

# **Final Environmental Assessment Assured Aerospace Fuels Research Facility**

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## **Wright-Patterson Air Force Base**

**Wright-Patterson Air Force Base  
88th Air Base Wing  
Civil Engineering  
Environmental Management Division**



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## **FINDING OF NO SIGNIFICANT IMPACT**

### **Environmental Assessment: Construction and Operation of the Assured Aerospace Fuels Research Facility**

Jet fuel can be produced from domestic sources of solid or gaseous fuels through the Fischer-Tropsch (FT) process. This synthetic fuel is a cleaner burning fuel and its use reduces the demand for imported petroleum. The Air Force is committed to certifying the entire fleet of aircraft to fly on a 50/50 blend of FT fuel and jet fuel by 2011 through the Assured Fuels Initiative. The Air Force Research Laboratory (AFRL) Propulsion Directorate at Wright-Patterson Air Force Base is an integral partner in this Initiative, and the construction and operation of the Assured Aerospace Fuels Research Facility (AAFRF) to produce FT fuel is critical to meeting this 2011 commitment.

#### **Description of Proposed Action and Alternatives**

The proposed action is to construct and operate a 4,000 square foot facility that would house the process equipment to produce research quantities (15 gallons/day) of FT fuel for blending with jet fuel and testing at the AFRL. The FT process equipment will convert compressed natural gas, hydrogen gas and carbon monoxide gas in the presence of a catalyst to synthetic jet fuel. Nitrogen is used as a purge gas and cooling water is circulated through the process equipment. Process output is jet fuel, cooling water, waste water, tail gas, waste hydrocarbons and spent catalyst. The proposed location is the south side of Building 490, in close proximity to Room 148 of Building 490, the S Fuel Farm and a 10,000-gallon liquid nitrogen tank. The proposed AAFRF will be constructed of reinforced concrete at grade on a concrete slab. This site is currently covered in asphalt and is used for parking.

Under the No Action alternative, the AAFRF would not be constructed and operated, eliminating a vital source of FT fuel needed for blending and testing at the AFRL. This alternative serves as a baseline against which the Proposed Action can be compared (EA Section 2.2).

#### **Environmental Consequences**

Both alternatives would have minimal or no environmental impacts on the following issues: natural resources, land use, cultural resources, and environmental justice (EA Sections 4.2, 4.5, 4.7, and 4.14).

**Water (EA Section 4.3):** There would be potential minor impacts to surface water during site preparation, excavation, and construction activities due to surface water runoff from the construction site. Impacts would be minimized because erosion and sedimentation controls would be implemented. The No Action alternative would not impact water resources.

**Hazardous Materials/Waste, Stored Fuels, and IRP (EA Section 4.4):** There would be potential minor impacts from the generation of waste hydrocarbons and the use of small amounts of solvents. Impacts would be minimized because hazardous materials and hazardous waste management systems would be in place at the AAFRF. The No Action alternative would not impact hazardous materials and management.

**Soils (EA Section 4.6):** There would be short-term, minor impacts from potential soil erosion during site preparation, excavation, and construction activities. Impacts would be minimized by implementing erosion and sedimentation controls. The No Action alternative would not impact soil or result in soil erosion.

**Air Quality (EA Section 4.8):** There would be minor, short-term impacts due to particulate matter and engine exhaust emissions generated during site preparation, excavation, and construction activities. In the long-term, there would be nominal impacts during the operation of the AAFRF. Based on the design described in the application, a final PTI has been issued. The No Action alternative would not impact air quality.

**Noise (EA Section 4.9):** There would be short-term minor impacts on ambient noise due to noise from site preparation, excavation, and construction activities. Impacts would be minimized because these activities would be carried out during normal working hours. The No Action alternative would not impact noise.

**Health and Safety (EA Section 4.10):** During site preparation, excavation, and construction, there would be potential impacts on the health and safety of workers. Impacts would be minimized by adherence to safety standards. During operation of the AAFRF, there would be potential impacts due to the use of compressed gases, hazardous materials, and thermal treatment of waste gas. Impacts would be minimized by adherence to health and safety standards and standard operating procedures. In addition, the AAFRF would be equipped with gas detection/alarm systems and a fire suppression system. The No Action alternative would not impact Health and Safety.

**Socioeconomics (EA Section 4.11):** There would be nominal, beneficial impacts on the local economy from revenue generated by construction activities. In the long-term, there would be potentially major beneficial impacts from the research and development of alternative, cleaner-burning fuels from domestic supplies. The No Action alternative could compromise the Air Force's goal to certify all weapons systems to use a 50/50 blend of petroleum-derived jet fuel and jet fuel from alternative sources by 2011. There could be major negative impacts on alternative fuels research with long-term consequences associated with dependence on foreign sources of fuel and continued combustion of interior fuel.

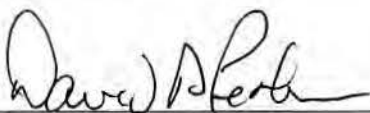
**Transportation/Traffic (EA Section 4.12):** During construction, there would be short-term nominal impacts due to intermittent construction traffic. Potential long-term impacts due to routing fuel delivery trucks around the AAFRF to the S Fuel Farm would be minimized by designing the site for optimal vehicle clearance. The No Action alternative would not impact transportation or traffic.

**Utilities (EA Section 4.13):** There would be potential short-term minor impacts on utilities in areas to be excavated by WPAFB. Impacts would be minimized by following the procedures specified for underground utilities (i.e., digging clearances), overhead utilities, and electrical utilities in the area. The need for environmental permits would be evaluated during the design process. The No Action alternative would not impact utilities.

**Cumulative Impacts (EA Section 4.18):** With regard to water resources, potable water would be obtained from the existing water lines and water main that currently exists at the proposed AAFRF location. This water main is slated for replacement as a part of another base project. If the replacement of the water main occurs during the construction phase of the AAFRF, there could be a potential for cumulative impacts. Impacts would be expected to be minor. With respect to traffic, overall traffic to Area B will increase due to the additional jobs resulting from BRAC activities. Because deliveries to the AAFRF would be infrequent, the potential for cumulative impacts to vehicle traffic is expected to be minor.

**Public Notice:** A public notice was posted in the Dayton Daily News on 17 August 2008. The comment period was held from 17 August until 22 August 2008. No comments were received.

**Finding of No Significant Impact (FONSI):** The proposed action is to construct and operate a facility to produce synthetic jet fuel in Area B. The fuel produced at the AAFRF is essential to the AFRL mission and the Air Force goal of less dependence on petroleum-based fuels. Under the No Action alternative, this synthetic fuel would not be produced at WPAFB, limiting alternative aviation fuels research. Based on my review of the facts and analysis contained in the EA, I conclude that the Proposed Action and the No Action alternative will not have a significant impact. Accordingly, the requirements of the National Environmental Policy Act, the Council on Environmental Quality Regulations and 32 CFR 989 have been fulfilled and an environmental impact statement is not required and will not be prepared.



DAVID A. PERKINS, PE  
Acting Director  
Civil Engineer Directorate

26 Sep 08

DATE



**Final  
Environmental Assessment for the  
Assured Aerospace Fuels Research Facility  
Wright-Patterson Air Force Base**

**Contract No. FA4890-04-D008  
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**September 2008**

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## LIST OF ACRONYMS

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AAFRF	Assured Aerospace Fuels Research Facility
AASHTO	American Association of State Highway and Transportation Officials
AFI	Air Force Instruction
AFRL	United States Air Force Research Laboratory
AICUZ	Air Installation Compatible Use Zone
APZ	Accident Potential Zone
BAT	Best Available Technology
BEEF	Base Engineer Emergency Force
BMP/LTM	Basewide Monitoring Program/Long Term Monitoring
CAA	Clean Air Act
CE	Civil Engineering
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNG	compressed natural gas
CO	carbon monoxide
dB	decibels
DoD	U.S. Department of Defense
DOT	Department of Transportation
EA	environmental assessment
EIAP	Environmental Impact Analysis Process
ESA	Endangered Species Act
FR	Federal Register
FT	Fischer-Tropsch
H <sub>2</sub>	hydrogen
ICP	Integrated Contingency Plan
IPM	Issue Point Manager
IRP	Installation Restoration Program
MACT	Maximum Achievable Control Technology
MCD	Miami Conservancy District
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
N <sub>2</sub>	Nitrogen
NOI	Notice of Intent
NO <sub>x</sub>	nitrogen oxides
NRHP	National Register of Historic Places
NPDES	National Pollution Discharge Elimination System
O <sub>3</sub>	ozone
OAC	Ohio Administrative Code
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
ORC	Ohio Revised Code
OU	Operable Unit

## LIST OF ACRONYMS (continued)

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OWS	oil/water separator
Pb	lead
PM	particulate matter
PM2.5	particulate matter with an aerodynamic particle size less than 2.5 micrometers
PM10	particulate matter with an aerodynamic particle size less than 10 micrometers
PSIG	pounds per square inch, gauge
POTW	Publicly-Owned Treatment Works
PTI	permit to install
RAPCA	Regional Air Pollution Control Agency
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RO	reverse osmosis
ROD	Record of Decision
SIP	State Implementation Plan
SO <sub>2</sub>	sulfur dioxide
SOP	standard operating procedure
SPC	Spill Prevention Coordinator
SPCC	spill prevention and control and countermeasures
SWP3	Storm Water Pollution Prevention Plan
tpy	tons per year
UEC	Unit Environmental Coordinator
UST	Underground Storage Tank
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish & Wildlife Service
VOC	volatile organic compound
WPAFB	Wright-Patterson Air Force Base

## 1.0 PURPOSE OF AND NEED FOR ACTION

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The United States Air Force Research Laboratory (AFRL), Propulsion Directorate is pursuing research into alternate fuels for various Air Force needs (WPAFB 2006a). As part of that research, AFRL is designing an Assured Aerospace Fuels Research Facility (AAFRF). The proposed facility would be used to produce synthesized jet fuel for research purposes.

The purpose of this environmental assessment (EA) is to analyze the environmental impacts of the proposed action and its alternative. Based on the evaluation in this EA, a determination will be made as to whether there are significant environmental impacts expected from the proposed action. This EA has been performed in accordance with the National Environmental Policy Act (NEPA) of 1969, 40 Code of Federal Regulations (CFR), Part 1500, the Council on Environmental Quality (CEQ) regulations implementing NEPA, and the U.S. Air Force Environmental Impact Analysis Process (EIAP) [32 CFR Part 989].

### 1.1 Project Description

The proposed AAFRF is a 4,000 square-foot facility that would be constructed on the south side of Building 490 (also known as Facility 20490) in Area B at Wright-Patterson Air Force Base (WPAFB). The proposed site for the project is shown on the site map in **Figure 1-1** and **Figure 1-2** and photographs in **Appendix A**. The facility would house the process equipment for producing a 50/50 blend of Fischer-Tropsch (FT) fuel and jet fuel from various feed stocks. This program is a major component of the Air Force Alternate Fuels Program. This project is needed to meet the Air Force's goal of certifying all aircraft weapons systems to use a 50/50 blend of petroleum-derived jet fuel and jet fuel from alternative sources by 2011 (DoD 2007).

As the largest single consumer of fuel in the United States, the U.S. Department of Defense (DoD) has the potential to make important contributions to the national effort to reduce the use and reliance on petroleum-based fuel. Aviation fuel makes up the largest portion of petroleum-based fuel consumed by DoD and, therefore, represents the greatest potential energy savings (CRS 2007). The need for alternative aviation fuels is also driven by the following concerns (DoD 2006):

- Lack of secure and reliable sources of energy, due to dependence on foreign oil or potential for becoming dependent on foreign refined fuels;
- Vulnerability of supply chain, due to reliance on mega-refineries and vulnerability to terrorist threats or natural disasters;
- Need for fewer, cleaner, and better fuels; and
- Potential limits on deployments.

The DoD has an interest in FT fuels because energy independence is a key element to ensuring the United States' economic and national security. An assured domestic supply of fuel and an aggressive energy conservation plan will benefit the entire Air Force (WPAFB 2006a). FT fuels will lessen dependence on foreign oil, reduce the number of different fuels required and reduce environmental impacts because they burn cleaner than other liquids (DOE 2008).

### ***1.2 Decision to be Made***

The purpose of this EA is to analyze the proposed action and its alternative and determine whether to implement the proposed action (i.e., construction and operation of the AAFRF on the south side of Building 490) so that a Finding of No Significant Impact can be made. The EA will provide the decision maker and the public with information required to understand the short-term and long-term consequences of the proposed action and its alternatives. Where applicable, mitigation measures will be recommended to minimize adverse impacts. The necessity for the preparation of an Environmental Impact Statement will also be determined.

### ***1.3 Scope of Environmental Analysis***

Aspects of the proposed action with potential environmental impacts include:

- Natural resources
- Water
- Hazardous materials/waste, stored fuels, and Installation Restoration Program (IRP)
- Land use
- Soils
- Cultural resources
- Air quality
- Noise
- Health and safety
- Socioeconomics
- Transportation/Traffic
- Utilities
- Environmental justice

Although all resources are evaluated, this EA is “issues-driven” because the resources of most concern to the project will be emphasized. These issues include water (i.e., storm water/waste water), hazardous materials and waste, stored fuels, cultural resources, air quality, and health and safety will be particularly emphasized as part of this EA.

#### 1.4 Regulatory Requirements

Potentially relevant statutes and regulations to which the Air Force must comply are summarized in **Table 1-1**. The regulatory requirements are presented under each appropriate category in Section 3.0.

**Table 1-1**  
**Summary of Applicable Regulatory Requirements**  
**for the Proposed Action and Alternative**

Compliance Area	Regulatory Requirements
Air Quality	Clean Air Act as amended, 42 U.S.C § 7401 et seq.
	National Ambient Air Quality Standards – 40 CFR 81.34 Metropolitan Dayton Intrastate Air Quality Control Region and 40 CFR 81.336 Ohio Attainment Standards
	Ohio Administration Code (OAC) 3745-17 Particulate Matter Standards
	OAC 3745-31 Permit to Install (PTI) New Source of Pollution
	OAC 3745-25 Emergency Episode Standards
	OAC 3745-15-06 <i>de minimis</i> air contaminant source exemption
Cultural/Historic Resources	National Historic Preservation Act as amended, 16 U.S.C § 470 et seq.
	36 CFR Part 800 – Protection of Historic and Cultural Properties
	AFI 32-7065, Cultural Resources Management
Health and Safety	Occupational Safety and Health Act as amended, Subpart Z Toxic and Hazardous Substances
	29 CFR Part 1910 Occupational Safety and Health Standards
	29 CFR Part 1926 Safety and Health Regulations for Construction
	National Fire Protection Association (NFPA), National Fire Codes
Land Use	AFI 32-7063, Air Installation Compatible Use Zone (AICUZ) Program
Natural Resources	Endangered Species Act, 16 U.S.C §1531 et seq.
	50 CFR Part 402 Interagency Cooperation--Endangered Species Act of 1973, as amended
	Ohio Revised Code (ORC) 1531.25, Protection of Species Threatened with State-Wide Extinction
	National Environmental Policy Act as amended, 42 U.S.C. § 4321 et seq.
	AFI 32-7064, Integrated Natural Resource Management Plan
Noise	29 CFR 1910.95 Occupational Noise Exposure
Wastewater & Storm water	Federal Water Pollution Control Act (Clean Water Act) as amended, 33 U.S.C. § 1251 et seq.
	40 CFR Part 122.26 Storm Water Discharges
	OAC 3745-33 Ohio NPDES Individual Permits
	OAC 3745-38 Ohio NPDES General Permits
	OAC 3745-42 Permits to Install and Plan Approvals for Water Pollution Control
	City of Dayton Sewer Use Ordinance (September 21, 1994).



## **2.0 Alternatives Including the Proposed Action**

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### **2.1 Introduction**

This section describes the selection criteria that were used to identify and evaluate alternatives for the construction and operation of the AAFRF. Three alternatives were considered: siting the AAFRF on the east end of Building 490, siting the AAFRF on the south of Building 490, and the no action alternative.

### **2.2 Process Used to Formulate Alternatives**

The following site selection criteria were used to identify and evaluate alternative site locations for the AAFRF:

- Proximity to Room 148 of Building 490 for FT fuel blending and testing
- Proximity to S Fuel Farm for fuel storage and process waste water separation
- Proximity to liquid nitrogen (N<sub>2</sub>) tank for purge gas
- Adequate space for ancillary equipment needed for future expansion for the gasifier
- Minimal disturbance to existing green areas

### **2.3 Alternatives Eliminated from Further Study**

The east side of Building 490 was considered as a site for the AAFRF with respect to the site selection criteria and technical, safety, and environmental issues. Technical issues involved proximity to existing infrastructure, safety issues involved accessibility and traffic patterns, and environmental issues involved spill prevention and preservation of green space (WPAFB 2008a). These issues are discussed in the following paragraphs.

Ideally, the AAFRF should be located very close to and in direct line of Room 148 of Building 490 for the transfer of fuel products and process waste. If the AAFRF were to be located on the east side of Building 490, a fuel line would need to be routed from the east side of the building to a tank in the southwest corner of the S Fuel Farm. Similarly, a process waste water line would need to be routed to an oil/water separator (OWS) on the southwest portion of the S Fuel Farm. The AAFRF would use large quantities of purge gaseous N<sub>2</sub>, which would be obtained from the N<sub>2</sub> tank that is located on the south side of Building 490. Due to space constraints and high pedestrian traffic on the east side, it would be difficult to locate the dedicated natural gas compressor needed to provide high pressure compressed natural gas (CNG) feed. In addition, there would not be adequate space for ancillary support equipment, storage space, and a delivery route in the event the AAFRF is expanded to include a coal gasification process in the future.

With respect to safety issues, the heavy pedestrian traffic, fire exit corridor, and emergency egress on the east side of Building 490 make the siting of the AAFRF on the east side of Building 490 problematic.

Locating the AAFRF on the east side of the building could result in blocking the existing fire exit corridor. Siting an emergency egress route between a fuel farm and hydrogen-generating facility such as the AAFRF, poses a potentially serious safety concern. The AAFRF building and associated components would also block the Fire Department's access to Building 490, if located on the east side. In addition, explosion mitigation measures for the AAFRF would include the addition of deflagration blow-out panels, as required by National Fire Protection Association (NFPA) codes. These blow-out panels should not be located near heavy pedestrian traffic, occupied buildings and associated parking lots.

From an environmental management perspective, using the east side of Building 490 eliminates one of the largest green spaces within the AFRL Campus and downtown Area B. This green area contains several mature sweet gum, crab apple and beech trees. The grassy area enhances permeation of rainwater, which reduces storm water runoff. The space adds to the aesthetic and intrinsic value of the area for the occupants of Building 490, neighboring buildings, the general WPAFB Area B populace, and visitors that use the highly traveled "C" Street. This green space has also been used by the Propulsion Directorate for retirement, farewell and other division-sanctioned gatherings, and provides a nice respite for Area B personnel throughout the year. Construction in a green space is not optimal when there are vast stretches of concrete and asphalt on the south side of the Building 490 that could be used. The areas on the south side have no aesthetic value and are already impervious to storm water.

Based on this rationale, the east side of Building 490 did not meet the site selection criteria and was deemed less than optimal as a site for the proposed AAFRF when compared with the south side of the building. Therefore, this alternative was eliminated from further study.

## ***2.4 Description of Considered Alternatives***

Two alternatives are considered in this EA: the proposed action to site the AAFRF on the south side of Building 490 and the no action alternative.

### ***2.4.1 Proposed Action***

This section describes the FT process, the process components, and the construction and operation of the proposed AAFRF. The description of the proposed action is based upon a 35% design submittal of the AAFRF and interviews with and information from representatives of the AFRL, Propulsion Directorate and Civil Engineering (CE) (WPAFB 2008b). Although some aspects of the design work are still in progress, the general concept for the AAFRF building and process design should not change substantially from the 35% design referenced in this EA.

The proposed action is to design and build the state-of-the-art AAFRF to produce research quantities of jet fuel using the FT process. The process was named after the German researchers, Franz Fischer and Hans Tropsch, who first converted carbon-based materials into petroleum products around 1923. The FT

process produces jet fuel from domestic energy sources, reducing dependence on foreign petroleum. The AAFRF project is a major component of the Air Force “Alternate Fuels” program, which has the stated goal of certifying all aircraft weapons systems to use a 50/50 blend of petroleum-derived jet fuel and jet fuel from alternate fuel sources.

FT fuel is a cleaner fuel than petroleum-based fuel. Combustion of FT fuel produces far fewer emissions, including reductions of over 2% in carbon dioxide emissions, 50% to 90% reductions in particulate matter (PM) and a 100% reduction in sulfur oxide emissions. FT fuel has superior thermal stability and superior low temperature properties that improve high altitude operations and engine starting at low temperatures (CRS 2007).

#### **2.4.1.1 FT Process Description**

The proposed AAFRF will produce jet fuel from Syngas via the FT process. Syngas is a 50% mixture of carbon monoxide (CO) and hydrogen (H<sub>2</sub>) gas and the FT process converts this gas to liquid hydrocarbons. Production rate is anticipated to be 15 gallons of jet fuel per day, all of which will be used for fuels research purposes.

In the initial phases of the program, a steam methane reformer will generate the Syngas from compressed natural gas to feed the FT process. Although future plans may involve generating Syngas from coal, biomass or other solid fuel feedstocks, the gasifier unit that would be required to generate Syngas from solid fuels has not been funded or designed. Therefore, the construction and operation of the gasifier is not considered in this EA, other than to set aside an area for the gasifier pad and for coal storage.

The current proposed action involves three major process components, which are the Steam Methane Reformer, the FT Reactor (Slurry Bubble Column Reactor) and the Upgrader (WPAFB 2008b). The process components were all designed as separate units, to be connected together as one system.

**Figure 2-1** presents the FT Process Diagram.

#### **2.4.1.2 FT Process Inputs**

The process inputs include reverse osmosis (RO) water, CNG, N<sub>2</sub> gas, H<sub>2</sub> and CO gas, a catalyst, and cooling water. The Reformer requires 28 gallons per hour of RO water to manufacture high pressure steam. The CNG is the fuel feedstock and would be used at a rate of 900 to 1,150 square feet per hour at nominal 500-pound-per-square-inch, gauge (PSIG) pressure and normal ambient temperature. The CNG would be supplied from a 6-inch line from C Street, and would be compressed up to appropriate pressure and distributed by two high pressure CNG compressors. Nitrogen gas is used as an inert gas to purge process lines at an estimated rate of 43 pounds per hour. Nitrogen would be supplied from a 10,000 gallon liquid N<sub>2</sub> tank on the south side of Building 490.

A mixture of H<sub>2</sub> and CO gas is needed for facility start-up and catalyst activation, and would be supplied from a six-pack of H<sub>2</sub> cylinders and a six-pack of CO cylinders. A six-pack holds roughly 1,200 cubic feet of compressed gas at 2,000 PSIG. These six-packs would be stored outside and on the west side of the AAFRF in a secure storage area with a fence and bollards for protection against damage and unauthorized access. Non-contact cooling water is used to cool exothermic processes and condense certain stages of the process. This water is used in tube-shell type heat exchangers, with an estimated 39 gallons per minute of cooling water.

