLOSSARY OF TERMS

AQUIFER - A geologic formation, or group of formations, that contains sufficient saturated permeable material to conduct ground water and to yield economically significant quantities of ground water to wells and springs.

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act.

CLASTIC - Pertaining to rock or sediments primarily composed of broken fragments derived from pre-existing rocks or minerals that have been transported a considerable distance from their place of origin.

CONTAMINANT - As defined by Section 101(f)(33) of SARA shall include, but not be limited to, any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction), or physical deformation in such organisms or their offspring; except that the term "contaminant" shall not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under the following,

(a) any substance designated pursuant to Section 311(b)(2)(A) of the Federal Water Pollution Control Act,

(b) any element, compound, mixture, solution, or substance designated pursuant to Section 102 of this Act,

(c) any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress),

(d) any toxic pollutant listed under Section 307(a) of the Federal Water Pollution Control Act,

(e) any hazardous air pollutant listed under Section 112 of the Clean Air Act, and

(f) any imminently hazardous chemical substance or mixture with respect to which the administrator has taken action pursuant to Section 7 of the Toxic Substance Control Act;

and shall not include natural gas, liquified natural gas, or synthetic gas of pipeline quality (or mixtures of natural gas and such synthetic gas).

CRETACEOUS - Of or relating to the period of geologic time that occurred after the Jurassic Period, generally thought to have occurred between 130 and 65 million years ago.

CRITICAL HABITAT - The native environment of an animal or plant which, due to either the uniqueness of the organism or the sensitivity of the environment, is susceptible to adverse reactions in response to environmental changes such as may be induced by chemical contaminants.

CROSSBEDDING - The arrangement of strata inclined at an angle to the main stratification where these crossbeds are more than one centimeter thick.

DISCHARGE - The release of any waste stream, or any constituent thereof, to the environment which is not recovered.

DOWNGRADIENT - A direction that is topographically or hydraulically down slope; the direction in which ground water flows.

EMBAYMENT - The formation of a bay, as by the sea overflowing a depression of the land near the mouth of a river.

EOCENE - A epoch of the lower Tertiary period, after the Paleocene epoch and before the Oligocene epoch and generally thought to have occurred between 54 and 38 million years ago.

FOLIATED - A small-scale structural term for a rock that exhibits a planar orientation of its platy minerals, usually due to metamorphism.

FORMATION - The fundamental formal unit of classification according to lithology and stratification.

HARM - Hazard Assessment Rating Methodology - A system adopted and used by the United States Air Force to develop and maintain a priority listing of potentially contaminated sites on bases and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts. (Reference: DEQPPM 81-5, 11 December 1981).

HAS - Hazard Assessment Score - The score developed by utilizing the Hazardous Assessment Rating Methodology (HARM).

HAZARDOUS MATERIAL - Any substance or mixture of substances having properties capable of producing adverse effects on the health and safety of the human being. Specific regulatory definitions are also found in OSHA and DOT rules.

HAZARDOUS WASTE - A solid or liquid waste that, because of its quantity, concentration, physical, chemical, or infectious characteristics may

(a) cause, or significantly contribute to, an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness or

(b) pose a substantial threat or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

INTERCALATED - Said of layered material that is interbedded as thin beds within thick beds of another type of material. An example would be thin beds of shale interbedded within a massive bed of sandstone.

LAMINATED - Said of a material (such as clay) that exhibits very thin layers (or laminae) which alternate (such as the laminated clays formed in a lake where the laminae are influenced by seasonal changes).

LIGNITE - a brownish black coal that is intermediate in coalification between peat and subbituminous coal.

LITHOLOGY - The physical character of a rock (e.g., particle size, color, mineral content, primary structures, thickness, weathering characteristics, and other physical properties).

LOAM - Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

MICACEOUS - Consisting of or pertaining to mica, the major phyllosillicate group of minerals.

MIGRATION (Contaminant) - The movement of contaminants through pathways (e.g., ground water, surface water, soil, and air).

PALEOCENE - An epoch of the early Tertiary period, after the upper Cretaceous period and before the Eocene epoch generally thought to have occurred between 65 and 54 million years ago.

PERMEABILITY - The capacity of a porous rock, sediment, or soil for transmitting a fluid without impairment of the structure of the medium; it is a measure of the relative ease of fluid flow under unequal pressure.

SARA - Superfund Amendments and Reauthorization Act.

SHALE - A fine-grained detrital sedimentary rock formed by the consolidation of clay, silt, or mud.

SILTSTONE - An indurated (hardened or consolidated by pressure, cementation, or heat) silt having the texture and composition of shale but lacking its fine lamination.

STRATIFICATION - Structure produced by deposition of sediments in layers or beds.

STRATUM - A section of a formation that consists of approximately the same kind of rock material throughout. Also a layer (of sediment) that was spread out horizontally with older layers below and younger layers above.

SURFACE WATER - All water exposed at the ground surface, including streams, rivers, ponds, lakes, and drainage ditches.

TERTIARY - The first period of the Cenozoic era, after the Cretaceous of the Mesozoic era and before the Quaternary generally thought to have occurred between 65 and two million years ago.

UPGRADIENT - A direction that is topographically or hydraulically up slope.

WATER TABLE - The upper limit of the portion of the ground that is wholly saturated with water.

WETLANDS - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

WILDERNESS AREA - Areas designated under federal or state laws as wilderness areas to be managed for their aesthetic or natural value.

BIBLIOGRAPHY

1. Velton C. Allgood, Soil Survey of Lauderdale County, Mississippi, United States Department of Agriculture, Soil Conservation Service, 1983.

2. Irving E. Anderson, Surface Waters of Mississippi, Bulletin 68, Mississippi State Geological Survey, 1950.

3. E. H. Boswell et al., Water for Industrial Development for Clark, Jasper, Lauderdale, Newton, Scott and Smith Counties, Mississippi, (U.S. Geological Survey), Mississippi Research and Development Center, 1970.

4. E. H. Boswell, The Lower Wilcox Aquifer in Mississippi, Water Resources Investigations 60-75, Open-File Report, U.S. Geological Survey in cooperation with the Mississippi Board of Water Commissioners, 1975.

5. Climatography of the United States No. 81: Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days, 1951-1980 (Mississippi), National Climatic Center, Asheville, North Carolina, September, 1982.

6. Federal Register, 47 31224-31235, 16 July 1982.

7. Geraghty, et al., Water Atlas of the United States, Third Edition, Waste Information Center, Inc., 1973.

8. R. D. Holtz and W. D. Kovacs, An Introduction to Geotechnical Engineering, Prentice-Hall, Inc., 1981.

9. Donald M. Keady, Geologic Study Along Highway 45 From Tennessee Line to Meridian, Mississippi, Bulletin 94, Mississippi Geological Survey in cooperation with the Mississippi State Highway Department, 1962.

10. J. W. Kemp and Associates, Ltd., Foundation Investigation for Proposed Squadron Operations Building, Key Field Air National Guard, Meridian, MS, Allen and Hoshall, 1986.

11. Meehan Quadrangle, Mississippi, Lauderdale County, 7.5 Minute Series (Topographic), United States Geological Survey, U.S. Department of the Interior, 1982.

12. Meridian South Quadrangle, Mississippi, Lauderdale County, 7.5 Minute Series (Topographic), United States Geological Survey, U.S. Department of the Interior, 1982.

13. The National Atlas of the United States of America, U.S. Department of the Interior, U.S. Geological Survey, Washington, D.C., 1970.

14. Richard Randall Priddy, Fresh Water Strata of Mississippi as Revealed by Electrical Log Studies, Bulletin 83, Mississippi State Geological Survey, 1955.

15. Edward H. Rainwater, Regional Stratigraphy of the Midway and Wilcox in Mississippi, Bulletin 102, Mississippi Geologic Research Papers, Mississippi Geological, Economic and Topographic Survey, 1964.

