

INSTALLATION AND OPERATION OF A COMBINED HEAT AND POWER COGENERATION FACILITY

US ARMY GARRISON ADELPHI LABORATORY CENTER

DRAFT ENVIRONMENTAL ASSESSMENT

December 2009



Cover Sheet

DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR THE INSTALLATION AND OPERATION OF A COMBINED HEAT AND POWER (CHP) COGENERATION FACILITY AT US ARMY GARRISON (USAG) ADELPHI LABORATORY CENTER (ALC)

- a. ***Responsible Agency:*** United States Army (Army)
- b. ***Cooperating Agency:*** None
- c. ***Proposals and Actions:*** This EA analyzes the potential environmental consequences of a proposal to install and operate a CHP cogeneration facility at USAG ALC to eliminate electric utility vulnerabilities that could severely impact the ability of the installation to carry out its mission. The Proposed Action is to site two 1,100 KW natural gas-fueled stationary generators to produce electric power for the installation. The generators will be equipped with waste heat recovery systems so that the rejected heat from the generators can be used to off-load the burden of existing high temperature hot water boilers. The generators will synchronize with the connected utility's distribution network, but will only be used for internal power and will be equipped with reverse power relays to prevent back-feed. A No-Action Alternative was also analyzed.
- d. ***For Additional Information:*** Contact Conservation Specialist, Environmental Division, Directorate of Public Works, US Army Garrison Adelphi Laboratory Center, 2800 Powder Mill Rd., Adelphi, MD 20783-1197 or 301-394-3595.
- e. ***Designation:*** Draft Environmental Assessment
- f. ***Abstract:*** This EA has been prepared in accordance with the National Environmental Policy Act (NEPA). Through a combined scoping and comment period, potential effects to environmental resources will be identified and communication with federal, state and local agencies will be coordinated. Specific environmental resources with the potential for environmental consequences include: Land Use and Facility Operations, Noise, Safety, Socioeconomics and Environmental Justice, Cultural Resources, Natural Resources, Physical Resources, and Air Quality.

The Proposed Action will not require a change in the existing or future land use of the affected location (Building 106). No impacts to the overall transportation system are expected to occur as a result of the Proposed Action. Air emissions will increase which will require the installation to obtain a Part 70 (Title V) air permit from the Maryland Department of the Environment (MDE). However, the increase is not considered significant since the potential emission levels are not sufficient to require a conformity determination. The Proposed Action will not have a disproportionate impact on minority or low-income populations. No known cultural resources are projected to be impacted by construction. Construction will occur on ALC inside of an existing building. Best Management Practices (BMPs) will be used to ensure no impacts to natural and physical Resources. There are no significant cumulative impacts from the Proposed Action when considered with past, present, and reasonably foreseeable future projects.

**COMBINED HEAT AND POWER
COGENERATION FACILITY**

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LABORATORY CENTER**

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1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION AND ALTERNATIVES

The United States Army Garrison (USAG) Adelphi Laboratory Center (ALC) is proposing to install and operate a Combined Heat and Power (CHP) cogeneration facility composed of two 1,100 kilowatt (kW) natural gas- fueled, stationary generators to produce electric power for the installation. The generators will be equipped with waste heat recovery systems so that the rejected heat from the generators can be used to off- load the burden of existing high temperature hot water boilers. The generators will synchronize with the connected utility's distribution network, but will only be used for internal power and will be equipped with reverse power relays to prevent back-feed. A No-Action Alternative was also analyzed. The following sections summarize the purpose and need for the CHP cogeneration facility.

1.1 Purpose and Need for the Proposed Action

The mission of the USAG ALC is to support innovative science and technology by providing service and infrastructure while optimizing resources, sustaining the environment, and enhancing the wellbeing of the Army's workforce and community. The U.S. Army Research Laboratory (ARL), a tenant at the ALC, provides America's Soldiers a technological edge through scientific research, technology development, and analysis. The ARL also provides critical analysis on existing developmental weapon systems, with emphasis on factors such as survivability, lethality, man-machine interface, and battlefield environmental effects. The ARL is unique in the United States in that it serves as one of a few Army Laboratories that provides highly advanced, specialized and one-of-a-kind research facilities. The laboratory works in a variety of technical disciplines, through direct in-house laboratory efforts and joint programs with government, industry, and academia.

To meet the mission and ongoing requirements of the ALC and ARL, it is critical that uninterrupted electrical power is available. The U. S. Army Corps of Engineers Engineer Research and Development Center, Construction Engineering Research Laboratory (ERDC-CERL) conducted an energy security vulnerability assessment (ESVA) of ALC's energy distribution systems to obtain a quantitative, objective assessment of the risks to and vulnerabilities of their energy systems. The results of that ESVA are documented in the ALC Energy Security Plan of September 2004. ERDC-CERL made the determination that Building 106, the heating and cooling plant, is critical to the successful completion of the installation's critical missions. One significant shortcoming in the existing energy supply system is the lack of a backup chilled water supply to the computer network servers on the installation. The central plant in Building 106 has a small backup generator, but it is not adequate to power the chillers or the chilled water pumps to support cooling the servers. There is currently adequate backup generator power to operate the servers, but the servers will fail within 30 minutes without cooling. The Proposed Action will provide sufficient backup power to prevent the failure of these mission-critical servers. The Proposed Action will also reduce the cost of purchased electric power and will allow the utilization of the associated waste heat as a service utility throughout the facility. The recovered thermal energy will reduce the demand on the existing boilers. This will provide increased efficiency in energy use, thereby helping the installation to achieve the goals for reduction in energy intensity mandated in Executive Order 13423. The average efficiency of fossil-fueled power plants in the United States is about 33%. The other 67% is lost to the inefficiencies and is rejected as heat. The proposed CHP cogeneration facility captures a significant portion of the waste heat and therefore can achieve total system efficiencies of 50-80%. Because the CHP facility is more efficient, less fuel is required to produce a given energy output than with separate heat and power. Higher efficiency translates into reduced global emissions of all pollutants. Furthermore, the Proposed Action will also give the installation as a whole the ability to be self-sustaining in continuing its mission and ongoing operations in the event of failures in the public utility generation or distribution systems.

1.2 Introduction

The ALC is located approximately 10 miles north of the center of Washington, D.C., and approximately 26 miles southwest of Baltimore, Maryland. The ALC is within one mile of both Interstate 495 (I-495), also known as the Capital Beltway, and Interstate 95 (I-95). The installation is located adjacent to the

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majority of the facilities residing in Montgomery County. The proposed CHP Cogeneration Facility will be located in Building 106 in the southwest area of the installation (Figure 2).

The Proposed Action and Alternatives are addressed in accordance with the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321-4347), Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] § 1500-1508) and Title 32 CFR Part 989, et seq., also published as Army Instruction 32-651, Environmental Analysis of Army Actions. Potential consequences to both the human and natural environment are considered.

