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**PHASE I**  
**ENVIRONMENTAL SITE ASSESSMENT**



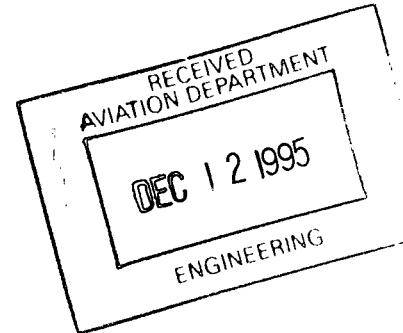
for the

**RICHARDS-GEBAUR MEMORIAL AIRPORT**  
**55-ACRE TRACT**  
**(INCLUDES RIFLE RANGE, SKEET RANGE & LANDFILL)**  
**KANSAS CITY, MISSOURI**

prepared for

**THE CITY OF KANSAS CITY, MISSOURI**  
**AVIATION DEPARTMENT**  
**KANSAS CITY, MISSOURI**

**CAMERA COPY**



**PSI PROJECT NUMBER 5985E110**

**October 30, 1995**

*Information To Build On*

## TABLE OF CONTENTS

	PAGE
SUMMARY .....	1
INTRODUCTION .....	3
Purpose And Scope .....	3
Authorization.....	3
Access .....	3
Information Provided by Client .....	3
Warranty.....	5
Limitations and Exceptions of Assessment.....	5
Unidentifiable Conditions .....	5
Use By Third Parties .....	6
SITE DESCRIPTION .....	7
Location .....	7
Legal Description .....	7
Vicinity Characteristics.....	7
Subject Site Description .....	7
Subject Site Use .....	7
Adjoining Property Use .....	8
Site Map.....	8
RECORDS REVIEW.....	10
Standard Federal and State Environmental Record Sources.....	10
Findings From Lists .....	10
Additional Local Records .....	13
Physical Setting Sources.....	13
Client Provided Information .....	14
HISTORICAL USE INFORMATION .....	18
Aerial Photograph Review.....	18
City Directory.....	19
RECONNAISSANCE AND INTERVIEWS .....	20
Interviews.....	20
On-Site Reconnaissance .....	20
Off-Site Reconnaissance.....	25

FINDINGS AND CONCLUSIONS .....	26
Phase I Site Assessment .....	26
Recommendations .....	27

## APPENDIX

- A. Maps
- B. Ownership and Historical Documents
- C. Regulatory Documentation
- D. Client Provided Information
- E. Reconnaissance Photographs
- F. Asbestos Analytical Results
- G. Author Credentials

## SUMMARY

Professional Service Industries has performed a Phase I Environmental Site Assessment in general accordance with the scope and limitations of ASTM E 1527-94 for the subject parcel located on the Richards-Gebaur Memorial Airport in Kansas City, Jackson County, Missouri. The 55-acre tract is located on the northeast area of the airport and incorporates vacant grass land, a rifle range (Buildings 1048, 1049, 1050 and a trailer), a skeet range (Building 1056), and a landfill. Any exceptions to, or deletions from, this standard of practice are described in the report.

This assessment has revealed evidence of recognized environmental conditions in connection with the site, including:

The Small Arms Range is classified by the Air Force as Category 3 which is defined as "areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, but at concentrations that do not require a removal or remedial action."

The Small Arms Range has also been classified by the Air Force as Category 7. Category 7 properties are defined as areas that are unevaluated or require additional evaluation.

Facilities 1048, 1049 and 1050 comprise the Small Arms Range. According to the Air Force, this range will be cleared of unexploded ordnance. The Small Arms Range was studied in a Phase II project (Firing Range Site Phase II, 1993). The report concluded that lead levels in site soils are above background levels but below levels requiring remedial action.

The northeast landfill, located east of the Small Arms Range, was used for the disposal of miscellaneous wastes including building rubble, yard debris and wastes from some industrial shop areas. Waste paints, thinners, strippers, oils, and fuels were reportedly poured into the trenches along with shop waste and demolition debris from base operations and burned for disposal. Dates of operation were 1961 through 1972. Empty drums, fuel tanks, mower and maintenance parts, and some demolition debris were observed during a site visit conducted by CDM Federal in October 1994.

Five monitoring wells were installed by E & E, Inc., during a 1986 investigation in the area of the northeast landfill. Soil and groundwater samples collected and analyzed revealed that fluoride, chloride, nitrate, bromide, and sulfate, were reported above detectable limits. Sulfate was reported at 280 mg/L which exceeds the EPA secondary drinking water standard of 250 mg/L. Total dissolved solid values for the monitoring wells ranged from 380 to 940 mg/L which is up to two times greater than the background range (250 to 470 mg/L). One of E & E's soil samples contained petroleum hydrocarbons at 440 mg/kg. Concentrations of lead in many of the soil samples exceeded the range that is considered normal for soils in Jackson and Cass Counties.

Located throughout the site was evidence of chemical containers. Evidence of tires, clay pigeons and shotgun shells were observed at the skeet range. Evidence of cable, piping, tanks, drums, equipment, and building materials were observed to be discarded on the property near the landfill. During the reconnaissance, PSI observed members of the Aviation Department collecting the discarded debris from the east area of the site placing the trash into a large dumpster. According to Mr. Malecki the discarded materials identified will be removed and disposed of properly.

Evidence of scrap metals and associated petroleum fluids were identified in the area of the railroad car dismantling project. Evidence of soil staining and stressed vegetation in this area was observed. According to Mr. Malecki, the cars are being dismantled by an independent contractor. The Aviation Department is currently attempting to coordinate the cleanup of this area with the appropriate individuals.

Indications of fill soil were observed on the property associated with the rifle range. A large soil berm was placed on the northeast area of the rifle range to capture rounds of ammunition. Fill soils were also observed in the area of the landfill. The fill soils were used to cap or cover the contents in the landfill.

Suspect asbestos-containing materials located at the firing range consisted of two types of linoleum located within the on-site trailer. Suspect materials located within the north building consisted of three types of floor tiles and roofing materials. Suspect materials located within a small cinderblock building consisted of roofing shingles. Suspect materials located at the skeet range consisted of three types of ceiling panels, floor tile, and roofing materials. Located along the east area of the landfill, amongst the discarded debris, was a pile of thermally wrapped piping. Suspect ACBM consisted of the mudded joint packing (MJP) located on the elbows of the piping. The pipe line was thermally wrapped with non-suspect fiberglass and sheetmetal. Laboratory analysis confirmed that the MJP contained 25% asbestos. On October 11, 1995, PSI was informed by Mr. Dennis Wilmsmeyer that additional suspect ACBM was discovered by personnel in the area of the discarded debris by the landfill. On October 12, 1995, PSI revisited the site and collected additional samples of suspect transite drain tile and siding. Laboratory analysis confirmed that the drain tile and siding piping contained asbestos.

This Summary is not to be used alone. The report must be read in its entirety.

## **INTRODUCTION**

### **PURPOSE AND SCOPE**

This Phase I Environmental Site Assessment (ESA) was performed to identify, to the extent feasible, recognized environmental conditions in connection with the site. The protocol utilized for this assessment is in general accordance with the requirements of ASTM Standard E 1527-94.

The site assessment included four components: Records Review, Site Reconnaissance, Interviews and Report Preparation. The purpose of the records review is to obtain and review records that will help identify recognized environmental conditions in connection with the site. The objective of the site reconnaissance is to obtain information indicating the likelihood of identifying recognized environmental conditions in connection with the site. The objective of the interviews is to obtain additional information indicating recognized environmental conditions in connection with the site. The report includes documentation to support the analysis, opinions and conclusions as presented.

### **AUTHORIZATION**

Authorization to perform this assessment was given verbally by Mr. Dennis Wilmsmeyer, Airport Planner with the City of Kansas City, Missouri, Aviation Department. A proposal was prepared by PSI (Proposal No. 598116, dated September 22, 1995) and a Purchase Order was issued for the project in accordance with the Annual Environmental Services Contract, Number PA2869, dated January 4, 1994, between the City of Kansas City, Missouri, and PSI.

### **ACCESS**

Field reconnaissance was performed on September 26, 1995. Instructions as to the location of the subject site, access, and an explanation of the subject site and facilities to be assessed were provided by Mr. Dave Malecki and Mr. Dennis Wilmsmeyer, of the City of Kansas City, Missouri, Aviation Department.

### **INFORMATION PROVIDED BY CLIENT**

The following site information was provided to PSI by Mr. Malecki and Mr. Wilmsmeyer with the Aviation Department or Mr. Mark Esch with the Air Force Base Conversion Agency.

ITEM	PROVIDED BY CLIENT	NOT PROVIDED BY CLIENT	DISCUSSED BELOW	DOES NOT APPLY
Environmental Questionnaire and Disclosure Statement			X	
Site Plan	X		X	
Legal Description		X		
Chain of Title		X		
Identification of Key Site Manager	X		X	
Letter of Access		X		
Environmental Liens		X		
Specialized Knowledge	X		X	

### **Environmental Questionnaire and Disclosure Statement**

A copy of the questionnaire was provided to Mr. Wilmsmeyer which was then forwarded to Mr. Mark Esch of the U.S. Air Force Base Conversion Agency. The questionnaire was not completed and returned to PSI by the date of this report.

### **Site Plan**

A Site Plan was provided to PSI by Mr. Malecki. A copy of the map, as provided to PSI, is included in Appendix A.

### **Identification of Key Site Manager**

The Key Site Manager was identified as Mr. Dave Malecki of the City of Kansas City, Missouri, Aviation Department. The Key Site Manager's contact address is 15405 Maxwell Road, Kansas City, Missouri and the contact telephone number is (816) 322-0001.

Information provided by the client has been incorporated into the body of the report and copies are included in the Appendix.

### **Specialized Knowledge**

Additional information was provided to PSI by Mr. Dennis Wilmsmeyer and Mr. Mark Esch. This information is discussed in the Additional Local Records section.

## **WARRANTY**

### **Phase I Assessment**

PSI warrants that the findings and conclusions contained herein were accomplished in accordance with the methodologies set forth in the protocol. These methodologies are described by the standard as representing good commercial and customary practice for conducting an Environmental Site Assessment of a parcel of property for the purpose of identifying recognized environmental conditions. However, these findings and conclusions contain all of the limitations inherent in these methodologies which are referred to in the protocol and some of which are more specifically set forth below.

No other warranties are implied or expressed.

## **LIMITATIONS AND EXCEPTIONS OF ASSESSMENT**

Along with all the limitations set forth in various sections of the protocol, the accuracy and completeness of this report is necessarily limited by the following:

### **Chain Of Title**

Chain of Title was not provided by the client for review by PSI. According to the Basewide Environmental Baseline Survey Richards-Gebaur Air Force Base, Missouri report, the property is known to have been owned by either the City of Kansas City, Missouri, or the U.S. Air Force since 1941.

### **Vegetation**

Located throughout the subject site were areas of vegetation ranging from recently mowed to 4' to 6' in height. Visual observations were limited due to the overgrowth.

### **Richards-Gebaur Memorial Airport Reports**

There is a magnitude of information regarding the Richards-Gebaur Memorial Airport which exists at different governing agencies (i.e. Corps of Engineers, U.S. Air Force, U.S. EPA, MDNR, and the City of Kansas City, Missouri). This report is limited to the information made available at the time of this assessment.

## **UNIDENTIFIABLE CONDITIONS**

There is a possibility that even with proper application of these methodologies, there may exist on the subject site conditions that could not be identified within the scope of the assessment or which were not reasonably identifiable from the available information. PSI believes that the information obtained from the records review and the interviews concerning the site is reliable. However, PSI cannot and does not warrant or guarantee that the information provided by these other sources is

accurate or complete. The methodologies of this assessment are not intended to produce all inclusive or comprehensive results, but rather to provide the client with information regarding apparent suspicions of existing and potential adverse environmental conditions relating to the subject property.

### **USE BY THIRD PARTIES**

This report was prepared pursuant to the contract PSI has with the City of Kansas City, Missouri. That contractual relationship included an exchange of information about the subject site that was unique and between PSI and its client and serves as the basis upon which this report was prepared. Because of the importance of the communication between PSI and its client, reliance or any use of this report by anyone other than the City of Kansas City, Missouri, for whom it was prepared, is prohibited and therefore not foreseeable to PSI.

Reliance or use by any such third party without explicit authorization in the report does not make said third party a third party beneficiary to PSI's contract with the City of Kansas City, Missouri.

Any such unauthorized reliance on or use of this report, including any of its information or conclusions, will be at the third party's risk. For the same reasons, no warranties or representations, expressed or implied in this report, are made to any such third party.

## **SITE DESCRIPTION**

### **LOCATION**

The subject site is located on the Richards-Gebaur Memorial Airport, in Kansas City, Jackson County, Missouri. The 55-acre tract is located on the northeast area of the airport, south of Andrews Road.

### **LEGAL DESCRIPTION**

A copy of the legal description for the area of the rifle range was provided to PSI by Mr. Wilmsmeyer. A copy of the legal description is included in Appendix B.

### **VICINITY CHARACTERISTICS**

The subject site is located on the Richards-Gebaur Memorial Airport. The site is situated south of Andrews Road and west of the St. Louis-San Francisco Railroad. The adjacent properties to the north and south consist of vacant grass land.

### **SUBJECT SITE DESCRIPTION**

The subject site consists of vacant grass land along the north area of the subject site. The southwest area of the subject site consists of an abandoned rifle range. The south central portion of the site consists of an abandoned skeet range. The southeast area of the subject site consists of the former northeast landfill. A St. Louis-San Francisco Railroad spur divides the northern vacant grass land from the southern ranges and landfill.

#### **Utilities**

Utilities on the site consisted of:

Water Utility by the Kansas City Water Department,

Electrical services by Missouri Public Service;

### **SUBJECT SITE USE**

#### **Current Use**

The subject site is currently unoccupied.

#### **Past Use**

To the extent that indications of past uses of the site were visually or physically observed on the site visit, or were identified in the interviews or record review, they are identified below and described if

they are likely to have involved the use, treatment, storage, disposal or generation of hazardous substances or petroleum products.

Review of a 1967 aerial photograph revealed that the subject site appeared similar to current conditions. According to the Environmental Baseline Survey the airport was primary farmland prior to 1941.

## **ADJOINING PROPERTY USE**

### **Current Use**

The current use of adjoining properties was observed from the subject site as follows:

North - North of the subject site lies Andrews Road across which is vacant grass land. Located farther north, near the entrance to the airport from U.S. Highway 150, is a small commuter parking lot. Located north across U.S. Highway 150 are a United Missouri Bank, an As Is Recycle Center, and Frontier Bag Inc.

East - East of the subject site is the St. Louis-San Francisco Railroad across which is the Cotter & Company building. Cotter & Company specializes in hardware, paint, and related lines.

South - South of the subject site is vacant grass land. Located approximately 600 feet southwest is the former Richards-Gebaur Memorial Airport wastewater treatment facility.

West - West of the subject site is Andrews Road across which is vacant grass land. Located farther west, approximately 1000 feet, are several above-ground storage tanks.

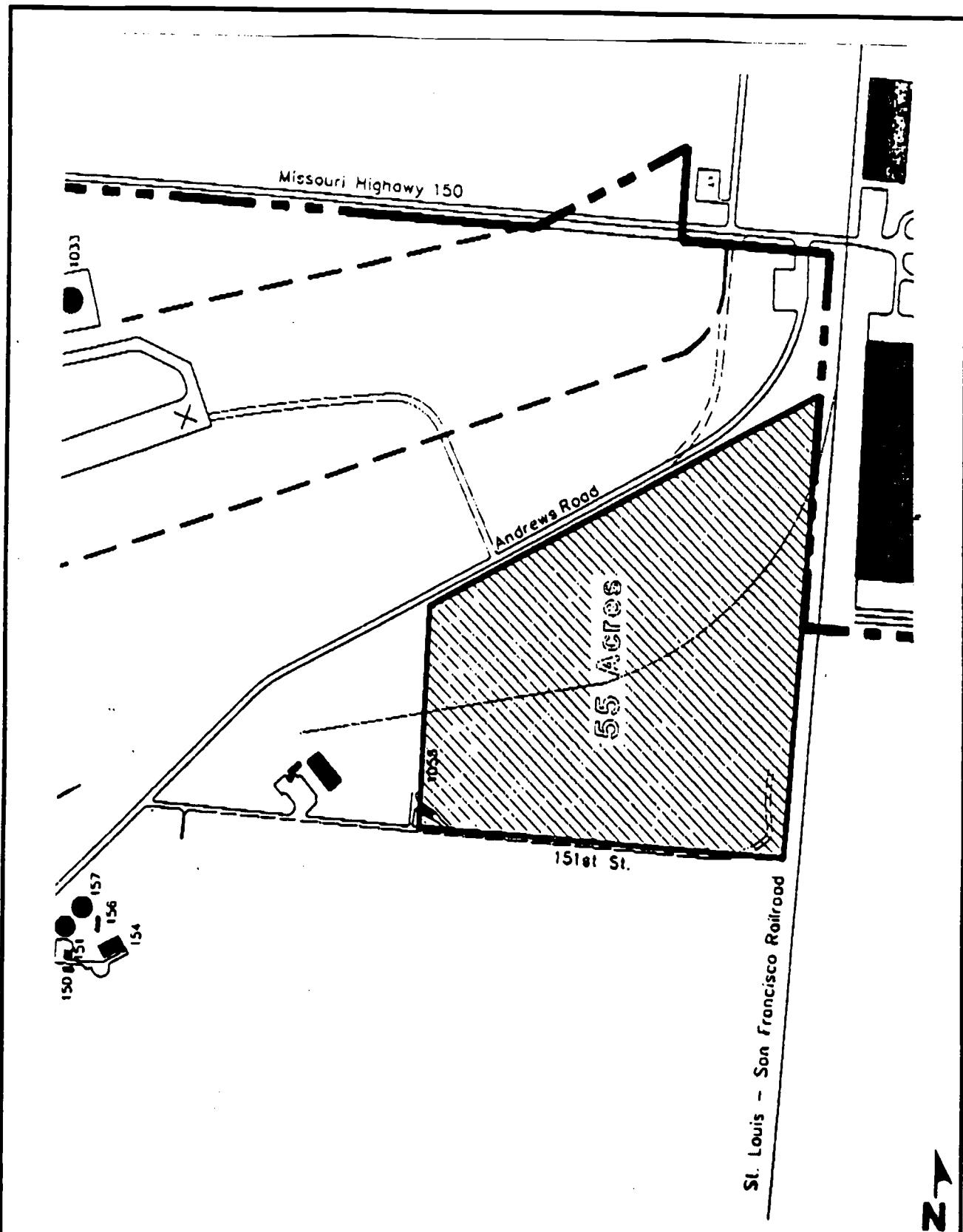
### **Past Use**

To the extent that indications of past uses of the adjoining sites were visually or physically observed on the site visit, or were identified in the interviews or record review, they are identified below and described if they are likely to have involved the use, treatment, storage, disposal or generation of hazardous substances or petroleum products.

No past usage of adjoining sites could be determined from visual observations.

## **SITE MAP**

A Client provided Site Map is included on the following page.



Site Name:

Richards-Gebaur Memorial Airport  
55-Acre Tract Along Andrews Road  
Kansas City, Missouri

CLIENT PROVIDED  
SITE MAP

Project No:

5985E110

Date:

10/30/95

## **RECORDS REVIEW**

### **STANDARD FEDERAL AND STATE ENVIRONMENTAL RECORD SOURCES**

Information from standard federal and state environmental record sources is provided through Environmental Data Resources, Inc. (EDR). The EDR reports were provided to PSI for use and inclusion in this report. Regulatory information from the following sources regarding possible recognized environmental conditions within the noted distance from the subject site was reviewed. Refer to Appendix C for a complete listing.

#### **Federal**

<u>List</u>	<u>Approximate Search Distance, Miles</u>
Federal NPL List	1.0
Federal CERCLIS List	0.5
Federal RCRA TSD Facilities List	1.0
Federal RCRA Generators List	Site and adjoining properties
Federal ERNS List	Site only

#### **State**

<u>List</u>	<u>Approximate Search Distance, Miles</u>
Missouri State SCL List	1.0
Missouri State SWLF List	0.5
Missouri State LUST List	0.5
Missouri State UST List	Property and adjoining properties

## **FINDINGS FROM LISTS**

### **Federal NPL Listing**

The National Priorities (Superfund) List is the EPA database of uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Superfund Program.

No NPL sites were listed within one mile of the subject site.

### **Federal CERCLIS Listing**

This list is a compilation of sites which the EPA has investigated or is currently investigating for a release or threatened release of hazardous substances.

The Richards-Gebaur Air Force Base is listed as a CERCLIS site. No additional information was obtainable from EDR.

### **Federal RCRA TSD Facilities Listing**

The EPA Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA TSD database is a compilation by the EPA of reporting facilities that transport, treat, store or dispose of hazardous waste.

No RCRA TSD facilities were listed within one mile of the subject site.

### **Federal RCRA Generators Listing**

The EPA Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Generators database is a compilation by the EPA of reporting facilities that generate hazardous waste.

No RCRA generators were listed on or adjacent to the subject site.

### **Federal Emergency Response Notification System (ERNS)**

The Emergency Response Notification System (ERNS) is a national database used to collect information on reported releases of oil or hazardous substances.

No ERNS listings were reported for the subject site.

### **State Contaminated Sites Listings**

The State of Missouri Department of Natural Resources (MDNR) maintains a listing of identified contaminated sites in the State of Missouri.

No SPL sites were listed within one mile of the subject site.

### **Solid Waste Landfill Listings**

The MDNR maintains a directory of Sanitary Landfills and Refuse Collectors in the State of Missouri.

No Sanitary Landfills or Refuse Collector facilities were listed for Richards-Gebaur Memorial Airport.

### **Registered Underground Storage Tanks**

The MDNR maintains a listing of registered USTs in the State of Missouri.

No UST facilities were identified on or adjacent to the subject site. However, two UST facilities were listed without street addresses.

Richards-Gebaur Airport  
No Street Address  
Kansas City, MO  
Facility ID: UT0012634  
Total Tanks: 1  
Status: Permanently Closed In Place  
Capacity: 2,000  
Substance: Diesel

Richards-Gebaur Airport  
No Street Address  
Kansas City, MO  
Facility ID: UT0012623  
Total Tanks: 6  
Status: All Permanently Closed In Place  
Capacity: 4 x 3,000-gallons, 1 x 4,000-gallon, and 1 x 500-gallon  
Substance: Five contained gasoline and one contained used oil

Note: According to Mr. Malecki, this site is the former gasoline station. Mr. Malecki's records indicate that the site and tanks were removed in 1988. The site is currently the location of a new USMC Building. With the above information, this facility would be located approximately 1600 feet southwest of the subject site. At this distance the USTs would not likely affect the subject site. Surface topography appears to slope in a northeasterly direction into Scope Creek which flows adjacent to the south of the subject site towards the east.

### **Leaking Underground Storage Tanks**

The MDNR maintains a listing of reported leaking USTs (LUSTs) in the State of Missouri.

One LUST facility was identified within one-half mile of the subject site.

Richards-Gebaur Air Base  
15404 Maxwell Avenue  
Kansas City, Missouri  
LUST Number: LU2102  
Status: No Information

Note: According to the USGS Topographic Map this facility is located approximately 2,000 feet south-southwest of the subject site. Surface topography appears to slope in a northeasterly direction into Scope Creek which flows adjacent to the south of the subject site towards the east. Due to the distance of the LUST facility and the location of Scope Creek, it does not appear likely that the subject site would be impacted.

## **ADDITIONAL LOCAL RECORDS**

The following additional local records were reviewed, and the findings are presented below.

### **Fire Department**

The Richards-Gebaur Memorial Airport Fire Department was contacted for information on environmental incidents or reported USTs at the subject site. According to the Fire Department Captain, there have been no known responses in the area of the subject site.

## **PHYSICAL SETTING SOURCES**

### **Topographic Map Review**

The USGS Belton, Missouri-Kansas Quadrangle, 7.5 minute topographic map was reviewed for this ESA. According to the contour lines on the topographic map, the subject site is located approximately 960 to 1000 feet above Mean Sea Level. The contour lines in the area of the subject site indicate the area slopes down towards the southeast.

### **Soil Conservation Service Map**

The USDA, Soil Conservation Service, Soil Survey of Jackson County, Missouri, was reviewed for this ESA. According to this survey, soils on the western third and north area of the subject site are classified as Macksburg silt loam complex with 2 to 5 percent slopes. Soils on the eastern two-thirds of the subject site are classified as Sampsel silty clay loam complex with 5 to 9 percent slopes.

The Macksburg silt loam complex is gently sloping, somewhat poorly drained soil located on moderately wide to wide ridgetops. Permeability is moderately slow and surface runoff is slow. Available water capacity is high and organic matter content is moderate. A seasonal high water table is at a depth of 2 to 4 feet. The shrink-swell potential is high in the subsoil.

The Sampsel silty clay loam complex is moderately sloping, poorly drained soil and is located on slightly concave side slopes and foot slopes along drainageways. Permeability is slow and surface runoff is medium. The available water capacity is moderate. A seasonal high water table ranges from near the surface to a depth of 1.5 feet. The shrink-swell potential is moderate in the surface soil and high in the subsoil.

### **Flood Insurance Rate Map**

The US Department of Housing, Federal Insurance Administration, National Flood Insurance Program, Flood Insurance Rate Map of the City of Kansas City, Missouri (Community Panel Number 290173 0140 B) was reviewed for this assessment. According to the map, the subject site is located within Zone C. Zone C is located within an area of minimal flooding.

## Client Provided Information

Mr. Wilmsmeyer provided to PSI a copy of the Department of the Air Force, Basewide Environmental Baseline Survey Richards-Gebaur Air Force Base, Missouri, report dated December 1993. PSI has reviewed this document and included excerpts from the report into the body of this report. The following information was obtained from the report.

- The Small Arms Range is classified as "Category 3"; samples confirm this fact. (Environmental Baseline Survey Errata Sheet). Category 3 is defined as "areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, but at concentrations that do not require a removal or remedial action" (page S-1).
- There are no active landfills at Richards-Gebaur AFB, and no known historical landfills (page S-4).
- At the time of the EBS report, all Air Force-owned transformers with 50 parts per million (ppm) or more PCBs have either been replaced with PCB-free equipment or retrofitted to bring the PCB concentration to below 50 ppm (page S-5). The U.S. EPA, Region VII, issued a Notice of Compliance to that effect on October 21, 1993 (page 3-20).
- Category 7 properties have also been identified as constituting all of the ... Small Arms Range ... parcels (page S-6). Category 7 properties are defined as areas that are unevaluated or require additional evaluation (page S-2).
- Drainage Patterns. The airfield and on-base storm drainage facilities consist of a combination of open channels and closed drainage systems. All base stormwater drains into Scope Creek, which flows into the Little Blue River (page 3-7).
- There are no grenade or skeet ranges at Richards-Gebaur AFB. Facilities 1048, 1049 and 1050 comprise the Small Arms Range. This range will be cleared of unexploded ordnance. The Small Arms Range was studied in a Phase II project (Firing Range Site Phase II, 1993). The report concluded that lead levels in site soils are above background levels but below levels requiring remedial action. Ordnance may have been disposed of by burning or blasting within the Belton Training Complex; rifle rounds were discovered during the visual site inspection. Facilities 1049 and 1050 have not been surveyed for unexploded ordnance and are, therefore, considered Category 7 (page 3-18).
- Building 1049 Range Control House was identified to have all negative samples for asbestos (page 3-32). Building 1050 Aboveground Magazine Storage was identified to have no suspected asbestos-containing material found.
- The north area of the subject site is listed as Vacant Land. The skeet range is listed as an Area of Concern and the landfill area is listed as a Formerly Used Defense Site (Figure 4-1).

- West Burn Pit located west of the Richards-Gebaur Airport runway is a CERCLIS Site. The site was used from 1954 to 1955 for fire training. Waste oils, solvents, and fuels were deposited in an open pit and burned. The site was classified No Further Action on 12/18/89.
- The Northeast landfill located east of the Small Arms Range is listed as a Formerly Used Defense Site and was used for the disposal of miscellaneous wastes including building rubble, yard debris and wastes from some industrial shop area. The wastes were typically burned and buried in trenches. Dates of operation were 1961 through 1972. Current Status: Records Search and Site Inspection.
- Building 1049 (Range Control House) was constructed in 1956 and consists of approximately 2,330 square feet. Building 1050 (Storage Magazine Aboveground) was constructed in 1956 and consists of approximately 100 square feet. A physical inspection revealed no ACM identified with the buildings. Lead-based paint may be associated with the buildings due to construction prior to 1978. The overall property category is 7 (page 5-14).
- Prior to 1941, the Richards-Gebaur Air Force Base property consisted of farmland.

Mr. Mark Esch provided to PSI a copy of the Asbestos Assessment Study for Richards-Gebaur Air Force Base, Kansas City, Missouri, Appendix E Spreadsheets, report dated September 30, 1987. PSI has reviewed this document and included excerpts from the report into the body of this report. The following information was obtained from the report.

- Building 1049 was surveyed with suspect ACM consisting of drop or lay-in panels in the front room. The material was sampled and analyzed and confirmed non-asbestos containing (page 119).
- Building 1050 was surveyed but no suspect ACM was identified.

Mr. Dennis Wilmsmeyer provided to PSI a copy of the U.S. Army Corps of Engineers, CDM Federal Programs Corporation (Project Number 6107-ODB, dated August 1995) report. PSI has reviewed this document and included excerpts from the report into the body of this report. The following information was obtained from the CDM report.

- CDM Federal Programs Corporation (CDM Federal) has been tasked with conducting a field investigation of potential contamination associated with waste disposal at Formerly Used Defense (FUD) Sites associated with operations of the USAF at the former Richards Gebaur Air Force Base in Belton, Missouri. CDM Federal has conducted a records review and evaluation, performed a visual site inspection, and prepared a Work Plan and a Site Health and Safety Plan for Richards Gebaur in accordance with the Scope of Work dated September 8, 1994 (page 2-1).
- The Northeast Landfill area is listed as a Formerly Used Defense Site (FUDS) (page 2-13).

- The Northeast Landfill is located in the Northeastern Quadrant of the Airport facility between Andrews Road and 155th Street. The area is bounded on the north by an abandoned spur of the St. Louis - San Francisco Railroad, on the east by the St. Louis - San Francisco Rail Line, on the south by Scope Creek, and on the west by a drainage swale just east of the Trap and Skeet Range. This site was used as a demolition and industrial waste landfill between 1961 and 1972. The eastern half of the Northeast Landfill was used for waste storage. Empty drums, fuel tanks, mower and maintenance parts, and some demolition debris were observed during a site visit conducted in October 1994. The west half of the landfill was a trench and fill operation. Waste paints, thinners, strippers, oils, and fuels were reportedly poured into the trenches along with shop waste and demolition debris from base operations and burned for disposal (pages 2-18 through 2-19).
- Five monitoring wells were installed by E & E, Inc., during a 1986 investigation. Soil and groundwater samples collected and analyzed revealed that fluoride, chloride, nitrate, bromide, and sulfate, were reported above detectable limits. Sulfate was reported at 280 mg/L which exceeds the EPA secondary drinking water standard of 250 mg/L. Total dissolved solid values for the monitoring wells ranged from 380 to 940 mg/L which is up to two times greater than the background range (250 to 470 mg/L). One of E & E's soil samples contained petroleum hydrocarbons at 440 mg/kg (pages 2-19 through 2-20).

Mr. Mark Esch provided to PSI a copy of Burns and McDonnell Engineering, Final Report for the Contract No: F23608-91-D0020-5016 RG 93-0024, Firing Range Site Phase II, Richards-Gebaur Air Force Base Missouri, dated August 1993. PSI has reviewed this document and included excerpts from the report into the body of this report. The following information was obtained from the report.

- Section 1.1 Scope of Work. The objective of this report is to present the results of the remedial investigation and provide a feasibility study detailing possible remediation and the cost of any remediation options at the Site (page 1).
- Section 1.3 Site History. The Site is a moderately sized firing range currently used for small arms practice and is thought to have been a building in the 1950's. Modifications to the original construction were made in 1988 (page 1).
- Section 2.1.1 Site Activities Scope. Field activities conducted at the Site included collecting subsurface soil samples from the soil berm, surface soil samples from the firing range and area behind the berm, and surface water/sediment samples from the Site's storm water drainage system and drainage ditch to the west and south of the Site. All samples collected were analyzed for copper, lead, and zinc-contaminants commonly found at firing ranges (page 4).
- Section 6.1 Because of physical characteristics, the potential for Site contaminant migration of lead, copper, and zinc through the air and groundwater pathways is

low. Review of Site data suggests that limited migration of lead and zinc in surface water may be occurring. However, the rate of migration is low and is apparently not impacting sediment or surface water at off-site locations (page 37).

- Section 7.2.1 Data Collection and Evaluation. Copper, lead, and zinc were detected at varying concentrations in most of the samples. Only lead appears to significantly exceed typical levels commonly found in soils compared to the mean values for Missouri agricultural soils (page 42).
- Section 7.7 Summary. This baseline risk assessment was conducted to determine the risk being posed by chemicals detected in soils, sediment, and surface water at the firing range at RGAFB. The potential for risk was then conservatively evaluated assuming a future residential land use, even though the most likely land use is industrial. An exposure scenario was developed to evaluate ingestion of surface soil by a child, in order to assess a reasonable maximum exposure. Risk to a future child resident was determined to be below levels of concern. Since the child resident scenario is considered the most conservative approach, the Site is very unlikely to pose a health risk under any other use situation (page 55).
- Section 8.1 Conclusion. Concentrations of lead in many of the soil samples exceeded the range that is considered normal for soils in Jackson and Cass Counties (page 57).
- Section 8.2 Recommendations. The concentrations of lead, copper, and zinc at the Firing Range Site are below levels of concern and do not require any remedial action. However, the levels of lead detected on the site are apparently elevated above background levels. The highest concentrations of lead were encountered in soils behind the impact berm. Lead contamination detected in this area is primarily due to over shot from a nearby skeet range not associated with the RGAFB. Therefore, the contamination in the area behind the berm could continue to increase in the future if the skeet range remains in operation. (page 57).

## **HISTORICAL USE INFORMATION**

To obtain information regarding the past uses of the subject site and immediately adjacent properties, available historical data was researched.

### **AERIAL PHOTOGRAPH REVIEW**

Available aerial photographs from 1995, 1980 and 1967 were obtained from the Kansas City, Missouri, City Hall, Mapping Department, and were reviewed for this ESA. Copies of the photographs are included in Appendix B. A colorized 1990 aerial photograph located at the Richards-Gebaur Memorial Airport, Aviation Department was reviewed. No copies of this photograph was obtained.

**Date: February 1995**

**Scale: 1" = 400'**

**Photo ID: Sheet 23-1**

The subject site and most of the surrounding area appear to be developed similar to present conditions in this photograph. The rifle range is located on the southwest area of the subject site with the skeet range located adjacent to the east. The vacant grass land on the north area of the subject site is divided by a railroad spur which runs from the northeast area across the subject site towards the southwest. The known landfill area is located on the southeast area of the subject site. A road bounds the south property line and continues north along the east area of the subject site. Three railroad cars, one abandoned to the northeast and two in the area of known scrapping, were identified on-site located along the railroad spur.

**Date: 1990**

**Scale: unknown**

**Photo ID: unknown**

The subject site and adjacent properties appear similar to current conditions. Ten large above-ground storage tanks appear to have been discarded at the north end of the road on the east area of the subject site. According to Mr. Malecki, these tanks were removed from another airport building and were placed on-site until disposal. No petroleum product associated with these tanks was ever stored on-site.

**Date: 1980**

**Scale: 1" = 400'**

**Photo ID: Sheet 22-1**

The subject site and most of the surrounding area appear to be developed similar to present conditions in this photograph. However, activity along the north area of the road on the east area of the subject site was observed. The activity appears to be the

storage of unknown materials on the ground. No railroad cars were observed along the railroad spur.

**Date:** 1967

**Scale:** 1" = 400'

**Photo ID:** Sheet 139

The subject site and the surrounding area appear to be developed similar to present conditions in this photograph. However, the skeet range appears to be situated differently on the same area of the site. Also, the south road which borders the subject site appears to lie only south of the firing range and then leads north between the two ranges. No railroad cars were observed along the railroad spur.

## **CITY DIRECTORY**

Available City Directories for the Kansas City, Missouri, Harrisonville, Missouri, Belton, Missouri, and Grandview, Missouri areas were reviewed at the Kansas City, Missouri, Public Library. No listings for Richards-Gebaur Memorial Airport, Richards-Gebaur Air-Force Base, or Andrews Road, were identified in any of the directories reviewed.

## RECONNAISSANCE AND INTERVIEWS

Where possible, photographs were taken during the reconnaissance to document the features observed and recognized environmental conditions. The photographic locations are shown on the site sketch included in the report section "Site Description". Interviews were conducted with persons as noted in the following table. Photographs and records of communication from interviews are included in the Appendix.

### INTERVIEWS

Interviews were conducted with the following:

NAME	FUNCTION	EMPLOYER	DATE	PHONE
Mr. Dave Malecki	Key Site Manager	City of Kansas City, Missouri, Aviation Department	9/26/95	(816) 322- 0001
Mr. Dennis Wilmsmeyer	Airport Planner	City of Kansas City, Missouri, Aviation Department	9/26/95	(816) 243- 3044
Mr. Steve Yates	Belton District Office	Missouri Public Service	10/23/95	(816) 331- 1085
Captain	Fire Department	Richards-Gebaur Memorial Airport Fire Department	10/26/95	(816) 331- 8529
Bob Koke	Regulator	U.S. EPA	10/26/95	(816) 551- 7468
Mr. Mark Esch	Environmental Coordinator	U.S. Air Force Base Conversion Agency	10/10/95	(816) 348- 2511

### ON-SITE RECONNAISSANCE

On-site visual reconnaissance of the subject site and improvements for indications of recognized environmental conditions was conducted on September 26, 1995, by Richard N. Leines, Environmental Project Manager for PSI.

Reconnaissance consisted of systematically walking the perimeter boundary of the site and crossing the interior to provide an overlapping field of view. The adjacent sites were not entered. Where possible, photographs were taken to document the features observed during the reconnaissance and environmental conditions of concern and the photographs are included in Appendix E.

A copy of the author's credentials may be found in Appendix G.

## **Drums, Containers and Storage Tanks**

The on-site reconnaissance addressed containers, drums, above ground storage tanks, and other storage units containing materials which may pose an environmental threat.

Located at the firing range were nineteen (19) empty 55-gallon plastic drums labelled "Empty Triple Rinsed".

Located at the skeet range were small quantities of herbicide, automatic transmission fluid, enamel paint, and a 5-gallon bucket containing an unknown substance with a rubber appearance.

Located at the disposal area on the east area of the subject site were four aboveground storage tanks which formerly contained diesel and water. Also located at this location were numerous collapsed 55-gallon drums.

Located at the railroad car dismantling area were cutting torch oxygen and acetylene bottles, and several different containers of petroleum products.

## **Evidence of Waste Disposal**

The on-site reconnaissance addressed dumps, pits, ponds, landfills, borrow pits, and lagoons which may have been used for disposal purposes.

Evidence of tires, clay pigeons and shotgun shells were observed at the skeet range.

Evidence of cable, piping, tanks, drums, equipment, and building materials were observed to be discarded on the property near the landfill. During the reconnaissance, PSI observed members of the Aviation Department collecting the discarded debris in this area and placing the trash into a large dumpster. According to Mr. Malecki the discarded materials identified will be removed and disposed of properly.

Evidence of scrap metals and associated petroleum fluids were identified in the area of the railroad car dismantling project. Evidence of soil staining and stressed vegetation in this area was observed. According to Mr. Malecki, the cars are being dismantled by an independent contractor. The Aviation Department is currently attempting to coordinate the cleanup of this area with the appropriate individuals.

## **Surface Fill**

The on-site reconnaissance included observation for visible indications of fill soils.

Indications of fill soil were observed on the property associated with the rifle range. A large soil berm was placed on the northeast area of the rifle range to capture rounds of ammunition.

Fill soils were also observed in the area of the landfill. The fill soils were used to cap or cover the contents in the landfill.

### **Surface Staining and Stressed Vegetation**

The on-site reconnaissance addressed indications of environmental conditions as evidenced by surface stains and/or stressed vegetation.

Evidence of surface staining and stressed vegetation was observed near the railroad spur area just north of the landfill. This area currently is involved in the dismantling of railroad cars. Several small areas of surface staining and stressed vegetation were observed on the soil from petroleum fluids.

### **Transformers**

The on-site reconnaissance also addressed indoor or outdoor transformers which may contain polychlorinated biphenyls (PCBs). No indoor transformers were observed at the time of the assessment.

Located at the rifle range, along the west area, were three pole-mounted transformers (pole # MPS J-88 SPP 3-45). No evidence of a blue "Non-PCB" sticker or signs of leakage were observed with the transformers.

Located near the rifle range was one pad-mounted General Electric transformer. This transformer was labelled as "dry-type" which means that no oils are located within the unit.

Located at the skeet range, along the south area, was one pole-mounted transformer (pole #8269). No evidence of a blue "Non-PCB" sticker or signs of leakage were observed with the transformer.

According to Mr. Steve Yates with the Missouri Public Service (MPS), Belton District Office, the transformers are owned by MPS and have not been tested for PCB content.

### **Suspect Asbestos-Containing Building Materials (ACBM)**

The on-site reconnaissance addressed suspect materials which may contain asbestos.

Suspect materials located at the firing range consisted of two types of linoleum located within the on-site trailer. Suspect materials located within the north building consisted of three types of floor tiles and roofing materials. Suspect materials located within a small cinderblock building consisted of roofing shingles.

Suspect materials located at the skeet range consisted of three types of ceiling panels, floor tile, and roofing materials.

Located along the east area of the landfill, amongst the discarded debris, was a pile of thermally wrapped piping. Suspect ACBM consisted of the mudded joint packing (MJP) located on the elbows

of the piping. The pipe line was thermally wrapped with a non-suspect fiberglass and sheetmetal. The Aviation Department was disposing and therefore a sample was collected and analyzed. Laboratory analysis confirmed that the MJP contained 25% asbestos.

On October 11, 1995, PSI was informed by Mr. Dennis Wilmsmeyer that additional suspect ACBM was discovered by personnel in the area of the discarded debris by the landfill. Airport personnel is currently in the process of clearing the discarded debris and disposing the material into an approved landfill. On October 12, 1995, PSI revisited the site and collected additional samples of suspect transite drain tile and siding. Laboratory analysis confirmed that the drain tile and siding piping contained asbestos. A copy of the sampling and analytical methods and analytical results are included in Appendix F.

### **Air Stacks, Vents, and Odors**

The on-site reconnaissance addressed air stacks, vents and strong, pungent or noxious odors.

Only vents associated with on-site HVAC systems were observed. No air stacks or odors were noticed at the time of the assessment.

### **Surface Drainage**

The on-site reconnaissance addressed the apparent drainage to and from the subject site. Specific elements are as follows:

Excess surface water drainage on the subject site would flow into an intermittent creek located in the center of the site which runs from the north to the south.

### **Evidence of Underground Storage Tanks**

None of the following indications of underground storage tanks (USTs) were found on the subject site.

- Pumps, pipes or vents
- Tank related manholes
- Tank related concrete pads or surface depressions

### **Conduits to Groundwater**

Located on the south area of the subject site, near the landfill, were several monitoring wells. Monitoring well information was obtained from the CDM Federal Programs Corporation report which has been reviewed by PSI and incorporated into the Additional Local Records section of this report.

## **Evidence of Improper Waste Discharge**

Pipes and/or vents, indicating improper release of waste discharge, were not found.

## **On-Site Environmental Management Practices**

The on-site reconnaissance addressed the following environmental management practices.

### Solid Waste

The subject site is currently unoccupied, therefore, no evidence of solid waste disposal was observed on the subject site.

### Hazardous Waste

The subject site is currently unoccupied, therefore, no indications of hazardous waste generation, storage or disposal were observed on the subject site.

### Treatment Facilities

No indications of wastewater disposal or treatment facilities were observed during the on-site reconnaissance.

### Application of Pesticides, Herbicides or Fertilizers

No indications of the use of pesticides, herbicides or fertilizers was observed during the on-site reconnaissance and/or interviews.

## **General Environmental Practices**

Indications of adverse environmental practices were observed during the site reconnaissance. Adverse practices were observed at the solid waste dumping area near the landfill and the spillage of petroleum fluids and metal scraping near the railroad car dismantling project.

## OFF-SITE RECONNAISSANCE

Off-site visual reconnaissance of adjacent properties from the subject site was conducted on September 26, 1995, by Richard N. Leines of PSI. The off-site reconnaissance was limited to areas and facilities that were readily accessible for visual observation, immediately adjacent to and visible from the subject site. The adjacent properties were not entered. Off-site visual reconnaissance addressed the same issues considered on-site. The adjacent properties were not entered.

ITEM	NOT OBSERVED	OBSERVED	DISCUSSED BELOW
Drums, Containers & Storage Tanks	X		
Dumps, Pits & Lagoons	X		
Surface Soil Staining or Stressed Vegetation	X		
Transformers	X		
Air Stacks, Vents & Odors	X		
Off-Site Drainage	X		
Underground Storage Tanks	X		
Aboveground Storage Tanks	X		
Shafts & Wells	X		
Off-Site Environmental Management Practices	X		

## FINDINGS AND CONCLUSIONS

### PHASE I ESA

PSI has performed a Phase I ESA on the subject site in general conformance with the scope and limitations of the protocol and the limitations stated earlier in this report. Exceptions to or deletions from this protocol are discussed earlier in this report. This assessment has revealed evidence of recognized environmental conditions in connection with the site, which include the following:

The Small Arms Range is classified as Category 3 which is defined by the Air Force as "areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, but at concentrations that do not require a removal or remedial action."

The Small Arms Range has also been classified by the Air Force as a Category 7 property. Category 7 properties are defined as areas that are unevaluated or require additional evaluation.

Facilities 1048, 1049 and 1050 comprise the Small Arms Range. According to the Air Force, this range will be cleared of unexploded ordnance. The Small Arms Range was studied in a Phase II- project (Firing Range Site Phase II, 1993). The report concluded that lead levels in site soils are above background levels but below levels requiring remedial action.

The northeast landfill, located east of the Small Arms Range, was used for the disposal of miscellaneous wastes including building rubble, yard debris and wastes from some industrial shop areas. Waste paints, thinners, strippers, oils, and fuels were reportedly poured into the trenches along with shop waste and demolition debris from base operations and burned for disposal. Dates of operation were 1961 through 1972. Empty drums, fuel tanks, mower and maintenance parts, and some demolition debris were observed during a site visit conducted by CDM Federal in October 1994.

Five monitoring wells were installed by E & E, Inc. during a 1986 investigation in the area of the northeast landfill. Soil and groundwater samples collected and analyzed revealed that fluoride, chloride, nitrate, bromide, and sulfate, were reported above detectable limits. Sulfate was reported at 280 mg/L which exceeds the EPA secondary drinking water standard of 250 mg/L. Total dissolved solid values for the monitoring wells ranged from 380 to 940 mg/L which is up to two times greater than the background range (250 to 470 mg/L). One of E & E's soil samples contained petroleum hydrocarbons at 440 mg/kg. Concentrations of lead in many of the soil samples exceeded the range that is considered normal for soils in Jackson and Cass Counties.

Located throughout the site was evidence of chemical containers. Evidence of tires, clay pigeons and shotgun shells were observed at the skeet range. Evidence of cable, piping, tanks, drums, equipment, and building materials were observed to be discarded on the property near the landfill. During the reconnaissance, PSI observed members of the Aviation Department collecting the discarded debris from the east area of the site placing the trash into a large dumpster. According to Mr. Malecki the discarded materials identified will be removed and disposed of properly.

Evidence of scrap metals and associated petroleum fluids were identified in the area of the railroad car dismantling project. Evidence of soil staining and stressed vegetation in this area was observed. According to Mr. Malecki, the cars are being dismantled by an independent contractor. The Aviation Department is currently attempting to coordinate the cleanup of this area with the appropriate individuals.

Indications of fill soil were observed on the property associated with the rifle range. A large soil berm was placed on the northeast area of the rifle range to capture rounds of ammunition. Fill soils were also observed in the area of the landfill. The fill soils were used to cap or cover the contents in the landfill.

Suspect asbestos-containing materials located at the firing range consisted of two types of linoleum located within the on-site trailer. Suspect materials located within the north building consisted of three types of floor tiles and roofing materials. Suspect materials located within a small cinderblock building consisted of roofing shingles. Suspect materials located at the skeet range consisted of three types of ceiling panels, floor tile, and roofing materials. Located along the east area of the landfill, amongst the discarded debris, was a pile of thermally wrapped piping. Suspect ACBM consisted of the mudded joint packing (MJP) located on the elbows of the piping. The pipe line was thermally wrapped with a non-suspect fiberglass and sheetmetal. Samples of the MJP were collected and laboratory analysis confirmed that the MJP contained 25% asbestos. On October 11, 1995, PSI was informed by Mr. Dennis Wilmsmeyer that additional suspect ACBM was discovered by personnel in the area of the discarded debris by the landfill. On October 12, 1995, PSI revisited the site and collected additional samples of suspect transite drain tile and siding. Laboratory analysis confirmed that the drain tile and siding piping contained asbestos.

## **RECOMMENDATIONS**

This assessment has revealed evidence of potential subsurface contamination at the subject site.

Potential contamination of subsurface soils and groundwater may arise from four specific areas of concern located on the subject site. First, the amounts of lead in the bermed soils originating from the Small Arms Range pose a concern for possible migration. PSI understands that the initial soil evaluation was performed in 1993, however, the firing range continued operations through 1994. PSI also understands that the berm is to be leveled for future improvements. For these reasons, PSI recommends reclaiming the lead from the soils for recycling and reusage of the soils.

Secondly, the skeet range raises concerns from the amount of lead in surface soils from shotgun fire and the amount of clay pigeon remnants scattered throughout the site. As mentioned above, PSI recommends reclaiming the lead from the soils for recycling reusage of the soils. PSI also recommends that a Phase II Site Assessment be performed which would include the sampling of the clay pigeons and near surface soils, and determine the lateral extent of contamination.

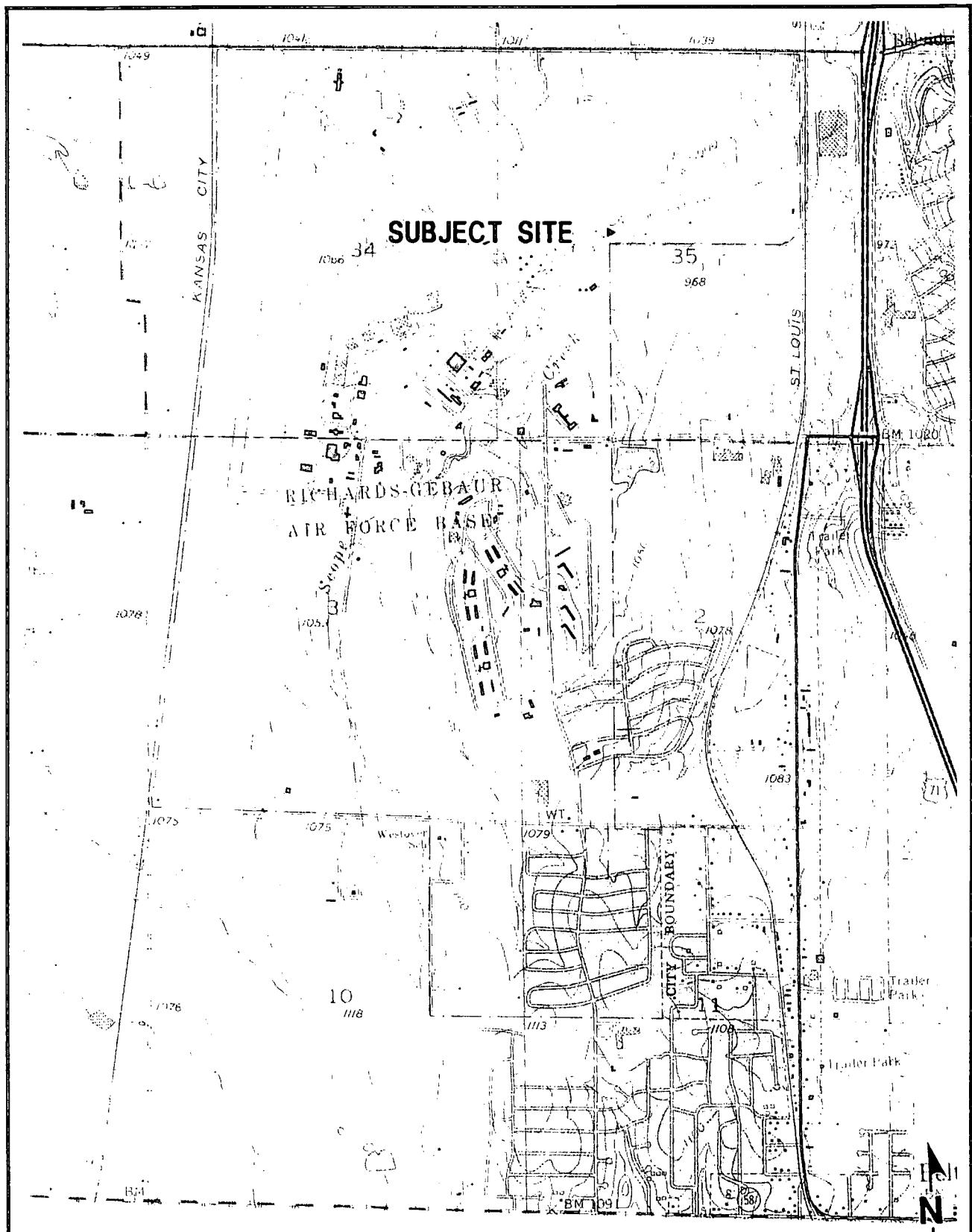
Thirdly, the landfill area has previously undergone groundwater studies with the installation of monitoring wells. PSI recommends sampling the groundwater on a periodic basis to determine possible migration of contamination off-site.

The fourth area of concern is the observed soil staining and stressed vegetation located throughout the area of the railroad car dismantling project. After removal of the railroad cars and scrap metals, PSI recommends sampling the various soil stained areas to determine the contaminant and also to characterize the soil for disposal into an approved landfill.

PSI also recommends sampling of suspect asbestos-containing materials located in the buildings at the skeet and firing ranges. PSI understands that these buildings are to be demolished for future development. PSI has already identified asbestos-containing materials in the east dumping area (MJP's, siding and piping) which will need to be transported and disposed of into an approved landfill.

## **APPENDIX**

**APPENDIX A**  
**MAPS**



Site Name:

Richards-Gebaur Memorial Airport  
55-Acre Tract Along Andrews Road  
Kansas City, Missouri

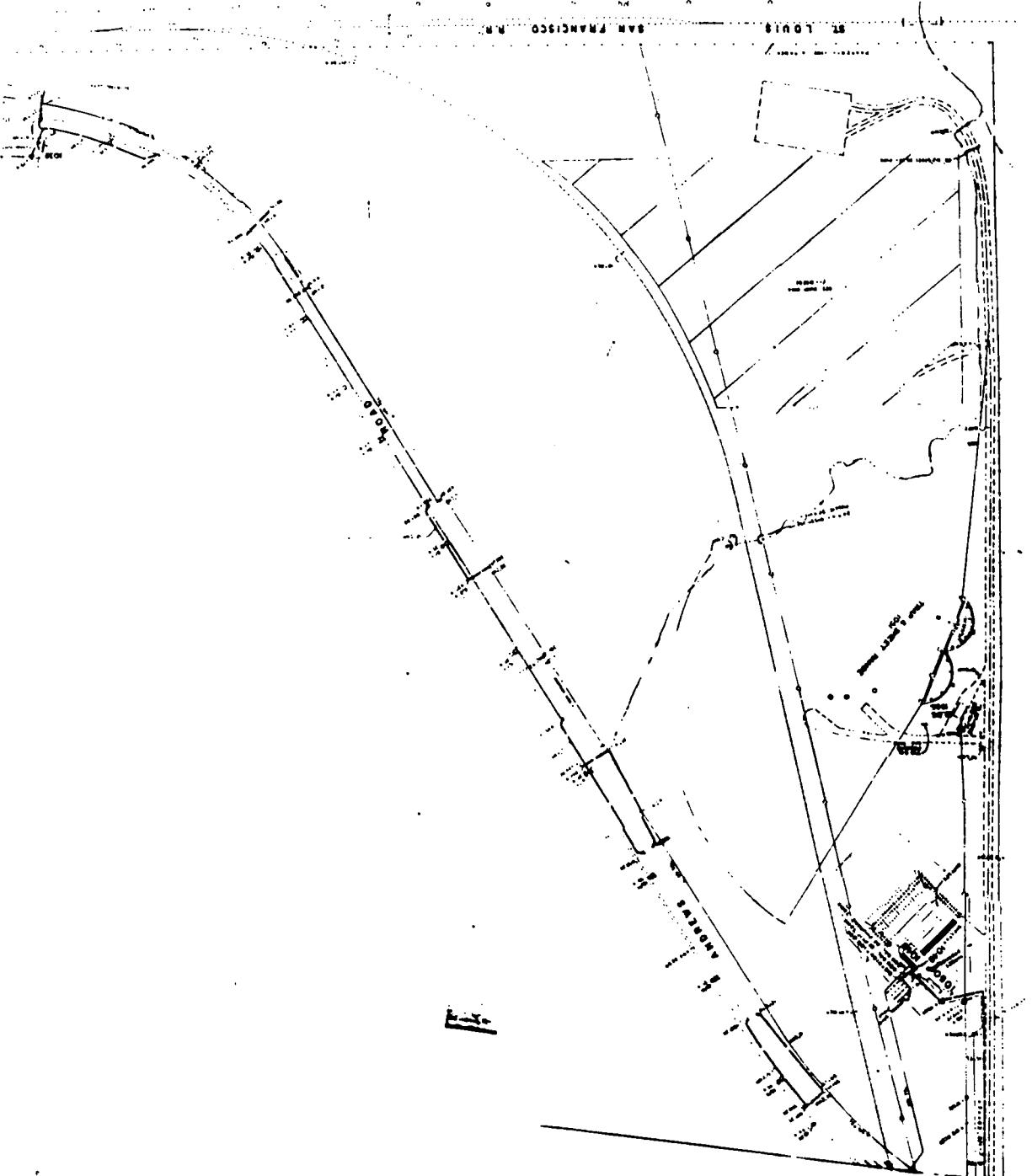
Project No:

5985E110

Date:

10/30/95

TOPOGRAPHIC MAP



-2-

Site Name:

Richards-Gebaur Memorial Airport  
55-Acre Tract Along Andrews Road  
Kansas City, Missouri

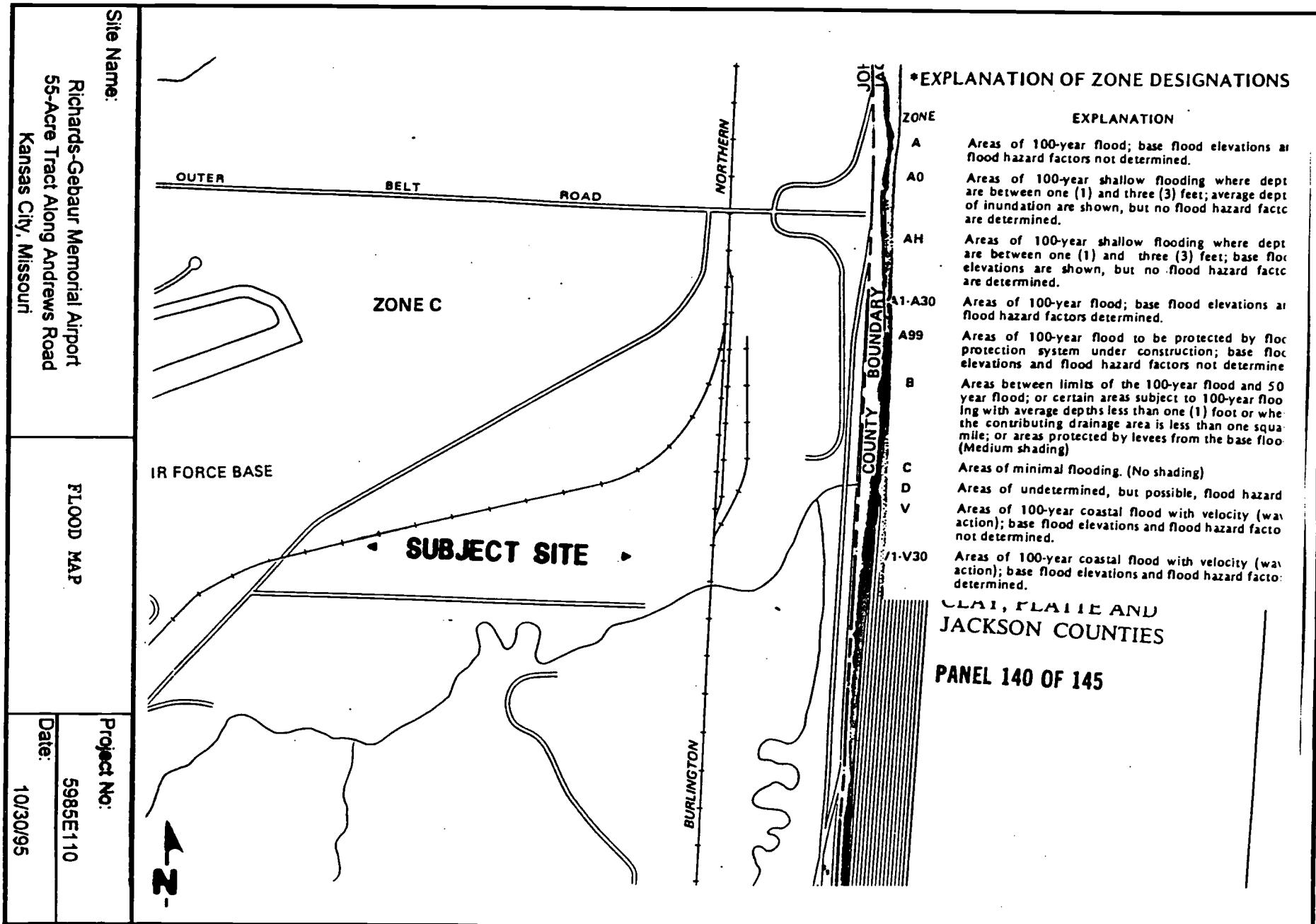
SITE MAP

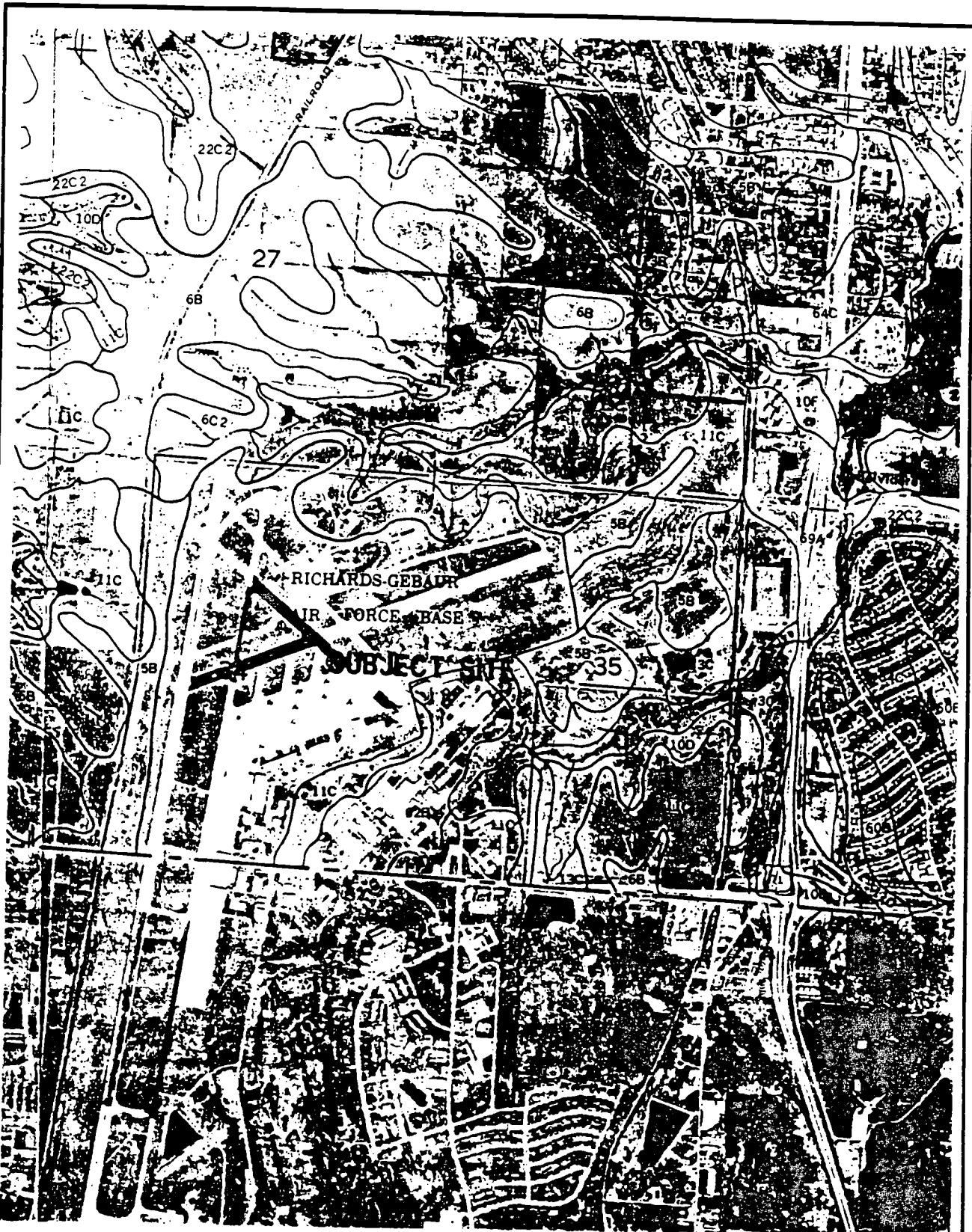
Project No:

5985E110

Date:

10/30/95





Site Name:  Richards-Gebaur Memorial Airport 55-Acre Tract Along Andrews Road Kansas City, Missouri	SOILS MAP	Project No:  5985E110
		Date:  10/30/95

regular addition of other organic material helps to improve fertility, reduce crusting, and increase water infiltration.

The use of this soil for pasture or hay is also an effective means of controlling erosion. The soil is best suited to shallow-rooted legumes and cool-season bunch grasses or to native warm-season grasses. Overgrazing or grazing when the soil is wet, however, causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture and soil in good condition.

This soil is suitable for building site development. Septic tank absorption fields generally are unsuitable because of wetness. Sewage lagoons function adequately if the area can be leveled and the lagoon sealed to prevent contamination of the ground water. As an alternative, the waste can be piped to a more suitable area. Concrete for footings, foundations, and basement walls of dwellings and small commercial buildings should be reinforced with steel and a backfill of sand and gravel placed around the foundation or basement wall to prevent damage caused by shrinking and swelling of the soil. Drainage tile installed at the base of the sand and gravel helps to prevent damage caused by excessive wetness around the foundation and basement walls and wet basements. Local roads and streets should be graded to shed water, and adequate side ditches and culverts should be installed to prevent damage caused by frost action, shrinking and swelling of the soil, and wetness. Adding crushed rock or other suitable material helps to prevent damage caused by low strength.

This Higginsville soil is in capability subclass IIIe.

**5B—Macksburg silt loam, 2 to 5 percent slopes.** This gently sloping, somewhat poorly drained soil is on moderately wide to wide ridgetops. Individual areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer is black, friable silty clay loam about 6 inches thick. The subsoil is about 38 inches thick. The upper part is dark grayish brown, mottled, firm silty clay loam, and the lower part is grayish brown, mottled, firm silty clay loam. The substratum to a depth of 60 inches is grayish brown, mottled, firm silty clay loam. In places the substratum is silty clay.

Included with this soil in mapping are small areas of Sharpsburg and Sibley soils. The moderately well drained Sharpsburg soils are on narrower ridgetops than the Macksburg soils. The well drained Sibley soils are adjacent to the Macksburg soils but on slightly higher positions. The included soils make up 5 to 10 percent of the map unit.

Permeability is moderately slow in this Macksburg soil, and surface runoff is slow. Reaction ranges from neutral to strongly acid in the surface layer. Natural fertility and



Figure 11.—Cattle grazing on bromegrass on Macksburg silt loam, 2 to 5 percent slopes.

available water capacity are high, and organic matter content is moderate. A seasonal high water table is at a depth of 2 to 4 feet. The surface layer is friable but has a narrow moisture range for tillage operations. It has a tendency to clod when tilled at a high moisture content. The shrink-swell potential is high in the subsoil.

Most areas of this soil are used for cultivated crops. This soil is well suited to corn, soybeans, small grains, and grasses and legumes for hay and pasture. If the soil is used for cultivated crops, erosion is a hazard. The use of minimum tillage and winter cover crops helps to prevent excessive soil loss. Returning crop residue or the regular addition of other organic material helps to improve fertility, reduce crusting, and increase water infiltration.

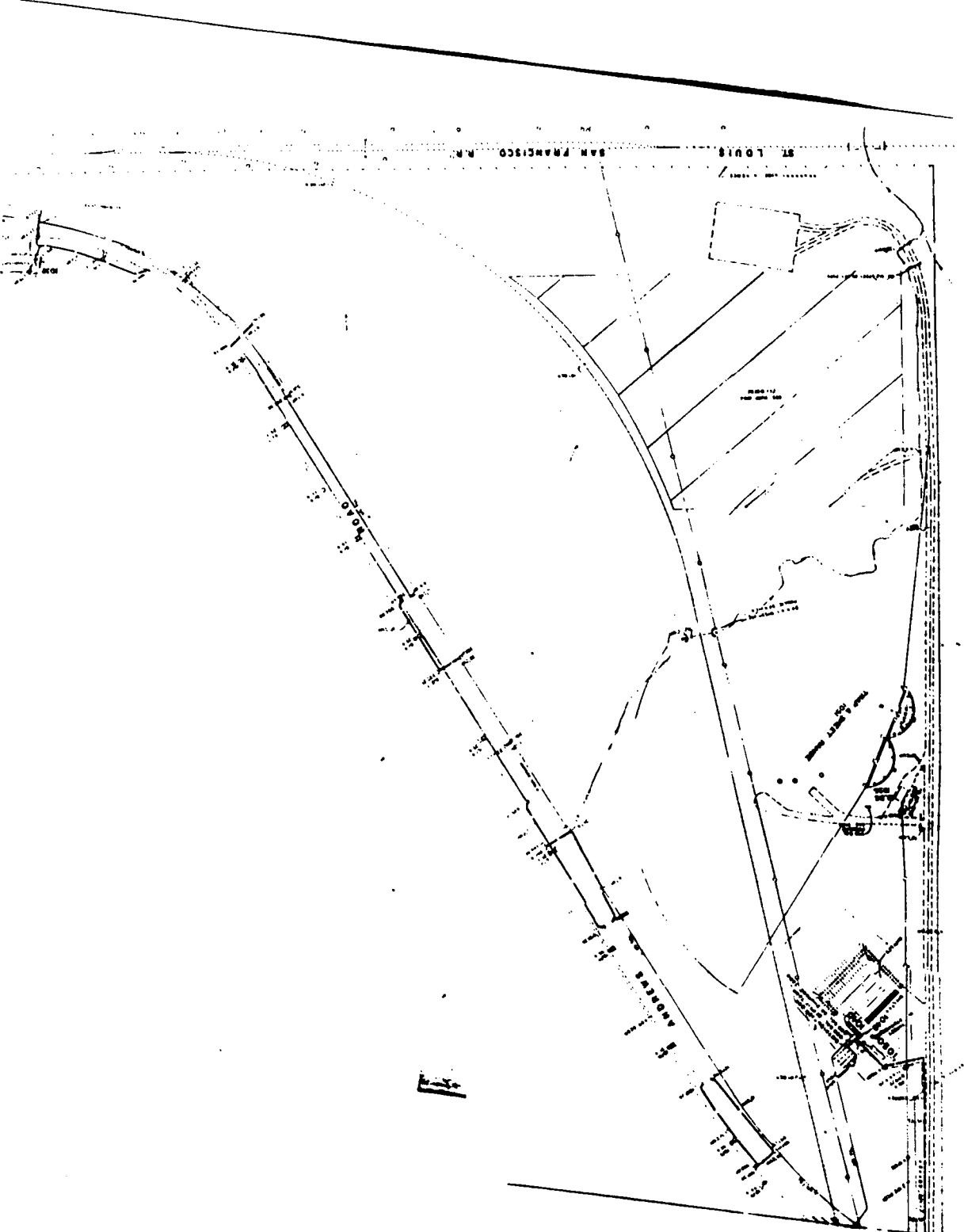
The use of this soil for pasture or hay is also an effective means of controlling erosion. The soil is best suited to shallow-rooted legumes and cool-season bunch grasses or to native warm-season grasses (fig. 11). Overgrazing or grazing when the soil is wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use during wet periods help to keep the pasture and soil in good condition.

This soil is suited to building site development and onsite waste disposal (fig. 12). Septic tanks generally are not suitable in this soil. Sewage lagoons should be sealed with slowly permeable material to prevent contamination of the ground water. Concrete for footings, foundations, and basement walls should be adequately reinforced with steel and a backfill of sand

## **APPENDIX**

## **APPENDIX A**

### **MAPS**



**-Z-**

**Site Name:**

Richards-Gebaur Memorial Airport  
55-Acre Tract Along Andrews Road  
Kansas City, Missouri

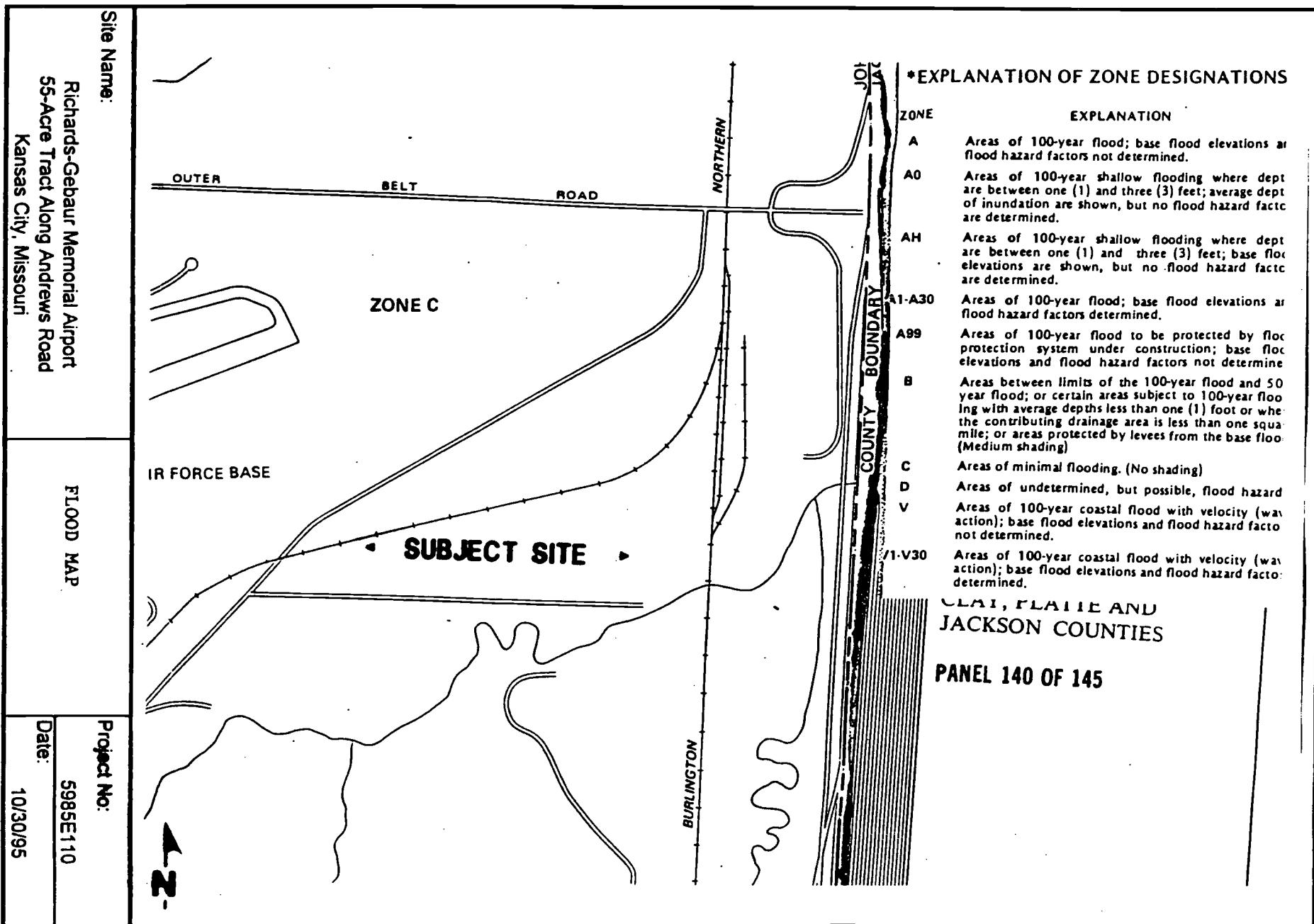
**SITE MAP**

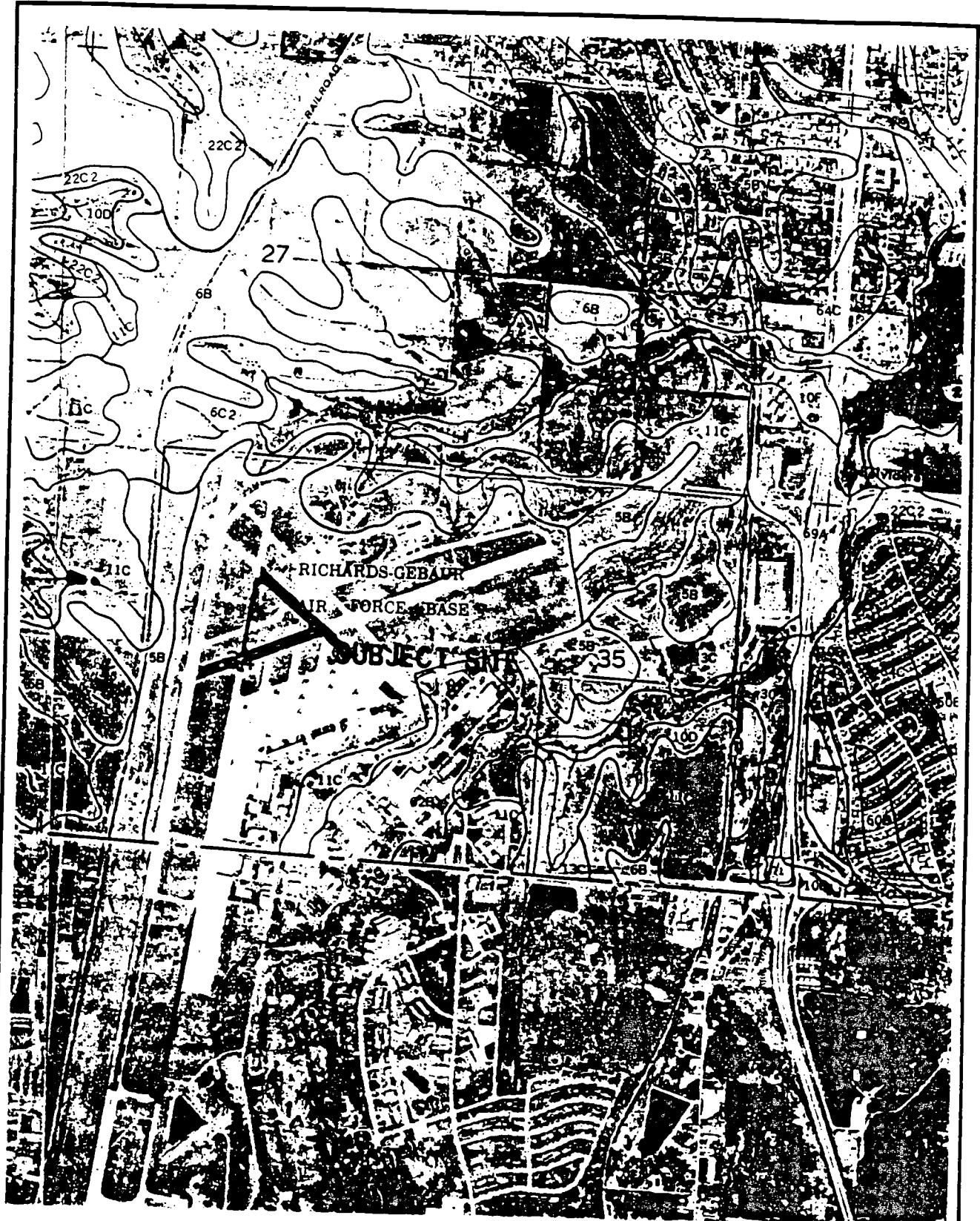
**Project No:**

5985E110

**Date:**

10/30/95





Site Name:  Richards-Gebaur Memorial Airport 55-Acre Tract Along Andrews Road Kansas City, Missouri	SOILS MAP	Project No: 5985E110 Date: 10/30/95
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regular addition of other organic material helps to improve fertility, reduce crusting, and increase water infiltration.

The use of this soil for pasture or hay is also an effective means of controlling erosion. The soil is best suited to shallow-rooted legumes and cool-season bunch grasses or to native warm-season grasses. Overgrazing or grazing when the soil is wet, however, causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture and soil in good condition.

This soil is suitable for building site development. Septic tank absorption fields generally are unsuitable because of wetness. Sewage lagoons function adequately if the area can be leveled and the lagoon sealed to prevent contamination of the ground water. As an alternative, the waste can be piped to a more suitable area. Concrete for footings, foundations, and basement walls of dwellings and small commercial buildings should be reinforced with steel and a backfill of sand and gravel placed around the foundation or basement wall to prevent damage caused by shrinking and swelling of the soil. Drainage tile installed at the base of the sand and gravel helps to prevent damage caused by excessive wetness around the foundation and basement walls and wet basements. Local roads and streets should be graded to shed water, and adequate side ditches and culverts should be installed to prevent damage caused by frost action, shrinking and swelling of the soil, and wetness. Adding crushed rock or other suitable material helps to prevent damage caused by low strength.

This Higginsville soil is in capability subclass IIIe.

**5B—Macksburg silt loam, 2 to 5 percent slopes.** This gently sloping, somewhat poorly drained soil is on moderately wide to wide ridgetops. Individual areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer is black, friable silty clay loam about 6 inches thick. The subsoil is about 38 inches thick. The upper part is dark grayish brown, mottled, firm silty clay loam, and the lower part is grayish brown, mottled, firm silty clay loam. The substratum to a depth of 60 inches is grayish brown, mottled, firm silty clay loam. In places the substratum is silty clay.

Included with this soil in mapping are small areas of Sharpsburg and Sibley soils. The moderately well drained Sharpsburg soils are on narrower ridgetops than the Macksburg soils. The well drained Sibley soils are adjacent to the Macksburg soils but on slightly higher positions. The included soils make up 5 to 10 percent of the map unit.

