

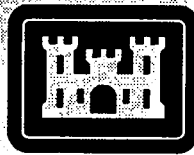
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**Technical Memorandum
Site-Specific Sampling and Analysis Plan
for
Interim Groundwater Sampling
at
Building 354 Area Solvent Detection Site**

Fort Riley, Kansas

October 1998

Prepared for



U.S. Army Corps of Engineers
Kansas City District

Prepared by

**Burns
&
McDonnell**

Contract Number: DACA41-96-D-8010
Project Number: 96-806-4-017



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LIST OF ACRONYMS AND ABBREVIATIONS

BMcD	Burns & McDonnell Engineering, Inc.
CAS	Continental Analytical Services, Inc.
CENWK	Kansas City District
DO	Dissolved Oxygen
DQCR	Daily Quality Control Report
FFA	Federal Facilities Agreement
FFTA-MAAF	Former Fire Training Area, Marshall Army Airfield
FSM	Field Site Manager
FSP	Field Sampling Plan
IDW	Investigation-Derived Waste
IH	Industrial Hygienist
KDHE	Kansas Department of Health and Environment
NPDES	National Pollutant Discharge Elimination System
NTUs	Nephelometric Turbidity Units
ORP	Oxidation-Reduction Potential
PID	Photo-ionization Detector
QA	Quality Assurance
QA Lab	Chemical Quality Assurance Branch Waterways Experiment Station
QAPP	Quality Assurance Project Plan
QC	Quality Control
Site Wide QCP	Quality Control Plan
SC	Specific Conductance
Site Wide SAP	Sampling and Analysis Plan, Volume I and II
Site Wide SSHP	Site Safety and Health Plan
SSHS	Site Safety and Health Supervisor
SVOCs	Semi Volatile Organic Compounds
TPH	Total Petroleum Hydrocarbons
USACE	United States Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOCs	Volatile Organic Compounds

1.0 Introduction

Burns & McDonnell Engineering, Inc. (BMcD) has been contracted by the United States Army Corps of Engineers (USACE), Kansas City District (CENWK), to conduct the Monitoring Well Interim Sampling and Analysis at the Building 354 Area Solvent Detection Site (Site) located on Main Post, Fort Riley, Kansas. Figure 1-1 illustrates the general location of the Former Building 354 Solvent Detection Area and Fort Riley. Figure 1-2 illustrates the layout of the Site and includes monitoring well locations.

Specific procedures and guidelines for conducting environmental investigations at Fort Riley are described in the Comprehensive Basic Documents listed below.

- *Sampling and Analysis Plan (Site Wide SAP) (BMcD, 1998a)*
 - *Volume I, Field Sampling Plan (FSP)*
 - *Volume II, Quality Assurance Project Plan (QAPP)*
- *Site Safety and Health Plan (Site Wide SSHP) (BMcD, 1998b)*
- *Site Wide Quality Control Plan (Site Wide QCP) (BMcD, 1998c)*

This technical memorandum serves as the Site Specific Sampling and Analysis Plan for Monitoring Well Interim Sampling and Analysis at the Site, as well as the addendum to the Site Wide SSHP. It describes procedures and activities not included or that deviate from those in the Comprehensive Basic Documents.

1.1 Project Purpose

This work is being undertaken as an interim measure until monitoring under the Remedial Investigation is initiated. The monitoring is designed to ensure consistency with actions that might be undertaken by Fort Riley pursuant to requirements of the Federal Facilities Agreement (FFA). Sampling and analyses of monitoring wells located at the Site will be conducted to detect potential increases in contaminant concentrations, determine if constituents are migrating, and begin collecting additional geochemical data.

2.0 Project Organization

The work will be conducted by BMcD. Key project personnel involved with the field activities and oversight are identified in this section.

2.1 U.S. Army Corps of Engineers

CENWK is the administrator of the Monitoring Well Interim Sampling and Analysis at the Site. Mr. Rick Van-Saun is the CENWK Project Manager for this project and will serve as the primary point of contact for BMcD. Mr. Van-Saun can be contacted at 816-983-3552.

Ms. Tina Gassen is the Fort Riley-DES representative for this project. Ms. Gassen can be contacted at 785-239-2140.

2.2 Burns and McDonnell

Mr. Tracy Cooley will serve as the BMcD Project Manager. Mr. Cooley will be the liaison between BMcD and the CENWK for this project. Mr. Cooley will be responsible for complete coordination of the work, including adequate internal controls and review procedures to eliminate conflicts, errors, and to verify technical accuracy. In addition, Mr. Cooley is responsible for overseeing activities involving sampling, laboratory analyses, and performance of audits. Mr. Cooley can be contacted at 816-822-3369.