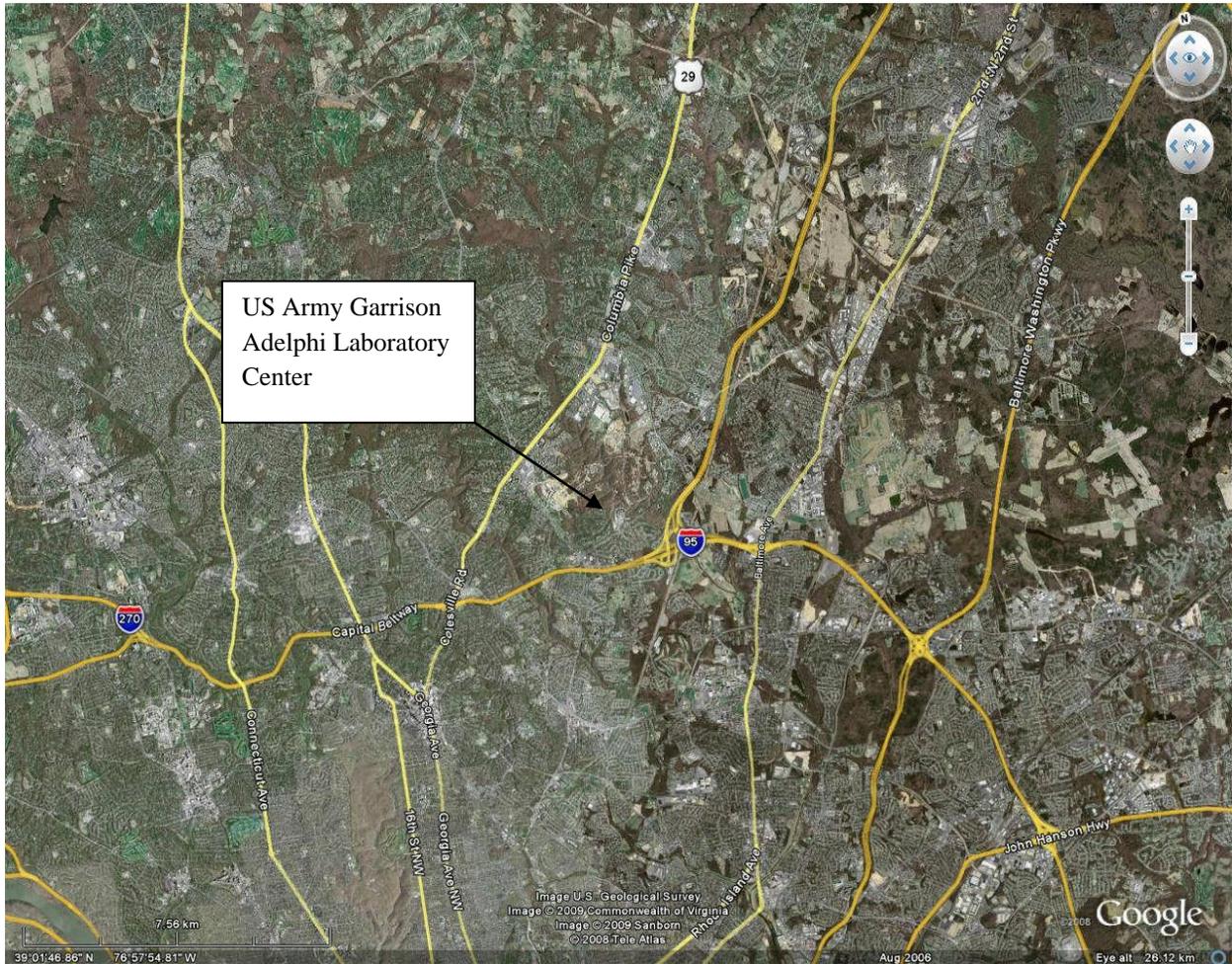


Figure 1. USAG ALC and Vicinity



Figure 2. USAG ALC

1.3 Organization of this EA

This EA includes seven chapters. Chapter 1.0 introduces the purpose and need for the CHP cogeneration facility. Chapter 2.0 characterizes the Proposed Action and Alternatives. The project's scope, region of influence (ROI), and regulatory framework are detailed. Chapter 3.0 describes the current baseline conditions of the affected environment and assesses the potential environmental consequences to the affected environment from the Proposed Action and Alternatives, including a No-Action Alternative. Chapter 4.0 explains cumulative effects and irreversible and irretrievable commitment of resources. Chapter 5.0 includes references and document contacts made during the environmental impact analysis process (EIAP). Resources under consideration for this EA include Land Use and Facility Operations, Noise, Safety, Socioeconomics and Environmental Justice, Cultural Resources, Natural Resources, Physical Resources, and Air Quality.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

The USAG ALC proposes to install and operate a Combined Heat and Power (CHP) cogeneration facility composed of two 1,100 KW natural gas-fueled, stationary generators to produce electric power for the installation to support the ongoing mission needs of the ALC. The No-Action Alternative is also discussed in this chapter. No other alternatives were considered.

2.2 Proposed Action

The Proposed Action is to install and operate a Combined Heat and Power (CHP) cogeneration facility composed of two 1,100 KW natural gas-fueled, stationary generators in Building 106. The generators will be equipped with waste heat recovery systems so that the rejected heat from the generators can be used to off-load the burden of existing high temperature hot water boilers. The generators will synchronize with the connected utility's distribution network, but will only be used for internal power and will be equipped with reverse power relays to prevent back-feed.

2.3 No-Action Alternative

The No-Action Alternative represents what would occur if the ALC were not to carry out the Proposed Action. The No-Action Alternative would result in the continuance of a major vulnerability to operations critical to the mission of the ALC. The No-Action Alternative would also prevent the ALC from being self-sustaining in the event of a natural, accidental, criminal or terrorist act to the public utility generation or distribution systems. Furthermore, the No-Action Alternative would inhibit the ability of the ALC to meet the goals of Executive Order 13423 for reduction in energy intensity.

Analysis of the No-Action Alternative is used as a benchmark, allowing for a comparison of the magnitude of potential environmental effects of the Proposed Action. Section 1502.14(d) of NEPA requires analysis of the No-Action Alternative in an EA.

2.4 Environmental Impact Analysis Process

The environmental impact analysis process reviews all information pertinent to the Proposed Action and Alternatives and provides a full and fair discussion of potential consequences to the human and natural environment resulting from these actions. The environmental impact analysis process includes involvement with public agencies to identify issues for analysis.

The following resources are analyzed in this EA: Land Use and Facility Operations, Noise, Safety, Socioeconomics and Environmental Justice, Cultural Resources, Natural Resources, Physical Resources, and Air Quality. A comparison of the potential environmental consequences is presented at the end of this chapter.

2.4.1 Public and Agency Coordination

A combined scoping and comment period gives the public and federal, state, and local agencies the opportunity to evaluate and comment on the potential environmental impacts of the proposed action. To facilitate public involvement, the ALC published a newspaper advertisement notifying the public of the preparation and availability of the Draft EA for review and comment. This advertisement was published in *The Washington Post* newspaper. The announcement solicited input and involvement from the public and agencies.

Agency consultation with the Maryland Historical Trust is needed to ensure compliance with the National Historic Preservation Act (NHPA). Compliance with the Endangered Species Act (ESA) requires communication with the U.S. Fish and Wildlife Service (USFWS) in cases where a federal action could affect listed threatened or endangered species, species proposed for listing, or candidates for listing. If any of these species is present, a determination is made of any potential adverse effects on the species. Should no species protected by the ESA be affected by the Proposed Action, no additional action is required. Letters were sent to the appropriate Maryland Historical Trust and USFWS offices informing them of the Proposed Action.

2.5 Regulatory Compliance

This EA has been prepared in accordance with NEPA (42 USC 4321-4347), Council on Environmental Quality (CEQ) Regulations (40 CFR § 1500-1508), and 32 CFR 651, et seq., Environmental Analysis of Army Actions (AR-200-2). The intent of NEPA is to protect, restore, and enhance the environment through well-informed federal decisions. If the analysis presented in this EA indicates that the implementation of the Proposed Action would not have a significant environmental impact, then a Finding of No Significant Impact (FONSI) can be issued.

The analysis of environmental resources has considered applicable federal, state, and local regulations. Certain areas of federal legislation have been given particular consideration and are described in each respective Chapter 3.0 section.