Powdered metal catalyst is delivered to the FT reactor and to the Upgrader to create the FT reaction. The catalysts are cobalt- or iron-based, and the formulations are proprietary. The expected usage of the catalysts is 84 pounds for a 90-day campaign. The expired catalyst would most likely be disposed of as non-hazardous waste based on process knowledge or laboratory analysis.

#### **2.4.1.3 FT Process Output**

The output of the Upgrader is jet fuel, tail gas, waste water, and hydrocarbon waste, along with additional cooling water. The process has been designed to generate an average of 15 gallons of jet fuel per day. This jet fuel derived from CNG (and gasified coal or biomass in the future) would be blended with petroleum-derived jet fuel and tested in Building 490.

The tail gas would be vented out the stack or sent to a thermal treatment system. Venting of the tail gas was considered in the air emissions calculations submitted to the Regional Air Pollution Control Agency (RAPCA) of the Ohio Environmental Protection Agency (OEPA) (Section 3.8). There are safety, rather than environmental concerns with the H<sub>2</sub> and CO emissions that would be present in this tail gas. A thermal treatment system is currently under investigation to manage these safety concerns. A safe tail gas treatment system would be engineered to eliminate any flammable or toxic emissions prior to AAFRF operation, through a collaborative effort between the AFRL/Det 1 SE System Safety Engineer, 88 ABW/CE, and the WPAFB Fire Department.

A small amount of water would be drained from various FT process condensation vessels and knockout pots. This water would be sent to OWS 2-490A, which has a capacity of 50 gallons per minute. OWS 2-490A routes the separated fuel to the 1,000 gallon scrap fuel tank (Tank S-17) connected to the effluent side of OWS 2-490A on the S Fuel Farm.

Hydrocarbon waste, such as naphtha, diesel, FT wax and other hydrocarbons would be contained in 55-gallon drums for testing and evaluation, or it would be sent directly to Tank S-1, a 10,000 gallon scrap fuel tank on the S-fuel farm. Drummed material would be properly processed as hazardous or non-hazardous waste, depending on waste evaluation or characterization data. The amount of waste

generation is estimated to be roughly equivalent to the amount of usable product generated or about 15 gallons per day.

Small amounts of solvents, greases, and oils would be required to provide normal and routine maintenance on process equipment. No non-routine tasks involving hazardous materials are known at this time with the possible exception of cleaning out the process equipment to switch catalyst materials.

The output of the non-contact cooling water is expected to equal the input amount of water. Therefore, 39 gallons per minute of warm water would be discharged to the sanitary sewer. According to Ordinance with the City of Dayton Publicly Owned Treatment Works (POTW), a discharge of water in excess of 60°C (140°F) would have to be coordinated with the POTW. The temperature of the cooling water output would be measured prior to discharge to the sanitary sewer. If necessary, measures would be taken to cool the water below POTW limits, or the discharge would be coordinated with the City of Dayton.

#### ***2.4.1.4 Siting and Construction of Proposed AAFRF***

The proposed siting of the 4,000-square-foot (40 feet x 100 feet) AAFRF is about 80 feet directly south of Room 148 of Building 490. Siting the AAFRF in this location allows the most convenient access to Room 148, the southwest corner of the S Fuel Farm and the 10,000-gallon N<sub>2</sub> tank. The proposed location was once part of the Wright Airfield apron, and it is currently used for parking. **Figures 2-2 and 2-3** show the proposed location, and indicate the area where the coal gasifier and coal storage area would be located in the event the proposed project is funded and designed.

The proposed AAFRF building would be constructed of poured, reinforced concrete at grade on a concrete slab. The existing pavement would be removed, and the area of underlying soil disturbance would be approximately 44 feet x 104 feet. Approximately 14 inches of soil would be removed before pouring the concrete slab, and the soil would be exposed for an estimated 3 months or less. The building would be constructed to fit in with the overall look of Building 490 and other nearby structures.

Based on the selection criteria, the south side of Building 490 is a suitable location for the proposed AAFRF. Therefore, the proposed action for this EA is defined as the construction and operation of the AAFRF on the south side of Building 490.

#### ***2.4.1.5 Operation of Proposed AAFRF***

The proposed AAFRF is currently programmed to operate as outlined in the above process description for ten years. The production rate is anticipated to be 15 gallons per day. Although some components may be changed during this period, the process would be expected to be similar. As noted above, future plans may involve synthesizing Syngas from coal, biomass or other solid fuel feedstocks. A gasifier unit would be required to generate Syngas from solid fuels. Therefore, the construction and operation of the gasifier



are not considered in this EA, other than to set aside an area for the gasifier pad and for coal storage. In the event the gasifier unit is funded and designed, the appropriate EIAP documentation and permit applications would be prepared.

#### **2.4.2 No Action**

Under the No Action alternative, it is assumed that the AAFRF would not be constructed and FT fuel research would not be performed at WPAFB. The no action alternative could compromise the Air Force's ability to meet its' stated goal of certifying all aircraft weapons systems to use a 50/50 blend of petroleum-derived jet fuel and jet fuel from alternative sources. The cost of aviation fuel would continue to comprise a large share of the DoD's operating budget, and its' fuel supply would continue to be vulnerable.

### **2.5 Comparison of Environmental Consequences Between Alternatives**

The impacts associated with the proposed action and the No Action alternatives are summarized in **Table 2-1**. The information includes a concise definition of the issues addressed and the environmental impacts associated with each alternative. The analysis is based on information discussed in detail in Chapter 4.0, Potential Environmental Impacts.

**Table 2-1  
Comparison of Environmental Consequences  
of the Proposed Action and Alternative**

<b>Affected Environment</b>	<b>Alternative A: Proposed Action</b>	<b>Alternative B: No Action</b>
<b>Natural Resources</b>		
Vegetation	Short-Term: No impact as the proposed AAFRF would be sited in an existing parking lot.  Long-Term: No impact.	Short-Term: No impact.  Long-Term: No impact.
Wildlife	Short-Term: No impact on wildlife as the proposed project area does not provide suitable habitat and the current land use would not change.  Long-Term: No impact.	Short-Term: No impact.  Long-Term: No impact.
Threatened and Endangered Species	Short-Term: No impact on threatened and endangered species as the proposed project area does not provide suitable habitat and the current land use would not change.  Long-Term: No impact. The proposed project area does not provide suitable habitat and the current land use would not change	Short-Term: No impact.  Long-Term: No impact.
Wetlands	Short-Term: No impact. No wetlands in the area.  Long-Term: No impact.	Short-Term: No impact.  Long-Term: No impact.
<b>Water Resources</b>		
Groundwater	Short-Term: No impact during construction as the proposed AAFRF would be built at grade.  Long-Term: Potential minor impacts to well field protection area in the event of surface spills or leaks from underground fuel and waste water lines. Impacts would be minimized by periodic integrity tests of underground lines.	Short-Term: No impact.  Long-Term: No impact.
Surface Water	Short-Term: Potential minor impacts during site preparation, excavation, and construction activities. Impacts would be minimized because erosion and sedimentation controls would be implemented.  Long-Term: No impact because there is no increase in impervious surface.	Short-Term: No impact.  Long-Term: No impact.
Floodplain Issues	Short-Term: No impact as the proposed site is outside of the floodplain.  Long-Term: No impact.	Short-Term: No impact.  Long-Term: No impact.

**Table 2-1**  
**Comparison of Environmental Consequences**  
**of the Proposed Action and Alternative (continued)**

Affected Environment	Alternative A: Proposed Action	Alternative B: No Action
Hazardous Materials/Waste	<p>Short-Term: Nominal impact from the use of paints and other construction materials.</p> <p>Long-Term: Potential minor impact from the generation of waste hydrocarbons and the use of small amounts of solvents to clean process equipment between test runs. Impacts would be minimized because hazardous materials and waste management systems would be in place at the AAFRF.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Stored Fuels	<p>Short-Term: No impact.</p> <p>Long-Term: Minor impact to the tank farm from the generation and storage of FT fuel (similar to jet fuel) and to the supply of CNG.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
IRP Sites	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Land Use	<p>Short-Term: No impact as the construction site is small and the operation of this research building is complementary to other research performed in the immediate area.</p> <p>Long-Term: No impact as the AAFRF complements other fuels research performed in the immediate area.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Soils	<p>Short-Term: Minor impacts during site preparation, excavation, and construction activities (i.e., soil erosion). Impacts would be minimized because erosion and sedimentation controls would be implemented.</p> <p>Long-Term: No impact.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Cultural Resources	<p>Short-Term: No impact to the Wright Field Historic District and contributing buildings and structures because no historic properties are located at the proposed AAFRF construction site.</p> <p>Long-Term: No impact as the AAFRF would be constructed to match other buildings in the area.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Air Quality	<p>Short-Term: Minor, short-term impact from particulate matter and engine exhaust emissions generated during site preparation, excavation, and construction activities.</p> <p>Long-Term: Nominal impact due to operation of AAFRF based on the PTI application. A final PTI has been issued.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>

**Table 2-1**  
**Comparison of Environmental Consequences**  
**of the Proposed Action and Alternative (continued)**

Affected Environment	Alternative A: Proposed Action	Alternative B: No Action
Noise	<p>Short-Term: Minor impacts on ambient noise from site preparation, excavation, and construction activities. Impacts would be minor because these activities would be carried out during normal working hours.</p> <p>Long-Term: No impact.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Health and Safety	<p>Short-Term: Potential impacts to workers during construction activities. Impacts would be minimized by adherence to safety standards.</p> <p>Long-Term: Potential minor impacts due to use of compressed gases, hazardous materials and thermal treatment of waste gas. Impacts would be minimized by adherence to Health and Safety standards and SOPs. In addition, the AAFRF would be equipped with gas detection/alarm systems and a fire suppression system.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Socioeconomics	<p>Short-Term: Nominal, beneficial impact on local economy from revenue generated by construction activities.</p> <p>Long-Term: Potentially major beneficial impacts from the research and development of alternative, cleaner burning fuels from domestic supplies to replace foreign sources of liquid fuels.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: Negative impacts on alternative fuels research with long-term consequences associated with dependence on foreign sources of liquid fuels and continued combustion of inferior fuels.</p>
Transportation	<p>Short-Term: Nominal, intermittent impacts from construction traffic.</p> <p>Long-Term: Potential minor impacts due to more constrained pathway for delivery of fuel to S Fuel Farm. Impacts would be minimized by designing the AAFRF site to optimize clearance for vehicles.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Utilities	<p>Short-Term: Minor impacts due to installation of water, sewer, CNG and electrical lines. Impacts would be minimized by obtaining digging clearances and observing safe working practices. The need for permits would be determined by later phases of the design.</p> <p>Long-Term: Nominal impact due to increase utility consumption by the AAFRF</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>
Environmental Justice	<p>Short-Term: No impact.</p> <p>Long-Term: No impact as there is no change in land use and minimal emissions from the AAFRF.</p>	<p>Short-Term: No impact.</p> <p>Long-Term: No impact.</p>

## 3.0 Affected Environment

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### 3.1 Introduction

Section 3.0 identifies existing environmental conditions at the proposed AAFRF location. These are the conditions that could be affected by the proposed action to construct and operate the AAFRF.

### 3.2 Natural Resources

Natural resources that may be affected by the proposed AAFRF include vegetation, wildlife, threatened and endangered species and wetlands.

#### 3.2.1 Vegetation

The proposed location, south of the southeast portion of Building 490 is currently covered by asphalt and used for fuel deliveries and parking (**Figures 2-2 and 2-3**). Access to the AAFRF for construction and operation would involve using existing asphalt roads. No vegetation is located at the proposed site.

#### 3.2.2 Wildlife

The proposed location is currently a parking lot and does not provide wildlife habitat nor function as a transitory route for wildlife migration.

#### 3.2.3 Threatened and Endangered Species

Compliance with Air Force Policy Directive 32-70 and Air Force Instruction (AFI) 32-7064 requires all Air Force properties to protect species classified as endangered or threatened under the Endangered Species Act of 1973 (ESA) and to comply with ORC 1531.25 and its implementing regulations for species listed by the state as threatened and endangered. To comply with these requirements, WPAFB developed an Endangered Species Management Plan (BHE 2001). The WPAFB Integrated Natural Resources Management Plan (WPAFB 2007a) contains a recent summary of threatened and endangered species on base.

Federal- and state-listed species at WPAFB considered imperiled or vulnerable include the Indiana bat (*Myotis sodalis*), bald eagle (*Haliaeetus leucocephalus*), and the clubshell (*Pleurobema clava*, a mussel). The eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*) is a candidate for federal listing, and the blazing star stem borer, a moth (*Papaopema beeriana*) is a vulnerable state listed species. There are no federally listed plants on base, and naturally occurring state-listed vegetation include whorled water-milfoil (*Myriophyllum verticillatum*) and pigeon grape (*Vitis cinerea*) (WPAFB 2007a).

The Indiana bat habitat follows the lower reaches of Hebble Creek, Trout Creek, and the riparian corridor of Mad River from its northern reach in Area A to its confluence with Hebble Creek (ICI/SAIC 1995, BHE/IT



1999) where this species roosts during the summer and forages in the floodplain/riparian forests. In July 2000, two Indiana bats (a juvenile female and an adult post-lactating female) were captured along Trout Creek during a base-wide mist net survey (BHE 2001). Radio tracking of these two bats confirmed the presence of a maternity colony in a dead slippery elm (*Ulmus rubra*) in a woodlot on the campus of Wright State University. No sightings of Indiana bats have been reported within the location of the proposed AAFRF site.

The bald eagle is a federal-listed threatened and a state-listed endangered species found throughout much of the contiguous 48 states along waterways and impoundments. Although bald eagles may be found year round in Ohio, they only occur near WPAFB as rare winter visitors with most recent WPAFB sightings occurring along the Mad River corridor in 1984. During the winter of 2004/2005, one bald eagle was recorded in Greene County, and two in Montgomery County. In the winter of 2005/2006, one bald eagle was observed in Greene County, and no eagles were observed in either Greene or Montgomery Counties during the winter of 2006/2007. There are no records of bald eagles nesting on base (WPAFB 2007a). No sightings of the bald eagle have been reported within the project area.

The eastern massasauga rattlesnake is usually found in wet areas including wet prairies, marshes, and low lying areas. Neither the historic nor current population size and status of massasauga snakes at WPAFB have been determined. Reports of massasauga sightings have been limited to the Prime Base Engineer Emergency Force (BEEF) Training Area and Twin Base Golf Course in Area C, which are not in the vicinity of the proposed action (WPAFB 2007a). There is no requirement to survey construction areas for potential snake habitat because the massasauga rattlesnake is a federal candidate species. No sightings of the massasauga rattlesnake have been reported within the project area or any part of Area B of the base.

The clubshell is a federal- and state-listed endangered species occurring in 12 streams in Kentucky, Pennsylvania, Indiana, Ohio, Michigan, and West Virginia. Surveys by 3D/International, Inc. (1998) and BHE Environmental (1999a) documented clubshell subfossil remains at the confluence of Trout Creek and the Mad River and near the confluence of Mud Run and the Mad River (WPAFB 2007a). There are no creeks or streams in the AFRL/RZ campus of downtown Area B and no sightings of the clubshell have been reported within the project area.

The blazing star stem borer moth is a state-listed endangered species occurring only in disjunct populations throughout the Midwestern United States. It is highly dependent upon remnants of mesic tall grass prairies. In 1992, three stem borers were captured at WPAFB's Huffman Prairie. Huffman Prairie is one of three locations where this species has been found in Ohio (WPAFB 2007a). No sightings of the blazing star stem borer have been reported within the project area.

### **3.2.4 Wetlands**

A thorough base-wide wetland survey was conducted in June and July of 2004 and documented in the 2005 Wetland Management Plan (BHE 2005). Seventeen wetlands were identified in Area B, all of which were located in developed areas. The sizes of Area B wetlands range from 0.01 to 0.5 acres, and the total wetland acreage in Area B is 2.51 acres. No wetlands are located in the vicinity of the proposed AAFRF construction site. The nearest wetland is over 3,500 feet southeast of the proposed site (WPAFB 2007a).

### **3.3 Water**

Water resources that may be affected by the proposed AAFRF include groundwater, surface water and the floodplain.

#### **3.3.1 Groundwater**

Regionally, the Great Miami Buried Valley Aquifer System has been determined to be a sole source aquifer by the United States Environmental Protection Agency (USEPA) (Federal Register May 4, 1988). The principal water-bearing glacial deposits in the Dayton area are the highly transmissive unconsolidated sand and gravel zones that are up to 200 feet thick. These glacial outwash deposits are saturated from a few feet below ground surface to the base of the aquifer and supply 97 and 100 percent of the public and private groundwater, respectively. The bedrock shales and limestones are not a significant source of groundwater within the buried valley aquifer (CH2M Hill 1997). Recharge to groundwater in the buried valley aquifer is by direct percolation through soils; by discharge from surface water streams, including the Mad River; and from seepage on the adjacent bedrock valley walls. On WPAFB the unconsolidated deposits on the buried valley aquifer lay along the western boundaries of Areas B and C (**Figure 3-1**).

It should be noted that the proposed location is within the downgradient area of petroleum contamination as designated under the Final Remedial Investigation Report, Operable Unit 8, Spill Site 5, UST 71A, and TCE Contamination at Monitoring Well TFF MW2 (CH2MHill 1997). An isolated pocket of floating fuel on the water table was discovered centering near MW 16S. This former pocket of subsurface fuel contamination is just south of the proposed site. The fuel contamination was extracted from the shallow groundwater zone via a Bioslurper extraction unit. The machine helped remediate the subsurface by locally extracting residual fuel and contaminated water, and aerating the soils. The Bioslurper operated for a short period (1997) on the fuel pocket, and was discontinued. There are no further actions affiliated with the site soils (WPAFB 1998). At the project site, the Operable Unit (OU) 8 Remedial Investigation (RI) identified two water-bearing zones that are separated by a relatively impermeable aquitard (**Figure 3-2**). Groundwater flow in both zones is to the west or northwest and occurs at approximately 25 feet below ground surface. The upper zone is approximately two feet thick and is comprised of sands and gravel. Recharge is through the surface soils and a thin clay layer influences the infiltration into the zone. In

addition, the majority of Area B is covered with impermeable materials (asphalt, concrete, and buildings). Therefore, the upper zone is not a prolific water producer.

The lower sand and gravel zone at the site is a semi-confined aquifer with the potentiometric surface occurring at approximately 5 to 7 feet higher than the upper layer. Groundwater flow through the lower aquifer is likely influenced by the on-base production wells and the Rhorers Island Wellfield (**Figure 3-1**). In addition, the northwest corner of Building 490 is within the WPAFB well-field protection area. The northwest corner of the building is within the WPAFB five-year travel time zone to recharge the aquifer (Tetra Tech 2007). During the design phase of the proposed project, coordination with 88ABW/CEV would be necessary to determine any construction or operation restrictions to protect the underlying groundwater resource in this area.

### **3.3.2 Surface Water**

There are no surface water bodies or drainages in the vicinity of the AAFRF location in Area B. Regionally, the Mad River, one of three major rivers in the Dayton area, is located adjacent to the northwestern boundary of Area B and flows northeast to southwest (**Figure 3-1**). The section of the Mad River near WPAFB has been designated by the State of Ohio as a State Water Resource and a Warm Water Habitat. Surface water runoff at the Base drains into the WPAFB storm sewer system, which ultimately discharges into the Mad River. The northwest corner of Building 490 is located approximately 2,000 feet from the Mad River.

Activities that could impact surface water are regulated under National Pollutant Discharge Elimination System (NPDES) permits. The OEPA requires a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWP3) for construction activities that disturb one or more acres of land. The proposed AAFRF construction site will involve the disturbance of less than one acre, and therefore a construction NOI and SWP3 are not required. The OEPA regulates industrial activities under a separate NPDES permit, and WPAFB operates under NPDES permit 11O00001\*CD for its industrial activities such as flight-line operations (air transportation) and the coal-fired heating plants. The AAFRF is a research facility that does not engage in industrial activities, and therefore is not subject to this NPDES permit.

### **3.3.3 Floodplain**

Immediately upstream of Area B is Huffman Dam, which creates a retarding basin for flood control. The dam was completed in 1922 as part of a comprehensive flood control project. According to the Flood Insurance Rate Map prepared by the Federal Emergency Management Agency and consultation with the Miami Conservancy District (MCD), the AAFRF site is not in the Mad River floodplain. This area of Area B is classified as Zone X. Zone X is defined as an area with less than a 0.2% chance of an annual flood. Copies of correspondence with MCD are in **Appendix D**.

### **3.4 Hazardous Materials/Waste, Stored Fuels and IRP**

#### **3.4.1 Hazardous Materials and Hazardous Waste**

Hazardous materials are used throughout the base, for research, operational and maintenance activities. WPAFB has a comprehensive hazardous material management program, utilizing a centralized tracking system to control procurement, receipt, labeling, storage, issue, use and final disposal. The hazardous material tracking system allows the base to pre-approve material procurement; minimize the use of hazardous materials and generation of hazardous waste; promote proper safety practices and use of personal protective equipment; provide hazardous material usage data to track chemical exposures to base employees; and report storage, use and emissions data to regulatory agencies. The Hazardous Substance Steering Committee is a network safety, environmental and logistics experts who work with hazardous material Issue Point Managers (IPMs), Unit Environmental Coordinators (UECs) and other hazardous material users to ensure safe and compliant hazardous material management throughout the base (WPAFB 2008c).

Resource Conservation and Recovery Act (RCRA) hazardous wastes are generated throughout the base from the use of hazardous materials. WPAFB is a large quantity hazardous waste generator and has a comprehensive hazardous waste management program. This program consists of RCRA compliance specialists, RCRA-trained UECs, hazardous waste generators, hazardous waste accumulation and storage areas and a hazardous waste inventory tracking system. There are regular hazardous waste pickups for either temporary storage in the on-site RCRA Part B permitted facility located in Facility 20479 or for shipment off-site to a treatment, storage and disposal facility (WPAFB 2008d).

The proposed AAFRF would use research quantities of hazardous materials and generate similar quantities of hazardous wastes. The AFRL/RZOE has trained IPMs and UECs to properly manage the compressed gases (H<sub>2</sub>, CO, N<sub>2</sub>, CNG), FT fuel, and solvents and all wastes generated from using these materials.

#### **3.4.2 Stored Fuels**

Stored fuels present a potential threat to the environment, which is mitigated at WPAFB through spill prevention and control and countermeasures (SPCC). The WPAFB Spill Prevention, Control and Countermeasure Plan (WPAFB 2008e) describes practices used to minimize the potential for stored fuel spills, prevent spilled materials from migrating off the base, and ensure that the cause of any spill is corrected. The WPAFB Oil and Hazardous Substance Integrated Contingency Plan (WPAFB, 2005) describes emergency planning, notification and spill response practices. Collectively, the SPCC Plan with a focus on spill prevention and the Integrated Contingency Plan (ICP) with a focus on spill response provide a comprehensive strategy for preventing stored fuel releases to the environment.

