



REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
HEADQUARTERS III CORPS AND FORT HOOD  
FORT HOOD, TEXAS 76544-5028

January 27, 2000

Environmental Programs

Mr. Monico Banda  
TNRCC  
Office of Air Quality  
New Source Review Division  
Mail Code 162  
P.O. Box 13087  
Austin, Texas 78711-3087

RE: Exemption Registration No. 41479 Soil Bioremediation Operations, Account ID No.  
94-1479-M

Dear Mr. Banda:

The intent of this letter is to correct an error on the location of the Bioremediation Operations at Fort Hood, Texas, as it is indicated on the Exemption Registration No. 41479. The Form PI-7 submitted to your office on April 28, 1999, indicated that this facility was located northwest of the intersection of Santa Fe Avenue and 77<sup>th</sup> Street; however, the plot plan shows that this facility is located northwest of the intersection of North Avenue and 37<sup>th</sup> Street. Enclosed is a revised Form PI-7 for your records to reflect the requested location change.

If you have any further questions, please contact Mr. Miguel Perez, (254) 287-8712, or Mr. William Bodkin, (254) 287-6499, Environmental Division.

Sincerely,

William C. Bodkin  
Chief, Environmental Division

Enclosure

Cc: Ms. Zoe Roscoe, Air Program Manager, Region 9, TNRCC, 6801 Sanger Avenue, Suite 2500, Waco, TX 76710-7807



# TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

## REGISTRATION FORM FOR EXEMPTIONS and PERMITS BY RULE

### FORM PI-7

Please mail to: TNRCC, Office of Air Quality, Air Permits Division (MC-162), PO Box 13087, Austin, TX 78711-3087

I. Company Name Fort Hood, U.S. Army  
(Corporation, Company, Government Agency, Firm, etc.)  
 Mailing Address U.S. Army, HQ III Corps & Fort Hood, Attn: AFZF-PW ENV, BLDG. 4219, 77<sup>th</sup> & Warehouse Ave, Fort Hood, TX 76544  
 Individual Authorized to Act for Registrant: Name Mr. William C. Bodkin Title Chief, Environmental Division  
 Address BLDG. 4219, 77<sup>th</sup> Street & Warehouse Avenue Telephone (254) 287-6499 Fax (254) 287-2718

II. PHYSICAL LOCATION OF FACILITY (Latitude and Longitude must be to the nearest second):  
 Name of Plant or Site Fort Hood  
 Street Address Northwest of the intersection of North Avenue and 37<sup>th</sup> Street  
 Nearest City Killeen Zip Code 76544-5028 County Bell/Corvell Latitude 31 Deg 8 Min 54 Sec Longitude 97 Deg 45 Min 29 Sec  
 SITE REQUIREMENTS: A. Submit a plot plan to scale of the property showing the location of plant boundaries, plant equipment, and surrounding area  
 B. Furnish an area map with a scale showing the facility location relative to highways and towns.  
 C. A physical address or accurate driving directions must be provided on all registrations.

III. TYPE OF FACILITY:  
 A. Applicable Exemption or Permit by Rule Number(s) from TNRCC List /106.533 and /106.262  
 B. Name of Facility and Company's Facility Number U.S. Army, HQ III and Fort Hood, N/A  
 C. TNRCC Account Identification Number BF-0129-I, BF-0028-P, BF-0027-R  
 D. Previous Special Exemption or Permit Number Not Applicable  
 E. Operating Schedule: Hours/day 24 Days/week 7 Weeks/year 52  
 F. Proposed Start of Construction 09/27/96 (Date) Operation 08/05/97 (Date) Permanent  Portable   
 H. Length of time at this site, if portable N/A  
 I. Does the company (including subsidiaries and parent companies) employ 100 or fewer persons? -YES -NO

IV. PROCESS INFORMATION  
 Description of Process: **Prepare and attach a written description of the exempt process and applicable checklists (when available). The description must be in sufficient detail to indicate that the facility will conform to the specified exemption.**