2.5.1 Permit Requirements

The Proposed Action will require a Permit to Construct from MDE. Because of the increase in potential to emit certain air emissions, the Proposed Action will also require a Title V Part 70 air permit from MDE. USAG ALC Combined Heat and Power Cogeneration Facility Draft Environmental Assessment

Best Management Practices (BMPs) related to construction will be followed. The Maryland Department of the Environment (MDE) Stormwater General National Pollution Discharge Elimination System Permit (NPDES) for the Clean Water Act (CWA) will be followed during construction.

2.6 Environmental Comparison of the Proposed Action and No-Action Alternative

Table 2-1 summarizes the potential environmental consequences of the Proposed Action and No-Action Alternative based on the impact analyses presented in Chapter 3.0.

Table 2-1. Summary of Potential Environmental Consequences (Page 1 of 2)
Resources Summary of Consequences
Proposed Action, No-Action

Resources	Summary of Changes	
	Proposed Action	No Action
Land Use and Facility Operations	No impact to land use is expected. Facility operations would be modified to a combined heat and power (CHP) facility and would result in premises-wide actual increased emissions of Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOC). Recovered thermal energy would reduce the load on the existing dual-fuel boilers and there would be a reduction of purchased electric power costs.	Same as the Proposed Action.
Noise	<p>Construction activities will slightly increase noise on a short term basis. All construction activities will occur within Building 106 and will be completed by June 2010.</p> <p>As a result of plant operations, projected internal plant noise for engine exhaust is expected to be 81 A-Weighted Decibal (dBA) with the incorporation of a sound attenuation device. At the property line engine exhaust noise is expected to be 51 dBA. The projected level of 51 dBA is below the maximum nighttime threshold of 55 dBA for residential areas.</p> <p>Projected ambient engine noise levels are expected to exceed the maximum nighttime threshold of 55 dBA. This will be mitigated with sound attenuation devices incorporated at the source or louver.</p>	No change from existing conditions.
Safety	Ground activities may expose workers performing the required site preparations and construction of the facility to some risk. Increased noise within Building 106 would occur and would require employee safety and sound mitigation measures. See <i>above Noise</i> summary.	No change from existing conditions.
Socioeconomics and Environmental Justice	No permanent or long lasting socioeconomic impacts. Construction activities may generate jobs during the short construction period. During facility operations, Ameresco personnel would be utilized for maintenance of equipment on a call as needed basis, approximately two to three man weeks per year. No disproportionate affect to minority, low-income populations, or children.	No change from existing conditions.
Cultural Resources	The construction is not expected to impact cultural resources. ALC will continue to manage cultural resources in accordance with the INRMP.	No change from existing conditions
Natural Resources	Construction is not expected to impact natural resources as it will occur within Building 106.	No change from existing conditions

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Physical Resources	Construction and operation of a CHP facility is not expected to have an impact on earth or water resources.	No change from existing conditions.
Air Quality	<p>Air emissions would increase which will require the installation to obtain a Title V Part 70 air permit from the Maryland Department of the Environment (MDE). However, the increase is not considered significant since the potential emission levels are not sufficient to require a conformity determination.</p> <p>Emissions during the construction work would result from engine exhaust and fugitive dust. Emissions generated by construction will increase ambient air emissions on a temporary basis but would end when construction is complete.</p>	No change from existing conditions.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter contains both the affected environment and potential environmental consequences analysis to implement the Proposed Action and Alternatives. NEPA requires that the analysis address those areas and components of the environment with the potential to be affected; locations and resources with no potential to be affected need not be analyzed.

Each resource discussion begins with a definition including resource attributes and any applicable regulations. The expected geographic scope of any potential consequences is identified as the ROI. For most resources in this chapter, the ROI is defined as the boundaries of USAG ALC. For some resources (such as air) the ROI extends over a larger jurisdiction unique to the resource.

The Existing Condition of each relevant environmental resource is described to give decision makers a baseline from which they can compare potential future effects. The Environmental Consequences section for each resource considers the direct and indirect effects of the Proposed Action and Alternatives. Cumulative Effects are discussed in Chapter 4.0.

3.1 Land Use and Facility Operations

3.1.1 Definition of the Resource

Land uses addressed for ALC include general land use patterns, relevant plans and ordinances, and land ownership. General land use patterns refer to the general character of a particular area on the installation. Facility operations address the modification of the existing central utility plant to a more energy efficient combined heat and power (CHP) facility.

3.1.2 Existing Conditions

ALC is located adjacent to Hillandale, MD approximately 10 miles north of Washington, DC and 26 miles southwest of Baltimore, MD. The installation occupies approximately 207 acres and is located within one mile of the Capital Beltway (I-495) and Interstate 95 (I-95). Six existing land use categories at ALC are characterized in the ALC Real Property Master Plan (2007-2008). The predominate lands use is research and development (R&D) with smaller land uses consisting of administration, storage and supply, maintenance, operations, and utility and ground improvements.

The land adjacent to the installation has a variety of land use designations. The GSA owns a large business complex adjacent to ALC to the north and slightly west. The land base to the east and south is primarily rural and suburban residential.

ALC currently operates a central utility plant and multiple satellite boilers. Several standby generators are also maintained and operated as necessary to ensure that electric power is always available for critical operations. The central plant provides chilled water and high-temperature hot water to the 100 and 200 series buildings year-round. Seven electric centrifugal chillers, totaling 7,300 tons of cooling capacity, provide 43°F chilled water for HVAC and process loads. Chilled water is distributed by a primary-secondary pumping arrangement. Three 200 hp secondary chilled hydraulic pumps with variable-speed drives distribute the chilled water through underground piping to the building. Each chiller has its own two-cell cooling tower with two dual-speed fans that maintain the condenser water temperature between 70°F and 85°F year-round. Buildings 207 and 203 use tertiary pumps to distribute chilled water throughout the building.

Seven Scotch-Marine boilers totaling 80 MMBtuh (2,388 boiler horsepower) provide 400°F high-temperature hot water for HVAC, domestic, and process heating to the 100 and 200 series buildings continuously year-round. Hot water is distributed to the 100 and 200 series buildings via underground piping with 15 hp constant-volume pumps.

3.1.3 Environmental Consequences

Proposed Action

The proposed Combined Heat and Power (CHP) Cogeneration facility would have generators that are equipped with heat recovery to capture thermal energy from both the engine cooling jackets and the engine exhaust. The recovered thermal energy will reduce the load on the existing dual-fuel (#2 fuel oil and natural gas fired) boilers. The installation of the CHP facility will reduce purchased electric power costs for the campus and reduce net air emissions through higher fuel efficiency.

The CHP facility would result in premises-wide actual and potential emissions of Nitrogen Oxides (NO_x) to exceed Title V threshold of 25 tons per year (tpy), and the facility will need to apply for a Title V Operating Permit. Additionally, there would be an increase of Volatile Organic Compounds (VOC) emitted but this increase will not exceed the Title V thresholds of 100 tpy.

The CHP facility would temporarily increase employment on site during the construction phase. During facility operations, Ameresco personnel would be utilized for maintenance of equipment on a call as needed basis, approximately two to three man weeks per year. Fulltime employment at the central utility plant is not expected to increase.

No-Action Alternative

Under the No-Action Alternative, a CHP facility would not be constructed. No changes would be expected.

3.2 Noise

3.2.1 Definition of the Resource

Noise is defined as any undesirable sound which interferes with communication, is intense enough to damage hearing, or is otherwise annoying (Federal Interagency Committee on Noise [FICON] 1992). Noise may be intermittent or continuous, steady or impulsive. Noise may also be stationary or transient.