The Spill Prevention Coordinator (SPC) is the primary point of contact for the SPCC Program. The SPC works closely with Tank Managers, UECs and WPAFB emergency response personnel to implement the SPCC Plan. Required SPCC training, standard operating procedures (SOPs), inspections, and record keeping are coordinated by the SPC.

Two types of stored fuels would be used or produced at the proposed AAFRF. Compressed natural gas would be used, and will be delivered through a natural gas line or CNG tube trailer used during process start-up or for back-up supply. FT liquid fuel (jet fuel) would be produced, and would be stored in drums or pumped directly to an underground storage tank at the S Fuel Farm. The S Fuel Farm has a dedicated tank manager and the proposed AAFRF would have a site-specific spill plan. The AFRL/RZOE UEC is trained in stored fuel management and spill procedures.

### **3.4.3 Installation Restoration Program**

The DoD developed the IRP to identify, assess, and control potential environmental contamination that may have resulted from past operations and waste disposal practices. The IRP, an element of the Defense Environmental Restoration Program, is a part of the environmental program at each DoD installation. WPAFB currently has identified 65 IRP sites, two regional groundwater sites, and several areas of concern per the Air Force Restoration Information Management System. WPAFB has grouped the majority of confirmed or suspected sites requiring investigation and characterization in 11 geographically-based OUs, designated OUs 1 through 11 (IT 1999). In addition to the 11 OUs, WPAFB addressed basewide issues of groundwater and surface water contamination under the Basewide Monitoring Program (IT 1995).

The AAFRF site is located in OU8. The closest IRP sites to the AAFRF are Spill Sites 5, 7, and 9, and Underground Storage Tank (UST) 71A, as shown in **Figure 3-2**. Of these sites, Spill Site 7 (Tank Farm F) and Spill Site 9 (Tank Farm B) were closed under the Bureau of Underground Storage Tank Regulations, and therefore did not require additional investigation and characterization in OU8.

As shown in **Figure 3-2**, Building 490 is surrounded by monitoring wells that were installed under the Site Investigation for 16 IRP Sites (SAIC 1993) and the OU8 RI (CH2M Hill 1997). A number of these monitoring wells have been abandoned or are currently being evaluated for abandonment (WPAFB, 2008f). Several of these wells, as noted on the figure, are currently monitored under the BMP/LTM Program. Volatile organic compounds (VOCs) have not been detected in any of the wells in the vicinity of Building 490 in the past five years (Shaw 2008). A Record of Decision (ROD) was approved for the IRP sites soils associated with groundwater upgradient of Building 490 (WPAFB 1998). Per the ROD, the approved remedial alternative for soils at these sites was No Action.

### **3.5 Land Use**

WPAFB is divided into three areas: A, B, and C. Area A contains primarily administrative activities; Area B focuses on acquisition, education, research, and development; and Area C is dominated by airfield operation, maintenance, and civil engineering activities. The base encompasses 8,145 acres and is classified as non-industrial with mixed development. Ten major land use categories have been identified on WPAFB (WPAFB 2001).

Although research and development is not the predominant land use in Wright Field in terms of total acreage, it is the dominant function. Currently, the proposed construction site of the AAFRF consists of land designated as Research and Development. The areas in vicinity of the site also include Administrative and Open Space (WPAFB 2001).

To address both noise and safety, DoD required military departments to establish an Air Installation Compatible Use Zone (AICUZ) program. The goal of AICUZ is to promote compatible land use around air bases by providing information concerning aircraft operations, noise exposure, and accident potential to local governments (WPAFB 1995, 2001). One component of the AICUZ study was the development of noise contours. These contours are produced by the computerized Day-Night Average A-Weighted Sound Level metric and the NOISEMAP methodology. According to the AICUZ study, the proposed construction site of the AAFRF is located in the maximum mission noise contour of 70 to 75 decibel (dB) (WPAFB 1995).

The AICUZ program is also intended to reduce the potential for aircraft mishaps in populated areas. As a result of this program, WPAFB has altered basic flight patterns to avoid heavily populated areas. In addition, airfield safety zones were established under AICUZ to minimize the number of people who would be injured or killed if an aircraft crashed. Three safety zones are designated at the end of all active runways: Clear Zone, Accident Potential Zone (APZ) I, and APZ II. The Clear Zone represents the most hazardous area. Although administrative uses (industrial, business services, manufacturing) are permitted in the APZs, “people-intensive” uses (e.g., auditoriums, classrooms) are discouraged in these areas. According to AFI 32-7063, all new construction is required to comply with the AICUZ. The proposed site of the AAFRF is located within APZ II. During the design phase of the project, coordination with WPAFB airspace managers and a variance request for constructing a new facility within the APZ II would be required (WPAFB 2006b).

### **3.6 Soils**

The surficial soil layer at the AAFRF site is fill or a silt/clay unit with an approximate thickness of 7 – 8 feet. The soil is characterized by the presence of organic material and is light brown in color. The fill material is typically a soft, lean clay with sand and gravel. Grain-size and moisture content analyses indicated a sandy lean clay with a moisture content of 17.3 percent.

The upper sand and gravel unit is a glacial outwash deposit consistently present beneath the surficial soil layer. This unit is typically a brown, poorly graded sand which grades into a well-graded sand and gravel with increasing depth. The unit has an average thickness of approximately 20 feet. The bottom portion of this unit is typically saturated. Moisture content in this unit ranged from 6.5 to 7.8 percent.

A layer of very dense to hard silt and clay beneath the upper sand and gravel unit exists throughout the majority of OU8. This unit is gray in color, dry, has varying amounts of sand and gravel, and is characterized as glacial till. The clay unit slopes gently to the west but is not verified to be continuous to the Rohrer's Island Wellfield area. The thickness of the clay unit at the AAFRF (approximately 3 feet) is relatively thin compared to the layer east and west of the site. In this area the clay is relatively soft and contains a higher percentage of sand.

The lower sand and gravel layer was encountered below the clay layer. This unit is a dense, gray-brown, well-graded sand and gravel with a trace of silt and thickness of 30 feet at the AAFRF site. The size of the gravel in this unit ranged from 1 to 3 inches, corresponds with coarse gravel to a cobble. This unit is saturated and is likely influenced by the production wells on base and at the Rohrer's Island Wellfield.

According to the AAFRF feasibility study (WPAFB 2006b), the ground-bearing capacity at the proposed location is assumed to be suitable because there are no known structural problems with Building 490. As part of the design process, however, soil analysis would be performed to verify the suitability of soils adjacent to Building 490.

### **3.7 Cultural Resources**

WPAFB is obligated to protect or otherwise treat archaeological sites and historic buildings that are listed as eligible, potentially eligible for, or not yet evaluated for the National Register of Historic Places (NRHP) (WPAFB, 2006c). During previous years, WPAFB has consulted with the Ohio Historic Preservation Office (OHPO) to reach a consensus determination of eligibility on the significance of the base's resources.

Based on WPAFB's Integrated Cultural Resources Management Plan, the proposed construction site for the AAFRF lies within the Wright Field Historic District. The district consists of 83 buildings, 15 structures, and 2 objects constructed between 1925 and 1945. Wright Field Historic District is eligible for listing in the NRHP.

WPAFB has assessed all buildings on the installation that are 50 years or older, and has assessed buildings for exceptional significance relating to the Cold War. The only historic buildings and structures in the vicinity of the proposed AAFRF that are eligible for the NHRP are located on the east side of C Street and the triangular runway southwest of the proposed area (**Figure 3-3** and **Appendix E**). The

facilities are considered contributing buildings to the Wright Field Historic District and include Facilities 20001, 20007, 20008, 20009, 20022, 20070, and 20071 (WPAFB 2006c). Of these, Facilities 20001, 20009, and 20022 are considered to be individually eligible. The triangular runway is also considered to be a contributing structure to the Wright Field Historic District (WPAFB 2006c).

WPAFB has also undertaken archeological surveys for prehistoric and historic-era archeological sites (**Appendix E**). An extensive historical map research was conducted by the U.S. Army Construction Engineering Research Laboratory as part of their base-wide inventory to identify potential historic archaeological sites. No potential sites are located in the vicinity of the AAFRF.

### **3.8 Air Quality**

According to the Clean Air Act (CAA), National Ambient Air Quality Standards (NAAQS) are to be set by the USEPA. The NAAQS are designed to limit pollution in the air anywhere in the United States in order to protect human health and public welfare. The NAAQS have been established for six criteria pollutants, which include sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), PM, CO, ozone (O<sub>3</sub>), and lead (Pb). Sections 107 and 110 of the CAA give the responsibility to each state of developing a set of regulations that implement the NAAQS, called State Implementation Plans (SIPs).

The OEPA is responsible for developing the SIP and implementing and enforcing the environmental regulatory requirements outlined by USEPA, including monitoring for criteria pollutants to determine if the levels meet the criteria pollutant attainment standards. The publication of the attainment and non-attainment area designations in the Federal Register (FR) triggers the clock for OEPA to develop a revision to their SIP that will bring the area into attainment for a specific criteria pollutant or specify a maintenance plan for maintaining attainment. Currently, the entire state of Ohio is in attainment for SO<sub>2</sub>, NO<sub>x</sub>, CO, and Pb. Ohio has several non-attainment areas for O<sub>3</sub> and PM with an aerodynamic particle size less than 2.5 micrometers (PM<sub>2.5</sub>).

WPAFB is located in the Dayton/Springfield area for O<sub>3</sub> NAAQS, which covers Clark, Greene, Miami and Montgomery counties. On 15 April 2004, USEPA designated the Dayton/Springfield area as “basic non-attainment” for the 8-hour O<sub>3</sub> NAAQS. This designation was published in the 30 April 2004 Federal Register notice [69 FR 23858]. USEPA also published the *Final Rule to Implement the 8-hour Ozone National Ambient Air Quality Standard – Phase 1* on 30 April 2004 [69 FR 23951]. OEPA petitioned the USEPA on 6 November 2006 to redesignate the Dayton/Springfield area to attainment for the 8-hour O<sub>3</sub> NAAQS. USEPA approved the redesignation by publishing notice in the 13 August 2007 Federal Register [72 FR 45169]. On 27 March 2008, however, USEPA announced revised O<sub>3</sub> standards [73 FR 16436] which open the possibility of the Dayton/Springfield area being redesignated back to non-attainment for these new O<sub>3</sub> standards. OEPA has until March 2009 to recommend the designation to USEPA with SIP revisions due by March 2013.



New PM<sub>2.5</sub> standards were promulgated in 2006 and USEPA published rules and guidance on CAA requirements for States to implement to the PM<sub>2.5</sub> NAAQS [25 April 2007, 72 FR 20586]. OEPA has recently submitted a plan to USEPA that demonstrates how areas will be brought into attainment by late 2010. The Dayton/Springfield area is currently awaiting official designation as being non-attainment for PM<sub>2.5</sub> which is expected by the end of 2008.

Section 176(c) of the CAA requires that before a Federal entity takes an action, it must make a determination that the proposed action will not interfere with the SIP or the State's ability to attain and maintain the NAAQS. In 1995, Congress limited the application of section 176(c) to non-attainment and maintenance areas only.

USEPA established emissions rate levels and exempted certain actions from conformity determinations which are listed in 40 CFR 93.153. USEPA also allowed Federal entities to develop their own list of actions which are presumed to conform. For non-exempt actions that increase emissions above the emission rate levels listed in paragraphs (b)(1) or (2) of 40 CFR 93.153, the Federal agency must demonstrate that the action will conform with the SIP or will not cause or contribute to any new violation of any standard in any area; interfere with provisions in the applicable SIP for maintenance of any standard; increase the frequency or severity of any existing violation of any standard; or delay timely attainment of any standard or any required interim emissions reductions or other milestone.

For O<sub>3</sub> non-attainment and maintenance areas located outside an O<sub>3</sub> transport region, the emission rate levels are 100 ton per year (tpy) for either VOC or NO<sub>x</sub>. For PM<sub>2.5</sub> non-attainment areas, the emission rate levels are 100 tpy for either direct emissions of PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, or VOC.

WPAFB is considered a major source of air pollutants, and submitted an application for a Clean Air Act Title V – Air Quality Operating permit in February 1996. OEPA issued a final Title V permit on 27 January 2004 with an effective date of 17 February 2004, identifying all sources of air pollution, applicable regulatory requirements, and emission limits. WPAFB applied for a renewal of their Title V permit 12 June 2008 which is set to expire 17 February 2009.

The AAFRF research facility would house process equipment for synthesizing jet fuel at a rate of 15 gallons per day. The process consists of a Steam-Methane Reformer, FT Reactor and an Upgrader, as described in Section 2.4 Ohio Administrative Code (OAC) 3745-15-02 requires that a new source obtain a permit to install (PTI) prior to construction unless exempted by OAC 3745-15-03. A PTI air permit is required for the construction and operation of the AAFRF because no exemptions in OAC 3745-15-03 apply. A PTI application for the AAFRF (WPAFB, 2007c) was submitted to OEPA on 14 January 2008 and a final PTI was issued by OEPA on 29 May 2008. The AAFRF would be added to the Title V permit as a non-insignificant emission unit when the Title V renewal permit is issued.

### **3.9 Noise**

Potential sources of noise associated with the AAFRF include construction activities, aircraft, and AAFRF operations. During the construction phase of the AAFRF, the demolition of the existing asphalt pavement and operation of heavy machinery and equipment would contribute to the ambient noise in the vicinity of the AAFRF. As discussed in Section 3.5, noise from aircraft is addressed by the AICUZ program. The proposed site of the AAFRF is also located in the maximum mission noise contour of 70 to 75 dB (WPAFB, 1995) based on aircraft activity in the area. At the time the EA was prepared, long-term impacts to noise due to the operation of the AAFRF had not been identified. In later design stages, an evaluation of noise generated by the AAFRF and options for mitigation would be considered if WPAFB judges that noise-sensitive areas are adjacent to the AAFRF (WPAFB 2006b).

### **3.10 Health and Safety**

The primary health and safety issues associated with the proposed action and alternative for the AAFRF include: worker safety during construction activities, siting of the AAFRF in an area designated as an APZ, toxicity hazards, and fire/explosion hazards.

Worker safety concerns during construction activities would primarily include hazards associated with physical hazards, such as heavy equipment and vehicles, power tools, and underground utilities. Other potential hazards are associated with hazardous materials, such as fuels from equipment or fuels from the nearby S Fuel Farm.

As discussed in Section 3.5 regarding land use, the proposed AAFRF is located in an area designated as APZ II. Administrative uses (industrial, business services, manufacturing) are generally permitted in the APZs while “people-intensive” uses, such as auditoriums and classrooms are discouraged. Because the AAFRF would primarily house the production equipment, the facility would not be used for “people-intensive” activities. According to AFI 32-7063, however, all new construction is required to comply with the AICUZ.

As shown in **Figure 2-1**, hazardous materials would be used throughout the production process of FT fuel and operation of the AAFRF. The hazards posed by these materials can be generally categorized as toxic, flammable, and explosive hazards. Material Safety Data Sheets (MSDS) for all materials used in the AAFRF process equipment would be recorded with the 88 ABW/CEV.

The input hazardous materials for the process would include: CO and H<sub>2</sub> gas, CNG, and N<sub>2</sub>. For facility start-up and catalyst activation, CO and H<sub>2</sub> gas would be supplied from six compressed gas cylinders (i.e., six-pack) each. These cylinders would be stored outside of the facility on the west side of the proposed AAFRF in a secure storage area with a fence and bollards for protection against damage or unauthorized access (WPAFB 2008b). The CNG would be used to generate the feed Syngas for the process. It would

be distributed from two high pressure compressors from the 6-inch line from C Street. A CNG tube trailer would be located on a concrete pad on the east side of the AAFRF and used as a backup source of CNG. Liquid N<sub>2</sub> would be used to purge process lines and to sweep vent and relief headers. The N<sub>2</sub> would be supplied from a 10,000 gallon liquid N<sub>2</sub> tank on the south side of Building 490.

The output materials include FT fuel, tail gas consisting of CO and H<sub>2</sub>, waste water and hydrocarbon waste. Aromatics are widely accepted as the most toxic of the hydrocarbon components in jet fuel. According to information submitted with the AF Form 813 for the AAFRF, vapor pressures for FT fuels are similar to their petroleum-derived counterparts because they are refined to the same flash point and distillation specification limits. Therefore, personnel exposure to FT fuel vapors would be similar to that of conventional jet fuels. By adding FT fuels to the fuel blend, the aromatic hydrocarbons are diluted. Although toxicity tests are on-going, the FT fuel blend is expected to be less toxic than the current fuels due to the reduced level of aromatics.

The tail gas includes all expected air emissions to be vented out the stack or to a treatment system. As part of the design process, AFRL/Det 1, 88 ABW/CE, and the WPAFB Fire Department are evaluating a thermal treatment system to manage any flammable or toxic emissions.

The hydrocarbon waste would consist of compounds such as naphtha, diesel fuel, and wax (WPAFB 2008b). This material would be containerized in 55 gallon drums for testing and evaluation, or it would be sent directly to the 10,000 gallon stand-alone scrap tank, Tank S-1, on the S Fuel Farm. Drummed process-derived waste would be properly processed as hazardous or non-hazardous waste, depending on waste evaluation or characterization data. The amount of waste generation is estimated to be roughly equivalent to the amount of usable product generated or about 15 gallons per day.

Small amounts of solvents, greases, and oils would be required to provide routine maintenance on the process equipment. Wastes derived from maintenance would be properly characterized and disposed as either non-hazardous or hazardous waste. No non-routine tasks involving hazardous materials are known at this time with the exception of cleaning out the process to change catalyst materials (WPAFB 2008b).

### **3.11 Socioeconomics**

The local economic area surrounding WPAFB is comprised of five counties: Clark, Greene, Miami, Montgomery, and Preble. WPAFB provides a major source of employment in the five-county area. In addition, WPAFB awards numerous contracts every year to local businesses. As of September 2007, the total number of jobs provided by WPAFB was 24,817 (WPAFB 2007b). This number includes military active duty, trainees and reservists, DoD civilians, and other civilians, such as contractors. The number of indirect jobs supported by the base, such as restaurants, dry cleaners and others is estimated at 28,000. The total economic impact to the local Dayton community was \$4.4 billion.

The proposed AAFRF would be operated by the AFRL Propulsion Directorate (AFRL 2008a,b). The Propulsion Directorate was formed from sites at WPAFB (“East”) and at Edwards AFB (“West”) and is responsible for providing advanced propulsion technologies for the nation's military services. Because their organization partners with industry, they are also a principal provider of propulsion technologies for aircraft and rocket engine manufacturers. With respect to the proposed project, the Propulsion Directorate conducts leading edge research and development in aerospace fuels. Recent efforts resulted in qualifying the B-1, B-52, and C-17 aircraft on a 50/50 blend of JP-8 and synthetic fuel produced by the FT process.

The directorate consists of almost 1,000 people running approximately 550 research and development programs from basic research to advanced technology development. This directorate is the largest within the AFRL because its’ technologies have significant performance impact on the Air Force’s weapon systems. Locally, the Propulsion Directorate at WPAFB conducts a tremendous amount of business within the state of Ohio. Almost \$400 million is invested in Ohio and academia to conduct propulsion and power research and development. Approximately \$32 million is spent on support.

A secure and reliable fuel supply as well as fewer, cleaner, and better fuels are critical to the Air Force mission. The fuels research to be conducted at the AAFRF also has broader economic implications. The DoD currently is the largest single consumer of energy in the United States (CRS 2007). As discussed in Section 1.0, the largest portion of fossil fuel used by the DoD is in the form of aviation fuel. For every \$10 increase in the price of a barrel of oil, DoD’s operating costs increase by approximately \$1.3 billion. The Air Force, which operates the most of DoD’s fixed-wing aircraft, spends the largest share of DoD’s fuel budget. Every \$10 increase in a barrel of oil increases the Air Force’s fuel costs by \$600 million. The potential vulnerability of U.S. fuel sources as well as reliance on foreign sources are also economic factors. The Air Force’s “alternate fuels” program is intended to address these concerns.

### **3.12 Transportation**

Arterials at Wright Field handle a large volume of traffic, particular during peak hours (WPAFB 2001). The entry road leading to the Main Gate (Gate 1B) and Fifth Street in Downtown Area B are classified as Primary Arterials (**Figure 3-3**). C Street would be considered a Secondary Arterial.

As part of the feasibility study for the AAFRF, a site access evaluation was conducted to identify areas of concern regarding vehicle traffic and traffic patterns. The site access evaluation for the proposed AAFRF consisted of a review of traffic operations and circulation adjacent to Building 490 (WPAFB 2006b). For this evaluation, a design vehicle was defined for the various needs of Building 490 and was based on American Association of State Highway and Transportation Officials (AASHTO) standards. The purpose of the design vehicle was to determine the minimum turning radii of the different vehicle types needing to access the facility. The minimum turning radii are intended for turns at less than 10 miles per hour

(15 kilometers per hour) and to represent the biggest vehicles within that vehicle class. Vehicle and service access needs of the existing and proposed facility are summarized in the following sections.

Service vehicle access to the 12-foot (3.6 meter) doors on the south side of Building 490 for Rooms 144 through 148 is required. The design vehicle is a single-unit truck having an overall length of 30 feet (9.15 meters). The frequency of use is considered to be very low or once per year.

Tanker trucks delivering fuel to the S Fuel Farm typically enter Area B through Gate 1B and circulate in a clockwise direction to provide fuel deliveries to the fuel farm. The design vehicle is an intermediate semi-trailer referenced as a WB-50 vehicle (55 feet) or a WB-15 vehicle (16.8 meters). Cones are used to restrict parking in the parking lot south of the tank farm in order to maintain access to the tank farm access driveway. The frequency of use is considered to be moderate or more than once per month on average.

A similar class vehicle to the WB-50 (WB-15) delivers N<sub>2</sub> to the above ground tank located south of Building 490. The frequency of use is considered to be low or less than once every three months.

Based on peak hour traffic counts, there are approximately 1,000 vehicles in the peak hours on C Street at the intersection of C and Loop Road (WPAFB 2008g). If the AAFRF is constructed, trucks would turn west from C Street on to Access Road B, and then would turn right immediately past the AAFRF. The vehicle would then maneuver between the liquid N<sub>2</sub> tank on the south side of Building 490 and the AAFRF. The truck would make a second right turn and enter the S Fuel Farm. After passing through the fuel farm, the vehicle would exit onto C Street.

Currently, employees working on the east end of Building 490 prefer to park their cars south of the S Fuel Farm (WPAFB 2008b). Alternate parking is available in the parking lot west of Building 490 and Access Road D. The frequency of use is considered to be high.

### **3.13 Utilities**

The following utilities descriptions are based on the data presented in the feasibility study (WPAFB 2006b), the *Proposed Site Utilities* drawing (Figure C102) from the 35% Design Completion Submittal (WPAFB 2007d) and additional information provided by AFRL/RZOE. During the feasibility study, several general assumptions were made as to the various utility lines to be used in providing service to the AAFRF. The location and orientation of the AAFRF have changed, however, since the completion of the feasibility study. Line sizing for most utilities will not be finalized until the design is near completion. In addition, exact locations and depths of existing utilities would need to be field-verified. The following utility lines currently exist in the proposed footprint of the AAFRF: electrical, sanitary, storm, and drinking water.

### **3.13.1 Waste Water/Sanitary**

Waste water at the AAFRF would be separated with one line for potentially fuel-contaminated water going to OWS2-490A with another line going directly to the sanitary sewer, which is connected to the City of Dayton POTW. Waste water from floor drains and the process water/fuel mixture from the fuel production would go to the OWS, where the fuel is separated and water discharges to the Dayton POTW. Waste water from AAFRF sinks, toilets, and non-contact process cooling water would be discharged directly to the POTW. Discharges of non-contact process cooling water in excess of 60 degrees C (140 degrees F) may be prohibited by the City of Dayton, and any such discharges would require special permission by the POTW Director (WPAFB 2008b).

### **3.13.2 Fuel Line**

As part of the AAFRF, a new fuel line would be installed. This fuel line would run north from the AAFRF to the S Fuel Farm and scrap fuel tank, Tank S-1.

### **3.13.3 Potable Water**

Potable water would be obtained from the existing water lines and water main at the proposed AAFRF location. The water main is slated for replacement as a part of another base project, but would continue to serve as the source of potable water for the AAFRF after replacement. The replacement project would include abandoning the existing water main in place and digging next to it and installing a new line. If a new water main is installed, or the size is increased or decreased, a Plans Approval would be required.

In accordance with OAC 3745-95-04, an approved backflow prevention device is required to be installed on each service line to a consumer's water system serving premises where any substance is handled in such a fashion as to create an actual or potential hazard to a public water system. This requirement includes premises having sources or systems containing process fluids. These criteria would apply to the proposed AAFRF.

### **3.13.4 Storm Sewer**

Surface drainage at the site consists of several curb inlets along the south and east sides of Building 490 and the storm drain immediately south of S Fuel Farm. All storm drainage ultimately discharges into the Mad River (Section 3.3.2). The civil design would address the connection requirements for the storm drain system at the AAFRF.

### **3.13.5 Natural Gas**

The design of the natural gas piping configuration and supply main connection for the AAFRF is currently in progress. The main supply would most likely be the 6-inch main on C-Street. The CNG system would consist of some combination of a compressor and pressure vessel. There would be no

emissions from the unit except from a pressure relief emergency situation vent. All of the CNG would likely be consumed in the process and/or sent to the Oxidizer for treatment.

### **3.13.6 *Electric***

The primary electrical service to the AAFRF would likely be relocated from the current location due to the location of the building and auxiliary components, such as the CNG compressor and Oxidizer. The final design has not yet been completed; however, there would be sufficient power available from the Building 490 substation located south of Building 490. This substation has 800 ampere feeds available.

### **3.14 *Environmental Justice***

The purpose of Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, is to identify, address, and avoid disproportionately high and adverse human health or environmental effects on minority and low-income populations. The area of the proposed action is located in Area B; there are no residences in this area. There would also be little change in facility operations following completion of the project.

## 4.0 Potential Environmental Impacts

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### 4.1 Introduction

This section identifies the potential impacts of the proposed action to construct and operate the AAFRF on the south side of Building 490 and the No Action alternative.

### 4.2 Natural Resources

Natural resources that could be impacted include vegetation, wildlife, threatened and endangered species and wetlands.

#### 4.2.1 Proposed Action

No vegetation would be affected by the proposed construction and operation of the AAFRF, as the proposed site is a parking lot covered in asphalt. Construction and AAFRF operation would not impact wildlife in the surrounding area, any more than existing research activities currently affect wildlife in this portion of Area B. Care would be taken during construction and operation to ensure that contaminants are not discharged to storm water, which could impact aquatic life downstream from the proposed project. There would be no impacts to threatened and endangered species. There are no wetlands in the vicinity of the AAFRF proposed location, and therefore, wetlands would not be impacted.

Copies of correspondence with the Ohio Department of Natural Resources (ODNR) and the U.S. Fish & Wildlife Service (USFWS) regarding the potential occurrences of threatened and endangered species in the project areas are provided in **Appendices B** and **C**, respectively. As indicated by ODNR, there is one potentially threatened plant species, pigeon grape (*Vitis cinerea*), located at two sites just within one mile of the proposed project area (**Appendix B**). In addition, ODNR indicated that two sites for the Indiana bat (*Myotis sodalist*), a state endangered and federal endangered species, have been identified within a five-mile radius of the proposed project area (**Appendix B**).

The USFWS was unable to respond to WPAFB's request for information on the affect to threatened or endangered species at this time due to staff and budget constraints (**Appendix C**). The USFWS referred the base to their website for assistance with consultation. 88 ABW/CEV consulted the suggested website, however, the instructions stated on the website for Section 7 consultation were initiated via the 5 June 2008 correspondence. However, the USFWS was not able to fulfill their consultation due to declining budgets, smaller staff, and competing priorities.

#### 4.2.2 No Action

There would be no impacts to Natural Resources under the No Action alternative.



### **4.3 Water**

#### **4.3.1. Proposed Action**

Construction activities for the AAFRF would have minimal impact on groundwater at the site. During construction the impermeable asphalt layer currently overlying the site would be removed exposing the upper surficial soil zone (Section 3.6). This soil is predominantly fill or silt/clay and is not considered hydraulically transmissive. Therefore, during construction and the relatively brief amount of time the soil would be exposed, it is not anticipated that the infiltration of precipitation or construction-related materials (i.e., in the event of a minor spill) would impact the upper water bearing zone below the surficial layer (Section 3.3.1).

During operation of the AAFRF, the fuel-contaminated water going to OWS2-490A could potentially enter into the subsurface in the event of a piping leak or overflow of the OWS. Potential impacts would be minimized by performing periodic integrity tests. As the AAFRF would consist of an impermeable ground surface, it is not anticipated that minor fuel or other chemical spills would impact groundwater at the site.

In addition, the northwest corner of Building 490 is within the WPAFB well-field protection area. The northwest corner of the building is within the WPAFB five-year travel time zone to recharge the aquifer (Tetra Tech 2007). To minimize potential impacts, 88ABW/CEV would be consulted during the design phase of the project to determine whether construction or operation restrictions would be necessary to protect the underlying groundwater resource in this area.

AAFRF construction and operation would have minimal impact on surface water quality. The AAFRF would not increase the amount of impervious surface, as the proposed building would be constructed on the existing asphalt surface near Building 490. No new access roads or parking would be needed for AAFRF construction and operation, and there is an existing storm drain located due east of the proposed location. Soil erosion and sediment control measures would be required at the proposed construction site, along with spill prevention and mitigation measures. Care would be taken during construction activities involving concrete to ensure that these activities do not elevate stormwater pH.

Proper hazardous material management, waste management and fuel management practices that would be part of AAFRF SOPs would protect surface water quality. Any leaks or spills that may occur during AAFRF operation would be managed under a site-specific spill plan, designed to protect human health and the environment.

The AAFRF site is not in the floodplain. Therefore, no impacts to the floodplain would occur under either the proposed action or no action alternative.

#### **4.3.2 No Action**

No impacts to groundwater, surface water or the floodplain would occur under the No Action alternative.

### **4.4 Hazardous Materials/Waste, Stored Fuels and IRP**

#### **4.4.1 Proposed Action**

The proposed AAFRF would utilize hazardous materials and stored fuels that are currently used by nearby laboratories. Furthermore, the AAFRF, would generate fuels and wastes that are similar to those managed by nearby laboratory operations. Potential impacts would be minimized because existing hazardous material management, waste management, fuel management and emergency management programs and systems would be applicable to the AAFRF. In addition to these existing systems, AAFRF standard operating procedures and the required site-specific spill plan promote best management practices and prevent or mitigate releases of hazardous materials, waste and stored fuels. Although the site is located within the area of OU8, no impacts to IRP sites or on-going groundwater monitoring are anticipated.

#### **4.4.2 No Action**

The No Action alternative would have no impact on hazardous materials, hazardous waste, stored fuels, or IRP sites.

### **4.5 Land Use**

#### **4.5.1 Proposed Action**

As stated in Section 3.5, current land use of the proposed construction site for the AAFRF is classified as Research and Development. The land use classification in the vicinity of Building 490 and the AAFRF is not expected to change in the future. Therefore, the proposed action would have no impact on land use.

The proposed AAFRF is located in APZ II. Impacts would be minor because there would be no “people-intensive” activities conducted at the facility. Coordination with WPAFB airspace managers and a variance request for constructing a new facility within APZ II would be required during the project design phase (WPAFB 2006b). The likelihood that the AAFRF would be involved in an aircraft accident would be similar to that of Building 490 and other nearby research facilities. In the unlikely event that the AAFRF would be involved in an aircraft accident, impacts would be managed by the base’s emergency response disaster management personnel.

#### **4.5.2 No Action**

The No Action alternative would have no impact on land use.

## **4.6 Soils**

### **4.6.1 Proposed Action**

The land at the proposed location for the new AAFRF was previously used as a parking apron for aircraft, and then as a vehicle parking lot for Building 490. The land surface in this portion of Area B is flat. Site preparation for construction would involve minimal leveling. In addition, there would not be any subsurface building construction that would require extensive excavation. Therefore, with the exception of excavation for the footers, foundation, and rerouting and installing utility lines, the overall impact to soils in the vicinity would be minimal. Soil erosion would be minimized during construction and until the concrete slab can cover the soil, by implementing erosion and sediment control measures.

All spills of hazardous chemicals, any materials entering sewers or drains, and releases of materials that have the potential to damage or pollute the environment must be reported to the Base Fire Department by calling 911 or Fire Dispatch at 257-9111.

### **4.6.2 No Action**

No impacts to soil quality would occur under the No Action alternative.

## **4.7 Cultural Resources**

### **4.7.1 Proposed Action**

Based upon past historic building evaluations and archaeological surveys, there are no historic properties located in the proposed project area. Although the proposed AAFRF is within the Wright Field Historic District, the new building would be designed to match the architectural style of the Building 490 and constructed with exterior concrete materials similar to those of the surrounding buildings. Therefore, this undertaking would not adversely affect historic properties at WPAFB (**Appendix E**).

The proposed project site has been previously disturbed. No known archaeological, historic, or Native American ceremonial/traditional sites are expected within the site boundaries. In the event that cultural items are encountered during project activities, work would cease immediately and the Cultural Resources Manager would be contacted to assess the items.

In accordance with 36 CFR 800.11, WPAFB has provided documentation to the OHPO regarding the proposed construction of the AAFRF. The OHPO has concurred with the base's finding of no adverse effect. A copy of the correspondence with the OHPO is provided in **Appendix E**.

### **4.7.2 No Action**

No impacts to cultural resources would occur under the No Action alternative.

## **4.8 Air Quality**

### **4.8.1 Proposed Action**

In the short-term, there would be minor, negative impacts to air quality. Impacts from construction activity associated with the AAFRF include the generation of fugitive dust and particulates from the removal and grading of soil, excavation operations, and other associated construction activities. The estimated area for the excavation portion of the project is 4,600 square feet (0.1 acres) and is expected to last for about 3 months. Based on a conservative estimate, particulate emissions of 0.08 tpy were estimated for the construction phase of the project. This amount is negligible compared with the estimated 16.18 PM<sub>10</sub> (particulate matter with an aerodynamic particle size less than 10 micrometers) normal basewide emissions from 2006 WPAFB construction activities (WPAFB 2007e). Emissions calculations and assumptions for the calculations are provided in **Appendix F**. In addition to the construction activities, minor short-term emissions from vehicles that would travel in the construction area would be created. During construction, dust suppression measures would be used to minimize fugitive dust emissions.

As concluded in the PTI application, installation of this new research facility at WPAFB would not trigger a major modification (as defined in OAC 3745-31-01) since the CO and VOC emission increases are below the significant emission increase thresholds. The new facility would not be subject to any National Emission Standards for Hazardous Air Pollutants (NESHAPS) or Maximum Achievable Control Technology (MACT) standards. The AAFRF meets the definition of a Research and Development Facility as defined 112(c) (7) of the Clean air Act and is located at an Air Force base, not a manufacturing facility. Best Available Technology (BAT) limits are proposed in the application for CO and OC/VOC emissions, which are greater than 10 tpy but less than 50 tpy, which is the typical trigger level for a BAT study.

As determined by OEPA, potential long-term emissions include 59.9 tpy CO and 15.1 tpy VOC determined from worst case modeling of the process assuming 10 gallon/day capacity each for the Reformer and Reactor and 15-gallon/day capacity for the Upgrader. Emission calculations and assumptions are provided in **Appendix F** and served as the basis for issuing PTI 08-04919 for the AAFRF.

Conformity determinations are required for each criteria pollutant or precursor where the total direct and indirect emissions in a non-attainment or maintenance area for that pollutant exceed the rates provided for in 40 CFR 93.153 (b). The PM<sub>2.5</sub>, VOC, SO<sub>2</sub>, and/or NO<sub>x</sub> emissions (if any) from fuel combustion in construction equipment would be expected to be negligible and do not warrant a detailed emissions estimation. Additionally, routine activities associated with the ongoing operation and maintenance of the AAFRF are considered de minimis as listed in 40 CFR 93.153(c)(2). The total PM, SO<sub>2</sub>, VOC, and NO<sub>x</sub> emissions from all direct and indirect activities would be below the emission rates of 100 tpy PM<sub>2.5</sub>,

100 tpy SO<sub>2</sub>, 100 tpy VOC, and 100 tpy for NO<sub>x</sub>, and thus, in accordance with 40 CFR 93.153(c)(1), a conformity determination is not required.

#### **4.8.2 No Action**

No impacts to air quality would occur under the No Action alternative.

### **4.9 Noise**

#### **4.9.1 Proposed Action**

There would be a minor, negative short-term impact on ambient noise levels at the project site over the course of project from the operation of heavy machinery and equipment. The nearby facilities would experience muffled construction noise during the workday.

The proposed construction site is located in the 70 to 75 db maximum mission noise zone. Because this level represents the maximum, aircraft noise at the AAFRF is not expected to increase in the future. In addition, personnel working at the AAFRF would not experience any more noise than typically occurs in the vicinity of the AFRL campus.

Long-term impacts to noise due to the operation of the AAFRF had not been identified at the time the EA was prepared. In later design stages, an evaluation of noise generated by the AAFRF and options for mitigation would be considered if WPAFB judges that noise-sensitive areas are adjacent to the AAFRF (WPAFB 2008b). The EA will be amended later if any of the impacts associated with later design stages indicate that those impacts will require further discussion or mitigation.

#### **4.9.2 No Action**

No impacts to noise would occur under the No Action alternative.

### **4.10 Health and Safety**

#### **4.10.1 Proposed Action**

Because construction workers for the proposed AAFRF would be responsible for complying with health and safety plans, SOPs, and applicable health and safety regulations (**Table 1-1**), no impacts to health and safety would be expected. In addition, “digging clearances” would be obtained from Civil Engineering and Base Utilities prior to excavating soil and installing utility lines.

Impacts to health and safety of nearby personnel would be minimized by clearly identifying the construction zone and prohibiting access to unauthorized individuals. Use of cranes and other high-profile equipment would require a “spotter” when operating near any overhead hazards. To minimize vehicle accidents, construction personnel would direct heavy vehicles entering and exiting the site.

The proposed AAFRF would use hazardous materials and generate hazardous wastes. Due to the nature of the AAFRF, these materials would be used in quantities appropriate to research rather than manufacturing. Although these materials pose potential health and safety hazards, impacts would be minimized through adherence to occupational health and safety regulations, SOPs and safe work practices. In addition, the AFRL/RZOE has trained IPMs and UECs to properly manage the compressed gases (H<sub>2</sub>, CO, N<sub>2</sub>, CNG), FT fuel, and solvents and wastes generated from using these materials.

Although there are no environmental impacts anticipated from the tail gas from the process, the CO and H<sub>2</sub> emissions would present a safety concern. The proposed facility would be equipped with gas detection and alarm systems. CO would be detected by specific sensors. H<sub>2</sub> would be monitored based on the lower explosive limit. The lighting and receptacle outlets would be explosion-proof and a fire suppression system would be installed. In addition, explosion mitigation measures for the AAFRF would include the addition of deflagration blow-out panels, as required by NFPA codes.

#### **4.10.2 No Action**

No impacts to health and safety would occur under the No Action alternative.

### **4.11 Socioeconomics**

#### **4.11.1 Proposed Action**

Nominal, temporary socioeconomic impacts could occur during construction activities. Contractors and local businesses would benefit from employment and income through contracts associated with the proposed task.

Major long-term beneficial impacts would result from the alternative fuels research associated with the production and testing of FT fuel at the AAFRF. Conversion of natural gas, and ultimately coal and biomass to liquid fuels is integral to reducing dependence on petroleum-based fuels. These benefits are local to the mission of WPAFB, regional for domestic solid and gaseous fuel sources, and both national and international for military and commercial fuel applications.

#### **4.11.2 No Action**

Potentially major negative long-term impacts would result from not expanding alternative fuel research technologies. The proposed AAFRF would be a unique research facility and would serve a critical research function of the DoD Assured Fuels Initiative. FT fuel research is a major component of the Air Force Alternate Fuels Program and WPAFB is the premier location for military fuels research. Not siting the AAFRF at WPAFB would weaken the AFRL Propulsion Directorate and DoD's ability to perform alternative fuels research. The no action alternative would compromise the Air Force's ability to meet its' stated goal of certifying all aircraft weapons systems to use a 50/50 blend of petroleum-derived jet fuel

and jet fuel from alternative sources. The cost of aviation fuel would continue to comprise a large share of the DoD's operating budget, and its' fuel supply would continue to be vulnerable.

In addition, this research is critical to economic and national security. There are potential regional and national implications as the production of liquid transportation fuel from domestic natural gas, coal, biomass, and other carbon-based fuels could be adversely impacted if FT fuel research is not performed.

#### **4.12 Transportation**

##### **4.12.1 Proposed Action**

There would be a short-term impact to traffic circulation due to construction-related vehicles using primary and secondary arterial roadways (Fifth Street and C Street respectively) to the AAFRF construction site. These deliveries would be infrequent and would not be a traffic concern for Base Office of Vehicle Operations (WPAFB 2008h).

The operators of the AAFRF would be comprised primarily of the workers currently working in adjacent Building 490. Therefore, additional personal vehicle traffic would not impact traffic in the vicinity of Building 490. It is anticipated that the existing roadways and access to the site would be more than adequate to accommodate the traffic volume of the AAFRF. Parking would likely be prohibited within 100 feet of the AAFRF due to nature of the materials that would be used. Given the availability of parking in the vicinity of Building 490, however, the construction of the AAFRF would have minimal impact on parking.

The types and quantities of materials that would be transported to the AAFRF, such as flammable gases, compressed gases, fuels, and liquid N<sub>2</sub>, would be similar to materials being transported to Building 490 in support of other research efforts. Although these materials would be transported through Gate 1B and along heavily traveled routes such as Fifth Street and C Street, deliveries would be infrequent and would not add appreciably to the overall hazardous materials transportation that occurs in Area B. These materials would be transported in accordance with Department of Transportation (DOT) regulations and no impacts would be anticipated.

As discussed in Section 3.12, fuel delivery trucks would need to pass between the existing N<sub>2</sub> storage tank and the AAFRF to enter the S Fuel Farm. Drivers would need to exercise extreme caution while maneuvering vehicles around and through the S Fuel Farm. To minimize the potential for accidents, the proposed AAFRF would be proportioned for optimum clearance.

##### **4.12.2 No Action**

No impacts to transportation around Building 490 or in Area B would occur under the No Action alternative.

#### **4.13 Utilities**

##### **4.13.1 Proposed Action**

Short-term impacts would be minimized by following the procedures specified for “digging clearances.” Underground utilities (e.g., electric) in areas to be excavated would be marked by each division of base utilities. Proper excavation techniques would be used to ensure that underground utilities lines are not cut. Although the base has maps that describe the location of the utilities, there would be a potential for unmarked utilities. In the event a utility line is cut or otherwise damaged, on-site personnel would need to implement emergency procedures.

Procedures used to protect the utilities would be similar to those used to protect health and safety. When working with active electrical lines, a lock out/tag out procedure would be used. Use of cranes and other high-profile equipment would require a “spotter”. Other than an existing street light, which would be demolished, there are no overhead utilities at the AAFRF location. Construction sites would have utility line trenches marked and warning signs would be used during construction activities.

Because the design is 35% complete, precise specifications for the utilities are not currently available. From a conceptual standpoint, however, impacts associated with the installation and operation of the AAFRF would be minimized, as follows (WPAFB 2006b, 2008b):

- As discussed in Section 3.13.3, backflow prevention would be required for service lines to the potable water system.
- Because there would be little change to the impervious surfaces surrounding the proposed AAFRF, it would be expected that the existing storm sewer would continue to handle the runoff. Should the storm drain need to be moved, impacts would likely be minor because the area south of Building 490 and the S Fuel Farm is an open parking lot.
- The AAFRF would discharge additional waste water to the sanitary sewer. With regard to the cooling water output, the temperature would be measured prior to discharge to the sanitary sewer. If necessary, measures would be taken to cool the water below POTW limits, or the discharge would be coordinated with the City of Dayton. A PTI may be required for this project depending upon the connections to the sewer system. This requirement will be further evaluated during the design process. The EA will be amended later if any of the impacts associated with later design stages indicate that those impacts will require further discussion or mitigation.
- Natural gas would most likely be supplied from the 6-inch main on C Street. There would be no emissions with the exception of a pressure relief emergency situation vent. All of the CNG would either be consumed in the process or treated.
- Explosion-proof containment construction would be provided for all utilities throughout the space.

##### **4.13.2 No Action**

The No Action alternative would have no effect on utilities.



#### **4.14 Environmental Justice**

##### **4.14.1 Proposed Action**

There is little potential for the proposed action to have a disproportionately high adverse human health or environmental effect on low-income and minority populations that are located outside the boundaries of WPAFB. In the short-term, there would be no substantial economic ramifications resulting from the proposed action. The absence of nearby populations (including low-income and minority populations), the limited scope of the proposed action, and minimal effects do not present conditions for an Environmental Justice issue.

##### **4.14.2 No Action**

There would be no Environmental Justice issues with the No Action alternative.

#### **4.15 Unavoidable Adverse Effects**

If the proposed action were implemented, there would be a commitment of soil that is excavated as part of the site preparation/construction work. Minor impacts from noise would slightly affect passers-by and nearby workers. The increase in noise would be primarily due to construction/excavation equipment. Construction noise would only exist during working hours and would end at the completion of the operation. Temporary, minor increases in traffic would occur during the proposed action due to construction equipment.

#### **4.16 Relationship of Short-Term Uses and Long-Term Productivity**

The proposed AAFRF is a unique research facility that is essential to moving alternative fuel technology forward, and WPAFB is the premier location for military fuels research. The no action alternative would compromise the Air Force's ability to meet its' stated goal of certifying all aircraft weapons systems to use a 50/50 blend of petroleum-derived jet fuel and jet fuel from alternative sources. Furthermore, no action could have ramifications for the Air Force and DoD in terms of supply of military fuel, as the AAFRF serves a critical research function of the DoD Assured Fuels Initiative. In addition, there are potential regional and national implications as the production of liquid transportation fuel from domestic natural gas, coal, biomass, and other carbon-based fuels could be adversely impacted if FT fuel research is not performed.

#### **4.17 Irreversible and Irretrievable Commitments of Resources**

CEQ regulations in 40 CFR 1502.16 require that an agency identify any irreversible or irretrievable commitments of resources that would be involved in the proposed action, should it be implemented. Capital, energy, materials, and labor would be required to construct and operate the AAFRF. These resources are not retrievable.

#### **4.18 Cumulative Impacts**

Cumulative effects are those which may result from the incremental impact of the federal action (construction and operation of the AAFRF) when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such actions (See 40 CFR § 1508.7).

As discussed in Section 3.13.3, potable water would be obtained from the existing water lines and water main that currently exists at the proposed AAFRF location. This water main is slated for replacement as a part of another base project. The replacement project would include abandoning the existing water main in place and digging next to it and installing a new line. If the replacement of the water main occurs during the construction phase of the AAFRF, there could be a potential for cumulative impacts. However, impacts would be expected to be minor. Regardless of when the replacement occurs, a water main will be available for use by the AAFRF.

The 2005 Defense Base Realignment and Closure Commission has realigned several missions to WPAFB. This includes approximately 1,500 new jobs added to the Area B Hilltop area beginning in FY 2011. Overall traffic to Area B as a result of BRAC activities will increase. It is estimated that vehicle traffic at Gate 1B will increase by 200 vehicles in the peak hours. As discussed in Section 4.12.1, deliveries to the AAFRF would be infrequent and not a significant increase in traffic. Therefore, the potential for cumulative impacts to additional vehicle traffic is expected to be minor.

## 5.0 List of Preparers

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The following individuals assisted in the preparation of or provided background information for this EA:

<b><u>Name/Expertise</u></b>	<b><u>Role</u></b>	<b><u>Affiliation</u></b>
Martha Gitt Environmental Science	Report Preparation	Shaw Environmental, Inc.
Cynthia Hassan NEPA, Risk Assessment	Project Manager Report Preparation	Shaw Environmental, Inc.
Gregory Plamondon Geology, IRP	Report Preparation	Shaw Environmental, Inc.
Timothy Rust Air Quality	Report Preparation	Shaw Environmental, Inc.

## 6.0 List of Persons Contacted

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Several persons were contacted or consulted during the preparation of the EA. The persons contacted are listed below:

<u>Name</u>	<u>Role</u>	<u>Affiliation</u>
Raymond Baker	EIAP Manager/Cultural Resources Manager	88 ABW/CEV
Dave Duell	WPAFB Air Quality Program Manager	88 ABW/CEV
Mark Epstein	Resource Protection and Review	Ohio Historic Preservation Office
Mary Knapp	Threatened and Endangered Species	U.S. Fish and Wildlife Services
Amir Mott	Program Manager	88 ABW/CECW
Zachary Olds	WPAFB Air and Water Program Technician	88 ABW/CEV
Warren Richardson	Traffic/Transportation	Base Vehicle Operations
Kurt Rinehart	Floodplain Issues	Miami Conservancy District
Sherman Siegal	Installation Restoration Program	88 ABW/CEV
Gavin Spencer	Unit Environmental Coordinator	AFRL/RZOE
Frederick Tito	Traffic Manager	88 ABW/CECP
Debbie Woischke	Natural Resources	Ohio Department of Natural Resources; Division of Natural Areas & Reserves; Columbus, Ohio
John Wolfe	WPAFB Stormwater Program Manager	88ABW/CEV

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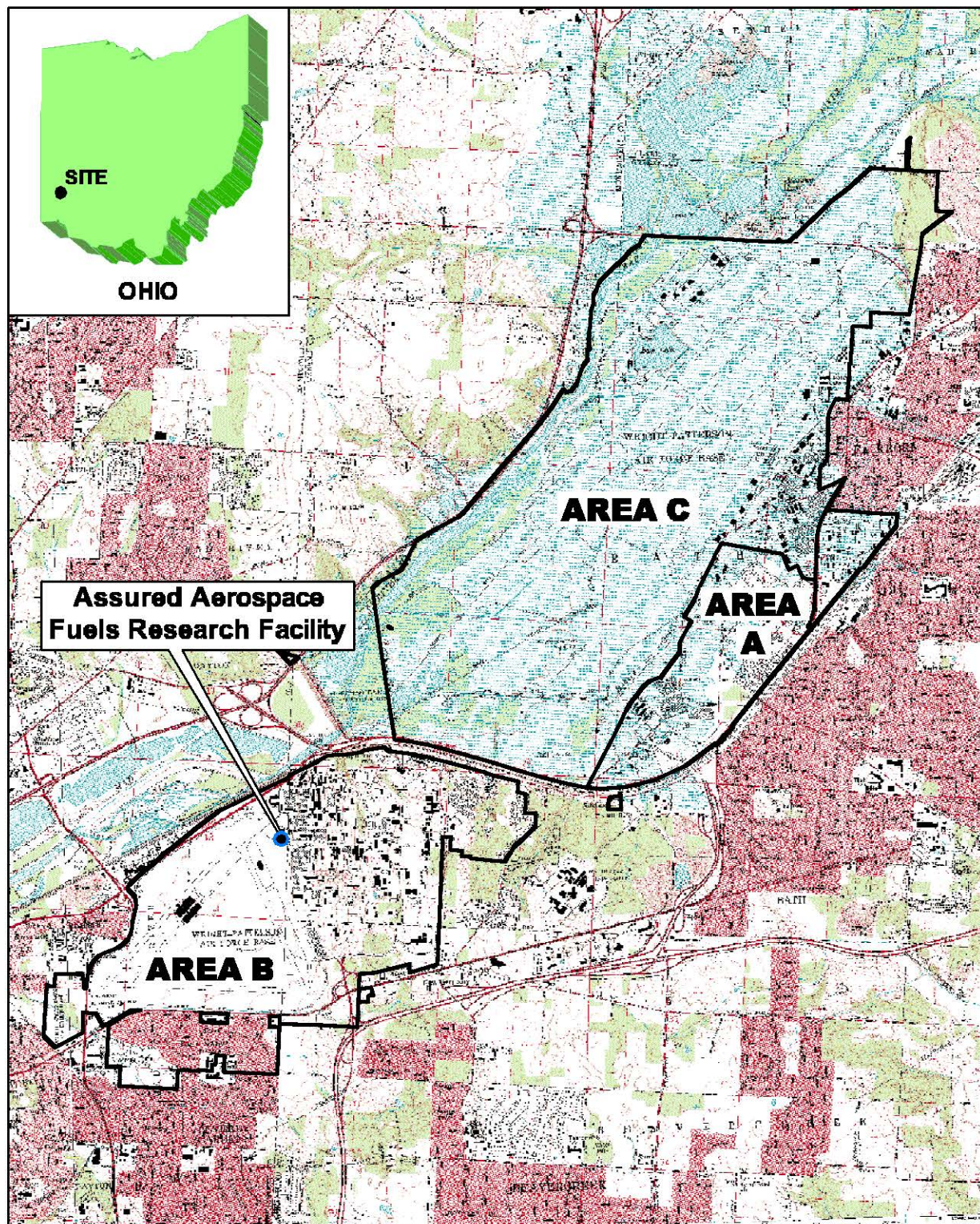
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## ***Figures***



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/29/08	--	MSV	MG	CH	2008 17-03



**REFERENCE:**

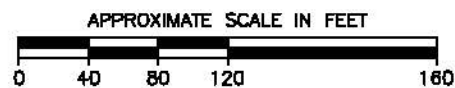
U.S.G.S. 7.5 MIN. TOPOGRAPHIC MAP OF DAYTON NORTH OH., DATED 1965, REVISED 1992; AND FAIRBORN OH DATED 1965, REVISED 1992; SCALE 1"=1 MILE



**FIGURE 1-1**  
**Location of the Proposed**  
**Assured Aerospace Fuels Research Facility**  
**Wright-Patterson Air Force Base**  
**Dayton, Ohio**



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**FIGURE 1-2**  
**Proposed Site for the**  
**Assured Aerospace Fuels Research Facility**  
 Wright-Patterson Air Force Base  
 Dayton, Ohio

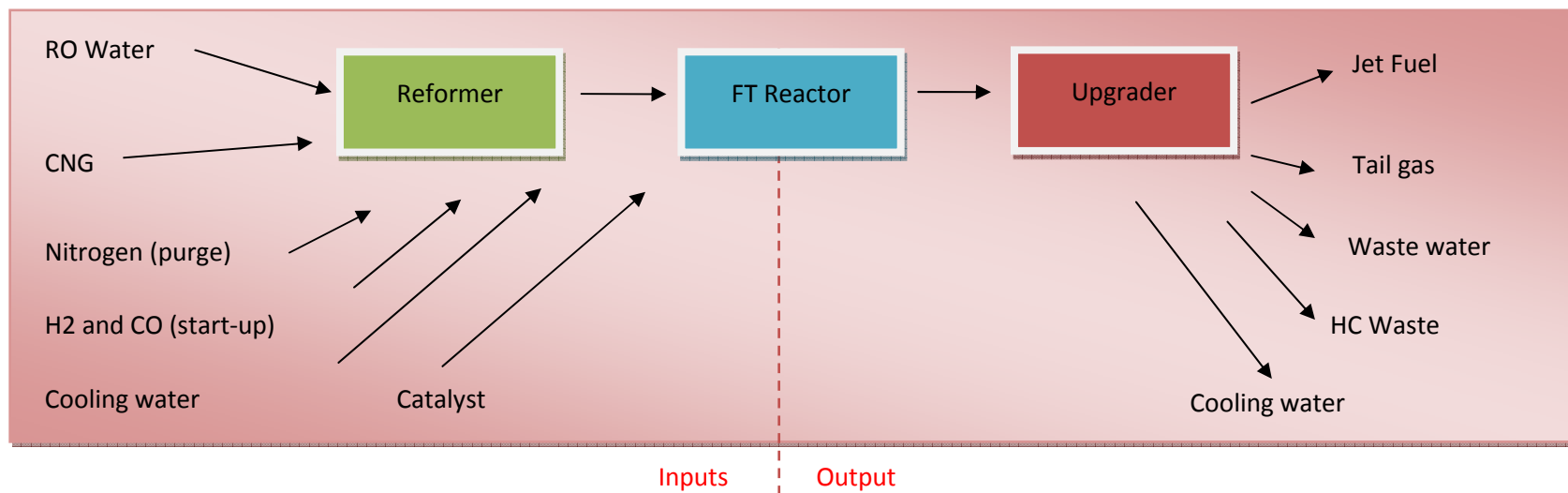
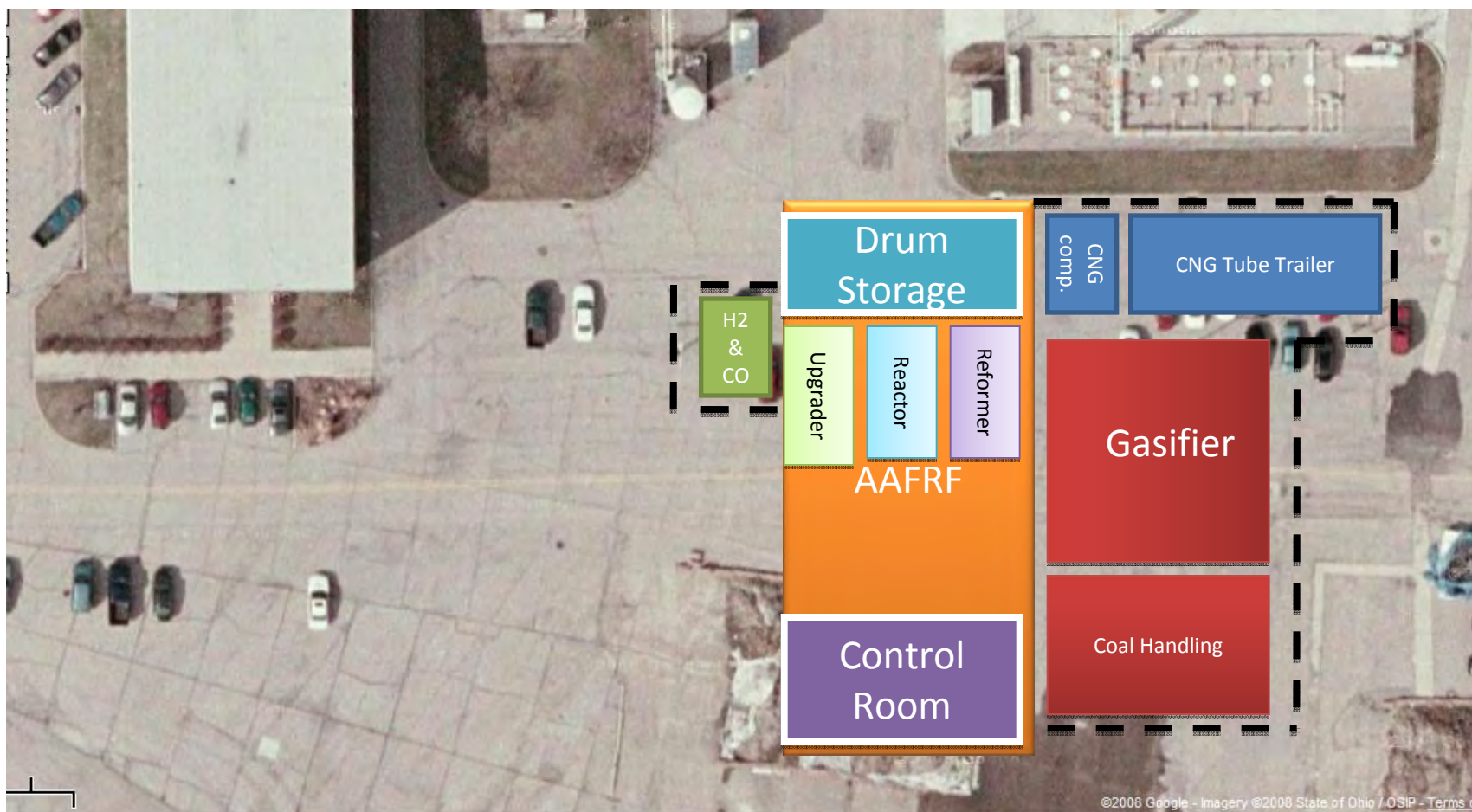


Figure 2-1  
FT Process Diagram



Source: AFRL/RZOE

Figure 2-2. AAFRF Component Concept Drawing



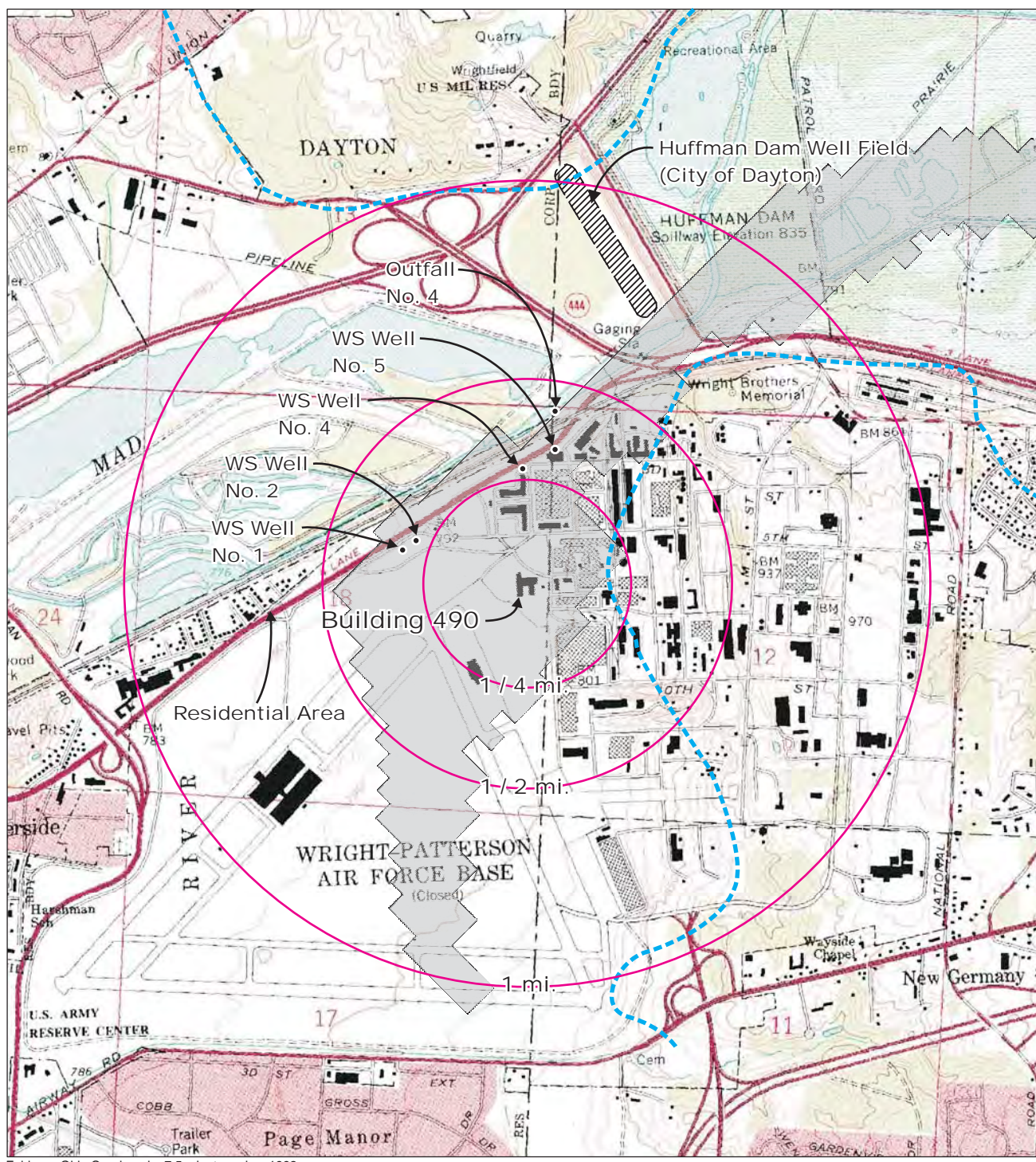


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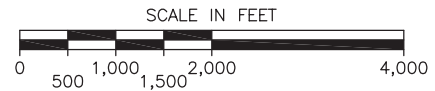
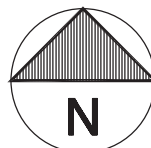
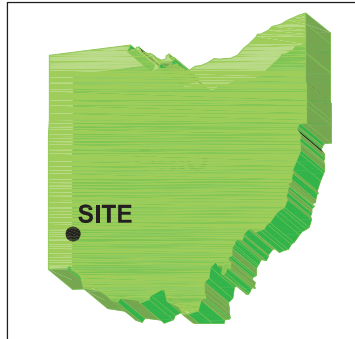
Figure 2-3. AAFRF Concept Drawing



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Fairborn, Ohio Quadrangle; 7.5 minute series, 1992

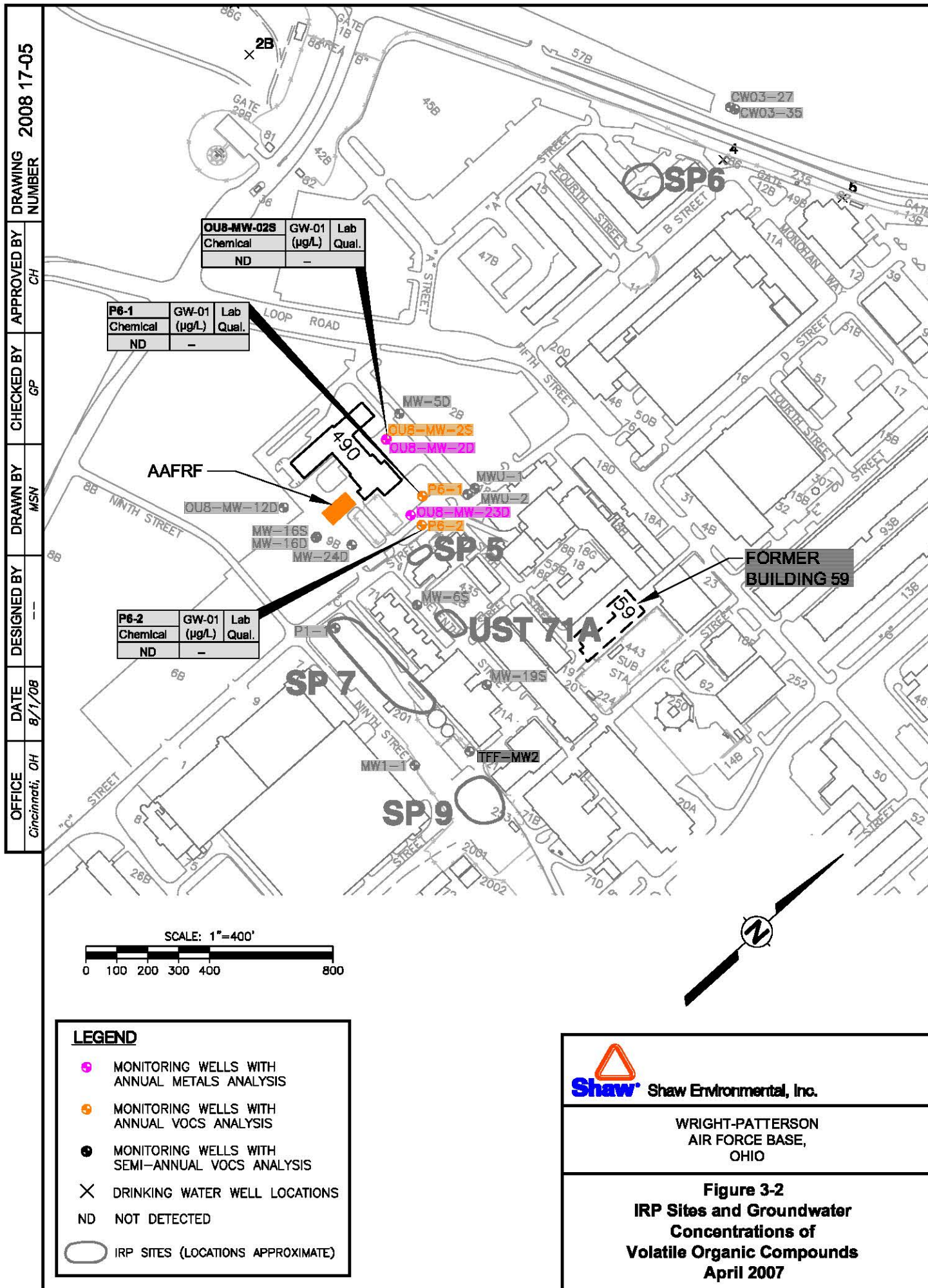


CONTOUR INTERVAL 10 FEET  
NATIONAL GEODETIC VERTICAL DATUM OF 1929

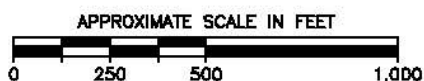
- WS Well WPAFB Water Supply Well
- Upland Bedrock Boundary
- Contributing Recharge Area

**Figure 3-1**  
**Hydrogeologic Setting Map,**  
**Area B, WPAFB, OH.**





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Cincinnati, OH	8/7/08	---	MSV	CH	CH	2008 17-08



 Shaw Environmental, Inc.

**FIGURE 3-3**  
**Areas Surrounding Proposed Site for the**  
**Assured Aerospace Fuels Research Facility**  
 Wright-Patterson Air Force Base  
 Dayton, Ohio



## ***Appendix A***

### ***Site Photographs***



Photo 1. View of Proposed AAFRF location, looking north toward Facility 20490.



Photo 2. View of Proposed AAFRF location, looking north toward Room 148 and S Fuel Farm.

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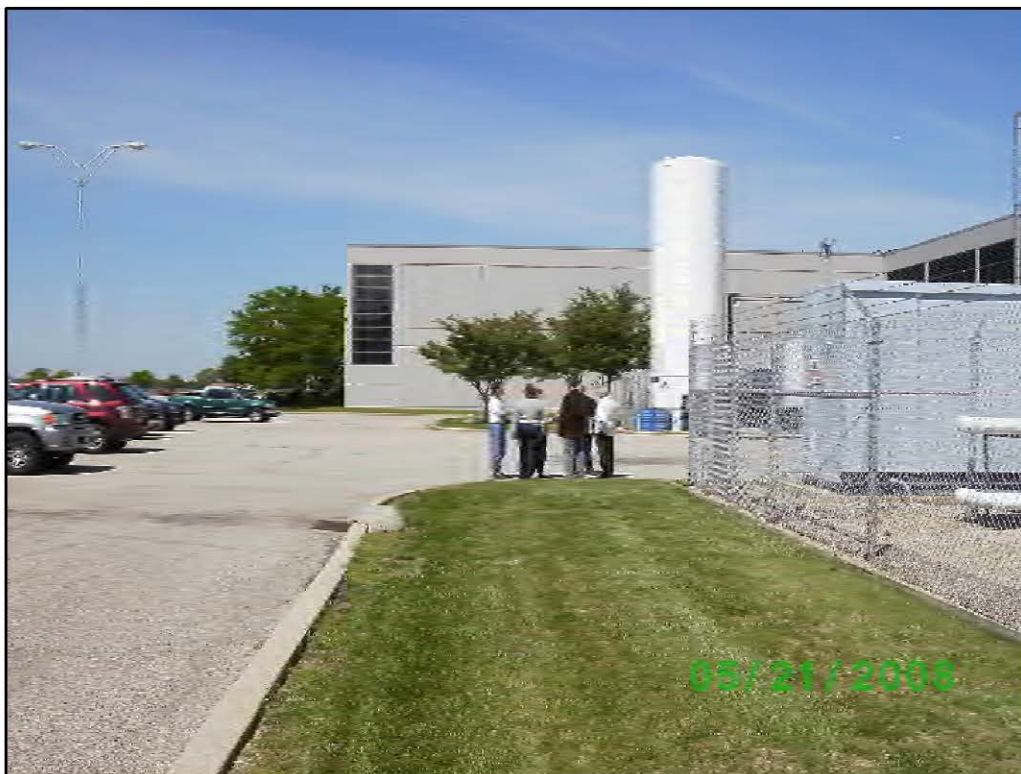


Photo 3. View of Proposed AAFRF location, looking west toward Facility 20490 and the nitrogen storage tank.



Photo 4. View looking north toward corner of Access Road B and C Street.

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	8/6/08	APPROVED BY	CH	8/6/08	

***Appendix B***

***Correspondence with the  
Ohio Department of Natural Resources***





# Ohio Department of Natural Resources

TED STRICKLAND, GOVERNOR

SEAN D. LOGAN, DIRECTOR

## Division of Natural Areas and Preserves

Steven D. Maurer, Chief

2045 Morse Rd., Bldg. F-1

Columbus, OH 43229-6693

Phone: (614) 265-6453; Fax: (614) 267-3096

June 12, 2008

Cynthia Hassan  
Shaw Environmental & Infrastructure, Inc.  
5050 Section Ave.  
Cincinnati, OH 45212

Dear Ms. Hassan:

I have reviewed our Natural Heritage maps and files for the Assured Aerospace Fuels Research Facility project area, including a one mile radius, on Access Rd. B in Area B of Wright-Patterson Air Force Base in Montgomery County, and on the Fairborn Quad. The numbers/letters on the list below correspond to the areas marked on the accompanying map. Common name, scientific name and status are given for each species.

### Fairborn Quad

#### A. Huffman MetroPark - Five Rivers MetroParks

1. *Vitis cinerea* - Pigeon Grape, potentially threatened (2 sites)

The review also included a search for Indiana Bat (*Myotis sodalis*, state endangered, federal endangered) sites within a five mile radius. Two sites within the five mile radius are shown on a second map.

There are no state nature preserves or scenic rivers at the project site. We are also unaware of any unique ecological sites, geologic features, animal assemblages, state parks, state forests or state wildlife areas within a one mile radius of the project area.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Please note that although we inventory all types of plant communities, we only maintain records on the highest quality areas.

Please contact me at 614-265-6818 if I can be of further assistance.

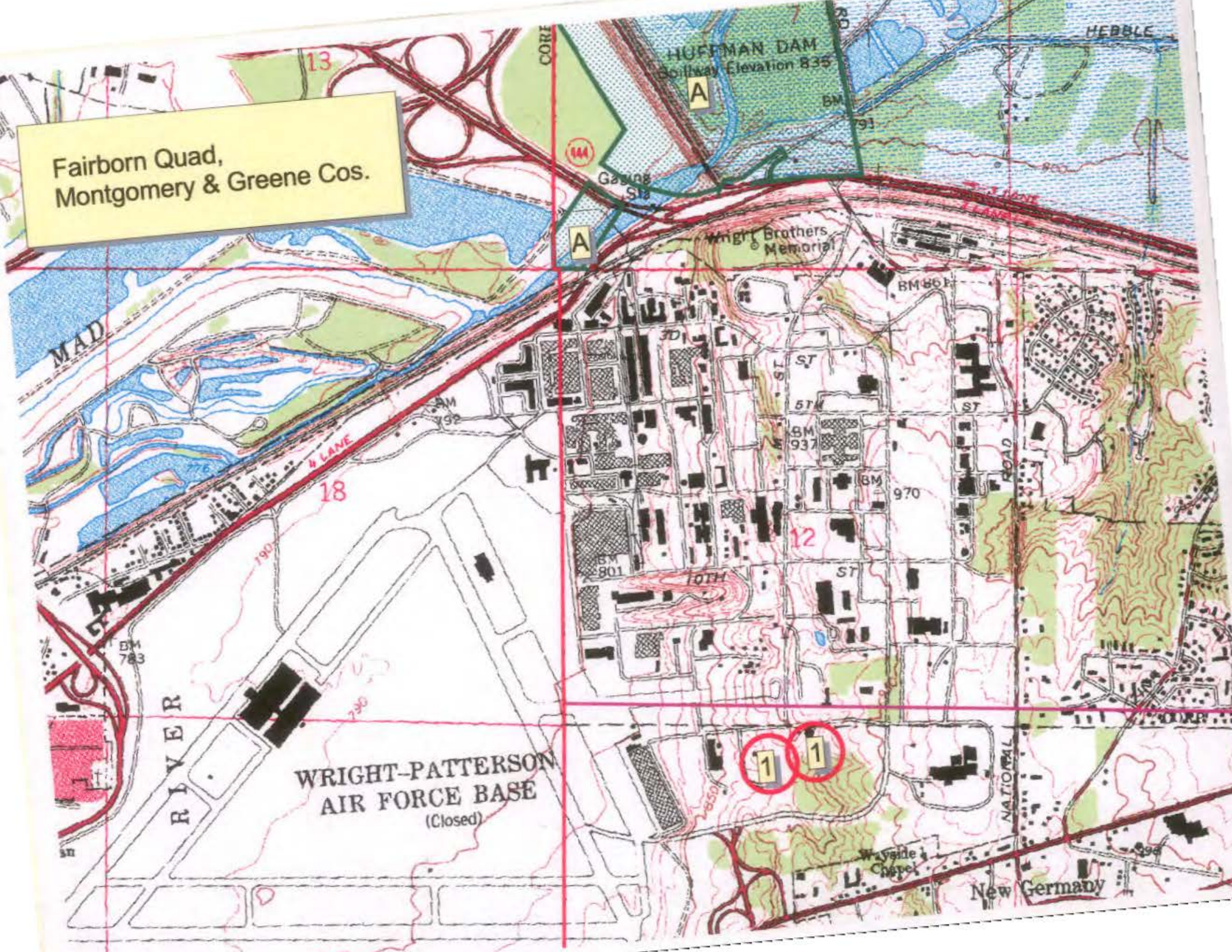
Sincerely,

Debbie Woischke, Ecological Analyst  
Natural Heritage Program





Fairborn Quad,  
Montgomery & Greene Cos.





Fairborn Quad,  
Montgomery & Greene Cos.

Indiana Bat site

Indiana Bat site

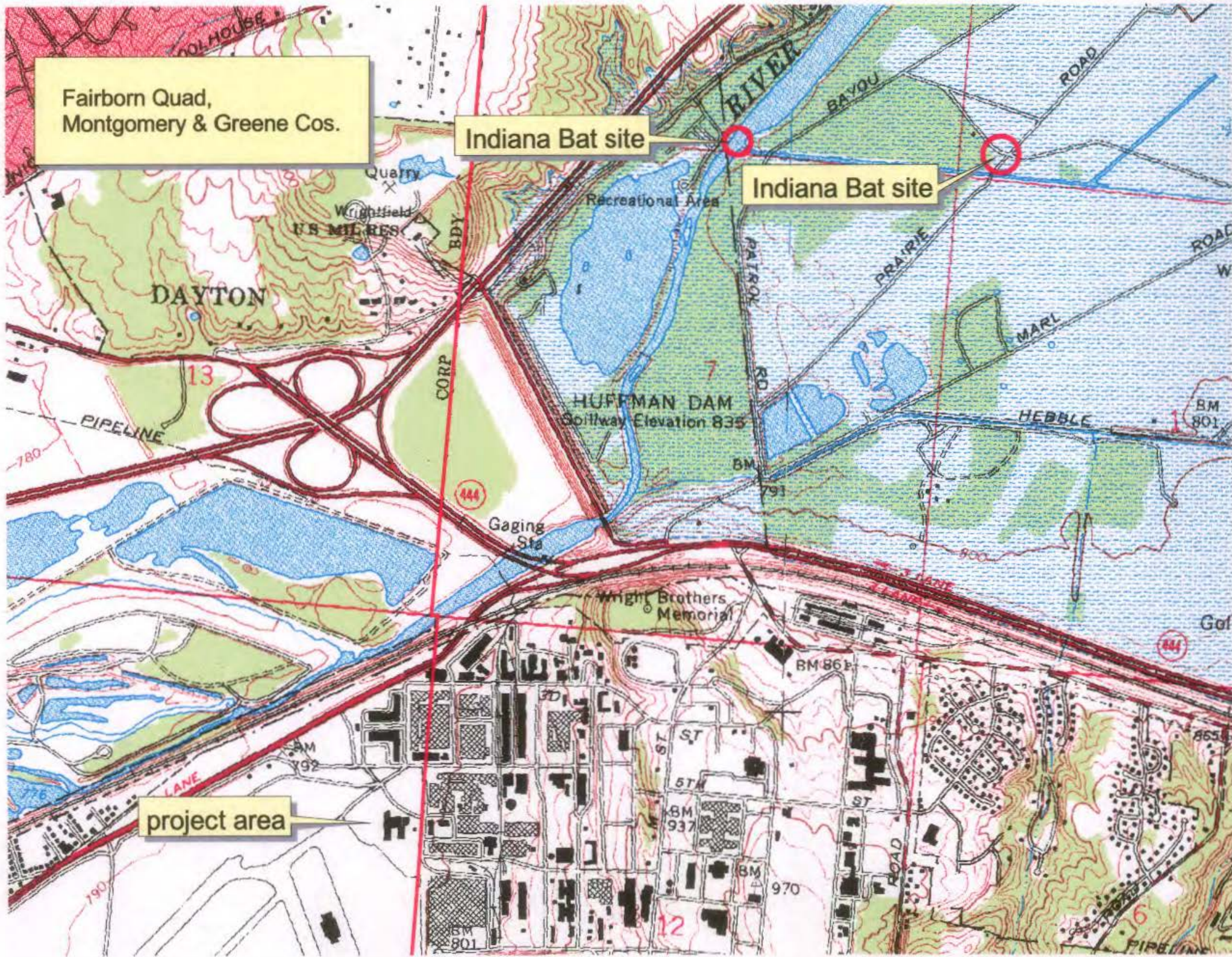
DAYTON

HUFFMAN DAM  
Soilway Elevation 835

Gaging Sta

Wright Brothers  
Memorial

project area







Shaw Environmental, Inc.

5050 Section Avenue  
Cincinnati, OH 45212-2025  
513.782.4700  
Fax: 513.782.4807

June 9, 2008

Ms. Debbie Woischke  
Ohio Department of Natural Resources  
Division of Natural Areas and Preserves  
Natural Heritage Data Service  
2045 Morse Road, Building F-1  
Columbus, Ohio 43229-6693

Subject: Rare Species Data Request and Informal Consultation  
Environmental Assessment of Assured Aerospace Fuels Research Facility  
Wright-Patterson Air Force Base, Ohio

Dear Ms. Woischke:

The purpose of this letter is to request information from the National Heritage Program for State- and Federally-listed threatened or endangered plants and animals in the vicinity of the proposed Assured Aerospace Fuels Research Facility (AAFRF). This proposed facility would be located in Area B of Wright-Patterson Air Force Base (WPAFB), and would be bordered by Access Road B, Access Road D, C Street, and Sixth Street, as shown on the enclosed maps.

We are currently preparing an Environmental Assessment (EA) under contract to WPAFB, which will address potential impacts associated with the construction and operation of the AAFRF. The intent of the EA is to satisfy requirements under the National Environmental Policy Act (NEPA) of 1969. We are requesting the locations of known populations of rare, threatened and endangered species within a one mile radius of this project site as part of this assessment. For the Indiana bat, we are requesting information within a five-mile radius. We would also like to request informal consultation regarding possible impacts of this proposed project on species listed as threatened or endangered in accordance with Section 7 of the Endangered Species Act.

The proposed AAFRF is a 4,000 square foot building that would be used to house Fischer-Tropsch (F-T) fuel process equipment. The proposed location of the AAFRF is immediately south of Building 20490, adjacent to the Building 20490 tank farm, and immediately east of the liquid nitrogen tank. The proposed building would be constructed at grade, and would consist of a reinforced concrete building on a concrete foundation. The proposed construction site is currently comprised of asphalt and is used for fuel deliveries to the tank farm and for parking. The surrounding area consists primarily of asphalt parking lots, the former runways of Wright Field, research facilities, and maintained lawns.



Enclosed is an Ohio Natural Heritage Program Data Request Form. We would appreciate any information from your database that applies to our project area. Please expedite our request, if possible, and contact me at (513)782-4967 or [Cindy.Hassan@shawgrp.com](mailto:Cindy.Hassan@shawgrp.com) if you have any questions or require further information. Thank you for your attention to the request.

Sincerely,

*Cynthia A. Hassan*

Cynthia A. Hassan  
Project Manager  
Shaw Environmental, Inc.

cc: Raymond Baker (88 ABW/CEVO)

Enclosures: USGS Quadrangle Map  
2008 Aerial Photo Map  
Ohio Natural Heritage Program Data Request Form



## DATA REQUEST FORM

OHIO DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF NATURAL AREAS AND PRESERVES  
OHIO NATURAL HERITAGE PROGRAM  
2045 MORSE RD., BLDG. F-1  
COLUMBUS, OHIO 43229-6693  
PHONE: 614-265-6453; FAX: 614-267-3096

### **INSTRUCTIONS:**

Please complete both sides of this form, sign and return it to the address or fax number given above along with: (1) a brief letter describing your project, and (2) a map detailing the boundaries of your project site. A copy of the pertinent portion of a USGS 7.5 minute topographic map is preferred but other maps are acceptable. Our turnaround time is two weeks, although we can often respond more quickly. If you fax in your request you do not need to mail the original unless otherwise requested.

### **FEES:**

Fees are determined by the amount of time it takes to complete your project. The charge is \$50.00 per half hour with a one hour minimum. A cost estimate can be provided upon request. An invoice will be included with our response.

**WHAT WE PROVIDE:** The Natural Heritage Database is the most comprehensive source of information on the location of Ohio's rare species and significant natural features. Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Records for the following will be provided from the Natural Heritage Database: plants and animals (state and federal listed species), high quality examples of natural plant communities, geologic features, breeding animal concentrations, and unprotected natural areas. In addition, we report locations for managed areas including federal, state, county, local and non-profit areas, as well as state and national scenic rivers. Natural Heritage Data can be provided in many formats, including GIS shapefiles, spreadsheets, printed reports or maps. A minimum one mile radius around the project site will automatically be searched. Because Natural Heritage data is sensitive information, it is our policy to provide only the data needed to complete your project.

\*\*\*\*\*

Date: June 9, 2008

Company name: Shaw Environmental and Infrastructure, Inc.

Your name: Cynthia A. Hassan, Project Manager

Address: 5050 Section Avenue

City/State/Zip: Cincinnati, OH 45212-2025

Phone: (513) 782-4967 Fax: (513) 782-4807

E-mail address: cindy.hassan@shawgrp.com

Environmental Assessment to Construct and Operate the Assured  
Project Name: Aerospace Fuels Research Facility (AAFRF)

Project Number: \_\_\_\_\_

Project Site Address: Access Road B, Area B, Wright-Patterson Air Force Base

Project County: Montgomery

Project Township: Mad River

Project site is located on the following USGS 7.5 minute topographic quad(s): \_\_\_\_\_

Fairborn Quad, R.7, T.2

Description of project: Construction and operation of a 4,000 square foot facility to produce research volumes of Fischer-Tropsch fuel (synthetic fuel) for blending with JP-8 and testing as an alternative aviation fuel.

How do you want your data reported? Printed list and map X GIS shapefile \_\_\_\_\_

Other format (please specify): None

Additional information required: For the Indiana bat, include information within a five-mile radius.

How will the information be used? The name, status and location of each species will be published in an environmental assessment that is being performed to satisfy requirements under the National Environmental Policy Act (NEPA).

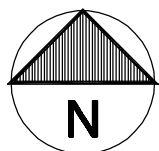
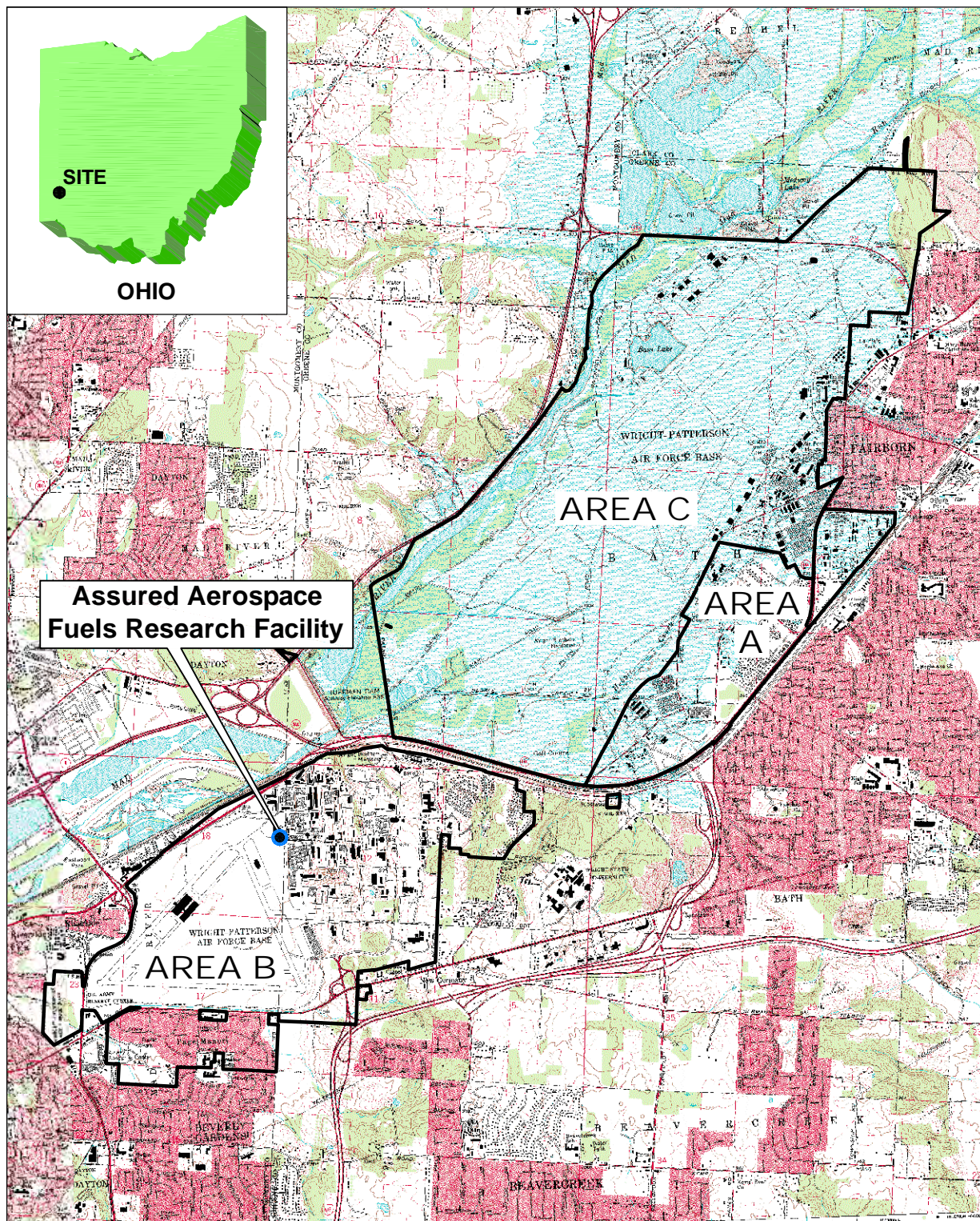
I certify that data supplied by the Ohio Natural Heritage Program will not be published without crediting the ODNR Division of Natural Areas and Preserves as the source of the material. In addition, I certify that electronic datasets will not be distributed to others without the consent of the Division of Natural Areas and Preserves, Ohio Natural Heritage Program.

Signature Cynthia A. Hansen

Date: 6/9/08



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/29/08	---	MSN	MG	CH	2008 17-01



**REFERENCE:**

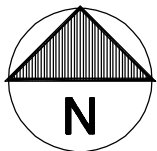
U.S.G.S. 7.5 MIN. TOPOGRAPHIC MAP OF DAYTON NORTH OH., DATED 1965, REVISED 1992; AND FAIRBORN OH DATED 1965, REVISED 1992; SCALE 1"=1 MILE



**FIGURE 1**  
**Location of the Proposed**  
**Assured Aerospace Fuels Research Facility**  
**Wright-Patterson Air Force Base**  
**Dayton, Ohio**



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/29/08	--	MSN	MG	CH	2008 17-02



**FIGURE 2**  
**Proposed Site for the**  
**Assured Aerospace Fuels Research Facility**  
**Wright-Patterson Air Force Base**  
**Dayton, Ohio**

## ***Appendix C***

### ***Correspondence with the U.S. Fish & Wildlife Service***



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

Ecological Services  
6950 Americana Parkway, Suite H  
Reynoldsburg, Ohio 43068-4132  
614-469-6923 / FAX 614-469-6919  
June 26, 2008

Tails: 2008-FA-0249

Raymond F. Baker  
88 ABW/CEVO  
1450 Littrell Road, Building 22  
Wright-Patterson AFB, OH 45433-5209

Re: Assured Aerospace Fuels Research Facility

Dear Mr. Baker:

We have received your recent correspondence requesting information about the subject proposal. Due to declining budgets, smaller staffs, and competing priorities, we are unable to respond to all requests for technical assistance at this time. Without a thorough review of the project, it would be impossible to accurately assess the potential effects.

As an alternative, we encourage you to visit the Service's Region 3 Section 7 Technical Assistance website at <http://www.fws.gov/midwest/Endangered/section7/s7process>. There you will find guidance to assist you in fulfilling the requirements for consultation under Section 7 of the Endangered Species Act, including a step-by-step explanation of the section 7 process, species distribution lists, species life history information and conservation measures, and examples of typical letters.

If you have additional questions or require further assistance with your project proposal, please contact me at the following number (614) 469-6923 x12. I would be happy to discuss the project in further detail with you and provide additional assistance if necessary. In addition, you can find more information on natural resources in Ohio by visiting our homepage at: <http://www.fws.gov/midwest/Reynoldsburg>.

Sincerely,

Mary Knapp, Ph.D.  
Field Supervisor



**DEPARTMENT OF THE AIR FORCE**  
**HEADQUARTERS 88TH AIR BASE WING (AFMC)**  
**WRIGHT-PATTERSON AIR FORCE BASE, OHIO**

5 June 2008

88 ABW/CEVO  
1450 Littrell Road, Building 22  
Wright-Patterson AFB OH 45433-5209

Dr. Mary Knapp  
U.S. Fish and Wildlife Service  
6950 Americana Parkway, Suite H  
Reynoldsburg, OH 43068-4127

Dear Dr. Knapp:

The U.S. Air Force is seeking informal consultation with the U.S. Fish and Wildlife Service in compliance with Section 7 of the Endangered Species Act regarding the proposed construction and operation of the Assured Aerospace Fuels Research Facility (AAFRF). Wright-Patterson Air Force Base (WPAFB) has initiated an Environmental Assessment (EA) for this project in accordance with the requirements of the National Environmental Policy Act of 1969. The proposed location for this project is shown on the enclosed maps.

The proposed research facility is a 4,000 square foot building that would be used to house Fischer-Tropsch (F-T) fuel process equipment. The proposed location of the AAFRF is immediately south of Building 20490, adjacent to the Building 20490 tank farm, and immediately east of the liquid nitrogen tank. Building 20490 and the proposed site are bordered by Access Road B, Access Road D, Sixth Street, and C Street in Area B at WPAFB.

The proposed building would be constructed at grade, and would consist of a reinforced concrete building on a concrete foundation. The proposed construction site is currently comprised of asphalt and is used for fuel deliveries to the tank farm and for parking. The surrounding area consists primarily of asphalt parking lots, the former runways of Wright Field, research facilities, and maintained lawns. There are no known natural resources (i.e., woodland, prairie, wetlands, ponds, streams) in the immediate vicinity of this proposed site.

Thank you for your consideration. Please return your comments to me at the above address. If you have any questions, please contact me at (937) 257-0177 or by email at [Raymond.Baker@wpafb.af.mil](mailto:Raymond.Baker@wpafb.af.mil).

Sincerely,

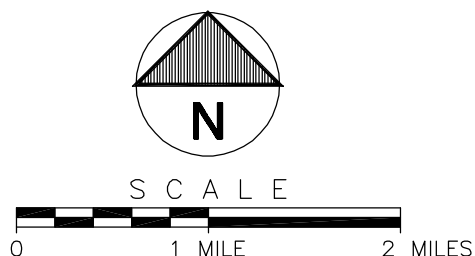
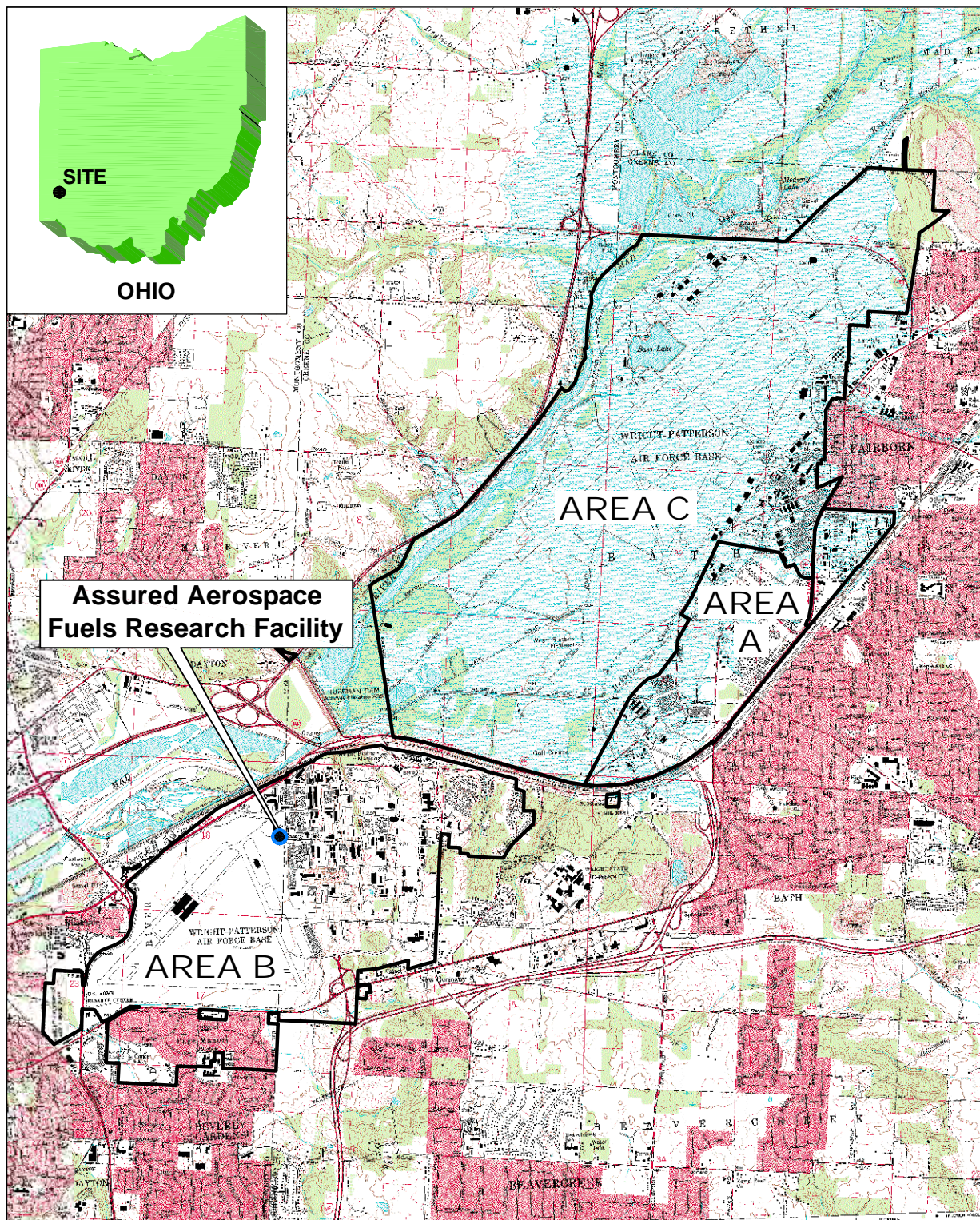
RAYMOND F. BAKER  
Operations Branch  
Environmental Management Division

cc: Cynthia Hassan/Shaw Environmental

Enclosures: USGS Quadrangle Map  
2008 Aerial Photo Map



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/29/08	---	MSN	MG	CH	2008 17-01



**REFERENCE:**

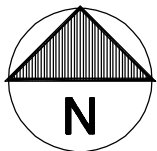
U.S.G.S. 7.5 MIN. TOPOGRAPHIC MAP OF DAYTON NORTH OH., DATED 1965, REVISED 1992; AND FAIRBORN OH DATED 1965, REVISED 1992; SCALE 1"=1 MILE



**FIGURE 1**  
**Location of the Proposed**  
**Assured Aerospace Fuels Research Facility**  
**Wright-Patterson Air Force Base**  
**Dayton, Ohio**



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/29/08	--	MSN	MG	CH	2008 17-02



**FIGURE 2**  
**Proposed Site for the**  
**Assured Aerospace Fuels Research Facility**  
**Wright-Patterson Air Force Base**  
**Dayton, Ohio**

***Appendix D***

***Correspondence with the  
Miami Conservancy District***



**MIAMI  
CONSERVANCY  
DISTRICT**

*BOARD OF DIRECTORS*  
William E. Lukens  
Gayle B. Price, Jr.  
Thomas B. Rentschler  
  
*GENERAL MANAGER*  
Janet M. Bly

June 13, 2008

Mr. Raymond F. Baker  
Operations Branch  
Environmental Management Division  
88 ABW/CEVO  
1450 Littrell Road, Building 22  
Wright Patterson AFB, OH 45433-5209

Dear Mr. Baker:

The 100-year floodplain along the Mad River downstream of Huffman Dam was analyzed as part of the Federal Emergency Management Agency (FEMA) Flood Insurance Study for Montgomery County. The study report and floodplain maps are available on Montgomery County's Web site. The report can be found at:

[http://www.mcoho.org/revize/montgomery/services/building/docs/fis\\_montgomery.pdf](http://www.mcoho.org/revize/montgomery/services/building/docs/fis_montgomery.pdf)

The Flood Insurance Rate Map (FIRM) depicting the floodplain along the Mad River near the proposed AAFRF can be found at:

<http://www.mcoho.org/revize/montgomery/services/building/docs/0186E.pdf>

The Miami Conservancy District does not have any more detailed analysis of this section of the Mad River. The proposed project would not affect the flood protection works of The Miami Conservancy District. Please contact me if you have additional questions.

Sincerely,

Kurt A. Rinehart  
Chief Engineer

KAR:vlt



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 88TH AIR BASE WING (AFMC)  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

5 June 2008

88 ABW/CEVO  
1450 Littrell Road, Building 22  
Wright-Patterson AFB OH 45433-5209

Kurt Rinehart  
Miami Conservancy District  
38 E. Monument Avenue  
Dayton, OH 45402

Dear Mr. Rinehart

Wright-Patterson AFB (WPAFB) is preparing an Environmental Assessment to evaluate the environmental impacts of the proposed construction and operation of the Assured Aerospace Fuels Research Facility (AAFRF). The purpose of this letter is to notify you of this proposed project and request your evaluation of potential impacts of this project on the Miami Conservancy District.

The AAFRF would consist of a 4,000 square foot building that would be used to house Fischer-Tropsch fuel process equipment. The proposed location of the AAFRF is immediately south of Building 20490 and adjacent to the Building 20490 tank farm in Area B at WPAFB. Building 20490 and the proposed project site are bordered by Access Road B, Access Road D, Sixth Street, and C Street. The surrounding area consists primarily of asphalt parking lots, the former runways of Wright Field, research facilities, and maintained lawns. The enclosed maps show the location of this proposed facility.

The proposed construction site is located down gradient of the Huffman Dam flood control basin and approximately 2,000 feet from the Mad River. The ground surface elevation at the site is approximately 797.5 ft above mean sea level (MSL). According to the U.S. Geological Survey, Fairborn, Ohio quadrangle map (USGS, 1992), the proposed site is not within the Mad River 100-year floodplain. It has been determined through the U.S. Corp of Engineers HEC-1 modeling program, however, that the 100-year floodplain elevation within the Huffman Dam retarding basin is 814.3 ft, MSL. Please advise me as to whether a similar study for the 100-year floodplain for the Mad River has been completed for the watershed down gradient of Huffman Dam, including Area B of WPAFB.

Thank you for your consideration. Please return your comments to me at the above address. If you have any questions, please contact me at (937) 257-0177 or by email at [Raymond.Baker@wpafb.af.mil](mailto:Raymond.Baker@wpafb.af.mil).

Sincerely

RAYMOND F. BAKER  
Operations Branch  
Environmental Management Division

cc: Cynthia Hassan/Shaw Environmental

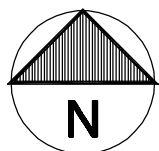
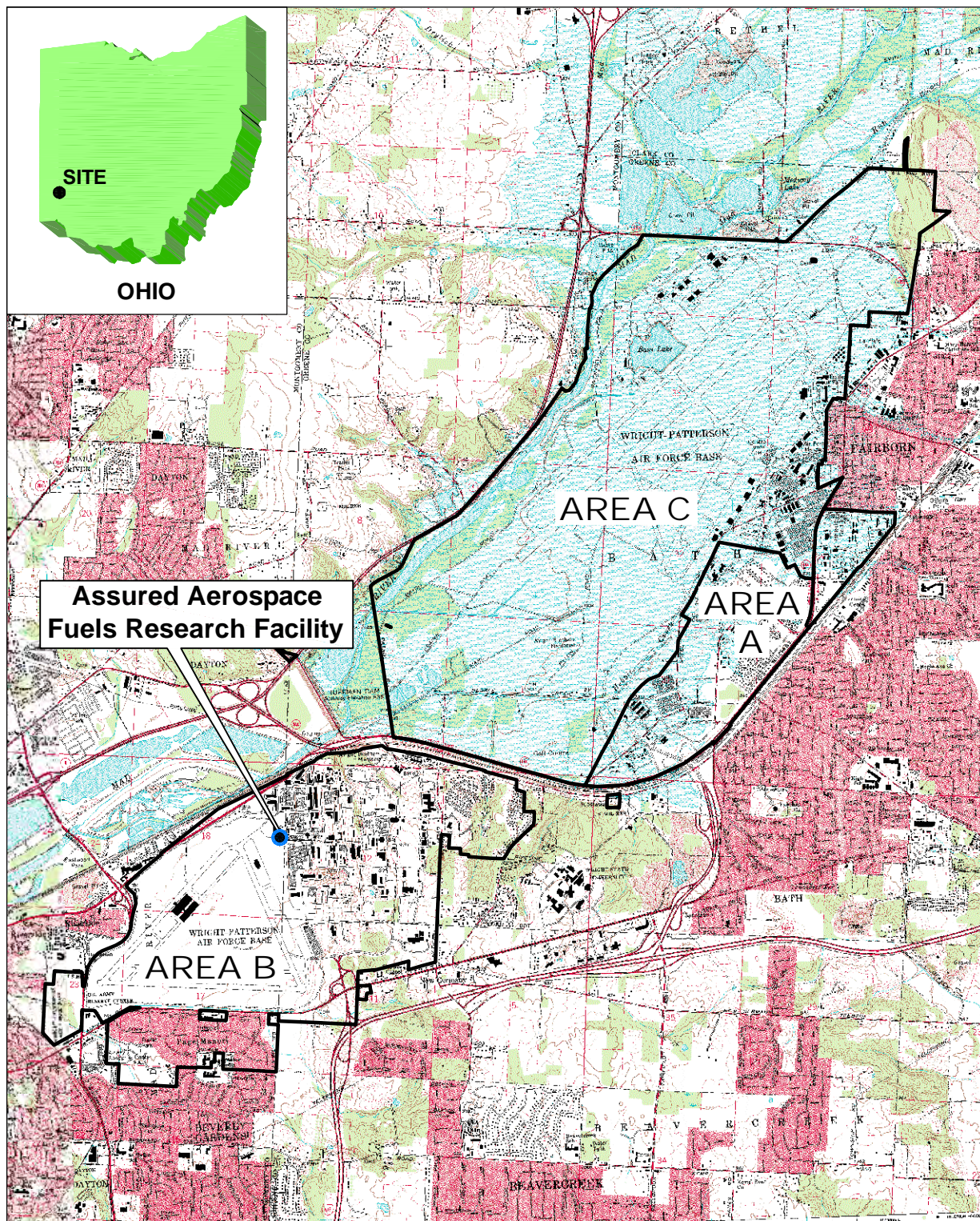
Enclosures: USGS Quadrangle Map  
2008 Aerial Photo Map



Printed on Recycled Paper



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	5/29/08	---	MSN	MG	CH	2008 17-01



**REFERENCE:**

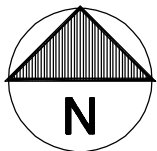
U.S.G.S. 7.5 MIN. TOPOGRAPHIC MAP OF DAYTON NORTH OH., DATED 1965, REVISED 1992; AND FAIRBORN OH DATED 1965, REVISED 1992; SCALE 1"=1 MILE



**FIGURE 1**  
**Location of the Proposed**  
**Assured Aerospace Fuels Research Facility**  
**Wright-Patterson Air Force Base**  
**Dayton, Ohio**



OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
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**FIGURE 2**  
**Proposed Site for the**  
**Assured Aerospace Fuels Research Facility**  
**Wright-Patterson Air Force Base**  
**Dayton, Ohio**

***Appendix E***

***Correspondence with the  
Ohio Historic Preservation Office***





September 3, 2008

Raymond F. Baker  
Cultural Resources Program Manager  
Operations Branch  
Environmental Management Division  
88 ABE/CEVO  
1450 Littrell Road  
Wright-Patterson Air Force Base, Ohio 45433-5209

Dear Mr. Baker:

Re: Construction of Assured Aerospace Fuels Research Facility  
Area B, Wright-Patterson Air Force Base, Ohio

This is in response to correspondence, received on July 3, 2008, regarding the above referenced project. My comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and the associated regulations at 36 CFR Part 800.

Wright-Patterson Air Force Base proposes to construct a building to house the Assured Aerospace Fuels Research Facility (AAFRF) immediately south of Facility 20490 in Area B of the base. Project activities will include site preparation and construction of a 40' x 100' building, parking areas, site utilities, and a fenced area on the east side of the new building housing a coal storage area, gasifier, compressed natural gas (CNG) compressor, and a CNG tube trailer.

The project location is within the boundaries of the Wright Field Historic District, which has been determined to be eligible for listing in the National Register of Historic Places. The project area has a very low potential for yielding significant archaeological resources due to severe ground disturbance associated with previous construction activities, including the construction of Facility 20490 and the surrounding parking lots where the proposed facility will be built.

While the project area is within the Wright Field Historic District, the area immediately adjacent to the site selected for the AAFRF contains no properties that contribute to the district. Facility 20490 is a non-contributing resource surrounded entirely by parking lots and undeveloped land. In many ways the proposed AAFRF facility will resemble the existing Facility 20490; however, it will have a considerably smaller footprint. The new facility will be a 30' tall pre-cast concrete building constructed at grade on a concrete foundation. The massing of the new building will be in keeping with other buildings in the area, including numerous structures that are contributing resources within the historic district.

OHIO HISTORICAL SOCIETY

*Ohio Historic Preservation Office*

567 East Hudson Street, Columbus, Ohio 43211-1030 ph: 614.298.2000 fx: 614.298.2037

[www.ohiohistory.org](http://www.ohiohistory.org)

Raymond F. Baker  
September 3, 2008

Page Two

Based on the information submitted – including mapping, photographs, an elevation drawing, and a concept drawing – I concur with your finding that the proposed project will have no adverse effect on historic properties. No further coordination with this office is necessary unless there is a change in the project.

If you have any questions, please contact me by phone at (614) 298-2000 or by email at [jcook@ohiohistory.org](mailto:jcook@ohiohistory.org). Thank you for your cooperation.

Sincerely,

A handwritten signature in black ink that reads "Justin M. Cook". The signature is written in a cursive style with a large, sweeping initial "J".

Justin M. Cook, History Reviews Manager  
Resource Protection and Review

OHPO Serial # 1020440



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 88TH AIR BASE WING (AFMC)  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

1 July 2008

88 ABW/CEVO  
1450 Littrell Road  
Wright-Patterson AFB OH 45433-5209

Mr. Mark Epstein  
Department Head, Resource Protection & Review  
Ohio Historic Preservation Office  
567 East Hudson Street  
Columbus OH 43211-1030

Dear Mr. Epstein

Wright-Patterson Air Force Base (WPAFB) is proposing to construct a new fuels research building to house alternative fuel process equipment within the Wright Field Historic District, which is eligible for listing in the National Register of Historic Places (NRHP), and is currently being considered for nomination as a National Historic Landmark by the National Park Service. We have determined that no historic properties will be adversely affected by this undertaking. In accordance with 36 CFR 800.11, we are submitting the following documentation.

Description of the undertaking. The proposed Assured Aerospace Fuels Research Facility (AAFRF) is an approximately 4,000 square foot (40' x 100') building that would be used to support the Air Force Research Laboratory, Turbine Engine Division, research into new alternative aviation fuels. Construction for the proposed undertaking includes site preparation, construction of the building, parking areas and site utilities. Also being proposed, as part of the construction, is a fenced in area on the east side of the building enclosing a coal storage area, gasifier, compressed natural gas (CNG) compressor and CNG tube trailer. The proposed location of the building is immediately south of Facility 20490, adjacent to the Facility 20490 tank farm. Facility 20490 and the proposed site are bordered by Access Road B, Access Road D, Sixth Street, and C Street in Area B at WPAFB.

The proposed building would be constructed at grade, and would consist of an approximately 30' tall pre-cast concrete building on a concrete foundation. The proposed construction site is currently comprised of asphalt and is used for fuel deliveries to the tank farm and for parking. The surrounding area consists primarily of asphalt parking lots, the former runways of Wright Field, research facilities, and maintained lawns. Attachment 1 contains the site plan showing the area of potential effect (APE), along with concept and engineering drawings of the new facility. Attachment 2 contains photos of the proposed area.

Description of steps taken to identify historic properties. WPAFB has assessed all buildings on the installation that are 50 years old or older, and has assessed buildings for exceptional significance relating to the Cold War. Your office has reviewed the information we have collected, and our two offices have reached a consensus determination of eligibility for listing on the NRHP for facilities at WPAFB. We have also undertaken archaeological surveys for prehistoric and historic-era archaeological sites, and have provided reports of those surveys to your office for review. In 1990 extensive historical map research

was conducted by the U.S. Army Construction Engineering Research Laboratory as part of their base-wide inventory to identify potential historic archaeological sites in the preparation of the base's Historic Resources Management Plan. No potential sites were located in or near the APE. The proposed construction site does not contain and is not adjacent to any identified archaeological sites. The proposed area is considered previously disturbed due to the construction of Facility 20490 and the surrounding parking lots and roadways. Therefore, the potential for the discovery of archaeological resources during construction is low. The only historic buildings and structures in the vicinity of this project are the NRHP eligible buildings on the east side of C Street and the triangular runway southwest of the proposed site (see Attachment 1).

Basis for determining no historic properties adversely affected. Based upon our past archaeological surveys and historic building evaluations we have determined that no historic properties are present in the area of potential effect. The proposed undertaking is within the Wright Field Historic District. However, since the new building will be designed to match the architectural style of Facility 20490 and constructed with similar exterior concrete materials as the surrounding buildings, there will be no direct or indirect effects to the Historic District. Therefore, this undertaking will not adversely affect historic properties at WPAFB.

Please review the documentation we have provided and let us know whether you concur with our assessment. Should you have any questions, I can be reached at (937) 257-0177, or via email at [raymond.baker@wpafb.af.mil](mailto:raymond.baker@wpafb.af.mil).

Sincerely



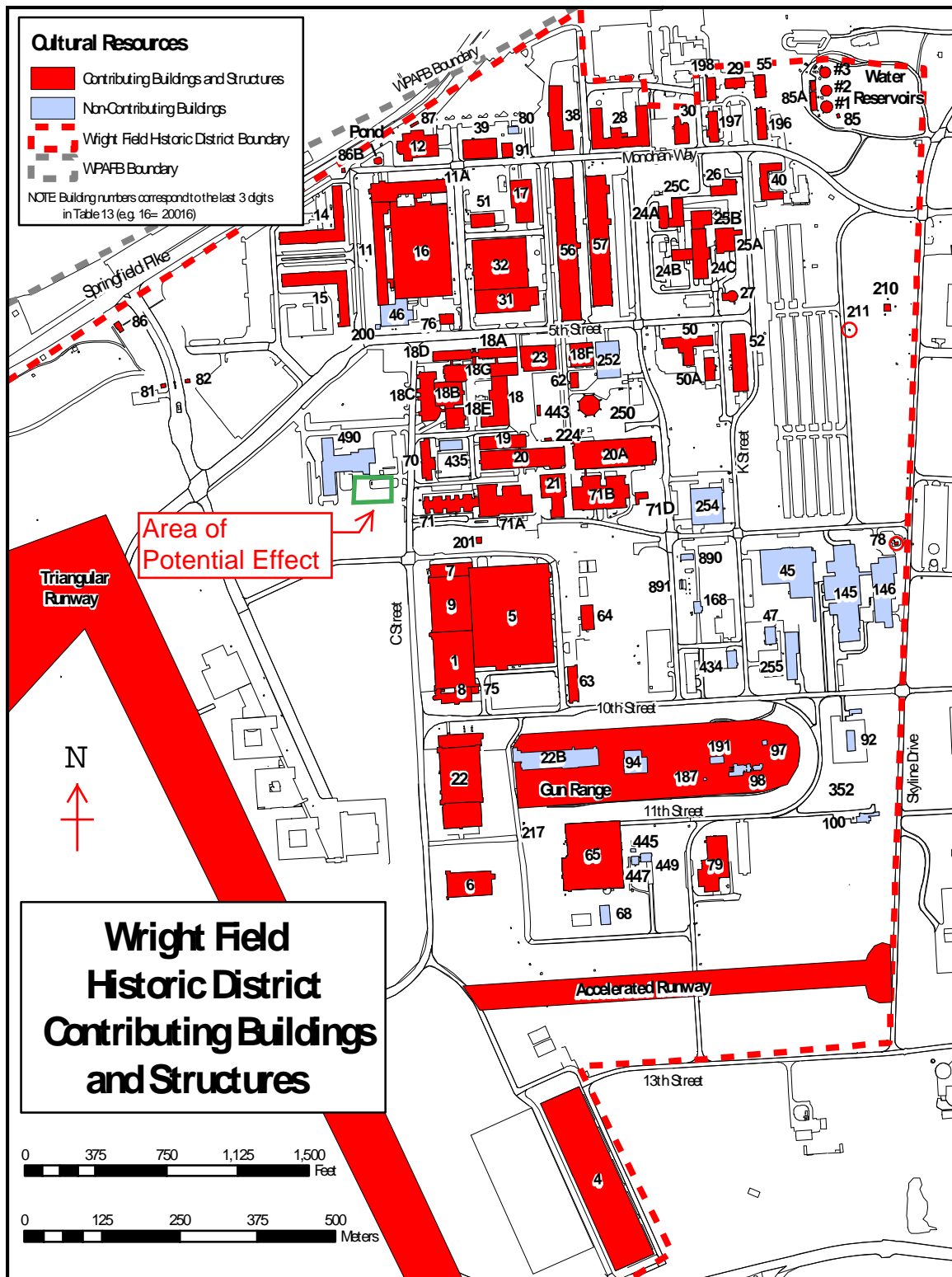
RAYMOND F. BAKER  
Cultural Resources Program Manager  
Operations Branch  
Environmental Management Division

Attachments

1. Site Plans
2. Photos & Concept Drawings

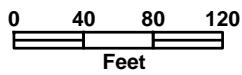
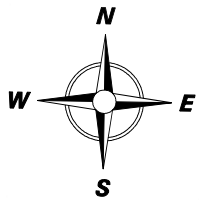


FINAL INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN  
WRIGHT-PATTERSON AIR FORCE BASE



Site Plan: Area of Potential Effect





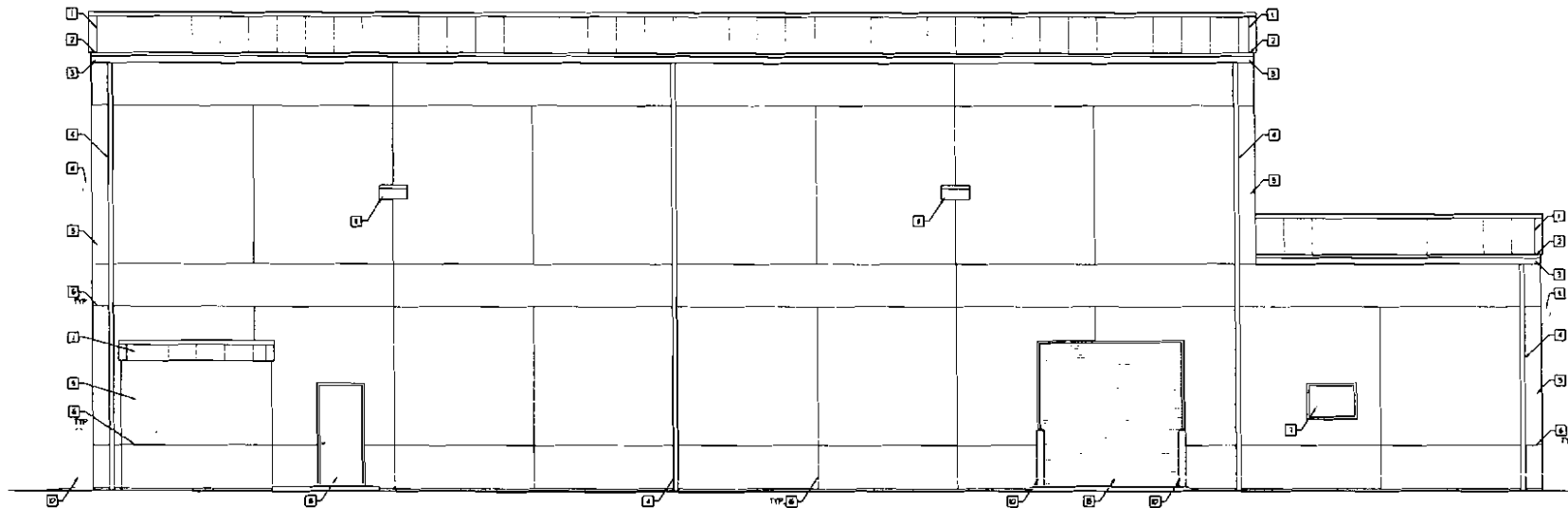
 Area of Potential Effect

Overhead View of APE

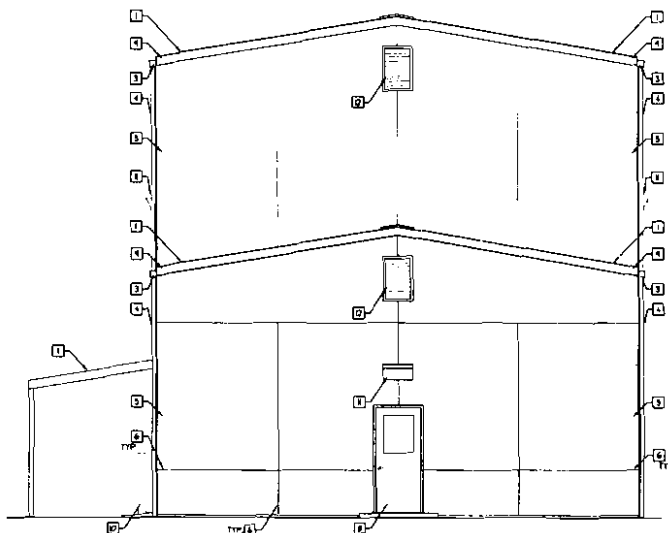




AAFRF Concept Drawing



2 EXTERIOR ELEVATION - SOUTH  
1/4" = 1'-0"



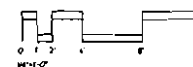
1 EXTERIOR ELEVATION - EAST  
1/4" = 1'-0"

#### CONSTRUCTION NOTES

- 1 METAL STANDING ROOF - SP-1
- 2 METAL PANELS - PE-1
- 3 METAL BUTTER - PE-1
- 4 METAL DOWNSPUT WITH BOOT - PE-1
- 5 EXTERIOR INSULATION AND FINISH SYSTEM - EPS-1
- 6 3/4" X 1/2" GROOVE
- 7 STEEL HINGED - PAINT PE-1
- 8 METAL DOOR AND FRAME - PAINT PE-1
- 9 METAL EDGE FINISH - PE-1
- 10 6" CONCRETE FILLED METAL BOLLARD - PAINT PE-1
- 11 EXTERIOR WALL FINISH (SEE ELECTRICAL DRAWINGS)
- 12 MAIN HALL VENTILATION (SEE ELECTRICAL DRAWINGS) - PAINT PE-1
- 13 OVERHEAD COILING DOOR - PE-1
- 14 EACH END - AL-1

#### GENERAL NOTES

- A. FROM FLOOR ELEVATION SHOW ON ARCHITECTURAL DRAWINGS AS 1/4" OF 1/8" SCALE TO THE ACTUAL FLOOR ELEVATION SHOW ON THE GYM DRAWINGS
- B. SEE STRUCTURAL DRAWINGS FOR FOUNDATION INFORMATION
- C. SEE PLUMBING, MECHANICAL, AND ELECTRICAL DRAWINGS FOR LOCATIONS OF ADDITIONAL WALL PENETRATIONS INCLUDING WALL HYDRANTS, ELECTRICAL RECEPTACLES OVERLAP W/DOORS, ETC.



COORDINATOR		DESIGN CHIEF		ENGINEERING CHIEF	
DATE	NO.	DATE	NO.	DATE	NO.
<b>WPAFB</b> WRIGHT-PATTERSON AIR FORCE BASE <b>CIVIL ENGINEER</b>				USAF  CIVIL ENGINEER	
PROJECT No. ZHIV-031004-19 INSTALL ASSURED AEROSPACE FUELS RESEARCH FACILITY(AARF) EXTERIOR ELEVATIONS - OPTION A				A7010 X of XX	
DESIGNED: TOM		DRAWN: MAP		CHECKED: TOM	
				DATE: 12/18/17	

FINAL INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN  
WRIGHT-PATTERSON AIR FORCE BASE

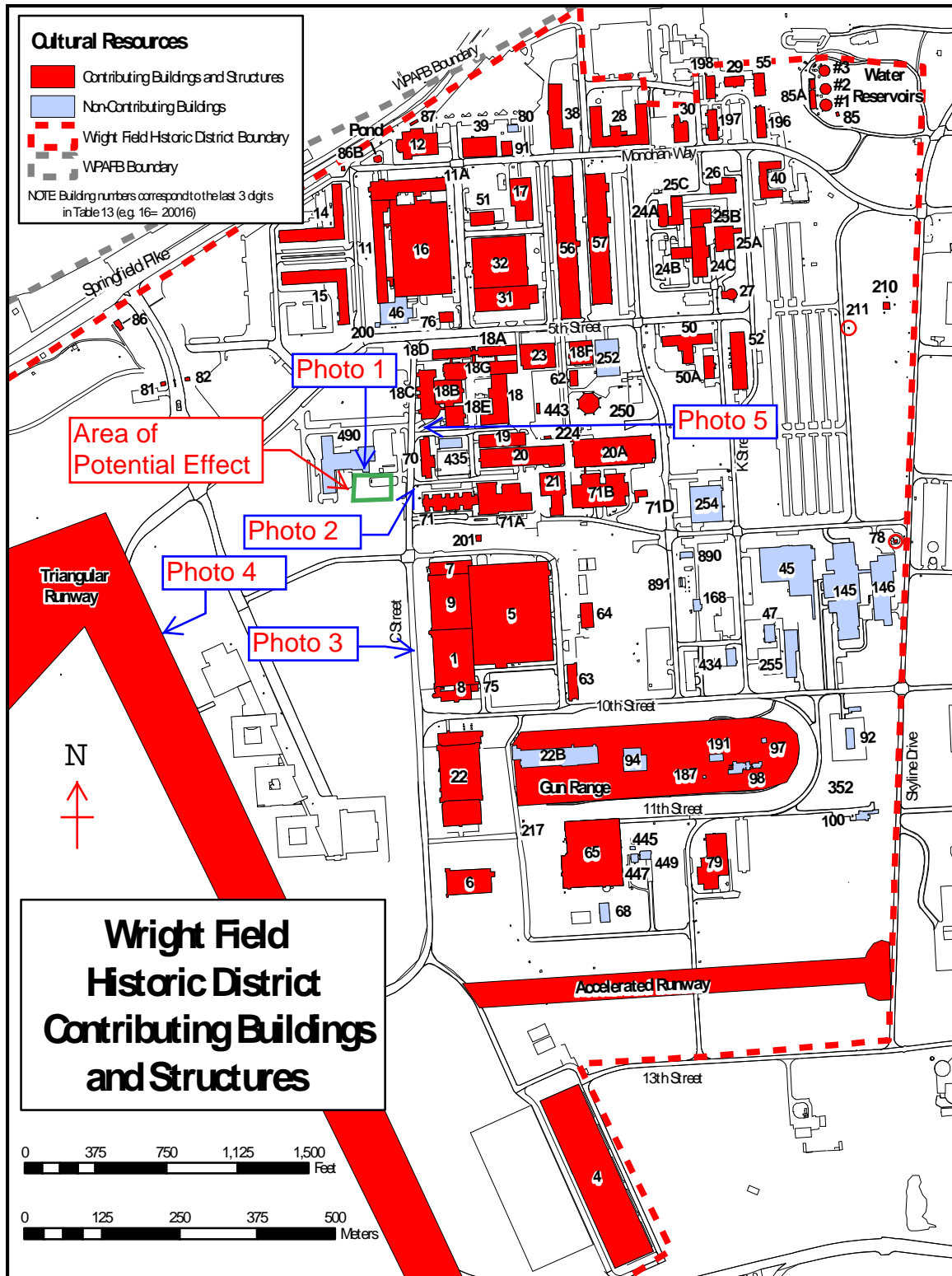






Photo 1: Proposed AAFRF location, looking north towards Facility 20490





Photo 2: Proposed AAFRF location, looking east towards NRHP eligible facilities





Photo 3: Proposed AAFRF location, looking SSE towards NRHP eligible facilities





Photo 4: Proposed AAFRF location, looking SSW towards triangular runway



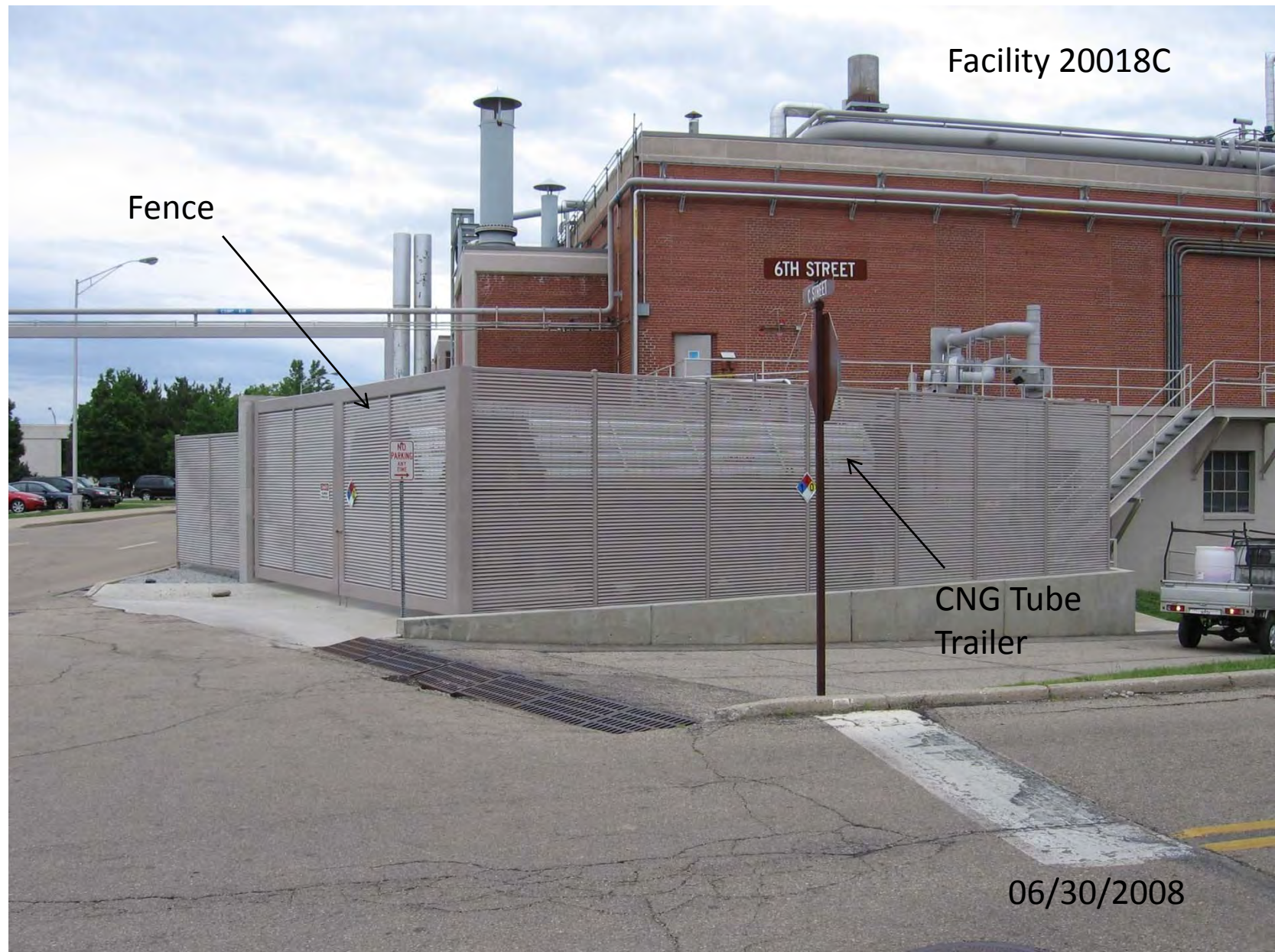


Photo 5: Example of fence and CNG tube trailer to be installed on east side of AAFRF



## ***Appendix F***

### ***Emissions Estimates for the Construction and Operation of an Assured Aerospace Fuels Research Facility***

### AAFRF Potential Emissions†1

365 days/year with no FT tailgas recycling

Emissions	CO				VOC			
	lbs/hour	lbs/day†3	lb/gallon†5	tons/year	lbs/hour	lbs/day	lb/gallon†5	tons/year
<b>Steam-Methane Reformer</b>								
Syngas†2	25.20	50.40	5.04	9.20	0.00	0.00	0.00	0.00
<b>Fischer Tropsch (FT) Reactor</b>								
FT Tailgas†4	12.60	277.00	27.70	50.60	1.20	28.80	1.90	5.26
Naphtha	0.00	0.00	0.00	0.00	2.20	52.80	3.52	9.64
<b>Upgrader</b>								
Upgrader Tailgas	0.03	0.60	0.06	0.11	0.05	1.20	0.08	0.22
<b>Total</b>	<b>37.83</b>	<b>328.00</b>	<b>32.80</b>	<b>59.91</b>	<b>3.45</b>	<b>82.80</b>	<b>5.50</b>	<b>15.12</b>

†1 Note: Emissions: To calculate the emissions, Aspen Technologies patented software was used by the Idaho National Laboratories (INL) to develop the process model for this specific project and licensed to Battelle for its use. Aspen Technologies programs are process modeling tools for conceptual design, optimization, and performance monitoring for the chemical, polymer, specialty chemical, metals and minerals, and coal power industries.

†2 Note: CO emissions from steam-methane reformer only occur during a two hour warm up period

†3 Note: The steam-methane reformer must be warmed up for the FT reactor to operate. Therefore, the worst case day for CO emissions is 2 hours of operation for the steam-methane reformer and 22 hours for the FT reactor.

†4 Note: Process is designed to recycle FT Tailgas reducing actual emissions to zero most of the time.

†5 Note: Emission Factor reflects worst case for emissions, based on 10 gallons/day capacity for Steam-Methane reformer and FT reactor, 15 gallons/day capacity upgrader.

### Construction of Assured Aerospace Fuels Research Facility Construction Emissions Estimate

#### Construction Emissions

Area Description	Area		Project Duration	Emission Factor	Control Efficiency	Estimated Emissions
	A		T	EM <sub>FAC</sub>	CE	E <sub>TON</sub>
	A = L * W		†2	†3	†4	E <sub>TON</sub> = A * T * EM <sub>FAC</sub>
	(ft. <sup>2</sup> )†1	(acre)	(months)	(ton/acre/month)	(%)	(ton)
Overall Construction Area	4,600.0	0.1	3	1.2	80%	0.08

Normal Base-wide Emissions	Variable Description
E <sub>NORM</sub>	Symbol
†5	Footnote
(ton/yr.)	Units
16.18	Values

#### Conclusions:

Based upon previous estimates of basewide particulate emissions as referenced and the conservative emissions estimates, the proposed project is expected to have only short-term negligible impacts on air quality.

#### LEGEND

†1 Note: Based on the total construction area of 4,600 square feet, for a 3 month period.

†2 Note: Conservative estimate for excavation work = 3 months.

†3 Note: Emission factor Section 13.2.3 "Heavy Construction Operations" (dated 1/95), of AP-42, "Compilation of Air Pollutant Emission Factors", 5th Edition, U.S. EPA, Research Triangle Park, NC, 1998.

†4 Note: Table 2.1.1-3 - "Summary of Techniques, Efficiencies, and Costs for Controlling Fugitive Dust from Paved and Unpaved Surfaces," Fugitive Dust Control Technology, Orlemann (1993).

Control efficiency for watering of paved surfaces.

†5 Note: Particulate emissions from WPAFB Fee Emission Report for 2006.