SUMMARY

S.1 INTRODUCTION

This environmental impact statement (EIS) assesses the U.S. Department of Defense (DOD) proposed action to design, construct, and operate one or more pilot test facilities for assembled chemical weapon (ACW) destruction systems at one or more chemical weapons stockpile installations.

S.1.1 Background

The U.S. Congress has mandated the destruction of the U.S. chemical weapons stockpile (Volume 50, page 1521 of the *United States Code* [50 USC 1521]). The destruction is necessary in order to comply with the *Convention on the Prohibition of the Development, Stockpiling, and Use of Chemical Weapons and Their Destruction*. This convention, commonly known as the Chemical Weapons Convention or CWC, is an international treaty that entered into force on April 29, 1997, the same day it was ratified by the U.S. Congress. The CWC (Article IV, Paragraph 6) established the date for the destruction of chemical weapons stockpiles as 10 years after the entry into force of the convention, or April 29, 2007. The CWC also contains a provision for submitting a request to the Organization for the Prohibition of Chemical Weapons to extend the destruction completion date for five years, until April 29, 2012. As part of the *Omnibus Consolidated Appropriations Act of 1997* (Public Law [P.L.] 104-208), the U.S. Congress established the Assembled Chemical Weapons Assessment Program (ACWA).

S.1.2 Purpose and Need

DOD defines ACWs as munitions containing both chemical agent and energetic material (explosives and propellants) that are stored in the U.S. chemical weapons stockpile. (The agent is in the form of either blister agent [mustard agent H, HD, or HT] or nerve agent [GB, also known as Sarin, or VX]).

The purpose of the proposed action is to pilot test alternative systems that do not involve incineration for destroying the ACWs stockpiled in the United States. Such testing is necessary in order to respond adequately to the *National Defense Appropriations Act for Fiscal Year 1999*. In this legislation, Congress directed the Program Manager of ACWA (PMACWA) to plan for the pilot-scale testing of alternative technologies.

S.1.3 Scope of the EIS

Scope refers to the range of actions, alternatives, and impacts to be considered in an EIS.

The ACW destruction systems analyzed in the EIS are those that have completed successfully the demonstration phase of development: neutralization/biological treatment (Neut/Bio), neutralization/supercritical water oxidation (Neut/SCWO), neutralization/gas-phase chemical reduction/transpiring wall supercritical water oxidation(Neut/GPCR/TW-SCWO), and electrochemical oxidation (Elchem Ox). Potential locations for pilot testing include Anniston Army Depot (ANAD) in Alabama, Pine Bluff Arsenal (PBA) in Arkansas, Pueblo Chemical Depot (PCD) in Colorado, and Blue Grass Army Dept (BGAD) in Kentucky (Figure S.1-1).

The scope of the EIS includes the impacts from constructing and operating each of the ACW destruction systems successfully demonstrated by ACWA as a pilot test at each of the four installations under consideration. These activities could occur simultaneously with any existing chemical demilitarization programs and schedules at these installations. Appropriate ACW destruction systems could be piloted at more than one installation. Whether a particular system is appropriate for initial consideration at an installation is determined by the system's applicability to the components of the installation's stockpile. The rationale used to arrive at the EIS alternatives is described in more detail in Chapter 2 of the EIS. At ANAD and BGAD, all four systems are considered. At PBA, all technologies are considered except Neut/Bio, because this installation has no ACWs with blister agent. At PCD, which has only blister agent, the technologies considered are limited by P.L. 106-398 to those demonstrated by ACWA on or before May 1, 2000. These are Neut/Bio and Neut/SCWO. This EIS also addresses a no action alternative: continued storage at the stockpile installations until a destruction system can be constructed and implemented (PCD and BGAD) or until the ACW stockpile can be destroyed at the baseline incineration facility already being used for other demilitarization activities (ANAD and PBA). The process used to arrive at the proposed action and alternative systems and installations is described in more detail in Chapter 2. Table S.1-1 links the alternative destruction systems proposed for pilot testing to the types of agent at each installation.

The substantive impact areas that are considered for each installation include the following broad categories: land use, infrastructure, waste management, air quality, noise, human health and safety, visual resources, geology and soils, water use and quality, biological resources, cultural resources, socioeconomics, environmental justice, agriculture, accidents, and cumulative effects. Discussions of the affected environment and the impact of facility construction and routine operation for each installation are found in Chapters 4 (ANAD), 5 (PBA), 6 (PCD), and 7 (BGAD) of the EIS.

Since the eventual size (throughput) of the pilot facility has not been determined, for purposes of the EIS analysis, a full-sized facility is assumed. A full-sized facility is considered to be comparable to the incineration facilities being constructed by the U.S. Army Program Manager for Chemical Demilitarization (PMCD) at ANAD and PBA. The EIS also assumes that

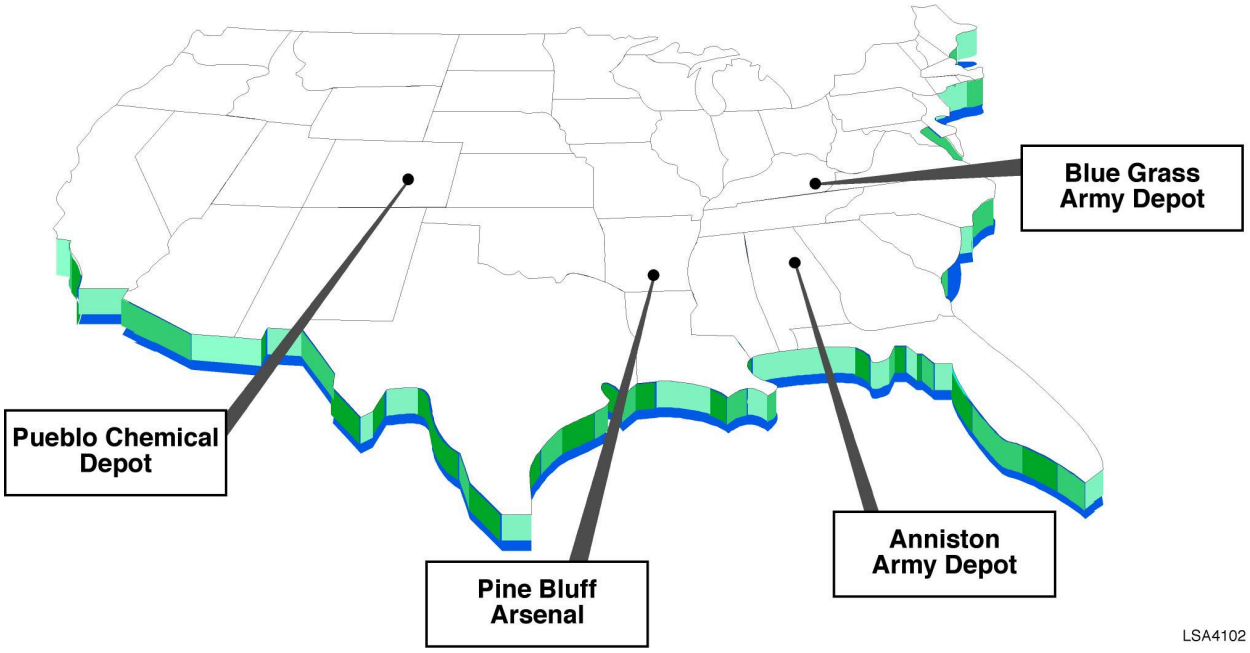

FIGURE S.1-1 Locations of the U.S. Army's Stockpile of Lethal Unitary Chemical Munitions Included in the EIS

TABLE S.1-1 Applicability of Alternative Destruction Systems to Installation Stockpiles[a]

Installation and Agent	Neut/Bio	Neut/SCWO	Neut/GPCR/ TW-SCWO	Elchem Ox
Anniston Army Depot				
Blister	Yes	Yes	Yes	Yes
Nerve	No	Yes	Yes	Yes
Pine Bluff Arsenal				
Blister[b]	None	None	None	None
Nerve	No	Yes	Yes	Yes
Pueblo Chemical Depot				
Blister	Yes	Yes	NC	NC
Nerve	None	None	None	None
Blue Grass Army Depot				
Blister	Yes	Yes	Yes	Yes
Nerve	No	Yes	Yes	Yes

[a] Yes = There are ACWs with this agent at this installation. None = There are no ACWs with this agent at this installation. No = The technology is not applicable to this agent. NC = This technology is not considered at this installation on the basis of P.L. 106-398.

[b] PBA does have bulk quantities of blister agent, but pilot testing would not apply to bulk agent.

the pilot tests will operate at design throughputs. The design throughput is the maximum capacity of the overall destruction system. These parameters allow for the assessment of a reasonable worst-case scenario. The amount of time assumed for facility construction is about 34 months, and up to 36 months is assumed for facility operations.

For the EIS analysis, it would be premature to assume that a proposed technology would be used to destroy the entire inventory at an installation. Any use of a proposed technology beyond pilot testing is beyond the scope of the EIS. For this reason, closure and decommissioning of pilot test facilities are also addressed in the EIS scope.

S.1.4 Public Involvement

S.1.4.1 General Public Involvement

DOD has invited full public participation and has promoted open communication with the public in order to facilitate better decision making. All persons and organizations that have a potential interest in the proposed action, including minority, low-income, disadvantaged, and Native American groups, have been urged to participate. The scoping and public involvement processes have helped DOD focus the EIS on issues of importance to the public and other interested agencies and organizations.

The public participation process for this EIS is guided by (1) the President's Council on Environmental Quality (CEQ) implementing regulations; (2) DOD Directive 6050.1, *Environmental Effects in the United States of DOD Actions*; and (3) Army Regulation (AR) 200-2, *Environmental Effects of Army Actions.* These three regulations provide for public participation and notification through the following: (1) the notice of intent (NOI), (2) public scoping, (3) public review of the draft EIS (DEIS), (4) public meetings on the DEIS, (5) public release of the final EIS (FEIS) and a 30-day waiting period, and (6) publication of the Record of Decision (ROD). These steps are discussed in Sections S.1.4.3 through S.1.4.6.

S.1.4.2 ACWA Dialogue

In addition to receiving guidance from the general public participation process established by CEQ implementing regulations, DOD has instituted the ACWA Dialogue to foster additional public participation opportunities in areas such as perspectives on the ACWA Program, development of ACWA technologies, and the *National Environmental Policy Act* (NEPA) process. The goal of the Dialogue is to draw on a wide range of experience, perspectives, and expertise to help identify and demonstrate safe, effective, and broadly acceptable methods for the destruction of chemical munitions and the disposal of the resulting materials or waste streams.

Participants in the Dialogue include representatives of affected communities, state regulatory and tribal representatives, U.S. Environmental Protection Agency (EPA) staff, DOD staff from affected installations and headquarters, representatives from national citizens' groups that regularly work on the chemical demilitarization issue, and other concerned entities.

S.1.4.3 Notice of Intent and Public Scoping

The NOI for the EIS was published in the April 14, 2000, issue of the *Federal Register* (Attachment 1 in the FEIS). This was followed by a 45-day scoping period. Public scoping meetings were held in May 2000 in Pueblo, Colorado; Pine Bluff, Arkansas; Anniston, Alabama; Richmond, Kentucky; and Washington, D.C. The written comments obtained through this process were taken into consideration in developing the scope of the EIS.

S.1.4.4 Draft Environmental Impact Statement (DEIS)

Copies of the DEIS were made available for review and comment. A Notice of Availability was published in the *Federal Register* on May 9, 2001, to notify the public of the DEIS release. A 45-calendar-day comment period (starting on the date of publication of the notice of availability [NOA] in the *Federal Register*) was established to give all agencies, organizations, and individuals the opportunity to comment on the DEIS. The comment period was subsequently extended by DOD for 45 days in response to public request, and it ended on August 9, 2001. During the comment period, DOD collected written comments and held public meetings at each of the four installations considered in the EIS.

S.1.4.5 Final Environmental Impact Statement (FEIS)

DOD assessed and considered the comments on the DEIS provided by agencies, organizations, and individuals. This FEIS incorporates changes suggested in these comments, as appropriate, and contains written responses to the comments received during the DEIS review period. Copies of the comments and their responses are provided in Volume 2 of this FEIS. The NOA for the FEIS was published in the *Federal Registe*r and in local and regional newspapers to inform the public of the FEIS release. The notices also identified where the FEIS would be available and informed people how they could obtain copies.

S.1.4.6 Record of Decision (ROD)

At least 30 days after the publication of the FEIS NOA, a ROD will be signed and published in the *Federal Register* by the Army. The ROD will describe DOD's decision regarding the proposed action, identify potential problems, explain any uncertainties, and identify the type and extent of impacts that might occur. The ROD will also describe the actions to be taken by DOD to reduce or mitigate any significant adverse impacts associated with its decision.

S.2 PROPOSED ACTION

DOD proposes to design, construct, and operate one or more pilot test facilities for ACW destruction systems at one or more chemical weapons stockpile installations. The action would occur simultaneously with any existing chemical weapons destruction or demilitarization programs and schedules at these installations. The ACWA pilot test facilities are further described in Chapter 3 of the EIS.

S.3 DESCRIPTION OF ALTERNATIVE DESTRUCTION SYSTEMS AND NO ACTION

The ACWs to be destroyed exist in a variety of forms, each with a different combination of components. All consist of a metal casing, within which there is some type of chemical agent. By definition, ACWs also contain some type of explosive (known as a burster) for chemical agent dispersal. This burster may be accompanied by a fuze (an initiating mechanism) and a supplemental charge.

Artillery projectiles, mortar projectiles, rockets, and land mines are the major forms of ACWs (Figure S.3-1). The chemical agents contained in these forms fall into two main categories: nerve agents and chemical blister agents. GB (Sarin) and VX are the two types of nerve agents in ACWs. Three closely related types of blister agents are used in ACWs: the mustard agents H, HD, and HT. Table S.3-1 lists the types and locations of the ACWs that are considered in the EIS and the types of components that may be associated with each type of munition. Any single ACW contains one type of agent and one or more types of energetic material (explosives and propellants). Each stockpile location has a different combination of ACW types.

Four systems for ACW destruction are being considered for pilot testing: neutralization/ biotreatment (Neut/Bio), neutralization/supercritical water oxidation (Neut/SCWO), neutralization/gas-phase chemical reduction/transpiring wall supercritical water oxidation (Neut/GPCR/TW-SCWO), and electrochemical oxidation (ElChem Ox). Each of the technology systems being considered for pilot testing is designed to treat four categories of material: agent, energetics, metal parts, and dunnage. These four systems are described briefly below and in greater detail in Chapter 3 of the EIS.

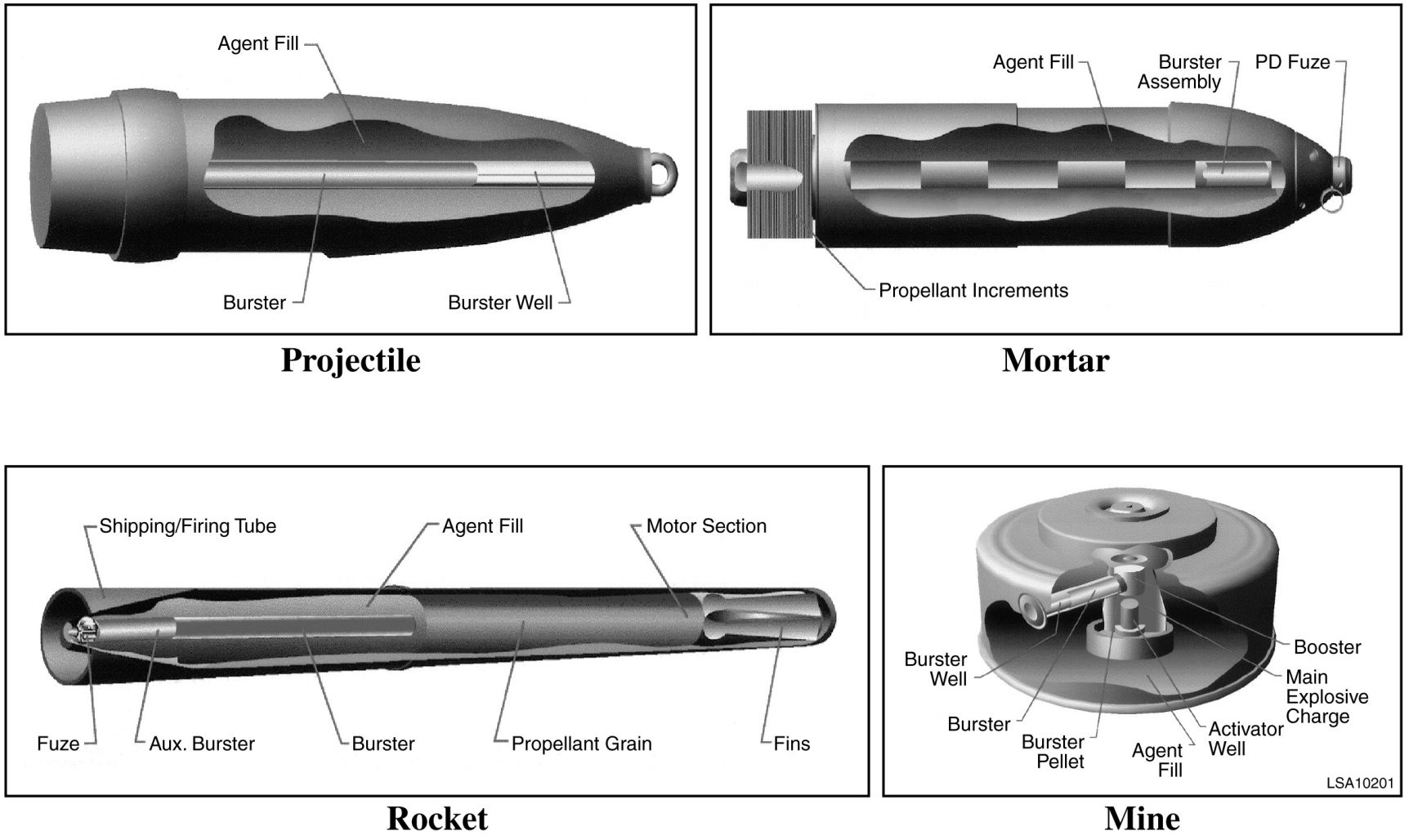

FIGURE S.3-1 General Diagrams of a Projectile, Mortar, Rocket, and Mine

TABLE S.3-1 Agent, Burster, and Propellant Types That May Be Associated with Each Munition Type

ACW Form and Munition Type	Agent Type	Burster and Supplemental Charge Type	Fuze[a]	Propellant[b]	Applicable Location[c]
155-mm projectiles M121, M121A1, M104, M110, M122	GB, VX, H, HD	Composition B4, tetrytol, TNT	No	No	ANAD, PCD,[d] BGAD
105-mm projectiles M60, M360	HD, GB	Tetrytol, Composition B4	Yes	No	ANAD, PCD[d]
105-mm cartridges M60, M360	HD, GB	Tetrytol, Composition B4	Yes	Yes	ANAD, PCD[d]
8-in. projectiles M426	GB, VX	Composition B4, TNT	No	No	ANAD, BGAD
4.2-in. mortars M2, M2A1	HD, HT	Tetryl, tetrytol	Yes	Yes	ANAD, PCD[d]
Rockets M55, M56[e]	GB, VX	Composition B4, tetrytol	Yes	Yes[e]	ANAD, PBA, BGAD
Land mines M23	VX	Composition A5, Composition B4, tetryl	Yes	No	ANAD, PBA

[a] Fuzes are mechanical devices that trigger the detonation of a small explosive charge (commonly lead azide), which, in turn, detonates the larger supplemental and burster charges.

[b] Propelling charges are predominately nitrocellulose compounds with nitroglycerin added.

[c] Only for those locations included in this EIS.

[d] Only the mustard agents HD and HT are contained in munitions at PCD.

[e] The M56 is a rocket warhead without a rocket motor (i.e., propellant) attached.

Source: U.S. Army (1988).

S.3.1 Neutralization Followed by Biological Treatment (Figure S.3-2)

This alternative process would disassemble the munitions to access the agent and energetics and subsequently neutralize the blister agent and energetics with water and caustic chemicals. The products of neutralization would then be destroyed in a biological treatment (i.e., biotreatment) process operated at near ambient temperatures and pressures. Air emissions would be passed through an air pollution control process. Recovered metal parts and dunnage would be

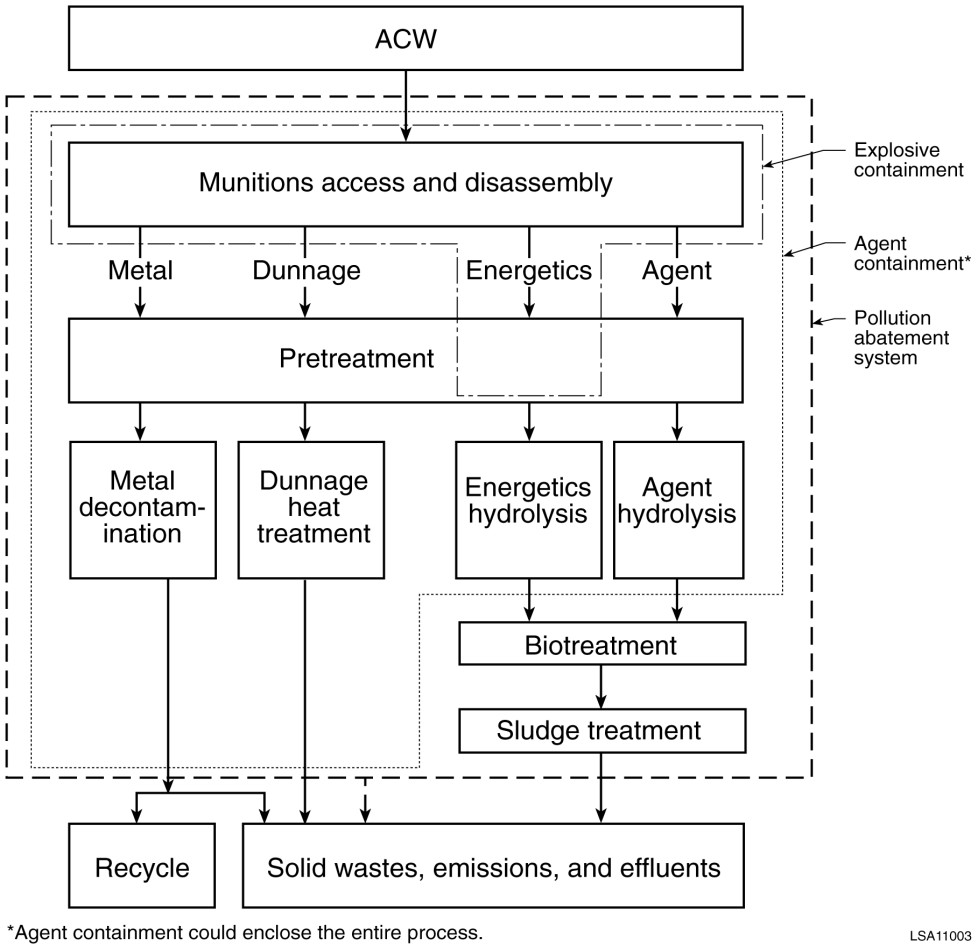

FIGURE S.3-2 Neutralization/Biotreatment System

treated at high temperatures. Effluents could be held and tested before being released to pollution control processes. Process water would be reused, and remaining solid residues would be disposed of in an appropriate landfill. The PMACWA considers this a viable solution for the destruction of ACWs containing mustard agents but not for ACWs containing nerve agents (PMACWA 1999). The ACW destruction system based on this technology is described in greater detail in Chapter 3 of the EIS.

S.3.2 Neutralization Followed by Supercritical Water Oxidation (Figure S.3-3)

This alternative would disassemble the munitions to access the agent and the energetics. They would then be neutralized with water and caustic chemicals. The products of the neutralization and the shredded dunnage would then be destroyed by the SCWO process. SCWO mineralizes the resulting chemicals at temperatures and pressures above the critical point of water (705.2°F and 3,204.6 pounds per square inch absolute [psia]). Recovered metal parts

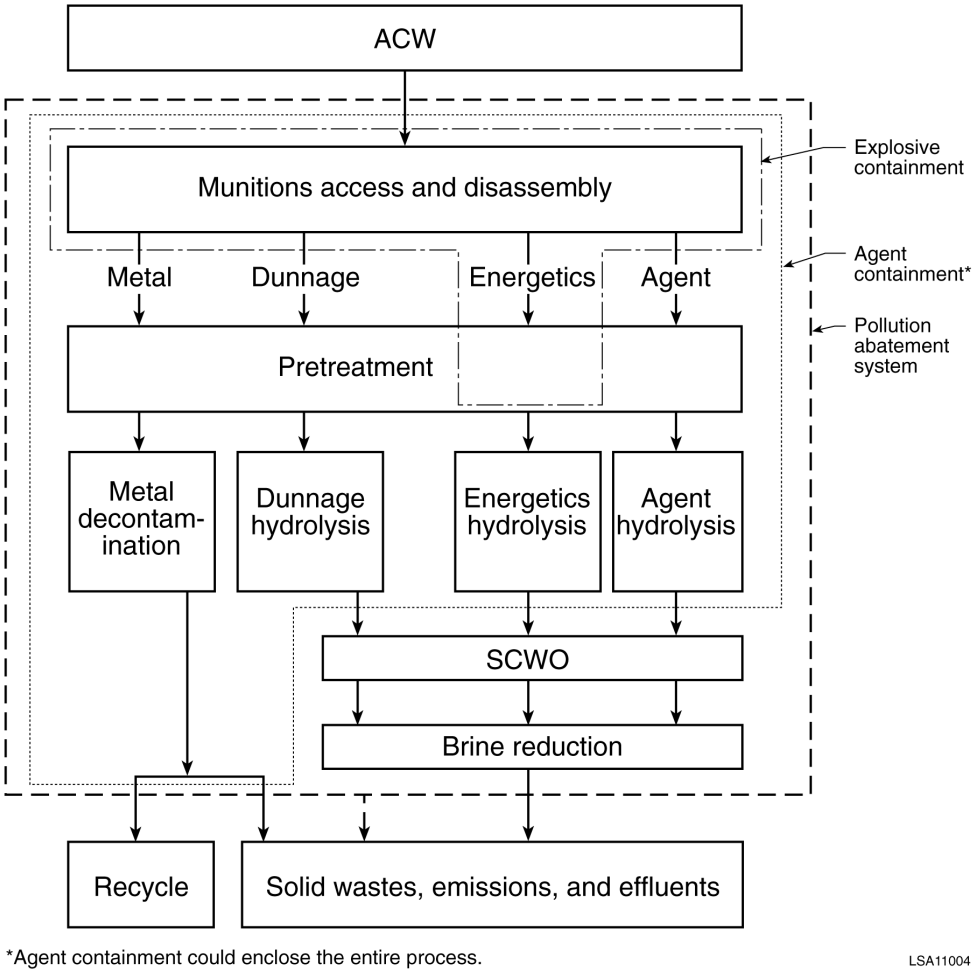

FIGURE S.3-3 Neutralization/SCWO System

would be washed with caustic chemicals and treated at high temperatures. Effluents could be held and tested before being released to pollution control processes. Process water would be reused, and remaining solid residues would be disposed of in an appropriate landfill. The PMACWA considers this technology a viable solution for the destruction of all ACWs (PMACWA 1999).

S.3.3 Neutralization Followed by Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation (Figure S.3-4)

The Neut/GPCR/TW-SCWO process consists of the neutralization of agents and energetics, gas-phase chemical reduction (GPCR) of solids and gasses, and treatment of hydrolysate using transpiring wall (TW) supercritical water oxidation (SCWO). As envisioned, the system would use the baseline reverse assembly process or a modification of this process for

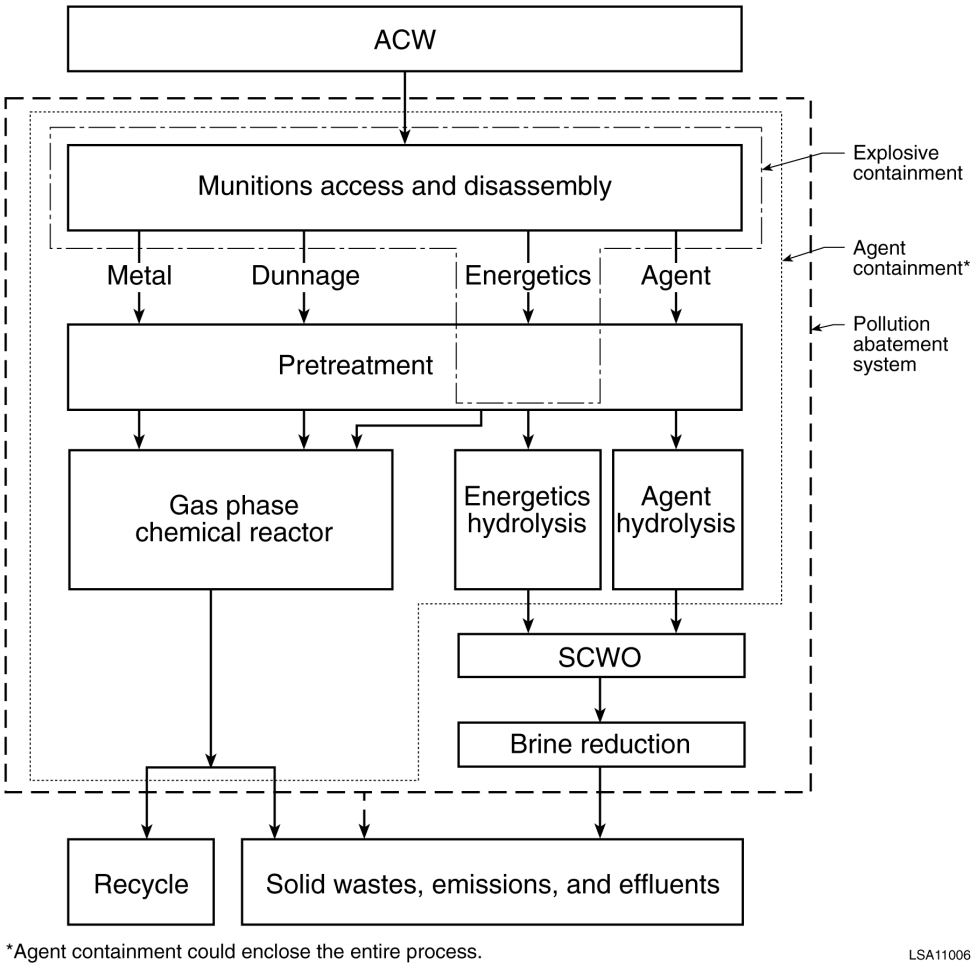

FIGURE S.3-4 Neutralization/GPCR/TW-SCWO System

ACW disassembly, after which materials would be prepared for neutralization. Agents and energetics would be neutralized in separate hydrolysis systems by using a caustic solution for nerve agent and energetics and by using water followed by caustic for mustard agent.

To decrease other hazards and chemical compounds of concern that might remain after neutralization, the agent and energetic hydrolysates would be combined and treated by SCWO. This process takes place in a vessel with a transpiring wall through which water would be continuously pumped to prevent corrosion and the buildup of solids. Metal parts would be treated by caustic hydrolysis and washed. Then metals parts and dunnage would be thermally treated in a hydrogen and steam atmosphere to ensure that agents and energetics were destroyed. The PMACWA considers this technology to be a viable solution for the destruction of all ACWs (PMACWA 2001).

S.3.4 Electrochemical Oxidation (Figure S.3.5)

The electrochemical oxidation system (SILVER II™) employs silver nitrate in a concentrated nitric acid bath to which electric current is applied to oxidize organic substances. Thermal decontamination is used for metal parts and dunnage. As currently envisioned, the system would use the baseline reverse assembly process or a modification of this process for ACW disassembly. After disassembly, materials would be prepared for treatment. To completely eliminate other hazards and chemical compounds of concern, agents and energetics would be treated in separate oxidation systems. Nitrogen oxides formed as a result of the oxidation process would be converted to nitric acid. Dunnage would be size-reduced and then would be thermally treated. Metals parts also would be thermally treated to ensure that agents and energetics were removed. The PMACWA considers this technology a viable solution for the destruction of all forms of ACWs (PMACWA 2001).

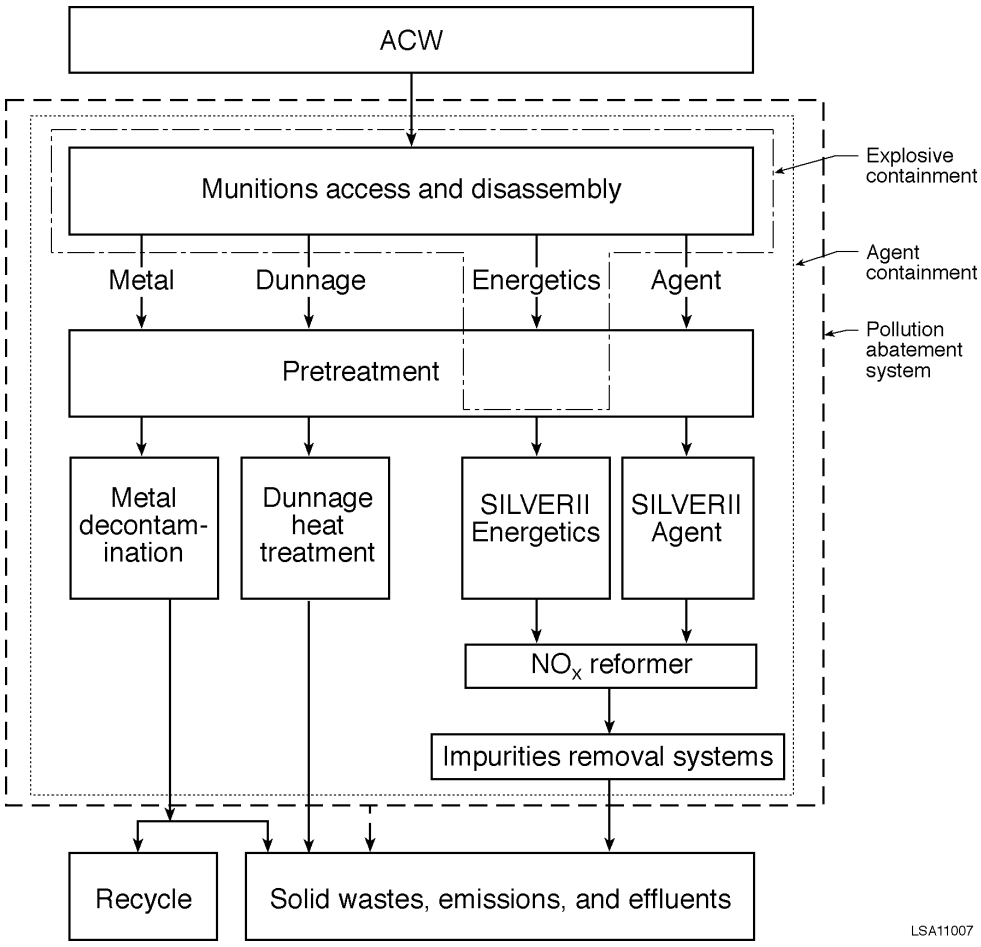

FIGURE S.3-5 Electrochemical Oxidation System

S.3.5 No Action Alternative

If the PMACWA decides not to proceed with the design, construction, and operation of a pilot facility at an installation, no ACWA pilot plant facilities would be constructed or operated there. In that situation, the portion of the ACW stockpile that would be used for pilot testing would remain in storage, as would the rest of the ACW stockpile. Under either the proposed action or the no action alternative, ACWs would continue to be stored until their destruction. The means of destruction available for the ACW stockpile would depend on the completion of construction of incinerators at ANAD and PBA and on the results from the evaluation of alternatives being included in the PMCD EISs for PCD and BGAD. Munitions being stored until their destruction would remain in their existing storage location and be maintained under existing conditions. It is assumed that the current munitions management procedures would continue to be followed and that the munitions would be safeguarded against any release to the environment.

S.4 ANNISTON ARMY DEPOT

A more detailed discussion of the affected environment and potential consequences from the proposed action and no action at ANAD is provided in Chapter 4 of the EIS.

S.4.1 Affected Environment

ANAD is located in a rural area of northeastern Alabama in Calhoun County, about 90 miles west of Atlanta, Georgia; 49 miles east of Birmingham, Alabama; and about 10 miles west of the city of Anniston. ANAD covers 15,279 acres of land.

For the EIS, three candidate locations for an ACWA pilot test facility were selected for assessment: Area A, the current location of Building 88 between C-Block and G-Block; Area B, adjacent and to the west of the incinerator presently under construction; and Area C, to the east of Elwood Road close to the center of ANAD. Figure S.4-1 locates these areas on the installation. The following describes ANAD in terms of the affected environment for each impact area.

Land Use: Current land use at ANAD includes industrial and related activities primarily associated with the maintenance of combat vehicles. The most dominant feature of the installation is more than 11,000 acres of woodland and 5 acres of lakes and streams. Surrounding land use is primarily rural, with land cover dominated by forest.

Infrastructure: ANAD purchases power from the Alabama Power Company. The incinerator is served by a 44-kV line and a substation. A main gas pipeline supplies natural gas from Alagasco. ANAD purchases water from the City of Anniston; the water distribution system is currently being upgraded to support the incinerator. ANAD treats domestic sewage at an existing sewage treatment plant that also is being upgraded.

Waste Management: ANAD generates a variety of wastes associated with its three missions: (1) vehicle maintenance, (2) munitions management, and (3) hazardous material management. Most of these wastes are packaged and shipped off post to appropriate treatment and disposal facilities. ANAD also generates a variety of nonhazardous wastes that are collected and disposed of off post in a *Resource Conservation and Recovery Act* (RCRA) Subtitle D landfill or are recycled. Sanitary wastes are treated in an on-site sewage treatment plant.

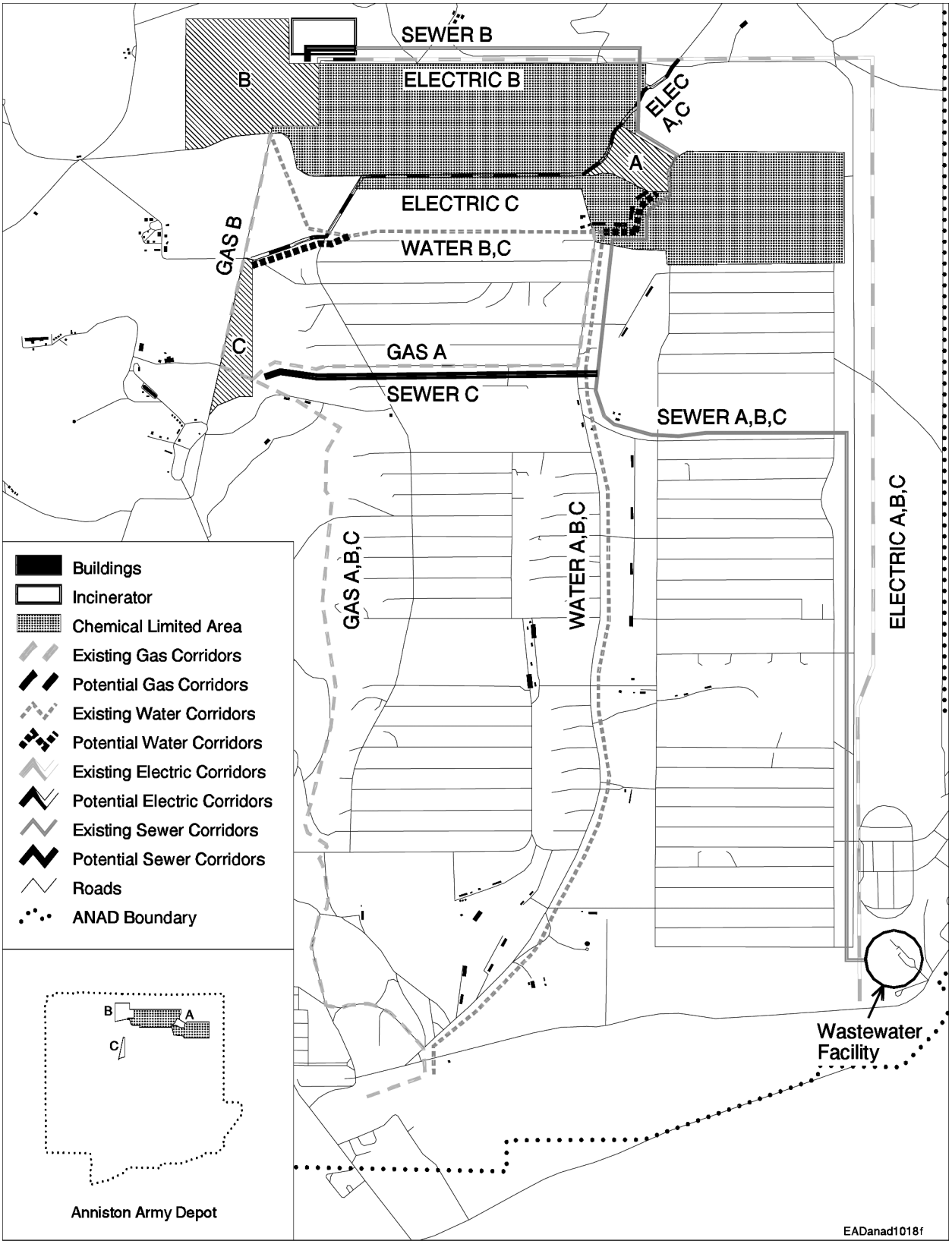

FIGURE S.4-1 Assessment Areas at ANAD

Air Quality: The climate of the surrounding area is temperate and characterized as subtropical. The existing sources of criteria pollutant emissions and volatile organic compounds (VOCs) at ANAD include boilers, degreasing operations, paint booths, fuel storage and dispensing, and open burning/open detonation. The combined emissions are large enough for ANAD to be designated as a major stationary source. Calhoun County complies with all National Ambient Air Quality Standards (NAAQS). Concentrations of particulate matter that is 2.5 micrometers or less in diameter ($PM_{2.5}$), however, are close to the proposed standard. Under Title V of the *Clean Air Act*, ANAD is classified as a major source emitter for VOCs.

Human Health and Safety: No existing contamination has been identified at areas being considered for an ACWA pilot test facility.

Noise: Most areas surrounding ANAD are suitable for noise-sensitive land uses (e.g., residential). No noise-sensitive receptors are located near the installation, and the nearest residence is located about 1.2 miles east of the installation. There are no off-post noise problems associated with on-post activities. The dense forests within and around ANAD are likely to decrease noise levels.

Visual Resources: The landscape is characterized by woodlots or forests on low mountains and hills with scattered open land areas. Industrial and administrative development is confined mostly to the southern and southeastern portions of the post.

Geology and Soils: In the Anniston area, bedrock consists of Cambrian to Ordovician-age clastic and carbonate rocks composed of sandstones, shales, cherty limestones, dolomites, and quartzites. Numerous faults are present in the ANAD vicinity, but none of them are considered capable of producing an earthquake.

Water: The quality of water in Calhoun County is generally good, and approximately 90% of the water consumed in the county is groundwater. The majority of the municipal water is groundwater supplied by Coldwater Spring, which also supplies ANAD. ANAD is located in the Coosa River Basin; water quality in the river is generally good and is satisfactory for domestic, agricultural, and most industrial uses. The proposed areas for the ACWA facility are located above the floodplain, except for 12 acres in Area A.

Biological Resources: ANAD lies within the Central Appalachian Ridges and Valleys Ecoregion, which is characterized by a mosaic of agricultural land and woodland or forest on low mountain hills. ANAD is predominantly undeveloped; 75% of the installation is unimproved.

Terrestrial communities in the vicinity consist primarily of broadleaf deciduous forest and pine forest. Tennessee yellow-eyed grass is a federal endangered species; eight colonies occur in Alabama, and two of these populations are on ANAD. Approximately 112 acres of wetland occur at ANAD.

Cultural Resources: Because ANAD presented few opportunities for permanent settlement, and because there is significant history of ground disturbance, the potential for archaeological resources is limited.

Socioeconomics: The region of influence (ROI) includes Calhoun County, Etowah County, and Talladega County. More than 90% of ANAD workers currently reside in these counties. The population of the ROI in 2000 was 296,000. From 1990 to 2000, the population grew slightly. The economy of the ROI is dominated by trade and services.

Environmental Justice: The 2000 census recorded that 22.0% of the residents of Calhoun County were minority, and the 1990 census indicated that 15.7% of the county residents were below the poverty level. The latter level was higher than that for the United States as a whole.

Agriculture: The agricultural ROI surrounding the installation contains 4.7 million acres, of which 20% were farmland in 1997. There were 6,500 farms in the ROI, of which about one-third were operated by full-time farmers. Agriculture was traditionally only a moderately significant local source of employment in the ROI, and its importance declined somewhat during the 1990s.

S.4.2 Consequences of the Proposed Action and No Action

Table S.4-1 summarizes the impacts associated with the location of each of the four technologies at ANAD and those associated with the decision to take no action. For almost all impact areas, the consequences associated with construction and normal operations for the technologies would be the same among the four technologies and no action. Some differences in impacts would occur in the areas of utility requirements, water use, human health, and socioeconomics. There would be no significant impacts in any of the impact areas.

TABLE S.4-1 ANAD Summary Table[a]

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/ Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Land use	All systems: Land requirements for the facility and additional infrastructure could total 30 to 77 acres. Impacts on and off the installation would be negligible because proposed activities would take place in the Chemical Limited Area. Normal operations would be consistent with installation use and would not significantly adversely affect other continuing installation operations.				No impacts
Infrastructure					
Electric power supply	All systems: Current infrastructure would not be able to meet the needs for the pilot facility. New service connections would have to be added, and a new substation would need to be constructed. The new power supply infrastructure would be independent of the other ANAD power supply.				No impacts.
	36 GWh/yr would be required.	60 GWh/yr would be required.	26 GWh/yr would be required.	105 GWh/yr would be required.	
Natural gas and fuel oil supply	All systems: The current infrastructure would be likely to meet the needs, although new pipelines might be needed to extend the system The fuel oil requirement is 48,000 gal/yr.				No impacts.
	50 million scf/yr of natural gas would be required.	69 million scf/yr of natural gas would be required.	130 million scf/yr of natural gas would be required.	48 million scf/yr of natural gas would be required.	
Water supply and use					
Construction	All systems: Construction would require water for a variety of uses. These needs have not been quantified; however, estimated use would be small compared with existing capacity. The existing system could meet these needs.				No impacts since there would be no construction.
Operations	All systems: The existing water supply system would be sufficient if pipeline extensions were built. The existing system would not be adequate to meet peak water demands for emergencies. About 7.5 million gal/yr of sanitary sewage would be produced. Current sewage treatment capacity would need to be expanded.				No impacts.
	7 million gal/yr of process water required; 6.4 million gal/yr of potable water required.	8.3 million gal/yr of process water required; 6.4 million gal/yr of potable water required.	18 million gal/yr of process water required; 6.4 million gal/yr of potable water required.	1 million gal/yr of process water required; 6.4 million gal/yr of potable water required.	

TABLE S.4-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/ Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Waste management and facilities					
Construction	All systems: No changes in ANAD waste management systems would be needed for management and disposal of these construction wastes. Construction would generate solid and liquid nonhazardous waste.				No impacts since there would be no construction.
	It would also generate 80 yd^3 of solid hazardous waste and 32,000 gal of liquid hazardous waste.	It would also generate 80 yd^3 of solid hazardous waste and 34,000 gal of liquid hazardous waste.	It would also generate 90 yd^3 of hazardous solid waste and 36,000 gal of liquid hazardous waste.	It would also generate 100 yd^3 of hazardous solid waste and 39,000 gal of liquid hazardous waste.	
Operations	All systems: Hazardous and nonhazardous solid wastes would be generated during the treatment processes. These solid wastes would be collected and disposed of off post at appropriately permitted facilities. Quantities of brine salts produced by all technologies would vary, depending on the agent to be destroyed. Nonprocess solid wastes could be contaminated with agent and would also require treatment. If these treatment residual wastes are defined as RCRA hazardous waste, the estimated volume of hazardous waste would be larger, and additional treatment might be necessary before disposal. Process and nonprocess liquid wastes would be recycled within the treatment process. The only liquid waste associated with ACWA facilities that would be discharged would be domestic sanitary wastewater.				No impacts.

TABLE S.4-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/ Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Operations (Cont.)	Treatment of ACWs would produce 970 tons of residual brine, which is a hazardous waste, and 550 tons of hazardous biomass. No significant impacts are expected.	Treatment of ACWs would produce brine salts ranging from 1,000 to 1,900 tons. No significant impacts are expected.	The TW-SCWO system and GPCR unit would produce hazardous salts as waste. The total salts produced would range from 1,000 to 2,200 tons. No significant impacts are expected.	Silver chloride salt cake would be produced and sent for silver recovery. The remaining salts, solids, and other impurities would be disposed of as hazardous waste. The amount would vary from 250 to 1,200 tons). Small amounts of dilute nitric acid would be neutralized and disposed of as a hazardous liquid. Treatment of ACWs would result in additional residual brine waste of 110 to 170 tons.	
Air quality — criteria pollutants					
Construction	All systems: Emissions of criteria pollutants would include fugitive dust from earth-moving activities and exhaust emissions from equipment and vehicles. Exhaust emissions would be relatively small when compared with fugitive dust. PM_{10} and $PM_{2.5}$ concentration increments would be relatively small fractions of applicable NAAQS. The total 24-hour and annual concentrations of $PM_{2.5}$ (background and incremental) would be below but close to applicable NAAQS as a result of high background concentrations.				No impacts since there would be no construction.
Operations	All systems: Estimated maximum concentration increments would contribute less than 9% of applicable NAAQS for all pollutants. Except for 8-hour CO and $PM_{2.5}$, total concentrations of criteria pollutants (background plus incremental) would be less than or equal to 53% of NAAQS. CO and $PM_{2.5}$ would be close to, but still below, standards because of high background levels.				Impacts on air quality expected to be minimal.

TABLE S.4-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/ Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Air quality — toxic air pollutants					
Construction	All systems: Impacts would be negligible. Minor emissions would result from construction equipment.				No impacts since there would be no construction.
Operations	All systems: Routine operations: Pilot facility would not be a major source of HAP emissions and would not fall under any of the source categories regulated by the EPA under NESHAP. Fluctuating operations: No agent emissions would be expected. Modeling of worst-case emissions resulted in estimated ambient agent concentrations of less than 1% of the allowable concentrations for general population exposure established by the CDC.				No impacts.
Human health and safety — routine operations					
Construction	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 18	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 23	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 23	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 24	No impacts since there would be no construction.
	All systems: Other on-post workers: There would be no adverse health impacts. Off-post public: There would be no adverse health impacts.				
Operations	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 31	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 31	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 31	Facility workers: Estimated annual fatalities: <1 Estimated Annual injuries: 31	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 4

TABLE S.4-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/ Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Operations (cont.)	All systems: Other on-post workers: Estimated hazard indices and carcinogenic risks from inhalation of toxic air pollutants are well below benchmarks considered representative of negligible risk levels. No agent emissions are expected. Even under hypothetical worst-case emission levels, the maximum estimated on-post concentration would be less than 1% of the allowable concentration for general public exposures. The maximum estimated incremental cancer risk from the inhalation of hypothetical mustard emissions is well below the benchmark risk value. Off-post public: Estimated hazard indices and carcinogenic risks from inhalation of toxic air pollutants are well below benchmarks considered representative of negligible risk levels. No agent emissions are expected, but even under hypothetical worst-case emission levels, the maximum estimated off-post concentration would be less than 1% of the allowable concentration for general public exposures. The maximum estimated incremental cancer risk from the inhalation of hypothetical mustard emissions is well below the benchmark risk value.				No impacts.
Noise					
Construction	All systems: Construction activities would result in maximum estimated noise levels of approximately 48 dBA at the installation boundary closest to a proposed construction site. This level is below the EPA guideline of 55 dBA for residential zones. Potential noise impacts are expected to be minor to negligible at the nearest residence.				No impacts since there would be no construction.
Operations	All systems: Noise levels generated by operation should have negligible impacts on the residence located nearest to the proposed facility and would be well within EPA guideline limits for residential areas.				Levels of noise generated by current stockpile maintenance activities would be part of the background noise levels.
Visual resources					
Construction	All systems: No effect on visual character.				No impacts since there would be no construction.
Operations	All systems: ACWA facility would be consistent with surrounding land uses and would not adversely affect visual character. Operation would not create significant visible emissions.				No impacts.

TABLE S.4-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/ Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Geology and soils					
Construction	All systems: Approximately 25 acres of ground could be disturbed to some degree from construction of the pilot facility. Development of utilities could cause additional soil disturbance. This could result in increased potential for erosion, which, in turn, could affect surface water bodies and biological resources. Best management practices would be used to minimize potential for erosion.				No impacts since there would be no construction.
Operations	All systems: Concentrations of contaminants from operations would be so low that they would have no impact on surface soils.				No impacts.
Groundwater					
Construction	All systems: Impacts would be none to negligible, and if impacts did occur, they would be temporary and short-lived. Water use during construction is estimated to be 7 million gal over three years. This is about 0.02% of the minimum yield of Coldwater Spring and would have a negligible impact on the water supply from the spring. Impacts on the groundwater aquifer would also be negligible. Construction would generate 4.5 million gal of sanitary waste over the same period of time.				No impacts since there would be no construction.
Operations	Use of 14 million gal/yr is about 0.04% of the minimum flow of Coldwater Spring.	Use of 15 million gal/yr is slightly more than 0.04% of the minimum flow of Coldwater Spring.	Use of 24 million gal/yr is slightly more than 0.2% of the minimum flow of Coldwater Spring.	Use of slightly more than 7 million gal/yr is about 0.02% of the minimum flow of Coldwater Spring.	No impacts.
Surface water					
Construction	All systems: Construction impacts on surface flow would be negligible to minor and could be naturally mitigated by standard construction practices. There would be no impacts on off-post surface water.				No impacts since there would be no construction.
Operations	All systems: Impacts on both on-post and off-post surface water would be negligible to low. Estimated sewage discharge of 7.5 million gal/yr would be small compared with surface water flows and would not significantly change flow conditions in the vicinity of the treatment plant. The additional withdrawals at Coldwater Spring would not be significant and would have negligible impacts on the surface water environment downstream of the spring.				No impacts.

TABLE S.4-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/ Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Terrestrial habitats and vegetation					
Construction	All systems: The pilot facility would require approximately 25 acres; however, up to 11 acres might be disturbed as a result of infrastructure additions for Area A, up to 6 acres for Area B, and up to 52 acres for Area C. Biotic communities occurring in undeveloped land in all three areas are relatively common and well represented. Disturbance of communities within existing corridors would be temporary.				No impacts since there would be no construction.
Operations	All systems: During routine operations, biota in the vicinity of the facility would be exposed to emissions from the boiler and the process stack. Emissions would be within applicable standards. Maximum annual average air concentrations of organic compounds due to facility emissions would be considerably lower than levels known to be harmful to biota.				No impacts.
Wildlife					
Construction	All systems: The loss of habitat would not be expected to threaten local populations of any wildlife species since similar habitat would be available nearby.				No impacts since there would be no construction.
Operations	All systems: Deposition from atmospheric emissions would result in very low concentrations of trace metals and organic compounds, well below levels known to be harmful to biota. Consequently, routine operations would result in negligible impacts on wildlife.				No impacts.
Aquatic habitats and fish					
Construction	All systems: Rerouting or culverting the streams in Area A could result in loss of stream habitat. Because of the limited diversity of aquatic habitat and lack of undisturbed habitat in Area A, disturbances could constitute a minor adverse impact. Aquatic habitats do not occur in Areas B or C.				No impacts since there would be no construction.
Operations	All systems: Water withdrawal from surface waters, as well as wastewater discharge, would result in negligible changes to surface water levels. These changes would result in only negligible impacts on aquatic ecosystems. Depositions from atmospheric emissions would result in very low concentrations of trace metals and organic compounds, well below levels known to be harmful to biota.				No impacts.

TABLE S.4-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/ Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Protected species					
Construction	All systems: None of the sites assessed for the pilot facility or the routes for infrastructure corridors are located in the immediate vicinity of populations of Tennessee yellow-eyed grass. Therefore, the direct impact on this species from construction would be negligible. Implementation of storm-water control measures would greatly reduce the potential for indirect impacts.				No impacts since there would be no construction.
Operations	All systems: During routine operations, biota in the vicinity of the pilot facility would be exposed to atmospheric emissions from the boiler stack and the process stack. Facility emissions would be within applicable air quality standards. The maximum annual average concentration of trace metals would be well below levels known to result in adverse impacts on biota through biouptake and biomagnification. Routine operations would not affect Tennessee yellow-eyed grass.				No impacts.
Wetlands					
Construction	All systems: The loss of up to 1.2 acres of palustrine wetland, up to 1,912 ft of riverine wetland, and up to 12 acres of floodplain as a result of construction in Area A would constitute a moderate to large adverse impact. Wetlands do not occur in Areas B or C.				No impacts since there would be no construction.
Operations	All systems: Water withdrawals from surface waters for the pilot plant as well as wastewater discharge would result in negligible changes in surface water levels. These changes would result in only negligible impacts on aquatic ecosystems, including wetlands located on the periphery of the surface water bodies.				No impacts.
Cultural resources					
Construction	All systems: The probability of adverse effects on cultural resources as a result of construction is very small. The potential for archaeological sites is low in most areas of ANAD. Each of the construction areas is a considerable distance from known archeological sites. No traditional cultural properties are known to exist within the proposed construction areas. Only Area A includes an existing structure, which is scheduled for demolition.				No impacts since there would be no construction.
Operations	All systems: Routine operations should have no impact on archaeological resources, traditional cultural properties, or historic structures.				No impacts.

TABLE S.4-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/ Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Socioeconomics					
Construction	All systems: The impact on the ROI would be relatively small. In-migration would have only a marginal effect on population growth. No significant impact on public finances or public service jobs would be expected. On-post employee commuting patterns would have no impact on levels of service in the local transportation network.				No impacts since there would be no construction.
	Increases: Employment: 640 direct jobs 540 indirect jobs Income: $35 million In-migrating population: 640	Increases: Employment: 730 direct jobs 520 indirect jobs Income: $37 million In-migrating population: 890	Increases: Employment: 740 direct jobs 580 indirect jobs Income: $39 million In-migrating population: 970	Increases: Employment: 790 direct jobs 620 indirect jobs Income: $42 million In-migrating population: 1,100	
Operations	All systems: The impact on the ROI would be relatively small.				Negligible impact on the ROI.
	Increases: Employment: 660 direct jobs 580 indirect jobs Income: $46 million In-migrating population: 740	Increases: Employment: 660 direct jobs 580 indirect jobs Income: $46 million In-migrating population: 740	Increases: Employment: 660 direct jobs 590 indirect jobs Income: $46 million In-migrating population: 740	Increases: Employment: 660 direct jobs 820 indirect jobs Income: $53 million In-migrating population: 930	Continued storage produces: Employment: 90 direct jobs 60 indirect jobs Income: $7 million
Environmental justice					
Construction	All systems: The socioeconomic impacts from construction would primarily increase short-term employment and income. They would also increase demand for housing, schools, and public services. None of these impacts would be high or adverse for local governments, and the existing housing stock should be able to meet the demand. Similarly, no high and adverse impacts are anticipated during construction of an ACWA facility. As a result, environmental justice impacts are not anticipated from construction.				No impacts since there would be no construction.

TABLE S.4-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/ Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Operations	All systems: During operations, there would be no high and adverse socioeconomic impacts associated with the facility. In addition, the risk of noncancer health effects and the risk of cancer from hazardous chemicals released during normal operations would be very low for both workers and the public. Neither of these impacts would be considered high and adverse. As a consequence, no environmental justice impacts are anticipated.				No impacts.
Agriculture					
Construction	No impacts are likely as a result of construction.				No impacts since there would be no construction.
Operations	During routine operations, facility emissions would be within applicable air quality standards. A screening-level agricultural risk assessment was conducted. The results indicated negligible risk from maximum concentrations on post and even lower risk off post. There is no evidence of bioaccumulation.				No impacts.

[a] Abbreviations: CDC = Centers for Disease Control and Prevention, CO = carbon monoxide, HAP = hazardous air pollutant, NESHAP = National Emission Standards for Hazardous Air Pollutants, PM_{10} = particulate matter with a mean aerodynamic diameter of 10 micrometers or less, $PM_{2.5}$ = particulate matter with a mean aerodynamic diameter of 2.5 micrometers or less, ROI = region of influence, scf = standard cubic foot (feet).

S.5 PINE BLUFF ARSENAL

More detailed discussion of the affected environment and potential consequences from the proposed action and no action at PBA is found in Chapter 5 of the EIS.

S.5.1 Affected Environment

PBA is located in Jefferson County, Arkansas, approximately 30 miles south and slightly east of the state capital, Little Rock. PBA is about 15,000 acres in size. The U.S. Food and Drug Administration's National Center for Toxicological Research (NCTR), which employs 670 workers, occupies an area in the northern portion of PBA that is approximately 500 acres in size. In addition to storing chemical weapons, PBA performs a variety of conventional munitions production and maintenance operations, and a chemical weapons incinerator is currently under construction there.

The two potential areas selected for the proposed ACWA pilot facility are located in the northern part of PBA, near the chemical storage area. Figure S.5-1 shows the locations of these areas. The topography around these areas is flat to gently rolling hills, with both proposed areas in relatively flat locations. The areas were chosen on the basis of their suitability for construction, access to the chemical storage area, proximity to other structures and boundaries, and availability of required utilities. Area A is located immediately east of the chemical storage area; it is wooded. Area B is approximately halfway between the chemical storage area and the PMCD Pine Bluff Chemical Demilitarization Facility (PBCDF), which is currently under construction; it is not wooded. The following text describes PBA in terms of the affected environment in each impact area.

Land Use: The northern boundary of PBA borders privately owned agricultural lands and timberlands with scattered residences. The southern boundary borders developed and undeveloped industrial property. The University of Arkansas, Pine Bluff, is located 2 miles to the southeast. The town of Redfield, with a population of about 1,100, is 5 miles northwest of the PBA boundary. The NCTR is on the northeast boundary. The eastern boundary of PBA is the Arkansas River. The western boundary adjoins the Union-Pacific Railroad right-of-way, residential properties, and the town of Whitehall, with approximately 5,000 residents. Land use immediately east and north of PBA is primarily rural, in an area known for agricultural crops and livestock, including soybeans, rice, wheat, hay, cotton, and beef cattle. Agricultural land is interspersed with residential areas (communities and isolated residences) and mixed forest. To the west and south of PBA are built-up bedroom communities and a major urban area.

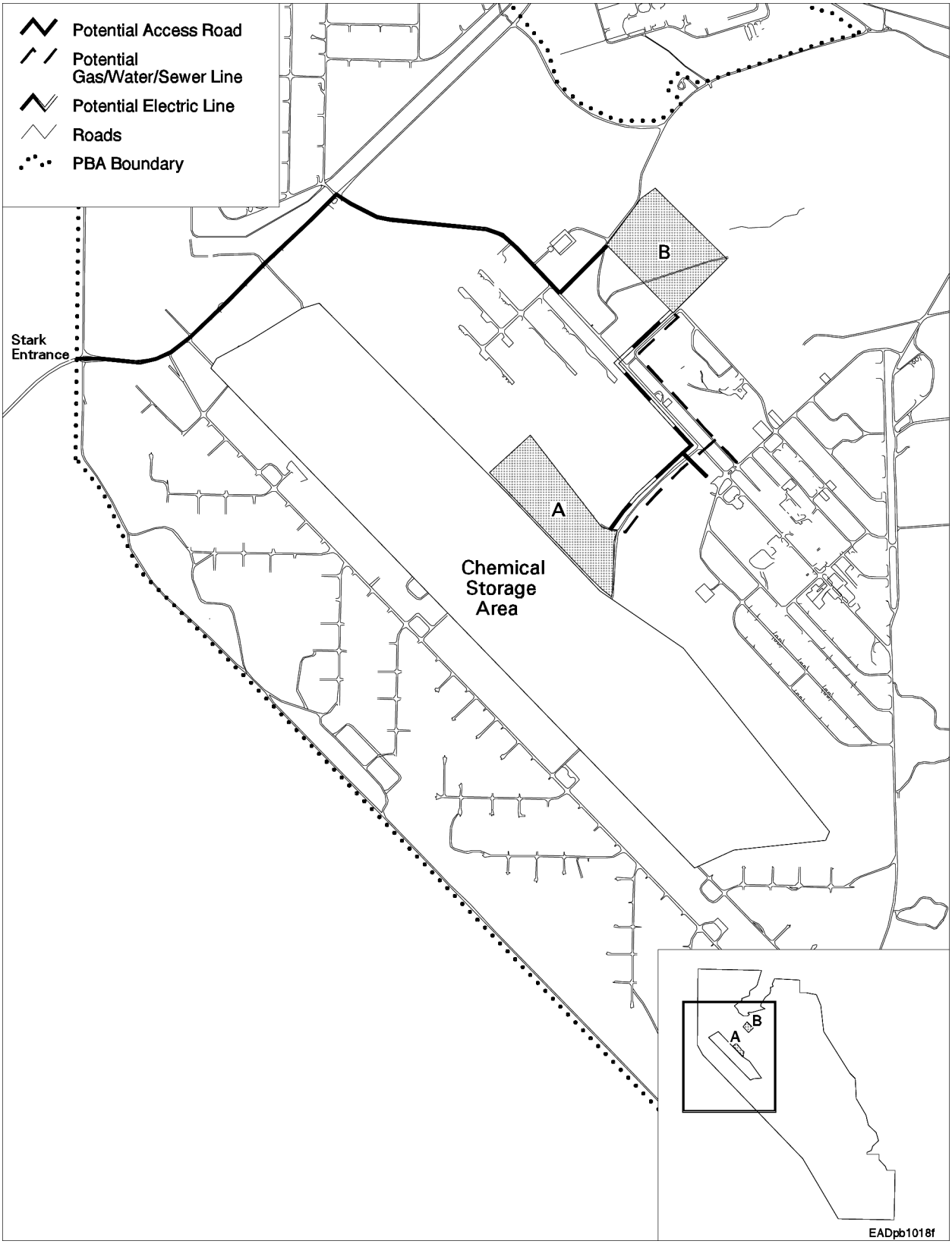

FIGURE S.5-1 Assessment Areas at PBA

Infrastructure: The current electricity supplier is Entergy Systems, which has sufficient capacity to meet current and projected needs at the installation. The natural gas supplier for PBA is Reliant Energy, which also has sufficient capacity to meet current and projected needs. Water at PBA is supplied by 12 on-post wells that have sufficient capacity to meet current and projected needs.

Waste Management: PBA currently has an incinerator under construction for use in the destruction of some or all of the chemical munitions held in inventory at the installation. PBA generates a variety of hazardous wastes associated with its missions for the Army. Most hazardous wastes generated at PBA are packaged and transported off post to appropriately permitted treatment and disposal facilities. Some wastes (off-specification conventional munitions) are treated in PBA permitted facilities. PBA also generates a wide variety of nonhazardous solid wastes. These wastes are collected and disposed of off post in a permitted landfill or recycled if possible. Sanitary wastes are treated in an on-post sewage treatment plant.

Air Quality: The state of Arkansas is divided geographically into two regions: the interior highlands and the flat lowlands, where PBA is located. The climate of the area surrounding PBA is modified continental. The summer season is marked by prolonged periods of warm and humid weather. Precipitation is normally abundant.

PBA is located in the Central Arkansas Intrastate Air Quality Control Region, which is designated as being in attainment for all NAAQS. PBA emission sources are being operated in accordance with permits issued by the Arkansas Department of Environmental Quality (ADEQ). PBA is classified as a major stationary source for Prevention of Significant Deterioration (PSD) purposes, for which actual or potential emissions are above the applicable source threshold. The only reportable source emission from PBA for 1999 under the EPA's Toxics Release Inventory (TRI) regulations was hydrochloric acid. No other toxic air pollutant emissions exceeded reporting limits under TRI.

Human Health and Safety: Contamination of groundwater was detected, and remedial action was completed.

Noise: No sensitive noise receptors are located near the installation. In the general PBA area, sound levels are typical of rural areas. Near the western boundary of PBA, the background accoustical environment may be higher because of highway and railroad traffic.

Visual Resources: PBA is located in a rural, wooded environment. Privately owned farms and timberland lie north of the installation. To the west is the Union-Pacific Railroad right-

of-way and a sparse number of residential properties. The land south and west of PBA consists primarily of undeveloped industrial property and the Mid-Atlantic Packaging Facility. The Arkansas River is the eastern boundary of PBA. Viewing distances are short on PBA, restricted by heavy vegetation and small hills. The town of Redfield is about 5 miles northwest of PBA, the town of Whitehall lies to the west, and the city of Pine Bluff lies 2 miles to the south.

Geology and Soils: PBA is located in the Gulf Coastal Plain Physiographic Province. The topography is fairly flat. The soils at PBA tend to be loamy, level to gently sloping, and poorly to moderately well drained.

PBA lies within the Ouachita Seismic Zone. There are no known faults at or near PBA. The nearby New Madrid Seismic Zone, located about 120 miles northeast of the installation, is the dominant source of major earthquakes in the area. The maximum earthquake that could occur at PBA would be a repetition of the New Madrid earthquake. PBA is located in Seismic Probability Zone I. Within this zone, minor earthquake damage may be expected to occur at least once in 500 years.

Water: Most water used in Jefferson County, Arkansas, is from groundwater sources. Other deeper aquifers exist but have not been developed because of low yield and poor quality. The Sparta Formation is the major groundwater source near PBA and supports both the city of Pine Bluff and industry. The on-post water supply for PBA is also from the Sparta Aquifer and is provided by 12 on-post wells. Water table declines in the Pine Bluff area are large and have been caused by the large withdrawals in the area.

Surface water flow at PBA is typified by sluggish, meandering streams, abandoned meanders, and oxbow lakes. The gentle topography and slow stream flow result in numerous wetland areas or bayous. PBA is located within the Caney Bayou-Arkansas River watershed.

The water quality of the streams on PBA is generally fair, and the quality of the surface waters is generally good. Water quality of bayous around PBA is generally poor, with low levels of dissolved oxygen. There are no developed areas on PBA that are subject to flooding. In Jefferson County, no surface water sources are used for public water supply.

Biological Resources: Vegetation at PBA is mostly representative of native plant communities found within the Western Gulf Coastal Plain Physiographic Province. Natural plant communities range from forested communities in the Arkansas River floodplain to upland, drier forest and grassland areas. Diverse wildlife species have been documented. Recreational fishing occurs at several locations on the installation. No federal listed species are known to occur at PBA.

Palustrine forested wetlands (hardwood bottomland forests) occur extensively along streams near PBA. The predominant hydrologic regimes in these wetland communities are seasonally and temporarily flooded. Wetland types range from permanently flooded ponds to intermittent streams.

Cultural Resources: A comprehensive cultural resources survey conducted at PBA in 1990 identified 90 locations. Forty-six of the locations were designated as sites by the Arkansas Archaeological Survey; seven sites were determined to be potentially significant. No archaeological resources have been identified within the proposed alternative construction areas for the ACWA pilot test facility.

No traditional cultural properties are known to occur within the proposed construction areas. No PBA structures were found to meet Army criteria for designation as important historical structures or eligibility criteria for the *National Register of Historic Places* (NRHP).

Socioeconomics: The Pine Bluff region of influence (ROI) surrounding the installation is composed of four counties: Grant County, Jefferson County, Lincoln County, and Pulaski County. Ninety percent of PBA workers currently reside in these counties. The population of the ROI in 2000 was almost 477,000; it grew slightly over the period 1990–2000. The economy of the county is dominated by the trade and service industries.

Environmental Justice: Of the Jefferson County residents recorded in the 2000 census, 52.0% were minority. This percentage is well in excess of the minority representation for the United States as a whole. The 1990 census recorded 23.9% of the Jefferson County population as being below the poverty level; this number also is greater than the figure for the United States as a whole.

Agriculture: The ROI includes 11 counties. This area contains 4.6 million acres of land, of which 1.6 million acres (35%) was in farms in 1997. The ROI contained 3,800 farms, with more than half operated by full-time farmers. Agriculture was historically only a moderately significant local source of employment in the ROI, and its importance declined somewhat during the 1990s.

S.5.2 Consequences of the Proposed Action and No Action

Table S.5-1 summarizes the impacts associated with the location of each of the three technologies at PBA and the decision to take no action. For all impact areas, the consequences associated with construction and normal operations of the technologies would be very similar. There would be no significant impacts associated with any of the technologies or with no action.

TABLE S.5-1 PBA Summary Table[a]

Environmental Consequence	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Land use	All systems: Actions would be consistent with current and planned installation use. Up to 37 acres would be disturbed.			No impacts.
Infrastructure				
Electric power supply	All systems: Additional electric power lines would be required.			No impacts.
	60 GWh/yr would be required.	26 GWh/yr would be required.	120 GWh/yr would be required.	
Natural gas	All systems: Construction of additional gas pipelines required. Natural gas supplier has sufficient capacity to meet current and future demand.			No impacts.
	52 million scf/yr would be required.	140 million scf/yr would be required.	48 million scf/yr would be required.	
Water supply and use				No impacts.
Construction	All systems: Impacts on water supply and sewage treatment systems would be negligible.			
Operations	The ACWA facility would have a negligible impact on water supply systems. Sewage systems have sufficient capacity to meet the additional requirements of an ACWA facility.			
	6 million gal/yr of process water would be required; 5.5 million gal/yr of potable water would be required.	18 million gal/yr of process water would be required; 6.4 million gal of potable water would be required.	900,000 gal/yr of process water would be required; 6.4 million gal/yr of potable water would be required.	
Waste management and facilities				
Construction	All systems: Hazardous and nonhazardous wastes would be generated during construction. All wastes would be collected and disposed of off post in accordance with all applicable regulations. Nonhazardous wastes would be collected and disposed of in a local landfill. Sanitary wastes would be treated in an on-post sewage treatment plant. No significant impacts are expected.			No impacts since there would be no construction.

TABLE S.5-1 (Cont.)

Environmental Consequence	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Operations	All systems: Hazardous and nonhazardous solid wastes would be generated during the treatment processes. These solid wastes would be collected and disposed of off post at appropriately permitted facilities. Quantities of brine salts produced by all technologies would vary, depending on the agent to be destroyed. Nonprocess solid wastes could be contaminated with agent and would also require treatment. If these treatment residual wastes are defined as RCRA hazardous waste, the estimated volume of hazardous waste would be larger, and additional treatment might be necessary before disposal. Process and nonprocess liquid wastes would be recycled within the treatment process. The only liquid waste associated with ACWA facilities that would be discharged would be domestic sanitary wastewater.			No impacts.
Air quality — criteria pollutants				
Construction	All systems: Concentration increments of criteria air pollutants and fugitive dust emissions would be relatively small fractions of applicable NAAQS. Total estimated annual concentration of $PM_{2.5}$ would be below but close to applicable NAAQS primarily because of high background concentration levels.			No impacts since there would be no construction.
Operations	All systems: Estimated maximum concentration increments due to operation would contribute less than 2% of applicable NAAQS for all pollutants. Except for $PM_{2.5}$, maximum estimated concentrations of criteria pollutants would be less than or equal to 54% of NAAQS. $PM_{2.5}$ would be close to standards but still below them.			No impacts.
Air quality — toxic air pollutants				
Construction	All systems: Impacts would be negligible. Minor emissions would result from construction equipment.			No impacts since there would be no construction.
Operations	All systems: Routine operations: Pilot facility emissions would not be a major source of HAP emissions and would not fall under any of the source categories regulated by the EPA under NESHAP. Fluctuating operations: No agent emissions would be expected. Modeling of worst-case emissions resulted in estimated ambient agent concentrations of less than 1% of the allowable concentrations for general population exposure established by the CDC.			No impacts.

TABLE S.5-1 (Cont.)

Environmental Consequence	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Human health and safety — routine operations				
Construction	Facility workers: Estimated annual fatalities: < 1 Estimated annual injuries: 22	Facility workers: Estimated annual fatalities: < 1 Estimated annual injuries: 23	Facility workers: Estimated annual fatalities: < 1 Estimated annual injuries: 24	No impacts since there would be no construction.
	All systems: Other on-post workers and residents: There would be no adverse health impacts. Off-post public: There would be no adverse health impacts.			
Operations	Facility workers: Estimated annual fatalities: < 1 Estimated annual injuries: 35	Facility workers: Estimated annual fatalities: < 1 Estimated annual injuries: 35	Facility workers: Estimated annual fatalities: < 1 Estimated annual injuries: 35	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 5
	All systems: Other on-post workers and residents: Estimated hazard indices and carcinogenic risks from inhalation of toxic air pollutants are well below benchmarks considered representative of negligible risk levels. No agent emissions are expected. Even under hypothetical worst-case emission levels, the maximum estimated on-post concentration would be less than 1% of the allowable concentration for general public exposures. Off-post public: Estimated hazard indices and carcinogenic risks from inhalation of toxic air pollutants are well below benchmarks considered representative of negligible risk levels. No agent emissions are expected. Even under hypothetical worst-case emission levels, the maximum estimated off-post concentration would be less than 1% of the allowable concentration for general public exposures.			No impacts.

TABLE S.5-1 (Cont.)

Environmental Consequence	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Noise				
Construction	All systems: Impacts on nearest residents would be negligible. Noise level would be below EPA guidelines for residential zones.			No impacts since there would be no construction.
Operations	All systems: Impacts on nearest residents would be negligible. Noise level would be below EPA guidelines for residential zones.			No impacts.
Visual resources				
Construction	All systems: Temporary impacts would result from increased traffic and construction dust. Impacts would be negligible.			No impacts since there would be no construction.
Operations	All systems: Impacts would be negligible. Facility would not be visible from off post. Steam from the facility might be visible on and off post during cold weather, which would be consistent with the industrial character of the area.			No impacts.
Geology and soils				
Construction	All systems: Approximately 25 acres could be affected to some degree during construction. Additional ground would be disturbed for development of site infrastructure. Best management practices would minimize adverse impacts of potential soil erosion.			No impacts since there would be no construction.
Operations	All systems: Potential impact could occur in the event of an accidental spill or release of hazardous material. Containment actions would be taken to limit migration and contaminated soils would be removed. No significant impact on soils would result from air emissions.			No impacts.
Groundwater				
Construction	All systems: Impacts would be none to negligible and would be short-lived. No contamination of groundwater is expected. Existing water supply wells have the capacity to meet construction demand.			No impacts since there would be no construction.
Operations	All systems: Increase in potable water use would not be significant, and existing wells have capacity to meet additional demand. Increased drawdown would not be permanent. Procedures exist to preclude spills and to address them should they occur.			No impacts.

TABLE S.5-1 (Cont.)

Environmental Consequence	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Surface water				
Construction	All systems: Construction impacts on surface flow would be negligible to minor and could be naturally mitigated by standard construction practices. During incident-free construction, no contamination of surface water would be expected. Berms should be placed to restrict surface runoff. If spills or leaks would occur, procedures would exist to quickly remove contaminants before they could be transported to existing surface or groundwater resources. There would be no impacts on off-post surface water.			No impacts since there would be no construction.
Operations	All systems: Impacts would be negligible. Estimated sewage discharge would be small compared with surface water flows and would not significantly change flow conditions. There would be no impacts on off-post surface water.			No impacts.
Terrestrial habitats and vegetation				
Construction	All systems: Construction would disturb about 25 acres for the pilot facility plus another 4–12 acres for infrastructure.			No impacts since there would be no construction.
Operations	All systems: Impacts on vegetation would be negligible because levels of air pollutant release would be low. Deposition levels on soil and vegetation downwind of the ACWA facility would be negligible.			No impacts.
Wildlife				
Construction	All systems: The presence of construction crews and traffic would cause some species to avoid areas near construction sites during construction period. Less mobile species would be killed during vegetation clearing. Loss of habitat is not expected to eliminate any wildlife species since similar habitat is relatively common elsewhere on the installation.			No impacts since there would be no construction.
Operations	All systems: Increase in human activity and associated traffic would increase number of roadkills. Wildlife species would not be affected by releases of trace metals and organic compounds because food chain transfer via plants would be minimal. The potential for bioaccumulation is low.			No impacts.
Aquatic habitats and fish				
Construction	All systems: No impacts would be likely because erosion control measures would be used to control runoff during construction of the ACWA facility and infrastructure.			No impacts since there would be no construction.

TABLE S.5-1 (Cont.)

Environmental Consequence	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Operations	All systems: No impacts would be likely because emission rates of all trace constituents and particulates are expected to be at levels well below those that would affect ecosystems through biouptake or biomagnification in the food chain.			No impacts.
Protected species				
Construction	All systems: No impacts on protected species are anticipated. No federal endangered or threatened species are known to exist at PBA.			No impacts since there would be no construction.
Operations	All systems: There would be no impacts because no federal endangered or threatened species are known to exist at PBA.			No impacts.
Wetlands				
Construction	All systems: Construction at Area A could potentially eliminate the small palustrine wetlands on the southwest margin of the area. Grading for preparation of Area B could disturb wetlands and alter drainage patterns within the area. Construction on Area B could eliminate two wetlands.			No impacts since there would be no construction.
Operations	All systems: Deposition from atmospheric emissions would result in very low concentrations of trace metals and organic compounds, well below levels known to be harmful to biota. The impact on wetlands would be negligible.			No impacts.
Cultural resources				
Construction	All systems: There would be small probability for adverse effects. Area A has not been surveyed, but there is considerable disturbance and waste disposal within the area. The potential for finding intact cultural deposits is low. Areas B and C were surveyed, and no cultural sites were recorded. No traditional cultural properties and no standing structures are located in any of the areas.			No impacts since there would be no construction.
Operations	All systems: There are no cultural resources in the area, so there should be no impacts.			No impacts.
Socioeconomics				
Construction	All systems: Impact on ROI would be relatively small. In-migration would have only a marginal effect on population growth. No significant impact on public finances or public service jobs would be expected. On-post employee commuting patterns would have no impact on levels of service in the local transportation network.			No impacts since there would be no construction.

TABLE S.5-1 (Cont.)

Environmental Consequence	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Construction (Cont.)				
	Increases: Employment: 730 direct jobs 570 indirect jobs Income: $40 million In-migrating population: 210	Increases: Employment: 740 direct jobs 610 indirect jobs Income: $42 million In-migrating population: 220	Increases: Employment: 780 direct jobs 660 indirect jobs Income: $45 million In-migrating population: 250	
Operations	All systems: Impacts on the ROI would be relatively small.			Negligible impacts on the ROI.
	Increases: Employment: 720 direct jobs 760 indirect jobs Income: $53 million In-migrating population: 580	Increases: Employment: 720 direct jobs 760 indirect jobs Income: $53 million In-migrating population: 580	Increases: Employment: 720 direct jobs 850 indirect jobs Income: $56 million In-migrating population: 640	Continued storage produces: Employment: 100 direct jobs 80 indirect jobs Income: $8 million
Environmental justice				
Construction	All systems: The socioeconomic impacts from construction would primarily increase short-term employment and income. They would also increase demand for housing, schools, and public services. None of these impacts would be high or adverse for local governments, and the existing housing stock would likely meet the demand. Similarly, no high and adverse impacts are anticipated during construction of an ACWA facility. As a result, environmental justice impacts are not anticipated from construction.			No impacts since there would be no construction.
Operations	All systems: During operations, there would be no high and adverse socioeconomic impacts associated with the facility. In addition, the risk of noncancer health effects and the risk of cancer from hazardous chemicals released during normal operations would be very low for both workers and the public. Neither of these impacts would be considered high and adverse. As a consequence, no environmental justice impacts are anticipated.			No impacts.

TABLE S.5-1 (Cont.)

Environmental Consequence	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Agriculture				
Construction	No impacts would be likely from construction.			No impacts since there would be no construction.
Operations	Facility emissions would be within applicable air quality standards. A screening-level agricultural risk assessment indicated that the risks from maximum concentrations of emissions from operations would be negligible.			No impacts.

[a] Abbreviations: CDC = Centers for Disease Control and Prevention, CO = carbon monoxide, HAP = hazardous air pollutant, NESHAP = National Emission Standards for Hazardous Air Pollutants, PM_{10} = particulate matter with a mean aerodynamic diameter of 10 micrometers or less, $PM_{2.5}$ = particulate matter with a mean aerodynamic diameter of 2.5 micrometers or less, ROI = region of influence, scf = standard cubic foot (feet).

S.6 PUEBLO CHEMICAL DEPOT

More detailed discussion of the affected environment and potential consequences from the proposed action and no action at PCD are provided in Chapter 6 of the EIS.

S.6.1 Affected Environment

Pueblo Chemical Depot (PCD) is located in southeastern Colorado, approximately 14 miles east of the center of the City of Pueblo in Pueblo County and about 2 miles north of the Arkansas River. The installation encompasses approximately 23,000 acres and includes a variety of buildings, structures, and undeveloped areas. PCD's primary function is the storage of chemical weapons.

It is assumed that any ACWA pilot test facilities would be constructed within the area near Munitions Storage Area A where the chemical weapons are stored. The areas along the western, southern, and eastern edges of Munitions Storage Area A were considered appropriate for construction of an ACWA pilot test facility and are labeled A, B, and C. These are shown in Figure S.6-1. The following text describes PCD in terms of the affected environment.

Land Use: Current land use at PCD is primarily industrial and includes the storage of chemical munitions, environmental restoration, and related activities. Existing facilities include buildings used for administrative, housing, maintenance, and storage. In addition, PCD has igloos originally constructed for the storage of munitions. Surrounding lands are primarily rural and are used for grazing.

Infrastructure: PCD purchases power from the Western Area Power Administration, West Plains Energy Corporation, and Southern Colorado Power Company. A main gas pipeline supplies natural gas from Excel Energy. PCD obtains water from seven active water supply wells located on the installation. In most years, the right to use this water must be purchased from more senior water rights holders. Sanitary wastewater is treated on the installation.

Waste Management: PCD generates a variety of hazardous wastes associated with environmental restoration, vehicle and facility maintenance, munitions management, and hazardous material management. Most of these wastes are packaged and shipped off post to appropriate treatment and disposal facilities. Groundwater from environmental remediation operations is treated and discharged on the installation. PCD also generates a variety of nonhazardous wastes that are collected and disposed of off post in a RCRA Subtitle D landfill or are recycled.

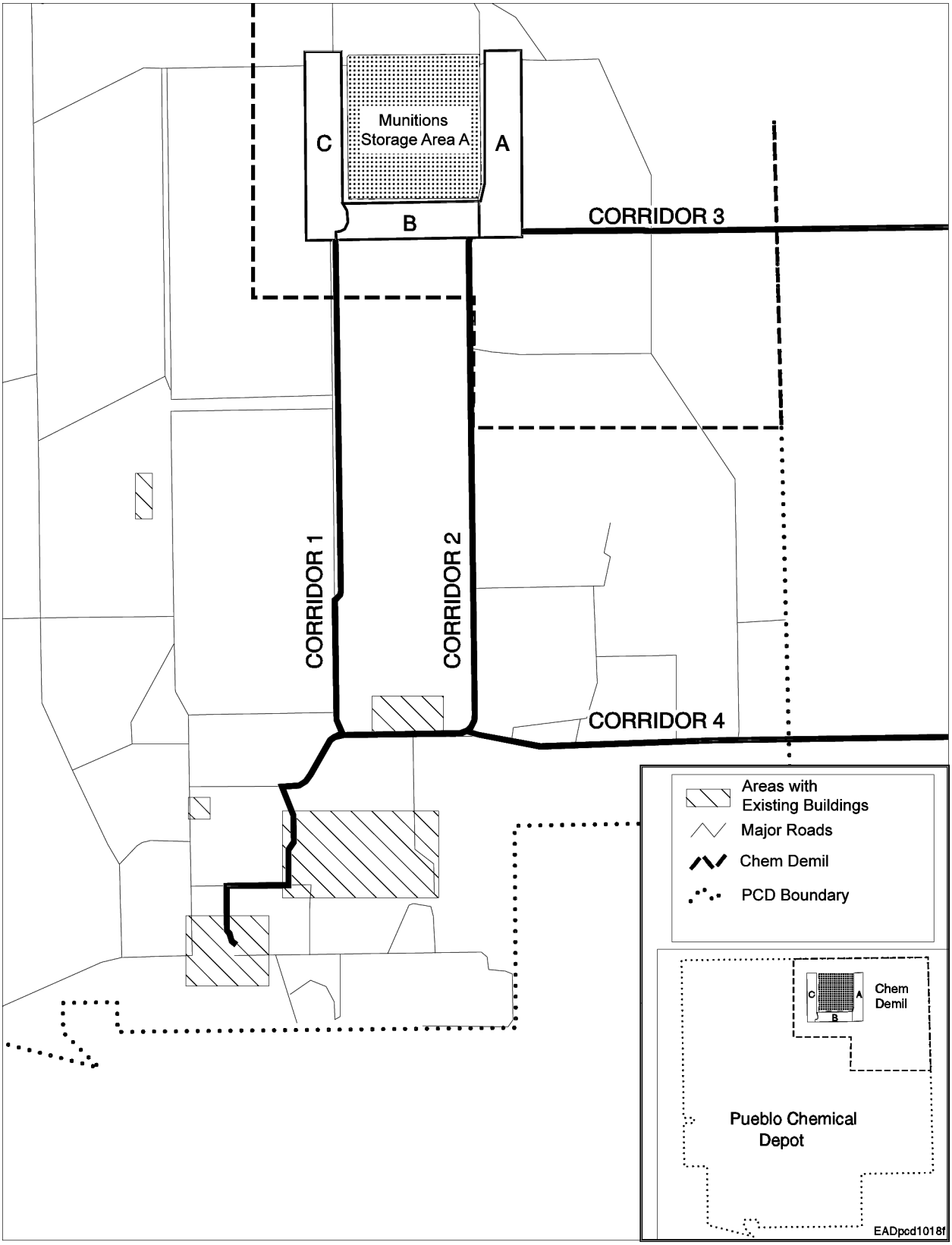

FIGURE S.6-1 Assessment Areas at PCD

Air Quality: The climate of the surrounding area is semiarid and marked by large daily temperature variations. Pueblo County is in attainment for all NAAQS. The existing sources of criteria pollutant emissions at PCD include building heaters, boilers, and emergency generators. Under Title V of the *Clean Air Act*, PCD is classified as "a synthetic minor source" (i.e., a source with potential emissions of less than 250 tons/yr for all criteria pollutants or less than 100 tons/yr for each individual pollutant) with respect to hazardous air pollution (HAP) emissions. Primary sources of these emissions include fuel storage, degreasing activities, and landfills. HAP emissions have decreased since 1994.

Human Health and Safety: No past contamination has been identified at areas being considered for an ACWA pilot test facility.

Noise: There are no on-post or off-post noise problems associated with on-post activities. Current noise levels are comparable to the residual sound levels of typical rural areas.

Visual Resources: The landscape is characterized by rolling, open pasture land. Industrial and administrative development is confined mostly to the southern portion of the installation. Although there are mountain vistas, there are no areas of significant scenic quality within the installation.

Geology and Soils: PCD is situated on a terrace in the western part of the Colorado Piedmont section of the Great Plains. Underlying PCD are deposits of sand, gravel, and clay over a layer of shale. Mineral resources are not known to be present. Faults occur in the PCD vicinity, but PCD is located in a zone where only minor earthquake damage is estimated to occur once in 500 years.

Water: Except in the southern portion of the installation, the quality of the groundwater is good. Groundwater contamination from past industrial operations is present in the southern portion of PCD. Groundwater treatment systems are being operated in this area to mitigate off-post migration of the contaminants. PCD is located in the Arkansas River Valley; water quality in the river is generally good and is satisfactory for domestic, agricultural, and most industrial uses. The proposed areas for the ACWA facility are located above the floodplain.

Biological Resources: PCD is characterized as gently sloping prairie or shortgrass steppe. The black-tailed prairie dog and the mountain plover, both of which are proposed federal threatened species, occur at PCD. The burrowing owl, ferruginous hawk, northern harrier, black tern, and loggerhead shrike are considered federal sensitive species and are found on PCD.

Wetlands occur along stream courses throughout the installation, especially in the eastern and western portions.

Cultural Resources: There are no known archaeological or Native American cultural properties within PCD. There are historical structures at PCD, but a programmatic agreement among the U.S. Army, Colorado State Historic Preservation Officer, and Advisory Council on Historic Preservation states that documentation of the facilities on PCD has been completed and no further documentation is required to mitigate actions involving the facilities.

Socioeconomics: The region of influence (ROI) is Pueblo County. The population in 2000 was about 141,000. From 1990 to 2000, the annual population growth rate was less than 1.4%. The economy of the ROI is dominated by trade and services.

Environmental Justice: The 2000 census recorded that 42.3% of the residents of Pueblo County are minority, and the 1990 census recorded that 20.2% of the county residents are below the poverty level. Both of these levels are higher than those for the United States as a whole.

Agriculture: The agricultural ROI includes five counties surrounding the installation. This area contains 5.9 million acres, of which 4.3 million acres (73%) were farmland in 1997. There were approximately 2,700 farms in the ROI, of which more than half were operated by full-time farmers. Traditionally, agriculture was only a moderately significant source of employment in the ROI, and its importance declined somewhat in the 1990s.

S.6.2 Consequences of the Proposed Action and No Action

Table S.6-1 summarizes the impacts associated with the location of the two technologies considered at PCD and the decision to take no action. For almost all impact areas, the consequences associated with the construction and normal operations of the technologies would be the same. There would be some differences in utility requirements and impacts on human health. None of the impacts would be significant.

TABLE S.6-1 PCD Summary Table[a]

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	No Action
Land use	Both systems: There would be no impacts. Construction would be within the industrial area. The maximum area disturbed for the facility and associated infrastructure would be 85 acres. Land use would be consistent with the reuse plan.		No impacts.
Infrastructure			
Electric power supply			
Construction	Both systems: Power lines and substations would be required. Supply would be adequate to meet increased demand. There would be no impacts.		No impacts.
Operations	36 GWh/yr would be required.	60 GWh/yr would be required.	No impacts.
Natural gas supply	New gas pipeline would be required. Supply would be adequate to meet increased demand. 94 million scf/yr would be required.	149 million scf/yr would be required.	No impacts.
Water supply and use			
Construction	Both systems: New water pipelines required. Supply would be adequate to meet increased demand of 8.6 acre-ft/yr. Additional water rights would need to be purchased. There would be no impact.		No impacts since there would be no construction.
Operations	Both systems: Additional water rights would need to be purchased. Supply is adequate to meet demand. Existing sewage lagoons might need to be expanded.		No impacts.
	Supply would be adequate to meet increased demand of 13 million gal/yr of process water[b] and 6.4 million gal/yr of potable water.	Supply would be adequate to meet increased demand of 18 million gal/yr of process water[b] and 6.4 million gal/yr potable water.	
Waste management and facilities			
Construction	Both systems: Existing waste management facilities would be adequate to handle hazardous solid wastes. No significant impacts would result from the generation of hazardous and nonhazardous wastes during construction.		No impacts since there would be no construction.

TABLE S.6-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	No Action
Operations	Both systems: Hazardous and nonhazardous solid wastes would be generated during the treatment processes. These solid wastes would be collected and disposed of off post at appropriately permitted facilities. Quantities of brine salts produced by the technologies would vary. Nonprocess solid wastes could be contaminated with agent and would also require treatment. Chemical weapons are RCRA listed wastes in Colorado; therefore, all treatment residues are also listed wastes and, if not delisted under RCRA, must be managed and disposed of as hazardous waste. Process and nonprocess liquid wastes would be recycled within the treatment process. The only liquid waste associated with ACWA facilities that would be discharged would be domestic sanitary wastewater.		Waste would be generated from occasional leaks. Facilities and procedures would be adequate to handle leaks.
Air quality — criteria pollutants			
Construction	Both systems: Emissions would include fugitive dust from earth-moving activities and exhaust from equipment and vehicles. Concentration increments would be relatively small fractions of applicable NAAQS. Overall ambient air quality would be good. Impacts would be minor.		No impacts since there would be no construction.
Operations	Both systems: Concentration increases due to operation would contribute approximately 2% of NAAQS/SAAQS. Overall ambient air quality would be good. Impacts would be negligible.		Stockpile maintenance activities would generate very small emissions from boilers and vehicular traffic in the area of Munitions Storage Area A. Impact would be negligible.
Air quality — toxic air pollutants			
Construction	Both systems: Impacts would be negligible. Minor emissions would result from construction equipment.		No impacts since there would be no construction.
Operations	Both systems: Normal: Pilot facility would not be a major source of HAP emissions and would not fall under any of the source categories regulated by the EPA under NESHAP. Fluctuating: No agent emissions would be expected. Modeling of worst-case emissions resulted in estimated ambient agent concentrations of less than 1% of the allowable concentrations for general population exposure.		No impacts.

TABLE S.6-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	No Action
Human health and safety — routine operations			
Construction	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 17	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 21	No impacts since there would be no construction.
	Both systems: Other on-post workers and residents: There would be no adverse health impacts. Off-post public: There would be no adverse health impacts.		
Operations	Both systems: Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 30		Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 4
	On-post workers and residents: Estimated hazard indices and carcinogenic risks from inhalation of toxic air pollutants are well below benchmarks considered representative of negligible risk levels. No agent emissions are expected. Even under hypothetical worst-case emission levels, the maximum estimated on-post concentration would be less than 1% of the allowable concentration for general public exposures. The maximum estimated incremental cancer risk from the inhalation of hypothetical mustard emissions is well below the benchmark risk value.		No impacts.
	Off-post public: Estimated hazard indices and carcinogenic risks from inhalation of toxic air pollutants are well below benchmarks considered representative of negligible risk levels. No agent emissions are expected. Even under hypothetical worst-case emission levels, the maximum estimated off-post concentration would be less than 1% of the allowable concentration for general public exposures. The maximum estimated incremental cancer risk from the inhalation of hypothetical mustard emissions is well below the benchmark risk value.		No impacts.
Noise			
Construction	Both systems: Noise levels would be within local/state limits. Potential noise impacts are expected to be comparable to background levels at the nearest residence. Impacts would be negligible.		No impacts since there would be no construction.

TABLE S.6-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	No Action
Operations	Both systems: Estimated noise level at the nearest residence from the proposed facility (less than 35 dBA) would be within residential noise standards (55 dBA). Impacts would be negligible.		Noise generated by stockpile maintenance would be part of background and within legal limits.
Visual resources			
Construction	Both systems: Some decrease in visibility would result from dust emissions. Impacts would be small, intermittent, and temporary.		No impacts since there would be no construction.
Operations	Both systems: ACWA facility would be consistent with surrounding landscape. Operations would not create significant, visible emissions. There would be no impacts.		No impacts.
Geology and soils			
Construction	Both systems: As many as 85 acres of soil could be affected from construction of pilot facilities and associated infrastructure. Best management practices for soil erosion would mitigate potential adverse impacts.		No impacts since there would be no construction.
Operations	Both systems: No contamination of soils would be expected. Facilities are designed to contain small accidental releases. There would be no impacts.		Potential impacts would be limited primarily to leaks of petroleum-based products from vehicles. Impacts would be negligible.
Groundwater			
Construction	Both systems: Water use would be relatively small compared with historical use. Impacts would be negligible.		No impacts since there would be no construction.
Operations	Both systems: Water use would be relatively small compared with historical use. Impacts from water withdrawals would be negligible. Facilities are designed to contain small accidental releases of agent.		No impacts.

TABLE S.6-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	No Action
Surface water			
Construction	Both systems: Construction impacts on surface flow would be negligible to minor and could be naturally mitigated by standard construction practices. No contamination of surface water would be expected. Facilities are designed to contain small accidental releases.		No impacts since there would be no construction.
Operations	Both systems: No contamination of surface water would be expected. Facilities are designed to contain small accidental releases. There would be no impacts.		No impacts.
Terrestrial habitats and vegetation			
Construction	Both systems: As much as 85 acres of vegetative and terrestrial habitats could be disturbed. Most disturbances would be short-term and would be mitigated through revegetation. Small amount of permanent loss would occur. Negligible impacts.		No impacts since there would be no construction.
Operations	Both systems: Metals and organic compounds in emissions would be deposited on the ground in very low concentrations and would not adversely affect terrestrial biota. No impacts.		No impacts.
Wildlife			
Construction	Both systems: Less mobile burrowing species could be killed during construction and site preparation. Some losses would occur because of roadkills. Noise, human activity, and habitat loss would have no impact on the continued survival of the species because of the abundance of similar habitat next to proposed construction areas.		No impacts since there would be no construction.
Operations	Both systems: Noise, human activity, and habitat loss would have little impact because of the abundance of similar habitat next to proposed facility sites. Annual emission rates of all trace constituents and particulates would be well below levels affecting ecosystems through biomagnification or biouptake. There would be no impacts.		No impacts.
Aquatic habitats and fish			
Construction	Both systems: No aquatic resources in the areas be would affected by construction. There would be no impacts.		No impacts since there would be no construction.

TABLE S.6-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	No Action
Operations	Both systems: Concentrations of organic compounds and trace metals would not be at levels that would adversely affect aquatic ecosystems downwind. There would be no impacts.		No impacts.
Protected species			
Construction	Both systems: The loggerhead shrike, a federal sensitive species, could be affected by loss of habitat.		No impacts since there would be no construction.
Operations	Both systems: No impacts on endangered, threatened, or candidate species would result from normal operations.		No impacts.
Wetlands			
Construction	Both systems: No wetlands are near the proposed construction areas. There would be no impacts.		No impacts since there would be no construction.
Operations	Both systems: Concentrations of organic compounds and trace metals would not be at levels that would adversely affect downwind wetlands. There would be no impacts.		No impacts.
Cultural resources			
Construction	Both systems: No known cultural resources are located within the construction area. Unexpected discoveries of cultural resources during earth-moving activities would be evaluated in coordination with regulators. Impacts are unlikely.		No impacts since there would be no construction.
Operations	Both systems: There are no known cultural resources. There would be no impacts.		No impacts.
Socioeconomics			
Construction	Both systems: Impacts on the ROI would be relatively small. In-migration would have only a marginal effect on population growth. No significant impact on public finances or public service jobs is expected. On-post employee commuting patterns would have no impact on levels of service in the local transportation network.		No impacts since there would be no construction.

TABLE S.6-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	No Action
Construction (Cont.)	Increases Employment: 600 direct jobs 570 indirect jobs Income: $36 million In-migrating population: 1,140	Increases Employment: 680 direct jobs 540 indirect jobs Income: $37 million In-migrating population: 1,200	
Operations	Both systems: Impact on the ROI would be relatively small.		Negligible impact on the ROI.
	Increases: Employment: 640 direct jobs 530 indirect jobs Income: $44 million In-migrating population: 750	Increases: Employment: 640 direct jobs 580 indirect jobs Income: $45 million In-migrating population: 790	Continued storage produces: Employment: 80 direct jobs 60 indirect jobs Income: $6 million
Environmental justice			
Construction	Both systems: The socioeconomic impacts from construction would primarily increase short-term employment and income. They would also increase demand for housing, schools, and public services. None of these impacts would be high or adverse for local governments, and the existing housing stock would likely meet the demand. Similarly, no high and adverse impacts are anticipated during construction of an ACWA facility. As a result, environmental justice impacts are not anticipated from construction.		No impacts since there would be no construction.
Operations	Both systems: During operations, there would be no high and adverse socioeconomic impacts associated with the facility. In addition, the risk of noncancer health effects and the risk of cancer from hazardous chemicals released during normal operations would be very low for both workers and the public. Neither of these impacts would be considered high and adverse. As a consequence, no environmental justice impacts are anticipated.		No impacts.

TABLE S.6-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	No Action
Agriculture			
Construction	Both systems: No impacts on agriculture would be likely from facility construction.		No impacts since there would be no construction.
Operations	Both systems: Facility emissions would be within applicable air quality standards during routine operations. A screening-level agricultural risk assessment indicated that risks from maximum concentrations would be negligible.		No impacts.

[a] Abbreviations: CDC = Centers for Disease Control and Prevention, CO = carbon monoxide, HAP = hazardous air pollutant, NESHAP = National Emission Standards for Hazardous Air Pollutants, PM_{10} = particulate matter with a mean aerodynamic diameter of 10 micrometers or less, $PM_{2.5}$ = particulate matter with a mean aerodynamic diameter of 2.5 micrometers or less, ROI = region of influence, scf = standard cubic foot (feet).

[b] The numbers used in the analysis were from demonstration testing. Subsequent engineering design studies now indicate 5.7 million gal/yr of process water for Neut/Bio and 1.3 million gal/yr for Neut/SCWO.

S.7 BLUE GRASS ARMY DEPOT

A more detailed discussions of the affected environment and potential consequences from the proposed action and no action at BGAD is provided in Chapter 7 of the EIS.

S.7.1 Affected Environment

Blue Grass Army Depot (BGAD) is located in east central Kentucky, just southeast of the city of Richmond and approximately 30 miles southeast of the city of Lexington. The installation encompasses approximately 14,600 acres, composed mainly of open fields and wooded areas. The installation is used for the storage of conventional explosive munitions as well as ACWs.

It is assumed that the potential locations for an ACWA pilot test facility would be in close proximity to the current ACW storage location. Area A is directly adjacent to the eastern boundary of the Chemical Limited Area (CLA) (Figure S.7-1). Area B is directly adjacent to the western boundary of the current storage area. The following text describes BGAD in terms of the affected environment for each impact area.

Land Use: Land use on BGAD primarily involves industrial and related activities associated with the storage and maintenance of conventional and chemical munitions. There are about 1,150 structures on BGAD, but the facility is dominated by undeveloped woodland and areas leased for hay production and pasture. There is also a contractor-operated helicopter maintenance facility located on the installation. Land use in the vicinity includes agricultural, industrial, and low-density residential uses. A large public recreational facility adjoins the northwestern boundary of BGAD.

Infrastructure: Electricity is provided by the Kentucky Utilities Company via 69-kV transmission lines. Delta Natural Gas Company supplies natural gas to the installation. The main gas line at BGAD does not extend to the CLA. Water is supplied from Lake Vega, a 135-acre impoundment with an estimated capacity of 600 million gallons. The water treatment plant has a capacity of 720,000 gal/d. Two wastewater treatment plants treat on-post sanitary sewage, and there are also several septic systems.

Waste Management: BGAD generates hazardous wastes from maintenance of conventional munitions, demilitarization of obsolete conventional munitions, and storage of obsolete chemical munitions. Hazardous wastes are either shipped off post to a permitted disposal facility or are stored at a number of locations on post. Nonhazardous wastes are disposed of at an off-post landfill.

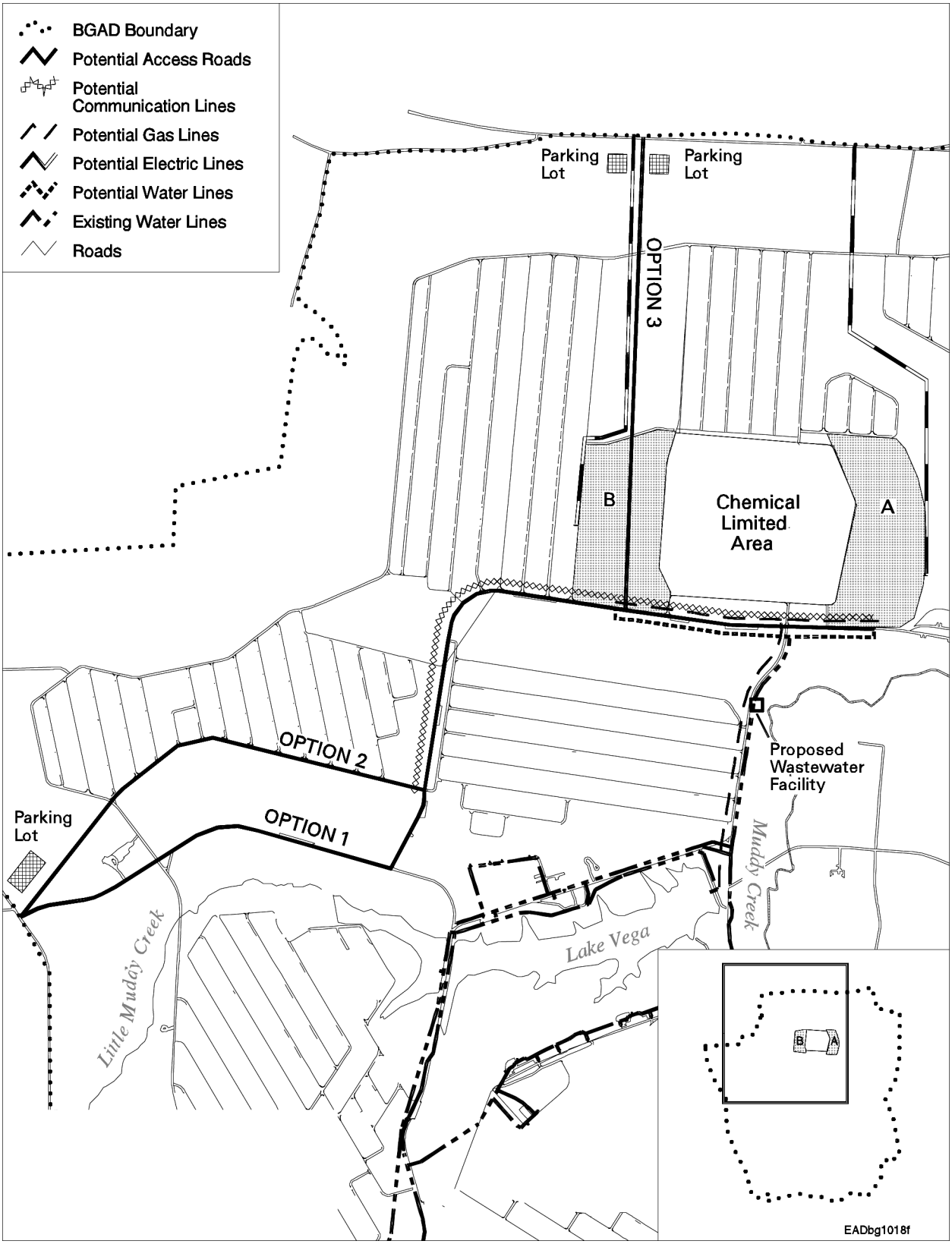

FIGURE S.7-1 Assessment Areas at BGAD

Air Quality: The climate is continental temperate, with a rather large day-to-night temperature range. The existing sources of criteria pollutants include boilers and ovens, solid waste disposal, surface coating and metal cleaning operations, fuel storage and handling, and miscellaneous industrial processes. The combined emissions from BGAD make up a very small percentage of the total emissions for the county, which is in attainment for NAAQS and SAAQS. However, statewide concentrations of ozone and $PM_{2.5}$ exceed the NAAQS and SAAQS. Emissions of toxic air pollutants did not reach the thresholds for required reporting under TRI regulations.

Human Health and Safety: No existing contamination associated with chemical agent has been detected at areas being considered for an ACWA pilot test facility.

Noise: The areas adjacent to BGAD boundaries are suitable for noise-sensitive uses, except for an area along the southern boundary that is subject to potentially objectionable noise levels from open detonation. The nearest residence to the facility is located about 1.6 miles north of the installation. Other noise-sensitive receptors are located at greater distances.

Visual Resources: BGAD is generally characterized by open fields and rolling hills with scattered woodlots. The military and industrial nature of the installation mainly is hidden from view, but where it is visible, it is consistent with other industrial land use in the area.

Geology and Soils: The topography is characterized by gently rolling hills that become steeper near major streams. Bedrock is composed of nearly horizontally bedded dolomite, shale, and limestone units. No mineral deposits of economic value have been mapped. There are no indications of faults that would be capable of creating an earthquake.

Water: BGAD is located within the Kentucky River watershed. There are a large number of lakes and streams of various sizes on the installation and many more in the surrounding area. Groundwater resources are limited and are not used at BGAD. Surface water quality in the area is generally good.

Biological Resources: Most of the BGAD land area is maintained as pasture, interspersed with shrubs and trees. Forests cover roughly 2,900 acres. Vegetation on most of the installation, including forested areas, has been adversely affected by cattle grazing. The diversity of ground-nesting birds, amphibians, and reptiles is relatively low because of the effects that grazing has had on their habitat. Rivers and streams in the area support fisheries that are attractive to recreational anglers. The bald eagle and running buffalo clover are the only protected

species known to occur at BGAD. Wetlands occur along streams and other surface water bodies scattered throughout the installation.

Cultural Resources: No cultural resources have been identified in surveyed portions of the two proposed locations for an ACWA pilot facility. However, very little of the area has been surveyed for archaeological sites. Several sites have been recorded in the vicinity of the project area. The potential for containing cultural resources is high in approximately one-half of the unsurveyed portion of the project area. There are no standing structures within the project area, and no traditional cultural properties have been identified.

Socioeconomics: The BGAD region of influence (ROI) is composed of Clark, Estill, Fayette, Jackson, and Madison Counties. Almost 80% of BGAD workers reside in these counties. In 2000, the ROI population was 393,330, and it was increasing at an annual rate of 1.5% over the period 1990–2000. Trade and service industries constitute the dominant areas of employment in the ROI. The manufacturing sector has been growing rapidly, while agricultural employment has been declining.

Environmental Justice: In Madison County, the 2000 census recorded 7.6% of the population as having minority ethnic/racial status, whereas the 1990 census recorded 21.2% as having incomes below the poverty level. When compared with the United States as a whole, the Madison County percentage of minorities is lower and its percentage of low-income population is higher.

Agriculture: The agricultural ROI includes 22 counties around the installation. The ROI contains 3.9 million acres of land, of which 2.4 million acres (61%) were farmland in 1997. There were 16,000 farms, of which more than a third were operated by full-time farmers. Although farming has historically been a significant source of employment in the ROI, its importance declined somewhat during the 1990s.

S.7.2 Consequences of the Proposed Action and No Action

Table S.7-1 summarizes the impacts associated with the location of each of the four technologies at BGAD and those associated with the decision to take no action. For almost all of the impact areas, consequences associated with the construction and normal operations of the technologies would be the same. There would be some differences in the areas of human health and socioeconomics. None of the impacts, however, would be significant.

TABLE S.7-1 BGAD Summary Table[a]

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Land use	All systems: Actions would be consistent with current and planned installation use. Construction could disturb up to 95 acres for the facility and supporting infrastructure. Development of Proposed Area A may interfere with other site activities.				No impacts.
Infrastructure					
Electric power supply	All systems: Temporary lines or generators would be required for construction. A new line and substation would be needed for operation. Supply would be adequate to meet increased demand.				No impacts.
	2 GWh/yr would be required.	60 GWh/yr would be required.	26 GWh/yr would be required.	122 GWh/yr would be required.	
Natural gas	All systems: Extension of gas pipelines and a new metering station would be required. Supply would be adequate to meet increased demand.				No impacts.
	9 million scf/yr would be required.	52 million scf/yr would be required.	138 million scf/yr would be required.	52 million scf/yr would be required.	
Water supply and use	All systems: Extension of water supply pipelines would be required. Supply would be adequate to meet increased demand. A new storage tank would be required for emergency response. A new wastewater treatment plant would be required.				No impacts.
	1.3 million gal/yr of process water would be required; 300,000 gal/yr of potable water would be required.	6.3 million gal/yr of process water would be required; 6.4 million gal/yr of potable water would be required.	18 million gal/yr of process water would be required; 6.4 million gal/yr of potable water would be required.	1 million gal/yr of process water would be required; 6.4 million gal/yr of potable water would be required.	
Waste management and facilities					
Construction	All systems: Construction wastes could be treated by existing systems. No additional impacts from managing these wastes are anticipated.				No impacts since there would be no construction.

TABLE S.7-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Operations	All systems: Hazardous and nonhazardous solid wastes would be generated during the treatment processes. These solid wastes would be collected and disposed of off post at appropriately permitted facilities. Quantities of brine salts produced by all technologies would vary, depending on the agent to be destroyed. Nonprocess solid wastes could be contaminated with agent and would also require treatment. Chemical weapons are RCRA listed wastes in Kentucky; therefore, all treatment residues are also listed wastes and, if not delisted under RCRA, must be managed and disposed of as hazardous waste. Process and nonprocess liquid wastes would be recycled within the treatment process. The only liquid waste associated with ACWA facilities that would be discharged would be domestic sanitary wastewater.				No impacts.
Air quality — criteria pollutants					
Construction	All systems: Total concentrations of criteria air pollutants resulting from fugitive dust emissions would be below applicable NAAQS, except for $PM_{2.5}$. Statewide background levels of $PM_{2.5}$ are above the annual NAAQS without the addition of an ACWA pilot facility; consequently, the total estimated annual average concentrations of $PM_{2.5}$ would be above the applicable NAAQS.				No impacts.
Operations	All systems: Estimated maximum concentration of criteria air pollutants would be within applicable standards, except for $PM_{2.5}$, for routine and fluctuating operations. Total estimated annual average concentrations of $PM_{2.5}$ would be above the applicable NAAQS, primarily because of high background concentration levels.				Background levels of $PM_{2.5}$ exceed NAAQS.
Air quality — toxic air pollutants					
Construction	All systems: Impacts would be negligible. Minor emissions would result from construction equipment.				No impacts since there would be no construction.
Operations	All systems: Routine: Pilot facility emissions would not be a major source of HAP emissions and would not fall under any of the source categories regulated by the EPA under NESHAP. Fluctuating: No agent emissions would be expected. Modeling of worst-case emissions resulted in estimated ambient agent concentrations of less than 1% of the allowable concentrations for general population exposure established by the CDC.				No impacts.

TABLE S.7-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Human health and safety — routine operations					
Construction	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 17	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 22	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 22	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 24	No impacts since there would be no construction.
	All systems: Other on-post workers and residents: Potential for adverse health impacts from inhalation of $PM_{2.5}$ in existing environment already exists. There would be no other impacts. Off-post public: Potential for adverse health impacts from inhalation of $PM_{2.5}$ in existing environment already exists. There would be no other impacts.				
Operations	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 35	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 35	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 35	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 35	Facility workers: Estimated annual fatalities: <1 Estimated annual injuries: 3
	All systems: On-post workers and residents: Estimated hazard indices and carcinogenic risks from inhalation of toxic air pollutants are well below benchmarks considered representative of negligible risk levels. No agent emissions are expected. Even under hypothetical worst-case emission levels, the maximum estimated on-post concentration would be less than 1% of the allowable concentration for general public exposures. The maximum estimated incremental cancer risk from the inhalation of hypothetical mustard emissions is well below the benchmark risk value. Potential for adverse health impacts from inhalation of $PM_{2.5}$ in the existing environment already exists. Off-post public: Estimated hazard indices and carcinogenic risks from inhalation of toxic air pollutants are well below benchmarks considered representative of negligible risk levels. No agent emissions are expected. Even under hypothetical worst-case emission levels, the maximum estimated on-post concentration would be less than 1% of the allowable concentration for general public exposures. The maximum estimated incremental cancer risk from the inhalation of hypothetical mustard emissions is well below the benchmark risk value. Potential for adverse health impacts from inhalation of $PM_{2.5}$ in existing environment already exists.				Potential for adverse health impacts from inhalation of $PM_{2.5}$ in existing environment already exists.

TABLE S.7-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Noise					
Construction	All systems: Impacts on nearest residents would be negligible. Noise level would be below EPA guidelines for residential zones.				No impacts since there would be no construction
Operations	All systems: Impacts on nearest residents would be negligible. Noise level would be well below EPA guidelines for residential zones.				No impacts.
Visual resources					
Construction	All systems: Temporary impacts would result from increased traffic and construction dust.				No impacts since there would be no construction.
Operations	All systems: There would be no impacts. Industrial character of the facility and possible presence of small steam plume would be consistent with the visual character of the surrounding area and depot.				No impacts.
Geology and soils					
Construction	All systems: Impacts would be negligible. Up to 95 acres would be disturbed by construction of pilot facilities and associated infrastructure. Best management practices for soil erosion would minimize adverse impacts.				No impacts since there would be no construction.
Operations	All systems: There would be no impacts. No contamination of soils would be expected. The facility would be designed to prevent migration of small accidental releases (spills or leaks).				No impacts. Procedures are in place to prevent migration of small accidental releases (spills or leaks) while ACWs are in storage.

TABLE S.7-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Groundwater					
Construction	All systems: There would be no impacts. The use of best management practices for erosion control would restrict surface runoff. Existing procedures dictate that spills or leaks of contaminants be quickly removed so they will not be transported to groundwater resources.				No impacts since there would be no construction.
Operations	All systems: Impacts would be negligible. There would be a slight increase in groundwater flow because of releases from the domestic sewage treatment plant.				No adverse impact from continued storage.
Surface water					
Construction	All systems: Construction impacts on surface flow would be negligible to minor and could be naturally mitigated by standard construction practices. Existing procedures dictate that spills or leaks of contaminants be quickly removed so they will not be transported to surface waters. Impacts on water supply would be negligible.				No impacts since there would be no construction.
Operations	All systems: There would be no impacts. The facility would be designed to prevent migration of small accidental releases (spills or leaks). Impacts on water supply would be negligible.				No impacts.
Terrestrial habitats and vegetation					
Construction	All systems: Impacts would be negligible. Up to 95 acres of vegetation and terrestrial habitat could be disturbed. Much of the disturbance would be temporary and mitigated through revegetation. Best management practices for soil erosion would minimize adverse impacts.				No impacts since there would be no construction.
Operations	All systems: Impacts would be negligible. The facility would be designed to prevent migration of small accidental releases (spills or leaks). Air emissions would be low and would not affect vegetation. Concentrations and deposition of emission constituents would pose no ecological risk.				No impacts.

TABLE S.7-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Wildlife					
Construction	All systems: Impacts would be negligible. Noise, human activity, and habitat loss would have little impact because nearby habitats are similar. Less mobile species could be killed during construction and site preparation. Mitigation measures would be implemented to avoid impacts from erosion, use of construction vehicles, and siting of transmission lines.				No impacts since there would be no construction.
Operations	All systems: Impacts would be negligible. Noise, human activity, and habitat loss would have little impact because nearby habitats are similar. Releases of trace metals and organic compounds would be well below threshold levels for ecosystems. Deposition from atmospheric emissions would result in very low concentrations of trace metals and organic compounds. Deposition was shown to pose no ecological risk to terrestrial habitats.				No impacts.
Aquatic habitats and fish					
Construction	All systems: Impacts would be unlikely. Potential impacts due to soil erosion or sedimentation would be avoided through mitigation.				No impacts since there would be no construction.
Operations	All systems: There would be no impacts. No effluents would be released to streams because all process liquids would be recycled.				No impacts.
Protected species					
Construction	All systems: Construction of a transmission line could affect the running buffalo clover, a federal listed endangered species, through direct disturbance or loss of individual plants. Mitigation measures have been developed to minimize adverse effects.				No impacts since there would be no construction.
Operations	All systems: There would be no impacts.				No impacts.
Wetlands					
Construction	All systems: No wetlands would be directly affected within proposed Area A. Proposed Area B contains three small wetlands that could be adversely affected. Mitigation measures have been developed to minimize adverse effects.				No impacts since there would be no construction.

TABLE S.7-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Operations	All systems: There would be no impacts.				No impacts.
Cultural resources					
Construction	Several archaeological sites are known to occur near the project area. Surveys would be required before ground disturbance could begin. Additional sites could be identified. Mitigation would be required if important archaeological sites were to be adversely affected by construction. No impacts are expected on previously surveyed portion of Proposed Area A.				No impacts since there would be no construction.
Operations	All systems: There would be no impacts.				No impacts.
Socioeconomics					
Construction	All systems: Impacts on the ROI would be relatively small. In-migration would have only a marginal impact on population growth. No significant impact on public finances or public service jobs would be expected. On-post employee commuting patterns would have no impact on levels of service in the local transportation network.				No impacts since there would be no construction.
	Increases: Employment: 570 direct jobs 530 indirect jobs Income: $35 million In-migrating population: 310	Increases: Employment: 670 direct jobs 510 indirect jobs Income: $37 million In-migrating population: 490	Increases: Employment: 710 direct jobs 550 indirect jobs Income: $39 million In-migrating population: 570	Increases: Employment: 800 direct jobs 610 indirect jobs Income: $44 million In-migrating population: 740	

TABLE S.7-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Operations	All systems: Impacts on the ROI would be relatively small.				Negligible impact on the ROI.
	Increases: Employment: 720 direct jobs 570 indirect jobs Income: $49 million In-migrating population: 680	Increases: Employment: 720 direct jobs 610 indirect jobs Income: $51 million In-migrating population: 720	Increases: Employment: 720 direct jobs 560 indirect jobs Income: $49 million In-migrating population: 680	Increases: Employment: 720 direct jobs 600 indirect jobs Income: $50 million In-migrating population: 710	Continued storage produces: Employment: 50 direct jobs 40 indirect jobs Income: $4 million
Environmental justice					
Construction	All systems: The socioeconomic impacts from construction would primarily increase short-term employment and income. They would also increase demand for housing, schools, and public services. None of these impacts would be high or adverse for local governments, and the existing housing stock would likely meet the demand. Similarly, no high and adverse impacts are anticipated during construction of an ACWA facility. As a result, environmental justice impacts are not anticipated from construction.				No impacts since there would be no construction.
Operations	All systems: During operations, there would be no high and adverse socioeconomic impacts associated with the facility. In addition, the risk of noncancer health effects and the risk of cancer from hazardous chemicals released during normal operations would be very low for both workers and the public. Neither of these impacts would be considered high and adverse. As a consequence, no environmental justice impacts are anticipated.				No impacts.

TABLE S.7-1 (Cont.)

Environmental Consequence	Neutralization/ Biotreatment	Neutralization/ Supercritical Water Oxidation	Neutralization/Gas-Phase Chemical Reduction/Transpiring Wall Supercritical Water Oxidation	Electrochemical Oxidation	No Action
Agriculture					
Construction	All systems: Impacts on agriculture from facility construction would not be likely.				No impact since there would be no construction.
Operations	During normal operations, facility emissions would be within applicable air quality standards. A screening-level agricultural risk assessment was conducted. The analysis indicated that the risks from maximum concentrations would be negligible.				No impact.

[a] Abbreviations: CDC = Centers for Disease Control and Prevention, CO = carbon monoxide, HAP = hazardous air pollutant, NESHAP = National Emission Standards for Hazardous Air Pollutants, PM_{10} = particulate matter with a mean aerodynamic diameter of 10 micrometers or less, $PM_{2.5}$ = particulate matter with a mean aerodynamic diameter of 2.5 micrometers or less, ROI = region of influence, scf = standard cubic foot (feet).

S.8 SUMMARY AND COMPARISON OF ACCIDENTS

The analysis provides an estimate of the upper range of the potential fatalities that might occur as a result of the hypothetical highest-risk accident related to the proposed action (i.e., pilot testing of the proposed technology) or related to no action (i.e., continued storage). The term "highest-risk accident" is used in this analysis to define the accident scenario that has the highest combination of consequences (in terms of human fatalities) and probability of occurrence among all of the scenarios considered. For existing continued storage and for operations, highest risk accidents would involve the release of chemical agent; release of other materials would result in lesser consequences.

The hypothetical accident for the proposed action (pilot testing ACWA technologies) evaluates either an earthquake scenario (BGAD and PCD) or a rocket-handling accident scenario (ANAD and PBA). For the no action alternative (continued storage of the inventory), a lightning strike into a rocket storage igloo was evaluated for all sites except PCD. An aircraft crash into a storage igloo was used in this case. The greatest consequences from the no action alternative scenarios were always greater than or equal to the consequences from the proposed action scenarios.

The accidents evaluated could have consequences of major proportions, including human fatalities, the generation of large quantities of hazardous waste, destruction of wildlife and wildlife habitat, destruction of economic resources, and denial of access to historic or recreational properties. However, the accidents evaluated also have a low estimated probability of occurrence, on the order of 2×10^{-3} per year or less (1 occurrence in 476 years). Thus, the actual risk (consequences multiplied by probability) of such accidents is low.

S.9 SUMMARY AND COMPARISON OF CUMULATIVE IMPACTS

Cumulative impacts would result from adding the incremental impacts of the proposed action to other past, present, and reasonably foreseeable future actions. "Reasonably foreseeable future actions" are considered to be (1) actions that are covered in an environmental impact document that was either published or in preparation, (2) formal actions such as initiating an application for zoning approval or a permit, or (3) actions for which some funding has already been secured. Cumulative impacts could result from actions occurring at the same time or from actions occurring over a period of time.

An ACWA pilot test facility could take up to 34 months to construct and would operate for up to 36 months, depending on the duration of the pilot test program and the quantity of the stockpile. This short operational time frame reduces the potential for cumulative impacts. The two scenarios for cumulative impacts that were considered and that are presented below are (1) the construction and operation of an ACWA pilot test facility in addition to other activities that are occurring or planned on post and off post and (2) the construction and operation of an

ACWA facility in addition to other activities plus the operation of an incinerator. Tables S.9-1 through S.9-4 provide summaries of the cumulative impacts for each of the four installations.

TABLE S.9-1 Cumulative Impacts at ANAD

Impact Area	ACWA Facility + Operating Incinerator + Other Activities
Land use	An incinerator and ACWA pilot test facility together would disturb up to 150 acres (0.8% of the area of ANAD), some of it in previously disturbed areas. Other anticipated on-post activities would disturb additional land but would follow current on-post land use patterns. Cumulative land use impacts from on- and off-post activities should not be significant.
Electric power	A new transmission line and substation have been built to supply the incinerator. Additional power distribution infrastructure would be needed to meet electric power needs of an ACWA pilot and other on-post activities. Depending on the ACWA technology selected, more than 105 GWh/yr of electric power, in addition to the 33 GWh for the incinerator, might be needed. Together, these could represent an increase of about 220% over year 2000 consumption levels. Discussions with local planners indicated no current or foreseeable problems supplying electric power.
Natural gas	Additional gas distribution infrastructure would be needed beyond that built for the incinerator. Depending on the ACWA technology selected, more than 130 million scf/yr of natural gas, in addition to the 1.3 billion scf/yr required by the incinerator, would be needed while still supplying other on-post uses. This would represent an increase of about 460% over year 2000 consumption levels. Other future on-post actions would require additional gas. Discussions with local planners indicated no current or foreseeable problems with supplying natural gas.
Water supply and sewage treatment	Coldwater Spring has the capacity to support an ACWA facility, the incinerator, and other reasonably foreseeable on-post actions. The water supply system is being upgraded to support an incinerator. Additional water distribution pipelines and a supply system to provide for peak demands for emergency response would be needed for an ACWA facility. Other on-post activities would require additional pipelines beyond ACWA requirements to meet emergency demands. The existing sewage treatment plant is being upgraded to meet incinerator demands. Expanded treatment capacity might be required for an ACWA facility and other on-post facilities.
Waste management and facilities	The quantities of wastes generated by construction of an ACWA facility and other on-post facilities would be small and have minimal impacts on waste management systems. The quantities of wastes generated during operation of an ACWA facility and a baseline incinerator would represent a substantial increase for ANAD but would be minimal in the vicinity of the post. Sewage from both facilities together would represent a large increase over the sewage treated in 1999. A new sewage treatment plant will be available for the incinerator. An additional increase in sewage treatment capacity might be needed to handle the additional load from an ACWA facility.
Air quality	Simultaneous construction of an ACWA facility and operation of the incinerator would not cause ambient air concentrations in excess of particulate NAAQS levels. Concentrations during construction of an ACWA facility would exceed 99% of the NAAQS level for annual $PM_{2.5}$, but existing background levels are already near or above this NAAQS level in Alabama. During operation, concentrations of everything except annual $PM_{2.5}$ would be, at most, 83% of NAAQS levels. Concentrations of annual $PM_{2.5}$ during operation would be 97% of the NAAQS level. Other future on- and off-post actions would contribute small or temporary increases to these levels.

TABLE S.9-1 (Cont.)

Impact Area	ACWA Facility + Operating Incinerator + Other Activities
Human health and safety — routine operations	Particulate NAAQS levels would not be exceeded off-post during construction of an ACWA facility. For annual $PM_{2.5}$ levels, however, operation of an incinerator and construction of an ACWA facility would raise the maximum level to over 99% of NAAQS level. During routine operations, annual $PM_{2.5}$ would be about 97% of the NAAQS level. Other actions would contribute small concentrations to these levels and raise the annual $PM_{2.5}$ concentrations. The preexisting high background level almost equal to the NAAQS presents a potential for cumulative adverse health impacts off post. The total carcinogenic risk for operating an ACWA facility and incinerator would be 82% of the level generally considered negligible (a risk level of one in 1 million). The maximum agent concentration from simultaneous operation of both facilities would be 0.68% of the allowable level recommended by the CDC. It is unlikely, however, that this level would be reached during normal operations.
Noise	The cumulative off-post noise level during construction of an ACWA facility and during concurrent operation of both facilities would be less than the EPA's 55-dBA guideline.
Visual resources	Increased traffic and dust during construction of an ACWA facility would be temporary and intermittent. During operations, an ACWA pilot facility would produce a small plume. When present, the plume would add to the visual impact of the large steam plume from the incinerator. Other on-post actions would be in keeping with the industrial nature of the southeastern portion of the post. Overall visual impacts in the vicinity of ANAD would not be significant.
Soils	Construction activities would increase erosion and the potential for accidental spills and releases. These impacts would be temporary and minor if best-management practices were followed. Deposition from operations of an ACWA facility would add to deposition from an incinerator, but, given the low emissions from both units, the cumulative impact should be negligible. There would be no significant cumulative impact on surface soils from routine operation of an ACWA facility, the incinerator, and other on- and off-post actions.
Groundwater	Coldwater Spring supplies water to ANAD. Impacts on groundwater from construction of an ACWA and other on-post facilities would be negligible if standard precautions were taken to prevent leaks and spills. Operation of an ACWA facility and incinerator could use up to 94 million gal/yr of water, about 1.4% of Coldwater Spring's minimum flow. Water use by other on-post facilities would be smaller, and cumulative needs would not exceed the water available from Coldwater Spring. Neither facility would release process water. The discharge of treated sanitary sewage from both facilities and future on-post actions would not affect groundwater flows.
Surface water	Construction impacts on surface flow would be negligible to minor and could be naturally mitigated by standard construction practices. Neither an ACWA facility nor the incinerator would discharge process water during operation. Together, both facilities would discharge about 15 million gal/yr of treated sanitary sewage. This discharge would be small compared to surface water flows and would not significantly change flow conditions in the vicinity of ANAD. Water discharges from other on-post actions would not be expected to affect surface water flows significantly.
Terrestrial habitats and vegetation	Construction of an ACWA facility would disturb up to 77 acres of previously undisturbed land in addition to the 70 acres disturbed by construction of the incinerator. Each new on-post construction action would disturb additional land and increase vegetation and habitat loss. Emissions from an ACWA facility and incinerator along with future on-post and off-post actions would have negligible impacts on terrestrial habitats and vegetation.

TABLE S.9-1 (Cont.)

Impact Area	ACWA Facility + Operating Incinerator + Other Activities
Wildlife	Construction of an ACWA facility would disturb up to 77 acres of land in addition to the 70 acres disturbed by construction of the incinerator. Each new on-post construction action would increase habitat loss, human activity, and construction traffic, causing additional deaths among less mobile species and displacing additional wildlife during the construction period. Increased noise would cumulatively displace additional small mammals and increase the potential for habitat abandonment by songbirds. Additional operations on post would increase roadkills. Emissions from an ACWA facility and the incinerator along with other future on-post and off-post actions would have negligible impacts on wildlife.
Aquatic habitats and fish	Disturbance of streams in Area A could result in loss of aquatic habitat. Construction in any of the three proposed areas could result in impacts on downstream habitats. Avoidance of streams where possible and implementation of erosion and sedimentation controls would minimize the potential for construction impacts. Operational impacts from an ACWA facility and the incinerator would be small. The minor emissions potential of other reasonably foreseeable actions and the distance from the ACWA facility of those actions should mean that during routine operations, cumulative impacts from an ACWA facility, the incinerator, and other on- and off-post actions would be negligible.
Protected species	Construction of an ACWA facility and associated utility corridors and construction of other reasonably foreseeable on-post facilities would not be likely to affect protected species adversely. Implementation of runoff and sedimentation controls during construction of an ACWA facility and other future on-post facilities would reduce the potential for impacts on the aquatic habitats of protected species. Impacts on protected species from routine operations of an ACWA facility, the incinerator, and other future on- and off-post activities would be negligible.
Wetlands	Construction of an ACWA facility in Area A would be likely to require construction in a 100-yr floodplain, an adverse impact. It could also result in the loss of wetlands, which could have an adverse impact. Construction in any of the three areas could affect downstream wetlands. Impacts downstream from the areas would be negligible if standard measures for controlling erosion and runoff are followed. Cumulative impacts from routine operations of an ACWA facility, the incinerator, and other future on- and off-post actions would be negligible.
Socioeconomics	Cumulative impacts from constructing and operating an ACWA facility, the baseline incinerator, and other future on- and off-post actions would be relatively small. Adverse cumulative impacts on housing should not occur. Even if other reasonably foreseeable actions were to occur during operation of the baseline incinerator and construction and operation of the ACWA facility, the potential cumulative impacts on the local economy, local labor markets, and public and community services would be minor. Operation of the baseline incinerator with concurrent construction and operation of an ACWA facility and other future actions might have moderate impacts on the local transportation network.
Environmental justice	During construction and routine operation of an ACWA facility, the incinerator, and other future actions, no high and adverse human health or socioeconomic impacts on populations are anticipated. Consequently, significant environmental justice impacts are not anticipated.

TABLE S.9-2 Cumulative Impacts at PBA

Impact Area	ACWA Facility + Operating Incinerator + Other Activities
Land use	Depending on the location chosen, the PBCDF and construction of an ACWA pilot facility would disturb up to 82 acres of land (0.5% of the area of PBA). Cumulative land use impacts from on- and off-post activities should not be significant.
Water supply and sewage treatment	There would be no off-post impacts on water supply and infrastructure, since these systems are self-contained at PBA. New water distribution pipelines and sewage pipelines, in addition to those supplying the incinerator, would be required for an ACWA facility. Water supply at PBA is sufficient to meet the needs of an ACWA facility, the PBCDF, and other on-post actions. PBA currently has the capacity to treat the sewage from these facilities.
Electric power	Depending on the technology chosen, an ACWA facility would require up to 120 GWh of electric power annually, in addition to the 33 GWh required by the incinerator, an increase of about 450% over current consumption levels. New power lines and service connections would be needed to supply the power needs of the ACWA facility. Discussions with local planners indicated no current or foreseen problems supplying electric power.
Natural gas	The existing infrastructure could not supply the natural gas needs of an ACWA pilot facility. Additional pipelines would be needed for an ACWA facility as well as for any other new on-post activities. An ACWA facility and incinerator would require about 1.4 billion scf of natural gas annually, increasing current natural gas consumption by 340% during operation while still supplying existing on-post use. This would be a significant increase in the consumption of natural gas at PBA. Discussions with local planners indicated no current or foreseen problems supplying natural gas.
Waste management and facilities	The quantities of construction wastes generated by an ACWA facility and other on-post facilities would be small and have minimal impacts on waste management systems. The quantities of wastes generated during the operation of an ACWA facility and the PBCDF would represent a substantial increase for PBA but would be minimal in the vicinity of the post. Both facilities together would discharge less than 21% of the amount of sewage currently discharged. PBA currently has the capacity to treat this and other reasonably foreseeable increases in sewage.
Air quality	Simultaneous construction of an ACWA facility and operation of the PBCDF would not cause ambient concentrations in excess of particulate NAAQS levels. Concentrations during construction of an ACWA facility could exceed 99% of the NAAQS level for annual $PM_{2.5}$, but already existing background levels are near or above this NAAQS level in Arkansas. Except for annual $PM_{2.5}$, ambient concentrations during simultaneous operation of both facilities would be, at most, 84% of NAAQS levels. Annual $PM_{2.5}$ concentrations would exceed 96% of the NAAQS level. Other future on- and off-post actions would raise the cumulative annual $PM_{2.5}$ level during construction and operation of an ACWA facility.

TABLE S.9-2 (Cont.)

Impact Area	ACWA Facility + Operating Incinerator + Other Activities
Human health and safety — routine operations	NAAQS levels would not be exceeded off post during construction or operation of an ACWA facility. For $PM_{2.5}$, however, operation of the PBCDF and construction of an ACWA facility could raise the maximum level to more than 99% of the NAAQS level for annual $PM_{2.5}$, while concurrent operation of both facilities could result in a maximum level of more than 96% of this level. Other future actions would contribute small concentrations to this level and raise the cumulative annual $PM_{2.5}$ concentrations. Because of the preexisting high background level, there is a potential for cumulative adverse health impacts off post. Noncarcinogenic risks from operation of an ACWA facility and the PBCDF along with the Central Incinerator Complex would be less than 20% of the levels considered to present hazards. The maximum increase in carcinogenic risk to on- and off-post populations from concurrent operation of an ACWA facility, the PBCDF, and the Central Incinerator Complex would be in the lower end of the target range used by the EPA to determine whether cleanup of hazardous waste sites is warranted and would generally be considered negligible. The maximum increase in agent concentration from the ACWA facility and PBCDF operations would be, at most, 0.06% of the maximum allowable level recommended by the CDC. It is unlikely, however, that these levels would be reached during routine operations.
Noise	The cumulative off-post noise impact from construction and operation of an ACWA facility, the PBCDF, and other future on- and off-post actions would not exceed the EPA's 55-dBA guideline.
Visual resources	Current actions and reasonably foreseeable future on-post actions are in keeping with the existing visual character of PBA. Traffic and dust during construction of the ACWA facility would be visible but intermittent and temporary. During operation, a small plume would be visible from an ACWA pilot facility. This would add to the visual impact of the large plume from the incinerator. However, the cumulative visual impact would remain in keeping with the visual character of the installation and would not be significant.
Soils	Construction activities would increase erosion and the potential for accidental spills and releases. These impacts would be temporary and minor if best management practices were followed. There would be no significant cumulative impacts on surface soils from the routine operations of an ACWA facility, the PBCDF, and other on- and off-post actions.
Groundwater	All water used at PBA is withdrawn from the Sparta Aquifer. Impacts on groundwater from the construction of an ACWA facility and other on-post facilities would be negligible if standard precautions were taken to prevent leaks and spills. The operation of an ACWA facility, the PBCDF, and other on-post activities would represent an increase of 28% in current water use at PBA and an increase of 0.49% in current withdrawals in the vicinity of PBA. The on-post wells could supply the increased need. Other on- and off-post actions would increase the withdrawals from the aquifer. In view of the large ground water supply, cumulative impacts on groundwater supplies would not be significant. During operation of an ACWA facility and the PBCDF, all liquid process wastes would be recycled, and there would be no discharge of process wastewater. Hence, there would be no groundwater impacts involving discharges from facilities.
Surface water	Construction impacts on surface flow would be negligible to minor and could be naturally mitigated by standard construction practices. Surface water is not used for potable water supply at PBA. Impacts from the operation of an ACWA facility and other on-post facilities should be negligible if standard precautions to prevent leaks and spills are followed. During the routine operation of an ACWA facility and the PBCDF, all liquid process wastes would be recycled. There would be no discharge of process water. Sanitary sewage would be treated in the on-post treatment plant. An ACWA facility and the PBCDF together would discharge about 15 million gal/yr of sewage, less than 21% of the amount currently discharged. The cumulative additional discharge should not affect surface water flows on PBA or in the vicinity.

TABLE S.9-2 (Cont.)

Impact Area	ACWA Facility + Operating Incinerator + Other Activities
Terrestrial habitats and vegetation	Construction of an ACWA facility would disturb 37 acres in addition to the 45 acres already disturbed by construction of the PBCDF. Construction of other on-post facilities would increase loss of vegetation. Emissions from both facilities and reasonably foreseeable future actions would be small and would have negligible impacts on terrestrial biota in the vicinity of PBA.
Wildlife	Construction of an ACWA facility would disturb 37 acres in addition to the 45 acres already disturbed by the construction of the PBCDF. Construction of other on-post facilities would increase habitat loss, human activity, and construction traffic, thereby causing additional deaths among less mobile species and displacing additional wildlife. Increased noise would displace additional small mammals and lead to potential increased habitat abandonment by songbirds. Additional operations on post would increase roadkills. Cumulative impacts on wildlife due to emissions from an ACWA facility, the PBCDF, and other potential on- and off-post actions would be negligible.
Aquatic habitats and fish	Aquatic habitats and fish would not be likely to suffer impacts from construction of an ACWA pilot test facility along with other reasonably foreseeable on-post activities if runoff and siltation control measures were employed. Any impacts would add to impacts already caused by construction of the PBCDF. During routine operations, air emissions and deposition from an ACWA facility, the PBCDF, and other on- and off-post actions would have negligible impacts on aquatic habitats and fish.
Protected species	No federal listed species are known to occur at PBA. Cumulative impacts on protected species from an ACWA pilot test facility, the PBCDF, and other reasonably foreseeable actions would be negligible.
Wetlands	Both Area A and Area B contain wetlands that could be eliminated or affected by construction of an ACWA facility. There are wetlands in Area C where the conventional weapons SCWO will be constructed. Avoidance of wetlands and the use of standard practices for controlling runoff, sedimentation, and erosion would reduce the potential for impacts on wetlands. Cumulative impacts from routine operations of an ACWA facility, the PBCDF, and other potential on-post actions would be negligible. Reasonably foreseeable off-post actions would be too far away to affect wetlands on PBA.
Socioeconomics	The cumulative impacts from constructing and operating an ACWA facility, the PBCDF, and other future on- and off-post actions would be relatively small. Adverse cumulative impacts on housing should not occur. Even if other reasonably foreseeable actions were to occur during the construction and operation of an ACWA facility and operation of the PBCDF, the potential cumulative impacts on the local economy, local labor markets, and public and community services would be minor. Operation of the PBCDF with concurrent construction and operation of an ACWA facility and other future actions might have moderate impacts on the local transportation network.
Environmental justice	Construction and routine operation of an ACWA facility, the PBCDF, and other future operations are not anticipated to contribute to high and adverse human health or socioeconomic impacts to populations. Consequently, significant environmental justice impacts are not anticipated.

TABLE S.9-3 Cumulative Impacts at PCD

Impact Area	ACWA Facility + Other Activities	ACWA Facility + Incinerator + Other Activities
Land use	This scenario would require 85 acres, 0.4% of PCD's land area. Activities would be consistent with current and future land use under the reuse plan. Cumulative land use impacts from on- and off-post activities should not be significant.	This scenario would require 170 acres, 0.8% of PCD's land area. Activities would be consistent with current and future land use under the reuse plan. Cumulative land use impacts from on- and off-post activities should not be significant.
Electric power	Depending on which technology was chosen, more than 60 GWh/yr of additional electric power would be needed for an ACWA facility, an increase of more than 500% over recent consumption levels. Local electric supplies could meet this demand. Current infrastructure would have to be expanded to meet the needs both of an ACWA facility and of future on-post operations. Discussions with local planners indicated no current or foreseen problems with supplying electric power.	Depending on which technology was chosen, more than 89 GWh/yr of additional electric power would be needed for an ACWA facility and an incinerator, an increase of more than 800% over current consumption levels. Local electric supplies could meet this demand. Additional infrastructure would be needed beyond that required for an ACWA facility and other future on-post operations. Discussions with local planners indicated no current or foreseen problems with supplying electric power.
Natural gas	Depending on which technology was chosen, more than 149 million scf of gas would be needed annually for an ACWA facility. Additional gas would be required for other future on-post needs. Local gas supplies could meet this demand. More pipelines and stations would be essential for an ACWA facility as well as other future on-post needs. Discussions with local planners indicated no current or foreseen problems with supplying natural gas.	Depending on which technology was chosen, more than 609 million scf of gas would be needed annually for an ACWA facility and an incinerator. Additional gas would be required for other future on-post needs. Local gas supplies could meet this demand. More pipelines and stations would be essential for an incinerator, beyond those required by an ACWA facility and other future on-post needs. Discussions with local planners indicated no current or foreseen problems with supplying natural gas.
Water supply and sewage treatment	Water use during the construction and operation of an ACWA facility and other reasonably foreseeable on-post actions would be less than historic peak groundwater withdrawals and could be supplied. Additional delivery and storage systems would be needed to support an ACWA facility and other future on-post facilities. Expansion of existing sewage lagoons might be required.	Water use during the construction and operation of an ACWA facility, an incinerator, and other reasonably foreseeable on-post actions would be less than historic peak groundwater withdrawals and could be supplied. Additional delivery and storage systems would be needed beyond those required to support an ACWA facility and other future on-post facilities. Expansion of existing sewage lagoons might be required.
Waste management and facilities	The quantities of wastes generated by construction and operation of an ACWA facility and other on-post future facilities would represent a substantial increase for PCD but would be minimal in the vicinity of the installation. The additional sanitary waste generated by an ACWA facility and other on-post future actions might require expansion of the on-post evaporative lagoons.	The quantities of wastes generated by construction and operation of an ACWA facility, a baseline incinerator, and other on-post future facilities would represent a substantial increase for PCD but would be minimal in the vicinity of the installation. The additional sanitary waste generated by an ACWA facility, an incinerator, and other on-post future actions might require expansion of the on-post evaporative lagoons.

TABLE S.9-3 (Cont.)

Impact Area	ACWA Facility + Other Activities	ACWA Facility + Incinerator + Other Activities
Air quality	Simultaneous construction of an ACWA facility and other on- and off-post facilities would not cause off-post particulate levels to exceed NAAQS levels. Operation of an ACWA facility and other on- and off-post facilities would not cause off-post criteria pollutant levels to exceed NAAQS levels.	Simultaneous construction of a baseline ACWA facility, an incinerator, and other on- and off-post facilities would not cause off-post particulate levels to exceed NAAQS levels. Operation of an ACWA facility, an incinerator, and other on- and off-post facilities would not cause off-post criteria pollutant levels to exceed NAAQS levels.
Human health and safety — routine operations	No adverse cumulative impacts on the health of the off-post public would occur during construction of an ACWA facility and other on- and off-post facilities. Applicable ambient standard levels for criteria pollutants would not be exceeded during construction or operation of an ACWA facility and other on- and off-post actions. The maximum increase in carcinogenic risk to on- and off-post populations from ACWA facility operations would be about 20% of the level generally considered negligible. The maximum concentration of agent from ACWA operations would be 0.2% of the allowable level recommended by the CDC. Other future on-post facilities would contribute negligible health risks.	No adverse cumulative impacts on the health of the off-post public would occur during construction of an ACWA facility, an incinerator, and other on- and off-post facilities. Applicable ambient standard levels for criteria pollutants would not be exceeded during concurrent construction and operation of an ACWA facility and a baseline incinerator with other on- and off-post actions. The maximum increase in carcinogenic risk to on- and off-post populations from an ACWA facility and incinerator operations would be about 82% of the level generally considered negligible. The maximum concentration of agent from ACWA facility operations would be 0.4% of the allowable level recommended by the CDC. Other future on-post facilities would contribute negligible health risks.
Noise	Cumulative noise levels at the nearest residences during construction and operation of an ACWA facility and other on-post facilities would be less than the EPA's 55-dBA guideline.	Simultaneous construction and operation of an incinerator and an ACWA facility would increase cumulative noise levels at the nearest residences by, at most, a barely perceptible 3 dBA. The cumulative level would still be below the EPA's 55-dBA guideline.
Visual resources	Construction and operation of an ACWA facility would be consistent with the largely industrial nature of PCD. Any plumes from an ACWA facility and other on-post actions would be small. No adverse visual impacts would result from construction and operation of an ACWA facility and other on- and off-post facilities.	Construction and operation of an incinerator and an ACWA facility would be consistent with the largely industrial nature of PCD. Any plumes from an ACWA facility and other on-post actions would be small. An operating incinerator would produce a larger, additional plume. No adverse visual impacts would result from construction and operation of an ACWA facility, an incinerator, and other on- and off-post facilities.
Soils	Construction could contribute to soil erosion and to accidental spills and releases. These impacts would be temporary and minor if best-management practices were followed. There should be no significant impacts on soils from routine operations of an ACWA facility and other on-post facilities.	Construction could contribute to soil erosion and to accidental spills and releases. These impacts would be temporary and minor if best-management practices were followed. Impacts from an incinerator would add to the impacts of an ACWA facility alone, but there should be no significant cumulative impacts on soils from routine operations of an ACWA facility, an incinerator, and other on-post facilities.

TABLE S.9-3 (Cont.)

Impact Area	ACWA Facility + Other Activities	ACWA Facility + Incinerator + Other Activities
Groundwater	PCD water use during operation of an ACWA facility and other on-post actions would exceed 24 million gal/yr. This use is less than historic peak withdrawals from the terrace alluvial aquifer. However, PCD would have to purchase additional water rights. After completion of pilot testing, withdrawals would cease, and the aquifer would recharge quickly. PCD is hydrologically isolated from off-post activities, so there would be no cumulative impacts on groundwater quantity or quality. No contamination of groundwater should occur during construction of any facilities if standard precautions are taken to prevent leaks and spills. The ACWA facility and other on-post facilities would not be expected to release substances to the groundwater during routine operations.	PCD water use during operation of an ACWA facility, an incinerator, and other on-post actions would exceed 48 million gal/yr. This use is less than historic peak withdrawals from the terrace alluvial aquifer. However, PCD would have to purchase additional water rights. After completion of chemical demilitarization, withdrawals would cease, and the aquifer would recharge quickly. PCD is hydrologically isolated from off-post activities, so there would be no cumulative impacts on groundwater quantity or quality. No contamination of groundwater should occur during construction of any facilities if standard precautions are taken to prevent leaks and spills. An ACWA facility, an incinerator, and other on-post facilities would not be expected to release substances to the groundwater during routine operations.
Surface water	Cumulative impacts on surface flow from construction of an ACWA facility and other on-site facilities would be negligible to minor and could be naturally mitigated by standard construction practices. Routine operation of an ACWA facility would not result in additional releases to surface waters. Cumulatively, the impacts from an ACWA facility and other reasonably foreseeable actions would be small. Domestic sewage would be treated in lined evaporative lagoons before release.	Cumulative impacts on surface flow from construction of an ACWA facility, an incinerator, and other on-post facilities would be negligible to minor and could be naturally mitigated by standard construction practices. Routine operation of an ACWA facility and an incinerator would not result in additional releases to surface waters. Cumulatively, the impacts from an ACWA facility, an incinerator, and other reasonably foreseeable actions would be small. Domestic sewage would be treated in lined evaporative lagoons before release.
Terrestrial habitats and vegetation	Construction of an ACWA facility and associated infrastructure would disturb about 85 acres of land. Each new construction activity would increase loss of vegetation as sites were cleared. Emissions from an ACWA facility and other future actions would have negligible impacts on terrestrial habitats and vegetation.	Construction of an ACWA facility, an incinerator, and associated infrastructure would disturb about 170 acres of land, causing greater impact on terrestrial habitats and vegetation than would construction of an ACWA facility alone. Each new construction activity would increase loss of vegetation as sites were cleared. Emissions from an ACWA facility, an incinerator, and other on-site future actions would have negligible impacts on terrestrial habitats and vegetation.

TABLE S.9-3 (Cont.)

Impact Area	ACWA Facility + Other Activities	ACWA Facility + Incinerator + Other Activities
Wildlife	Construction of an ACWA facility and associated infrastructure would disturb about 85 acres of land. Each new on-post construction activity would increase habitat loss, increase human activities, cause additional deaths among less mobile species, and displace additional wildlife. Further operations on-post would increase traffic, with a consequent increase in roadkills. Emissions from an ACWA facility and other future on- and off-post actions would have negligible impacts on wildlife.	Construction of an ACWA facility, an incinerator, and associated infrastructure would disturb about 170 acres of land, causing greater impacts on wildlife than would construction of an ACWA facility alone. Each new on-post construction activity would increase habitat loss, increase human activities, cause additional deaths among less mobile species, and displace additional wildlife. Adding an incinerator on post would increase traffic, with a consequent upsurge in roadkills beyond the levels associated with an ACWA facility alone. Emissions from an ACWA facility, an incinerator, and other future on- and off-post actions would have negligible impacts on wildlife.
Aquatic habitats and fish	No aquatic resources occur in the areas proposed for construction of an ACWA facility or other on-post future actions. Operation of these facilities would have negligible impacts on aquatic habitats and fish.	No aquatic resources occur in the areas proposed for construction of an ACWA facility, an incinerator, or other on-post future actions. Impacts from incinerator operations would add to impacts from an ACWA facility. Overall, operation of these facilities would have negligible impacts on aquatic habitats and fish.
Protected species	Construction impacts, if any, would depend on the location selected for the facility. Avoiding the southern portions of Areas B and C and the shrubland habitat in Areas A and B would minimize potential adverse impacts. Cumulative impacts from routine operations of an ACWA facility and other future on- and off-post actions would be negligible.	Construction impacts beyond those associated with an ACWA facility would depend on the location selected for an incinerator. Avoiding the southern portions of Areas B and C and the shrubland habitat in Areas A and B would minimize potential adverse impacts. Cumulative impacts from routine operations of an ACWA facility, an incinerator, and other future on- and off-post actions would be negligible.
Wetlands	There are no wetlands in the areas proposed for an ACWA facility and other future on-post actions. Operations of an ACWA facility and other on- and off-post facilities would have negligible impacts on wetlands.	There are no wetlands in the areas proposed for an ACWA facility, an incinerator, and other future on-post actions. Operations of an ACWA facility, an incinerator, and other on- and off-post facilities would have negligible impacts on wetlands.
Socioeconomics	The cumulative impacts from constructing and operating an ACWA facility and other future on- and off-post actions would be relatively small. Adverse cumulative impacts on housing should not occur. Even if other reasonably foreseeable actions were to occur during the construction and operation of an ACWA facility, the potential cumulative impacts on the local economy, local labor markets, and public and community services would be minor. Concurrent construction and operation of an ACWA facility and other future actions might have minor impacts on the local transportation network.	The cumulative impacts from constructing and operating an ACWA facility, a baseline incinerator, and other future on- and off-post actions would be relatively small. Adverse cumulative impacts on housing should not occur. Even if other reasonably foreseeable actions were to occur during the concurrent construction and operation of an ACWA facility and an incinerator, the potential cumulative impacts on the local economy, local labor markets, and public and community services would be minor. Concurrent construction and operation of an ACWA facility, an incinerator, and other future actions might have moderate impacts on the local transportation network.

TABLE S.9-3 (Cont.)

Impact Area	ACWA Facility + Other Activities	ACWA Facility + Incinerator + Other Activities
Environmental justice	During construction and routine operation of an ACWA facility and other on-post actions, no high and adverse impacts on human health or socioeconomic impacts on populations are anticipated. Consequently, significant environmental justice impacts are not anticipated.	A baseline incinerator would add to the human health and socioeconomic impacts from an ACWA facility alone. The overall impacts of an ACWA facility, an incinerator, and other on-post actions would not be high and adverse. Consequently, significant environmental justice impacts are not anticipated.

TABLE S.9-4 Cumulative Impacts at BGAD

Impact Area	ACWA Facility + Other Activities	ACWA Facility + Incineration + Other Activities
Land use	This scenario would require 95 acres, 0.6% of BGAD's land area. Activities would be consistent with use of BGAD for industrial activities and the continuing trend of urbanization in the BGAD vicinity. Cumulative land use impacts from on- and off-post activities should not be significant.	This scenario would require 180 acres, 1.2% of BGAD's land area. Activities would be consistent with use of BGAD for industrial activities and the continuing trend of urbanization in the BGAD vicinity. Development of two destruction facility sites may interfere with other site activities. Cumulative land use impacts from on- and off-post activities should not be significant.
Electric power	Depending on which technology was chosen, up to 120 GWh/yr of additional electric power would be needed for an ACWA facility, an increase of 1,500% over year 2000 consumption levels. Local electric supplies could meet this demand. Current infrastructure would need to be expanded. Discussions with local planners indicated no current or foreseen problems with supplying electric power.	Depending on which technology was chosen, up to 150 GWh/yr of additional electric power would be needed for an ACWA facility and a baseline incinerator, an increase of about 2,000% over year 2000 consumption. Local electric supplies could meet this demand. Additional infrastructure would be required in addition to that necessary for an ACWA facility and other future on-post needs. Discussions with local planners indicated no current or foreseen problems with supplying electric power.
Natural gas	Existing infrastructure could not supply the needs both of an ACWA facility and other future on-post facilities. Additional gas lines and metering stations would be necessary. Depending on which technology was chosen, an ACWA facility would significantly increase natural gas consumption at BGAD, requiring up to 140 million scf/yr, a large increase over current consumption levels. Discussions with local planners indicated no current or foreseen problems with supplying natural gas.	Existing infrastructure could not supply the needs of an ACWA facility, a baseline incinerator, and other future on-post facilities. Additional gas lines and metering stations would be needed. Depending on which technology was chosen, an ACWA facility and a baseline incinerator would significantly increase natural gas consumption at BGAD, requiring up to 978 million scf/yr, a large increase over current consumption levels. Discussions with local planners indicated no current or foreseen problems with supplying natural gas.
Water supply and sewage treatment	Current water supply capacity would be sufficient to meet demands of an ACWA facility and other reasonably foreseeable on-post actions. Additional delivery, storage, and emergency supply systems would be needed. Additional sewage treatment capacity would be necessary.	Current water supply capacity would be sufficient to meet the demands of an ACWA facility, an incinerator, and other reasonably foreseeable on-post actions. Additional delivery, storage, and emergency supply systems would be needed beyond those necessary to support an ACWA facility and other future on-post facilities. Additional sewage treatment capacity would be required beyond that needed for an ACWA facility and other future on-post facilities.

TABLE S.9-4 (Cont.)

Impact Area	ACWA Facility + Other Activities	ACWA Facility + Incineration + Other Activities
Waste management and facilities	The quantities of wastes generated during construction would be small and would have minimal impacts on waste management systems. The quantities of wastes generated during operations of an ACWA facility and other on-post facilities would represent a substantial increase for BGAD but would be minimal in the vicinity of the post. An ACWA facility would increase the amount of sanitary sewage needing treatment by about 21%. Other future on-post facilities would produce additional sewage. Additional sewage treatment capacity would be necessary.	The quantities of wastes generated during construction would be small and would have minimal impacts on waste management systems. The quantities of wastes generated during operations of a baseline incinerator and an ACWA facility would represent a substantial increase for BGAD but would be minimal in the vicinity of the post. An ACWA facility and a baseline incinerator would increase the amount of sanitary sewage needing treatment by about 54%. Other future on-post facilities would produce additional sewage. Additional sewage treatment capacity would be needed.
Air quality	Simultaneous construction of an ACWA facility and other future on-post actions would not cause concentrations in excess of PM_{10} and 24-hour $PM_{2.5}$ NAAQS levels. The annual $PM_{2.5}$ NAAQS level would be exceeded, but background levels in the vicinity of BGAD and throughout Kentucky already exceed this level, even without an ACWA facility. With the exception of the annual $PM_{2.5}$ concentration, operations of an ACWA facility and other future on-post facilities would not cause off-post concentrations to exceed NAAQS levels. All new activities would add small increments to the current levels of $PM_{2.5}$.	Simultaneous construction of an ACWA facility, a baseline incinerator, and other future on-post actions would not cause concentrations in excess of PM_{10} and 24-hour $PM_{2.5}$ NAAQS levels. The annual $PM_{2.5}$ NAAQS level would be exceeded, but background levels in the vicinity of BGAD and throughout Kentucky already exceed this level, even without an ACWA facility. Simultaneous construction of an ACWA facility and a baseline incinerator would add less than 3% of the annual $PM_{2.5}$ NAAQS level. With the exception of the annual $PM_{2.5}$ concentration, operations of an ACWA and other future on-post facilities would not cause off-post concentrations to exceed NAAQS levels. All new activities would add small increments to the current levels of $PM_{2.5}$. Simultaneous operation of an ACWA facility and a baseline incinerator would add less than 3% to the annual $PM_{2.5}$ NAAQS level.
Human health and safety — routine operations	Except for the potential for adverse cumulative impacts associated with existing annual $PM_{2.5}$ concentrations, which already exceed NAAQS levels, no adverse cumulative impacts on the health of the off-post public would occur. The maximum increase in carcinogenic risk to on- and off-post populations from ACWA facility operations would be about 0.2% of the level generally considered negligible. The maximum agent concentration from ACWA facility operations would be, at most, 0.26% of the maximum allowable level recommended by the CDC. Increases in health risks beyond those associated with an ACWA facility would be negligible.	Except for the potential for adverse cumulative impacts associated with existing annual $PM_{2.5}$ concentrations, which already exceed NAAQS levels, no adverse cumulative impacts on the health of the off-post public would occur from the construction and operation of an ACWA facility, a baseline incinerator, and other future on- and off-post facilities. The maximum increase in carcinogenic risk to on- and off-post populations from simultaneous ACWA facility and baseline incinerator operations would be about 62% of the level generally considered negligible. The maximum agent concentration from routine operations of an ACWA facility and a baseline incinerator would be, at most, 0.52% of the maximum allowable level recommended by the CDC. Increases in health risks beyond those associated with an ACWA facility would be negligible.

TABLE S.9-4 (Cont.)

Impact Area	ACWA Facility + Other Activities	ACWA Facility + Incineration + Other Activities
Noise	Construction and operation of an ACWA facility and other future on-post actions would result in noise levels below the EPA's 55-dBA guideline at the nearest boundary.	Simultaneous construction and operation of an ACWA facility and a baseline incinerator would increase cumulative noise levels at the nearest boundary by, at most, a barely perceptible 3 dBA. The cumulative level would still be below the EPA's 55-dBA guideline.
Visual resources	The cumulative visual impacts from construction and operation of an ACWA facility would remain in keeping with the visual character of BGAD and the surrounding area and would not be significant. Any plumes from an ACWA facility and other on-post actions would be small.	The cumulative visual impacts from construction and operation of an ACWA facility and an incinerator would remain in keeping with the visual character of BGAD and the surrounding area and would not be significant. Any plumes from an ACWA facility and other on-post actions would be small. An operating baseline incinerator would produce an additional, larger plume.
Soils	Construction activities would increase erosion and the potential for accidental spills and releases. These impacts would be temporary and minor if best-management practices were followed. There would be no significant impacts on soils from routine operations of an ACWA facility along with other on- and off-post facilities.	Construction activities would increase erosion and the potential for accidental spills and releases. These impacts would be temporary and minor if best-management practices were followed. Impacts from a baseline incinerator would add to the impacts of an ACWA facility alone, but there should be no significant cumulative impacts on soils from routine operations of an ACWA facility, a baseline incinerator, and other on- and off-post facilities.
Groundwater	Groundwater is not used for water supplies at BGAD. No contamination of groundwater should occur during construction of any facilities if standard precautions are taken to prevent leaks, spills, and erosion. An ACWA facility would not release process water during normal operations. Other on-post facilities would have negligible or no impacts on groundwater. Increased sewage treatment flows from new on-post facilities would not affect groundwater resources.	Groundwater is not used for water supplies at BGAD. No contamination of groundwater should occur during construction of any facilities if standard precautions are taken to prevent leaks, spills, and erosion. Neither an ACWA facility nor a baseline incinerator would release process water during normal operations. Other on-post facilities would have negligible or no impacts on groundwater. Increased flows from sewage treatment from new on-post facilities would not affect groundwater resources.

TABLE S.9-4 (Cont.)

Impact Area	ACWA Facility + Other Activities	ACWA Facility + Incineration + Other Activities
Surface water	On-post Lake Vega supplies water to BGAD. Construction impacts on surface flow would be negligible to minor and could be naturally mitigated by standard construction practices. Depending on which technology was chosen, an ACWA facility could use up to 24 million gal/yr of water. Current water supply capacity would be sufficient to meet this need. Other future on-post actions would use additional, minor quantities of water. None of the ACWA technologies would discharge process water during operation. The discharge of additional sanitary sewage would not affect surface water flows. Other future on-post facilities would produce additional minor quantities of sewage.	On-post Lake Vega supplies water to BGAD. Construction impacts on surface flow would be negligible to minor and could be naturally mitigated by standard construction practices. Depending on which technology was chosen, an ACWA facility and a baseline incinerator could use up to 127 million gal/yr of water. Current water supply capacity would be sufficient to meet this need. Other future on-post actions would use additional minor quantities of water. Neither an ACWA facility nor a baseline incinerator would discharge process water during operation. The discharge of additional sanitary sewage from both facilities would not affect surface water flows. Other future on-post facilities would produce additional minor quantities of sewage.
Terrestrial habitats and vegetation	Construction of an ACWA facility and associated infrastructure could disturb up to 95 acres of land. Each new construction activity would increase loss of vegetation as sites were cleared. Emissions from an ACWA facility would be small and would have negligible impacts on terrestrial habitats and vegetation. Impacts on terrestrial habitats and vegetation from off-post actions could not be quantified but are expected to be minor.	Construction of an ACWA facility, a baseline incinerator, and associated infrastructure could disturb up to 180 acres of land. Each new construction activity would increase loss of vegetation as sites were cleared. Emissions from an AWCA facility, a baseline incinerator, and other future on-post actions would be small and would have negligible impacts on terrestrial habitats and vegetation. Impacts on terrestrial habitats and vegetation from off-post actions could not be quantified but are expected to be minor.
Wildlife	Construction of an ACWA facility and associated infrastructure could disturb up to 95 acres of land. Each new construction activity would affect wildlife by increasing loss of habitat, human activity, and construction traffic. These impacts could cause additional deaths among burrowing and less mobile species. If possible, construction disturbance to tributaries and portions of Proposed Area B should be avoided in order to protect the floodplain riparian community. Additional operations on post would increase roadkills. Emissions from an ACWA facility and other future on-post actions would be small and would have negligible impacts on wildlife. Reasonably foreseeable off-post actions would have localized impacts that could not be quantified but would have temporary or minor impacts at BGAD.	Construction of an ACWA facility, a baseline incinerator, and associated infrastructure could disturb up to 180 acres of land. Each new construction activity would affect wildlife by increasing loss of habitat, human activity, and construction traffic. These impacts could cause additional deaths among burrowing and less mobile species. If possible, construction disturbance to tributaries and portions of Proposed Area B should be avoided in order to protect the floodplain riparian community. Additional operations on post would increase roadkills. Emissions from an ACWA facility, a baseline incinerator, and other future on-post actions would be small and would have negligible impacts on wildlife. Reasonably foreseeable off-post actions would have localized impacts that could not be quantified but would have temporary or minor impacts at BGAD.
Aquatic habitats and fish	Adverse impacts would be unlikely if measures were taken to control runoff and erosion during construction. Cumulative impacts should be negligible during routine operations of an ACWA facility and other reasonably foreseeable actions.	Adverse impacts would be unlikely if measures were taken to control runoff and erosion during construction. Cumulative impacts from the operation of an ACWA facility, a baseline incinerator, and other future on-post facilities should be negligible.

TABLE S.9-4 (Cont.)

Impact Area	ACWA Facility + Other Activities	ACWA Facility + Incineration + Other Activities
Protected species	Construction could have adverse impacts on running buffalo clover. Surveying for clover colonies and marking and avoiding patches during construction would reduce the potential for impacts. The cumulative deposition potential of an ACWA facility and other future on- and off-post actions is small and would have negligible impacts on protected species.	Construction of a baseline incinerator would add to the potential for adverse impacts on running buffalo clover associated with an ACWA facility alone. Surveying for clover colonies and marking and avoiding patches during construction could reduce the potential for impacts. The cumulative deposition potential of an ACWA facility, a baseline incinerator, and other future on- and off-post actions is small and would have negligible impacts on protected species.
Wetlands	If built in Proposed Area B, an ACWA facility could affect wetlands. Other future on-post actions appear to avoid wetlands. Potential construction impacts could be mitigated by avoiding wetlands and using standard practices to control sedimentation and runoff. Because the emissions deposition potential would be small, cumulative impacts from routine operation of an ACWA facility and other future on- and off-post actions would be negligible.	If built in Proposed Area B, an ACWA facility and a baseline incinerator could affect wetlands. Potential construction impacts could be mitigated by avoiding wetlands and using standard practices to control sedimentation and runoff. Other future on-post actions appear to avoid wetlands. Because the emissions deposition potential would be small, cumulative impacts from routine operation of an ACWA facility, a baseline incinerator, and other future on- and off-post actions would be negligible.
Socioeconomics	The cumulative impacts from constructing and operating an ACWA facility and other future on- and off-post actions would be relatively small. Adverse cumulative impacts on housing should not occur. Even if other reasonably foreseeable actions were to occur during the construction and operation of an ACWA facility, the potential cumulative impacts on the local economy, local labor markets, and public and community services would be minor. Concurrent construction and operation of an ACWA facility and other future actions might have moderate impacts on the local transportation network.	The cumulative impacts from constructing and operating an ACWA facility, a baseline incinerator, and other future on- and off-post actions would be relatively small. Adverse cumulative impacts on housing should not occur. Even if other reasonably foreseeable actions were to occur during the concurrent construction and operation of an ACWA facility and an incinerator, the potential cumulative impacts on the local economy, local labor markets, and public and community services would be minor. Concurrent construction and operation of an ACWA facility, an incinerator, and other future actions might have moderate impacts on the local transportation network.
Environmental justice	During construction and routine operation of an ACWA facility and other on-post actions, no high and adverse human health or socioeconomic impacts on populations are anticipated. Consequently, significant environmental justice impacts are not anticipated.	A baseline incinerator would add to the human health and socioeconomic impacts from an ACWA facility alone. During construction and routine operation of an ACWA facility, a baseline incinerator, and other on-post actions, no high and adverse human health or socioeconomic impacts on populations are anticipated. Consequently, significant environmental justice impacts are not anticipated.

S.10 PREFERRED ALTERNATIVE

DOD prefers the proposed action, which is to pilot test one or more technologies at one or more installations. On the basis of the environmental analysis contained in this FEIS, the preferred alternative(s) are discussed below for each installation.

At ANAD, four alternative technology systems were examined: Neut/Bio, Neut/SCWO, Neut/GPCR/TW-SCWO, and Elchem Ox. None of the systems evaluated would have a significant effect on the human environment. The preferred alternative at ANAD is No Action.

At PBA, three alternative technology systems were examined: Neut/SCWO, Neut/GPCR/TW-SCWO, and Elchem Ox. None of the systems evaluated would have a significant effect on the human environment. The preferred alternative at PBA is No Action.

At PCD, two alternative technology systems were examined, as specified by P.L. 106-398: Neut/Bio and Neut/SCWO. Neither of the systems evaluated would have a significant effect on the human environment. The preferred alternative at PCD is Neut/Bio. Additionally, the Army will look for ways to accelerate the demilitarization process.

At BGAD, four alternative technology systems were examined: Neut/Bio, Neut/SCWO, Neut/GPCR/TW-SCWO, and Elchem Ox. None of the systems evaluated would have a significant effect on the human environment. The preferred alternative at BGAD is No Action at this time. The Army will continue analysis in the site-specific EIS by PMCD, which will preserve options for deployment of a full-scale pilot plant. Additionally, the Army will look for ways to accelerate the demilitarization process.

The ROD for this NEPA action will announce the decision on pilot testing ACWA technology systems. This decision will be based on the results of the environmental impact analysis presented in this FEIS, as well as other factors. These other factors will include, but not be limited to, mission needs, budget, other programmatic factors, and installation-specific factors.

S.11 CLOSURE AND DECOMMISSIONING

After the conclusion of testing, an ACWA pilot facility could be (1) closed and decommissioned (i.e., operations ceased and the site secured), (2) converted to an operational chemical weapon destruction facility (this assumes that there would be chemical weapons remaining at the site), or (3) converted to functions other than the demilitarization of weapons in the chemical weapons stockpile (within the constraints imposed by the *National Defense Authorization Act for Fiscal Year 2000*). Assessment of the latter two options is beyond the scope of this EIS and would require additional NEPA analysis. Hence, only closure and decommissioning of the ACWA pilot facility are addressed in the EIS. On the basis of the general requirements for a treatment, storage, and disposal facility (TSDF) under RCRA, U.S. Army and DOD policies and regulations, and concepts for the decommissioning of chemical destruction facilities, the following steps would likely be involved in the closure and decommissioning of an ACWA pilot facility:

- Removal of all hazardous wastes from the installation;
- Decontamination of the structures and equipment (to include piping and tankage) to allow safe handling;
- Removal of all or part of the remaining equipment;
- Demolition of all or part of the facility;
- Removal or abandonment of all or part of the supporting infrastructure; and
- Grading and revegetation, as needed, of the areas after removal of structures and infrastructure.

These actions would generate wastes similar to those wastes created during the operation of the facility: (1) decontamination solutions consisting of water or caustic solutions containing agent and energetic by-products (similar to agent and energetic hydrolysates); (2) contaminated and noncontaminated debris, such as metals, wood, and concrete (similar to dunnage and maintenance wastes); (3) protective clothing; (4) wastes from administrative and maintenance areas; and (5) petroleum products and industrial chemicals. To the degree feasible, these materials would be processed through the ACWA facility in the same manner as like materials during the pilot testing. Once the facility was rendered nonoperational, these materials would be collected, placed in containers, and treated or disposed of in accordance with environmental regulations.

Equipment removed from the facility would be decontaminated and reused or recycled when possible. Structures would be decontaminated to the degree required by the U.S. Army and

DOD regulations to allow either their reuse or their demolition. Demolition debris would be disposed of in accordance with environmental, U.S. Army, and DOD regulations.

A more detailed discussion of closure is in Chapter 8 of the EIS.

S.12 REFERENCES

PMACWA, 1999, *Assembled Chemical Weapons Assessment Program: Supplemental Report to Congress*, U.S. Department of Defense, Program Manager Assembled Chemical Weapons Assessment, Aberdeen Proving Ground, Md., Sept. 30.

PMACWA, 2001, *Final Technical Evaluation: AEA Technology/CH2MHill SILVER II Electrochemical Oxidation, Foster Wheeler/Eco Logic International/Kvaerner Neutralization/ GPCR/TW-SCWO, Teledyne-Commodore Solvated Electron Systems*, Appendix C in *Assembled Chemical Weapons Assessment Program: Supplemental Report to Congress*, June 2001, U.S. Department of Defense, Program Manager Assembled Chemical Weapons Assessment, Aberdeen Proving Ground, Md., March.

U.S. Army, 1988, *Chemical Stockpile Disposal Program Final Programmatic Environmental Impact Statement*, Program Manager for Chemical Demilitarization, Aberdeen Proving Ground, Md., Jan.