3.2.2 Existing Conditions

The State of Maryland has established environmental noise standards based on land use type. For a receiving residential land use, such as the Hillandale community adjacent to the ALC, the maximum noise levels at the property line are:

- Daytime – 65 dB(A)
- Nighttime – 55 dB(A)

The regulations define day as the period between 7a.m. and 10 p.m. Noise sources at the ALC include the carpenter shop in Building 103, the metal shop in Building 203, periodic testing of emergency electrical generators in Buildings 106, 202, 203, 204, 205, and 500, and outside generators servicing Buildings 207, 403, and 500. Additional noise is generated by air gun testing at the Acoustics and Special Sensors Branch.

November 2009 baseline sound readings were taken at the USAG ALC western property boundary near the Hillandale residential community and within Building 106 where the existing utility plant is housed using a Bruel and Kjaer Type 2239 sound level meter. The property line reading was within the 42.1 dB(A) to 43.1 dB(A) range. Sound readings taken inside USAG ALC Building 106 fluctuated depending on what equipment was operating. The sound reading taken next to the proposed CHP facility location read 74 dB(A) and the sound level readings taken next to the #3 Boiler and the Centrifugal Chiller #2 while operating were within the 85.3 dB(A) to 85.6 dB(A) range. Readings from a July 2005 noise survey were between 89 dB(A) and 98 dB(A) while chillers 1, 2, 3, 6 and 7 were operational. Noise impacts tend to be higher during the summer because of increased cooling demand on the chillers for air conditioning.

Table 3-1. Common Sound Levels	
Source	Sound Level, (dB(A))
Near large jet at takeoff	140
Air-raid siren	130
Threshold of pain	120
Thunder or sonic boom	110
Garbage or trailer truck at roadside	100
Power lawnmower at 5 feet	90
Alarm clock or vacuum cleaner	80
Freeway traffic at 50 feet	70
Conversation Speech	60
Average residence	50
Bedroom*	40
Soft whisper at 15 feet	30
Rustle of leaves	20
Breathing	10
Threshold of hearing	0

*includes HVAC system, conversation, walking, doors opening and closing

The unit of measure is the “A-weighted” decibel (dB(A)). The dB(A) scale de-emphasizes the very low and the very high frequencies and emphasizes the middle frequencies, thereby closely approximating the frequency response of the human ear.

Human ability to perceive change in noise levels varies widely from person to person, as do responses to perceived changes. Generally, a three dB(A) change in noise level would be barely perceptible to most listeners, whereas a ten dB(A) change is typically perceived as a doubling (or halving) of noise levels and is considered a substantial change. These thresholds (summarized in Table 3-1) permit direct estimation of an individual's probable perception of changes in noise levels.

3.2.3 Environmental Consequences

Noise associated with the Proposed Action is considered in this section and compared with the baseline conditions to assess potential impacts. The potential for noise generated by gas turbines within the proposed modification of the utility plant and its impacts on nearby residences and employees was considered.

Proposed Action

It is the intent of USAG ALC to reduce any noise impacts associated with the CHP facility at the source through construction specifications and available technology. The CHP facility would be located within Building 106 which will minimize outside noise disturbance that may impact the residential neighborhood. An increase of ambient noise and exhaust noise is proposed to occur but mitigation measures would be implemented which may include one or more sound attenuation devices: sound barriers, critical silencers, noise hoods over louvers, sound curtains and sound pillows.

As a result of plant operations, projected internal plant noise for engine exhaust is expected to be around 81 dB(A) with the incorporation of a sound attenuation device. At the property line, engine exhaust noise is expected to be 51 dB(A). The projected level of 51 dB(A) is below the maximum threshold of 55 dB(A) for residential areas.

Projected ambient engine noise levels are expected to exceed the maximum threshold of 55 dB(A). As a result, this will be mitigated with sound attenuation devices incorporated at the source or louver.

Noise associated with construction would be expected to be short-term (approximately one month). Primary noise sources during such activity would be expected to be from delivery of plant components and overall construction of the CHP facility. Construction noise emanating off the installation is not expected to create adverse impacts within the vicinity of ALC.

With regulatory compliance and mitigation measures implemented, operational noise off the installation is not expected to create adverse impacts.

An increase of noise will be mitigated due to regulatory requirements and the facility would be required to comply with the Montgomery County Noise Ordinance (Montgomery County Code, Chapter 31B), Department of the Army Pamphlet 40-501, and 29 CFR Part 1910, Occupational Safety and Health Standards. The noise control measures described above would be designed to ensure compliance with the Montgomery County ordinance.

No-Action Alternative

Under the No-Action Alternative, a CHP facility would not be constructed. No changes would be expected.

3.3 Safety

3.3.1 Definition of the Resources

This section addresses safety associated with energy system operations conducted at ALC. These operations focus on the proposed CHP facility.

3.3.2 Existing Conditions

In the event of an energy system emergency at ALC, the Red Plan and the Energy Emergency Preparedness and Operations Plan serves as an immediate action tool to ensure that the correct response is initiated at the earliest possible time. The plan provides in-depth information on emergency response and notification procedures.

3.3.3 Environmental Consequences

Proposal-related activities are considered to determine if additional or unique safety risks are associated with their undertaking. If any proposal-related activity indicated a major variance from existing conditions, it would be considered a safety impact.

Proposed Action

Activities involved with proposed construction are not unique. Standard construction procedures and environmental regulations would be followed. Labor activities may expose workers performing the required site preparations and construction to some risk. The U.S. Department of Labor, Bureau of Labor

Statistics maintains data, analyzing occupational injuries. Strict adherence to all applicable occupational safety requirements would minimize the relatively low risk associated with these construction activities. As described in Section 3.3.2, in the event of an energy system emergency at ALC, the Red Plan and the Energy Emergency Preparedness and Operations Plan serves as an immediate action tool to ensure that the correct response is initiated at the earliest possible time. The plan provides in-depth information on emergency response and notification procedures.

In addition to implementing mitigation measures to decrease operational noise within the facility (see section 3.2 Noise), workers would be exposed to increased decibel levels which would require strict adherence to physical safety requirements. The proper Personal Protective Equipment (PPE) would be worn which includes ear protection.

No-Action Alternative

Under the No-Action Alternative, the CHP facility would not be constructed.

3.4 Socioeconomics and Environmental Justice

3.4.1 Definition of the Resource

Socioeconomic factors are defined by the interaction or combination of social and economic factors. The relevant factors related to the ALC includes population and housing, economic development, and quality of life/health and safety issues.

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs federal agencies to address environmental and human health conditions in minority and low-income communities. In addition to environmental justice issues are concerns pursuant to EO 13045, Protection of Children from Environmental Health Risks and Safety Risks, which directs federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children.

For the purposes of this analysis, minority, low-income and youth populations are defined as follows:

- Minority Populations: Persons of Hispanic origin of any race (e.g., Blacks, Asians).
- Low-Income Population: Persons living below the poverty level.
- Youth Population: Children under the age of 18 years.

3.4.2 Existing Conditions

Socioeconomics`

ALC is located in northeastern Montgomery County, Maryland with a portion of the installation crossing into Prince George's County, Maryland. In 2007 Montgomery County had a population of 930,813 and Prince George's County had a population of 828,770. White Oak and Fairland are the two closest neighboring communities.

In 2007 White Oak had a total population of 20,665. The typical White Oak area household is a college educated, married couple between the ages of 25 and 54. The 2007 median household income was \$67,959.

The White Oak area has a total of 8,107 housing units offering a variety of housing types. Of the 8,107 housing units offered in White Oak in 2007 single-unit detached homes accounted for 38.8 percent, single-unit detached homes accounted for 6.3 percent, multi-units accounted for 54.7 percent, and other accounted for 0.3 percent.