V. EMISSIONS DATA **Furnish a description of the basis for emission rates including fugitives. (Calculations, emission factors, measurement, NSPS, etc.)**

| Emission Point Number | Name of Source      | Name of Air Contaminant | Emission Rate of Each Air Contaminant |             |         |             |
|-----------------------|---------------------|-------------------------|---------------------------------------|-------------|---------|-------------|
|                       |                     |                         | lb/hr                                 |             | tons/yr |             |
|                       |                     |                         | Gaseous                               | Particulate | Gaseous | Particulate |
| EP-BI01               | Soil Bioremediation | VOC                     | 0.53                                  | N/A         | 2.32    | N/A         |
|                       |                     | Benzene                 | 0.08                                  |             | 0.35    |             |
|                       |                     |                         |                                       |             |         |             |
|                       |                     |                         |                                       |             |         |             |
|                       |                     |                         |                                       |             |         |             |
|                       |                     |                         |                                       |             |         |             |

VI. The required copy of the registration request has been sent to the Regional Office of the TNRCC:  Yes  No  
 The required copy of the registration request has been sent to the Local Programs (if applicable): N/A  Yes  No

VII. I, William C. Bodkin Chief, Environmental Division  
(Name) (Title)  
 state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project will satisfy the conditions and limitations of the indicated exemption. The facility will operate in compliance with all Regulations of the Texas Natural Resource Conservation Commission and with Federal Environmental Protection Agency Regulations governing air pollution.  
 DATE 27 January, 2000 SIGNATURE \_\_\_\_\_



DEPARTMENT OF THE ARMY  
HEADQUARTERS III CORPS AND FORT HOOD  
FORT HOOD, TEXAS 76544-5028

REPLY TO  
ATTENTION OF

May 27, 1999

Environmental Programs Office

Office of Air Quality  
New Source Review Division  
TNRCC  
Mail Code 162  
P.O. Box 13087  
Austin, Texas 78711-3087

RE: Application for Standard Exemption Registration for Fort Hood Soil Bioremediation Operations

Dear Sir:

Enclosed is an application for Standard Exemption Registration for Soil Bioremediation Operations at Fort Hood, Texas. We are proposing to register this site per Texas Natural Resources Conservation Commission regulations  $\square$ 106.533 (Previously Standard Exemption 68) and  $\square$ 106.262(3) (Previously Standard Exemption 118). Fort Hood sent a registration for this facility to the attention of Mr. Dennis Rogers at TNRCC on January 9, 1998.

If you have any further questions, please contact Mr. Miguel Perez (254) 287-8712, or Mr. William Bodkin, (254) 287-8713, Environmental Division.

Sincerely,

William C. Bodkin  
Chief, Environmental  
Management Branch

Enclosure

Cc: Ms. Zoe Roscoe, Air Program Manager, Region 9, TNRCC, 6801 Sanger Avenue, Suite 2500, Waco, TX 76710-7807

**APPLICATION FOR STANDARD EXEMPTION REGISTRATION  
FOR SOIL BIOREMEDIATION OPERATIONS AT  
U.S. ARMY, HQ III CORPS AND FORT HOOD  
FORT HOOD, TEXAS**

**Submitted to:**

U.S. Army HQ III Corps and Fort Hood  
Attn: AFZF-PW-ENW  
Building 4219, 77th & Warehouse Avenue  
Fort Hood, Texas 76544-5057

**Submitted by:**

Earth Tech  
1420 King Street, Suite 600  
Alexandria, Virginia 22314

**Date**

January 1999

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# **SECTION A**

## **INTRODUCTION**

# SECTION A

## INTRODUCTION

With

The bioremediation operation included in this application meets all of the requirements of the TNRCC regulations §106.211, §106.533, and §106.262(3). The information that follows demonstrates compliance with these requirements. PI-7 forms and supporting documentation are included in the sections that follow.