Permeability is moderately slow in this Macksburg soil, and surface runoff is slow. Reaction ranges from neutral to strongly acid in the surface layer. Natural fertility and



Figure 11.—Cattle grazing on bromegrass on Macksburg silt loam, 2 to 5 percent slopes.

available water capacity are high, and organic matter content is moderate. A seasonal high water table is at a depth of 2 to 4 feet. The surface layer is friable but has a narrow moisture range for tillage operations. It has a tendency to clog when tilled at a high moisture content. The shrink-swell potential is high in the subsoil.

Most areas of this soil are used for cultivated crops. This soil is well suited to corn, soybeans, small grains, and grasses and legumes for hay and pasture. If the soil is used for cultivated crops, erosion is a hazard. The use of minimum tillage and winter cover crops helps to prevent excessive soil loss. Returning crop residue or the regular addition of other organic material helps to improve fertility, reduce crusting, and increase water infiltration.

The use of this soil for pasture or hay is also an effective means of controlling erosion. The soil is best suited to shallow-rooted legumes and cool-season bunch grasses or to native warm-season grasses (fig. 11). Overgrazing or grazing when the soil is wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use during wet periods help to keep the pasture and soil in good condition.

This soil is suited to building site development and onsite waste disposal (fig. 12). Septic tanks generally are not suitable in this soil. Sewage lagoons should be sealed with slowly permeable material to prevent contamination of the ground water. Concrete for footings, foundations, and basement walls should be adequately reinforced with steel and a backfill of sand

and gravel placed around the foundation and basement walls to prevent damage caused by shrinking and swelling of the soil. Drainage tile installed at the base of the sand and gravel helps to prevent wet basements. Local roads and streets should be graded to shed water, and adequate side ditches and culverts should be installed to prevent damage caused by frost action and shrinking and swelling of the soil. Adding crushed rock or other suitable material helps to prevent damage caused by low strength.

This Macksburg soil is in capability subclass IIe.

**6B—Sharpsburg silt loam, 2 to 5 percent slopes.** This deep, gently sloping, moderately well drained soil is on convex ridgetops. Individual areas are long and narrow and range from 5 to 90 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 6 inches thick. The subsurface layers are very dark grayish brown, friable silt loam and silty clay loam about 15 inches thick. The subsoil is about 26 inches thick. The upper part is dark brown, firm silty clay loam, and the lower part is dark brown and dark yellowish brown, mottled, firm silty clay loam. The substratum to a depth of about 60 inches is dark yellowish brown, mottled, firm silty clay loam. In places the dark soil in the upper part of the profile is more than 24 inches thick and grayish brown mottles are at a depth of more than 36 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Macksburg soils and well drained Menfro soils. Macksburg soils are on broader ridgetops than Sharpsburg soils. Menfro soils are at the ends of ridges closer to the drainageways. The included soils make up about 5 percent of the map unit.

Permeability is moderately slow in this Sharpsburg soil, and surface runoff is medium. Reaction ranges from slightly acid to strongly acid in the surface layer. Natural fertility and available water capacity are high. The organic matter content is moderate. The surface layer is friable and easily tilled through a fairly wide range in moisture content. It does, however, have a tendency to crust or puddle after hard rains. The shrink-swell potential is moderate.

Most areas of this soil are used for cultivated crops. This soil is suited to corn, soybeans, small grains, and grasses and legumes for pasture and hay. If the soil is used for cultivated crops, erosion is a hazard. The use of minimum tillage, winter cover crops, and grassed waterways helps to prevent excessive soil loss. Most areas can be terraced and farmed on the contour. Returning crop residue or the regular addition of other organic material helps to improve fertility, reduce crusting, and increase water infiltration.

The use of this soil for pasture or hay is also an effective means of controlling erosion. This soil is suited to alfalfa and smooth bromegrass. Overgrazing or



Figure 12.—Urban encroachment on Macksburg silt loam, 2 to 5 percent slopes.

grazing when the soil is wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture and soil in good condition.

This soil is suited to building site development and onsite waste disposal. Septic tank filter fields need to be larger than those commonly constructed because of moderate permeability in the lower part of the subsoil. Sewage lagoons should be sealed with slowly permeable material to prevent seepage. Concrete for footings, foundations, and basement walls of dwellings and small commercial buildings should be reinforced with steel and a backfill of sand and gravel placed around the foundation and basement walls to help prevent damage caused by shrinking and swelling of the soil. Local roads and streets should be graded to shed water, and adequate side ditches and culverts should be installed to prevent damage caused by frost action and shrinking and swelling of the soil. Adding crushed rock or other suitable material helps to prevent damage caused by low strength.

This Sharpsburg soil is in capability subclass IIe.

**6C2—Sharpsburg silt loam, 5 to 9 percent slopes, eroded.** This moderately sloping, moderately well drained soil is on convex side slopes and narrow, convex ridgetops. Areas are irregular in shape and range from 5 to 60 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsoil is

locate suitable sites for sewage lagoons. Concrete for footings, foundations, and basement walls for dwellings and small commercial buildings should be reinforced with steel and a backfill of sand and gravel placed around the foundation and basement walls to help prevent damage caused by shrinking and swelling and excessive wetness. Drainage tile installed at the base of the sand and gravel also helps to prevent damage caused by wetness. Local roads and streets should be graded to shed water, and adequate side ditches and culverts should be installed to prevent damage caused by frost action and shrinking and swelling of the soil. Adding crushed rock or other suitable material helps to prevent damage caused by low strength.

This Sampsel soil is in capability subclass IIe.

**13C—Sampsel silty clay loam, 5 to 9 percent slopes.** This moderately sloping, poorly drained soil is on slightly concave side slopes and foot slopes along drainageways. Individual areas are irregular in shape and range from 10 to about 200 acres.

Typically, the surface layer is very dark gray, friable silty clay loam about 6 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is very dark gray, firm silty clay loam; the middle part is dark grayish brown, firm silty clay; and the lower part is grayish brown, firm silty clay.

Included with this soil in mapping are small areas of somewhat poorly drained Greenton soils and moderately deep Snead soils. Greenton soils are upslope from Sampsel soils, and Snead soils are in narrow bands along the upper edge of the unit. The included soils make up 5 to 10 percent of the map unit.

Permeability is slow in this Sampsel soil, and surface runoff is medium. Reaction ranges from medium acid to moderately alkaline. Natural fertility is medium, and organic matter content is moderate. The available water capacity is moderate. A seasonal high water table ranges from near the surface to a depth of 1.5 feet. The shrink-swell potential is moderate in the surface soil and high in the subsoil. The surface layer is friable but difficult to till. It has a narrow moisture range for tillage operations and tends to become cloddy if tilled when dry and cloddy and compacted if tilled when wet. In addition, this soil may have seepy areas that stay wet most of the year.

Most areas of this soil are used for cultivated crops. The soil is suited to corn and soybeans. If this soil is used for cultivated crops, excessive erosion is a hazard and the surface soil may become compacted in seepy areas. The use of conservation tillage, winter cover crops, and grassed waterways helps to prevent erosion. Most areas can be farmed on the contour and are suitable for the construction of terraces. Returning crop residue or the regular addition of other organic material

helps to improve fertility, reduce surface compaction, and increase water infiltration.

The use of this soil for pasture or hay is also an effective means of controlling erosion. This soil is best suited to shallow-rooted legumes and cool-season bunch grasses or to native warm-season grasses. Because of the natural wetness of this soil and the silty clay loam surface layer, careful management is needed to keep a good stand of grasses and legumes. Overgrazing or grazing when the soil is wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, pasture rotation, and restricted use during wet periods help to keep the soil and pasture in good condition.

This soil generally is unsuitable for septic tanks because of wetness and slow permeability, and it is limited for sewage lagoons because of depth to rock and slope. Sewage generally can be piped to more suitable adjacent areas. Onsite investigations are needed to locate sites that have more depth to rock for placement of the sewage lagoons. Some areas can be leveled to reduce the slope if additional soil material is available for the construction of berms. Concrete for footings, foundations, and basement walls for dwellings and small commercial buildings should be adequately reinforced with steel and a backfill of sand and gravel placed around the foundations and basement walls to help prevent damage from shrinking and swelling and wet basements. Drainage tile installed at the base of the sand and gravel also helps to prevent damage caused by wetness. Local roads and streets should be graded to shed water, and adequate side ditches and culverts should be installed to provide good drainage and prevent damage caused by frost action and shrinking and swelling of the soil. Adding crushed rock or other suitable material helps to prevent damage caused by low strength.

This Sampsel soil is in capability subclass IIIe.

**15B—Menfro silt loam, 2 to 5 percent slopes.** This deep, gently sloping, well drained soil is on narrow, convex ridgetops near streams. Individual areas are irregular in shape and range from 5 to 50 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is brown, friable silt loam about 6 inches thick. The subsoil is about 38 inches thick. It is dark yellowish brown, firm silty clay loam. The substratum to a depth of about 60 inches is dark brown, friable silty clay loam. In places the dark surface layer is 6 to 10 inches thick. In other places grayish brown mottles are at a depth of less than 36 inches.

Included with this soil in mapping are small areas of Sharpsburg, Sibley, and Weller soils. Sharpsburg and Sibley soils have dark surface layers more than 10 inches thick and are on broader ridgetops than the Menfro soils. The moderately well drained Weller soils have more clay in the subsoil and are on ridgetops at a

**APPENDIX B**

**OWNERSHIP AND HISTORICAL DOCUMENTS**

Facilities Located on Parcels A-1 through A-5 Airport

A-1:

900	901	903*	904*	918	925	926
927	930	940	946*	947*	948	949*
958	965	966	971			

A-2:

801\*

A-3:

839

Facilities Located on Parcels B-1 through B05 ( Airport Related)

B-1: 610 617\* 620\* 621\* 622\*  
922\* 923\* 924\* 931\* 936\* 937\*  
938 942\* 951\* 953\* 954 955 957

B-2: No Facilities

B-3: 105\*

B-4: 1049\* 1050\*

B-5: Andrews Road & 155th Street

B-6: 1025

B-7: 1033

\* Scheduled for demolition

Navigational Facilities owned by Air Force are presently in interim lease and are to be transferred to Kansas City

80	83	84	85	87	89
90	841	1027	1401	1800	1900

EAST ALONG THE EAST LINE OF SECTION 34, A DISTANCE OF 49.92 FEET TO A POINT ON THE NORTH LINE OF 155TH STREET, THAT IS 50 FEET NORTH OF THE CENTERLINE THEREOF, AND THE TRUE POINT OF BEGINNING OF THE TRACT OF LAND HEREIN DESCRIBED; THENCE NORTH 86°-21'-47" WEST ALONG SAID NORTH LINE, A DISTANCE OF 303.32 FEET TO A POINT ON THE CENTERLINE OF SCOPE CREEK; THENCE THE FOLLOWING COURSES ALONG THE CENTERLINE OF SCOPE CREEK; THENCE NORTH 37°-48'-39" EAST, A DISTANCE OF 88.51 FEET; THENCE NORTH 22°-00'-00" EAST, A DISTANCE OF 95 FEET; THENCE NORTH 52°-00'-00" EAST, A DISTANCE OF 110 FEET; THENCE NORTH 54°-00'-00" EAST, A DISTANCE OF 50 FEET; THENCE NORTH 73°-00'-00" EAST, A DISTANCE OF 50 FEET; THENCE SOUTH 77°-00'-00" EAST, A DISTANCE OF 40 FEET; THENCE SOUTH 76°-26'-57" EAST, A DISTANCE OF 83.67 FEET; THENCE SOUTH 68°-17'-54" EAST, A DISTANCE OF 47.82 FEET; THENCE SOUTH 76°-50'-01" EAST, A DISTANCE OF 63.19 FEET; THENCE SOUTH 87°-21'-00" EAST, A DISTANCE OF 51.25 FEET; THENCE SOUTH 3°-23'-23" WEST, A DISTANCE OF 240.68 FEET TO A POINT ON THE NORTH LINE OF 155TH STREET; THENCE NORTH 86°-21'-47" WEST, A DISTANCE OF 225.78 FEET TO THE TRUE POINT OF BEGINNING. CONTAINING, 117,506.22 SQUARE FEET, OR 2.70 ACRES, MORE OR LESS.

PARCEL B-3

ALL THAT PART OF THE SOUTHWEST 1/4 OF SECTION 35, TOWNSHIP 47, RANGE 33, IN KANSAS CITY, JACKSON COUNTY, MISSOURI, DESCRIBED AS FOLLOWS: COMMENCING AT THE SOUTHWEST CORNER OF SAID SECTION 35; THENCE SOUTH 86°-21'-37" EAST ALONG THE SOUTH LINE OF SAID 1/4 SECTION, A DISTANCE OF 1321.74 FEET; THENCE NORTH 3°-38'-23" EAST, A DISTANCE OF 54.99 FEET TO A POINT ON THE NORTH LINE OF 155TH STREET AND 55.00 FEET NORTH OF THE CENTERLINE THEREOF, AND THE TRUE POINT OF BEGINNING OF THE TRACT OF LAND HEREIN DESCRIBED; THENCE NORTH 3°-44'-34" EAST, A DISTANCE OF 376.95 FEET; THENCE SOUTH 87°-08'-32" EAST, A DISTANCE OF 180.83 FEET; THENCE SOUTH 3°-30'-24" WEST, A DISTANCE OF 379.41 FEET TO A POINT ON THE NORTH LINE OF SAID 155TH STREET; THENCE NORTH 86°-31'-45" WEST, ALONG THE NORTH LINE OF SAID 155TH STREET, A DISTANCE OF 182.37 FEET TO THE TRUE POINT OF BEGINNING. CONTAINING 68,675 SQUARE FEET OR 1.58 ACRES, MORE OR LESS.

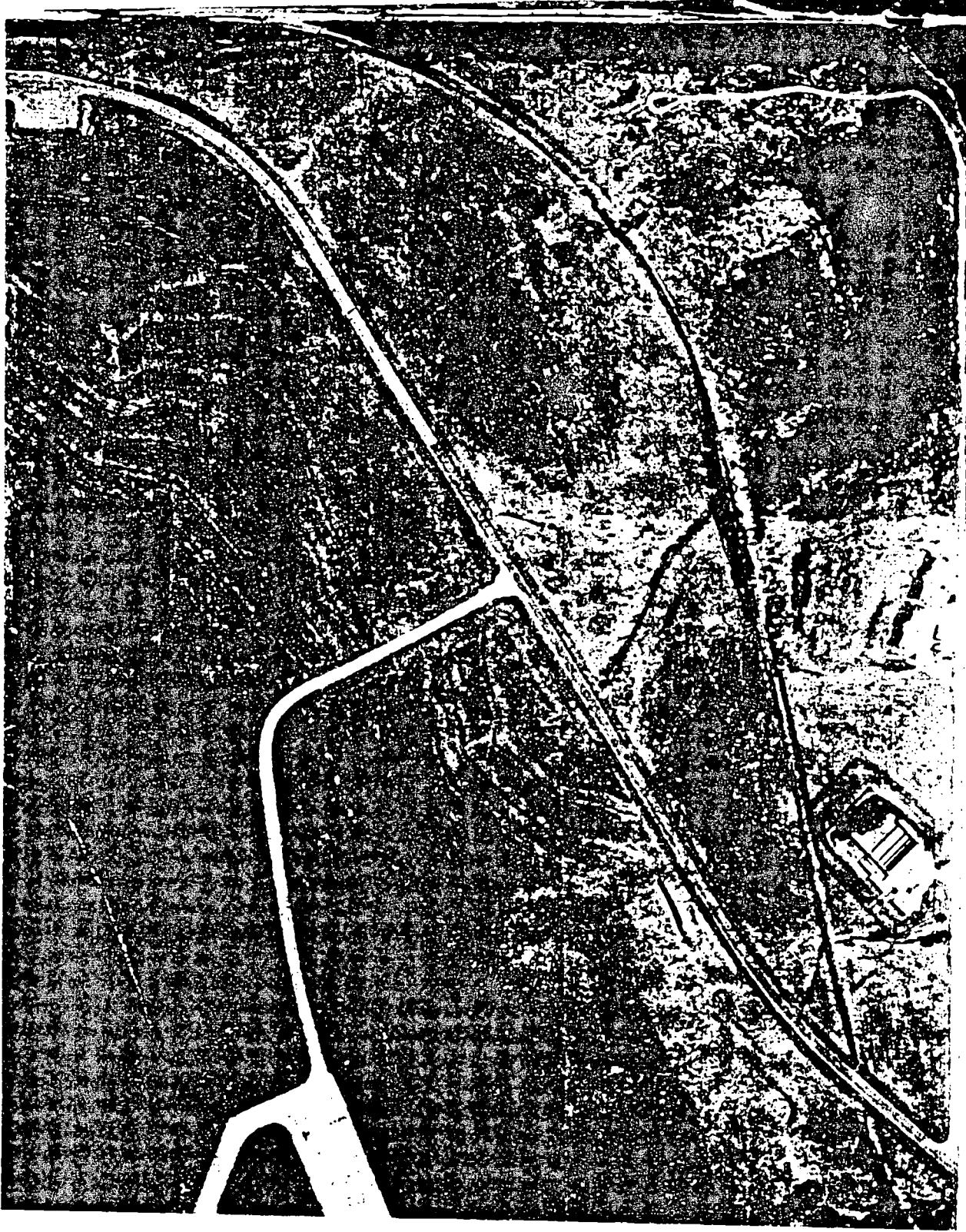
PARCEL B-4

ALL THAT PART OF THE NORTHWEST 1/4 OF SECTION 35, TOWNSHIP 47, RANGE 33, IN KANSAS CITY, JACKSON COUNTY, MISSOURI, DESCRIBED AS FOLLOWS: COMMENCING AT THE SOUTHWEST CORNER OF SAID 1/4 SECTION; THENCE SOUTH 86°-19'-50" EAST ALONG THE SOUTH LINE OF SAID 1/4 SECTION, A DISTANCE OF 2052.93 FEET; THENCE NORTH 3°-40'-10" EAST, A DISTANCE OF 79.56 FEET TO THE TRUE POINT OF BEGINNING OF THE TRACT

OF LAND HEREIN DESCRIBED; THENCE NORTH 21°-38'-05" WEST, A DISTANCE OF 124.20 FEET; THENCE NORTH 50°-10'-12" EAST, A DISTANCE OF 290.00 FEET; THENCE NORTH 80°-33'-03" EAST, A DISTANCE OF 120.00 FEET; THENCE SOUTH 42°-26'-57" EAST, A DISTANCE OF 187.00 FEET; THENCE SOUTH 41°-04'-40" WEST, A DISTANCE OF 263.77 FEET; THENCE NORTH 86°-19'-50" WEST, PARALLEL WITH THE SOUTH LINE OF SAID 1/4 SECTION, A DISTANCE OF 248.69 FEET TO THE TRUE POINT OF BEGINNING. CONTAINING 99,868 SQUARE FEET OR 2.29 ACRES, MORE OR LESS.

PARCEL B-5

ALL THAT PART OF SECTION 34 AND 35, TOWNSHIP 47, RANGE 33, IN JACKSON COUNTY, MISSOURI, AND ALL THAT PART OF SECTIONS 2 AND 3, TOWNSHIP 46, RANGE 33, IN CASS COUNTY, MISSOURI, DESCRIBED AS FOLLOWS: BEGINNING AT THE NORTHEAST CORNER OF THE WEST 1/2 OF THE WEST 1/2 OF SAID SECTION 2; THENCE SOUTH 2°-46'-02" WEST ALONG THE EAST LINE OF THE WEST 1/2 OF THE WEST 1/2 OF SAID SECTION 2, A DISTANCE OF 65.01 FEET; THENCE NORTH 80°-27'-24" WEST, A DISTANCE OF 145.75 FEET; THENCE NORTH 86°-21'-47" WEST ALONG A LINE THAT IS 65.00 FEET SOUTH OF AND PARALLEL WITH THE CENTERLINE OF 155TH STREET, AS MEASURED AT RIGHT ANGLES THERETO, A DISTANCE OF 996.33 FEET; THENCE NORTH 80°-21'-47" WEST ALONG A LINE THAT IS 50.00 FEET SOUTH OF AND PARALLEL WITH SAID CENTERLINE, AS MEASURED AT RIGHT ANGLES THERETO, A DISTANCE OF 2280.98 FEET; THENCE NORTH 10°-18'-43" EAST, A DISTANCE OF 100.68 FEET TO A POINT ON A LINE THAT IS 50.00 FEET NORTH OF AND PARALLEL WITH THE CENTERLINE OF SAID 155TH STREET; THENCE SOUTH 86°-21'-47" EAST ALONG SAID PARALLEL LINE, A DISTANCE OF 933.49 FEET TO A POINT ON A LINE THAT IS 40.00 FEET NORTHWESTERLY OF AND PARALLEL WITH THE CENTERLINE OF 155TH STREET, AS MEASURED AT RIGHT ANGLES THERETO; THENCE NORTH 43°-57'-21" EAST ALONG THE LAST SAID PARALLEL LINE, A DISTANCE OF 805.60 FEET; THENCE SOUTH 46°-09'-52" EAST, A DISTANCE OF 24.90 FEET; THENCE NORTH 43°-53'-54" EAST, A DISTANCE OF 36.57 FEET; THENCE SOUTH 46°-04'-57" EAST, A DISTANCE OF 55.14 FEET TO A POINT ON A LINE THAT IS 40.00 FEET SOUTHEASTERLY OF AND PARALLEL WITH THE CENTERLINE OF SAID 155TH STREET, AS MEASURED AT RIGHT ANGLES THERETO; THENCE SOUTH 43°-57'-21" WEST ALONG THE LAST SAID PARALLEL LINE, A DISTANCE OF 774.36 FEET TO A POINT ON A LINE THAT IS 50.00 FEET NORTH OF AND PARALLEL WITH THE CENTERLINE OF SAID 155TH STREET, AS MEASURED AT RIGHT ANGLES THERETO; THENCE SOUTH 86°-21'-47" EAST ALONG THE LAST SAID PARALLEL LINE, A DISTANCE OF 1329.77 FEET; THENCE SOUTH 89°-13'-41" EAST, A DISTANCE OF 100.09 FEET TO A POINT ON A LINE THAT IS 55.00 FEET NORTH OF AND PARALLEL WITH THE CENTERLINE OF SAID 155TH STREET; THENCE SOUTH 86°-21'-47" EAST ALONG THE LAST SAID PARALLEL LINE, A DISTANCE OF 593.05 FEET; THENCE NORTH 3°-30'-24" EAST, A DISTANCE OF 375.82 FEET; THENCE SOUTH 87°-08'-32" EAST, A DISTANCE OF



Site Name:

Richards-Gebaur Memorial Airport  
55-Acre Tract Along Andrews Road  
Kansas City, Missouri

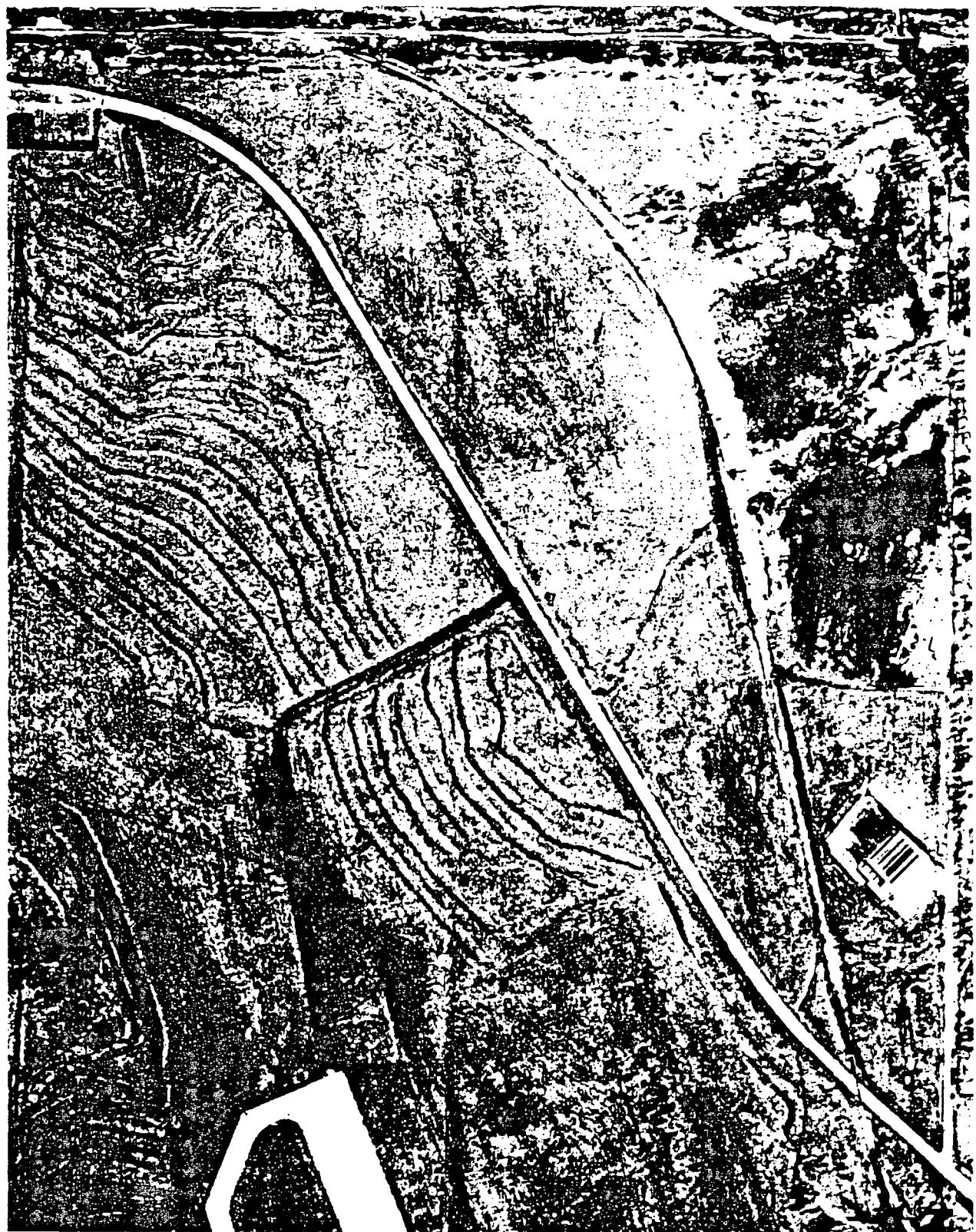
1995 AERIAL  
PHOTOGRAPH

Project No:

5985E110

Date:

10/30/95



Site Name:

Richards-Gebaur Memorial Airport  
55-Acre Tract Along Andrews Road  
Kansas City, Missouri

Project No:

5985E110

1980 AERIAL  
PHOTOGRAPH

Date:

10/30/95



Site Name:

Richards-Gebaur Memorial Airport  
55-Acre Tract Along Andrews Road  
Kansas City, Missouri

1967 AERIAL  
PHOTOGRAPH

Project No:

5985E110

Date:

10/30/95

**APPENDIX C**

**REGULATORY DOCUMENTATION**

The following EDR report was obtained for Building 610 at Richards-Gebaur Memorial Airport; however, the information contained in the EDR report is considered valid for the subject site.

## **The EDR-Radius Map with GeoCheck™**

**Richards-Gebaur AP Bldg 610**  
**15326 Andrews**  
**Kansas City, MO 64147**

**Inquiry Number: 187422.6p**

**August 25, 1995**



**Environmental  
Data  
Resources, Inc.**

**Creators of Toxiccheck®**

**The Source  
For Environmental  
Risk Management  
Data**

**3530 Post Road  
Southport, Connecticut 06490**

**Nationwide Customer Service**

**Telephone: 1-800-352-0050  
Fax: 1-800-231-6802**

## TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
Executive Summary.....	ES1
Topographic Map.....	2
GeoCheck Summary.....	3
Overview Map.....	4
Detail Map.....	5
Map Summary - All Sites.....	6
Map Summary - Sites with higher or the same elevation as the Target Property.....	7
Map Findings.....	8
Orphan Summary.....	9
 <u>APPENDICES</u>	
GeoCheck Version 2.1.....	A1
Government Records Searched / Data Currency Tracking Addendum.....	A6

*Thank you for your business.*  
Please contact EDR at 1-800-352-0050  
with any questions or comments.

### Disclaimer

This Report contains information obtained from a variety of public sources and EDR makes no representation or warranty regarding the accuracy, reliability, quality, or completeness of said information or the information contained in this report. The customer shall assume full responsibility for the use of this report. No warranty of merchantability or of fitness for a particular purpose, expressed or implied, shall apply and EDR specifically disclaims the making of such warranties. In no event shall EDR be liable to anyone for special, incidental, consequential or exemplary damages.

## EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The search met the specific requirements of ASTM Standard Practice for Environmental Site Assessments, E-1527-94, including those associated with governmental databases, search distances and data currency.

The address of the subject property for which the search was intended is:

15326 ANDREWS  
KANSAS CITY, MO 64147

No mapped sites were found in EDR's search of available ("reasonably ascertainable") government records either on the subject property or within the ASTM E-1527-94 search radius around the subject property for the following Databases:

NPL:	National Priority List
Delisted NPL:	NPL Deletions
RCRIS-TSD:	Resource Conservation and Recovery Information System
State Haz. Waste:	Registry and Registry Log
CERCLIS:	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP:	Comprehensive Environmental Response, Compensation, and Liability Information System
CORRACTS:	Corrective Action Report
State LF:	Solid Waste Disposal Areas & Processing Facilities
LUST:	Leaking Underground Storage Tanks
UST:	Underground Storage Tank Information
AST:	Service Station Master Listing
RAATS:	RCRA Administrative Action Tracking System
RCRIS-SQG:	Resource Conservation and Recovery Information System
RCRIS-LQG:	Resource Conservation and Recovery Information System
HMIRS:	Hazardous Materials Information Reporting System
PADS:	PCB Activity Database System
ERNS:	Emergency Response Notification System
FINDS:	Facility Index System
TRIS:	Toxic Chemical Release Inventory System
NPL Liens:	Federal Superfund Liens
TSCA:	Toxic Substances Control Act

Unmapped (orphan) sites are not considered in the foregoing analysis.

### Search Results:

Search results for the subject property and the search radius, are listed below:

### Subject Property:

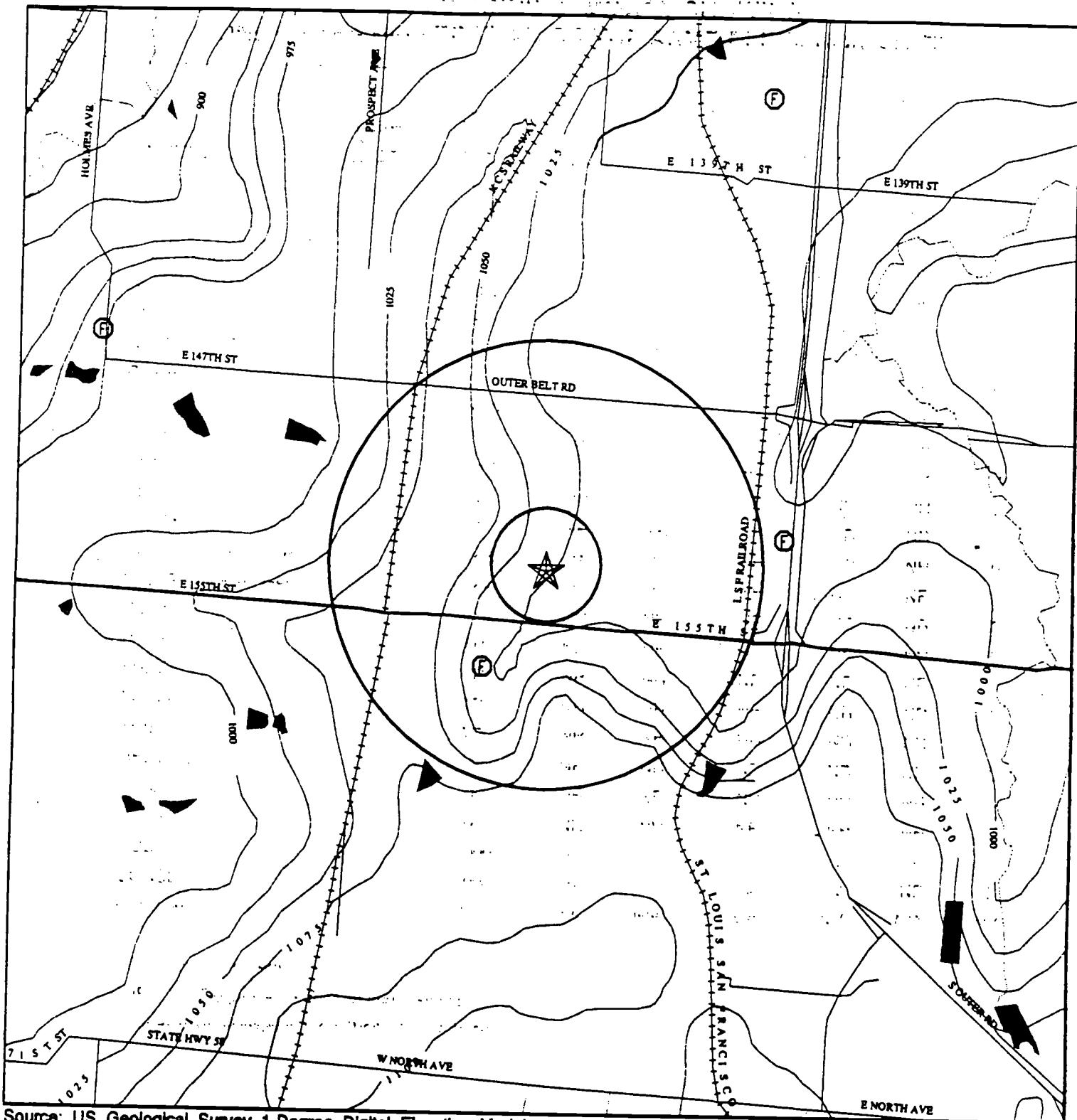
The subject property was not listed in any of the databases searched by EDR.

## EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

<u>Site Name</u>	<u>Database(s)</u>
RICHARDS GEBAUR AIR FORCE BASE	CERCLIS
WAL-MART	LUST
R W HARMON	LUST
FAA - VORTAC	LUST
BRUGGER McDOWELL AUTO UNLIMITED	LUST
TOTAL PETROLEUM (LAT-LONG) LENEXA Q	LUST
BYRAM SITE	LUST
RICHARDO - GEBAUR AIR BASE	LUST
CIRCLE K #2433	LUST
USPCI-KAW YARD OFFICE	LUST
COMMERCE BANK - PRICE DEVELOPMENT C	LUST
WATERWAY GAS & WASH/AMOCO OIL #2384	LUST
PREMIER CADILLAC DEALERSHIP	LUST
AMOCO OIL #2242	LUST
CONOCO #25022	LUST
RICHARDS-GEBAUR AIRPORT	UST
RICHARDS-GEBAUR AIRPORT	UST
RICHARDS-GEBAUR AIRPORT	UST
COTTER & CO	UST
PAYLESS CASHWAYS, INC	RCRIS-SQG,FINDS,UST
RICHARDS-GEBAUR AIRPORT	UST
PAYLESS CASHWAYS INC	RCRIS-SQG,FINDS

# TOPOGRAPHIC MAP - 187422.6p - PSI, Inc.



Source: US Geological Survey 1-Degree Digital Elevation Model  
Compiled 09/15/92

0 1/4 1/2 1 2  
Miles

- N - Major Roads
- N - Contour lines (25 foot interval unless otherwise shown)
- N - Waterways

- (\*) - Earthquake epicenter, Richter 5 or greater.
- (F) (S) - Closest well according to (F)ederal or (S)tate database in quadrant.
- (P) - Closest public water supply well.

TARGET PROPERTY: Richards-Gebaur AP Bldg 610  
ADDRESS: 15326 Andrews  
CITY/STATE/ZIP: Kansas City MO 64147  
LAT/LONG: 38.8482 / 94.549

CUSTOMER: PSI, Inc.  
CONTACT: Rick Leines  
INQUIRY #: 187422.6p  
DATE: August 25, 1995

# GEOCHECK VERSION 2.1

## SUMMARY

### GEOLGIC AGE IDENTIFICATION†

Geologic Code: PP3  
 Era: Paleozoic  
 System: Pennsylvanian  
 Series: Missourian Series

### ROCK STRATIGRAPHIC UNIT†

Category: Stratified Sequence

### GROUNDWATER FLOW INFORMATION

General Topographic Gradient: General ESE  
 General Hydrogeologic Gradient: no hydrogeologic data available.

Note: In a general way, the water table typically conforms to surface topography.‡

### USGS TOPOGRAPHIC MAP ASSOCIATED WITH THIS SITE

Target Property: 2438094-G5 BELTON, MO KS

### FEDERAL DATABASE WELL INFORMATION

<u>WELL QUADRANT</u>	<u>DISTANCE FROM TP</u>	<u>LITHOLOGY</u>	<u>DEPTH TO WATER TABLE</u>
North	>2 Miles	Not Reported	Not Reported
East	1 - 2 Miles	Not Reported	Not Reported
South	1/2 - 1 Mile	Not Reported	Not Reported
West	>2 Miles	Not Reported	Not Reported

### PUBLIC WATER SUPPLY SYSTEM INFORMATION (EPA-FRDS)

Searched by Nearest Well.

Location Relative to TP: >2 Miles South  
 PWS Name: SOUTHFORK MHP  
 1301 N. SCOTT AVE.  
 BELTON, MO 64012

Well currently has or has had major violation(s): No

### AREA RADON INFORMATION

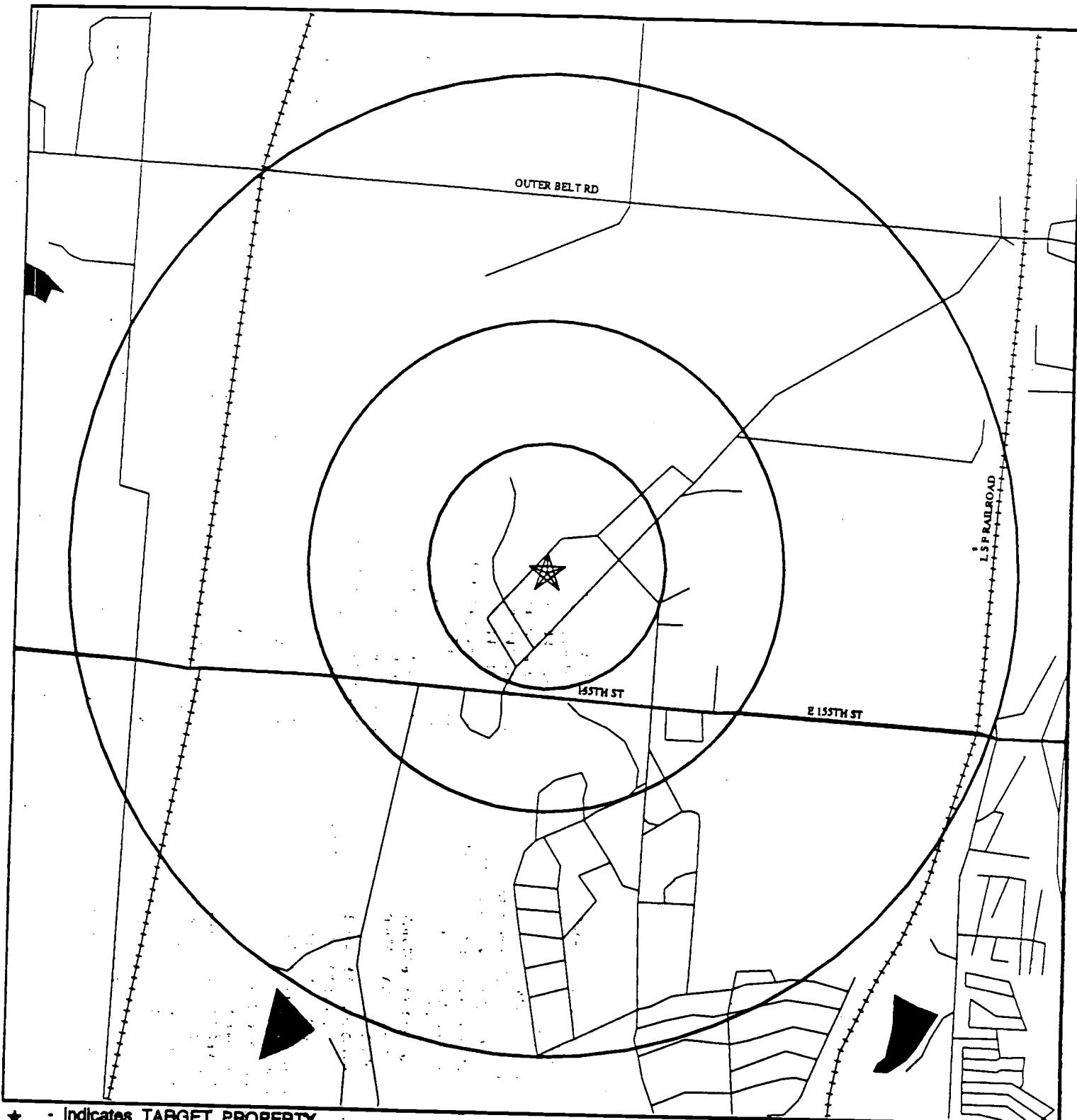
#### JACKSON COUNTY, MO

Number of sites tested: 207

<u>Area</u>	<u>Average Activity</u>	<u>% &lt;4 pCi/L</u>	<u>% 4-20 pCi/L</u>	<u>% &gt;20 pCi/L</u>
Living Area - 1st Floor	3.172 pCi/L	72%	28%	0%
Living Area - 2nd Floor	1.300 pCi/L	100%	0%	0%
Basement	4.266 pCi/L	68%	30%	1%

† Source: P.G. Schruben, R.E. Arndt and W.J. Baucus, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beckman Map, USGS Digital Data Series DDS-11 (1994)  
 ‡ U.S. EPA Ground Water Handbook, Vol I: Ground Water and Contamination, Office of Research and Development EPA/625/6-90/016a, Chapter 4, page 78, September 1990.

OVERVIEW MAP - 187422.6p - PSI, Inc.



- ★ - Indicates TARGET PROPERTY.
- ▲ - Indicates sites at elevations higher than or equal to the target property.
- - Indicates sites at elevations lower than the target property.
- ▲ - Coal Gasification Sites (if requested)
- - National Priority List Sites

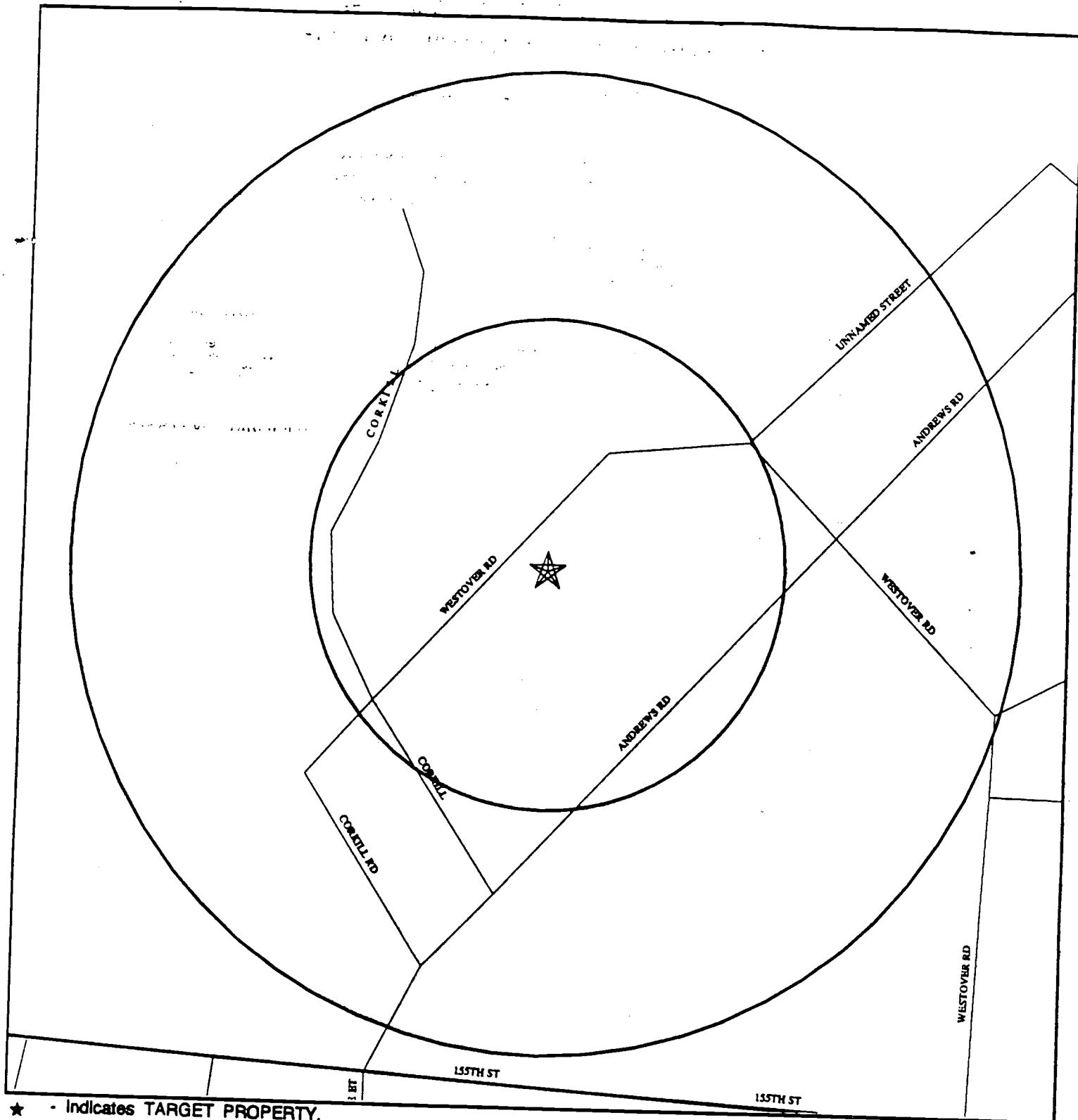
0      1/4      1/2      1  
Miles

- AV - Power transmission lines (USGS DLG, 1993)  
 NV - Oil & Gas pipelines (USGS DLG, 1993)

TARGET PROPERTY: Richards-Gebaur AP Bldg 610  
 ADDRESS: 15326 Andrews  
 CITY/STATE/ZIP: Kansas City MO 64147  
 LAT/LONG: 38.8482 / 94.549

CUSTOMER: PSI, Inc.  
 CONTACT: Rick Laines  
 INQUIRY #: 187422.6p  
 DATE: August 25, 1995

DETAIL MAP - 187422.6p - PSI, Inc.



- ★ - Indicates TARGET PROPERTY.
- ▲ - Indicates sites at elevations higher than or equal to the target property.
- ◆ - Indicates sites at elevations lower than the target property.
- ▲ - Coal Gasification Sites (if requested)
- - Sensitive Receptors
- - National Priority List Sites

0      1/8      1/4  
Miles

- - Power transmission lines (USGS DLG, 1993)  
 △ - Oil & Gas pipelines (USGS DLG, 1993)

TARGET PROPERTY: Richards-Gebaur AP Bldg 610  
 ADDRESS: 15326 Andrews  
 CITY/STATE/ZIP: Kansas City MO 64147  
 LAT/LONG: 38.8482 / 94.549

CUSTOMER: PSI, Inc.  
 CONTACT: Rick Leines  
 INQUIRY #: 187422.6p  
 DATE: August 25, 1995

**MAP FINDINGS SUMMARY SHOWING  
ALL SITES**

<u>Database</u>	<u>Target Property</u>	<u>Search Distance (Miles)</u>	<u>&lt; 1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>&gt; 1</u>	<u>Total Plotted</u>
NPL		1.000	0	0	0	0	NR	0
Delisted NPL		1.000	0	0	0	0	NR	0
RCRIS-TSD		1.000	0	0	0	0	NR	0
State Haz. Waste		1.000	0	0	0	0	NR	0
CERCLIS		0.500	0	0	0	NR	NR	0
CERC-NFRAP	TP	NR	NR	NR	NR	NR	NR	0
CORRACTS		1.000	0	0	0	0	NR	0
State Landfill		0.500	0	0	0	NR	NR	0
LUST		0.500	0	0	0	NR	NR	0
UST		0.250	0	0	NR	NR	NR	0
AST	TP	NR	NR	NR	NR	NR	NR	0
RAATS	TP	NR	NR	NR	NR	NR	NR	0
RCRIS Sm. Quan. Gen.		0.250	0	0	NR	NR	NR	0
RCRIS Lg. Quan. Gen.		0.250	0	0	NR	NR	NR	0
HMIRS	TP	NR	NR	NR	NR	NR	NR	0
PADS	TP	NR	NR	NR	NR	NR	NR	0
ERNS	TP	NR	NR	NR	NR	NR	NR	0
FINDS	TP	NR	NR	NR	NR	NR	NR	0
TRIS	TP	NR	NR	NR	NR	NR	NR	0
NPL Liens	TP	NR	NR	NR	NR	NR	NR	0
TSCA	TP	NR	NR	NR	NR	NR	NR	0
MLTS	TP	NR	NR	NR	NR	NR	NR	0
ROD	1.000	0	0	0	0	NR	0	0
CONSENT	1.000	0	0	0	0	NR	0	0
Coal Gas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TP = Target Property

NR = Not Requested at this Search Distance

\* Sites may be listed in more than one database

**MAP FINDINGS SUMMARY SHOWING  
ONLY SITES HIGHER THAN OR THE SAME ELEVATION AS TP**

<u>Database</u>	<u>Target Property</u>	<u>Search Distance (Miles)</u>	<u>&lt; 1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>&gt; 1</u>	<u>Total Plotted</u>
NPL		1.000	0	0	0	0	NR	0
Delisted NPL		1.000	0	0	0	0	NR	0
RCRIS-TSD		1.000	0	0	0	0	NR	0
State Haz. Waste		1.000	0	0	0	0	NR	0
CERCLIS		0.500	0	0	0	NR	NR	0
CERC-NFRAP		TP	NR	NR	NR	NR	NR	0
CORRACTS		1.000	0	0	0	0	NR	0
State Landfill		0.500	0	0	0	NR	NR	0
LUST		0.500	0	0	0	NR	NR	0
UST		0.250	0	0	NR	NR	NR	0
AST		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
RCRIS Sm. Quan. Gen.		0.250	0	0	NR	NR	NR	0
RCRIS Lg. Quan. Gen.		0.250	0	0	NR	NR	NR	0
HMIRS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
ERNS		TP	NR	NR	NR	NR	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
NPL Liens		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
ROD		1.000	0	0	0	0	NR	0
CONSENT		1.000	0	0	0	0	NR	0
Coal Gas		N/A	N/A	N/A	N/A	N/A	N/A	N/A

TP = Target Property

NR = Not Requested at this Search Distance

\* Sites may be listed in more than one database

**MAP FINDINGS**

Map ID  
Direction  
Distance  
Elevation Site

EDR ID Number  
Database(s) EPA ID Number

Coal Gas Site Search: EDR does not presently have coal gas site information available in this state.

NO SITES FOUND

## ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)	Facility ID
BELTON	1000481425	RICHARDS GEBAUR AIR FORCE BASE	HWY 150 & US 71 HWY	64012	CERCLIS	
BELTON	S101443008	WAL-MART	HWY 58 / US 71	64012	LUST	
BELTON	S100488774	R W HARMON	17327 S 71 HWY	64012	LUST	
KANSAS CITY	U001159835	RICHARDS-GEBAUR AIRPORT	3509 E 147TH ST BLDG 1010	64147	UST	LU1022
KANSAS CITY	U001159837	RICHARDS-GEBAUR AIRPORT	3401 E 155TH TER BLDG 82	64147	UST	UT0012633
KANSAS CITY	U000752660	RICHARDS-GEBAUR AIRPORT	3411 E 155TH TER BLDG 829	64147	UST	UT0012631
KANSAS CITY	S100917043	FAA - VORTAC	HWY 169 / 108TH	64147	UST	UT0012632
KANSAS CITY	S100489503	BRUGGER McDOWELL AUTO UNLIMITED	1005 HWY 25 SOUTH		LUST	LU01913
KANSAS CITY	1000631621	COTTER & CO	14900 S 71 HWY	64147	RCRIS-SQG, FINDS, UST	LU1131
KANSAS CITY	U000752268	PAYLESS CASHWAYS, INC	14330 S 71 HWY	64147	UST	UT0001980
KANSAS CITY	1000830453	PAYLESS CASHWAYS INC	14330 S 71 HWY	64147	UST	UT0003199
KANSAS CITY	S100773573	TOTAL PETROLEUM (LAT-LONG) LENEXA Q	79TH / STATE LINE RD	64147	RCRIS-SQG, FINDS	
KANSAS CITY	U001159836	RICHARDS-GEBAUR AIRPORT	15415 DENVER AVE, BLDG 1301	64147	LUST	LU1354
KANSAS CITY	S100489824	BYRAM SITE	6704 NW HWY 9	64147	UST	UT0012635
KANSAS CITY	S100773813	RICHARDO - GEBAUR AIR BASE	15404 MAXWELL AVE		LUST	LU1950
KANSAS CITY	U001159833	RICHARDS-GEBAUR AIRPORT	15600 SPRUCE AVE BLDG 514	64147	LUST	LU2102
KANSAS CITY	S101099622	CIRCLE K #2433	13011 STATE LINE RD	64147	UST	UT0012625
KANSAS CITY	S101094068	USPCI-KAW YARD OFFICE	STATE LINE RD		LUST	LU3237
KANSAS CITY	S101094069	COMMERCE BANK - PRICE DEVELOPMENT C	STATE LINE RD / 135TH ST		LUST	LU04094
KANSAS CITY	S101094066	WATERWAY GAS & WASH/AMOCO OIL #2384	8507 STATE LINE RD		LUST	LU03473
KANSAS CITY	S101094067	PREMIER CADILLAC DEALERSHIP	8011 STATE LINE RD		LUST	LU01612
KANSAS CITY	S100660708	AMOCO OIL #2242	13013 STATE LINE RD		LUST	LU03368
KANSAS CITY	S100660561	CONOCO #25022	7425 STATE LINE RD		LUST	LU03232
KANSAS CITY	U000752662	RICHARDS-GEBAUR AIRPORT	NO STREET ADDRESS	64147	UST	LU03955
KANSAS CITY	U000752657	RICHARDS-GEBAUR AIRPORT	NO STREET ADDRESS	64147	UST	UT0012634
						UT0012623

**GEOCHECK VERSION 2.1 ADDENDUM**  
**FEDERAL DATABASE WELL INFORMATION**

Well Closest to Target Property (North Quadrant)

**BASIC WELL DATA**

Site ID:	385240094315001	Distance from TP:	>2 Miles
Site Type:	Single well, other than collector or Ranney type		
Year Constructed:	Not Reported	County:	Jackson
Altitude:		State:	Missouri
Well Depth:	685.00 ft.	Topographic Setting:	Not Reported
Depth to Water Table:	Not Reported	Prim. Use of Site:	Not Reported
Date Measured:	Not Reported	Prim. Use of Water:	Not Reported

**LITHOLOGIC DATA**

Geologic Age ID (Era/System/Series):	Pennsylvanian-Middle-Des Moinesian
Principal Lithology of Unit:	Not Reported
Further Description:	Not Reported

**WATER LEVEL VARIABILITY**

Not Reported

**GEOCHECK VERSION 2.1**  
**FEDERAL DATABASE WELL INFORMATION**

Well Closest to Target Property (East Quadrant)

**BASIC WELL DATA**

Site ID:	385100094314501	Distance from TP:	1 - 2 Miles
Site Type:	Single well, other than collector or Ranney type		
Year Constructed:	Not Reported	County:	Jackson
Altitude:	1024.00 ft.	State:	Missouri
Well Depth:	433.00 ft.	Topographic Setting:	Not Reported
Depth to Water Table:	Not Reported	Prim. Use of Site:	Not Reported
Date Measured:	Not Reported	Prim. Use of Water:	Not Reported

**LITHOLOGIC DATA**

Geologic Age ID (Era/System/Series):	Pennsylvanian-Middle-Des Moinesian
Principal Lithology of Unit:	Not Reported
Further Description:	Not Reported

**WATER LEVEL VARIABILITY**

Not Reported

**GEOCHECK VERSION 2.1**  
**FEDERAL DATABASE WELL INFORMATION**

Well Closest to Target Property (South Quadrant)

**BASIC WELL DATA**

Site ID:	385030094331501	Distance from TP:	1/2 - 1 Mile
Site Type:	Single well, other than collector or Ranney type		
Year Constructed:	Not Reported	County:	Cass
Altitude:		State:	Missouri
Well Depth:	32.00 ft.	Topographic Setting:	Not Reported
Depth to Water Table:	Not Reported	Prim. Use of Site:	Withdrawal of water
Date Measured:	Not Reported	Prim. Use of Water:	Domestic

**LITHOLOGIC DATA**

Geologic Age ID (Era/System/Series):	Pennsylvanian
Principal Lithology of Unit:	Not Reported
Further Description:	Not Reported

**WATER LEVEL VARIABILITY**

Not Reported

**GEOCHECK VERSION 2.1**  
**FEDERAL DATABASE WELL INFORMATION**

Well Closest to Target Property (West Quadrant)

**BASIC WELL DATA**

Site ID:	385145094351001	Distance from TP:	>2 Miles
Site Type:	Single well, other than collector or Ranney type		
Year Constructed:	Not Reported	County:	Jackson
Altitude:		State:	Missouri
Well Depth:	965.00 ft.	Topographic Setting:	Not Reported
Depth to Water Table:	Not Reported	Prim. Use of Site:	Not Reported
Date Measured:	Not Reported	Prim. Use of Water:	Not Reported

**LITHOLOGIC DATA**

Geologic Age ID (Era/System/Series):	Pennsylvanian-Middle-Des Moinesian
Principal Lithology of Unit:	Not Reported
Further Description:	Not Reported

**WATER LEVEL VARIABILITY**

Not Reported

**GEOCHECK VERSION 2.1**  
**PUBLIC WATER SUPPLY SYSTEM INFORMATION**

Searched by Nearest Well.

**PWS SUMMARY:**

PWS ID:	MO1048442	PWS Status:	Active	Distance from TP:	>2 Miles
Dir relative to TP:	South	Date Initiated:	November / 1991	Date Deactivated:	Not Reported
PWS Name:	SOUTHFORK MHP 1301 N. SCOTT AVE. BELTON, MO 64012				

Addressee / Facility Type:	Not Reported
Facility Name:	Not Reported

Facility Latitude:	38 48 42	Facility Longitude:	094 31 54
City Served:	SOUTHFORK MHP		
Treatment Class:	Untreated	Population Served:	501 - 1,000 Persons

Well currently has or has had major violation(s): No

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

**Elapsed ASTM days:** Provides confirmation that this EDR report meets or exceeds the 90-day updating requirement of the ASTM standard.

## FEDERAL ASTM RECORDS:

**CERCLIS:** Comprehensive Environmental Response, Compensation, and Liability Information System  
Source: EPA/NTIS  
Telephone: 703-416-0702

**CERCLIS:** CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 03/15/95  
Date Made Active at EDR: 06/08/95

Date of Data Arrival at EDR: 04/25/95  
Elapsed ASTM days: 44

**ERNS:** Emergency Response Notification System  
Source: EPA  
Telephone: 202-260-2342

**ERNS:** Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/94  
Date Made Active at EDR: 05/25/95

Date of Data Arrival at EDR: 04/11/95  
Elapsed ASTM days: 44

**NPL:** National Priority List  
Source: EPA  
Telephone: 703-603-8852

**NPL:** National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, it is EDR's policy to plot NPL sites greater than approximately 500 acres in size as areas (polygons). Sites smaller in size are point-geocoded at the site's address.

Date of Government Version: 05/26/95  
Date Made Active at EDR: 06/06/95

Date of Data Arrival at EDR: 06/06/95  
Elapsed ASTM days: 0

**RCRIS:** Resource Conservation and Recovery Information System  
Source: EPA/NTIS  
Telephone: 202-260-3393

**RCRIS:** Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

Date of Government Version: 05/31/95  
Date Made Active at EDR: 08/22/95

Date of Data Arrival at EDR: 06/28/95  
Elapsed ASTM days: 55

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

## FEDERAL NON-ASTM RECORDS:

**CONSENT:** Superfund (CERCLA) Consent Decrees

Source: EPA Regional Offices

Telephone: Varies

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: Varies

Date of Next Scheduled Update: 09/01/95

**CORRACTS:** Corrective Action Report

Source: EPA

Telephone: 202-260-3393

**CORRACTS:** CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 04/10/95

Date of Next Scheduled Update: 09/18/95

**FINDS:** Facility Index System

Source: EPA/NTIS

Telephone: 800-908-2493

**FINDS:** Facility Index System. FINDS contains both facility information and "pointers" to other sources that contain more detail. These include: RCRIS, PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]), CERCLIS, DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), FRDS (Federal Reporting Data System), SIA (Surface Impoundments), CICIS (TSCA Chemicals in Commerce Information System), PADS, RCRA-J (medical waste transporters/disposers), TRIS and TSCA.

Date of Government Version: 07/27/94

Date of Next Scheduled Update: 10/16/95

**HMIRS:** Hazardous Materials Information Reporting System

Source: U.S. Department of Transportation

Telephone: 202-366-4555

**HMIRS:** Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 06/30/94

Date of Next Scheduled Update: 12/04/95

**MLTS:** Material Licensing Tracking System

Source: Nuclear Regulatory Commission

Telephone: 301-415-7169

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 01/01/95

Date of Next Scheduled Update: 10/16/95

**NPL LIENS:** Federal Superfund Liens

Source: EPA

Telephone: 202-260-8969

**NPL LIENS:** Federal Superfund Liens. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/91

Date of Next Scheduled Update: 11/27/95

**PADS:** PCB Activity Database System

Source: EPA

Telephone: 202-260-3992

**PADS:** PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 10/14/94

Date of Next Scheduled Update: 09/18/95

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

**RAATS:** RCRA Administrative Action Tracking System  
Source: EPA

Telephone: 202-564-4104

**RAATS:** RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA.

Date of Government Version: 04/17/95

Date of Next Scheduled Update: 10/02/95

**ROD:** Records Of Decision

Source: NTIS

Telephone: 703-416-0703

**Record of Decision.** ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 03/31/95

Date of Next Scheduled Update: 12/04/95

**TRIS:** Toxic Chemical Release Inventory System

Source: EPA/NTIS

Telephone: 202-260-2320

**TRIS:** Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/92

Date of Next Scheduled Update: 10/09/95

**TSCA:** Toxic Substances Control Act

Source: EPA/NTIS

Telephone: 202-260-1444

**TSCA:** Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site. USEPA has no current plan to update and/or re-issue this database.

Date of Government Version: 05/15/86

Date of Next Scheduled Update: 09/18/95

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

## STATE OF MISSOURI ASTM RECORDS:

**LUST:** Leaking Underground Storage Tanks  
Source: Department of Natural Resources  
Telephone: 314-526-3349

**LUST:** Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 05/31/95  
Date Made Active at EDR: 07/26/95

Date of Data Arrival at EDR: 06/16/95  
Elapsed ASTM days: 40

**SHWS:** Registry and Registry Log  
Source: Department of Natural Resources  
Telephone: 314-751-1990

**SHWS:** State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: 06/30/95  
Date Made Active at EDR: 08/21/95

Date of Data Arrival at EDR: 07/21/95  
Elapsed ASTM days: 31

**SWF/LS:** Solid Waste Disposal Areas & Processing Facilities  
Source: Department of Natural Resources  
Telephone: 314-751-5401

**SWF/LS:** Solid Waste Facilities/Landfill Sites. SWF/LS type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Section 2004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/15/95  
Date Made Active at EDR: 07/26/95

Date of Data Arrival at EDR: 06/19/95  
Elapsed ASTM days: 37

**UST:** Underground Storage Tank Information  
Source: Department of Natural Resources  
Telephone: 314-751-7326

**UST:** Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 03/31/95  
Date Made Active at EDR: 06/26/95

Date of Data Arrival at EDR: 05/30/95  
Elapsed ASTM days: 27

## STATE OF MISSOURI NON-ASTM RECORDS:

**AST:** Service Station Master Listing  
Source: Department of Agriculture  
Telephone: 314-751-4278

Date of Government Version: 05/01/95

Date of Next Scheduled Update: 11/13/95

### Historical and Other Database(s)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

**Former Manufactured Gas (Coal Gas) Sites:** The existence and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. ©Copyright 1993 Real Property Scan, Inc. For a technical description of the types of hazards which may be found at such sites, contact your EDR customer service representative.

## Disclaimer Provided by Real Property Scan, Inc.

The information contained in this report has predominantly been obtained from publicly available sources produced by entities other than Real Property Scan. While reasonable steps have been taken to insure the accuracy of this report, Real Property Scan does not guarantee the accuracy of this report. Any liability on the part of Real Property Scan is strictly limited to a refund of the amount paid. No claim is made for the actual existence of toxins at any site. This report does not constitute a legal opinion.

### NFRAP: No Further Remedial Action Planned

Source: EPA/NTIS

Telephone: 703-416-0702

**NFRAP:** As of February 1995, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has removed approximately 25,000 NFRAP sites to lift the unintended barriers to the redevelopment of these properties and has archived them as historical records so EPA does not needlessly repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help cities, states, private investors and affected citizens to promote economic redevelopment of unproductive urban sites.

### FRDS: Federal Reporting Data System

Source: EPA/Office of Drinking Water

FRDS provides information regarding public water supplies and their compliance with monitoring requirements, maximum contaminant levels (MCL's), and other requirements of the Safe Drinking Water Act of 1986.

**Area Radon Information:** The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

**Oil/Gas Pipelines/Electrical Transmission Lines:** This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines and electrical transmission lines.

**Sensitive Receptors:** There are individuals who, due to their fragile immune systems, are deemed to be especially sensitive to environmental discharges. These typically include the elderly, the sick, and children. While the exact location of these sensitive receptors cannot be determined, EDR indicates those facilities, such as schools, hospitals, day care centers, and nursing homes, where sensitive receptors are likely to be located.

**USGS Water Wells:** In November 1971 the United States Geological Survey (USGS) implemented a national water resource information tracking system. This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on more than 900,000 wells, springs, and other sources of groundwater.

**Flood Zone Data:** This data, available in select counties across the country, was obtained by EDR in 1994 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

**Epicenters:** World earthquake epicenters, Richter 5 or greater

Source: Department of Commerce, National Oceanic and Atmospheric Administration

**APPENDIX D**

**CLIENT PROVIDED INFORMATION**

**CONTRACT NO: F23608-91-D0020-5016  
RG 93-0024, FIRING RANGE SITE PHASE II,  
RICHARDS-GEBAUR AIR FORCE BASE, MISSOURI**

**FINAL  
REPORT**

**AUGUST 1993**

**91-804-3-018-01**

**Burns and McDonnell Engineering  
Engineers-Architects-Consultants  
Kansas City, Missouri**

## 1.0 INTRODUCTION

### 1.1 SCOPE OF WORK

This report has been prepared by Burns & McDonnell for activities conducted at the firing range (Site) at Richards-Gebaur Air Force Base (RGAFB). The objective of this report is to present the results of the remedial investigation and provide a feasibility study detailing possible remediation and the cost of any remediation options at the Site. Included in this report are sections discussing field, sampling, and analytical procedures; Site geology and soils; nature and extent of contamination; quality assurance; fate and transport; a risk assessment; and conclusions and remedial options. This report has been prepared in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan.

### 1.2 SITE LOCATION

RGAFB is located in west-central Missouri, about 2.6 miles east of the Kansas state line, as shown in Figure 1. Portions of the base are in Jackson and Cass counties. The county line runs east-west through the base. In Cass County, the base is bound by the City of Belton on the east and south, and in Jackson County, the base is bound by Kansas City. Downtown Kansas City is about 18 miles to the north, Grandview is about 3 miles to the northeast, and Belton is about 1 mile to the southeast. The main access to the base is from U.S. Highway 71. The Site is located in the northeast portion of RGAFB south of Andrews Road (see Figure 2).

### 1.3 SITE HISTORY

The Site is a moderately sized firing range currently used for small arms practice and is thought to have been built in the 1950s. Modifications to the original construction were made in 1988. This work included, among other tasks, removing and replacing soil from the face of the berm, increasing the height and width of the berm, and adding a bullet deflector wall on top of the berm. Additional earth work was conducted in 1990 to correct a sloughing problem along the face of the berm. Sloughing is still occurring along the face of the berm.

\* \* \* \* \*

## 2.0 SUMMARY OF FIELD, SAMPLING, AND ANALYTICAL PROCEDURES

### 2.1 SITE ACTIVITIES

#### 2.1.1 Scope

Field activities conducted at the Site included collecting subsurface soil samples from the soil berm, surface soil samples from the firing range and area behind the berm, and surface water/sediment samples from the Site's storm water drainage system and drainage ditch to the west and south of the Site. All samples collected, including quality assurance/quality control (QA/QC) samples, were analyzed for copper, lead, and zinc-contaminants commonly found at firing ranges. Table 1 presents a summary of the samples collected and analytical methods.

Subsurface soil samples were collected by trenching the soil berm forming the firing range backstop. Two trenches were excavated into the inside wall of the northwest-southeast trending portion of the berm. Ten grab soil samples, plus appropriate QA/QC samples, were obtained from each trench. Because the soil berm has undergone extensive rework, including increasing its height and width, the trenches were excavated approximately 30 feet laterally into the berms. Larger metallic pieces were removed from soil samples.

Thirteen composite surface soil samples plus appropriate QA/QC samples were collected from the actual firing range. Four to eight aliquots of soil were collected on a grid system, then composited to produce a surface soil sample. In the areas covered by gravel, the gravel was removed and the soil underneath sampled. Larger metallic pieces were removed from the soil samples.

Three composite surface soil samples were collected from the area behind the soil berm. Aliquots of soil were collected in a line parallel to the northwest-southeast trenching portion of the soil berm and composited. Composited soil samples were obtained at distances of 50, 100, and 200 feet from the northeast berm edge.

Five surface water and five sediment samples were collected from the storm water drainage system and the drainage ditch located east and south of the Site. Surface water and sediment samples were collected from the same sampling points. One sample point was the manhole located on the Site. A second sampling point was located in the drainage ditch upgradient of the Site. A third sampling point was the discharge point of the storm sewer system into the drainage ditch. The fourth and fifth sample points were located downgradient of the discharge point.

#### 2.1.2 Purpose

The purpose of this report is to assess the nature and extent of Site contamination, if any exists, and evaluate potential remedial options. The soil berm on the Site was sampled to determine what amount of contamination, if any, may be present in the soil.

## 4.0 NATURE AND EXTENT

### 4.1 GENERAL

A total of 16 composite surface soil samples, 20 discrete subsurface trench samples, five discrete surface water samples, and five discrete sediment samples were obtained for chemical analyses. The locations from which these samples were obtained and the locations of the trenches are shown on Figures 3, 4, and 5. In addition, duplicate samples, MS\MSD samples, and rinsate blanks were collected in accordance with Sections 2.2.4, 2.3.4, 2.4.4, and 2.5.4. Tables 6, 7, and 8 present the analytical results of all of the samples except the MS/MSD and rinsate blank samples. Chain-of-custody forms are presented in Appendix A. The laboratory analytical reports can be found in Appendix B.

As a small arms range, the weapons expected to have been used at this site include pistols, rifles, and machine guns with calibers of 0.6 inches (15 mm) or less. A typical round of ammunition consists of a bullet or ball, cartridge case that contains the propellant, and cap consisting of an ignition system. The bullets may come with or without an outer metal jacket. Lead and copper contamination at a firing range could potentially be released from the bullets. Copper and zinc contamination could be released from the metal jackets. (Heath, et. al, 1991)

Soil was removed from the face of the berm and replaced in 1988 when it was modified. As a result, the amount of metallic fragments observed in the berm during the sampling was low, and most of the lead levels in the berm material were relatively low.

For clarity, note that no sample was designated SS-14. This sample number was inadvertently skipped during preparation of the work plan. All of the samples proposed in the work plan were collected.

### 4.2 LEAD

The geometric mean of lead levels in Missouri soils is 20 parts per million (ppm approximately equivalent to mg/kg), with an observed range of 10 to 7,000 ppm. A more typical observed range for soils in Jackson and Cass counties is 10 to 90 ppm. Unfiltered lead concentrations in surface water in this region of Missouri are as high as 190  $\mu\text{g}/\text{L}$ . (USGS, 1984). The lead concentrations in the subsurface soil samples obtained from the trenches in the berm (TS-1 through TS-21) ranged from 10.8 mg/kg in TR-1 to 521 mg/kg in TR-14. The two highest concentrations were from samples TS-3 and TS-14, obtained at locations believed to be the remnant of the old berm before the modifications and mining took place.

The lead concentrations in the surface soil samples collected from inside the firing range (SS-1 through SS-13 and SS-18) ranged from 16.2 mg/kg in SS-3 to 144 mg/kg in SS-9. The higher lead concentrations inside the firing range were in the samples closest to the firing line (SS-1 and SS-2) and berm (SS-9 and SS10) on the rifle/pistol side. The lead concentrations in the surface soil samples collected from outside the firing range and behind the berm

**Table 6**  
**Analytical Results from Firing Range Berm Trenching**

Sample Number	Copper	Lead	Zinc
TS-1	8.5 mg/kg	10.8 mg/kg	28.8 mg/kg
TS-2	13.9 mg/kg	15.3 mg/kg	40.8 mg/kg
TS-3	11.4 mg/kg	484 mg/kg	36.6 mg/kg
TS-4	13.7 mg/kg	44.6 mg/kg	38.2 mg/kg
TS-5	27.6 mg/kg	15.1 mg/kg	41.6 mg/kg
TS-6	17.0 mg/kg	110 mg/kg	44.2 mg/kg
TS-7	13.0 mg/kg	17.8 mg/kg	39.4 mg/kg
TS-8	14.5 mg/kg	29.4 mg/kg	40.6 mg/kg
TS-9	7.8 mg/kg	16.1 mg/kg	26.6 mg/kg
TS-10	15.7 mg/kg	45.2 mg/kg	48.2 mg/kg
TS-11	16.7 mg/kg	13.5 mg/kg	62.8 mg/kg
TS-12	16.4 mg/kg	37.4 mg/kg	45.2 mg/kg
TS-13	15.6 mg/kg	11.1 mg/kg	51.2 mg/kg
TS-14	43.8 mg/kg	521 mg/kg	46.2 mg/kg
TS-15	17.7 mg/kg	35.0 mg/kg	55.0 mg/kg
TS-16	20.8 mg/kg	90.0 mg/kg	46.8 mg/kg
TS-17	29.8 mg/kg	57.5 mg/kg	46.0 mg/kg
TS-18	11.9 mg/kg	13.0 mg/kg	44.6 mg/kg
TS-19	16.2 mg/kg	11.5 mg/kg	57.4 mg/kg
TS-20	13.8 mg/kg	15.4 mg/kg	50.2 mg/kg
TS-21*	17.4 mg/kg	133 mg/kg	37.0 mg/kg

\* Duplicate of TS-5

Table 7  
Surface Soil Sample Analytical Results

Sample Number	Copper	Lead	Zinc
SS-1	31.8 mg/kg	106 mg/kg	46.6 mg/kg
SS-2	35.4 mg/kg	110 mg/kg	130 mg/kg
SS-3	14.9 mg/kg	16.2 mg/kg	28.0 mg/kg
SS-4	12.6 mg/kg	34.2 mg/kg	25.8 mg/kg
SS-5	15.3 mg/kg	39.8 mg/kg	32.8 mg/kg
SS-6	17.1 mg/kg	102 mg/kg	34.8 mg/kg
SS-7	14.7 mg/kg	62.8 mg/kg	27.6 mg/kg
SS-8	11.4 mg/kg	76 mg/kg	23.6 mg/kg
SS-9	11.6 mg/kg	144 mg/kg	26.6 mg/kg
SS-10	15.0 mg/kg	103 mg/kg	34.0 mg/kg
SS-11	15.4 mg/kg	55.4 mg/kg	36.0 mg/kg
SS-12	16.0 mg/kg	17.6 mg/kg	35.2 mg/kg
SS-13	29.0 mg/kg	57.2 mg/kg	71.6 mg/kg
SS-15	97.8 mg/kg	756 mg/kg	52.2 mg/kg
SS-16	16.2 mg/kg	646 mg/kg	45.8 mg/kg
SS-17	10.3 mg/kg	924 mg/kg	35.8 mg/kg
SS-18*	14.3 mg/kg	39.4 mg/kg	27.2 mg/kg

\* Duplicate of SS-4

**Table 8**  
**Surface Water and Sediment Sample Analytical Results**

Sample No.	Copper	Lead	Zinc
<b>Surface Water</b>			
SW-1	ND	23.5 µg/L	193 µg/L
SW-2	ND	3.1 µg/L	432 µg/L
SW-3	ND	ND	38.0 µg/L
SW-4	ND	ND	ND
SW-5	ND	ND	28.6 µg/L
SW-6 <sup>1</sup>	ND	ND	372 µg/L
<b>Sediment</b>			
SD-1	12.8 mg/kg	40.0 mg/kg	636 mg/kg
SD-2	14.5 mg/kg	202 mg/kg	739 mg/kg
SD-3	9.2 mg/kg	23.6 mg/kg	79.2 mg/kg
SD-4	9.0 mg/kg	40.2 mg/kg	47.2 mg/kg
SD-5	18.0 mg/kg	52.6 mg/kg	109 mg/kg
SD-6 <sup>2</sup>	14.5 mg/kg	167 mg/kg	878 mg/kg

1. Duplicate of SW-2

2. Duplicate of SD-2

ND= Not Detected above Quantitation Limit

(SS-15 through SS-17) ranged from 646 mg/kg in SS-16 to 924 mg/kg in SS-17. The sampling personnel reported seeing shotgun shot on the ground from the area where SS-17 was collected to within approximately 20 feet of SS-16. The entire area behind the berm is down range of a skeet shooting facility. The elevated lead concentrations in surface soil samples collected behind the berm are primarily due to overshot from the skeet shooting facility.

Contamination, if any, contributed by overshot from the firing range should be negligible by comparison. The location of the skeet range in relation to the Site is shown on Figure 6.

The lead concentrations in the surface water samples collected from the Site (SW-1 through SW-6) ranged from <0.6 µg/L in SW-3, 4, and 5 to 23.5 µg/L in SW-1. The highest concentration was in the sample collected from the drainage system inside the firing range.

The lead concentrations in the sediment samples collected at the Site (SD-1 through SD-6) ranged from 23.6 mg/kg in SD-3 to 202 mg/kg in SD-2. The two highest concentrations were detected in the sample collected at the outfall location and its duplicate.

#### 4.3 COPPER

The geometric mean of copper concentrations in Missouri soils is 13 ppm with an observed range of 18 to 640 ppm. Unfiltered copper concentrations in surface water in this region at Missouri are as high as 200 µg/L (USGS, 1984). The copper concentrations in the subsurface soil samples from the trenches in the berm (TS-1 through TS-21) ranged from 7.8 mg/kg in TR-9 to 43.8 mg/kg in TR-14. The highest concentration of copper in subsurface soil was detected in a sample from an interval believed to be a remnant of the old berm on the machine gun side of the range.

The copper concentrations in the surface soil samples collected inside and outside the firing range (SS-1 through SS-13 and SS-15 through SS-18) ranged from 10.3 mg/kg in SS-17 to 97.8 mg/kg in SS-15. The highest concentration of copper was detected in Sample SS-15, collected behind and closest to the berm.

The copper concentrations in the surface water samples collected at the Site were all below the level of detection for this method which is 2.0 µg/L.

The copper concentrations in the sediment samples collected at the Site (SD-1 through SD-6) ranged from 9.0 mg/kg in SD-4 to 18.0 mg/kg in SD-5. The concentrations of copper in the sediment samples were relatively uniform.

#### 4.4 ZINC

The geometric mean of zinc concentrations in Missouri soils is 49 ppm with an observed range of 18 to 640 ppm. Unfiltered zinc concentrations in surface water in this region of Missouri are as high as 480 µg/L (USGS, 1984). Zinc concentrations in the subsurface soil samples from the trenches in the berm (TS-1 through TS-21) ranged from 26.6 mg/kg in TR-9 to 62.8 mg/kg in TR-11.

Zinc concentrations were relatively uniform in the samples collected throughout the berm.

Zinc concentrations in the surface soil samples collected inside and outside the firing range (SS-1 through SS-13 and SS-15 through SS-18) ranged from 23.6 in mg/kg SS-4 to 130 mg/kg in SS-2. The highest concentration of zinc was detected in Sample SS-2, collected on the pistol/rifle side of the range nearest to the southeast end of the firing line.

Zinc concentrations in the surface water samples collected at the Site (SW-1 through SW-6) ranged from <3.0  $\mu\text{g}/\text{L}$  in SW-4 to 432  $\mu\text{g}/\text{L}$  in SW-2. The two highest concentrations were detected in Sample SW-2 collected from the outfall where the drainage system enters the ditch and its duplicate SW-6. The next highest concentration was detected in sample SW-1 collected from the firing range drainage system.

Zinc concentrations in the sediment samples collected at the Site (SD-1 through SD-6) ranged from 47.2 mg/kg in SD-4 to 878 mg/kg in SD-6. The two highest concentrations were detected in Sample SD-2 collected from the outfall where the drainage system enters the ditch and its duplicate SD-6. The next highest concentration was detected in Sample SD-1 collected from the firing range drainage system. The sample collected from the location furthest upstream in the ditch (SD-5) also had a relatively high concentration of zinc.

\* \* \* \* \*

## 6.0 FATE AND TRANSPORT

### 6.1 INTRODUCTION

The principal contaminants of concern at the site are lead, copper, and zinc. This section summarizes the potential for these compounds to migrate through the surface water, air, and groundwater pathways.

The levels of the contaminants of concern in soil and surface water were evaluated at locations on and off the small arms firing range to assess the nature and extent of contamination and evaluate contaminant mobility. The distribution of firing range metals of concern at the Site was discussed in Section 4.0 of this report.

Lead, copper, and zinc, due to their common low vaporization and solubility characteristics, have similar mobility potential in the environment. Because of these physical characteristics, the potential for Site contaminant migration through the air and groundwater pathways is low. Review of Site data suggests that limited migration of lead and zinc in surface water may be occurring. However, the rate of migration is low and is apparently not impacting sediment or surface water at off-site locations.

### 6.2 SURFACE WATER PATHWAY

#### 6.2.1 Copper

The levels of copper in soil and sediment from the firing range area were generally consistent across the Site, indicating that the firing range may have had little impact of the detected concentrations. The majority of the soil and sediment samples (37 of 44) reportedly had copper levels in the range of 7.8 to 20 mg/kg. Past studies of Missouri soil indicated Missouri soils have geometric mean copper concentrations of 13 to 17 mg/kg (USGS, 1984).

Levels of copper were slightly higher in each of the surface soil composite samples obtained from the firing line areas (29.0 to 35.4  $\mu\text{g}/\text{kg}$ ). This slight elevation in copper concentration may indicate minor leaching from ammunition casings; however, could also reflect normal variations in soil composition. Four subsurface soil samples obtained from the firing range impact berm had similarly elevated concentrations (20.8 to 43.8  $\mu\text{g}/\text{kg}$ ). The highest levels of copper detected were at surface soil sampling location SS-15 in the area behind the impact berm.