Mr. Ed Lindgren will serve as the BMcD Field Site Manager (FSM) and the Site Safety and Health Supervisor (SSHS). Mr. Lindgren will supervise the field activities relevant to this project and will have direct responsibility for site-specific activities and decisions regarding the immediate safety of investigation personnel. Mr. Lindgren will report to the BMcD Project Manager and the Safety and

1 Health Officer. Mr. Lindgren can be contacted at 816-333-8787, extension 5405. During field activities,
2 Mr. Lindgren can also be contacted at the BMcD field office at Fort Riley at 785-784-4142.
3

4 Mr. Eric Wenger, Industrial Hygienist, will serve as the BMcD Safety and Health Officer for this project
5 and will have ultimate responsibility for the health and safety of field personnel. Mr. Wenger can be
6 contacted at 816-822-3894.
7

8 **2.3 Contract Laboratory**

9 Continental Analytical Services, Inc. (CAS) is the contract laboratory for the analysis of groundwater
10 samples from the Site. The CAS address is listed below.
11

12 Continental Analytical Services, Inc.
13 1804 Glendale Road
14 Salina, Kansas 67401
15 Contact: Mr. Greg Groene
16 (800) 535-3076
17

18 **2.4 Quality Assurance Laboratory**

19 The USACE Chemical Quality Assurance Branch of Waterways Experiment Station (QA Lab) will
20 analyze quality assurance (QA) samples collected during groundwater sampling activities. The address
21 and lab coordinator are provided below.
22

23 Chemical Quality Assurance Branch
24 Waterways Experiment Station
25 420 S. 18th Street
26 Omaha, Nebraska 68102
27 (402) 444-4314
28 Contact: Ms. Laura Percifield
29 LIMS # (CENWK to provide)
30

31 **2.5 Reporting**

32 **2.5.1 Daily Quality Control Report**

33 The FSM will record daily activities on the standard Daily Quality Control Report (DQCR) form as
34 outlined in Section 9.0 of the Site Wide SAP, Volume I. A DQCR will be completed daily and submitted
35 in draft form to Fort Riley and the CENWK Project Manager by 0800 hours on the day following the field
36 work. Fort Riley and CENWK will review the reports. Comments will be provided as appropriate to the
37 BMcD Project Manager within 24 hours of submittal. BMcD will correct the reports in accordance with
38 the comments.
39

40 **2.5.2 Weekly Summary Report**

41 BMcD will prepare a Weekly Summary Report that will be forwarded to the Kansas Department of
42 Health and Environment (KDHE) and the U.S. Environmental Protection Agency (USEPA) upon
43 approval by Fort Riley and CENWK. A Weekly Summary Report will be prepared for each week of field
44 work. Each sampling round is anticipated to take between two and three days to complete, thus only one
45 weekly report will be required per sampling round.
46

47 **3.0 Sampling Activities**

48 Groundwater samples will be collected from five monitoring wells and three piezometers located at the
49 Site. Table 3-1 summarizes the monitoring wells, piezometers, analytical parameters, and sampling
50 methods.

3.1 Water Level Measurement

Prior to purging and sampling, a round of water level measurements will be collected within a 24 hour period from the five monitoring wells and three piezometers at the Site. Water levels will be measured according to procedures in Section 4.3.3 of the Site Wide SAP, Volume I. The CENWK Project Manager will be provided the results of the water level measurements within two working days after they are accomplished.

To ensure accurate representation of groundwater elevations at the Site, groundwater level measurements will be compared to previously measured water levels for each monitoring well. A groundwater elevation contour map will be generated during groundwater level measurement activities to identify anomalies. Additionally, subsequent water level measurements will also be taken at the time the groundwater samples are collected. If the current measurement is significantly different than previous data or the groundwater contours, the groundwater level will be re-measured for confirmation and the CENWK Project Manager will be notified of any significant changes. good

3.2 Monitoring Well Purging

Monitoring wells will be purged according to the procedures in Section 4.3.7.1 of the Site Wide SAP, Volume I. Table 3-1 indicates the method to be used for purging and sampling each monitoring well. In summary, three monitoring wells have dedicated bladder pumps, and the remaining five monitoring wells have no dedicated purging/sampling device and will be purged/sampled using one of the following devices at the discretion of the FSM; non-dedicated bladder pump (if adequate recharge) or disposable bailer (if slow recharge).

Field parameters to be measured during purging include temperature, pH, specific conductance (SC), dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity. Water will be removed from the monitoring wells until temperature, pH, SC, and DO have stabilized according to the criteria in Section 4.3.7.1 of the Site Wide SAP, Volume I, and turbidity is less than 30 nephelometric turbidity units (NTUs). Ferrous iron will be measured in the field after the collection of each groundwater sample. A flow-through cell will be used to measure DO and ORP during purging of monitoring wells with dedicated or non-dedicated bladder pumps. DO will not be used as a stabilization parameter for monitoring wells purged with a bailer.

Based on BMcD experience at other sites at Fort Riley, stabilization of DO is easily achieved in monitoring wells located in the alluvial aquifer that recharge quickly. However, stabilization of DO may prove difficult in monitoring wells that are slow to recharge or are quickly purged dry. If DO does not stabilize after the removal of five casing volumes, the sample will be collected and the CENWK Project Manager will be notified within one working day.

If turbidity measurements of less than 30 NTUs cannot be obtained during the removal of five casing volumes, an alternative sampling protocol will be employed. If all field parameters, except turbidity, are stabilized, groundwater samples will be collected for all parameters except metals and the CENWK Project Manager will be notified within one working day. The bailer or non-dedicated bladder pump will then be removed from the well and sediment will be allowed to settle in the well for a period of no more than 24 hours. The metals sample will then be collected using a disposable polyethylene bailer by slowly lowering the bailer into the water column and slowly removing the bailer in a manner that minimizes disturbance of sediment in the bottom of the well. A turbidity measurement of the water collected for metals analysis will be obtained.

3.3 Monitoring Well Sampling and Analysis

Monitoring wells will be sampled upon reaching the requirements previously described in Section 3.2. Samples will be collected according to the procedures in Section 4.3.7.2 of the Site Wide SAP, Volume I, and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), ethylene dibromide (using water quality method for lower detection limit), total petroleum hydrocarbons (TPH) OA-1, TPH OA-2, and eight RCRA metals. Table 3-2 lists the analytical parameters, methods, sample preservatives, and bottles.

4.0 Site Specific Safety and Health Plan

This section serves as an addendum to the Site Wide SSHP. A photo-ionization detector (PID) will be used to monitor the well headspace during groundwater sampling activities. The well headspace will be monitored upon opening the well cap and recorded in the field logbook. Figure 4-1 illustrates the route to Irwin Army Community Hospital (Building 600) from the Site. Table 4-1 provides a list of emergency phone numbers.

5.0 Investigation-Derived Waste

During the groundwater sampling activities, investigation-derived waste (IDW) will be generated that will consist of liquids and solids that will require proper disposal. Liquid IDW will consist of decontamination fluids and purge water generated during sampling procedures. The National Pollutant Discharge Elimination System (NPDES) permit for Fort Riley provides for disposal of water from monitoring wells and decontamination fluid directly into the Fort Riley Department of Public Works sanitary sewer via a designated point. Purge water and decontamination fluids will be disposed of at a designated discharge point on a daily basis.

Solid IDW will consist of personal protective equipment and miscellaneous trash and will be managed as non-hazardous solid waste. Solid IDW will be disposed of within the Post trash collection system at a designated dumpster at Camp Funston.

6.0 Quality Control Plan

This section serves as an addendum to the Site-Wide QCP. The purpose of this addendum is to present the personnel and Quality Control (QC) Team activities for oversight of work in the field and office for field activities at the Site.

6.1 Project Team Review Personnel

Review personnel assigned to the Project Team include a geologist/hydrogeologist, a chemist, an engineer, an industrial hygienist (IH), and the FSM who will also serve as the SSHS. These people also function as working members of the Project Team.

Members of the Project Team are experienced in groundwater sampling and evaluation activities and are technically proficient in their respective professional areas of expertise. Additionally, they are familiar with standard internal review processes and specific implementation for the project. Project Team members responsible for review of field procedures and office work are depicted on the project organizational chart in Figure 6-1. Their duties and authorities are presented in the Site Wide QCP.

6.2 Quality Control Team

The QC Coordinator for this project is Ms. Nanci Higginbotham, P.E. Ms. Higginbotham is a senior-level Project Manager with experience in similar projects and QC review processes. The QC Inspectors for this project are Mr. Alan Rittgers and Mr. Bill Craig. Both have experience in similar projects and are familiar with standard QC review processes and project specific implementation. The QC Team for this project is depicted on Figure 6-1. Their duties and authorities are presented in the Site Wide QCP.

1 **6.3 Quality Control Team Activities**

2 The QC audit will be conducted in the office prior to mobilization to review the sampling plan and
3 procedures and discuss field safety. In addition, the QC Team will review the documentation from the
4 first day of sampling. This approach is being utilized because the Project Team has conducted similar
5 groundwater sampling activities at this and other Fort Riley sites and is familiar with the proper sampling
6 protocol and documentation based on the Comprehensive Basic Documents.
7

8 **7.0 References**

9 Burns & McDonnell Engineering, Inc., 1998a, *Draft Final (Revised) Sampling and Analysis Plan for*
10 *Environmental Investigations at Fort Riley, Kansas, Volumes I and II*, September 1998.

11
12 Burns & McDonnell Engineering, Inc., 1998b, *Draft Final (Revised) Site Safety and Health Plan for*
13 *Environmental Investigations, Fort Riley, Kansas*, September 1998.

14
15 Burns & McDonnell Engineering, Inc., 1998c, *Site Wide Quality Control Plan for Environmental Studies*
16 *and Investigations at Fort Riley, Kansas*, February 1998.

TABLES

**Table 3-1
Monitoring Wells and Analytical Parameters
Building 354 Area Solvent Detection Site
Fort Riley, Kansas**

Sampling Method	GW Level	CAS							Field Measurement						
		TCL Volatiles	TCL Semi-Volatiles	Ethylene Dibromide	TPH - GRO	TPH - DRO	8 RCRA Metals	pH	Specific Conductance	Turbidity	Dissolved Oxygen	Oxidation Reduction Potential	Ferrous Iron	Temperature	
Wells															
TS0292-01	DBP	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TS0292-02	Other	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW95-03	DBP	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW95-04	DBP	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW95-06	Other	X	X	X	X	X	X	X	X	X	X	X	X	X	X
PZ-A	Other	X	X	X	X	X	X	X	X	X	X	X	X	X	X
PZ-B	Other	X	X	X	X	X	X	X	X	X	X	X	X	X	X
PZ-C	Other	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Record		9	9	9	9	9	9	9	9	9	9	9	9	9	9
Duplicate (10%)	NA	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MS (5%)	NA	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MSD (5%)	NA	1	1	1	1	1	1	1	1	1	1	1	1	1	1
QA Lab (10%)	NA	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Trip Blank (Daily)*	NA	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

* Estimated, provided all VOC samples are shipped in the same sample cooler. Otherwise, trip blanks must accompany every cooler containing VOC samples.

Project-specific MS/MSD required for each analytical batch containing project samples.

Rinsate samples will be collected only if a non-dedicated bladder pump is used for sampling.

CAS - Continental Analytical Services, Inc.

TCL - Target Compound List

Other - A non-dedicated bladder pump or disposable polyethylene bailer will be used at the discretion of the Field Site Manager.

DBP - Dedicated Bladder Pump

TPH - Total Petroleum Hydrocarbons

GRO - Gasoline Range Organics

DRO - Diesel Range Organics

Table 3-2
Analytical Methodologies and Protocol Requirements
Building 354 Area Solvent Detection Site
Fort Riley, Kansas

Matrix	Parameter	Analytical Method ¹	Sample Containers	Sample Preservation	Holding Times	
Water ²	TCL Volatiles	SW-846 8260B	2 X 40 mL glass vials Teflon-lined septa caps	HCl to pH<2 Cool to 4°C	Analyzed--14 days	
	TCL Semivolatiles	SW-846 8270C	2 X 1 L Amber glass	Cool to 4°C	Extracted--7 days Analyzed--40 days following extraction	
	TPH - GRO	OA-1	2 X 40 mL glass vials Teflon-lined septa caps	HCl to pH<2 Cool to 4°C	Analyzed--14 days	
	TPH - DRO	OA-2	2 X 1 L Amber Glass	Cool to 4°C	Extracted--7 days Analyzed--40 days following extraction	
	Ethylene Dibromide (EDB)	EPA 504.1	2 X 40 mL glass vials Teflon-lined septa caps	HCl to pH<2 Cool to 4°C	Analyzed--14 days	
	RCRA Metals					
	Barium, Cadmium, Chromium, Silver	SW-846 3010A/6010B	1 L HDPE ³	Nitric acid to pH<2	Analyzed--6 months	
	Arsenic	SW-846 inc/7060A	1 L HDPE ³	Nitric acid to pH<2	Analyzed--6 months	
	Lead	SW-846 3020A/7421	1 L HDPE ³	Nitric acid to pH<2	Analyzed--6 months	
	Mercury	SW-846 7470A	250 mL HDPE ³	Nitric acid to pH<2	Analyzed--28 days	
Selenium	SW-846 inc/7740	1 L HDPE ³	Nitric acid to pH<2	Analyzed--6 months		

Notes:

¹Analytical method references are given in Section 6.1 of the Quality Assurance Project Plan.
Where two numbers are cited, the first is the preparation method and the second is the analytical method.

²The water matrix includes groundwater as well as quality control samples prepared during water sampling activities.

³Samples for metals analyses may be collected in a single sample container.

TCL = Target Compound List

RCRA = Resource Conservation and Recovery Act

HDPE = High Density Polyethylene Bottles

HDPE = High-Density Polyethylene Bottles

L = Liter

mL = Milliliter

°C = Degrees Celsius

TPH = Total Petroleum Hydrocarbons

DRO = Diesel Range Organics

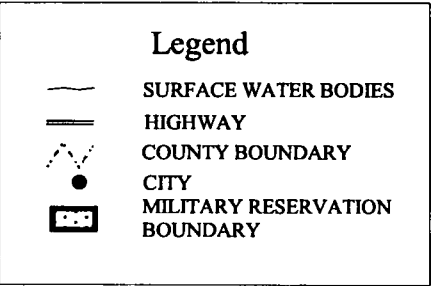
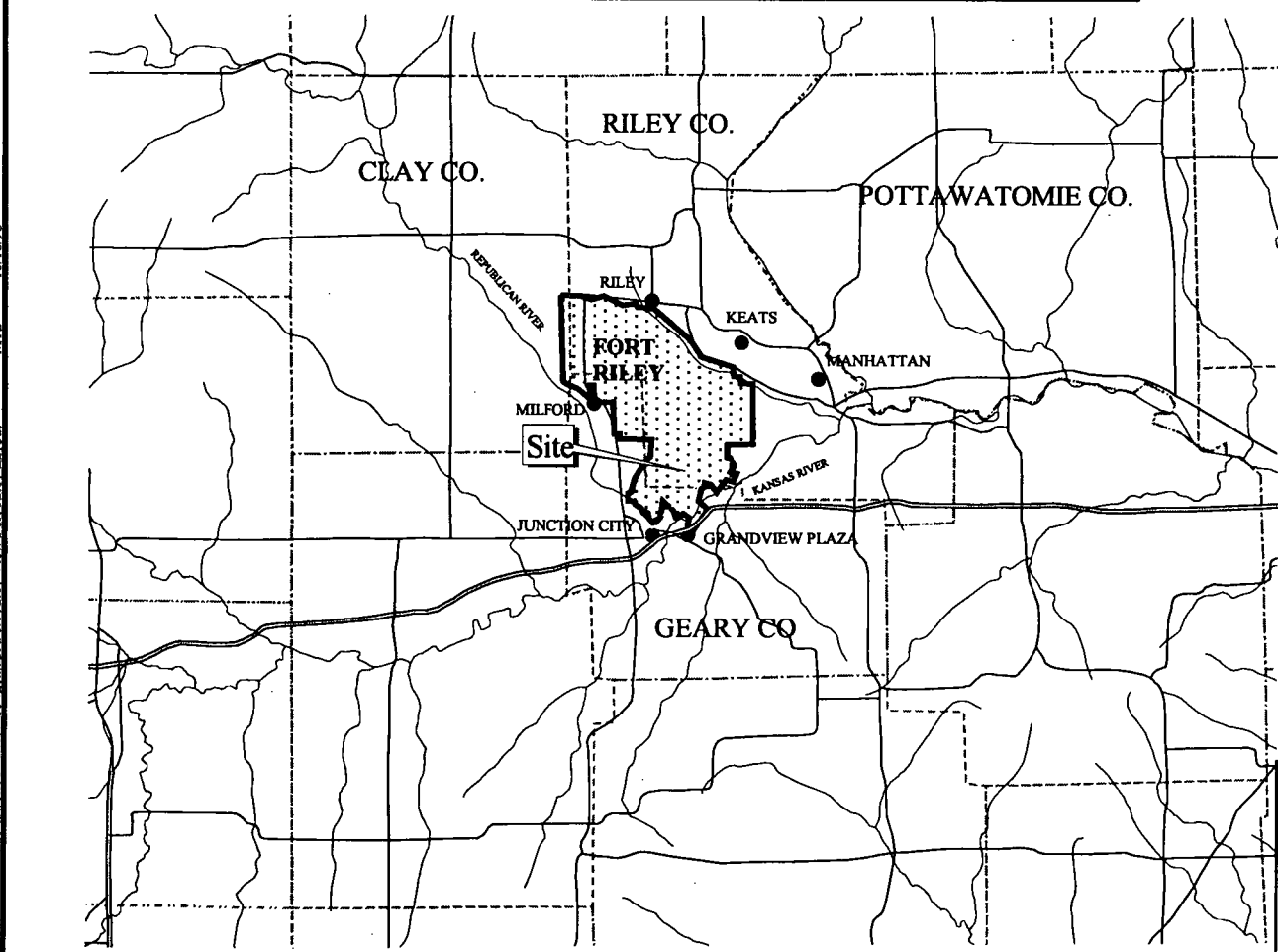
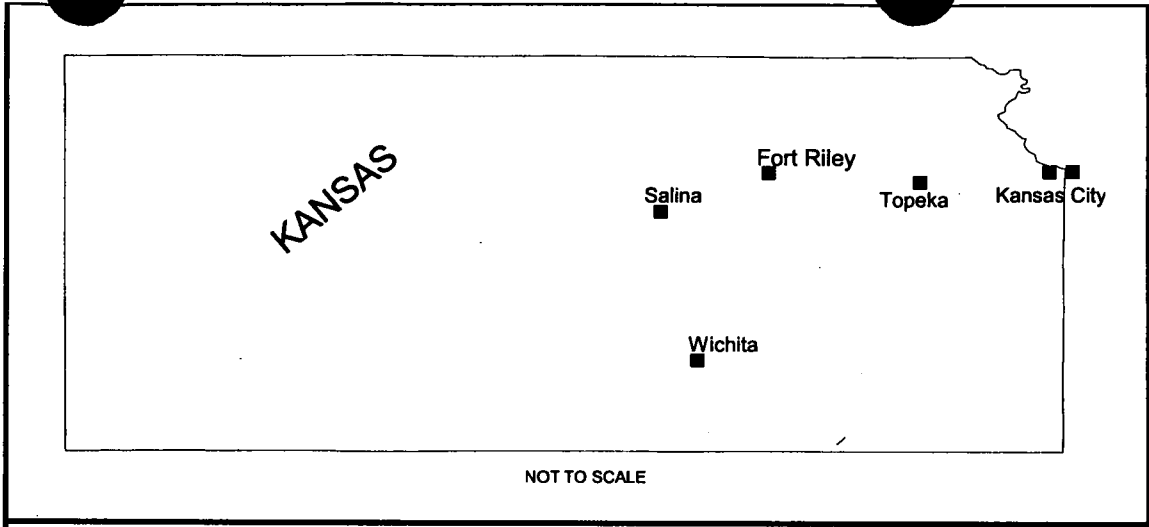
GRO = Gasoline Range Organics

**Table 4-1
Emergency Telephone Numbers
Building 354 Area Solvent Detection Site
Fort Riley, Kansas**

Ambulance (Fort Riley)	(785) 239-7835
Irwin Army Community Hospital	(785) 239-7777
Fire Department (Fort Riley)	(785) 239-4257
Military Police	(785) 239-3053
Geary County EMS	911
Geary County Sheriff	911
BMcD Safety (Eric Wenger)	(816) 822-3894
BMcD Project Manager (Tracy Cooley)	(816) 822-3369

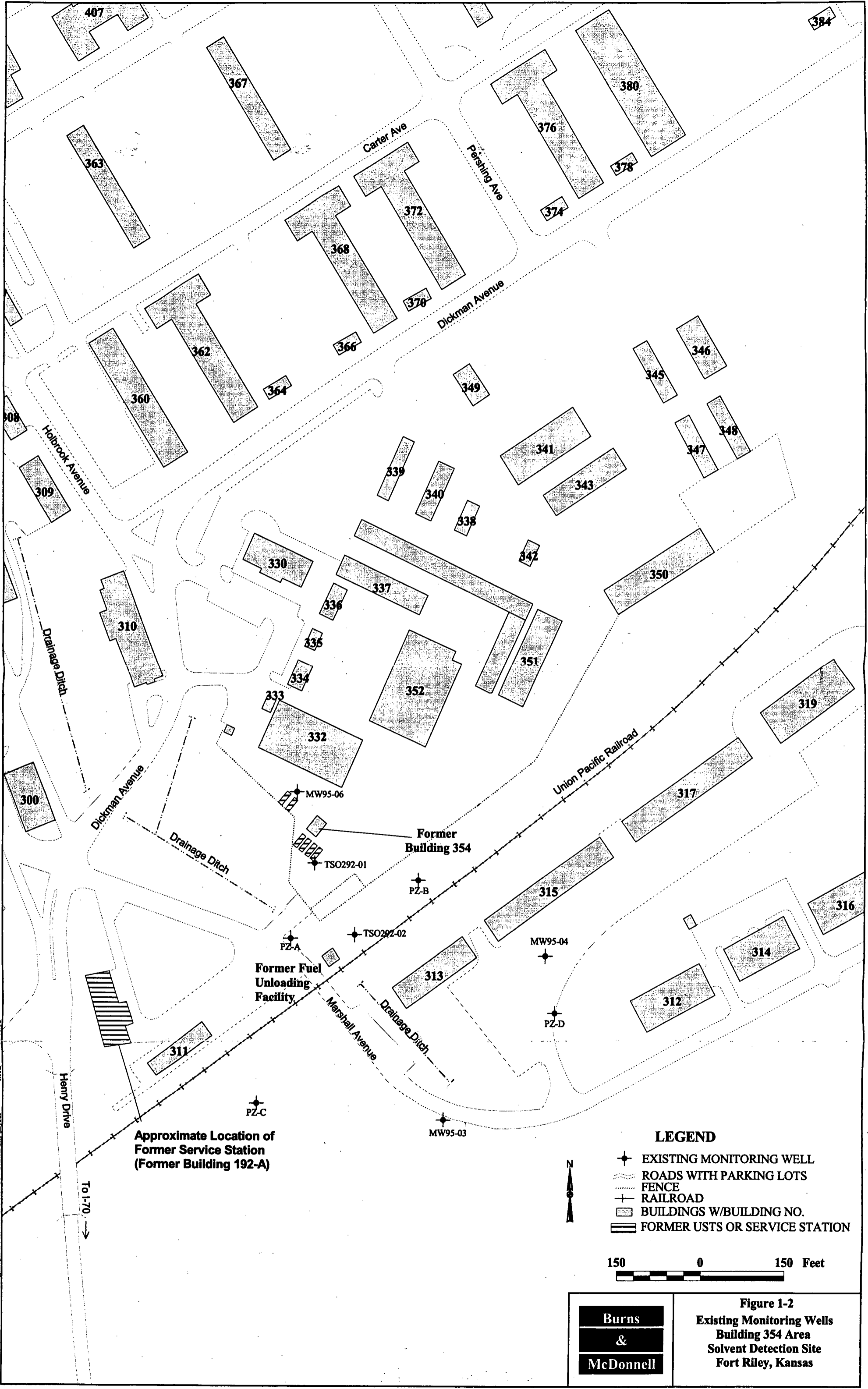
FIGURES

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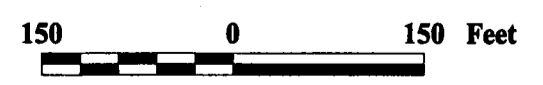
Figure 1-1
Site Location Map
Building 354 Area
Solvent Detection Site
Fort Riley, Kansas



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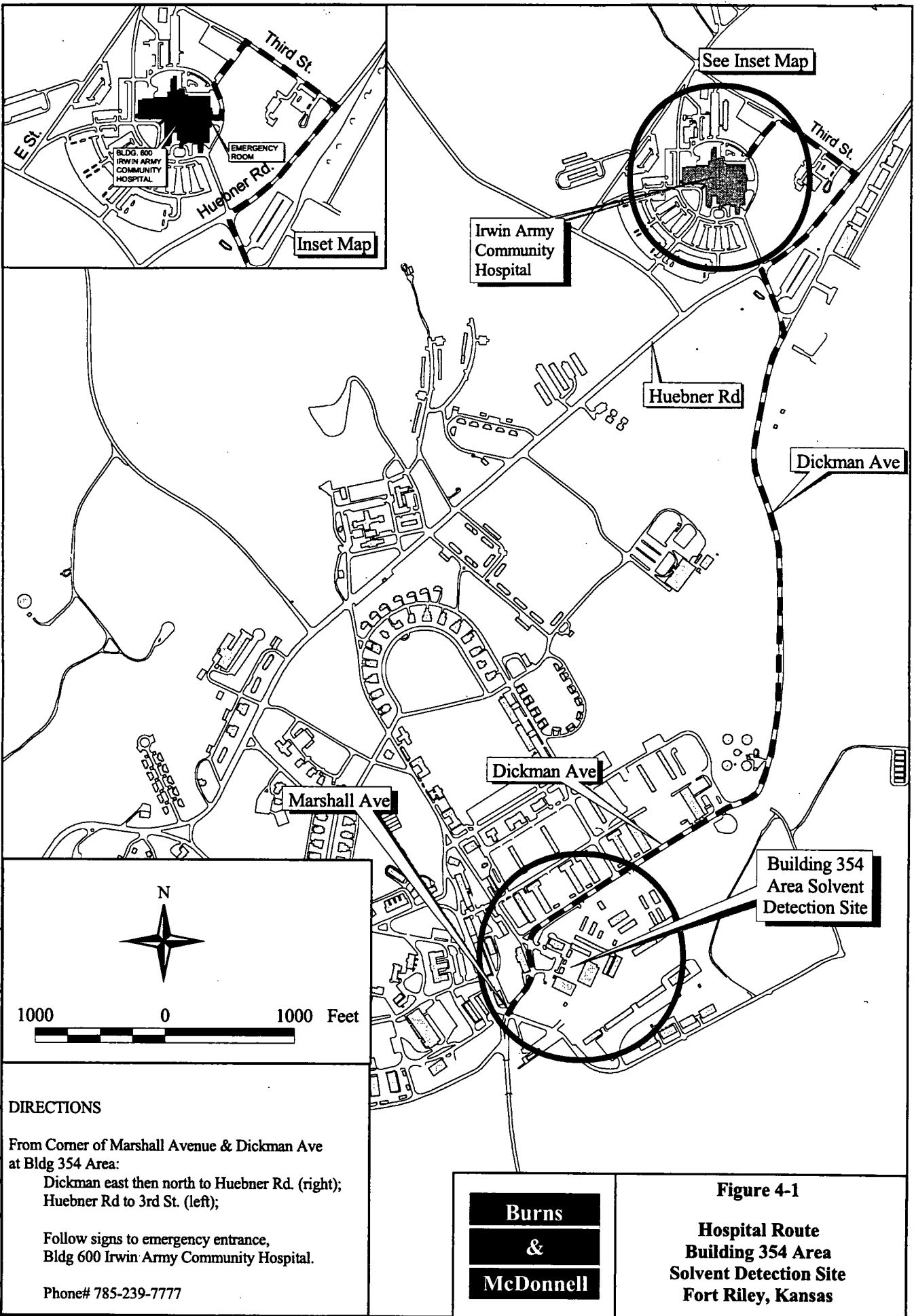
LEGEND

- ◆ EXISTING MONITORING WELL
- ▭ ROADS WITH PARKING LOTS
- ▭ FENCE
- RAILROAD
- ▭ BUILDINGS W/BUILDING NO.
- ▭ FORMER USTS OR SERVICE STATION



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 &
McDonnell

Figure 1-2
Existing Monitoring Wells
Building 354 Area
Solvent Detection Site
Fort Riley, Kansas



H:\arc\usfm\gw354\gen.apr\354 Hospital Route View\354 Hospital Route Layout

DIRECTIONS

From Corner of Marshall Avenue & Dickman Ave
at Bldg 354 Area:
Dickman east then north to Huebner Rd. (right);
Huebner Rd to 3rd St. (left);

Follow signs to emergency entrance,
Bldg 600 Irwin Army Community Hospital.

Phone# 785-239-7777

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&
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Figure 4-1
Hospital Route
Building 354 Area
Solvent Detection Site
Fort Riley, Kansas

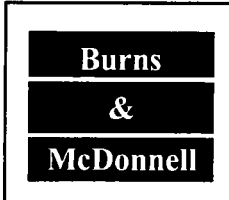
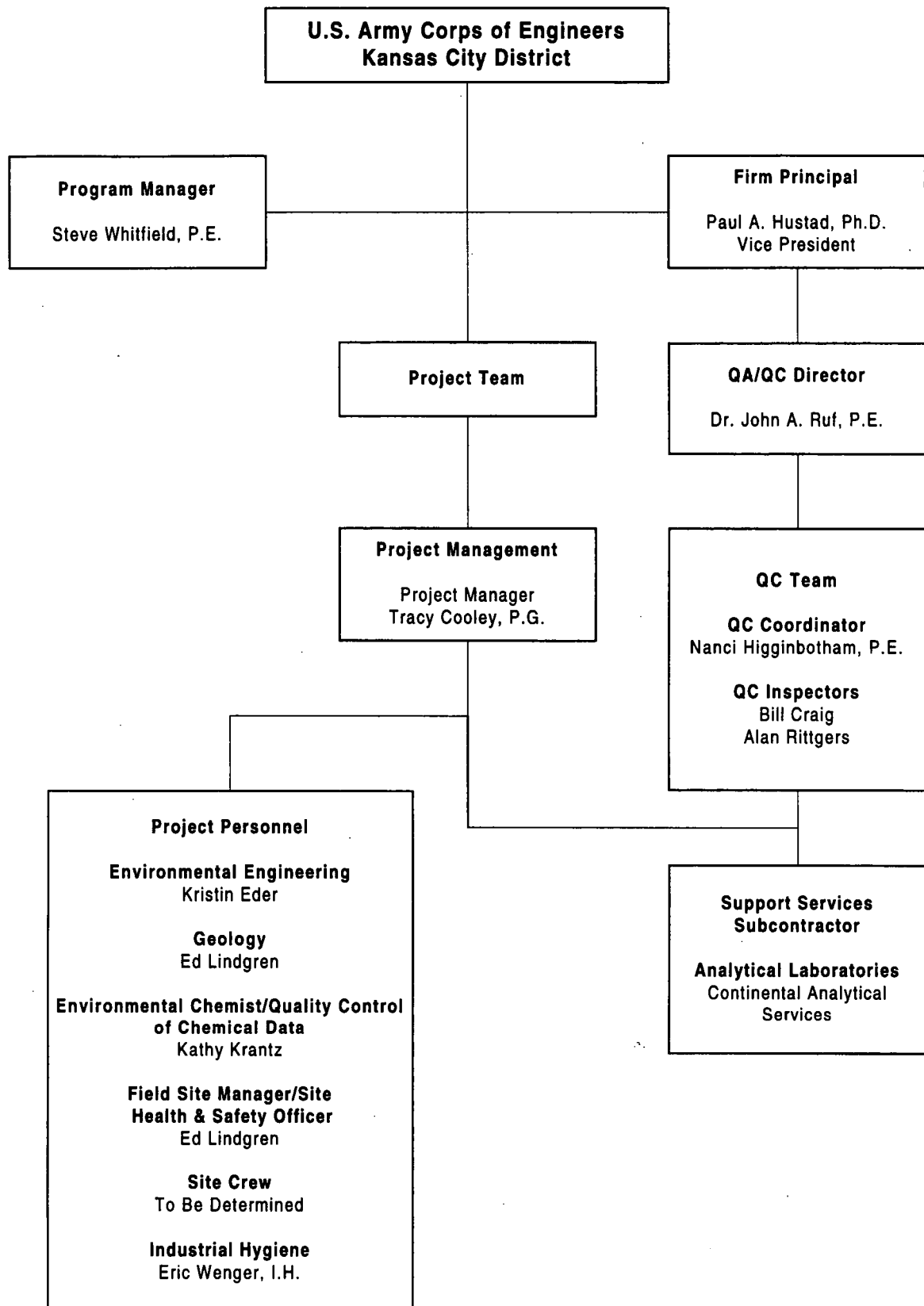


Figure 6-1
Burns & McDonnell
Organizational Chart
Building 354 Area
Solvent Detection Site
Fort Riley, Kansas