16. N.Irving Sax, Dangerous Properties of Industrial Materials, Sixth Edition, Van Nostrand Reinhold Company, Inc., 1984.

17. Thad N. Shows, Water Resources of Mississippi, Bulletin 113, Mississippi Geological, Economic, and Topographical Survey, 1970.

APPENDIX A

RESUMES OF ASG SEARCH TEAM MEMBERS

AUTOMATED SCIENCES GROUP, INC.

DAVID R. STYERS, P.E. - HEALTH PHYSICIST

PROFESSIONAL CAPABILITIES

Twelve years experience in program management that includes test planning, system design, training and management, research and development, and quality assurance/quality control. Expertise in radiation health physics that includes field surveys, safety reviews, hazard assessments, compliance reviews, and gamma spectroscopy (radiological chemical analyses). Conduct site surveys and records searches for Installation Restoration Program (IRP) for various Air National Guard bases. Efforts include risk assessment, site prioritization, and remedial action recommendations.

EDUCATION

M.S., Health Physics, Georgia Institute of Technology, Atlanta, 1985
Certified Professional Engineer in Civil Engineering
B.S., Education (Major, Chemistry, Minor, Physics), Slippery Rock College, Slippery Rock, PA, 1964

PROFESSIONAL EXPERIENCE

1987-Present Automated Sciences Group, Inc.
Health Physicist. Manage Tumulus Chemical and Nuclear Waste Disposal Task for ASG, including monitoring activities at Demonstration Site, SWSA-6. Prepare task implementation plans, maintain master schedule, and interface with clients at Oak Ridge National Laboratory. Active participation as a team member in Hazardous Waste Environmental Audits, Waste Minimization, and USAF Installation Restoration Program Projects.

1985-1987 Oak Ridge Associated Universities
Health Physics Team Leader. Directed on-site radiation survey teams throughout the United States; provided radiation safety assistance. Conducted complex radiological assays of samples; analyzed and interpreted data; prepared comprehensive reports of results. Reviewed safety procedures and engineering plans for decontamination of nuclear facilities and environmental impact documents. Conducted hazard assessments of radionuclides. Inspected operations and facilities for compliance with regulations.

1978-1985 Pennsylvania Department of Environmental Resources
Chemist. Performed qualitative and quantitative radioassay analyses by gamma spectroscopy techniques. Prepared and disposed of radioactive standards and samples in compliance with NRC regulations. Established quality control charts for radiation analyzers. Participated in quality assurance program of EPA's Environmental Surveillance Monitoring Laboratory; achieved 98% accuracy.

1974-1978 Pennsylvania Department of Transportation
Chemist. Supervised air monitoring section of Chemical Laboratory. Evaluated and selected test site locations for air monitoring projects;

trained staff in proper use of equipment. Scheduled laboratory and field testing. Designed mobile air monitoring vans. Prepared reports on air monitoring testing and research.

1968-1974 Pennsylvania Department of Transportation
Chemist. Supervised and performed qualitative and quantitative chemical monitoring activities.

1965-1968 Fairview Township Schools
Teacher. College preparatory Chemistry and Physics.

MEMBERSHIPS

American Nuclear Society
Health Physics Society

CLEARANCE

DOE-Q

AUTOMATED SCIENCES GROUP, INC.

WILLIAM L. CONDRA - SENIOR ENVIRONMENTAL ENGINEER

PROFESSIONAL SUMMARY

Over 23 years of experience in hazardous waste management involving sampling, coordinating resources, and managing the clean-up of hazardous chemical spills; hazardous waste minimization projects for various Naval facilities as mandated by DOD's Naval Energy and Environmental Support Activity (NEESA) and DOE's Hazardous Waste Remedial Actions Program (HAZWRAP); and site surveys and record searches for the Installation Restoration Program (IRP) for Air National Guard bases. Primary capabilities include extensive personnel and program management, scientific, engineering, and economic analyses of hazardous environments, industrial process analyses, performance of preliminary assessments, and environmental sampling and analytical protocol, including chain of custody.

EDUCATION

M.S., Industrial Technologies/Environmental and Safety Studies, Middle Tennessee State University, 1985
B.S., Chemistry, Middle Tennessee State University, 1961
Certified Hazardous Materials Manager, 1986
Certified Hazardous Materials Technician, 1986
Certified Practices and Procedures for Asbestos Control, 1986
Registered Professional Environmentalist, 1976

PROFESSIONAL EXPERIENCE

1988-Present Automated Sciences Group, Inc.
Senior Environmental Engineer, Hazardous Waste Minimization for Robins Air Force Base. Managerial responsibilities involve coordination, project review, and manpower/cost requirements determination. Environmental responsibilities include conducting Hazardous Waste Minimization Surveys at U.S. Air Force bases, investigations, audits, operational analyses, and hazardous waste sampling, in addition to conducting preliminary assessments at Air National Guard bases. Conduct installation records reviews; prepare environmental reports; maintain liaison with support contractors and client; provide coordination with state and federal agencies; and advise the client and ASG on compliance with EPA, DOT, and OSHA regulations.

1987-1988 The EC Corporation, Knoxville
Project Manager/Senior Environmental Engineer. Managed contractual projects for optimizing hazardous waste generation and facility retrofitting for Hard Chrome Plating operations at Naval facilities. Supervised engineers and provided coordination with Naval facility representatives to ensure completion of contract Statement of Work requirements for Naval Energy and Environmental Support Activity (NEESA).

1981-1987 Arnold Engineering Development Center (AECD), Tullahoma
Environmental Specialist. Responsible for interpreting and ensuring compliance of AEDC's environmental program with applicable state, federal (EPA, OSHA, DOT), and Air Force regulations. Activities included supervising, coordinating, consulting, statistical monitoring, inspecting, sampling, and reporting environmental accomplishments and discrepancies to proper Air Force and associated contractor personnel. Served as a specialist in the chemistry of toxic and hazardous waste. Investigated oil and hazardous chemical spill releases and managed the disposal of hazardous waste chemicals. Initiated cost savings of $80,000 to U.S. Air Force.

1974-1981 State of Tennessee, Bradley County Health Department
Environmentalist II/Chemist II. Supervised, promoted, and inspected projects for compliance with Tennessee environmental regulations. Managed startup of an analytical laboratory for monitoring water quality in public school system including potable water and domestic sewage.

1965-1974 Beaunit Fibers, Inc., Etowah, TN
Senior Chemical Control Engineer/Chemical Laboratory Area Supervisor. Responsible for improving Nylon 6/6 polymerization process performance and yield through process modifications involving polymerization rate studies and lubricant formulation changes. Implemented startup of a manageable quality control program resulting in an annual savings of $900,000. Coordinated customer complaints with manufacturing process engineers for corrective actions. Supervised and managed startup of an analytical laboratory and additive preparation area with an annual budget of $1M.

1961-1965 B.F. Goodrich Chemical Company, Calvert City, KY
Chemist. Supervised laboratory technicians; developed procedures for gas chromatography and wet chemistry techniques. Implemented quality control testing for incoming raw materials and finished products.

AFFILIATIONS

Institute of Hazardous Materials Management
Institute for Environmental Career Advancement
Tennessee Department of Health and Environment

CITIZENSHIP

U.S.

CLEARANCE

DOD - Secret (Inactive)

T. WARD DILWORTH - ENGINEER

PROFESSIONAL CAPABILITIES

Combined background in Geology and Civil Engineering with emphasis on the geotechnical and environmental difficulties encountered in soil, rock, ground water, and similar hydrologic situations. Experience in preparation of proposals and technical reports and laboratory and field testing of soils and concrete. Assist in the conduct of site surveys and records searches for Installation Restoration Program (IRP) for various Air National Guard bases. Efforts include data compilation, risk assessment, site idetification, and site prioritization.