Copper levels would have been expected to be greatest in the impact berm if the levels were due to firing range activities. Based on this data, the firing range is expected to have little, if any, impact on Site copper levels. Copper levels detected in on- and off-site sediment samples were consistently within natural levels reported by the literature. As a result, even if the minor elevations in copper concentration detected in on-site soil are related to firing range activities, the releases are not impacting off-site sediment or surface water.

### 6.2.2 Zinc

Similar to the distribution of copper, the variation of zinc levels detected in soil samples collected during the Site assessment was generally low. The detected zinc levels in soil were in the range of naturally expected soil concentrations. Past geochemical soil studies indicate that the geometric mean concentration of zinc in Missouri soil is 49 to 52 mg/kg (USGS, 1984).

The levels of zinc detected in soil samples from the firing range impact berm (26.6 to 62.8 mg/kg) did not appear to be significantly elevated compared to this geometric mean value for Missouri soil. The highest levels of zinc in the surface soil samples were at sampling points SS-2 (130 mg/kg) and SS-13 (71.6 mg/kg), located along the firing lines. The concentration of zinc in the remaining surface soil samples were slightly less, ranging from 23.6 to 52.2 mg/kg, and within the range of naturally occurring levels.

Zinc levels detected in the sediment samples obtained from the Site area were noticeably higher. The highest levels of zinc were detected in samples obtained from the nearest drainage channel sampling points SD-1 (636.0 mg/kg) and SD-2 (739.0 mg/kg). Zinc levels were also slightly elevated (109.0 mg/kg) in sediment obtained from upgradient sediment sampling location SD-5.

Zinc levels in the surface water samples ranged from nondetectable to 432 µg/L. The highest levels were detected in the surface water samples collected from sampling points located nearest to the firing range, SD-2 (432.0 µg/L) and SD-1 (193.0 µg/L). Levels of zinc detected in surface water samples obtained from the downgradient drainage channel were 38 µg/L at sampling point SW-3 and nondetectable at sampling point SW-4. These levels were comparable to the zinc surface water level of 28.6 µg/L detected at an upgradient sampling point.

Higher levels of zinc detected in surface water and sediment samples could suggest some limited wet weather releases of zinc from the property are occurring. However, the firing range soil sampling did not identify a significant source of zinc contamination at the property, so the firing range is not clearly the source of higher levels of zinc present in the surface water and sediment. Regardless of the slightly elevated levels of zinc detected in the Site drainage path, no significant impact on zinc levels in sediment or water obtained from the larger drainage channel downgradient of the Site is indicated. As a result, the releases of zinc from the Site in surface water, if any, is not indicated to be impacting off-site conditions.

### 6.2.3 Lead

Detected levels of lead in surface and subsurface soils at the Site were more variable than the reported zinc and copper detections. The geometric mean natural lead levels in Missouri soil is indicated in past studies to be 20 to 24 mg/kg (USGS, 1984). Levels of lead detected in the Site surface soil and sediment samples were generally higher than this estimated mean concentration range. Approximately one half of the subsurface soil samples collected from the firing range impact berm exceeded these average natural soil levels.

Lead levels in the subsurface soil samples from the firing range berm ranged from 10.8 to 521.0 mg/kg. The highest lead levels were detected in samples (484.0 mg/kg at TS-3 and 521 mg/kg at TS-14) obtained from near the impact berm base. The generally lower concentration of lead in the impact berm soils is assumed to reflect the fact that this soil was placed on the Site in approximately in 1988 after the face of the former berm was removed and replaced.

Site surface soil lead levels were generally higher than the estimated geometric mean level for Missouri soil. Detected levels in surface soil ranged from 16.2 to 924.0 mg/kg. The lowest levels were detected at the firing range, and the highest levels were detected behind the firing range impact berm. Detected levels on the firing range varied between 16.2 to 144 mg/kg. Levels in surface soil samples collected from the area behind the impact berm ranged from 646 to 924 mg/kg. The lead levels detected behind the impact berm are primarily related to shotgun shot originating from a nearby skeet shooting range and not related to activities on the small arms firing range.

The levels of lead in sediment and surface water samples did not indicate that the Site is a source of Site contamination. Low levels of lead were detected in surface water samples collected from near the Site. However, lead was not detected in samples from the nearby downgradient drainage channel. The level of lead detected in sediment collected from drainage channel located upgradient of the Site was 52.6 mg/kg. This was higher than sediment lead levels at other sampling points except SD-2 (202 mg/kg). The high sediment lead levels at SD-2, due to the relatively low sediment lead levels detected on the Site (40 mg/kg), are also potentially caused by a source unrelated to the small arms firing range. Sediment and surface water lead levels downgradient of SD-2 do not indicate that significant migration of lead from the small arms firing range is occurring.

#### **6.3 AIR PATHWAY**

Metals have a low vaporization potential and would not be expected to be present in vapor form at ambient temperatures. Releases through the air pathway would be limited to wind erosion releases. The potential for blowing dust releases at the Site is limited by the vegetative cover. Based on the current surface cover conditions, blowing dust releases would not be expected to be a significant contaminant migration pathway.

#### **6.4 GROUNDWATER PATHWAY**

Movement of the metals of concern through subsurface soils is expected to be limited by the physical characteristics of these metals. For example, unless soils are highly acidic, copper is strongly immobilized in the soil profile by organic matter, oxides of iron, aluminum and manganese, and clay minerals.

In one study conducted by Gores and Balling, virtually no downward movement of copper was observed in silty and clayey soils and only slight movement (1-3 cm) occurred in sandy soils having low cation exchange capacity. Studies near copper smelters indicate that copper emissions tend to accumulate in litter

overlying the soil or within the top few centimeters of the soil profile (Adriano, 1986).

Zinc also typically has a low mobility potential in the soil profile due to its relatively high potential for adsorption and low solubility. However, zinc is soluble in acidic environments and may be somewhat more mobile than copper in the soil profile. Due to the relatively low levels of zinc detected on the Site, significant leaching of zinc into the groundwater would not be anticipated. Sampling data obtained for the Site suggests that zinc detected in firing range area soil is generally within levels expected to be naturally occurring.

In general, lead is expected to have a low potential for migration in the soil profile due to potential for absorption to organics and clays and the formation of low solubility lead complexes. Studies along roadways have indicated that lead contamination by car emissions is typically concentrated in the upper soil profile (0-5 cm) (Adriano, 1986).

The low subsurface mobility of the contaminants of concern and the depth to a usable groundwater aquifer effectively limit groundwater contamination concerns at this Site. Contaminant migration to the groundwater is not expected to result from the observed soil contamination at this Site.

\* \* \* \* \*

- Exposure Assessment - Exposure scenarios are developed where possible exposure pathways are identified and doses which may be received by human receptors are quantitatively estimated.
- Risk Characterization - Doses and toxicity factors are combined to generate a quantitative estimate of risk. If quantitative analysis is not possible due to a lack of specific dose or toxicity information, a qualitative discussion of risk is presented.

The sixth section discusses uncertainties in the risk assessment, and the final section of the report is the summary of the risk assessment process and findings.

## 7.2 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

### 7.2.1 Data Collection and Evaluation

The Site was characterized in a Burns & McDonnell investigation conducted in May 1993. Samples were taken of surface soil inside the firing range area and outside the firing range beyond the berm. Additionally, soil samples were taken within the berm itself by trenching into the berm to evaluate potential variations in soil characteristics or contaminant levels with depth. Samples were also taken of surface water and sediment. The surface water occurs in drainage ditches at and adjacent to the Site, as does the sediment. Samples were analyzed for copper, lead, and zinc, since they were identified as the chemicals most likely to be of interest. Twenty-one samples were collected from the firing range berm during the trenching operation, 17 samples were collected of surface soil, and six samples each of surface water and sediment were collected.

The nature of the Site, as discussed earlier, directed the sampling and analyses. Copper, lead, and zinc were detected at varying concentrations in most of the samples. Geometric mean concentrations are shown in Table 9 for the impact berm, surface soil, and sediment. For comparison, mean values for Missouri agricultural soil are also shown. From this comparison, only lead appears to significantly exceed typical levels.

### 7.2.2 Summary of Chemicals of Concern

At this Site, because of its nature, lead would commonly be considered the only chemical of concern. However, to insure a thorough and complete assessment, all three elements present-copper, lead, and zinc-will be treated as chemicals of concern.

## 7.3 EXPOSURE ASSESSMENT

In the exposure assessment, potential pathways of exposure and potentially exposed populations are identified. Both current and possible future land uses are considered at a Site to identify pathways and populations. Only completed exposure pathways (i.e., a human receptor in

The uncertainty associated with the exposure assessment is appreciable but tends toward a conservative overestimation of exposure and is therefore protective of potentially exposed populations.

#### 7.6.3 Uncertainties from Toxicity Assessment

For some chemical substances, there is little or no toxicity information available, and for many what is available is typically from animal studies. The relative strength of the available toxicological information generates some uncertainty in the evaluation of possible adverse health effects and the exposure level at which they might occur. To ensure a safe margin of error, EPA applies adjustments to the toxicity values, as previously discussed.

In the case of this Site, the substances identified as the chemicals of concern have been reasonably well characterized as to toxicity. Toxicity values were available for copper and zinc. No toxicity values were available for lead. However, lead has been well studied and the levels of exposure necessary for significant risk are known.

#### 7.6.4 Overall Uncertainties

All of the above factors tend to introduce some uncertainty in the final estimate of risk. However in general, the uncertainties are in the direction that the risk has been overestimated, not underestimated.

### **7.7 SUMMARY**

This baseline risk assessment was conducted to determine the risk being posed by chemicals detected in soils, sediment, and surface water at the firing range at RGAFB. It was determined that there are no currently completed significant exposure pathways at the Site. The potential for risk was then conservatively evaluated assuming a future residential land use, even though the most likely land use is industrial. An exposure scenario was developed to evaluate ingestion of surface soil by a child, in order to assess a reasonable maximum exposure.

Risk to a future child resident was determined to be below levels of concern. Since the child resident scenario is considered the most conservative approach, the Site is very unlikely to pose a health risk under any other use situation.

\* \* \* \* \*

## 8.0 CONCLUSIONS AND RECOMMENDATIONS

### 8.1 CONCLUSION

The Firing Range Site field activities consisted of sampling subsurface soil from the impact berm, surface soil sampling, surface water sampling, and sediment sampling. Ten subsurface soil samples were obtained from each of the two trenches installed at the approximate locations shown in Figure 3. A total of 16 composite surface soil samples were collected from the locations shown on Figures 3 and 5. A total of five surface water grab samples and five sediment grab samples were collected from the locations shown on Figure 5. These samples and the associated QA samples were analyzed for lead, copper, and zinc.

The concentrations of zinc and copper detected in the soil and surface water samples are within the range that is considered normal for Missouri soils and regional surface water. The concentrations of lead detected in surface water samples is also within the normal range for regional surface water. Concentrations of lead in many of the soil samples exceeded the range that is considered normal for soils in Jackson and Cass Counties.

Based on the Site data and the physical characteristics of the metal contaminants of concern, the potential for significant migration of lead, copper, and zinc appears to be through the surface water, air, or groundwater pathways. The Site investigation did not indicate that off-site contaminant migration has occurred. Due to the low solubility and vaporization potential of the metals of concern, these metals would be expected to have a low mobility in the environment.

A baseline risk assessment was conducted utilizing the analytical results obtained from the Site investigation in accordance with EPA's Risk Assessment Guidance for Superfund. This risk assessment concluded that there are currently no complete significant exposure pathways at the Site. The risk assessment further concluded that the Site is very unlikely to pose a health risk under any future use situation. The levels of lead in Site soil, although elevated, were within interim cleanup guideline levels established by the EPA for residential areas. Mean lead levels were also below the Missouri Department of Health's proposed any-use soil level for lead. Since future use of the Site is likely to be industrial/commercial, these, residential guideline levels would be considered overly stringent. There are no specific "industrial use" cleanup levels. A quantitative assessment of zinc and copper exposure potential indicated no future exposure risk associated with the detected metal levels exists.

### 8.2 RECOMMENDATIONS

Based on this investigation, the concentrations of lead, copper, and zinc at the Firing Range Site are below levels of concern and do not require any remedial action. However, the levels of lead detected on the site are apparently elevated above background levels.

The highest concentrations of lead were encountered in soils behind the impact berm. Lead contamination detected in this area is primarily due to over shot from a nearby skeet range not associated with the RGAFB. Therefore, the contamination in the area behind the berm could continue to increase in the future if the skeet range remains in operation. It is advisable to sample behind the berm and inside Air Force property to determine what contamination the Skeet Range is contributing to the soil. An estimate for this sampling is included in Appendix E.

Based on available analytical data, the soils and surface water at the firing range site would not be considered hazardous waste and no releases of Site contaminants to the environment have been identified. Based on this information, Burns & McDonnell is aware of no reporting requirements related to current site conditions. A toxicity characteristic leaching procedure (TCLP) analysis of site soils would be required if soils were excavated for off-site disposal. If the soils failed the TCLP test, they would need to be managed as hazardous waste.

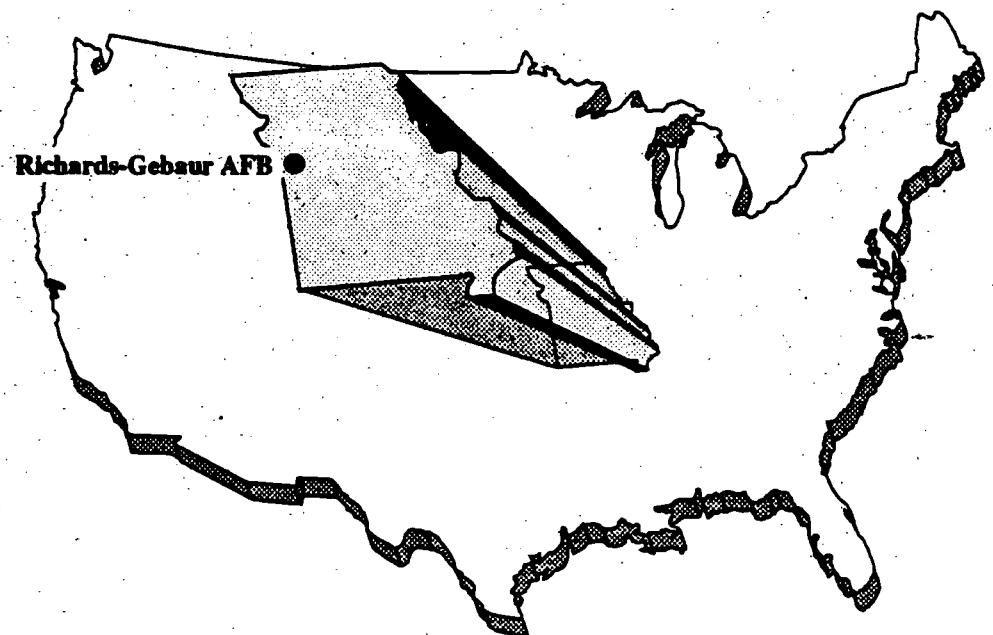
The estimate for leveling the firing range berm to grade, which was required by the statement of work, is included in Appendix E. Leveling the berm is not a recommendation of this report.

\* \* \* \* \*



**BASEWIDE  
ENVIRONMENTAL BASELINE SURVEY  
RICHARDS-GEBAUR AIR FORCE BASE,  
MISSOURI**

**December 1993**



# Environmental Baseline Survey Errata Sheet

Page	Section	Paragraph	Line	Error corrections
S-4	*	5	4-5	Lead has been found in the sediments of a drainage swale located in the central region of the Cantonment Area.
S-4	*	7	1-2	The area northwest of the POL Storage Yard contains construction debris on the surface. It has not been determined if the area qualifies as a landfill.
S-5, S-6, and S-7	*	5	15-16	The central drainage swale/wetland in Area D-3 is contaminated with lead ten times greater than the USEPA recommended action range. This should be Category 7 property. Excavation of a fuel line in Area D-1 proved contaminated soil is present. A portion of Area D-1 should be Category 6 property. FT002 has an area contaminated with lead greater than the USEPA recommended action range. A portion of Area B-1 should be Category 6 property. These corrections apply throughout the EBS.
S-5	*	6	All	Some of the property identified as "Category 7" is not, and some areas should have been classified "Category 7" instead of "Category 1" (Uncontaminated).
S-7	*	*	*	The Small Arms Range is classified as "Category 3"; samples confirm this fact. The POL Storage Yard is larger than shown. Immediately north of the POL Storage Area is a "Category 3" area. The NDI Laboratory is "Category 7" property.
2-5	*	7	*	Refer to errata for page S-4.
3-2	*	*	*	Remove all property improvements in the section of land containing the Belton Training Complex property. No roads or structures existed in 1955 within the section.
3-4	*	*	*	Change the Belton Training Complex coding to "Industrial Use."
3-5	*	*	*	Change the NDI Laboratory coding to "Aviation Support."
3-6	3.2	2	5	Replace the term "sites" with "parcels."
3-7	3.2	4	3-4	Replace "The effluent is held ...and passed through..." with "A portion of the flight line area is served by a detention reservoir (Facility 943) which processes effluent through..."
3-8	*	*	*	Add a surface impoundment 3/8" southwest of the POL Storage Yard on this figure.
3-12	3.3.1.2	bullet 2	9	Replace the term "rounds" with "shell casings."
3-13	3.3.2	2	2	Replace "1983" with "September 1982."
3-13	3.3.2	5	9-10	Replace the sentence "An interim removal...Site SS006" with "Interim removal/remedial actions have been completed at sites SS003, SS004, SS006, ST007 and SS009."



## SUMMARY

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This Environmental Baseline Survey (EBS) has been prepared to document the physical condition of real property at Richards-Gebaur Air Force Base (AFB), Missouri resulting from the storage, use, and disposal of hazardous substances and petroleum products and their derivatives over the installation's history, and to establish a baseline for use by the Air Force in making decisions concerning real property transactions. The preparation of an EBS is required by Department of Defense (DOD) policy before any property can be sold, leased, transferred, or acquired. Although primarily a management tool, this EBS will also be used by the Air Force in meeting its obligations under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 United States Code Section 9620(h), as amended by the Community Environmental Response Facilitation Act (CERFA), Public Law 102-426.

This EBS is based on information obtained through a records search, interviews, and visual inspections. The records search included a review of all available Air Force and other agency records, including environmental restoration and compliance reports, audits, surveys, facility drawings, and inspection reports; an analysis of aerial photographs; and a review of recorded chain of title documents for the property. Interviews with employees and visual inspections of the base property and facilities were also conducted. The EBS also includes an assessment of the environmental condition of off-base properties contiguous to or relatively near the base that could pose environmental concern and/or affect the subject property. Physical inspections were conducted on off-base properties where access was obtained from the owner or operator.

Based on an analysis of the available data, property on Richards-Gebaur AFB was classified into one of seven categories:

- Category 1 - Areas where no storage, release or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas)
- Category 2 - Areas where only storage of hazardous substances or petroleum products has occurred (but no release, disposal, or migration from adjacent areas has occurred)
- Category 3 - Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, but at concentrations that do not require a removal or remedial action

- Category 4 - Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, and all remedial actions necessary to protect human health and the environment have been taken
- Category 5 - Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, removal and/or remedial actions are under way, but all required remedial actions have not yet been taken
- Category 6 - Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, but required response actions have not yet been implemented
- Category 7 - Areas that are unevaluated or require additional evaluation.

Property in the first four categories would be eligible for deed transfer. Property in the last three categories would not be considered for transfer until all necessary actions have been taken and the property has been reclassified into one of the first four categories. Leases would be considered on a case-by-case basis for properties within the last three categories.

## ON-BASE PROPERTY FINDINGS

### Property Categorization Resources

The following resources were used in property categorization. Each resource was categorized individually; findings for each resource were then reviewed to obtain the overall property category.

Category 2 through 7 properties were identified based upon the methodology presented in Chapter 2. All remaining areas were determined to be Category 1.

Areas that stored hazardous materials and/or generated hazardous waste were considered Category 2 unless a suspected or confirmed release was identified. These include dormitories and offices where it is likely that household or office products containing hazardous substances were stored.

Category 3 designations for the apron were based upon existing documentation (e.g., personnel interviews, visual site inspections, written information). Spills are known to have occurred on the apron area, but the spill reports indicate that releases were minor and all appropriate cleanup actions were taken. Contaminant levels, if present, are considered to be well below action levels.

**Medical/Biohazardous Waste.** Medical/biohazardous wastes at Richards-Gebaur AFB have been generated at two facilities. The waste is disposed off base by a licensed contractor.

**Ordnance.** The Small Arms Range will be cleared of any unexploded ordnance prior to base closure. Lead levels in the soil at the Small Arms Range were sampled in 1993, and found to be below regulatory action levels. Historic maps and findings from recent visual inspections indicate that ordnance disposal may have taken place at the Belton Training Complex.

**Wastewater Discharges.** Sanitary sewage effluent from Richards-Gebaur AFB discharges into the Little Blue Valley Sewer District. There are also three active septic tank systems with leach fields located on Richards-Gebaur AFB property.

To minimize contaminants entering the storm drainage or sanitary sewer systems, the base has a separate industrial waste sewer that serves some maintenance facilities and the flightline area. The effluent is stored in a detention reservoir and then passed through an OWS prior to being discharged into the Little Blue Valley Sewer District System.

Richards-Gebaur AFB has filed for a Discharge Permit (Forms E and F) with MDNR. In a recent study, sediment and surface water in major drainage swales and tributaries on the base were investigated for hazardous characteristics. No indications of significant contamination were found, and no remediation of sediment or surface water is required.

**Radioactive and Mixed Wastes.** There are no radioactive or mixed waste sites or issues at Richards-Gebaur AFB.

**Solid Waste.** There are no active landfills at Richards-Gebaur AFB, and no known historical landfills.

#### **Disclosure Resources**

Disclosure resources (asbestos, polychlorinated biphenyls [PCBs], radon, and lead-based paint) were not used in property categorization.

**Asbestos.** A comprehensive basewide asbestos assessment study was completed in September 1987. The study included the 71 buildings on base at that time. Of the buildings surveyed, 39 were identified as having asbestos-containing material (ACM), and 32 buildings either had no suspected material found or all samples taken were negative for ACM. Facility 942 has been closed due to the condition of ACM.

**Polychlorinated Biphenyls.** All Air Force-owned transformers with 50 parts per million (ppm) or more PCBs have either been replaced with PCB-free equipment or retrofitted to bring the PCB concentration to below 50 ppm.

**Radon.** Based on radon samples taken by Cass and Jackson counties, the potential for radon greater than 4.0 picocuries per liter exists at Richards-Gebaur AFB. No radon surveys have been completed at Richards-Gebaur AFB because there is no family housing on base.

**Lead-Based Paint.** There are no residential or other high-priority facilities on base that present the risk of exposing children to lead-based paint. Facilities that were constructed prior to the implementation of the DOD ban on the use of lead-based paint in 1978 are likely to contain such paint.

#### OFF-BASE PROPERTY FINDINGS

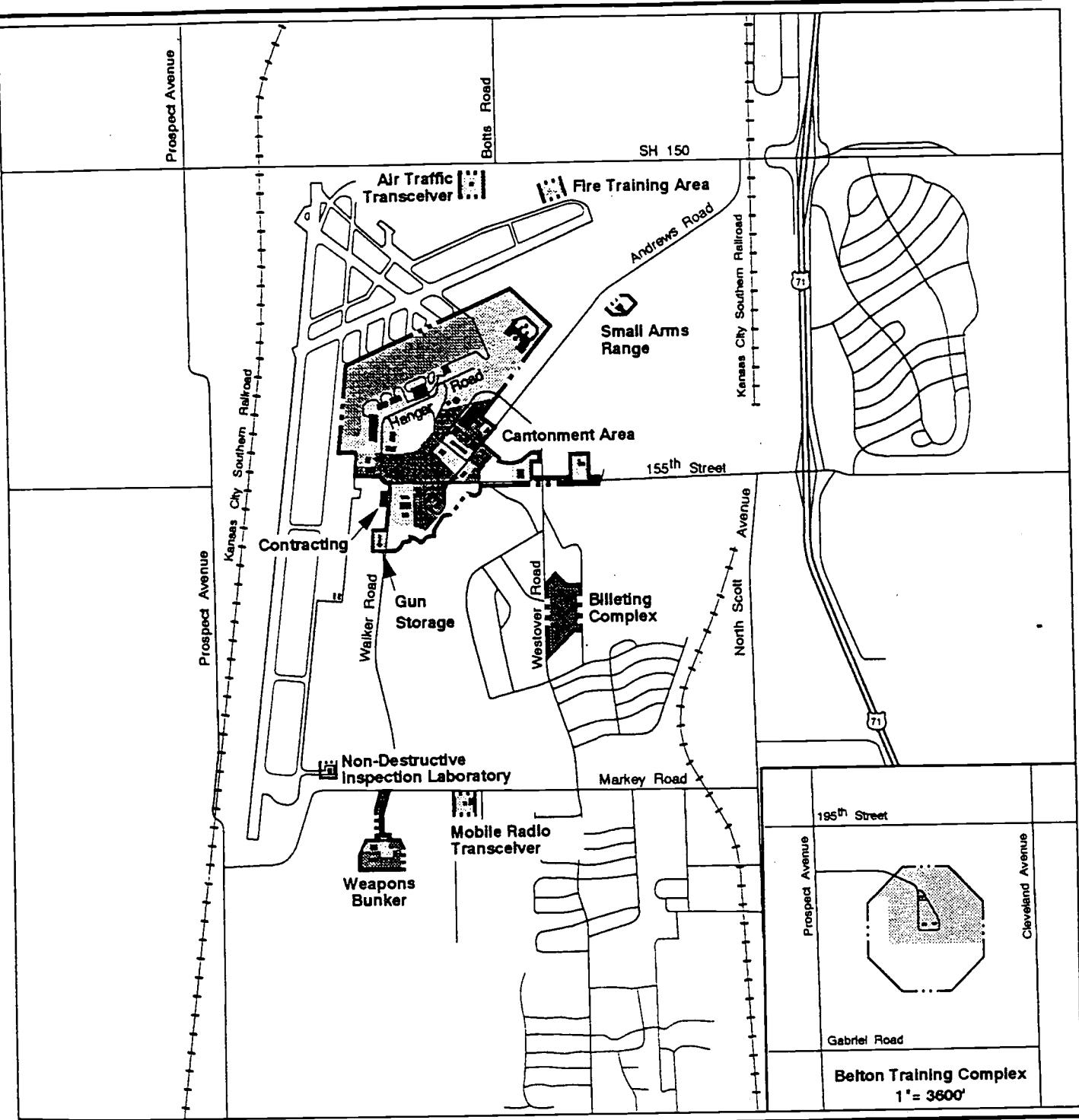
Of the 16 contiguous properties surveyed, 10 were physically inspected. Based on the records search and site inspections of the properties conducted for this EBS, there are no areas on Richards-Gebaur AFB where it is known that contamination has resulted from activities on any of the off-base properties; however, areas of possible concern were noted on contiguous properties during the survey. Other than Formerly Used Defense Sites, no off-base parcels are known to have been contaminated from activities on Richards-Gebaur AFB.

#### PROPERTY CATEGORIZATION

As described previously, property on Richards-Gebaur AFB was classified into one of the seven categories based on the findings of the EBS (Figure S-1). Category 1 properties were identified in three vacant and undeveloped areas in the central, eastern, and southern portions of the Cantonment Area, as well as in the southern portion of the Belton Training Complex. Category 2 properties are present in the Cantonment Area in two small areas along the flightline, as well as in most of the central portion of the Cantonment Area. The northeastern and southern portions of the Weapons Bunker, and the access road, are also classified as Category 2 properties. Additional Category 2 properties have been identified as constituting all of the Billeting Complex and Contracting parcels. Category 3 properties consist of the apron area and one small area at the southern end of the flightline. No Category 4 properties were identified at Richards-Gebaur AFB. One Category 5 property was identified at an IRP site at the southern end of the Air Force parking apron. One Category 6 property was identified at an IRP site in the northeastern portion of the Cantonment Area.

Category 7 properties are present on much of the Cantonment Area: a large area in the northeast, along the northern portion of the flightline, in the east along 155th Street, and in three smaller areas in the central and southern

portions. Category 7 properties have also been identified as constituting all of the Air Traffic Transceiver, Fire Training Area, Small Arms Range, Non-Destructive Inspection Laboratory, Gun Storage, and Mobile Radio Transceiver parcels. In addition, Category 7 properties have been identified in the northwest and central areas of the Weapons Bunker and the northern portion of the Belton Training Complex.



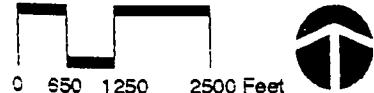
## **EXPLANATION**

-  Uncontaminated Property (Category 1)
  -  Hazardous substance stored - no release (Category 2)
  -  Hazardous substance release, below action levels (Category 3)
  -  Hazardous substance release, all actions have been taken (Category 4)

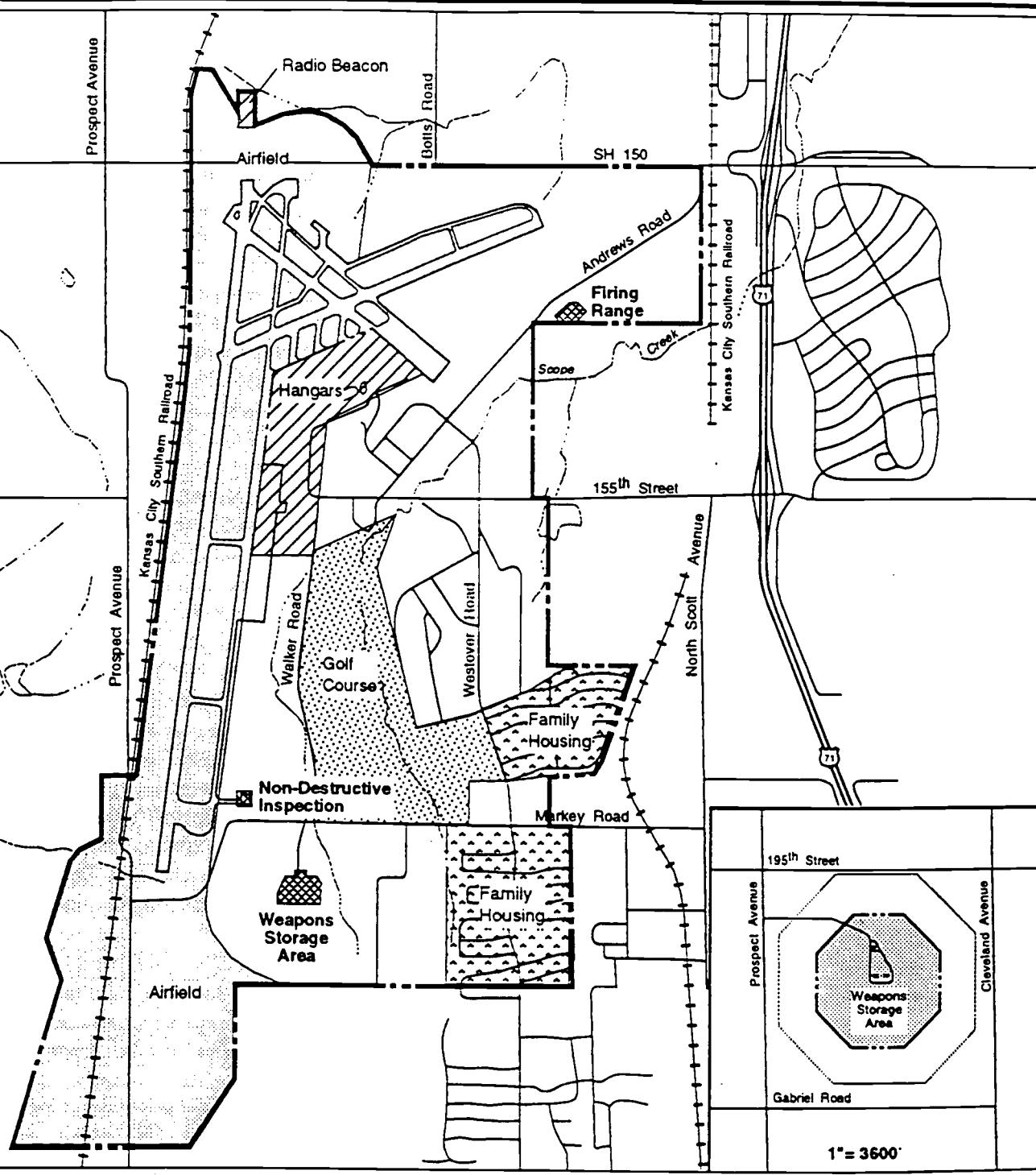
- Hazardous substance release, not all actions have been taken (Category 5)
- Hazardous substance release, no actions taken (Category 6)
- Areas requiring additional evaluation (Category 7)

----- Base Boundary

## Property Categorization



**Figure S-1**

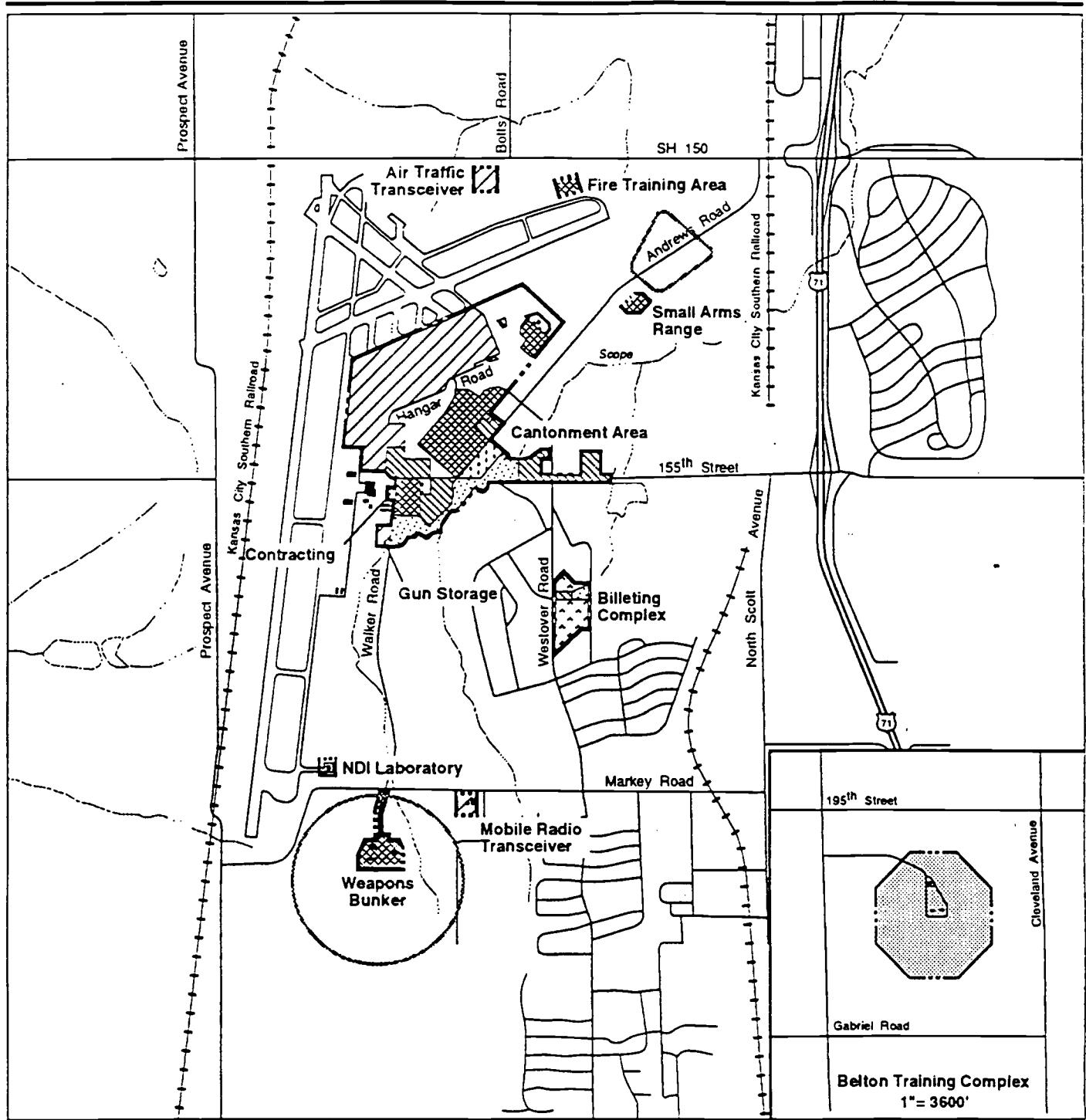


#### EXPLANATION

Airfield	Institutional (Education) (a)	Agriculture
Aviation Support	Commercial (a)	Vacant Land
Industrial	Residential	Base Boundary
Institutional (Medical) (a)	Public/Recreation	Easement
0 625 1250 2500 Feet	(a) Standard land use designation not applicable to this figure.	

#### Major Land Use Changes (1966)

Figure 3-2



#### EXPLANATION

[White Box]	Airfield (a)	[Solid Black Box]	Institutional (Education) (a)	[Cross-hatched Box]	Agriculture
[Diagonal Hatching]	Aviation Support	[Horizontal Hatching]	Commercial	[Wavy Lines]	Vacant Land
[Dotted Box]	Industrial	[Dotted Box]	Residential	[Dashed Line]	Base Boundary
[Dotted Box]	Institutional (Medical)	[Dotted Box]	Public/Recreation	[Solid Line]	Easement
[Scale Bar]	0 625 1250 2500 Feet	[Teardrop Logo]	(a) Standard land use designation not applicable to this figure.		

#### 1993 Land Use

Figure 3-3

airfield. These mains are a 12-inch and an 8-inch pipeline that both feed into a city meter pit on the south side of M-150. A 12-inch outlet from the meter pit feeds a 1,060,000-gallon and a 50,000-gallon in-ground tank. These tanks and the 12-inch main feed the water department's pump station, Facility 938.

The system distributes water through 12-inch output mains to provide the base domestic water and fire protection needs. This system supplies two additional storage tanks: a 320,000-gallon in-ground tank located near the flightline for fire protection (owned and operated by Kansas City), and an elevated 400,000-gallon steel tank at the south end of the system to provide pressure.

**Wastewater.** Wastewater generated on base is collected and discharged to the Little Blue Valley Sewer District Interceptor B. Interceptor B is a 12-inch pipeline that runs parallel to and west of U.S. 71 before heading west along M-150 and then turning southwest and onto the base. Sanitary sewers on base consist of 6-inch to 18-inch reinforced concrete pipes. Three active septic systems serve remote ancillary buildings.

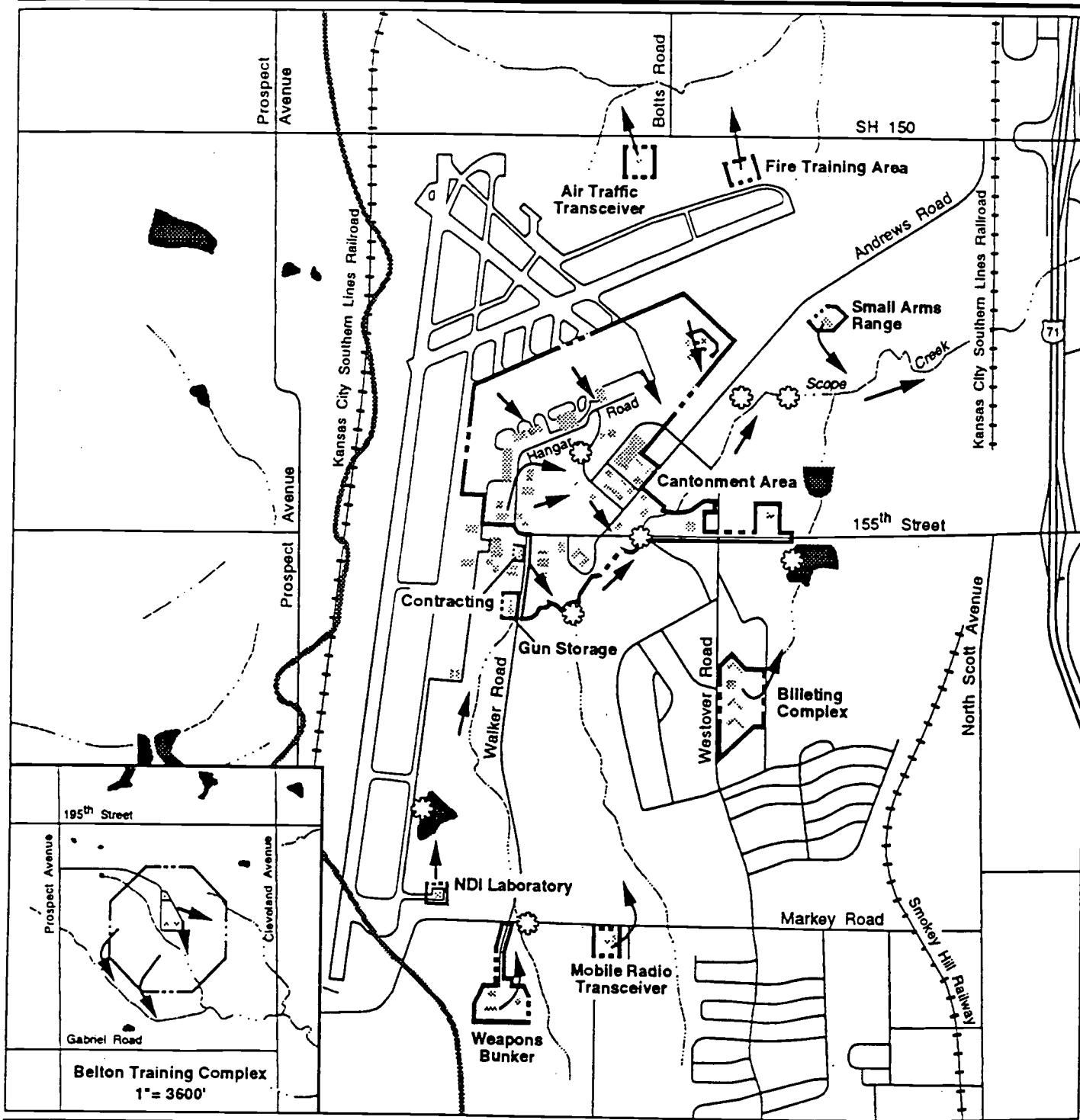
To minimize contaminants entering the storm drainage or sanitary sewer systems, the base has a separate industrial waste sewer that serves some maintenance facilities and the flightline area. The effluent is held in a detention reservoir (Facility 943) and passed through an OWS prior to being discharged into the Little Blue Valley Sewer District system.

**Drainage Patterns.** The airfield and on-base storm drainage facilities consist of a combination of open channels and closed drainage systems. The closed drainage systems include pipes ranging in diameter from 18 inches to 66 inches. All base stormwater drains into Scope Creek, which flows into the Little Blue River, which flows from southwest to northeast (Figure 3-4).

**Solid Waste.** Solid waste generated on Richards-Gebaur AFB is hauled off base by a commercial hauler and deposited in the Johnson County landfill in Shawnee, Kansas. Medical wastes are collected and disposed of off base by a private contractor.

**Electricity.** Missouri Public Service provides electricity to Richards-Gebaur AFB through two substations: the north substation, which has a 3,750-kilovolt ampere (kVA) capacity and provides primary service to the Cantonment Area, and the 7,500-kVA south substation. Electrical power is delivered to the north substation at 34.5 kilovolts (kV), and to the south substation at 69 kV. A combination of overhead and underground lines distribute electricity to the base buildings.

**Natural Gas.** Gas Service, a division of Western Resources, Inc., provides natural gas to the base via two high-pressure pipelines. A 4-inch pipeline



#### EXPLANATION

- Watershed Divide between Blue River and Little Blue River
- Intermittent Stream
- Surface Impoundment
- Base Boundary
- Water Quality Sampling Location
- Surface Flow Direction (Approximate)

3-8

Richards-Gebaur AFB EBS

#### Surface Hydrology

Figure 3-4

December 8, 1993

Medical and dental X-ray operations (Facility 604) produce photochemical wastes and utilize silver recovery units. The silver recovery units treat photochemical wastes prior to discharge to the local sewage system. A study to determine the extent of mercury contamination in Facility 604 is discussed in Section 3.3.1.2.

Based upon the methodology presented in Chapter 2, no evidence of a release occurring was identified at Facility 601, and it is considered Category 2. Contamination has been confirmed at Facility 604, and investigation and remedial actions are in progress, so it is considered Category 7. These facilities are listed in Table 5-1 and shown in Figure 5-1.

### 3.3.7 Ordnance

There are no grenade or skeet ranges at Richards-Gebaur AFB. Facilities 1049 and 1050 comprise the Small Arms Range. This range will be cleared of unexploded ordnance prior to disposal. The Small Arms Range was studied in a Phase II project (Firing Range Site Phase II, 1993). The report concluded that lead levels in site soils are above background levels but below levels requiring remedial action. Ordnance may have been disposed of by burning or blasting within the Belton Training Complex; rifle rounds were discovered during the VSI.

Facilities 1049 and 1050 have not been surveyed for unexploded ordnance, and are therefore considered Category 7. No investigations have been conducted at the Belton Training Complex to determine if any unexploded ordnance or residual soil contamination exists; therefore, this site is also considered Category 7.

### 3.3.8 Wastewater Discharges

Wastewater systems at Richards-Gebaur AFB consist of the sanitary sewer line, the industrial sewer line, and storm drainage.

The sanitary sewer system is connected to the Little Blue Valley Sewer District. The industrial sewer line collects effluent from the flightline and from industrial shops on base and discharges it into Facility 943, a detention reservoir. The effluent passes through an OWS (Facility 9470) and is then discharged to the sanitary sewer line leaving base. An environmental assessment of the detention reservoir is in progress. The Sanitary Sewer/Storm Water Runoff Study (Geraghty and Miller, 1991a) identified a drain at Facility 1201 as potentially draining to a leach field, and identifies interior drains in Facilities 605, 930, 948, 958, 965, and 966 that drain into the storm sewer system.

Storm water leaving the base was studied in the Water Course Soil Assessment, Richards-Gebaur AFB, Missouri, Phase II Final Report. This

### **3.4.2 Polychlorinated Biphenyls**

All transformers with 50 parts per million (ppm) or more PCBs have either been replaced with PCB-free equipment or retrofitted to bring the PCB concentration to below 50 ppm, and U.S. EPA, Region VII, issued a Notice of Compliance to that effect on October 21, 1993. A history of base transformers and their PCB concentrations is provided in Table 3-7. Figure 5-1 shows the locations of transformers that may have contained PCB fluids in the past. Although the status of all PCB transformers could not be determined by the records search, the Environmental Management Office reported that the base is PCB-free and all PCB transformers have been retrofitted.

### **3.4.3 Radon**

The Air Force sold or transferred all properties utilized as family housing or schools prior to implementation of the Radon Assessment and Mitigation Program; therefore the Air Force has not and does not plan to conduct any radon studies to determine the concentrations of radon in structures at Richards-Gebaur AFB. Results of a 1988 study (Missouri Department of Health, 1988) showed that more than 80 percent of samples in Cass County and more than 60 percent in Jackson County had radon levels below the U.S. EPA's recommended mitigation level of 4 picocuries per liter (pCi/l). The remainder of the samples had radon levels between 4 and 20 pCi/l, except 1 percent of the Jackson County samples, which were above 20 pCi/l.

### **3.4.4 Lead-Based Paint**

The use of lead-based paints declined after 1978. A comprehensive basewide survey to determine the use of lead-based paint at Richards-Gebaur AFB has not been conducted. Facilities constructed prior to the implementation of the DOD ban on the use of lead-based paint in 1978 are likely to contain such paint. There are 95 buildings on base that were constructed prior to or during 1978. Another nine buildings have unknown construction dates. Table 5-1 lists the construction date of each facility; Figure 5-1 shows the locations of facilities, and indicates which were constructed prior to or during 1978.

Table 3-6. Facilities Surveyed for Asbestos  
Page 2 of 2

Facility (Use)	Asbestos-Containing Material (ACM) Present
923 (Storage Shed)	No suspected material found
924 (Maintenance/Storage)	No suspected material found
925 (Reserve Forces Training)	Joint insulation
926 (Headquarters/Office)	Joint insulation
927 (Engine and Pneudraulics Shop)	Joint insulation
930 (Electronic Counter Measures Pad Shop/Storage)	Mechanical, joint, and duct insulation, lay-in ceiling
931 (Liquid Oxygen Storage)	No suspected material found
936 (Non-Air Force Administration Office)	No suspected material found
937 (Base Hazardous Storage)	No suspected material found
940 (Aircraft General Purpose Shop)	Tank, pipe, and joint insulation
942 (Heating Facility)	Boiler, tank, pipe and joint insulation
946 (Base Hazardous Storage)	No suspected material found
947 (Corrosion Control Storage)	No suspected material found
948 (Maintenance Dock Fuel System)	Boiler and joint insulation
949 (Corrosion Control Storage)	No suspected material found
951 (Maintenance Shop)	Boiler, tank, pipe, and joint insulation
953 (Liquid Fuel Pump Station)	No suspected material found
958 (Ground Support Shop)	Joint insulation
962 (Ground Equipment Shop)	No suspected material found
965 (Aircraft General Purpose Shop)	Boiler, tank, and joint insulation
966 (Maintenance Dock)	Tank and joint insulation
1011 (Electrical Power Station)	No suspected material found
1025 (Air Traffic Transceivers)	Pipe and joint insulation
1049 (Range Control House)	All negative samples
1050 (Aboveground Magazine Storage)	No suspected material found
1100 (Mobile Radio Transceiver)	Pipe and joint insulation
1201 (Office)	Duct and joint insulation
1202 (Missile Assembly and Training)	Mechanical insulation
1203 (Aboveground Magazine Storage)	No suspected material found
1205 (Base Hazardous Storage)	No suspected material found
1401 (Instrument Landing System Localizer)	No suspected material found
1800 (Instrument Landing System Marker Beacon)	No suspected material found
1900 (Instrument Landing System Marker Beacon)	No suspected material found

Source: Hall-Kimbrell, 1987.

Table 4-1. CERCLIS Sites

Map ID	Facility	Address	Status
15	Richards-Gebaur AFB West Burn Pit	West of Richards-Gebaur Airport runway, near public road, on Jackson/ Cass county line, Belton, MO 64012	No Further Action, 12/18/89. Site used from 1954 to 1955 for fire training. Waste oils, solvents, and fuels were deposited in an open pit and burned.

Table 4-2. RCRA Generators

Map ID	Facility	Address	Quantity Generated	Waste Type
1	Big Iron Works, Inc.	Hangar 1010 Richards-Gebaur AFB Belton, MO 64012	More than 1,000 kilograms per month	Ignitable solid waste, corrosive solid waste, chromium
2	Prime, Inc.	Hangar 1010 Richards-Gebaur AFB Belton, MO 64012	More than 1,000 kilograms per month	Ignitable solid waste
3	BTM, Inc.	15403 Andrews Rd. Kansas City, MO 64147	Between 100 and 1,000 kilograms per month	Ignitable solid waste, cadmium, chromium, lead

Table 4-3. Emergency Response Notification System Report

Map ID	Facility	Date	Spill Location and Description
Unable to locate	Location is Richards-Gebaur AFB; responsible party is unknown	09-22-92	Main Base Road, just off flightline; fuel oil leaking from an aboveground storage tank

**Table 4-5. Formerly Used Defense Sites**  
Page 1 of 2

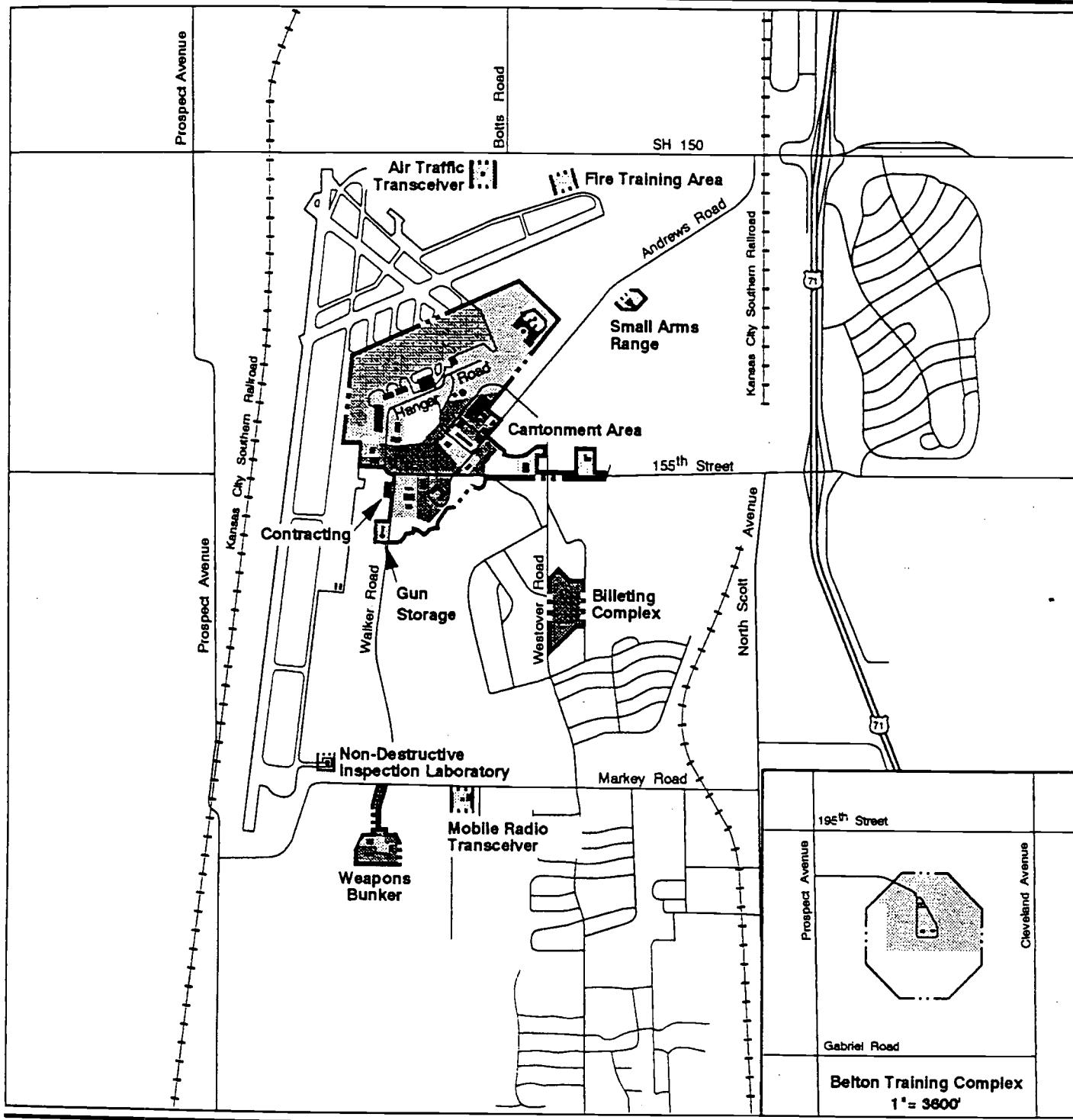
MAP ID	Site Number	Site Name	Location and Waste Description	Dates of Operation	Current Status
12	1	South Landfill	Near the Non-Destructive Inspection Laboratory and adjacent to Scope Creek. Site was used as a sanitary landfill until 1956. After that until 1961 some wastes, including building rubble, yard debris, and waste from some industrial shop areas, were deposited there.	1954-1961	Records Search and Site Inspection
13	2	Northeast Landfill	East of the Small Arms Range. Site was used for the disposal of miscellaneous wastes including building rubble, yard debris and wastes from some industrial shop areas. The wastes were typically burned and buried in trenches.	1961-1972	Records Search and Site Inspection
14	3	Contractor Rubble Burial Area	West of the golf course along Walker Road. Debris including wood, concrete, masonry and metal. Some use as a sanitary landfill has been reported here.	1954-1978	Records Search and Site Inspection
15	4	West Burn Pit	North of Jackson-Cass County line and west of the main runway. Site was used for fire training exercises for one year. Typically, waste fuels and waste oils were burned during fire training exercises.	1954-1955	Records Search and Site Inspection
16	5	South Burn Area	Southwest of South Landfill. Site used for fire training exercises for 10 years. Typically, waste fuels and waste oils were burned during fire training exercises.	1955-1965	Records Search and Site Inspection
17	7	Radioactive Disposal Well	North of the South Landfill and east of the flightline. Low-level radioactive materials were deposited into a cased well.	1955-1970	Records Search and Site Inspection

**Table 4-7. Areas of Potential Environmental Concern**  
**Page 1 of 2**

Map ID	Location	Condition of Off-Base Area of Concern	Specific Environmental Concern
19	Along base boundary northwest of Petroleum, Oils, and Lubricants (POL) Storage Yard	A large rectangular area of fill material with abrupt changes of vegetation including changes in condition and/or type to areas with no vegetation. Also, dumping of construction debris has taken place, and concrete, wood, asphalt and scrap metal were noted. A hardened tar-like material was also found in this area. It measured approximately 4 feet by 3 feet by 2 feet and its source (either dumped or from the ground) could not be determined.	Changes in vegetation type can be a sign of environmental impairment as different vegetations are more or less tolerant of particular types of contaminants, and lack of vegetation may be due to soils made unsuitable by contamination. The uncontrolled dump could have potential to introduce environmental hazards. The origins and constituents of the tar-like material are unknown and may represent environment contamination.
20	South of Facility 900 and west of Facility 801	Area consists of industrial facilities that maintain aircraft and vehicles and support other industrial operations. Two waste oil ASTs, two diesel fuel ASTs, a vehicle fuel station, five USTs, and a number of former USTs have existed here. An area of drainage leaving this area east of Facility 829 has left no vegetation. However, it could not be determined if this was due to the vigor of the drainage or potential contamination.	The industrial operations, ASTs, USTs (former and present), and vehicle refueling operations all have the potential for introducing contamination to base property by surface or subsurface migration. The drainage east of Facility 829 may be evidence of this.
21	East of and adjacent to the Small Arms Firing Range parcel	An active skeet range.	The skeet range may be contributing lead contamination behind the Small Arms Firing Range impact berm. The <u>Firing Range Site Phase II</u> (August 1993) identified elevated concentrations of lead in the soils behind the Small Arms Range impact berm, facing the Skeet Range.

AST = Aboveground storage tank.

UST = Underground storage tank.



#### EXPLANATION

- Uncontaminated Property (Category 1)
- Hazardous substance stored - no release (Category 2)
- Hazardous substance release, below action levels (Category 3)
- Hazardous substance release, all actions have been taken (Category 4)

0 650 1250 2500 Feet



- Hazardous substance release, not all actions have been taken (Category 5)
- Hazardous substance release, no actions taken (Category 6)
- Areas requiring additional evaluation (Category 7)

— - - Base Boundary

#### Property Categorization

Figure 5-2

**Table 5-1. Facility/Property Matrix - Richards-Gebaur AFB**  
**Page 6 of 7**

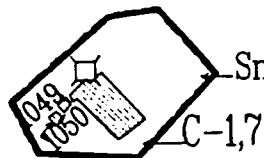
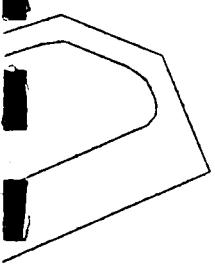
Facility (Use)	Property ID Number	Year of Construction	Square Footage	IRP Site	Hazardous Materials	Hazardous Waste	Storage Tanks/OWSs			ACM	Lead- Based Paint	Type of Inspection Completed	Overall Property Category
							Type	Content	Capacity (gallons) <sup>a</sup>				
1009 (Instrument Landing System Localizer)	(b)	Unknown	Unknown				AST-A(2)	MOGAS	275	N	X	Physical	2
1011 (Electrical Power Station)	(b)	1962	128				AST-R(3)	MOGAS	275	N	X	Physical	3
1025 (Air Traffic Transceivers)	A-1	1953	1,048				AST-A(2)	Diesel	90	Y	X	Physical	7
							AST-A(2)	Diesel	275				
							AST-A(2)	Diesel	560				
							UST-R(7)	Fuel oil #2	550				
							UST-R(7)	Diesel	275				
							UST-R(7)	Fuel oil #2	1,000				
1027 (Support Structure Antenna)	A-1	1969	NA							N	X	None	7
1033 (Fire Training Facility)	B-1	1973	NA	FT-002(5)		W-2	AST-R(7)	Waste JP-4	5,000	N	X	Physical	7
							OWS-I(7)	Waste oil	425				
							OWS-R(7)	Waste oil	565				
1049 (Range Control House)	C-1	1956	2,320							N	X	Physical	7
1050 (Storage Magazine Aboveground)	C-1	1956	100							N	X	Physical	7
1100 (Mobile Radio Transceiver)	F-1	1953	1,048				AST-A(2)	MOGAS	275	Y	X	Physical	7
							UST-R(7)	Fuel oil #2	550				
							UST-R(7)	Gasoline	250				
1101 (Support Structure Antenna)	F-1	1969	NA							N	X	None	7
1201 (Weapons System Maintenance Management Facility)	G-2	1961	1,429				UST-R(7)	Fuel oil #2	3,000	Y	X	Physical	7
1202 (Missile Assembly and Training)	G-2	1961	3,852		II-2	W-2	UST-R(7)	Fuel oil #2	1,500	Y	X	Physical	7
1203 (Storage Magazine Aboveground)	G-1	1961	5,644		II-2		UST-I(7)	Fuel oil #2	1,650		X	Physical	2
1205 (Base Hazardous Storage)	G-1	1962	53							N	X	Physical	2
1206 (Spares Inert Storage)	G-2	1991	6,000							N		None	2
1207 (Equipment Pad)	G-1	1991	7,074							N		None	2
1401 (Instrument Landing System Localizer)	(b)	1957	186				AST-R(2)	MOGAS	275	N	X	Visual	2
1600 (Reserve Forces Operational Training)	J-1	1956	1,267							N	X	Physical	7

**Table 5-2. Property/Facility Key**  
Page 1 of 4

Property ID Number, Property Category	Facility (Use)
A-1,7	1025 (Air Traffic Transceivers) 1027 (Support Structure Antenna)
B-1,7	1033 (Fireman Training Facility)
C-1,7	1049 (Range Control House) 1050 (Storage Magazine Aboveground)
D-1,7	903 (Electric Power Station Building) 904 (Base Hazard Storage) 918 (Maintenance Hangar) 927 (Jet Engine Inspection and Maintenance Shop) 928 (Base Engineering Hazardous Storage) 930 (Electronic Counter Measures Pad Shop/Storage) 938 (Water Pump Station) 940 (Aircraft General Purpose Shop) 941 (Truck Fill Stand) 942 (Heating Facility Building) 943 (Industrial Waste Treatment and Disposal Detention Reservoir) 944-d (Engine Test Cell) 945 (Aircraft Wash Pad) 946 (Base Hazardous Storage) 947 (Corrosion Control Utility Storage) 948 (Fuel Systems Maintenance Dock) 949 (Corrosion Control Utility Storage) 950 (Transformer Storage) 958 (Aircraft Support Equipment Shop) 959 (Base Hazardous Storage) 960 (Liquid Fuel Stand) 961 (Aircraft Wash Rack Pad) 962 (Aircraft Support Equipment Shop) 963 (Aboveground Storage Tank) 964 (Liquid Oxygen Storage) 965 (Aircraft General Purpose Shop) 966 (Maintenance Dock) 968 (Test Stand) 970 (Refueling Vehicle Parking) 971 (Petroleum Operations) 972 (Base Hazardous Storage) 973 (Base Hazardous Storage) 9470 (OWS and Waste Storage)
D-2,6	951 (Base Engineering Maintenance Shop) 952 (Truck Fill Stand) 953 (Liquid Fuel Pump Station) 954 (Heating Fuel Oil Storage) 955 (Jet Fuel Storage)

FT-002

Fire Training Area



Small Arms Range

August 1995

## 2.0 INTRODUCTION

CDM Federal Programs Corporation (CDM Federal) has been tasked with conducting a field investigation of potential contamination associated with waste disposal at Formerly Used Defense (FUD) Sites associated with operations of the United States Air Force (USAF) at the former Richards Gebaur Air Force Base (Richards Gebaur) in Belton, Missouri. CDM Federal has conducted a records review and evaluation, performed a visual site inspection, and prepared a Work Plan and a Site Health and Safety Plan for Richards Gebaur in accordance with the Scope of Work dated September 8, 1994.

This Work Plan is prepared in support of field and laboratory activities and addresses U. S. Army Corps of Engineers (USACE) chemical data quality management requirements for chemical contamination investigative activities at defense facilities. These requirements are specified in USACE ER 1110-1-263 dated October 1, 1990.

### 2.1 BACKGROUND

The following records review and evaluation information for the FUD sites are taken from the Installation Restoration Programs Record Search, by CH2M Hill (March 1983), the Installation Restoration Program Phase II Confirmation/Quantification Stage 2, by Ecology and Environment, Inc. (July 1988), the Installation Restoration Program Remedial Investigation at Richards Gebaur Air Force Base, by O'Brien and Gere Engineers, Inc., (July 1990), and the Preliminary Report of Findings Literature Search for the Former Richards Gebaur Air Force Base, by Rust Environmental and Infrastructure (November 1993).

Richards Gebaur is located in western Missouri near the cities of Belton, Grandview, and Kansas City, Missouri. The airfield is 2.6 miles from the Kansas-Missouri stateline on the border of Jackson County and Cass County. Richards Gebaur is bordered on the north by U. S. Highway 150 and on the east by U. S. Highway 71. Figure 2-1 shows the site location.

August 1995

## 2.6 SITE DESCRIPTION

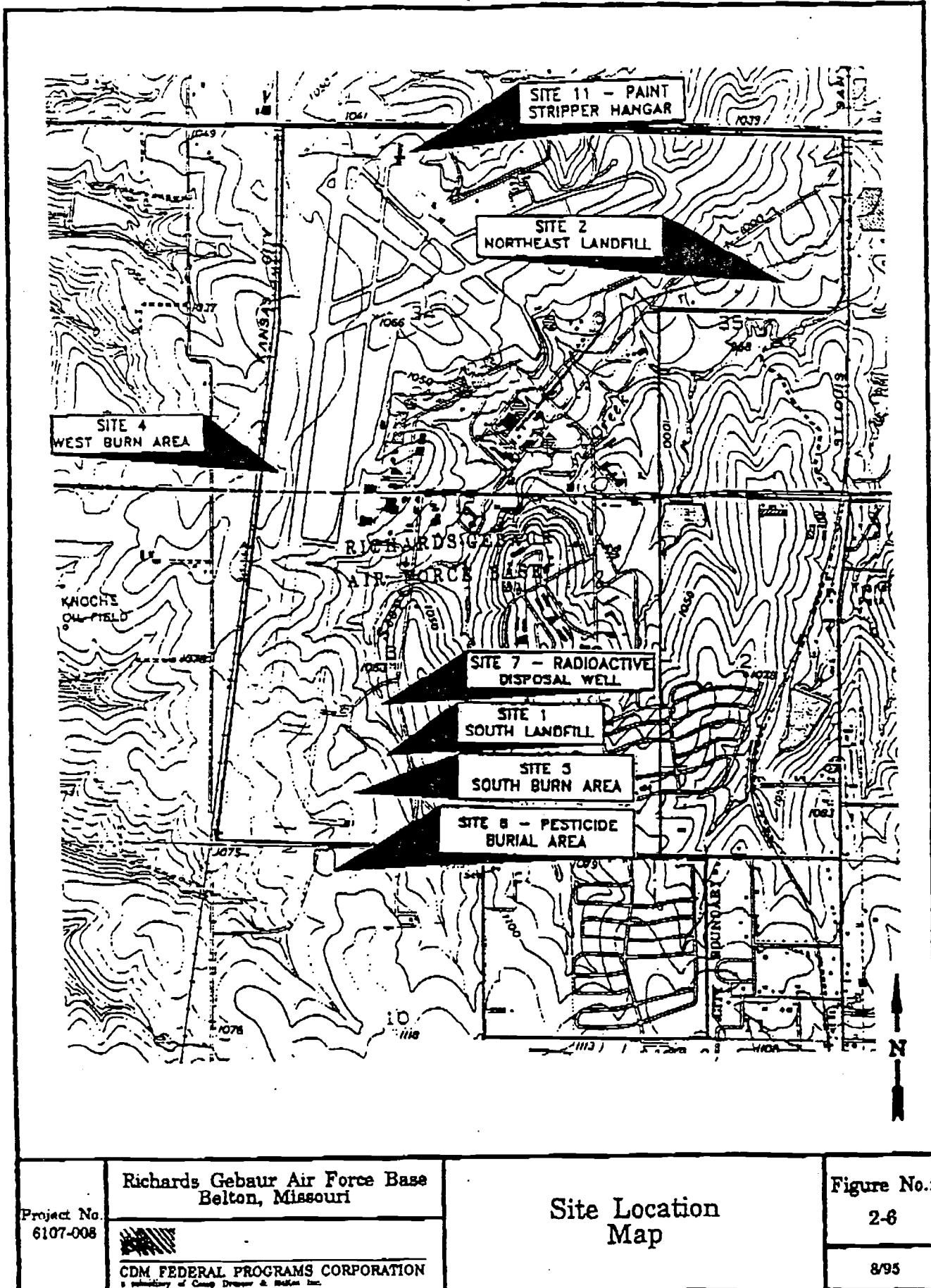
The primary source of historical information for Richards Gebaur is from the Installation Restoration Program Phase I Record Search by CH2M Hill dated March 1983. In addition, CDM Federal acquired information during records reviews and visual inspections of seven FUD sites. CDM Federal will evaluate the environmental conditions of seven sites at Richards Gebaur. These sites are shown in the following table and depicted in Figure 2-6.

FORMERLY USED DEFENSE SITES (FUDS)	
<i>Site No.</i>	<i>Site Description</i>
1	South Landfill
2	Northeast Landfill
4	West Burn Area
5	South Burn Area
7	Radioactive Disposal Well
8	Pesticide Burial Site
11	Print Stripper Hangar (Bldg 1010)

## 2.7 SOUTH LANDFILL

The South Landfill is located in the south-central part of Richards Gebaur. It is bounded on the west by a marshy area which is just below the base lake dam. The South Landfill is bounded on the north by a ditch for drainage from the base lake and on the east by Scope Creek (Figure 2-7). Access to the South Landfill is from the south where there is an open grassy area to the south boundary area, and to the southwest where the base runway and taxi ways are located. Approximately 1,000 yards to the southwest is Building 839, the Air Force's former non-destruct inspection laboratory.

The South Landfill is on a thin cover of unconsolidated silts and clays overlying Pennsylvanian Age rocks of the Zarah Subgroup. The unconsolidated deposit is less than eight feet thick and



August 1995

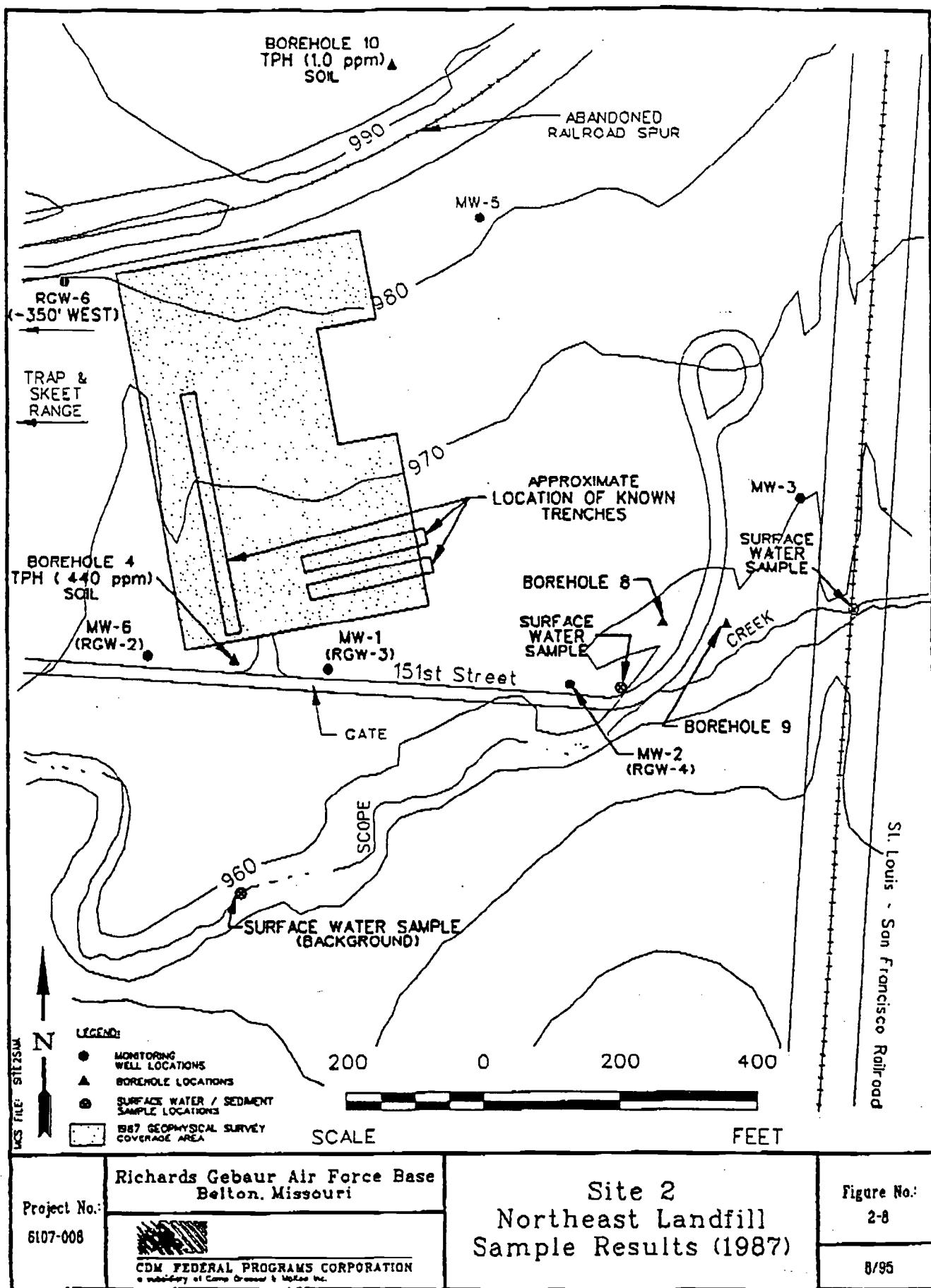
Any contaminants that may be present at the South Landfill could move vertically downward to the perched groundwater, then east-northeast toward Scope Creek on the east side of the Landfill. A formation of Lane Shale (Figure 2-2) underlays the area and may effectively restrict vertical groundwater movement. Contaminants from the Landfill could flow from groundwater seeps along Scope Creek downgradient of the area.

During a field investigation conducted by E&E, Inc. in October 1986, surface water samples were collected from Scope Creek and from ponded areas in drainage ditches in the Landfill. One soil boring was completed at the site. Sample parameters for surface water at the site included total petroleum hydrocarbons, total dissolved solids, halogenated and aromatic volatile organics, priority pollutant metals, extractable priority pollutants (GC/MS), common anions, and phenols. Soil samples were analyzed for volatile organics and total petroleum hydrocarbons. Four surface water samples and seven soil samples were collected. Of the eleven samples, one subsurface soil sample showed total petroleum hydrocarbons at 1.2 mg/kg (E&E 1988) upgradient of the Landfill to the south near the access road. Two surface soil samples, collected near seeps from the Landfill along the west bank of Scope Creek contained petroleum hydrocarbon at 1.9 mg/kg (Seep 1) and 16 mg/kg (Seep 2) (E&E 1988). These were the only contaminated samples reported at the South Landfill by E&E, Inc.

## 2.8 NORTHEAST LANDFILL

The Northeast Landfill is located in the Northeastern Quadrant of the Airport facility between Andrews Road and 155th Street (Figure 2-8). The area is bounded on the north by an abandoned spur of the St. Louis - San Francisco Railroad, on the east by the St. Louis - San Francisco Rail Line, on the south by Scope Creek, and on the west by a drainage swale just east of the Trap and Skeet Range. This site was used as a demolition and industrial waste landfill between 1961 and 1972.

The eastern half of the Northeast Landfill was used for waste storage. Empty drums, fuel tanks, mower and maintenance parts, and some demolition debris were observed during a site visit conducted in October 1994. The west half of the Northeast Landfill was a trench and fill



August 1995

operation. One trench, estimated to be 300 feet x 10 feet x 10 feet, ran north and south along the west boundary of the landfill area. Two additional trenches, 200 feet x 10 feet x 10 feet each, were constructed east and west just east of the north/south trench and just north of the west access road to the landfill area. A 1976 aerial photo in the Airport Manager's office also showed vegetation disturbance north of the trench location indicating a potential for an additional burial area. Waste paints, thinners, strippers, oils, and fuels were reportedly poured into the trenches along with shop waste and demolition debris from base operations and burned for disposal.

A magnetometer and electromagnetic (EM) geophysical survey was performed by E&E, Inc. (E&E 1988). Findings indicated three linear anomalies in the area of the trenches. It is believed that these anomalies correspond to locations of several trenches.

The Northeast Landfill is located on a thin cover of unconsolidated silts and clays overlying a gray to green shale averaging 22 feet in thickness. The unconsolidated deposit above the shale ranges from less than 8 feet thick to over 20 feet thick, and pinches out at or near the banks of Scope Creek on the south edge of the Northeast Landfill. A chert layer was found just above bedrock and just below the green shale layer at the site.

The Northeast Landfill is bounded on the south by Scope Creek in an area where the creek flows for the majority of the year. Five monitoring wells installed by E&E, Inc. during a 1986 investigation had sufficient recharge to allow collection of groundwater samples from the site. Three wells were located along the south and east boundaries of the suspected fill area (MW-1, MW-2, and MW-6). One well was located east of the suspected fill area (MW-3). One well was located northeast of the suspected fill area (MW-5).

E&E, Inc. collected eight water samples (3 surface and 5 groundwater) which were analyzed for petroleum hydrocarbons, total dissolved solids (TDS), halogenated and aromatic volatile organics, priority pollutant metals, extractable priority pollutants (GC/MS), common anions, and phenols. Sediment and soil samples were analyzed for volatile organics and petroleum hydrocarbons. Five anions, fluoride, chloride, nitrate, bromide, and sulfate, were reported above detectable limits. Sulfate was reported at 280 mg/L which exceeds the EPA secondary drinking water standard of

August 1995

250 mg/L. TDS values for the monitoring wells ranged from 380 to 940 mg/L which is two to four times greater than the background range (250 to 470 mg/L). One of E&E's soil samples contained petroleum hydrocarbons at 440 mg/kg (E&E 1988).

## 2.9 WEST BURN AREA

The West Burn Area was originally identified as a site beyond Richards Gebaur property lines, west of the Kansas City Southern Railroad Line on the west boundary of Richards Gebaur. The site was relocated on Air Force property shortly after it was realized the Burn Area was not located on Air Force property. The USACE and CDM Federal conducted a site visit in October 1994, and identified a small swale, the only remaining land feature in the area due to current runway modifications, that appears to have been used for some type of burning. The swale is located about 100 feet north of the Jackson/Cass County line gate and 50 feet east of the west Airport boundary fence (Figure 2-9).

This site has not been previously investigated. From 1954 to 1955, the burn area was located off the facility. From 1955 to 1969, the West Burn Area was in operation for fire training purposes at Richards Gebaur. Waste paint, thinners, solvents, oils, fuels, and potentially tank sludge from the Petroleum, Oil, and Lubricants (POL) Tank Farm may have been burned for fire training purposes at this site.

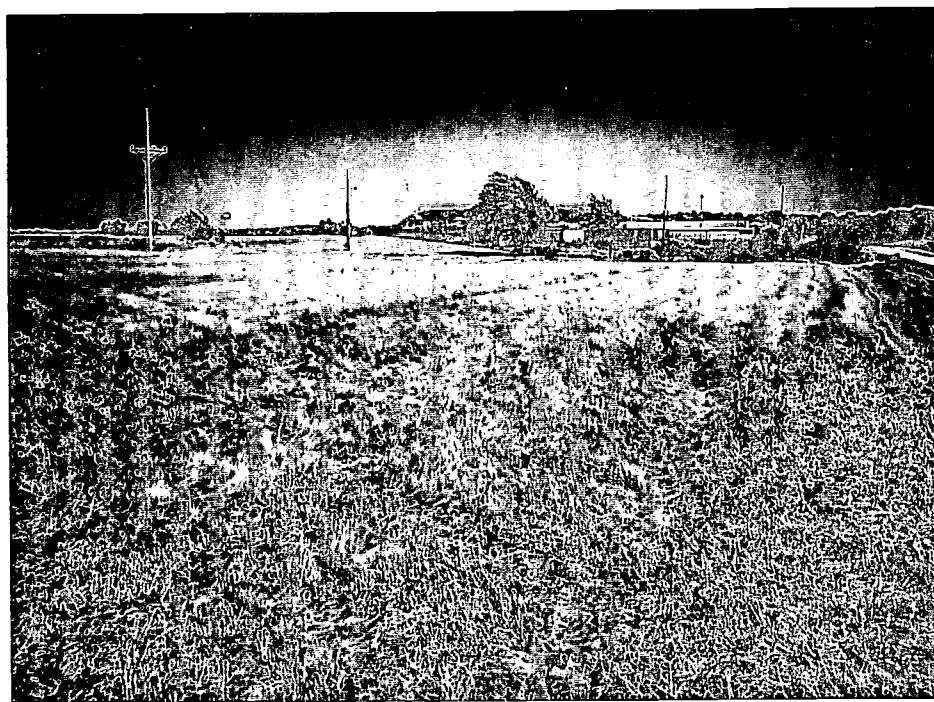
The West Burn Area may be located on a thin cover of unconsolidated silts and clays overlying a grey to green shale averaging 20 feet in thickness. The unconsolidated deposit above the shale is as much as 8 feet to 10 feet thick. A chert layer may be found just above bedrock and just below the shale layer.

Drainage from the site is to the south and southwest off the facility. There are no perennial streams on Richards Gebaur within the drainage area of the West Burn Area. The closest stream is estimated to be a mile to the southwest off the facility.

PRIORITIZATION ASBESTOS ASSESSMENT STUDY  
 RICHARDS-GEBAUER AIR FORCE BASE  
 MISSOURI

BLDG. NO.	BUILDING NAME	AREA NUMBER	AREA DESCRIPTION	MATERIAL LOCATION	SAMPLE BULK SAMPLE NUMBER DESCRIPTION	TOTAL # ASB. NO.	EXP. PRI. LVL.	QUANTITY	SIZE	TOTAL REM. COST (\$)	TOTAL REN. COST (\$)	TOTAL COST (\$)	PIPE ID	
1049	RG CON HOUSE	1049-01	Exposed Material	front room	63729 drop or lay-in panel 63729	0	0 0		sq. ft. 210.0 sq. ft.	\$0.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00		
										AREA TOTAL	\$0.00	\$0.00	\$0.00	
										BUILDING TOTAL	\$0.00	\$0.00	\$0.00	

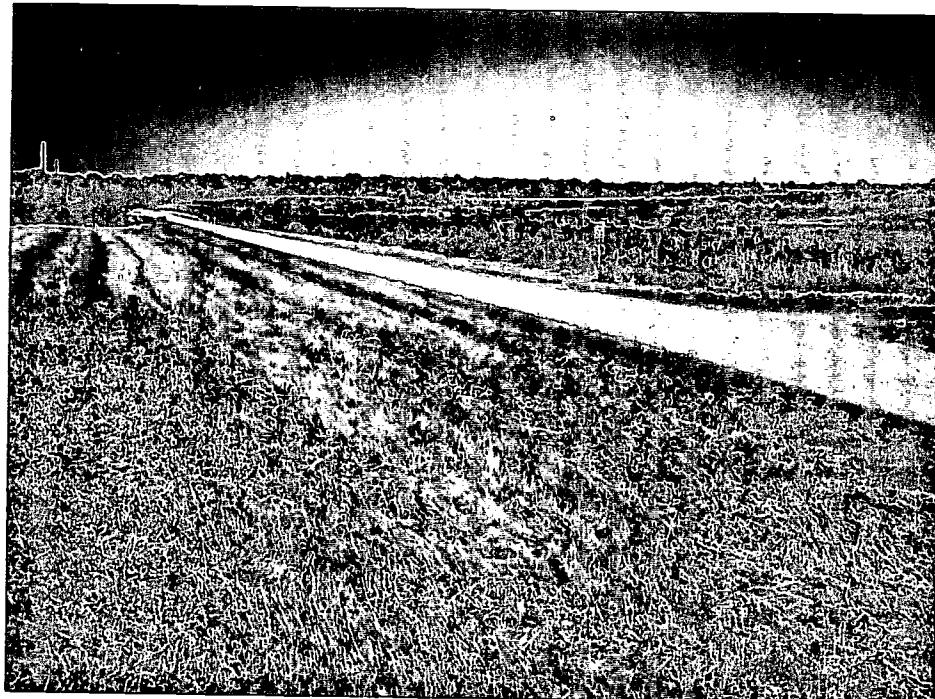
**APPENDIX E**  
**RECONNAISSANCE PHOTOGRAPHS**



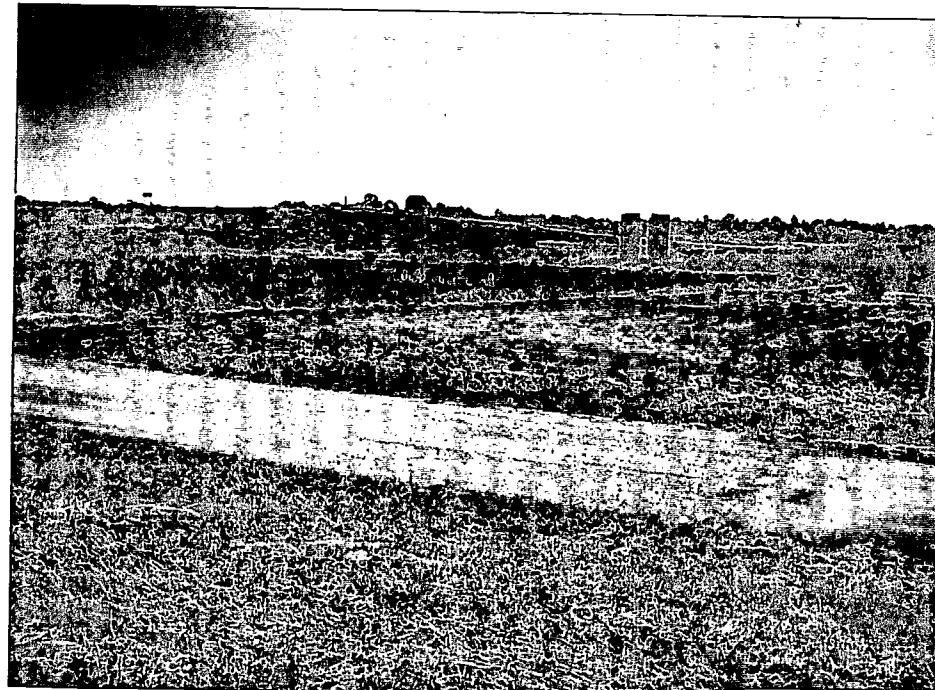
**PHOTOGRAPH 1:** West area of subject site viewing east towards the Small Arms Range.



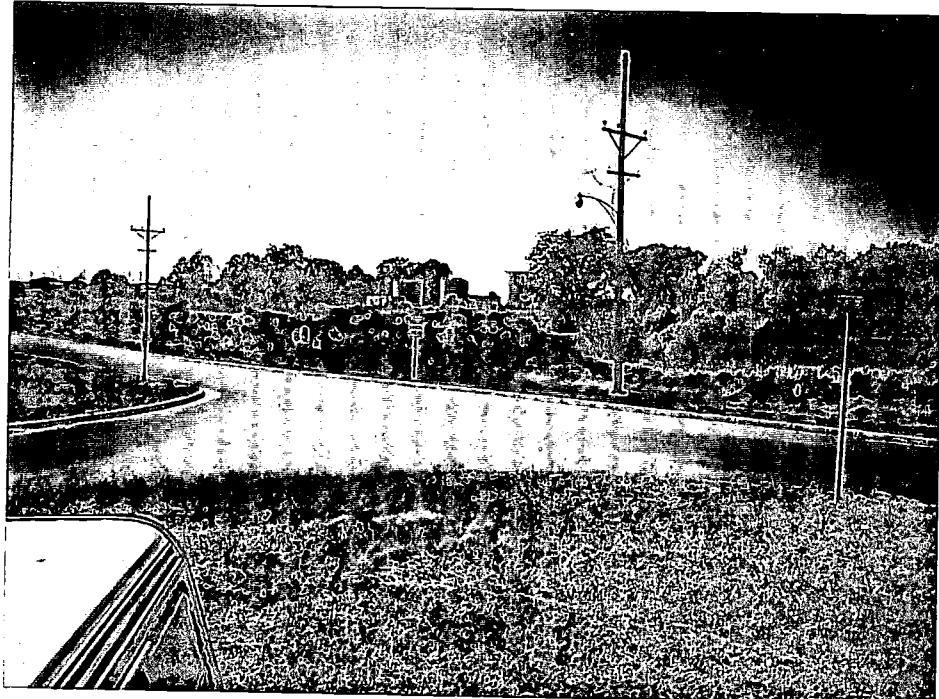
**PHOTOGRAPH 2:** Vacant grass land located south of Andrews Road.



**PHOTOGRAPH 3:** Southwest area of subject site and south adjacent property.



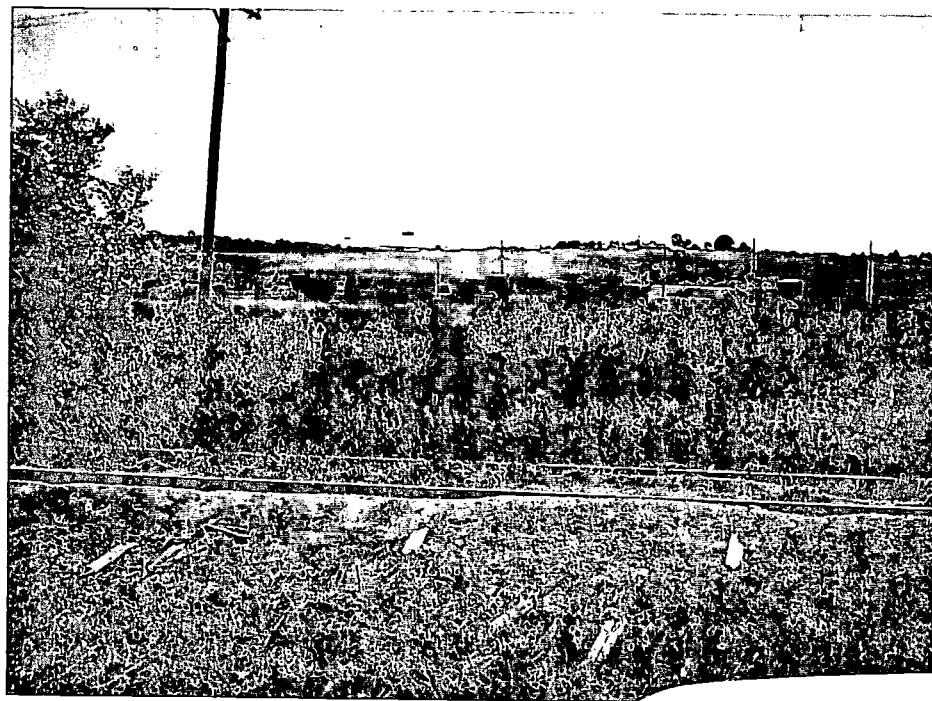
**PHOTOGRAPH 4:** South adjacent property.



**PHOTOGRAPH 5:** Adjacent property view located southwest across Andrews Road.



**PHOTOGRAPH 6:** North area of subject site viewing northeast.



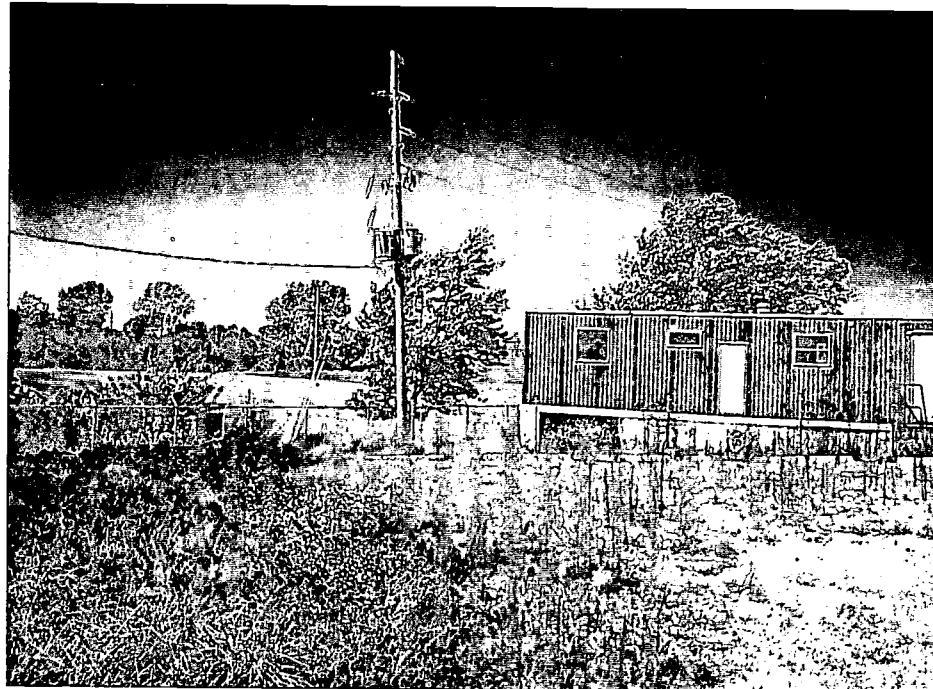
**PHOTOGRAPH 7:** View of railroad spur which runs across the subject site.  
Skeet range shown in the background.



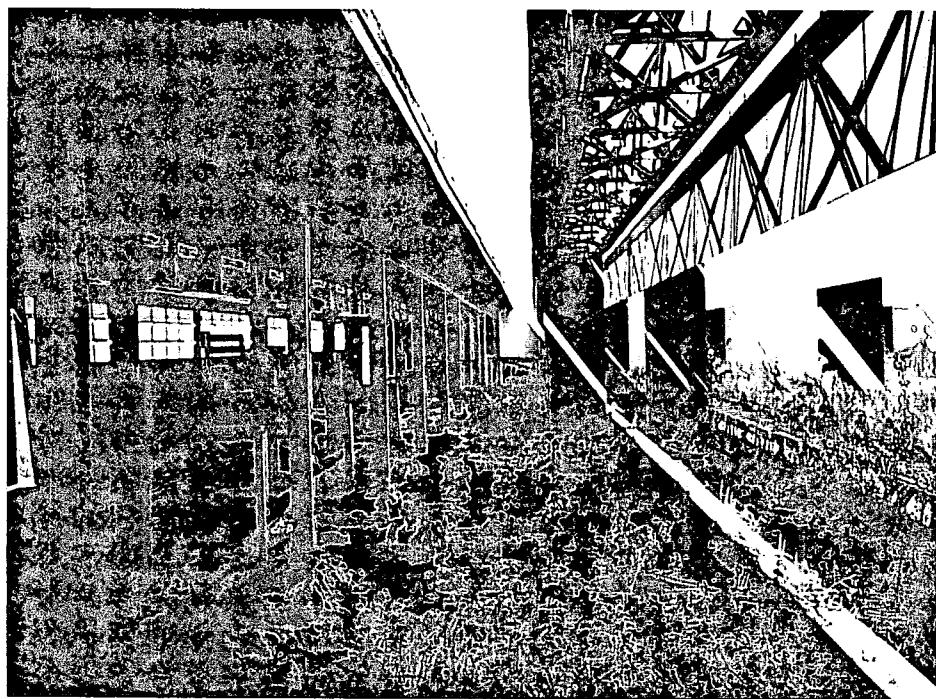
**PHOTOGRAPH 8:** View of railroad spur which runs across the subject site.



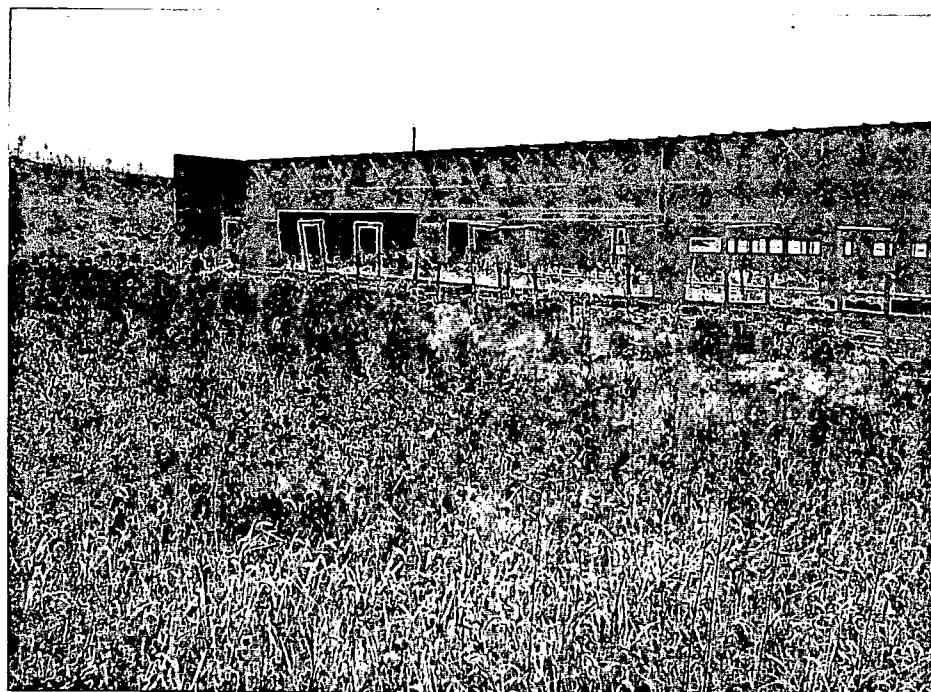
**PHOTOGRAPH 9:** North area of subject site viewing east across the vacant grass land.



**PHOTOGRAPH 10:** Small Arms Range with three pole-mounted transformers located on the west area of the site.



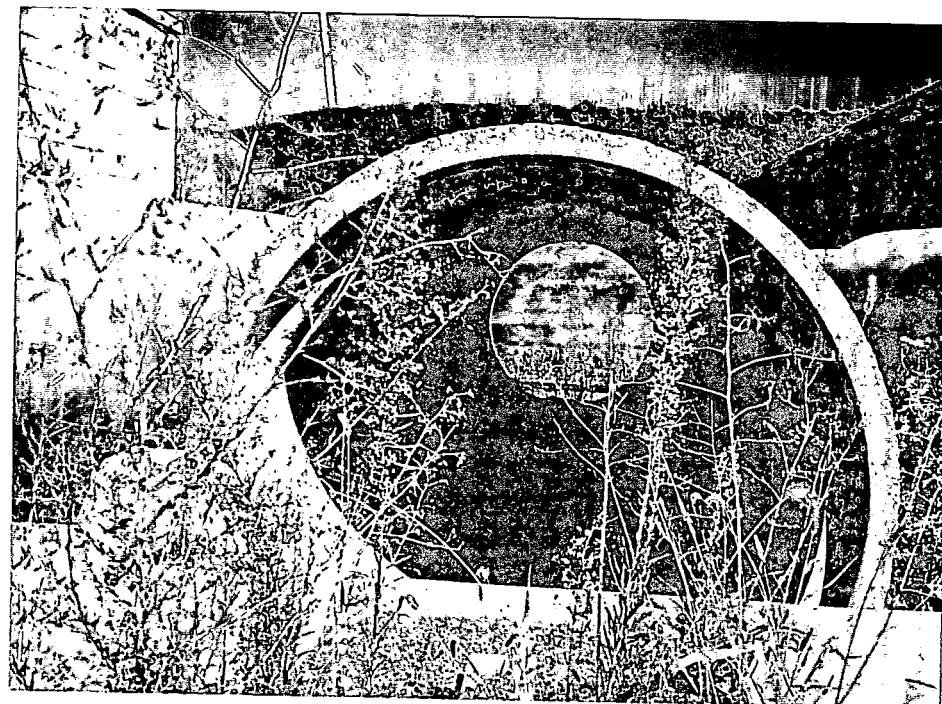
**PHOTOGRAPH 11:** Small Arms Range firing area.



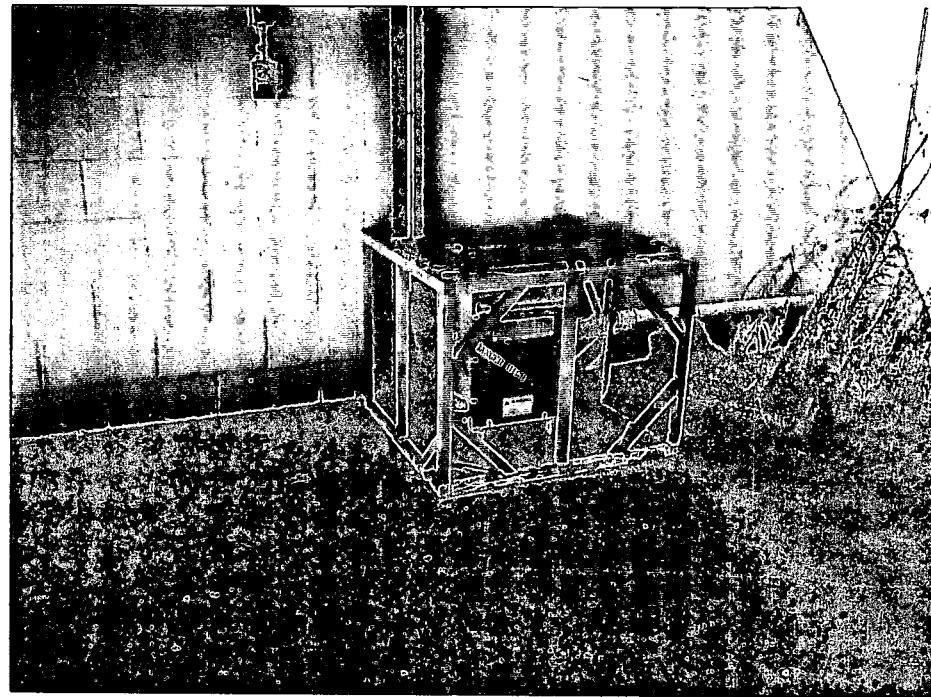
**PHOTOGRAPH 12:** Small Arms Range firing area.



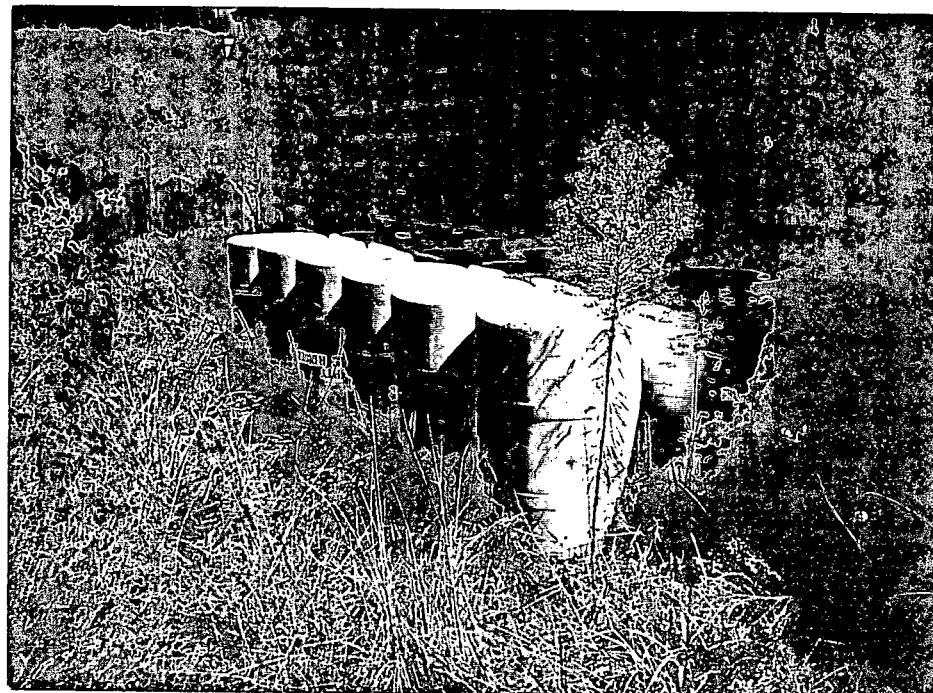
**PHOTOGRAPH 13:** Stormwater drainage system located in firing range.



**PHOTOGRAPH 14:** Small Arms Range firing area.



**PHOTOGRAPH 15:** Pad-mounted transformer located between buildings near firing range.



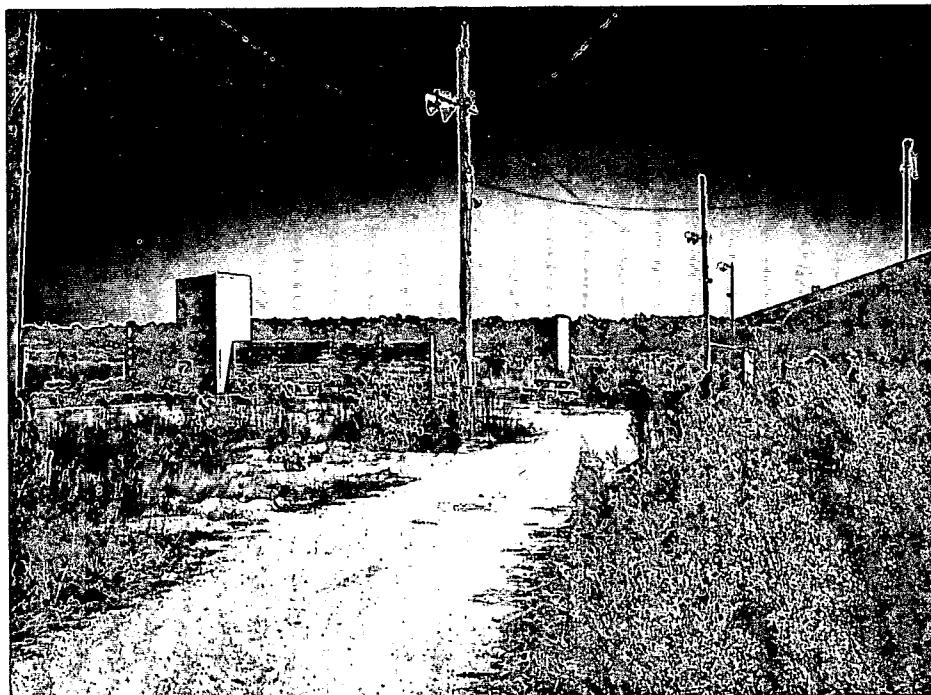
**PHOTOGRAPH 16:** Empty 55-gallon drums labeled "Empty Triple Rinsed" located in the north area of the Small Arms Range.



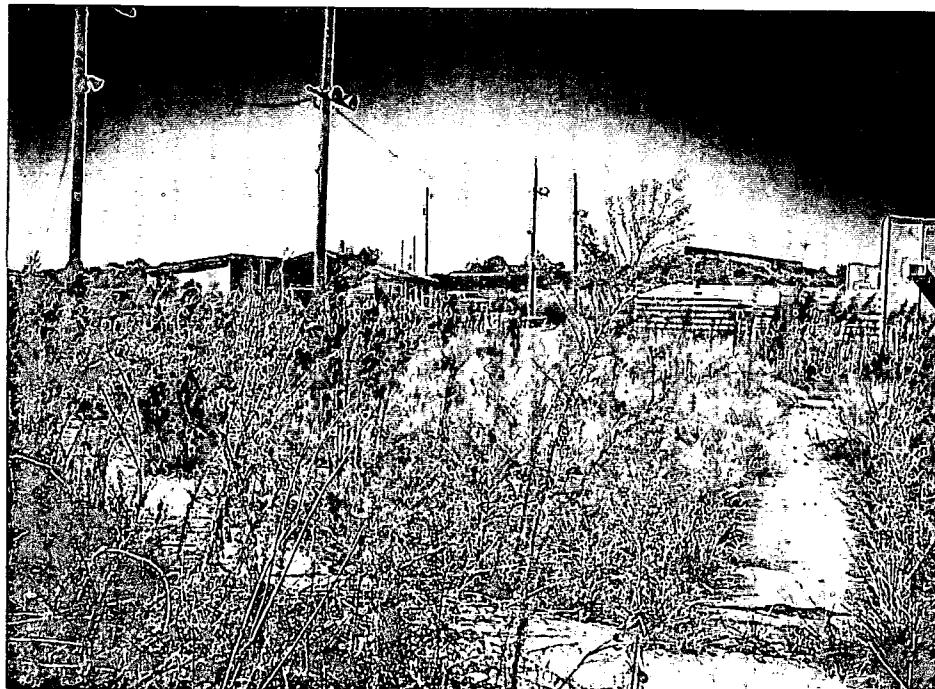
**PHOTOGRAPH 17:** Skeet Range and on-site building.



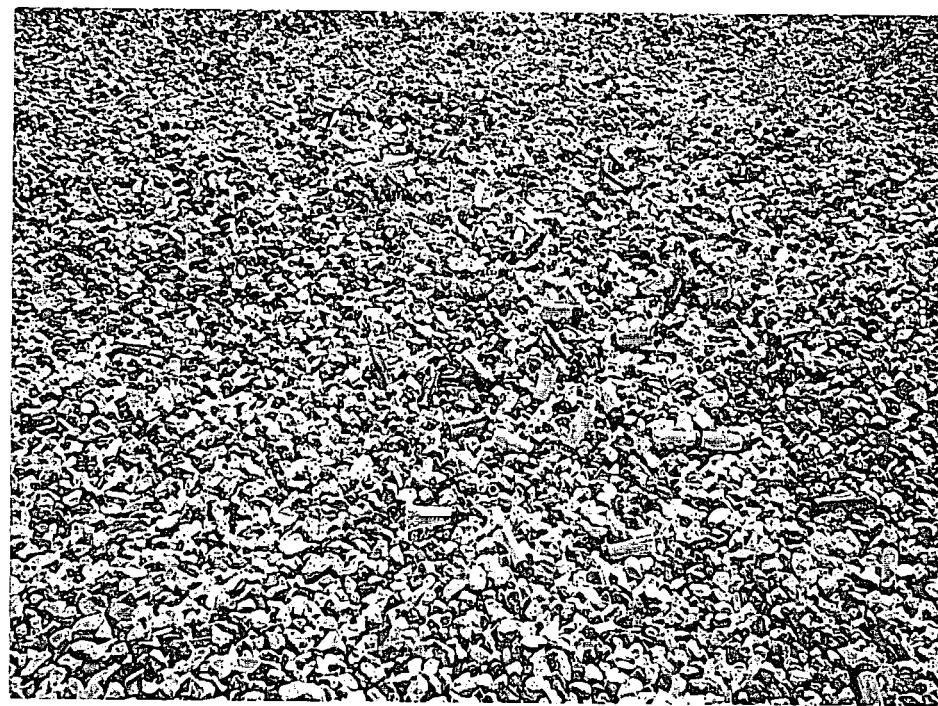
**PHOTOGRAPH 18:** Interior of Skeet Range building.



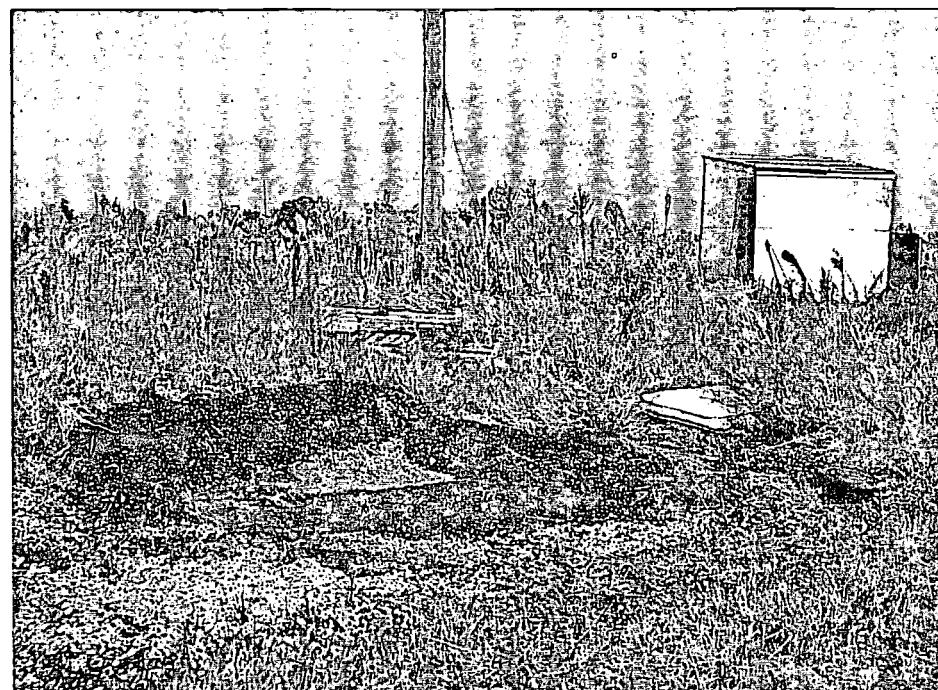
**PHOTOGRAPH 19:** View of Skeet Range viewing east.



**PHOTOGRAPH 20:** Skeet Range area viewing west. The berm of the Small Arms Range can be seen in the background.



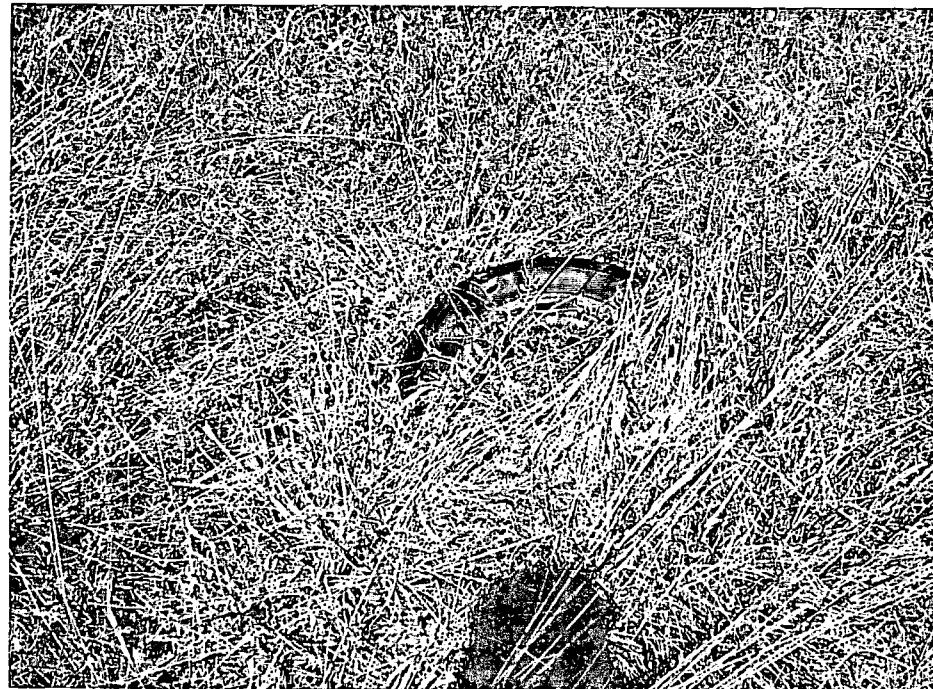
**PHOTOGRAPH 21:** Evidence of discarded empty shotgun shells located at the Skeet Range.



**PHOTOGRAPH 22:** Skeet Range with evidence of clay pigeon remnants.



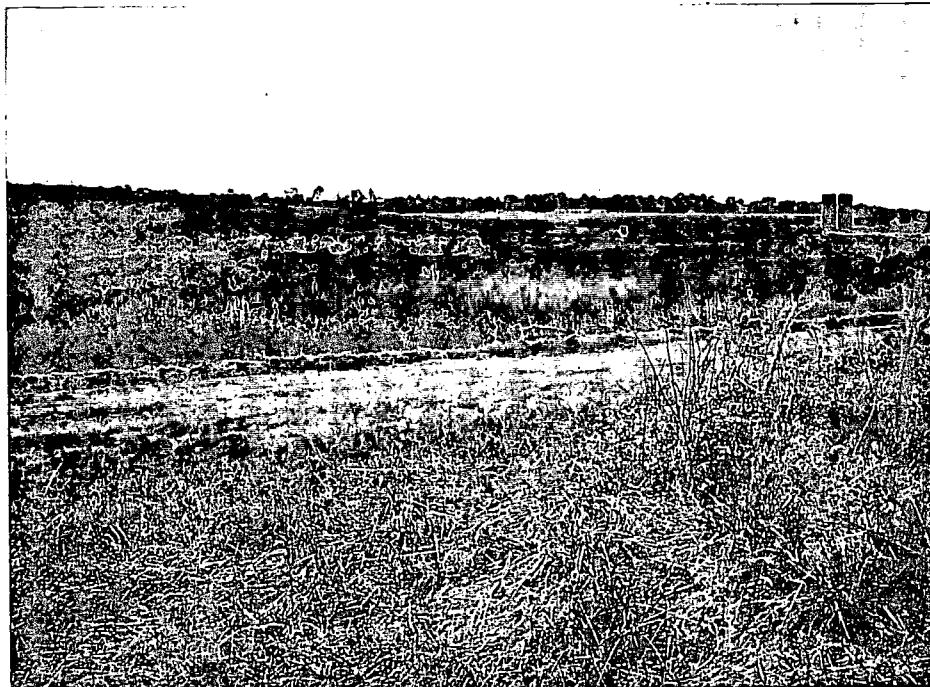
**PHOTOGRAPH 23:** Skeet Range with evidence of clay pigeon remnants.



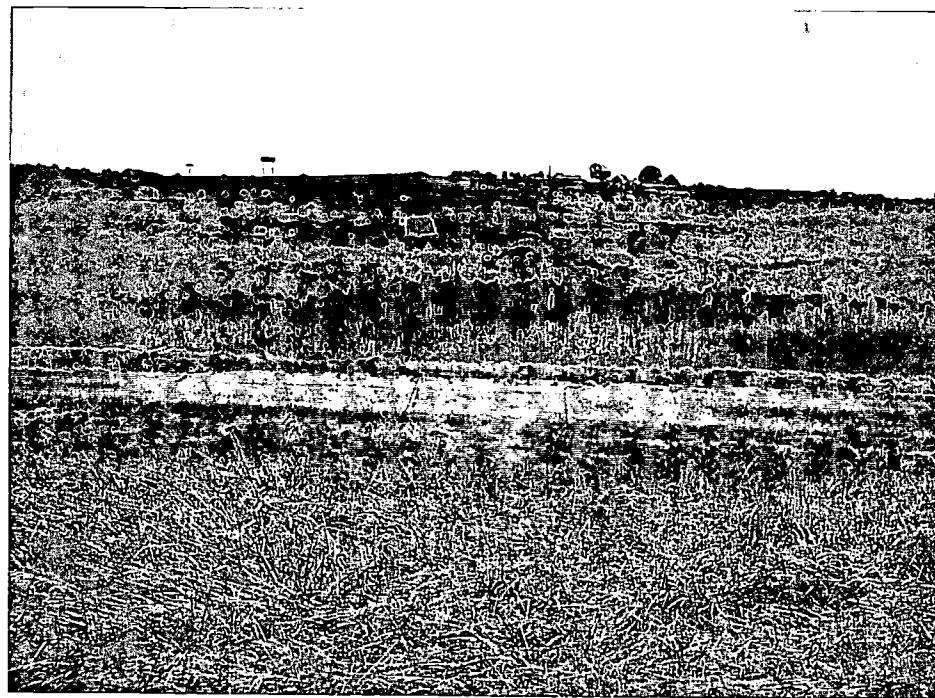
**PHOTOGRAPH 24:** Discarded tire located on the Skeet Range.



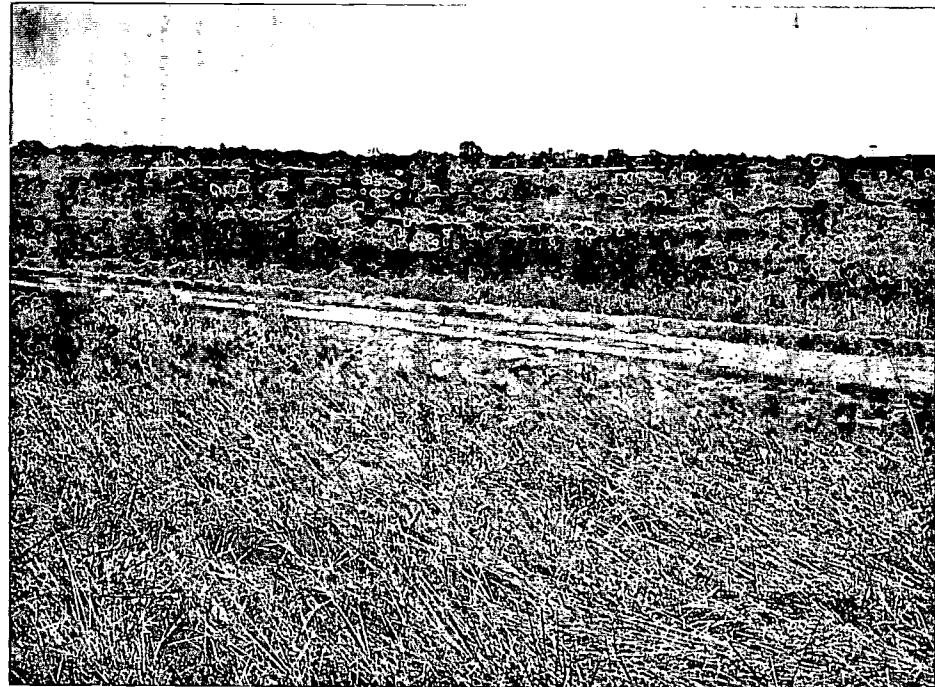
**PHOTOGRAPH 25:** Unknown pipe and localized stressed vegetation identified on the north area of the Skeet Range.



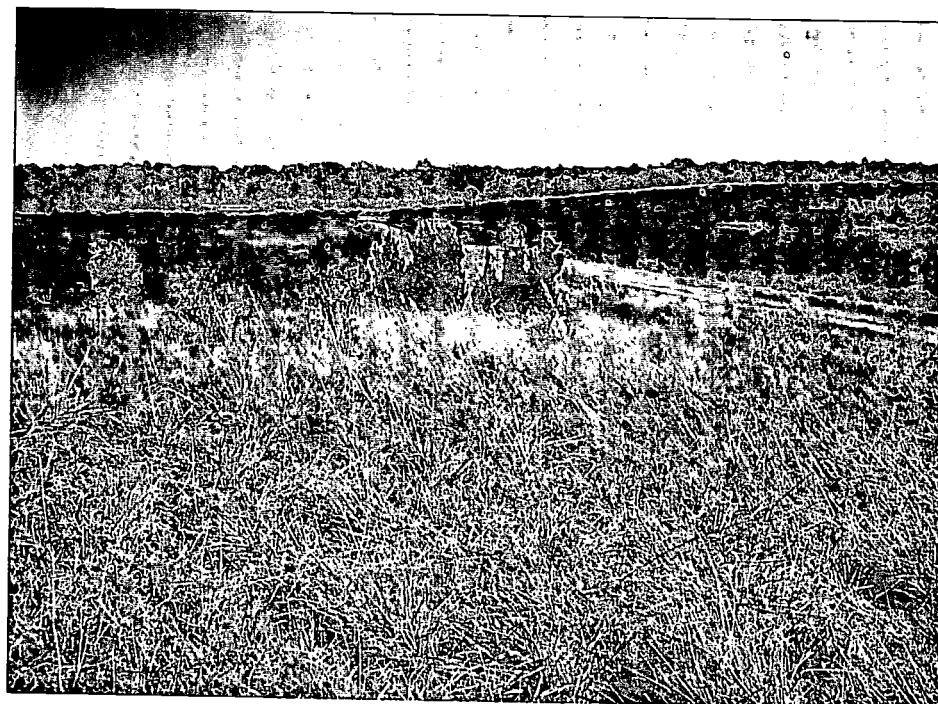
**PHOTOGRAPH 26:** Adjacent property located south, southwest of the Skeet Range.



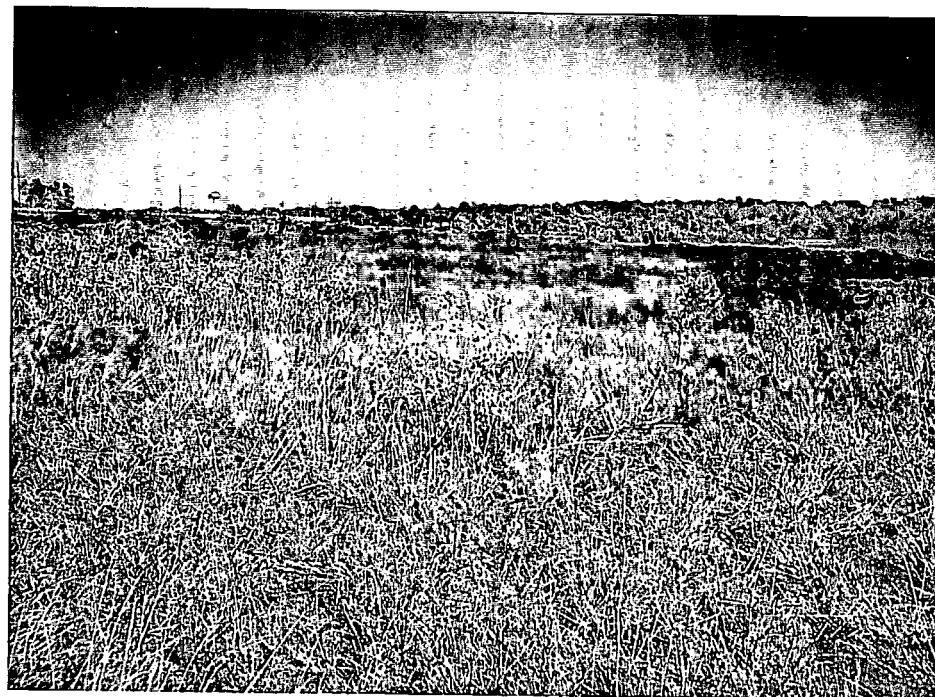
**PHOTOGRAPH 27:** Adjacent property located south of the Skeet Range.



**PHOTOGRAPH 28:** Adjacent property located south, southeast of the Skeet Range.



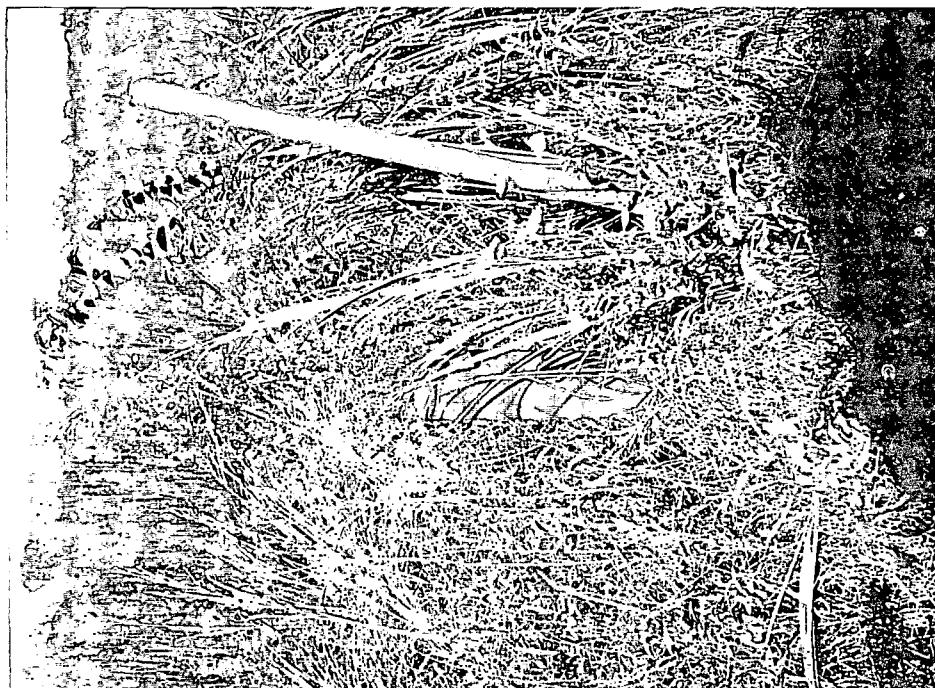
**PHOTOGRAPH 29:** South area of the subject site viewing east from the Skeet Range.



**PHOTOGRAPH 30:** View east across landfill located on the southeast area of the subject site.



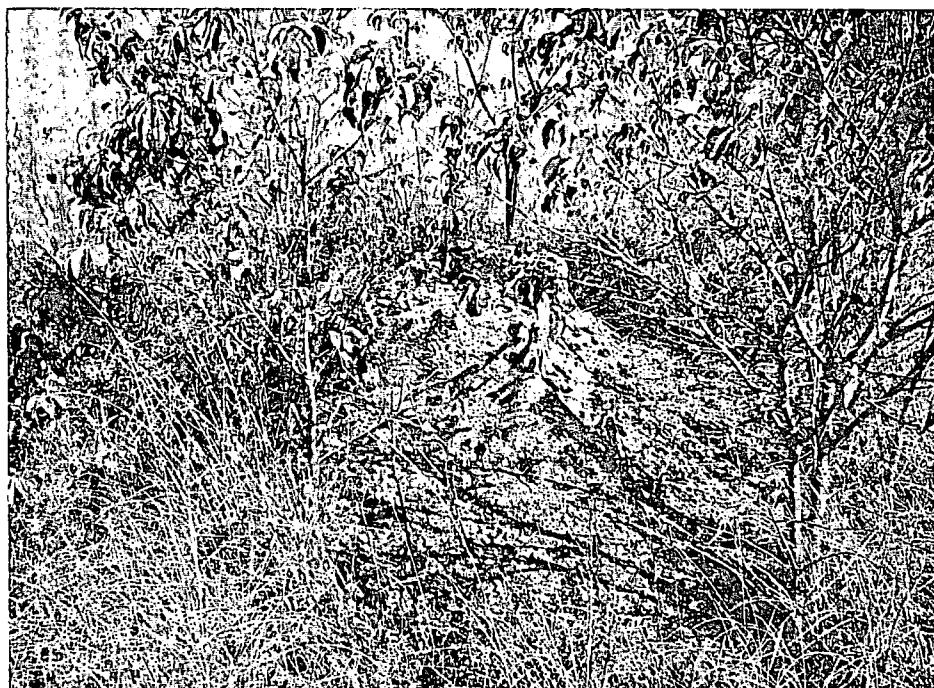
**PHOTOGRAPH 31:** View west across the on-site landfill area.



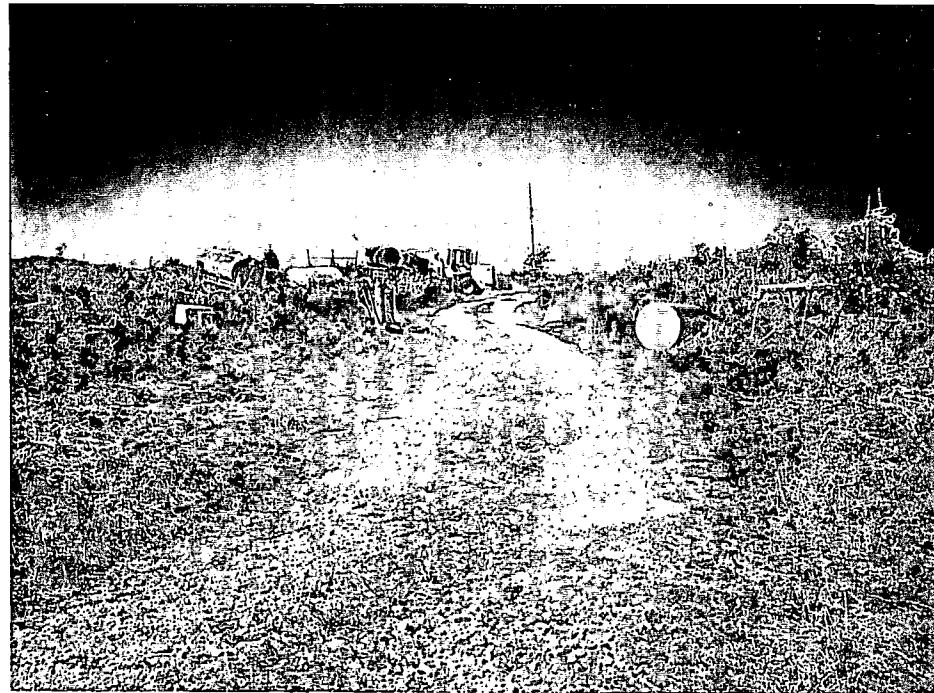
**PHOTOGRAPH 32:** Monitoring well located on the south area of the landfill.



**PHOTOGRAPH 33:** Open drainage channel located south of the landfill.



**PHOTOGRAPH 34:** Unknown concrete pile located on the northwest area of the landfill.



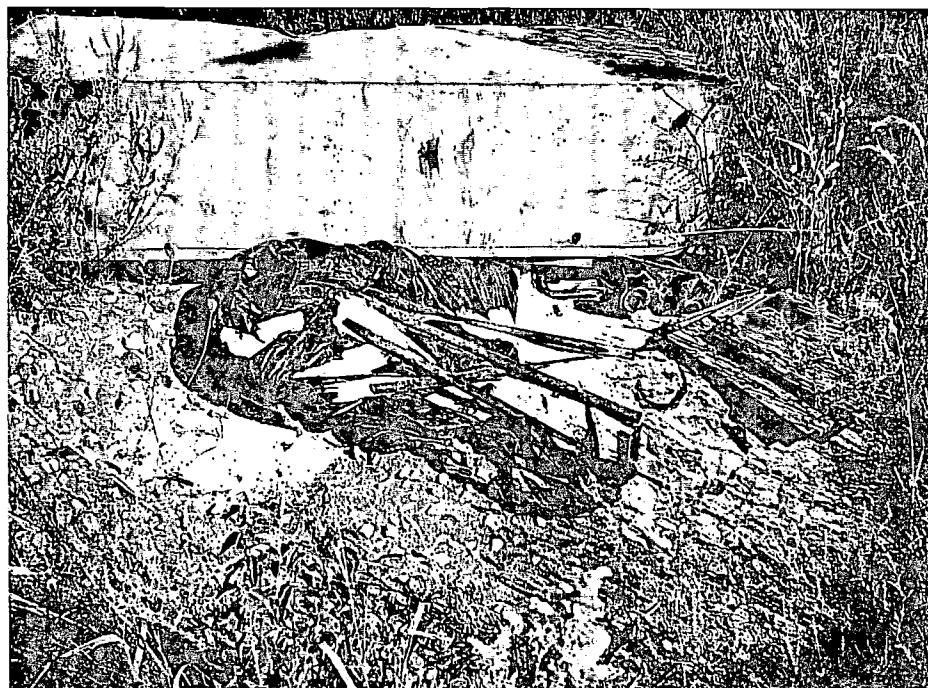
**PHOTOGRAPH 35:** Solid waste discarded on the east area of the subject site.  
Storage tanks and equipment were observed.



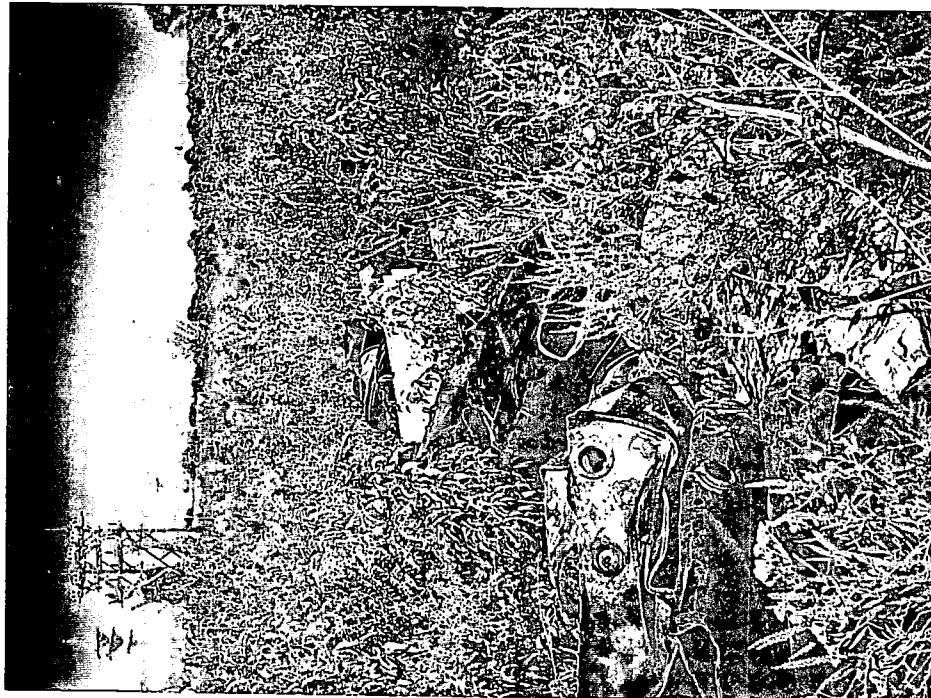
**PHOTOGRAPH 36:** Discarded equipment located on the east area of the subject site.



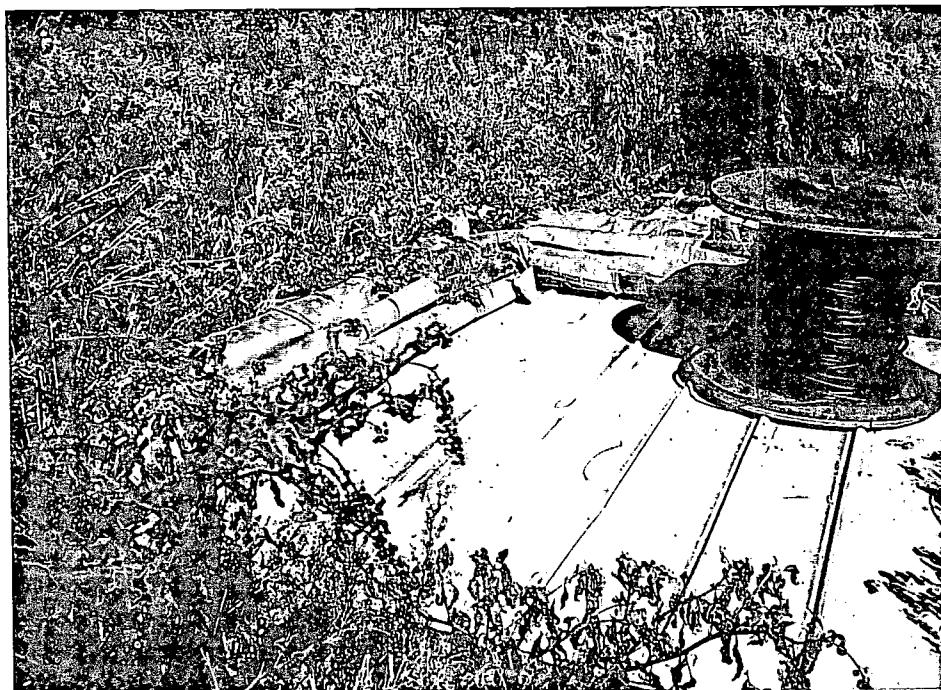
**PHOTOGRAPH 37:** Discarded equipment located on the east area of the subject site.



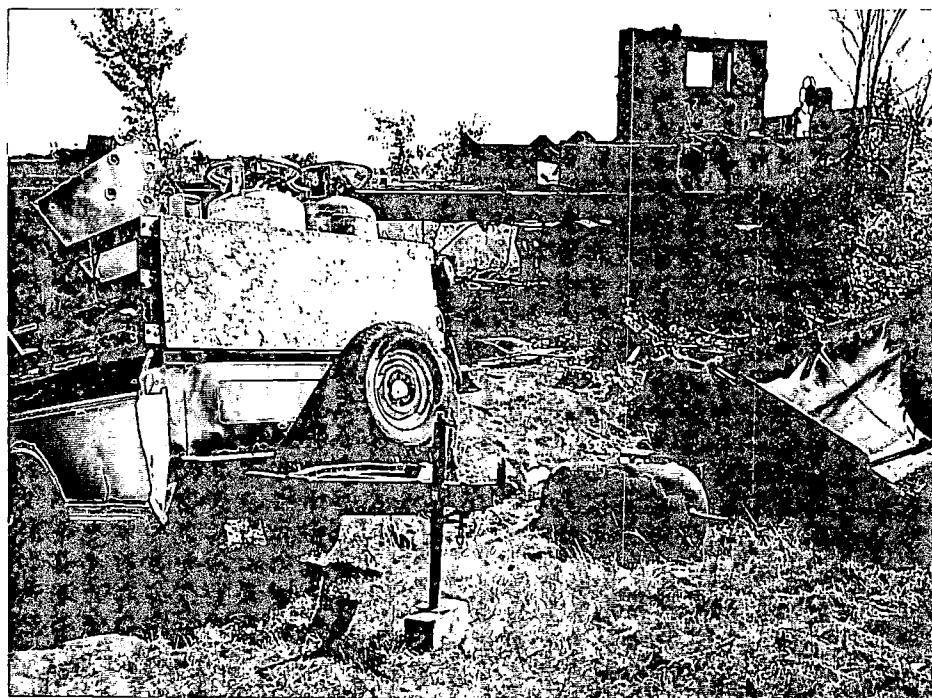
**PHOTOGRAPH 38:** Discarded equipment and unknown waste located on the east area of the subject site.



**PHOTOGRAPH 39:** Discarded 55-gallon drums located on the east area of the subject site.



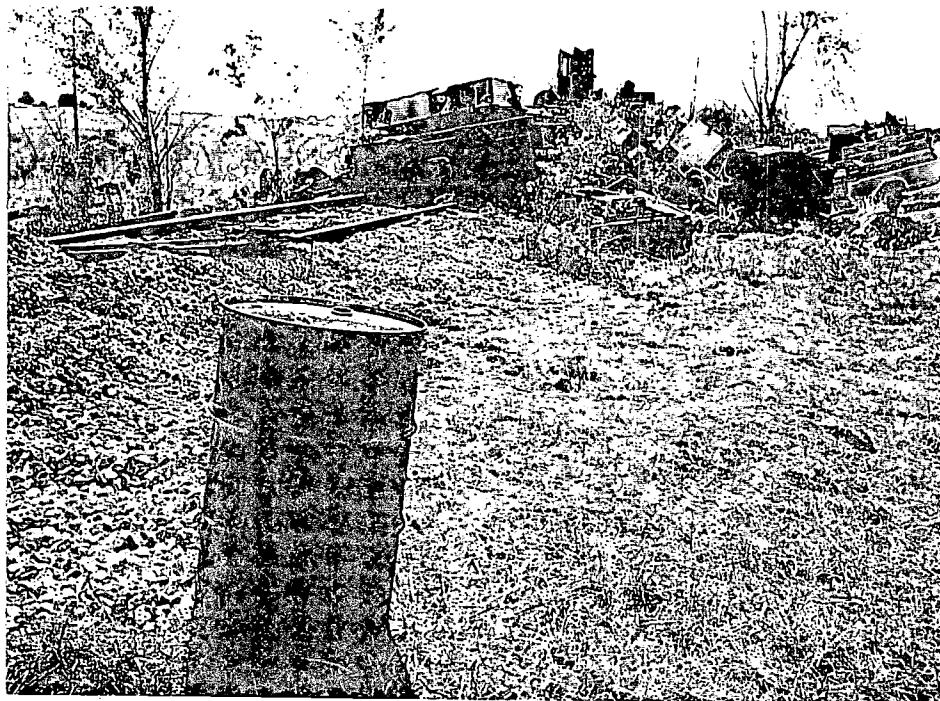
**PHOTOGRAPH 40:** Discarded piping and siding. The mudded joint packing located on the elbows of the pipe were analyzed and confirmed asbestos-containing.



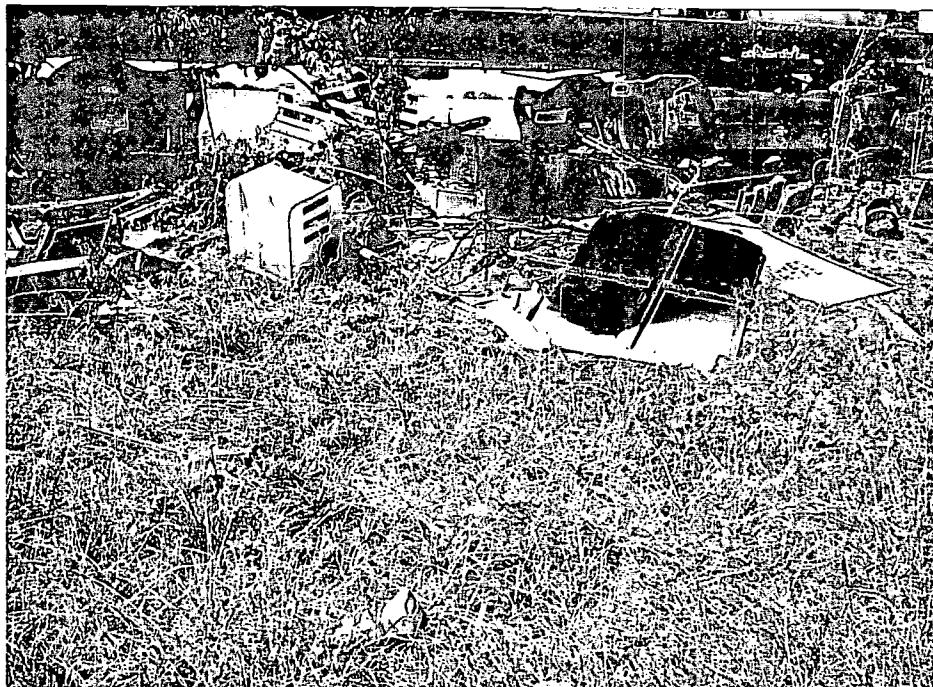
**PHOTOGRAPH 41:** Railroad car dismantling area located north of the landfill.



**PHOTOGRAPH 42:** Containers associated with the railroad car dismantling project.



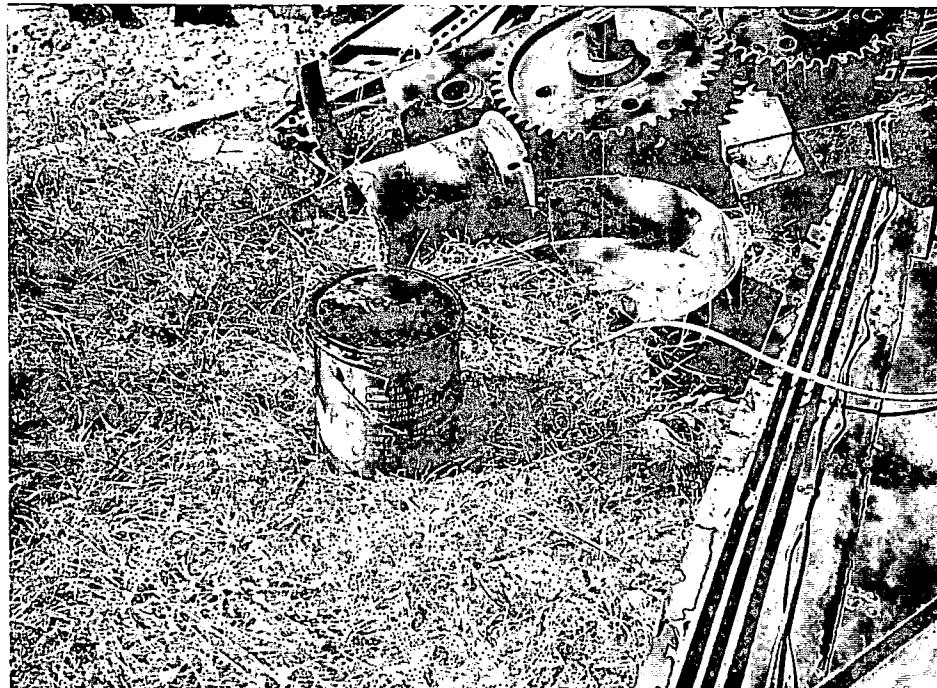
**PHOTOGRAPH 43:** Drums located near the railroad car dismantling project.



**PHOTOGRAPH 44:** Chemical spill and fire-burned area located at the railroad car dismantling project.



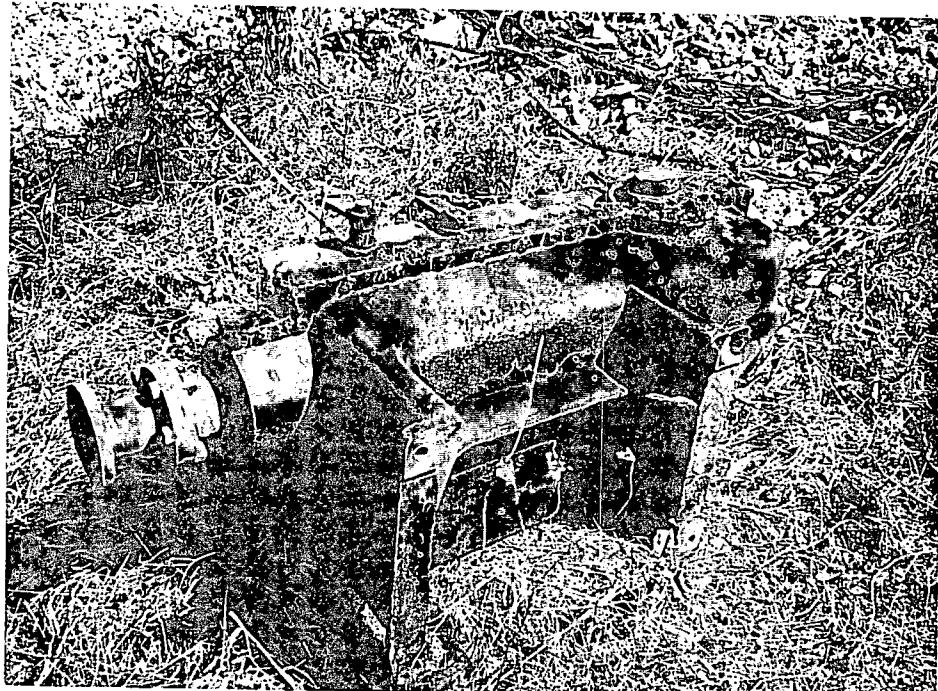
**PHOTOGRAPH 45:** Chemical containers located at the railroad car dismantling area.



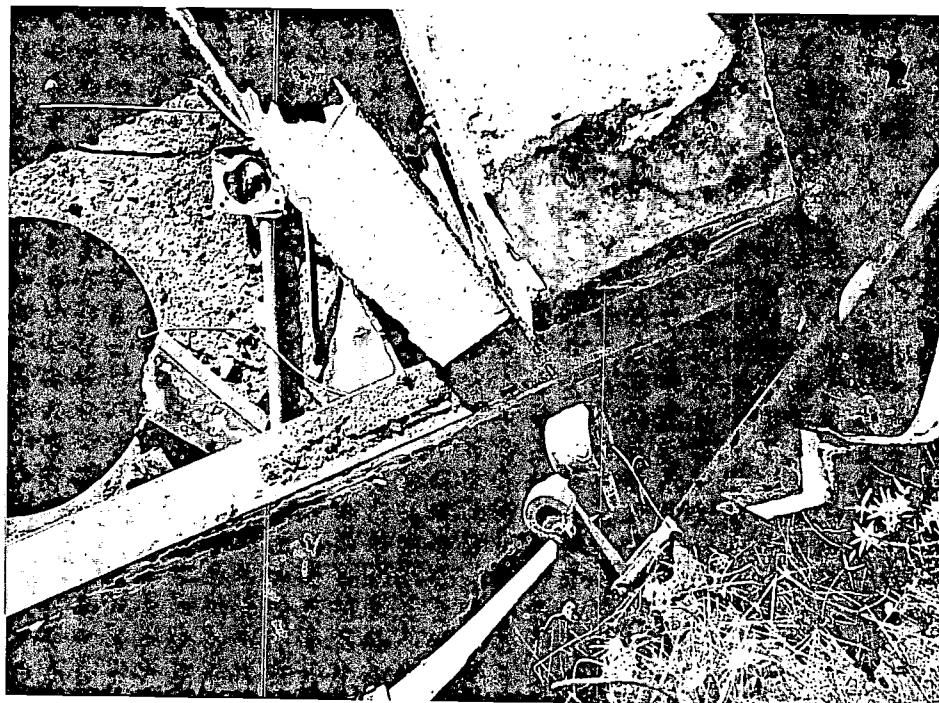
**PHOTOGRAPH 46:** Chemicals containing petroleum product located at the railroad car dismantling area.



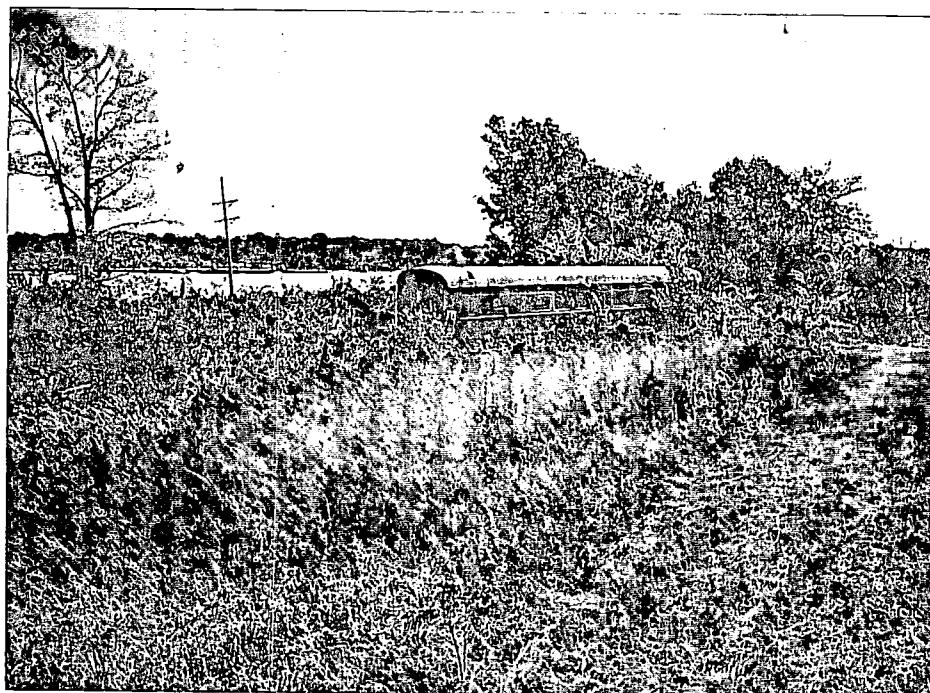
**PHOTOGRAPH 47:** Chemical spill located at the railroad car dismantling area.



**PHOTOGRAPH 48:** Engine part showing oil leakage at the railroad car dismantling area.



**PHOTOGRAPH 49:** Petroleum product observed on equipment located at the railroad car dismantling area.



**PHOTOGRAPH 50:** Abandoned railroad car located on the east area of the subject site.

**APPENDIX F**

**ASBESTOS ANALYTICAL RESULTS**

## LIMITED ASBESTOS SURVEY

### General Information

A limited on-site visual and sampling survey to determine the presence of suspect asbestos-containing building materials (ACBM) was conducted on September 26, 1995. The survey encompassed a walkthrough of accessible interior building spaces. The survey is an attempt to provide a general overview of significant asbestos concerns and is not meant to accurately represent a complete survey for asbestos-containing materials. Prior to renovation or demolition, the survey will need to be augmented to meet federal, state, and local requirements. Survey results are presented in this section; detailed data are presented in the Appendix.

### Survey Methodology

Inspection Procedures - The asbestos survey was performed by an EPA accredited inspector. A building walkthrough was conducted to determine the presence of suspect materials which were accessible and/or exposed. Materials which were similar in general appearance were grouped into homogeneous areas.

Sampling Procedures - Following the walkthrough, client-directed guidelines were used to determine the sampling protocol. Sampling locations were chosen to be representative of the homogeneous sampling area. While an effort was made to collect samples randomly, samples were taken preferentially from already damaged areas or areas which were the least visible to minimize disturbance of the material. In a limited sampling protocol, negative results may be misleading.

Sampling was performed in areas not normally occupied or during nonworking hours to minimize interference with building occupants.

### Laboratory Methodology

Method of Analysis - Samples were submitted to PSI's Lawrence, Kansas laboratory for analysis.

Samples were visually observed and microscopically examined. The samples were mounted on slides and analyzed for asbestos (chrysotile, amosite, crocidolite, anthophyllite, and actinolite/tremolite) and fibrous nonasbestos constituents (mineral wool, paper, etc.). Asbestos was identified by refractive indices, morphology, color, pleochroism, birefringence, extinction characteristics, and signs of elongation.

The microscopist visually estimated relative amounts of each constituent by determining the volume of each constituent in proportion to the total volume of the sample, using a stereoscope.

Laboratory results report the percentage of asbestos present in each sample analyzed. Samples which contain more than one percent asbestos are classified by the EPA as "asbestos-containing" and are subject to EPA regulations. A copy of the analytical report and laboratory certifications are presented in Appendix F.

### **Unaccessed Areas**

Some areas could not be surveyed due to suspended ceilings, or because the limited sampling did not include destruction of walls.

Such areas should be surveyed prior to renovation, demolition, or any activity which might disturb materials contained within these spaces in order to determine whether suspect asbestos materials are present.

The intent of a limited asbestos survey is to evaluate the potential liability associated with the materials suspected of containing asbestos within the building surveyed. The survey performed was not intended to meet the requirements established by OSHA or EPA and is not to be used for construction purposes.



## REPORT OF BULK SAMPLE ANALYSIS FOR ASBESTOS

Page 1 of 1

TESTED FOR: PSI EMD  
4820 W. 15th Street  
Lawrence, KS 66049  
Attn: Rick Leines

PROJECT: R.G. Memorial Airport  
Aviation Dept.

DATE: 10/9/95

REPORT NO.: 598

BOX NO.: 17191

Sample number:	132127					
layer no.:						
Material Type	Insulation					
Gross Appearance/Texture	Clumpy					
Is it homogeneous?	Yes					
Are there obvious layers?	No					
Is it fibrous?	Yes					
What color is it?	White					
IS ASBESTOS PRESENT?	Yes					
ASBESTOS(Type & Percent)						
Chrysotile	5					
Amosite	20					
Crocidolite						
Anthophyllite						
Actinolite						
Tremolite						
TOTAL PERCENT ASBESTOS	25					
OTHER FIBROUS MATERIALS						
(Type & Percent)						
Fibrous Glass						
Cellulose						
Synthetic Fiber						
Other (specify)						
NONFIBROUS MATERIALS %	.75					
Calcite						
Gypsum						
Granular Minerals						
Other (specify)						

COMMENTS:

Quantification is based on a visual determination of the relative volume of bulk sample components. The results are valid only for the item tested. This report may not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Method used: Method for the Determination of Asbestos in Bulk Building Materials, (EPA/600/R-93/118, July 1993). Samples will be disposed of within 30 days unless otherwise notified in writing by client. No part of this report may be reproduced except in full with the written permission of PSI.

Microscopist

Respectfully submitted, PSI

Division Manager

Information To Build On



## REPORT OF BULK SAMPLE ANALYSIS FOR ASBESTOS

Page 1 of 1

TESTED FOR: **PSI EMD**  
**4820 W. 15th Street**  
**Lawrence, KS 66049**  
**Attn: Rick Leines**

PROJECT: Richards-Gabaur Memorial Airport  
Aviation Dept. KCMO

DATE: **10/20/95**

REPORT NO.: **598-**

BOX NO.: **17283**

Sample number: layer no.:	Siding	Drain Tile				
Material Type	Transite	Tile				
Gross Appearance/Texture	Hard Tile	Clumpy				
Is it homogeneous?	Yes	Yes				
Are there obvious layers?	No	No				
Is it fibrous?	Yes	Yes				
What color is it?	Gray	Gray				
IS ASBESTOS PRESENT?	Yes	Yes				
ASBESTOS (Type & Percent)						
Chrysotile	<b>8</b>	<b>20</b>				
Amosite						
Crocidolite		<b>5</b>				
Anthophyllite						
Actinolite						
Tremolite						
<b>TOTAL PERCENT ASBESTOS</b>	<b>8</b>	<b>25</b>				
OTHER FIBROUS MATERIALS						
(Type & Percent)						
Fibrous Glass						
Cellulose						
Synthetic Fiber						
Other (specify)						
NONFIBROUS MATERIALS %	<b>92</b>	<b>75</b>				
Calcite						
Gypsum						
Granular Minerals						
Other (specify)						

COMMENTS:

Quantification is based on a visual determination of the relative volume of bulk sample components. The results are valid only for the item tested. This report may not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Method used: Method for the Determination of Asbestos in Bulk Building Materials, (EPA/600/R-93/16, July 1993). Samples will be disposed of within 30 days unless otherwise notified in writing by client. No part of this report may be reproduced except in full with the written permission of PSI.

Microscopist

Respectfully submitted, PSI,

Division Manager

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**APPENDIX G**

**AUTHOR'S CREDENTIALS**

**Relevant Experience**

Mr. Leines is responsible for client contact, consultation, proposal development, management, on-site investigation, record search, sampling, report writing and production of Phase I and II environmental and contamination assessments. His duties also include management of underground storage tank removal, sampling of soil, groundwater, wastewater, and NPDES storm water.

Previously, Mr. Leines was a field inspector for Hall-Kimbrell's asbestos division. In this position, he was responsible for a variety of field services necessary for successful completion of asbestos projects. During the assessment phase, he met with the client or building contact, conducted building inspections, sampled suspect materials, and determined exposure potentials for each area.

**Representative Projects**

*Dean Machinery Company* - Development of the site safety and health plan, management of the removal of an underground storage tank, soil sampling, supervised personnel, on-site monitoring, transportation of samples to the laboratory, assisted in the handling of UST, wastes, and contaminated soil disposal, report writing and production for submittal to the Missouri Department of Natural Resources (MDNR).

*United Investors Real Estate* - Managed the removal and incineration of five PCB-containing transformers. Developed the site safety and health plan, collected information necessary for contractors to complete tasks, and supervised removal and transportation of the transformers. Mr. Leines also assessed the extent of contamination, developed reports, and documented all procedures.

*Deluxe Check Printers* - Assisted with numerous phases of this large project involving assessment and remediation associated with leaking underground storage tanks. Conducted soil and water sampling, gathered data and supplies, decontaminated equipment, developed reports, and assessed contamination. Also assisted in developing a sampling grid for additional investigation, sampled water and soil from appropriate locations, observed the removal of an underground storage tank while ensuring the health and safety of the workers, conducted HNu organic vapor meter readings around the site, and took photographs. Performs ongoing quarterly sampling of monitoring and extraction wells, report production for submittal to the County Water Pollution Control Board and the Kansas Department of Health and Environment (KDHE).

*Hospital Linen Services* - Conducted semiannual sampling of wastewater discharge as it entered the municipal sewer system during normal working hours. Samples were delivered to our analytical facility with consideration of special transportation and holding time requirements and were analyzed for pH, surfactants, biochemical oxygen demand, chemical oxygen demand, and total suspended solids.

*State of Iowa Atlantic/Riverton - Community Remediation Project* - Investigation of site histories, obtained access agreements, located utilities prior to drilling operations, S.S. & Health officer, drilling assistant, soil sampling and on-site screening, development of monitoring wells, groundwater sampling and responsible for the transportation of samples to laboratory. Production of site cleanup reports for submittal to IDNR.

**Certifications and Affiliations**

OSHA 40-hour Health and Safety Training  
and Site Supervisor Training

Kansas Licensed UST Installer and Remover

National Groundwater Association

Iowa Well Contractor #40349

Phase I Environmental Site Assessment Training

Phase II Environmental Site Assessment Training

EPA-Certified Asbestos Management Planner

EPA-Certified Asbestos Inspector

**Education** - B.S. General Studies, University of Kansas, 1986

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## **Andrew L. Clayton, P.G.**

Senior Geologist

### **Professional Experience**

Mr. Clayton is responsible for developing and designing environmental assessment and remediation projects. His duties include supervision of the field assessment, data analysis, and final report production. Where environmental hazards are identified, Mr. Clayton develops remediation options and aids in the design and implementation of the remediation. In addition to several years of field experience, Mr. Clayton spent two years managing PSI's New York branch office and was responsible for the development and supervision of field assessments and mitigation projects. As a PSI Senior Author, Mr. Clayton is responsible for technical support and quality control of environmental projects.

Mr. Clayton previously worked for the Kansas Geological Survey and at Kansas State University and was responsible for the collection and analysis of samples of various rocks, soils, and waters.

### **Representative Projects**

*Kansas Department of Health and Environment* - Conducted site assessments/investigations at 10 Wichita area Trust Fund sites.

*Norfolk Southern Railroad* - Conducted a contamination assessment and installed a free-product recovery system at a fueling station site.

*J.C. Penney* - Conducted a site assessment and assisted in the remedial design at a former UST site.

*Lennar Northeast Properties* - Reviewed environmental documents and estimated environmental liabilities at 35 sites.

*Schwegman Giant Super Markets* - Developed a remedial action specification and developed contract documents for this UST site.

*St. Louis Regional Convention Center and Sports Complex Authority* - Managed the assessment of soil and groundwater contamination at the site of a former bus terminal.

*United Parcel Service* - Conducted contamination assessments to evaluate the extent of soil and groundwater contamination of four midwest distribution centers. Developed corrective action plans for contaminant remediation at three sites.

*Acme Printing Ink* - Implemented a vapor extraction system for removal of benzene from contaminated soil.

*Circle K Convenience Stores* - Designed and produced a remedial action plan to cleanup groundwater contamination resulting from leaking underground storage tanks at an active site.

### **Certifications and Affiliations**

Registered Professional Geologist - TN, IN, KY, PA (Pending)

Registered Ground Water Professional - IA

Certified UST Consultant - OK

OSHA 40-hour Health and Safety

American Industrial Hygiene Association

Site Supervisor Training

EPA-certified Asbestos Inspector

### **Education**

M.S. Geology, Kansas State University, 1985

B.S. Geology, Bowling Green State University, 1980