In 2007, the community of Fairland, located approximately three miles north of Adelphi, had a total population of 21,312. This population primarily consists of college educated, married couples between 25 and 54 years of age. The 2007 the median household income was \$70,059 (U.S Census Bureau 2007).

The Fairland area has a total of 9,305 housing units offering a variety of housing types. Multi-units made up the majority of housing types with 48.7 percent in 2007. Single-unit detached housing accounted for 23.1 percent of the housing stock and single-unit attached made up 28.3 percent of households (U.S Census Bureau 2007).

Environmental Justice

To comply with EO 12898, ethnicity status in the vicinity of ALC was examined and compared to state data. White Oak and Fairland have significant minority populations; in fact minorities are the majority ethnic group in these two communities. White Oak with a minority population of 62.5 percent and

Fairland with a minority population of 67.6 percent are significantly higher than the state minority population of 37.7 percent (U.S. Census Bureau 2005-2007). In Fairland, blacks account for 44.4 percent of the total population and 66.6 percent of the minority population. In White Oak blacks account for 41.9 percent of the total population and 64.4 percent of the minority population.

To comply with EO 12898, poverty status in the vicinity of ALC was examined and compared to state data. The incidence of persons and families in White Oak with incomes below the poverty level at 8.9 percent was comparable to state level of 8.2 percent. In Fairland 4.9 percent of the population are low-income families, significantly less than the state percentage of 8.2 percent (U.S. Census Bureau 2005-2007). Both communities have significantly lower than average percentage of low income families in comparison to US percentages.

To comply with EO 13045, the number of children under age 18 was determined for the vicinity of ALC and compared to state levels. In 2007, there were 5,014 children age 17 and under residing in Fairland, comprising 23.5 percent of the population. In 2007, there were 5,411 children age 17 and under residing in White Oak, comprising 26.2 percent of the population. In comparison, children age 17 and under comprised 24.4 percent of the population of Maryland and 24.7 percent for the nation. The populations of Fairland, White Oak, Maryland, and the US have comparable populations of children under 18 years of age.

Table 3-2 presents an overview of minorities, low income families, and youth by area community.

Table 3-2. Area Environmental Justice Overview

	Total Population	Percent Minority	Percent Low-Income Families	Percent Youth (Under 18)
White Oak	20,665	62.5%	8.9%	26.2%
Fairland	21,312	67.6%	4.9%	23.5%
Maryland	5,597,843	37.7%	8.2%	24.4%
United States	298,757,310	24.3%	13.3%	24.7%

Source: U.S. Census Bureau 2005-2007 American Community Survey

3.4.3 Environmental Consequences

Potential socioeconomic consequences were assessed in terms of effects of the Proposed Action on the local economy. Construction activity on ALC often generates temporary economic benefits to the area in terms of income. Environmental justice analysis applies to potential disproportionate effects on minority or low-income populations. Environmental justice issues could occur if an adverse environmental consequence to the human population fell disproportionately upon minority or low income populations.

Proposed Action

No permanent or long lasting socioeconomic impacts would be associated with the construction of the CHP facility. Construction activities may generate jobs during the short construction period. During facility operations, Ameresco personnel would be utilized for maintenance of equipment on a call as needed basis, approximately two to three man weeks per year. Minority or low-income populations within the vicinity of ALC do not represent a disproportionate segment of the population. No significant adverse environmental or health effects to the human population are expected. There are no special risks to children associated with the CHP facility.

No-Action Alternative

Under the No-Action Alternative, the CHP facility would not be constructed. No impacts to populations of concern would occur.

3.5 Cultural Resources

3.5.1 Definition of Resource

Cultural resources include any prehistoric or historic district, site, or building, structure, or object considered important to a culture or community for scientific, traditional, religious or other purposes. They might include archaeological sites, historic properties and architectural structures. Archaeological resources are sites with artifacts, structures, remains, and monuments of prehistoric and historic peoples. These sites typically require excavation in order to uncover remains and artifacts from earth that has been considerably altered by past human activities. Historic properties (as defined in 36 CFR 60.4) are significant archaeological, architectural, or traditional resources that are either eligible for listing, or listed in, the National Register of Historic Places (NRHP). Buildings generally must be 50 years or older in order to qualify for NRHP designation, although there are exceptions for properties with historical significance that are less than 50 years old.

3.5.2 Existing Conditions

Nine archeological sites have been recorded at ALC (Integrated Natural Resource Management Plan 1993). Evaluations of all nine archeological sites have been reviewed by the State Historic Preservation Office (SHPO), and SHPO has concurred that only one of the recorded sites is National Register of Historic Places (NRHP)-eligible (18PR466). There are no known additional potential NHRP sites at ALC. There are no known cemeteries at the ALC. No Native American sacred places are currently known to exist at the ALC. Prehistoric sites may exist in undisturbed areas on the installation.

3.5.3 Environmental Consequences

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may occur by physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource; introducing visual or audible elements that are out of character with the element; or neglecting the resource. Direct impacts can be assessed by identifying the types and locations of proposed activity and determining the exact location of cultural resource that could be affected. Indirect impacts generally result from the effects of project-induced population increase and the need to develop to accommodate. These activities and the subsequent use can impact cultural resources.

Proposed Action

The proposed CHP facility would be located within Building 106. All access roads for construction equipment delivery are existing paved roads. There will be no ground disturbance associated with this project, therefore cultural resources would not be impacted and are not expected to be encountered.

No-Action Alternative

Impacts to cultural resources are not expected under the No-Action Alternative. Cultural resources would continue to be managed in compliance with federal law and Army regulations.

3.6 Natural Resources

3.6.1 Definition of the Resource

Biological resources refer to plants and animals and the habitats in which they occur on and within the environs of ALC. Functional groups of species that are linked by ecological processes within a defined area are referred to as ecological communities. These communities may be either terrestrial or aquatic. Federal and state laws and regulations that apply to biological resources include: Fish and Wildlife Coordination Act, Migratory Bird Treaty Act, Clean Water Act (CWA), NEPA, Endangered Species Act (ESA), Sikes Act, and state laws protecting plants and nongame wildlife.

3.6.2 Existing Conditions

Terrestrial Communities and Wildlife

The ALC is generally considered to be in a residential-urban to rural-suburban area although there are significant areas of undeveloped forest lands. Collectively, this forest is a locally important wildlife resource as it is surrounded by developed or managed land uses. Its availability for use by wildlife having a forest preference is important as such forest lands are decreasing in acreage as regional development occurs. There is currently no wildlife management (e.g., hunting or trapping) or fishing program at the ALC due to the urban nature of the environment. White-tailed deer occur at populations above the biological carrying capacity and consequently a deer management task force has been formed. For non-game wildlife, blue bird boxes have been erected onsite.

Fisheries

Spawning areas for brown trout, an important sport fish, are found upstream of the ALC in the upper part of Paint Branch Creek (the area upstream of Fairland Road). The Montgomery County Council has designated this area as a Special Protection Area based on its trout spawning capability, high water quality, and the threat posed by the intensity of existing and future development in the watershed.

Wetlands and Other Waters of the US

No wetlands occur in the project area.

Threatened and Endangered Species and Special Status Species

No Federally Threatened, Endangered, or Special Status species occur on ALC. Rare species have been documented by the Maryland Department of Natural Resources in the Powder Mill Bog adjacent to Paint Branch Stream Valley Park west of Powder Mill Road, on ALC (Table 3-3).