## **SECTION B**

**COMPLIANCE WITH GENERAL STANDARD  
EXEMPTION LIST REQUIREMENTS  
(§116.211) AND STANDARD EXEMPTION  
REQUIREMENTS FOR SOIL BIOREMEDIATION**

# SECTION B

## COMPLIANCE WITH GENERAL STANDARD EXEMPTION LIST REQUIREMENTS (§116.211) AND STANDARD EXEMPTION REQUIREMENTS FOR SOIL BIOREMEDIATION

### B.1 GENERAL REQUIREMENTS

To qualify for a standard exemption under TNRCC, Title 30, Part 1, Subchapter C, Section 116.211, a facility must satisfy the following general requirements:

- (a) *Total actual emissions authorized under standard exemption from the proposed facility shall not exceed 250 tons per year (tons/yr) for carbon monoxide (CO) or nitrogen oxides (NOx), or 25 tons/yr of volatile organic compounds (VOC) or sulfur oxides (SO2) or inhalable particulate matter (PM10), or 25 tons/yr of any other air contaminant except carbon dioxide, water, nitrogen, methane, ethane, hydrogen and oxygen.*

The emissions from the soil bioremediation operation are outlined in the following sections of this registration. The actual emissions will not exceed the 250 tons/yr limit for either NOx or CO, or the 25 tons/yr limit for the other contaminants. The total proposed allowable emissions on the TNRCC PI-7 Forms are 2.32 tons/yr of VOCs, and 0.35 tons/yr benzene.

- (a)(4) *Any facility which constitutes a new major source, or any modification which constitutes a major modification under the new source review requirements of the FCAA, Part C (Prevention of Significant Deterioration) as amended by the FCAA Amendments of 1990, and regulations promulgated thereunder, shall be subject to the requirements of Subchapter B of this chapter rather than this subchapter.*

This modification would not be a major modification subject to Prevention of Significant Deterioration (PSD) review.

- (a)(5) *Total actual emissions authorized under standard exemptions from the property where the proposed facility is to be located shall not exceed 250 tons/yr for CO or NOx, or 25 tons/yr of VOC or SO2, or 25 tons/yr of any other air contaminant except CO, water nitrogen, methane, ethane, hydrogen, and oxygen, unless at least one facility at such property has*

*been subject to public notification and comment as required in Subchapter B or Subchapter D of this chapter (relating to New Source Review Permits or Permit Renewals) or the pertinent Chapter 116 procedures that were in effect at the time.*

Other facilities with standard exemptions at Fort Hood have been subject to public notification and comment in the course of obtaining a permit (TNRCC Permit No. 24538); therefore, compliance with this requirement is achieved.

- (a)(6) *Construction or modification of the facility shall be commenced prior to the effective date of a revision of the Standard Exemption List under which the construction or modification would no longer be exempt.*

The soil bioremediation operation at the Fort Hood facility meets all of the criteria under the most recent revisions of TNRCC §106.533 (Previously Standard Exemption 68) and TNRCC §106.262(3) (Previously Standard Exemption 118).

- (a)(7) *The proposed facility shall comply with the applicable provisions of the Federal Clean Air Act §111 (regarding Federal New Source Performance Standards [NSPS]) and §112 (regarding Hazardous Air Pollutants).*

There are no applicable NSPSs or National Emission Standards for Hazardous Air Pollutants for this source.

- (a)(8)(a) *There are no permits under the same TNRCC account number that contain a condition or conditions precluding use of the standard exemption or standard exemptions.*

There are no current permits for the Fort Hood facility (TNRCC Account Nos. BF-0129-I, BF-0028-P, and BF-0027-R) that preclude the use of TNRCC §106.533 (Previously Standard Exemption 68) and TNRCC §106.262 (Previously Standard Exemption 118).

- (a)(8)(b) *No person shall circumvent by artificial limitations the requirements of §116.110 of this title (relating to applicability).*

The sources included in this submission meet all the requirements for TNRCC§106.533 and §106.262(3) (Previously Standard Exemption 68 and 118, respectively). Therefore, a state permit is not required and the requirements of §116.110 will not be circumvented.