EDUCATION

B.A., Geology, University of Tennessee, 1984
B.S., Civil Engineering, University of Tennessee, 1987
Engineer In Training (E.I.T) Certification, State of Tennessee, 1987

PROFESSIONAL EXPERIENCE

1987 - Present Automated Sciences Group, Inc.

Engineer. Involved in Martin Marietta's site characterization investigations for the low-level waste disposal demonstration project. Duties encompass part of the ground-water characterization for the project and include monitoring ground-water levels on three sites, recording well details as they are finished, and transfer of collected data.

Also involved in development of ground-water computer modeling program. Assisted in survey of certain buildings at ORGDP to obtain information used to place those buildings in safe storage. Engaged in studies involving underground waste storage tanks, and assigned to five Preliminary Assessment projects for the Installation Restoration Program (IRP) for the Air National Guard Bureau (ANGB).

1986 - 1987 Law Engineering

Engineering Aide, Laboratory and Field Technician. Assisted senior engineering staff in preparation of technical reports and proposals. Checked field reports, prepared engineering drawings, and provided input on geologic considerations included in reports and proposals. Conducted laboratory and field tests on soil (in situ density, proctor test, freeze/thaw and wet/dry cycles on soil-cement samples, water content, and collecting bag samples) and concrete (compression testing of cylinders, making concrete cylinders, making grout cubes, slump testing, air content, density/unit weight). Assisted drilling crew in auger drilling operations and laying out borehole locations.

APPENDIX B

OUTSIDE AGENCY CONTACT LIST

CONTACT LIST FOR LOCAL, STATE, AND NATIONAL AGENCIES

Soil Conservation Service
2412 Summit Street
Meridian, MS 39301
(601) 485-4313
Information obtained: Soil Survey of Lauderdale County, Mississippi

Public Works Office (City Hall)
Engineering Division
P.O. Box 1430
Meridian, MS 39032
(601) 485-1920
Information obtained: Zoning map of Meridian, Mississippi

Mississippi Department of Natural Resources
Bureau of Land and Water Resources
2380 Highway 80 West
P.O. Box 10631
Jackson, MS 39209
(601) 961-5202
Information obtained: Driller logs of wells near the Base

Mississippi Department of Natural Resources
Bureau of Geology
2525 North West Street
P.O. Box 5348
Jackson, MS 39216
(601) 354-6228
Information obtained: Geologic, hydrologic, and hydrogeologic reports, maps, and cross-sections

U.S. Geological Survey, Water Resources Division
100 West Capitol Street
Jackson, MS 39269
(601) 965-5587 (Mike Mallory)
Information obtained: Ground-water survey covering Lauderdale County; WATSTORE computer printout of wells located within 3 miles of the Base

Engineering Plus
1724B 23rd Avenue
Meridian, MS 39301
(601) 693-4234
Information obtained: Flood Rate Insurance Map of Meridian; topographic base maps for area around the Base

National Climatic Data Center
Federal Building
Asheville, NC 28801
(704) 259-0682
Information obtained: Climate/meteorological information

APPENDIX C

USAF HAZARD ASSESSMENT RATING METHODOLOGY

USAF HAZARD ASSESSMENT RATING METHODOLOGY

The Department of Defense (DOD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DOD facilities. One of the actions required under this program is as follows:

> To develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the United States Air Force (USAF), using information gathered during the Preliminary Assessment (PA) of its Installation Restoration Program (IRP), has sought to establish a system of priorities for taking actions at identified sites.

PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites suspected of contamination from hazardous substances. This model will assist the Air National Guard (ANG) in setting priorities for follow-on site investigations.

This rating system is used only after it has been determined that (1) potential for contamination exists (i.e., hazardous wastes are present in sufficient quantity) and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

DESCRIPTION OF MODEL

Like other hazardous waste site ranking models, the USAF site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DOD program needs.

The model uses data readily obtained during the Preliminary Assessment portion of the IRP. Scoring judgment and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly no hazards. This approach meshes well with the policy for evaluating and setting restrictions on excess DOD properties.

Site scores are developed by using the appropriate ranking factors according to the method presented in the flow chart (see Figure 1). The site rating form and the rating factor guideline are provided at the end of this appendix.

As with the previous model, this model considers four aspects of the hazard posed by specific sites: possible receptors of the contamination, the waste and its characteristics, the potential pathways for contamination migration, and any efforts that were made to contain the wastes resulting from a spill.

The receptors category rating is based on four rating factors: the potential for human exposure to the site, the potential for human ingestion of contaminants should underlying aquifers be polluted, the current and anticipated uses of the surrounding area, and the potential for adverse effects upon important biological resources and fragile natural settings. The potential for human exposure is evaluated on the basis of the total population within 1000 feet of the site and the distance between the site and the Base boundary. The potential for human ingestion of contaminants is based on the distance between the site and the nearest well, the groundwater use of the uppermost aquifer, and population served by the groundwater supply within three miles of the site. The uses of the surrounding area are determined by the zoning within a one mile radius. Determination of whether or not critical environments exist within a one mile radius of the site predicts the potential for adverse effects from the site upon important biological resources and fragile natural settings. Each rating factor is numerically evaluated (0-3) and increased by a multiplier. The maximum possible score is also computed. The factor score and maximum possible scores are totaled, and the receptors subscore computed as follows: receptor subscore = (100 x factor score subtotal/maximum score subtotal).

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways: surface-water migration, flooding, and ground-water migration. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned; and for direct evidence, 100 points are assigned. If no evidence is found, the highest score among the three possible routes is used. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The scores for each of the three categories are added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Scores for sites with no containment are not reduced. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factor to the sum of the scores for the other three categories.

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

Rating Scale Levels

Rating Factors	0	1	2	3	Multiplier
A. Population within 1,000 ft	0	1-25	26-100	Greater than 100	4
B. Distance to nearest water well	Greater than 3 mile	1 to 3 mile	3,001 ft to 1 mile	0 to 3,000 ft	10
C. Land Use/Zoning (within 1-mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or Industrial	Residential	3
D. Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	6
E. Critical environments (within 1-mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination	Major habitat of an endangered species; threatened species; presence of recharge area; major wetlands	10

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

Rating Scale Levels

Rating Factors	0	1	2	3	Multiplier
F. Water quality / use designation of nearest surface water body	Agricultural or Industrial use	Recreation, propagation and management of fish and wildlife	Shellfish propagation and harvesting	Potable water supplies	6
G. Ground-water use of uppermost aquifer	Not used, other sources readily available	Commercial, industrial, or irrigation, very limited other water sources	Drinking water, municipal water available	Drinking water, no municipal water available, commer- cial, industrial, or irrigation, no other water source available	9
H. Population served by surface water supplies within 3 miles downstream of site	0	1-50	51-1,000	Greater than 1,000	6
I. Population served by aquifer supplies within 3 miles of site	0	1-50	51-1,000	Greater than 1,000	6

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)

- o Verbal reports from interviewer (at least 2) or written information from the records
- o Knowledge of types and quantities of wastes generated by shops and other areas on base

S = Suspected confidence level

- o No verbal reports or conflicting verbal reports and no written information from the records
- o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site

A-3 Hazard Rating

Rating Scale Levels

Rating Factors	0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability, and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

II. WASTE CHARACTERISTICS - Continued

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
80	L	C	M
	M	C	H
70	L	S	H
60	S	C	H
	M	C	M
50	L	S	M
	L	C	L
	M	S	H
	S	C	M
40	S	S	H
	M	S	M
	M	C	L
	L	S	L
30	S	C	L
	M	S	L
	S	S	M
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules

Confidence Level

- o Confirmed confidence levels (C) can be added.
- o Suspected confidence levels (S) can be added.
- o Confirmed confidence levels cannot be added with suspected confidence levels