Table 3-3. Special Status Species on USAG ALC

Scientific Name	Common Name	Status	Location
<i>Eriocaulon decangulare</i>	Ten-angled Pipewort	G5, S2	Montgomery & Prince George's Counties
<i>Juncus longii</i>	Long's Rush Fern	G3Q, S1, E	Montgomery County
<i>Pogonia ophioglossoides</i>	Snakemouth Orchid	N/A	N/A
<i>Rhynchospora cephalantha</i>	Bunched Beaksedge	N/A	N/A
<i>Solidago uliginosa</i>	Bog Goldenrod	G4G5, S2, T	Montgomery County

Source: Maryland Department of Natural Resources Wildlife and Heritage Service 2007

3.6.3 Environmental Consequences

Potential to impact natural resources including plants, wildlife, and habitat is based on the importance of the resource; proportion of the resource that would be affected relative to its occurrence in the region; sensitivity of the resource to the proposed action's activities; and duration of ecological ramifications. Permanent habitat loss and temporary disturbance due to construction are specific issues and concerns for biological resources. Habitat degradation caused by post-construction promotion of weeds is also a consideration.

Proposed Action

The Proposed Action would have no affect on natural resources including plants, wildlife, and habitat. Ground disturbance would not occur as part of the proposed action, therefore there will be no habitat loss or degradation. No federally listed species occur on the installation and no rare species occur in the proposed project area. No wetlands occur in the project area.

No-Action Alternative

The No-Action Alternative would be the same as baseline conditions.

3.7 Physical Resources

3.7.1 Definition of the Resource

Physical resources refer to geology, soils, and water. Geologic resources include subsurface and exposed rock. The inherent properties of local bedrock affect soil formation and properties, groundwater sources and availability, and terrain. Soils include particulate, unconsolidated materials that were formed in place, underlying bedrock and other parent material or transported from distant sources via glacial transport, water, and wind. Soils play a critical role in the natural and human environment, affecting vegetation and habitat, water and air quality, and the success of the construction and stability of roads, buildings, and shallow excavations. Water resources include surface water, such as lakes, rivers, streams and wetlands, and groundwater (subsurface hydrologic resources.)

3.7.2 Existing Conditions

The ALC is located at the fall line of the Piedmont Plateau and Atlantic Coastal Plain. U.S. Department of Agriculture soil surveys are available for Montgomery and Prince George's Counties, Maryland. Soils at the ALC consist of five series – Beltsville, Sassafras, Croom, Manor, and Hatboro. The moderately well-drained Beltsville and well-drained Sassafras series occur on nearly level land. Perched water tables may occur in the Beltsville series. The excessively well-drained Croom and well-drained Manor series occur on moderate to steep slopes, while Hatboro soils are poorly drained, silty loams occurring in stream beds.

The dominant hydrologic features on the installation are Paint Branch and its tributary, Hillandale Run. Paint Branch originates approximately six miles north of the installation, cuts in a southeasterly direction through the interior of the ALC, then flows another four miles south to its confluence with the Northeast Branch of the Anacostia River. Ultimately, the Anacostia River empties into the Potomac River, which discharges into the Chesapeake Bay. Hillandale Run flows west to east across the ALC, and empties into Paint Branch in the north central portion of the installation.

A second tributary of Paint Branch is located primarily outside of the eastern boundary of the installation. This stream, parallel to Kuester Road, receives drainage from the 400 Area. Erosion and sediment control are problems along the streams within ALC. Erosion problems occur at, but are not limited to, the Patrol Bridge crossing of the Paint Branch and the intersection at Hillandale Run and the Paint Branch. Hillandale Run brings a large quantity of water on the installation.

Small areas of the ALC are subject to flooding. Approximately eight acres of the installation are within the 100-year floodplain, which is less than 155 feet above mean sea level (MSL).

Groundwater depth is dependent on the surface elevation and ranges from approximately 15 feet to more than 50 feet below ground surface. The water table is near the base of the terrace deposits where they occur. Groundwater bulges in the terraces should be expected for several days following a heavy rain, as these materials are significantly more permeable than the residual soils and saprolite.

3.7.3 Environmental Consequences

As with Natural Resources (refer to Section 3.6.3), potential impacts to Physical Resources are considered using a similar approach.

Proposed Action

Construction of the Proposed Action would have no affect on Physical Resources. The CHP facility would be constructed within Building 106 and there would be no ground disturbing activities associated with construction of the facility. There would be no impacts to soils, therefore erosion and sedimentation would not occur.

No-Action Alternative

Under the No-Action Alternative, impacts to physical resources would continue as under current conditions.

3.8 Air Quality

3.8.1 Definition of Resource

Federal Air Quality Standards

Air quality is determined by the type and concentration of pollutants in the atmosphere, the size and topography of the air basin, and local and regional meteorological influences. The significance of a pollutant concentration in a region or geographical area is determined by comparing it to federal and/or state ambient air quality standards. Under the authority of the Clean Air Act (CAA), the US Environmental Protection Agency (USEPA) has established nationwide air quality standards to protect public health and welfare, with an adequate margin of safety.

These federal standards, known as the National Ambient Air Quality Standards (NAAQS), represent the maximum allowable atmospheric concentrations and were developed for six "criteria" pollutants: ozone (O₃), nitrogen dioxide (NO₂), carbon monoxide (CO), respirable particulate matter less than or equal to 10 micrometers in diameter (PM₁₀), sulfur dioxide (SO₂), and lead (Pb). The NAAQS are defined in terms of concentration (e.g., parts per million [ppm] or micrograms per cubic meter [$\mu\text{g}/\text{m}^3$]) determined over various periods of time (averaging periods). Short-term standards (1-hour, 8-hour, or 24-hour periods) were established for pollutants with acute health effects and may not be exceeded more than once a year. Long-term standards (annual periods) were established for pollutants with chronic health effects and may never be exceeded.

Based on measured ambient criteria pollutant data, the USEPA designates areas of the U.S. as having air quality equal to or better than the NAAQS (attainment) or worse than the NAAQS (nonattainment). States which have areas that are nonattainment are required to develop a State Implementation Plan (SIP) which identifies how that State will attain and/or maintain the NAAQS. Upon achieving attainment, areas are considered to be in maintenance status for a period of 10 or more years. Areas are designated as unclassifiable for a pollutant whenever there is insufficient ambient air quality data for the USEPA to form a basis for attainment status. For the purpose of applying air quality regulations, unclassifiable areas are treated similar to areas that are in attainment of the NAAQS.

The USEPA promulgated attainment designations for the newly established 8-hour O₃ standard effective as of June 15, 2004. However, states must continue to implement existing plans developed under the 1-hour standard during the transition to the new 8-hour standard. On December 17, 2004, the USEPA designated areas as attainment or nonattainment for the newly developed standard for particulates less than 2.5 micrometers in diameter (PM_{2.5}), which are fine particulates that have not been previously regulated (USEPA 2005).

State Air Quality Standards

Under the CAA, state and local agencies may establish ambient air quality standards and regulations of their own, provided that these are at least as stringent as the federal requirements.

ALC is located within the National Capital Interstate Air Quality Control Region, which includes Washington, DC and several surrounding counties, including Montgomery County, Maryland where the proposed CHP cogeneration facility would be located. The region currently meets National Ambient Air Quality Standards for all criteria pollutants except ozone and PM_{2.5}.

3.8.2 Existing Conditions

The ALC calculates air emissions based on fuel usage and emissions factors of registered boilers. If the emissions are found to be less than 50 percent of the 25 tons per year emissions threshold for the precursors of ozone (nitrogen oxides and VOC), no Title V permit is required. If emissions exceed 50 percent of the threshold, a Title V Permit is required. ALC's emissions are below 50 percent of the threshold, and therefore, a Title V permit is not required. Table 3-4 shows the total criteria pollutant emissions at the ALC during calendar year 2008. The State of Maryland considers the ALC to be a synthetic minor source, meaning it is an air pollution source that has the potential to emit air pollutants

in quantities at or above the major source threshold levels but that has accepted federally enforceable limitations to keep the emissions below such levels. The ALC operates twelve registered boilers and is required to report annual emissions on them. Boilers #6 and #7 require quarterly fuel use reports. There are ten emergency generators on the installation. These are monitored for fuel usage and duration of operation which averages approximately 10 hours per year. The ALC operations create no significant impacts on ambient air quality.