- (a)(8)(c) *The emissions from the facility shall comply with all rules and regulations of the TNRCC and with the intent of the TCAA, including protection of health and property of the public and all emissions control equipment shall*

*be maintained in good condition and operated properly during operation of the facility.*

This facility meets all rules and regulations of the TNRCC. In addition, compliance with TNRCC §106.533 and §106.262(3) ensures protection of health and property of the public.

## **B.2 STANDARD EXEMPTION FOR SOIL REMEDIATION, TNRCC §106.533 (PREVIOUSLY STANDARD EXEMPTION 68)**

As required by TNRCC §106.533(2) (Previously Standard Exemption 68) of TNRCC regulations, total emissions of petroleum hydrocarbons from soils contaminated with petroleum compounds should not exceed 1.0 lb/hr to satisfy standard exemption requirements. This is demonstrated below.

Soil contaminated due to spills/leaks from underground storage tanks/aboveground storage tanks (USTs/ASTs) is treated by bioremediation at Fort Hood. The contaminated soil consists mainly of jet fuel (JP-8). The soil is bioremediated by adding micro-organisms, fertilizer and water, and then turning the soil over to expose the maximum surface area of the contaminated soil. The procedure shown below is used to estimate VOC emissions from bioremediated soil. It should be noted that this estimation is conservative, with actual emissions being much lower.

Maximum concentration of TPH (total petroleum hydrocarbons) in soil = 25,000 parts per million (ppm) or 2.5 weight percent.

Average concentration of TPH in soil = 7,000 - 10,000 ppm.

Surface Area of bioremediation operation = 341.28' x 172.89' = 59,000 sq. ft

Depth of soil being bioremediated = 3" = 0.25 ft

Volume of soil being bioremediated = 59,000 ft<sup>2</sup> X 0.25 ft = 14,750 ft<sup>3</sup>.

Density of soil (assumed to be similar to broken clay) = 1.4 tons/yd<sup>3</sup>.

Volume of Exposed Soil = 14,750 ft<sup>3</sup>/27 ft<sup>3</sup>/yd<sup>3</sup> = 546 cu. yds

Weight of Exposed Soil = 546 cu. yds x 1.4 tons/yd<sup>3</sup> = 765 tons = 1,529,730 lbs.

At 25,000 ppm, weight of TPH = 1,529,730 lbs x 0.025 = 38,243 lbs.

Conservatively assuming that benzene, toluene, ethyl benzene, and total xylenes (BTEX)<sup>(1)</sup> content of TPH contamination = 10 percent of TPH<sup>(2)</sup>.

Amount of BTEX in contaminated soil =  $38,243 \times 0.1 = 3,824$  lbs.

The bacterial enzymes used for biotreatment will decrease the amount of BTEX by at least 30% due to absorption and adsorption.<sup>(3)</sup>

Therefore, amount of BTEX remaining in soil =  $3,824 \text{ lbs} \times 2/3 = 2,550$  lbs

The bioremediated soil is sprayed frequently with water, equivalent to providing approximately 1 inch of rain per week. Approximately 50 percent of the BTEX will remain in solution, after dissolving in water. This BTEX in solution is not easily volatilized, and will not escape to the atmosphere. Therefore, the remaining BTEX that can be emitted from the soil =  $2,550 \text{ lbs} \times 0.5 = 1,275$  lbs.

At 75° Fahrenheit (F), in loosely structural soil, approximately 1 percent of this BTEX is volatilized in a 24 hr period, or,  $0.01 \times 1,275 = 12.75$  lbs per 24 hrs<sup>(3)</sup>.

The VOC (BTEX) emission rate =  $12.75 \text{ lbs}/24 \text{ hrs} = 0.53 \text{ lbs/hr}$ .

The annual VOC emissions =  $0.53 \text{ lbs/hr} \times 8,760 \text{ hrs/yr} / 2,000 \text{ lbs/ton} = 2.32 \text{ tons/yr}$ .