Waste Hazard Rating
- o Wastes with the same hazard rating can be added.
- o Wastes with different hazard rating can only be added in a downgrade mode, e.g., MCM + SCH = LCM if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical State	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, ground water, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 Potential for Surface Water Contamination

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
Distance to nearest surface water (includes drainage ditches and storm sewers)	Greater than 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet	8
Net Precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay (>10^{-2} cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay (<10^{-6} cm/sec)	6
Rainfall intensity based on 1-year 24-hour rainfall (or number of Thunderstorms)	<1.0 inch (0-5) 0	1.0 to 2.0 inches (6-35) 30	2.1 to 3.0 inches (36-49) 60	>3.0 inches (>50) 100	8

B-2 Potential for Flooding

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
Floodplain	Beyond 100-year floodplain	In 100-year floodplain	In 10-year floodplain	Floods annually	1

B-3 Potential for Ground-Water Contamination

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
Depth to ground water	Greater than 500 feet	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Soil permeability	Greater than 50% clay ($<10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	0% to 15% clay ($>10^{-2}$ cm/sec)	8
Subsurface flows	Bottom of site greater than 5 feet above high ground-water level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located below mean ground-water level	8
Direct access to ground water (through faults, fractures, faulty well casings, subsidence, fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. Waste Management Practices Factor

The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o Contaminated soil removed
- o Soil and/or water samples confirm total cleanup of the spill

Fire Protection Training Areas:

- o Concrete surface and berms
- o Oil/Water separator for pretreatment of runoff
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete, the factor ratings under items I-A through I, III-B-1, or III-B-3, then leave blank for calculation of factor score and maximum possible score.

APPENDIX D

SITE HAZARDOUS ASSESSMENT RATING
FORMS AND FACTOR RATING CRITERIA

HAZARDOUS ASSESSMENT RATING FORM

Name of Site Site No. 1, Fire Training Area No. 1

Location West of the Fence that is between Buildings 114 and 4011

Date of Operation or Occurrence 1955-1960

Owner/Operator MS ANG at Key Field, Meridian, MS

Comments/Description Fire Training Area # 1

Site Rated By Automated Sciences Group, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest water well	3	10	30	30
C. Land use/zoning within 1-mile radius	2	3	6	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1-mile radius of site	0	10	0	30
F. Water quality of nearest surface-water body	1	6	6	18
G. Ground-water use of uppermost aquifer	1	9	9	27
H. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	2	6	12	18
Subtotals			93	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

80 x 0.9 = 72

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

72 x 1.0 = 72

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 0

B. Rate the migration potential for 3 potential pathways: Surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-Water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface-water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	24
		Subtotals	66	108

Subscore (100 x factor score subtotal/maximum score subtotal) 61

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	1	1	1	3

Subscore (100 x factor score/3) 33

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	0	8	0	24
		Subtotals	68	114

Subscore (100 x factor score subtotal/maximum score subtotal) 60

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 61

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	72
Pathways	61

Total 185 divided by 3 = 62
Gross Total Score

B. Apply factor for waste contaminant from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

62 x 1.0 = 62

HAZARDOUS ASSESSMENT RATING FORM

ame of Site Site No. 2, Fire Training Area No. 2

ocation Near the west end of the abandoned east-west runway, SE of impoundment area 2

ate of Operation or Occurrence 1960-1980

ner/Operator MS ANG at Key Field, Meridian, MS

mments/Description Fire Training Area # 2, T-33 aircraft wreckage in this FTA

ite Rated By Automated Sciences Group, Inc.

. RECEPTORS

ating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
. Population within 1,000 feet of site	1	4	4	12
. Distance to nearest water well	3	10	30	30
. Land use/zoning within 1-mile radius	2	3	6	9
. Distance to installation boundary	3	6	18	18
. Critical environments within 1-mile radius of site	0	10	0	30
. Water quality of nearest surface-water body	1	6	6	18
. Ground-water use of uppermost aquifer	1	9	9	27
l. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
. Population served by ground-water supply within 3 miles of site	2	6	12	18
Subtotals			85	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 47

I. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

100 x 0.9 = 90

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

90 x 1.0 = 90

II. PATHWAYS

ating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 0

B. Rate the migration potential for 3 potential pathways: Surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-Water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface-water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	24
Subtotals			66	108

Subscore (100 x factor score subtotal/maximum score subtotal) 61

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	1	1	1	3

Subscore (100 x factor score/3) 33

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	0	8	0	24
Subtotals			68	114

Subscore (100 x factor score subtotal/maximum score subtotal) 60

C. Highest pathway subscore
Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 61

V. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	47
Waste Characteristics	90
Pathways	61
Total 198 divided by 3 =	66
	Gross Total Score

B. Apply factor for waste contaminant from waste management practices
Gross Total Score x Waste Management Practices Factor = Final Score

66 x 1.0 = 66

HAZARDOUS ASSESSMENT RATING FORM

me of Site Site No. 3, Fire Training Area No. 3

cation Near the west end of abandoned east-west runway, SE of impoundment area 2, west of Site No. 2

ite of Operation or Occurrence 1980-present

ner/Operator MS ANG at Key Field, Meridian, MS

mments/Description Fire Training Area # 3, F-101 aircraft wreckage in this FTA

ite Rated By Automated Sciences Group, Inc.

, RECEPTORS

ating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
. Population within 1,000 feet of site	1	4	4	12
. Distance to nearest water well	3	10	30	30
. Land use/zoning within 1-mile radius	2	3	6	9
. Distance to installation boundary	3	6	18	18
. Critical environments within 1-mile radius of site	0	10	0	30
. Water quality of nearest surface-water body	1	6	6	18
. Ground-water use of uppermost aquifer	1	9	9	27
. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
. Population served by ground-water supply within 3 miles of site	2	6	12	18
Subtotals			85	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 47

I. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

80 x 0.9 = 72

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

72 x 1.0 = 72

I. PATHWAYS

ting Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 0

B. Rate the migration potential for 3 potential pathways: Surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-Water migration

	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface-water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	24
Subtotals			66	108
Subscore (100 x factor score subtotal/maximum score subtotal)				61

	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	1	1	1	3
Subscore (100 x factor score/3)				33

3. Ground-water migration

	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	0	8	0	24
Subtotals			68	114
Subscore (100 x factor score subtotal/maximum score subtotal)				60

C. Highest pathway subscore
Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 61

V. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	47
Waste Characteristics	72
Pathways	61

Total 180 divided by 3 = 60
Gross Total Score

B. Apply factor for waste contaminant from waste management practices
Gross Total Score x Waste Management Practices Factor = Final Score

60 x 1.0 = 60

HAZARDOUS ASSESSMENT RATING FORM

me of Site Site No. 4, Fire Training Area No. 4

cation At the west end of abandoned east-west runway, SE of impoundment area 2, SW of Site No. 2

te of Operation or Occurrence 1977-present

ner/Operator MS ANG at Key Field, Meridian, MS

mments/Description Fire Training Area No. 4 (two pits side by side)

te Rated By Automated Sciences Group, Inc.

RECEPTORS

ting Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
. Population within 1,000 feet of site	1	4	4	12
. Distance to nearest water well	3	10	30	30
. Land use/zoning within 1-mile radius	2	3	6	9
. Distance to installation boundary	3	6	18	18
. Critical environments within 1-mile radius of site	0	10	0	30
. Water quality of nearest surface-water body	1	6	6	18
. Ground-water use of uppermost aquifer	1	9	9	27
. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
. Population served by ground-water supply within 3 miles of site	2	6	12	18
		Subtotals	85	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 47

I. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

60 x 0.9 = 54

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

54 x 1.0 = 54

I. PATHWAYS

ting Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 0

B. Rate the migration potential for 3 potential pathways: Surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-Water migration

	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface-water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	24
		Subtotals	66	108

Subscore (100 x factor score subtotal/maximum score subtotal) 61

	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	1	1	1	3

Subscore (100 x factor score/3) 33

3. Ground-water migration

	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	0	8	0	24
		Subtotals	76	114

Subscore (100 x factor score subtotal/maximum score subtotal) 67

C. Highest pathway subscore
Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 67

V. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	47
Waste Characteristics	54
Pathways	67
Total 168 divided by 3 =	56
	Gross Total Score

B. Apply factor for waste contaminant from waste management practices
Gross Total Score x Waste Management Practices Factor = Final Score

56 x 1.0 = 56

HAZARDOUS ASSESSMENT RATING FORM

e of Site Site No. 5, Storm Drain at Outfall "Q"

ation Storm Drain at Outfall "Q", west of Building 4011

e of Operation or Occurrence 1939-present

er/Operator MS ANG at Key Field, Meridian, MS

ments/Description The storm drainage outfall and ditch

e Rated By Automated Sciences Group, Inc.

RECEPTORS

ing Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Population within 1,000 feet of site	3	4	12	12
Distance to nearest water well	3	10	30	30
Land use/zoning within 1-mile radius	2	3	6	9
Distance to installation boundary	3	6	18	18
Critical environments within 1-mile radius of site	0	10	0	30
Water quality of nearest surface-water body	1	6	6	18
Ground-water use of uppermost aquifer	1	9	9	27
Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
Population served by ground-water supply within 3 miles of site	2	6	12	18
Subtotals			93	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 52

WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

80 x 0.9 = 72

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

72 x 1.0 = 72

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: Surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-Water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface-water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	2	8	16	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	24
Subtotals			82	108

Subscore (100 x factor score subtotal/maximum score subtotal) 76

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding	1	1	1	3

Subscore (100 x factor score/3) 33

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	0	8	0	24
Subtotals			76	114

Subscore (100 x factor score subtotal/maximum score subtotal) 67

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	72
Pathways	80

Total 204 divided by 3 = 68
Gross Total Score

B. Apply factor for waste contaminant from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

68 x 1.0 = 68

HAZARDOUS ASSESSMENT RATING FORM

Name of Site Site No. 6, Storm Drain at Outfall "U"
Location Storm Drain at Outfall "U", southeast of Building 503
Date of Operation or Occurrence 1939-present
Owner/Operator MS ANG at Key Field, Meridian, MS
Comments/Description The storm drainage outfall and ditch
Site Rated By Automated Sciences Group, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest water well	3	10	30	30
C. Land use/zoning within 1-mile radius	2	3	6	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1-mile radius of site	0	10	0	30
F. Water quality of nearest surface-water body	1	6	6	18
G. Ground-water use of uppermost aquifer	1	9	9	27
H. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	2	6	12	18
Subtotals			93	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

80 x 0.9 = 72

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

72 x 1.0 = 72

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 80

B. Rate the migration potential for 3 potential pathways: Surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-Water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface-water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	2	8	16	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	24
Subtotals			82	108

Subscore (100 x factor score subtotal/maximum score subtotal) 76

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	1	1	1	3

Subscore (100 x factor score/3) 33

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	2	8	16	24
Direct access to ground water	0	8	0	24
Subtotals			76	114

Subscore (100 x factor score subtotal/maximum score subtotal) 67

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 52

Waste Characteristics 72

Pathways 80

Total 204 divided by 3 = 68

Gross Total Score

B. Apply factor for waste contaminant from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score 68 x 1.0 = 68

HAZARDOUS ASSESSMENT RATING FORM

Name of Site Site No. 7, Chemical Decontamination Agent Burial Site
Location North of instrument runway and west of Army depot
Date of Operation or Occurrence One event in 1975
Owner/Operator MS ANG at Key Field, Meridian, MS
Comments/Description Chemical decontamination agent buried
Site Rated By Automated Sciences Group, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest water well	3	10	30	30
C. Land use/zoning within 1-mile radius	2	3	6	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1-mile radius of site	0	10	0	30
F. Water quality of nearest surface-water body	1	6	6	18
G. Ground-water use of uppermost aquifer	1	9	9	27
H. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	2	6	12	18
Subtotals			89	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 49

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 0

B. Rate the migration potential for 3 potential pathways: Surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-Water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface-water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	24
		Subtotals	66	108

Subscore (100 x factor score subtotal/maximum score subtotal) 61

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	1	1	1	3

Subscore (100 x factor score/3) 33

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	0	8	0	24
		Subtotals	68	114

Subscore (100 x factor score subtotal/maximum score subtotal) 60

C. Highest pathway subscore
Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 61

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 49
Waste Characteristics 48
Pathways 61
Total 158 divided by 3 = 53
Gross Total Score

B. Apply factor for waste contaminant from waste management practices
Gross Total Score x Waste Management Practices Factor = Final Score

53 x 1.0 = 53

HAZARDOUS ASSESSMENT RATING FORM

Name of Site Site No. 8, Outside Vehicle Maintenance Area No. 1

Location Outdoor vehicle maintenance area, west side of 7th Ave. between Bldgs. 3301 and 401

Date of Operation or Occurrence 1969-1975

Owner/Operator MS ANG at Key Field, Meridian, MS

Comments/Description Area is underneath oak tree

Site Rated By Automated Sciences Group, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest water well	3	10	30	30
C. Land use/zoning within 1-mile radius	2	3	6	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1-mile radius of site	0	10	0	30
F. Water quality of nearest surface-water body	1	6	6	18
G. Ground-water use of uppermost aquifer	1	9	9	27
H. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	2	6	12	18
Subtotals			93	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

60 x 0.9 = 54

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

54 x 1.0 = 54

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 0

B. Rate the migration potential for 3 potential pathways: Surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-Water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface-water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	24
		Subtotals	66	108

Subscore (100 x factor score subtotal/maximum score subtotal) 61

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	1	1	1	3

Subscore (100 x factor score/3) 33

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	0	8	0	24
		Subtotals	68	114

Subscore (100 x factor score subtotal/maximum score subtotal) 60

C. Highest pathway subscore
Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 61

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors 52
Waste Characteristics 54
Pathways 61
Total 167 divided by 3 = 56
Gross Total Score

B. Apply factor for waste contaminant from waste management practices
Gross Total Score x Waste Management Practices Factor = Final Score

56 x 1.0 = 56

HAZARDOUS ASSESSMENT RATING FORM

Name of Site Site No. 9, Outside Vehicle Maintenance Area No. 2

Location Outdoor vehicle maintenance area, open area east of Building 705 and south of Building 803

Date of Operation or Occurrence 1969-1975

Owner/Operator MS ANG at Key Field, Meridian, MS

Comments/Description Area is under northernmost pecan tree

Site Rated By Automated Sciences Group, Inc.

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	3	4	12	12
B. Distance to nearest water well	3	10	30	30
C. Land use/zoning within 1-mile radius	2	3	6	9
D. Distance to installation boundary	3	6	18	18
E. Critical environments within 1-mile radius of site	0	10	0	30
F. Water quality of nearest surface-water body	1	6	6	18
G. Ground-water use of uppermost aquifer	1	9	9	27
H. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	2	6	12	18
		Subtotals	93	180

Receptors subscore (100 x factor score subtotal/maximum score subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor

Factor Subscore A x Persistence Factor = Subscore B

60 x 0.9 = 54

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

54 x 1.0 = 54

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore 0

B. Rate the migration potential for 3 potential pathways: Surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-Water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface-water	3	8	24	24
Net precipitation	2	6	12	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	3	8	24	24
Subtotals			66	108

Subscore (100 x factor score subtotal/maximum score subtotal) 61

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding	1	1	1	3

Subscore (100 x factor score/3) 33

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	3	8	24	24
Net precipitation	2	6	12	18
Soil permeability	3	8	24	24
Subsurface flows	1	8	8	24
Direct access to ground water	0	8	0	24
Subtotals			68	114

Subscore (100 x factor score subtotal/maximum score subtotal) 60

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore 61

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	54
Pathways	61

Total 167 divided by 3 = 56
Gross Total Score

B. Apply factor for waste contaminant from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

56 x 1.0 = 56

Mississippi Air National Guard

186th Tactical Reconnaissance Group (TRG)

Key Field

Meridian, Mississippi

USAF Hazard Assessment Rating Methodology

Rating Factor Criteria

The following is a summary and explanation of the rating factor criteria used to score the Base sites under HARM. The majority of the factors in the receptors and pathway categories are the same for each of the rated sites and are therefore stated only once. In those instances where a rating factor varies according to a specific site, the factor is addressed separately for each of the respective sites.

I. RECEPTORS

A. Population Within 1000 Feet of Site - Factor Rating 3 for Sites No. 1, 5, 6, and 8. Including the Base population, there are greater than 100 persons within 1000 feet of each of these rated sites. Factor Rating 1 for Sites No. 2-4. There are estimated to be 1 to 25 people within 1000 feet of these sites. Factor Rating 2 for Site No. 7. There are an estimated 26 to 100 people within 1000 feet of this site.

B. Distance to Nearest Well - Factor Rating 3. According to well records for Lauderdale County, there is a private domestic well within 1000 feet of each site.

C. Land Use/Zoning (Within One Mile Radius) - Factor Rating 2. A majority of the land use within a one mile radius of the Base is commercial/industrial.

D. Distance to Installation Boundary - Factor Rating 3. All the rated sites are within 1000 feet of the Base boundaries.

E. Critical Environments (Within One Mile Radius of Site) - Factor Rating 0. No critical environments exist within a one mile radius of any of the sites.

F. Water Quality/Use Designation of Nearest Surface Water Body - Factor Rating 1. The nearest surface water bodies in the vicinity of the Base are used for the propagation and management of fish.

G. Ground-water Use of Uppermost Aquifer - Factor Rating 1. The uppermost aquifer is used primarily for commercial, industrial, or irrigation purposes.

H. Population Served by Surface Water Supplies Within 3 Miles Downstream of the Site - Factor Rating 0. There was no evidence to indicate that the surface waters within 3 miles downstream of the Base are used as drinking water sources by any person.

I. Population Served by Aquifer Supplies Within 3 Miles of the Site - Factor Rating 2. Although the local municipality supplies most of the drinking water in the vicinity of the Base, there is no evidence to indicate that a population greater than 1000 is being served by ground water from domestic wells.

II. WASTE CHARACTERISTICS

Site No.1:

- A-1: Hazardous Waste Quantity - Factor Rating M. It was estimated that up to 2250 gallons of waste may have infiltrated into the ground over the 5-year time period that this site was in use.

- A-2: Confidence Level - Factor Rating C. This is based on the knowledge of the known types of materials used at this site.

- A-3: Hazard Rating - Factor Rating H. The hazard rating at this site is based on JP-4 toxicity. JP-4 has a Sax toxicity of 3, which corresponds to a HARM hazard rating of 3.

Site No. 2:

- A-1: Hazardous Waste Quantity - Factor Rating L. It was estimated that up to 28,800 gallons of waste may have infiltrated into the ground over the 20-year time period that this site was in use.

- A-2: Confidence Level - Factor Rating C. See Site No. 1, Section A-2.

- A-3: Hazardous Rating - Factor Rating H. See Site No. 1, Section A-3.

Site No. 3:

- A-1: Hazardous Waste Quantity - Factor Rating M. It was estimated that up to 2400 gallons of waste may have infiltrated into the ground over the 8-year time period that this site was in use.

- A-2: Confidence Level - Factor Rating C. See Site No. 1, Section A-2.

- A-3: Hazard Rating - Factor Rating H. See Site No. 1, Section A-3.

Site No. 4:

- A-1: Hazardous Waste Quantity - Factor Rating S. It was estimated that up to 990 gallons of waste may have infiltrated into the ground at this site over the 11-year time period that this site was in use.

- A-2: Confidence Level - Factor Rating C. See Site No. 1, Section A-2.

- A-3: Hazardous Rating - Factor Rating H. See Site No. 1, Section A-3.

Site No. 5:

- A-1: Hazardous Waste Quantity - Factor Rating M. It is estimated that the quantity of waste that may have infiltrated into the ground at this site over the 49-year time period is in the moderate category.

- A-2: Confidence Level - Factor Rating C. See Site No. 1, Section A-2.

- A-3: Hazardous Rating - Factor Rating H. See Site 1, Section A-3.

Site No. 6:

- A-1: Hazardous Waste Quality - Factor Rating M. The quantity of waste estimated to have infiltrated into the ground at this site was considered to be in the moderate category over the 49-year time period that this site was in use.

- A-2: Confidence Level - Factor Rating C. See Site No. 1, Section A-2.

- A-3: Hazard Rating - Factor Rating H. The hazard rating at this site is based on carbon remover, which has a flash point less than 80°F. This corresponds to a Sax ignitability of 3; thus, it has a HARM hazard rating of 3. The Base uses an estimated 5000 pounds of carbon remover per year.

Site No. 7:

- A-1: Hazardous Waste Quantity - Factor Rating S. Information concerning the type of operation done in this area indicates that approximately 110 gallons of waste were disposed of in a one-time event at this site.

- A-2: Confidence Level - Factor Rating C. See Site No. 1, Section A-2.

- A-3: Hazard Rating - Factor Rating H. A HARM rating of 3 was applied to this site since interview information indicated that the chemical decontamination agent disposed of in this area had a Sax toxicity rating of 3.

Site No. 8:

- A-1: Hazardous Waste Quantity - Factor Rating S. It is estimated that the quantity of contaminants present at this site is approximately 900 gallons of waste disposed of in the 6-year time period that this site was in use.

- A-2: Confidence Level - Factor Rating C. This rating is based on the known types of waste generated at this site.

- A-3: Hazardous Rating - Factor Rating H. Oil and/or grease and JP-4 are the suspected contaminants. See Site No. 1, Section A-3.

Site No. 9

- A-1: Hazardous Waste Quantity - Factor Rating S. It is estimated that the quantity of contaminants present at this site is approximately 480 gallons of waste disposed of in the 6-year time period that this site was in use.

- A-2: Confidence Level - Factor Rating C. This rating is based on the known types of waste generated at this site.

- A-3: Hazardous Rating - Factor Rating H. Oil and/or grease and JP-4 are the suspected contaminants. See Site No. 1, Section A-3.

For All HARM Rated Sites:

A. Persistence Multiplier - Factor Rating 0.9 for Sites No 1-6 and 8. JP-4 falls within the category of substituted and other ring compounds. Factor Rating 0.8 for Site No. 7. The main constituent of the chemical decontamination agent at this site is a straight chain hydrocarbon.

B. Physical State Multiplier - Factor Rating 1.0. The materials released at each site were in a liquid state.

III. PATHWAYS CATEGORY

A. Evidence of Contamination.

Sites No. 1-4, 7, and 8: Factor Rating 0 - No Evidence. There is no direct or indirect evidence that contaminants are migrating from these sites.

Sites No. 5 and 6: Factor Rating 80 - Indirect Evidence. There was visible evidence of ground staining at each of these sites.

B-1. Potential for Surface Water Contamination.

- Distances to Nearest Surface Water (Including Drainage Ditches and Storm Sewers) - Factor Rating 3. Each of the identified sites on the Base are within 500 feet of surface water.

- Net Precipitation - Factor Rating 2. Net precipitation at this Base is +5 to +20 inches per year.

- Soil Erosion:

  Sites No. 5 and 6 - Factor Rating 2. There were visible signs of moderate erosion at these sites.

  For Sites No. 1-4, 7, and 8 - Factor Rating 0. Sites No. 1 and 7 have been graded so that the surface of contaminated material, if it exists, would be covered by graded fill. Sites No. 2-4 and Site No. 8 showed no signs whatsoever of erosion.

- Surface Permeability - Factor Rating 1. All of these sites are located in soils that generally have 15 to 30% clay content. Sites No. 5 and 6 have a very short concrete sluice exiting the headwall, but the rest of the drainage ditches are unlined.

- Rainfall Intensity Based on One-Year, 24-Hour Rainfall - Factor Rating 3. The one-year, 24-hour rainfall value is greater than 3.0 inches.

B-2. Potential for Flooding - Factor Rating 1. According to the Flood Insurance Rate Map (FIRM) for the National Flood Insurance Program, the Base does lie within a 100-year floodplain.

B-3. Potential for Ground-water Contaminations.

- Depth to Ground Water - Factor Rating 3. Base records and past excavations on the Base indicate a shallow water table of less than 10 feet in most places under the Base.

- Net Precipitation - Factor Rating 2. See B-1.

- Soil Permeability - Factor Rating 3. The average clay content in the soil is less that 15%.

- Subsurface Flows:

  Sites No. 1-3, 7, and 8 - Factor Rating 1. These sites may occasionally become submerged.

  Sites No. 4-6 - Factor Rating 2. These sites may become submerged quite frequently.

- Direct Access to Ground Water - Factor Rating 0. There is no evidence of direct access to ground water at any of the sites.

APPENDIX E

UNDERGROUND STORAGE TANK LISTING
186th TRG, MSANG, KEY FIELD
MERIDIAN, MISSISSIPPI

Underground Storage Tank Listing

186th TRG, MSANG, Key Field, Meridian, Mississippi

Building or Facility Served	Capacity (gallons)	Years in Ground	Contents	Construction Material
103	250*	13	Waste Oils	Steel
104	450*	2	Purge Oils	Steel**
200	50*	2	Waste Oils	
4011	700*	14	Waste Oils	
POL	7500*	2	Waste POL	Steel**
330-1	8500	23	MOGAS	Steel

*This UST is associated with an Oil/Water Seperator.

**This UST has a passive cathodic protection system.

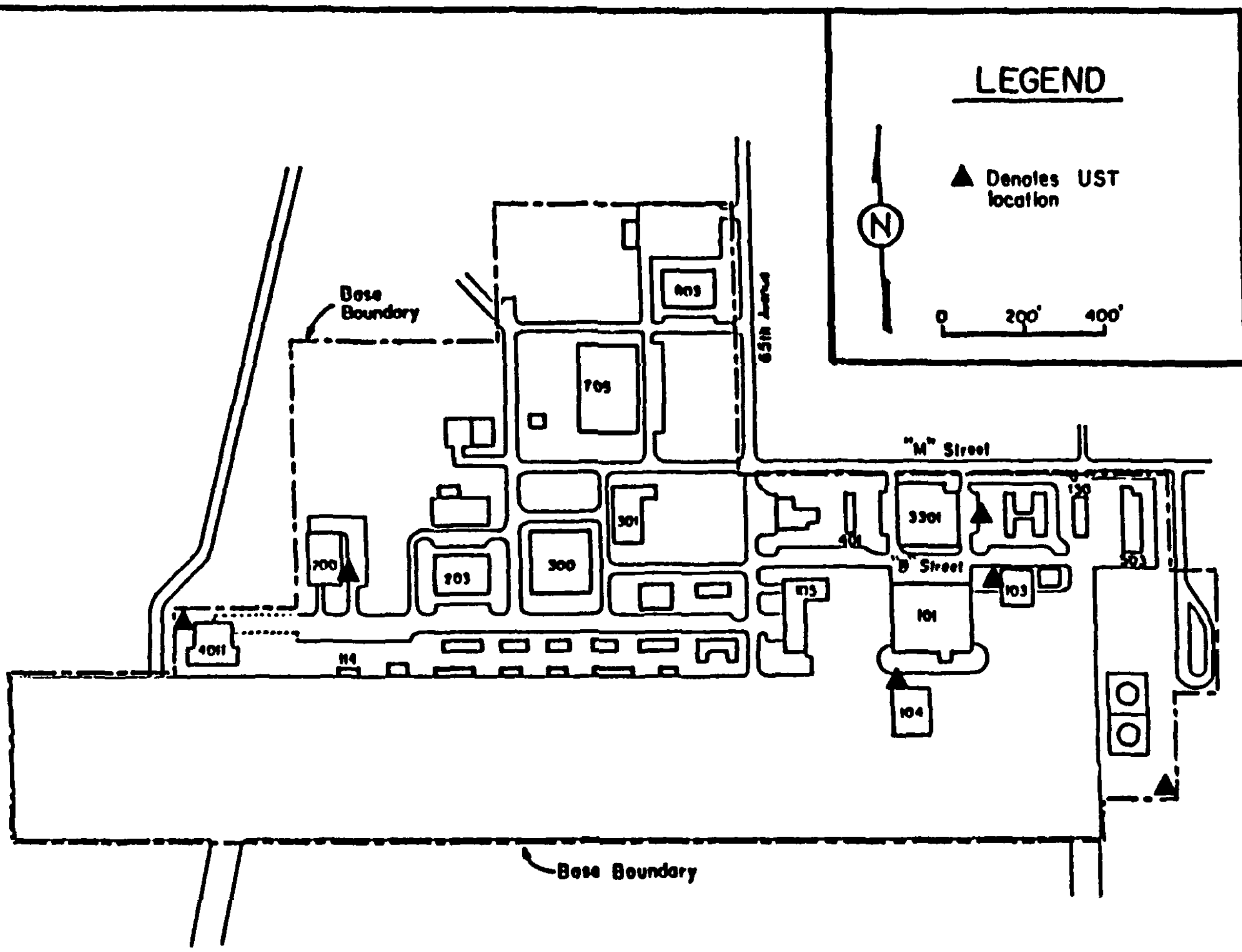

FIGURE BY
AUTOMATED SCIENCES GROUP, INC.

Figure 9. Locations of Underground Storage Tanks, 186th TRG,MSANG, Key Field, Meridian,Mississippi (1988).

APPENDIX F

SOIL DATA SPECIFIC TO THE 186th TRG, MSANG, KEY FIELD MERIDIAN, MISSISSIPPI

Soil Data Specific to the 186th TRG, MSANG, at Key Field, Meridian, Mississippi

Soil Borings were conducted at the Base in preparation for construction of a proposed Squadron Operations Building to be located at the southwest corner of "B" Street and 65th Avenue. Borings were advanced with a continuous flight auger. Auger cuttings of the soil were collected and stored in sealed sample containers for lab testing and classification. Standard penetration resistance values were obtained according to ASTM D-1586. Water level measurements were recorded when water was encountered. Laboratory tests included Atterberg limits, in situ moisture contents, grain size analyses, and visual classification (using USCS[1]).

Atterberg limits were run in an effort to estimate the susceptibility of the various soils encountered to shrink and swell with changes in moisture content. Liquid and plastic limits were run on selected samples from the various materials encountered (ASTM D-423 and ASTM D-424). The liquid limit is the moisture content at which a soil ceases to have the characteristics of a liquid, whereas the plastic limit is the moisture content at which a soil changes from a solid to a plastic state. The plasticity index is the numerical difference between the liquid limit and the plastic limit and is indicative of the relative activity of a cohesive soil.

Grain size analyses (ASTM D-422-63) were conducted on representative samples of the various soils encountered to determine the particle size distribution of materials comprising the strata. Results of these tests were utilized in classifying the soils in accordance with the unified soil classification system.

To aid in the general interpretation of the soil conditions at this site, in situ moisture contents were determined for the various soils encountered. This determination was made possible by placing extracted samples in sealed containers immediately upon removal from each strata. The results of these and other tests are recorded on the attached boring logs.

As depicted in the boring logs, the soil profile generally consists of intermittent stratas of clay (CL, CH)[2], silty clay (CL, CH) and sandy clay (CH). All of the selected soils samples had plasticity indices that ranged from 23 to 30. Standard penetration resistance values obtained within these soils ranged from 5 to 13 blows per foot. These materials extended to depths of 14 feet in Boring (1) and to 7.0 to 10.5 feet in Borings (2) through (5). At these depths a water bearing clayey sand (SM) was encountered that ranged in thickness from 2.5 feet in Boring (1), 6.5 feet in Borings (4) and (5), and 10 feet in Boring (3). These water-bearing sands were superimposed on a strata of very hard clayey silt (MH-CH) locally referred to as the Wilcox Formation.[3] This Wilcox was encountered in all borings except Boring (2) where the water bearing sand extended to the termination of the boring at the 20 foot depth.

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[1]Unified Soil Classification System.

[2]Abbreviations are according to the Unified Soil Classification System.

[3]This is probably part of the Hatchetigbee Formation that forms the upper portion of the Wilcox Group.

PROJECT:	Proposed Squadron Operations Building Key Field Ang, Meridian, MS	BORING NO.	1
FOR:	Allen & Hoshall - Engs./Archs. ATTENTION: Mr. Albert F. Usry, AIA	LAB. NO.	1088-86
		DATE :	6-10-86
		TECH:	DP/KR/TJ

AUGER SAMPLE — UNDISTURBED SAMPLE — STANDARD PENETRATION TEST

DEPTH FEET	SAMPLES	Description	Field Moist. %	LL %	PI %	Comp. Tst KSF	Std. Pen.
0		6" Topsoil					
		Gray CLAY - (CL) Medium Stiff	21	41	23		
5		Gray Silty CLAY - w/Yellow Clay Lense - (CH) Medium Stiff to Stiff	25	52	30		
		Yellow & Gray CLAY - (CH) Stiff	30	62	36		
10		Gray Silty CLAY - (CH) Stiff Hit Water @ 14'	31				
15		Yellow Brown Water Bearing Clayey SAND - (SM)	35		NP		
		Dark Gray Fine Sandy Clayey SILT - (MH) ("WILCOX") Very Stiff	34				
20							
25							
30							
35							

DEPTH TO WATER TABLE AFTER 4 HOURS = 6.5'

ELEVATION OF GROUND SURFACE = ____ BORING TERMINATED @ 20 FEET

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PROJECT:	Proposed Squadron Operations Building Key Field Ang, Meridian, MS	BORING NO.	2
		LAB. NO.	1088-86
FOR:	Allen & Hoshall -Engs./Archs.	DATE :	6-10-86
	ATTENTION: Mr. Albert F. Usry, AIA	TECH:	DP/KR/TJ

▨ AUGER SAMPLE
■ UNDISTURBED SAMPLE
☒ STANDARD PENETRATION TEST

DEPTH FEET	SAMPLES	Description	Field Moist. %	LL %	PI %	Comp.Tst KSF	Std.Pen.
0		3" Topsoil					
		Gray, Yellow Brown & Red Silty CLAY - (CL-CH) Medium Stiff	21				
5		Gray Fine Sandy Silty CLAY - (CL) Stiff	22				
		Yellow Brown & Gray Clayey Water Bearing SAND - (SM) Loose 7 - 13' Loose to Medium Dense 13-20' Hit Water @ 7'			NP		
10							
15							
20							
25							
30							
35							

DEPTH TO WATER TABLE AFTER 1 HOURS = 4.8'

ELEVATION OF GROUND SURFACE = ____ BORING TERMINATED @ 20 FEET

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Key Field Ang, Meridian, MS

FOR: Allen & Hoshall Engs./Archs.
ATTENTION: Mr. Albert F. Usry, AIA

BORING NO. 3
LAB. NO. 1088-86
DATE : 6-10-86
TECH: DP/KR/TJ

AUGER SAMPLE | UNDISTURBED SAMPLE | ⊠ STANDARD PENETRATION TEST

Depth (Feet)	Samples	Description	Field Moist. %	LL %	PI %	Comp. Tst TSF	Std. Pen.
0		Topsoil					
		Light Gray & Reddish Brown Silty CLAY - (CL) Med. Stiff					
	⊠	Reddish Brown & Gray Silty Sandy CLAY - (CL) Medium Stiff	24				5
			17	43	25		
5	⊠						13
		Gray Silty Clayey SAND - (SM) Medium Dense Became Water Bearing & Loose @ 7½'			NP		
10	⊠	Yellow Brown Medium Coarse Water Bearing Clayey SAND - (SM) Loose to Medium Dense Light Gray Silty Clay Lense 10 - 11'	28				10
15	⊠						8
20	⊠	Dark Gray Fine Sandy Clayey SILT - (MH-CH) Very Stiff "WILCOX"	44				19
25							
30							
35							

DEPTH TO WATER TABLE AFTER 1½ HOURS = 5.1'

ELEVATION OF GROUND SURFACE = ____ BORING TERMINATED @ 20 FEET

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Key Field Ang, Meridian, MS
FOR: Allen & Hoshall Engs./Archs.
ATTENTION: Mr. Albert F. Usry, AIA

BORING NO. 4
LAB. NO. 1088-86
DATE: 6-10-86
TECH: DP/KR/TJ

AUGER SAMPLE — UNDISTURBED SAMPLE — STANDARD PENETRATION TEST

DEPTH FEET	SAMPLES	Description	Field Moist. %	LL %	PI %	Comp. Tsf LSF	Std. Pen.
0		2" Asph. Surface, 4" Clay Gravel Base, 6" Yellow Sand Subbase (SM)	11		NP		
5		Gray & Reddish Brown Fine Sandy CLAY - (CH) Medium Stiff 1' - 5½'	20				
		Stiff 5½' - 10½'	17				
10		Hit Water @ 10½'					
		Yellow Brown Medium Coarse Water Bearing Clayey SAND - (SM)			NP		
15							
		Dark Gray Very Sandy Clayey SILT - (ML-MH) Stiff	33				
20							
25							
30							
35							

DEPTH TO WATER TABLE AFTER ¼ HOURS = 7.0'

ELEVATION OF GROUND SURFACE = ____ BORING TERMINATED @ 20 FEET

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PROJECT: Proposed Squadron Operations Building
Key Field Ang, Meridian, MS

FOR: Allen & Hoshall Engs./Archs.
ATTENTION: Mr. Albert F. Usry, AIA

BORING NO. 5
LAB. NO. 1088-86
DATE : 6-10-86
TECH: DP/KR/TJ

AUGER SAMPLE / UNDISTURBED SAMPLE / ☒ STANDARD PENETRATION TEST

DEPTH FEET	SAMPLES	Description	Field Moist.%	LL %	PI %	Comp.Tst KSF	Std.Pen.
0		2" Asph. Surf., 4" CL GR Base, 4" Red & Yellow Silty SAND Subbase (SM)			NP		
		Gray & Yellow Brown CLAY - (CH) Stiff	21	51	30		
5	☒						13
		Gray Fine Sandy Silty CLAY - (CL) Stiff	22	44	25		
w							
10	☒	Yellow Brown & Gray Water Bearing Clayey SAND - (SM) Loose	27		NP		7
		Hit Water @ 7½					
15	☒		34	60	30		33
		Dark Gray Fine Sandy Clayey SILT - (MH-CH) "WILCOX" Hard	31				
20	☒		33				54
25							
30							
35							

DEPTH TO WATER TABLE AFTER 3½ HOURS = 5.8'

ELEVATION OF GROUND SURFACE = ____ BORING TERMINATED @ 20 FEET

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