Table 3-4. Adelphi Laboratory Center Calendar Year 2008 Criteria Pollutant Emissions

Criteria Pollutant	Total Emissions
VOC	0.37 tons/yr
NO _x	7.98 tons/yr
CO	0.31 tons/yr
SO ₂	1.78 tons/yr
PM ₁₀	0.13 tons/yr

3.8.3 Environmental Consequences

Air emissions resulting from the Proposed Action were evaluated in accordance with federal, state, and local air pollution standards and regulations. The air quality impacts from the Proposed Action would be significant if they interfere with or delay timely attainment of the NAAQS.

Proposed Action

Like the existing boilers and generators on the installation, the two 1,100 KW natural gas-fueled stationary generators that would be installed and operated under the Proposed Action will emit criteria pollutants and their precursors. Table 3-5 shows their potential to emit the various criteria pollutants (Adelphi Laboratory Center Cogeneration Project Potential to Emit Analysis, Ameresco, Inc., 2009). The estimated potential emissions from these generators will be more than 50 percent of the 25 tpy threshold for the precursors of ozone (nitrogen oxides and VOCs) that would require a Part 70 Title V operating permit. Therefore, the Proposed Action would require the installation to apply for and obtain a Title V permit. However, the estimated emissions from the Proposed Action do not exceed New Source Review thresholds for the precursors of ozone (25 tpy for nitrogen oxides and 25 tpy for VOCs) or the precursors of PM_{2.5} (100 tpy for nitrogen oxides and 100 tpy for sulfur dioxide). Therefore, the Proposed Action will not require New Source Review.

Maryland is a member of the Regional Greenhouse Gas Initiative (RGGI), which imposes a cap and trade system of carbon emissions for electrical generating units. Units less than 25 megawatts (MW) in capacity are exempt from the requirements of RGGI. The generators that would be operated under the Proposed Action are both less than the 25 MW threshold and therefore are exempt from RGGI.

Table 3-5. Adelphi Laboratory Center Cogeneration Project Potential to Emit Analysis

Source Description and Location	Annual Process Throughput		Annual Process Duration		Emission Control		Criteria Pollutant	Emission Factors			Potential Emission Estimates	
											Lb/hr	Tons/yr
Proposed CHP Generator Bldg. 106 Central Utility Plant (1.1MW)	80.17	MMCF	8760	Hr	None	0	VOC	154.9	Lb/MMCF	3	1.42	6.21
	80.17	MMCF	8760	Hr	None	0	NO _x	277	Lb/MMCF	2	2.54	11.10
	80.17	MMCF	8760	Hr	None	0	CO	590	Lb/MMCF	2	5.40	23.65
	80.17	MMCF	8760	Hr	None	0	PM _{2.5}	0.1	Lb/MMCF	1	0.00	3.2E-03
	80.17	MMCF	8760	Hr	None	0	PM ₁₀	0.1	Lb/MMCF	1	0.00	3.2E-03
	80.17	MMCF	8760	Hr	None	0	SO ₂	0.6	Lb/MMCF	1	0.01	0.024

Proposed Action (two generators) Total Emissions (tons/yr)	
VOC	12.42
NO _x	22.21
CO	47.31
PM _{2.5}	0.01
PM ₁₀	0.01
SO ₂	0.05

Notes:

Source Process: fuel combustion

Fuel: natural gas

Assumed natural gas heating value: 1020 Btu/scf (HHV)

Emission Factor Sources:

1. AP-42 Chapter 3.2 Natural Gas-Fired Reciprocating Engines (Table 3.2-2)
2. Vendor (Dresser/Waukesha) guarantees
3. Vendor (Dresser/Waukesha) guarantees for NMHC

The General Conformity Regulations (Section 176(c) of the Clean Air Act) prohibit Federal entities from taking actions in nonattainment areas which do not conform to the State Implementation Plan (SIP) for the attainment of the NAAQS. Therefore, the purpose of conformity is to (1) ensure Federal actions do not interfere with the emission budgets in the SIPs; (2) ensure actions do not cause or contribute to new violations, and (3) ensure attainment of the NAAQS. The National Capital Interstate Air Quality Control Region is classified as a moderate nonattainment area for the 8-hour O₃ and the PM_{2.5} NAAQS. Section 51.853 (b)(1) of the General Conformity Regulations stipulates that a general conformity determination is required for moderate ozone nonattainment areas if VOC emissions have the potential to emit in excess of 50 tons per year or if emissions of nitrogen oxides have the potential to exceed 100 tons per year. Similarly, a general conformity determination is required for PM_{2.5} nonattainment areas if PM_{2.5} emissions have the potential to exceed 100 tons per year. As shown in Table 3-4, none of these thresholds is exceeded under the proposed action. Therefore, a conformity determination is not required for the Proposed Action. Actions which do not require a conformity determination are not considered to have a potential impact on the attainment of the NAAQS. Therefore, the Proposed Action will not result in any significant air quality impacts to the National Capital Interstate Air Quality Control Region.

As a mitigation measure to reduce nitrogen oxides and PM_{2.5} emissions from the generators which would operate under the Proposed Action, limits on permitted hours of operation per year may be instituted. Also, the use of renewable and cleaner burning fuels will be investigated.

Most of the work during the construction period would occur within Building 106. Emissions during the construction work would result from engine exhaust (i.e., construction equipment and material handling) and fugitive dust (e.g., from ground disturbance). The project construction contractor would minimize fugitive dust emissions. Using efficient practices and avoiding long periods where engines are running at idle may reduce combustion emissions from construction equipment. Emissions generated by construction are temporary in nature and would end when construction is complete. Emissions during the construction period are not expected to surpass any significant threshold and would not result in any significant air quality impacts to the National Capital Interstate Air Quality Control Region.

No-Action Alternative

The No-Action Alternative would not increase the emissions of criteria pollutants from ALC. No Title V air permit would be required. The No-Action Alternative would not generate any new construction emissions. Overall air emissions from the installation would remain the same.

4.0 CUMULATIVE EFFECTS AND OTHER ENVIRONMENTAL CONSIDERATIONS

CEQ regulations and 32 CFR Part 989 stipulate that the cumulative effects analysis should consider the potential environmental impacts resulting from “the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions” (40 CFR 1508.7). The first step in assessing cumulative effects involves identifying and defining the scope of other actions and their interrelationship with the Proposed Action or alternatives (CEQ 1997). The scope must consider other projects that coincide with the location and timetable of the Proposed Action and other actions. Cumulative effects analyses evaluate the interactions of multiple actions.

4.1 Past, Present, and Reasonably Foreseeable Actions

This chapter identifies relevant past, present, and reasonable foreseeable actions. These include military actions as well as federal actions. Non-federal actions are also considered and discussed in this chapter. An analysis of how the impacts of the identified actions might be affected by those actions resulting from the Proposed Action for each of the environmental resources is summarized. The chapter concludes with a discussion of the relationship between short-term uses of man’s environment, as well as, the maintenance and enhancement of long-term productivity and irreversible and irretrievable commitment of resources.

As noted in Table 4-1, the cumulative actions that have the potential to interact with the proposed CHP facility include current and future military and non-military projects.