It should be noted that this emission rate is extremely conservative, with the actual number being at least 1/3 lower, because maximum concentration of TPH in soil was used, and also because wind, moisture, and soil type are all variables which will affect the estimation.<sup>(3)</sup>

### **B.3 EMISSION AND DISTANCE LIMITATIONS, TNRCC §106.262 (PREVIOUSLY STANDARD EXEMPTION 118)**

In addition to meeting the 1.0 lbs/hr limit for emissions of TPH, as per §106.533 of TNRCC regulations, benzene emissions must also meet the condition of §106.262(3) of the TNRCC regulations (Previously Standard Exemption 118). This is demonstrated below.

TNRCC §106.262(3) states that benzene emissions from the bioremediated site shall not be greater than 5 tons/yr, nor greater than E, where

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<sup>(1)</sup>BTEX constitutes a majority of the readily volatile fraction of TPH.

<sup>(2)</sup>Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations, Occupational and Environmental Health Directorate, Bioenvironmental Engineering Division, Brooks Air Force Base, Texas, August 26, 1998 (Chapter 13, Table 13-2).

<sup>(3)</sup>References: (a) Dr. Bill Nesbeitt, CEO, Bioenvironmental Technology, Tomball, Texas (281) 351-5594. (b) Dr. Charles Calmbacher, PhD, President, SEA Consultants, Atlanta, Georgia.

$$E = L/K$$

Where: E = Maximum allowable hourly emissions of benzene (never to exceed 6 lbs/hr)  
L = 3 mg/m<sup>3</sup> for benzene  
K = Value, dependent on distance to the nearest off-plant receptor (in this case, a residence, hospital, or school)

The receptor closest to the bioremediation site is the Meadows Elementary School, located approximately 5,364 feet from the site.

In this case, K = 8.  
E = 3/8 = 0.375 lbs/hr

Weight percentage of benzene in BTEX (vapor phase) = 15.7%<sup>(2)</sup>.

Therefore, hourly emissions of benzene from bioremediation = 0.53 lbs/hr x 0.157 = 0.08 lbs/hr, which is less than the 0.375 lbs/hr maximum allowable emission rate for benzene.

The annual emissions of benzene = 0.08 lbs/hr x 8,760 hrs/yr / 2,000 lbs/ton = 0.35 tons/yr. Therefore, emissions of petroleum hydrocarbons and benzene meet the requirements of TNRCC §106.533 and §106.262(3), respectively the standard exemptions for soil remediation.

# SECTION C

## TNRCC PI-7 FORM



# TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

## REGISTRATION FORM FOR STANDARD EXEMPTIONS

### FORM PI-7

Please mail to: TNRCC, Office of Air Quality, New Source Review Division (MC-162), P.O. Box 13087, Austin, TX 78711-3087

I. Company Name U.S. Army, HQ III Corps and Fort Hood (Fort Hood)  
 (Corporation, Company, Government Agency, Firm, etc.)  
 Mailing Address Commander, HQ III Corps and Fort Hood, Attn: AFZF-DE-ENV, Fort Hood, TX 76544-5057  
 Individual Authorized to Act for Applicant: Name Mr. William C. Bodkin Title Chief, Environmental Mgmt Branch  
 Address Same as above Telephone (817) 287-8713 Fax (817) 287-3591

II. LOCATION OF EXEMPT FACILITY (Latitude and Longitude must be to the nearest second):  
 Name of Plant or Site Fort Hood  
 Street Address Northwest of the intersection of Santa Fe Avenue and 77th Street  
 Nearest City Killeen County Bell/Coryell Latitude UTM East 618390.00932 Longitude UTM North 3446696.39450  
 SITE REQUIREMENTS: A. Submit a plot plan to scale of the property showing the location of plant boundaries, plant equipment, and surrounding area.  
 B. Furnish an area map with a scale showing the facility location relative to highways and towns.

III. TYPE OF FACILITY:  
 A. Applicable Standard Exemption Number(s) from TNRCC List Standard Exemptions 68 and 118  
 B. Name of Facility and Company's Facility Number U.S. Army, HQ III Corps and Fort Hood, Not Applicable  
 C. TNRCC Account Identification Number BF-0129-I, BF-0028-P, BF-0027-R  
 D. Previous Special Exemption or Permit Number Not Applicable  
 E. Operating Schedule: Hours/day 24 Days/week 7 Weeks/year 52  
 F. Proposed Start of Construction 9/27/1996 (Date) Operation 8/5/97 (Date)  
 G. Permanent [  ] Portable [  ]  
 H. Length of time at this site, if portable Not Applicable

IV. PROCESS INFORMATION  
 Description of Process: Prepare and attach a written description of the exempt process and applicable checklists (when available). The description must be in sufficient detail to indicate that the facility will conform to the specified exemption.

V. EMISSIONS DATA  
 Furnish a description of the basis for emission rates including fugitives. (Calculations, emission factors, measurement, NSPS, etc.) (Please see attached estimated calculations).

| Emission Point Number | Name of Source      | Name of Air Contaminant | Emission Rate of Each Air Contaminant |                |         |                |
|-----------------------|---------------------|-------------------------|---------------------------------------|----------------|---------|----------------|
|                       |                     |                         | lb/hr                                 |                | tons/yr |                |
|                       |                     |                         | Gaseous                               | Particulate    | Gaseous | Particulate    |
| EP-B101               | Soil Bioremediation | VOC                     | 0.53                                  | Not Applicable | 2.32    | Not Applicable |
|                       |                     | Benzene                 | 0.08                                  | Not Applicable | 0.35    | Not Applicable |

VI. The required copy of the application has been sent to the Regional Office of the TNRCC: [X]Yes [ ]No  
 The required copy of the application has been sent to the Local Programs (if applicable): [ ]Yes [ ]No

VII. I, Mr. William C. Bodkin, Chief, Environmental Management Branch, ENV, DEH  
 (Name) (Title)  
 state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project will satisfy the conditions and limitations of the indicated exemption. The facility will operate in compliance with all Regulations of the Texas Natural Resource Conservation Commission and with Federal Environmental Protection Agency Regulations governing air pollution.  
 DATE 27 May 1997 SIGNATURE William C. Bodkin



# TEXAS NATURAL RESOURCES CONSERVATION COMMISSION

## REGISTRATION FORM FOR STANDARD EXEMPTIONS FORM PI-7

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| EP-B101               | Soil Bioremediation | VOC                     | 0.53                                  | Not Applicable | 2.32    | Not Applicable |
|                       |                     | Benzene                 | 0.08                                  | Not Applicable | 0.35    | Not Applicable |

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 The required copy of the application has been sent to the Local Programs (if applicable):  Yes  No

VII. I, Mr. William C. Rodkin, Chief, Environmental Management Branch, ENV, DEH (Name) (Title)  
 state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project will satisfy the conditions and limitations of the indicated exemption. The facility will operate in compliance with all Regulations of the Texas Natural Resource Conservation Commission and with Federal Environmental Protection Agency Regulations governing air pollution.  
 DATE 27 May 1997 SIGNATURE William C. Rodkin

## **SECTION D**

# **PLOT PLANS AND AREA MAP FOR THE BIOREMEDIATION OPERATION**

PLOT PLAN  
FORT HOOD  
STANDARD EXEMPTION FOR  
SOIL BIOREMEDIATION OPERATIONS

SITE OF THE  
BIOREMEDIATIONS  
OPERATIONS

BLDG.  
1950

1953

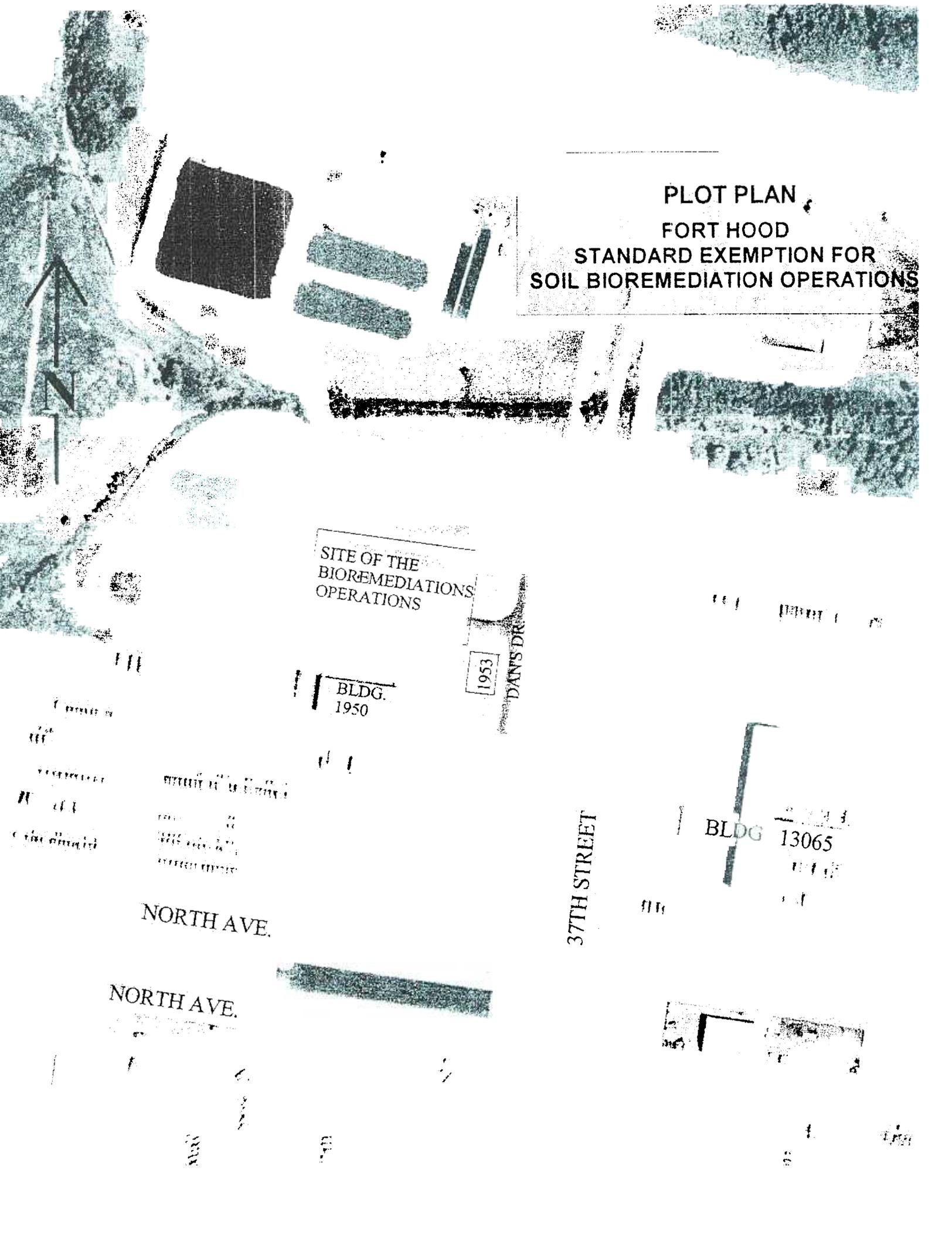
DAN'S DR.

BLDG 13065

37TH STREET

NORTH AVE.

NORTH AVE.



PLOT PLAN  
FORT HOOD  
STANDARD EXEMPTION FOR  
SOIL BIOREMEDIATION OPERATIONS

SITE OF THE  
BIOREMEDIATIONS  
OPERATIONS

BLDG.  
1950

1951

DANBURY

37TH STREET

BLDG. 13065

NORTH AVE.

NORTH AVE.

Standard Example of Soil Bioremediation Operations At Fort Hood