The General Services Administration (GSA) is located immediately adjacent to the USAG ALC and they are proposing to update the Food and Drug Administration (FDA) Headquarters to accommodate an increase of 1,170 FDA employees to support new FDA programs. The project will involve the development of 1,254,922 additional gross square feet of office and laboratory space, construction of a fitness center, and expansion of the Central Utility Plant (CUP) to serve the FDA Campus. In addition, GSA plans to relocate the Child Care Center and the Broadcast Studio from the locations proposed in the 2006 FDA Headquarters Master Plan.

The expansion of the CUP would include a 50,000 square foot building expansion and the addition of a thermal water storage tank to provide for utilities infrastructure needs for the increase in lab and office space at the FDA Campus. Two 15-Megawatt (MW) generators, five 1.980-ton chillers, a 300mbh (thousands of British Thermal Units per hour) boiler, and eight additional cooling towers would be installed. (The 300-mbh boiler will not be needed if dual fuel generators are installed.) In addition, at full build-out of the FDA campus, a 6,000-kilowatt (KW) capacity steam turbine generator is anticipated to utilize waste heat.

The Proposed Action is consistent with the mission of a military installation. No significant cumulative consequences are expected to occur to land use in conjunction with the CHP facility. No negative cumulative socioeconomic or environmental justice effects are anticipated as a result of the Proposed Action or other reasonably foreseeable projects. No additional cumulative safety impacts are anticipated other than those described in Chapter 3. No cumulative consequences are anticipated for cultural resources. No significant cumulative effects to biological species or physical resources are anticipated.

Construction activities and facility operations at ALC, FDA White Oak Campus, and in the region will continue to produce additional traffic and noise sources that will cumulatively affect air quality and noise levels.

Air emissions associated with construction of the CHP facility at ALC and development of the FDA White Oak Campus will increase but are not anticipated to affect the overall health, welfare, or financial base of the communities within the vicinity. Therefore, cumulative consequences would not be expected to exceed regulatory limits.

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The minor increase in noise emissions associated with construction of the CHP facility at ALC and development of the FDA White Oak Campus would not be significant when combined with past and present development, creating imperceptible or barely perceptible increases in traffic and operational noise that already experiences varying noise levels. Implementation of proper mitigation measures will ensure noise levels would be maintained below State of Maryland environmental noise standards.

Table 4-1. Current and Future Military and Non-Military Projects

Action	Source	Description
Military Projects		
Adelphi Master Planning Projects, Maryland	Adelphi Laboratory Center Real Property Master Plan 2007 - 2008	The Master Plan includes the Long Range Component Plan and Short Range Component Plan projects including specific site locations of proposed facilities and improvements.
Non-Military Projects		
Maryland Department of Transportation (DOT)	www.mcmaps.org	Maryland DOT is constructing road improvements on U.S. 29 between Fairland and Musgrove Roads. The scope of the project includes construction of the grade separated interchanges. Improvements along Fairland Road would extend from the Old Columbia Pike west of U.S. 29 and Brahms Avenue. The access point to the Verizon Chesapeake Complex would be modified. The work along Musgrove Road would impact the access points to the Verizon Fairland Data Center which would be modified under this project. This construction project is one of many along U.S. 29 as part of the Inter-County Connector Project.
Montgomery County, Maryland	www.mcmaps.org	A residential subdivision is planned north of the installation along Perimeter Road. There are additional, smaller, subdivision plans in the vicinity of ALC.
General Services Administration (GSA), Maryland	GSA Master Plan Draft EIS and FDA Draft EA Comment	<p>The GSA possesses 712 acres of the former Naval Surface Warfare Center adjacent to ALC. Existing facilities are undergoing renovation in order to consolidate research and development operations. The FDA Campus comprises 130 acres of the 662-acre Federal Research Center. FDA currently has an approved Master Plan for 7,719 employees. GSA and FDA are in the process of analyzing a Master Plan Update that would result in growth to 8,889 employees.</p> <p>The project will involve the development of 1,254,922 additional gross square feet of office and laboratory space, construction of a fitness center, and expansion of the Central Utility Plant (CUP) to serve the FDA Campus.</p>

4.2 Other Environmental Considerations

Other environmental considerations include evaluation of the relationship between short-term uses and long-term productivity of resources and an assessment of irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented.

4.2.1 Relationship between Short-Term Uses and Long-Term Productivity

CEQ regulations (Section 1502.16) specify that environmental analysis must address "...the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity." Special attention should be given to impacts that narrow the range of beneficial uses of the environment in the long-term or pose a long-term risk to human health or safety. This section evaluates the short-term benefits of the proposed alternatives compared to the long-term productivity derived from not pursuing the proposed alternatives. A short-term use of the environment is generally defined as a direct consequence of a project in its immediate vicinity.

Short-term effects could include a slight increase in noise as a result of construction activities and potential disruption of electrical power to on-site facilities.

Long-term effects would include energy savings through thermal energy recovery from both the engine cooling jackets and the engine exhaust. Operating on natural gas would result in a reduction of dependence on foreign oil. There would be a slight increase in air emissions which would require a Title V Operating Permit.

4.2.2 Irreversible and Irretrievable Commitment of Resources

NEPA CEQ regulations require environmental analyses to identify "...any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented" (40 CFR Section 1502.16). Primary irreversible effects result from permanent use of a nonrenewable resource (e.g., minerals or energy). Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., disturbance of a cultural site) or consumption of renewable resources that are not permanently lost (e.g., old growth forests). Secondary impacts could result from environmental accidents, such as accidents or fires. Natural resources include minerals, energy, land, water, forestry and biota. Nonrenewable resources are those resources that cannot be replenished by natural means, including oil, natural gas and iron ore. Renewable natural resources are those resources that can be replenished by natural means, including water, lumber and soil.

A commitment of fuel, including natural gas and energy would be required to construct the CHP facility. Other resource commitments during the construction phase would include construction materials and labor. There would be an additional long-term commitment of labor for the maintenance of the facility and the infrastructure. Once the CHP facility is installed, there is a commitment of utilities, fuel, and power. All of these resources are considered irretrievably committed.

Although the commitment of the above resources are considered irretrievable, energy consumption would be reduced, there would be a decrease on the dependence on oil, and there will be a reduction of purchased electrical power. Additionally, no irreversible or irretrievable effects are expected for cultural resources or other natural resources, including land and water.

5.0 REFERENCES

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Acronyms and Abbreviations

ALC	Adelphi Laboratory Center
ARL	Army Research Laboratory
BMP	best management practices
Btu	British thermal unit
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Register
CHP	combined heat and power
CO	carbon monoxide
CWA	Clean Water Act
dB(A)	A-weighted decibel
DoD	Department of Defense
DOT	Department of Transportation
EA	environmental assessment
EIAP	environmental impact analysis process
EIS	environmental impact statement
EO	Executive Order
ESA	Endangered Species Act
FDA	Food and Drug Administration
FONSI	Finding of No Significant Impact
GSA	General Services Administration
HHV	higher heating value
hp	horsepower
HVAC	heating, ventilation and air conditioning
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resource Management Plan
KW	kilowatt
mbh	thousands of BTUs per hour
MDE	Maryland Department of the Environment
MMCF	million cubic feet
NCPC	National Capital Planning Commission
NMHC	non-methane hydrocarbons
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
O ₃	ozone
Pb	lead
PM _{2.5}	particulate matter less than or equal to 2.5 micrometers in diameter
PM ₁₀	particulate matter less than or equal to 10 micrometers in diameter
ppm	parts per million
R&D	research and development
RGGI	Regional Greenhouse Gas Initiative
ROI	region of influence
scf	standard cubic foot
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO ₂	sulfur dioxide
tpy	tons per year
USACE	U.S. Army Corps of Engineers
USAG	U.S. Army Garrison
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound