DRAFT
FINDING OF NO SIGNIFICANT IMPACT (FONSI)

Proposed Installation and Operation of an Autoclave System to Expand Secondary Waste Treatment Capacity

Description of the Proposed Action:

The US Army Chemical Materials Agency (CMA) proposes to install and operate an autoclave system at the Deseret Chemical Depot (DCD) in Utah. Historically, agent-contaminated wastes – also referred to as secondary wastes - have been managed by off-site shipment and disposal in accordance with the Resource Conservation and Recovery Act (RCRA) permit. If direct off-site shipment was not permitted, the secondary wastes were either placed into on-site storage or were decontaminated or thermally treated in the Metal Parts Furnace (MPF) followed by off-site shipment and disposal of the treatment residues. In order to support timely closure of the facility, additional on-site treatment capability is required. The purpose of the proposed autoclave system is to augment the current on-site treatment capabilities for secondary hazardous waste, prior to off-site shipment for disposal at a permitted disposal facility.

Secondary wastes will continue to be generated throughout the operational lifetime. The current estimate of secondary wastes to be generated is approximately 2,000 tons, and includes wastes generated from the storage and destruction of chemical agents. For the remainder of the mustard campaign, the Tooele Chemical Agent Disposal Facility (TOCDF) MPF is the critical furnace supporting agent destruction and therefore opportunities will be limited to utilize the MPF for secondary waste processing.

Under the terms of an international disarmament treaty, known as the Chemical Weapons Convention, the United States must destroy its entire inventory of chemical weapons by April 2012. In order to minimize the potential for significantly extending the operational lifetime of the facility, additional on-site treatment capacity is required to support secondary waste treatment and disposal in conjunction with completion of the chemical agent munition storage and destruction mission. Specifically, the proposed autoclave system would provide a capacity for decontaminating some of the secondary wastes so that those wastes can be shipped directly off-site for disposal.

The proposed action consists of installing and operating two commercially available autoclave units to decontaminate secondary wastes prior to shipment of the wastes off-site for disposal. Both units would be installed within one of two existing igloos currently being utilized for mustard ton container sampling, located within the boundary of DCD's Area 10. To support waste characterization and

segregation activities, three drum ventilation units would be installed within the second existing sampling igloo.

It is anticipated that the autoclaves would be installed in the 2008-2009 time frame. Operation of the autoclaves would continue on an as-needed basis through closure. Although the exact amount of wastes to be treated in the autoclaves cannot be immediately quantified, wastes would continue to be treated until closure is complete. Even if all of the wastes required autoclave treatment, the entire inventory of secondary waste could be treated in the autoclaves prior to closure. Therefore, the capacity of the autoclave is not expected to be a limiting factor in the overall operational schedule.

PROJECT ALTERNATIVES: The alternatives to the Proposed Action include (1) the No-Action Alternative of continued use of the MPF to treat secondary wastes (2) Incineration systems (3) Chemical Reduction Waste Treatment Process (4) Steam Reforming Process (5) Plasma Arc Based Waste Treatment. The advantages and disadvantages of each of these alternatives are discussed in the Environmental Assessment (EA) *Proposed Installation and Operation of an Autoclave System to Expand Secondary Waste Treatment Capability* April 2008.

ANTICIPATED ENVIRONMENTAL EFFECTS: The information and analyses presented in EA *Proposed Installation and Operation of an Autoclave System to Expand Secondary Waste Treatment Capability* April 2008 indicate that the proposed action (installation and operation of a hazardous waste treatment unit, consisting of two autoclaves for the purpose of thermally treating secondary *hazardous* waste), would have no significant environmental impacts. Installation and operation of the proposed new equipment would ensure the treatment and management of secondary wastes could be completed in a timely and efficient manner.

Consumption of resources, such as electricity and water, to support the proposed action would involve incremental quantities that are mere fractions of the current consumption requirements. The additional waste streams to be created by the proposed action are primarily limited to (1) a small (about 10 %) increase in the resulting quantity of wastes after treatment in the autoclave units and (2) wastewater in the form of condensate from the steam used in autoclave operations. The emissions with the new equipment in operation would not result in significant impacts to human health or to ecological resources.

An evaluation of the alternative (i.e. continued use of the MPF for treatment of some secondary wastes) also indicates that no significant impacts would occur; however, the no-action alternative could add up to two years or more to the operational lifetime thereby delaying the date on which the facility could be closed and decommissioned.

FACTS AND CONCLUSIONS LEADING TO A FONSI: On reviewing the EA *Proposed Installation and Operation of an Autoclave System to Expand Secondary Waste Treatment Capability* April 2008 and other project information, the Commander of the Deseret Chemical Depot has concluded that installing and operating an autoclave system to augment the current on-site treatment capabilities for secondary hazardous waste, prior to off-site shipment for disposal would have no significant adverse impact on land use, air quality, water use and/or water quality, ecological resources, socioeconomic resources in the area, cultural (i.e. archaeological and historic) resources, human health, minority or low-income populations in the area, or on waste management practices. The cumulative impacts of the proposed action in relation to the impacts of past, present and reasonably foreseeable actions related to storage and destruction of chemical agents and in the general area would likewise not be significant. Therefore, an environmental impact statement will not be prepared.

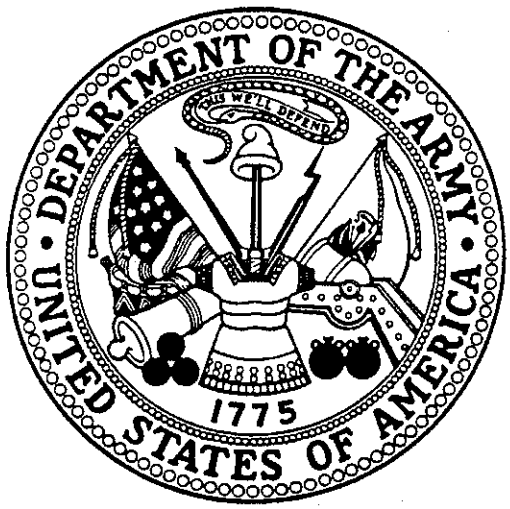
ADMINISTRATION OF ENVIRONMENTAL DOCUMENTATION: Persons wishing to comment may do so within 30 days of the date of publication of this notice in the *Tooele Transcript, Salt Lake Tribune* and the *Deseret News*. All comments received during the comment period will be considered in developing the final decision of the Proposed Action.

Requests for copies of the EA and this Draft FONSI are available from

Public Affairs Officer
Deseret Chemical Depot
Tooele, Utah 87074

PROPOSED INSTALLATION AND OPERATION OF AN AUTOCLAVE SYSTEM TO EXPAND SECONDARY WASTE TREATMENT CAPABILITY

ENVIRONMENTAL ASSESSMENT



April 2008

U.S. ARMY CHEMICAL MATERIALS AGENCY
ABERDEEN PROVING GROUND, MARYLAND

ENVIRONMENTAL ASSESSMENT

Lead Agency:	Department of the Army; Deseret Chemical Depot
Title of Proposed Action:	Proposed Installation and Operation of an Autoclave System to Expand Secondary Waste Treatment Capability
Affected Jurisdiction:	Tooele County, Utah

Recommended Approval:

21 MAY 08

THADDEUS A. RYBA, JR. DATE
TOCDF Site Project Manager

Legally Sufficient:

Philip E. Lower 5/14/08

PHILIP E. LOWER DATE
Attorney Advisor

Approved By:

Frederick D. Pellissier 22 may 08

FREDERICK PELLISSIER DATE
Colonel
Commander, Deseret Chemical Depot

ORGANIZATION OF THIS ENVIRONMENTAL ASSESSMENT

This Environmental Assessment (EA) evaluates the environmental effects of the Army's proposed action: installation and operation of additional equipment and systems at the Deseret Chemical Depot in Utah for the purpose of expanding that facility's secondary waste treatment capability. This EA provides information to be considered in making decisions regarding the proposed action and its alternatives.

SECTION 1 **INTRODUCTION** summarizes the purpose of and need for the proposed action and provides relevant background information about the secondary wastes requiring management and disposal.

SECTION 2 **PROPOSED ACTION AND ALTERNATIVES** describes the proposed action and the no-action alternative, as well as other alternatives to the proposed action.

SECTION 3 **THE AFFECTED ENVIRONMENT AND POTENTIAL ENVIRONMENTAL CONSEQUENCES** describes the existing environmental resources that could be affected by the proposed action, identifies potential environmental impacts of implementing the proposed action and no-action alternatives, and identifies proposed mitigation measures, as appropriate.

SECTION 4 **CONCLUSIONS** summarizes the findings about the potential environmental impacts for the proposed action and no-action alternative, and makes a recommendation on whether to proceed with a Finding of No Significant Impact.

SECTION 5 **PERSONS CONTACTED AND CONSULTED** provides a listing of those individuals who were contacted to provide data and information for the analyses in this EA, as well as those who contributed to the preparation of this EA through their analyses and expert reviews.

SECTION 6 **REFERENCES** provides bibliographic information for cited reference materials.

ACRONYMS AND ABBREVIATIONS

CFR	*Code of Federal Regulations*
CMA	U.S. Army Chemical Materials Agency
CWC	Chemical Weapons Convention
DCD	Deseret Chemical Depot (in Utah)
DFS	deactivation furnace system
DOT	Department of Transportation
DPE	demilitarization protective ensemble
DUN	dunnage furnace
EA	environmental assessment
EPA	U.S. Environmental Protection Agency
FR	*Federal Register*
ft^3	cubic foot
gal	gallon
GB	a nerve agent, also called "sarin"
H	mustard agent, also called "Levenstein mustard"
HD	mustard agent, also called "distilled mustard"
HHRA	human health risk assessment
HVAC	heating, ventilation and air conditioning
hr	hour
JACADS	Johnston Atoll Chemical Agent Disposal System
KVA	kilovolt-ampere
kW	kilowatt
LIC	liquid incinerator (there are two of these at the TOCDF)
m^3	cubic meter
mg	milligram (one thousandth of a gram)
mg/m^3	milligrams per cubic meter
MPF	metal parts furnace
NEPA	National Environmental Policy Act
NO_x	nitrogen oxides
PAS	pollution abatement system
PMCD	Program Manager for Chemical Demilitarization (a predecessor organization to the U.S. Chemical Materials Agency)
psig	pounds per square inch, gauge

RCRA	Resource Conservation and Recovery Act
SO_2	sulfur dioxide
TOCDF	Tooele Chemical Agent Disposal Facility (in Utah)
TSDF	treatment, storage, and disposal facility
UDEQ	Utah Department of Environmental Quality
U.S.	United States
VX	a nerve agent
yr	year

1. INTRODUCTION

The U.S. Army Chemical Materials Agency (CMA) is charged with safely storing and destroying the U.S. inventory of chemical warfare agents and munitions while protecting the public, the workers, and the environment. Under the terms of an international disarmament treaty, known as the Chemical Weapons Convention (CWC), the United States must destroy its entire inventory of chemical weapons by April 2012.

The CMA is presently conducting the destruction of chemical weapons at designated chemical weapons storage sites. The largest single inventory of chemical agents and munitions in the United States is stored at the Deseret Chemical Depot (DCD), near Tooele, Utah, where one of the Army's four chemical weapons incineration facilities—the Tooele Chemical Agent Disposal Facility (TOCDF)—began to destroy chemical weapons in August 1996.

As a result of chemical agent storage and destruction activities, agent contaminated wastes—also referred to as secondary wastes—are generated. Secondary wastes have historically been managed by off-site shipment and disposal in accordance with the provisions of the Resource Conservation and Recovery Act (RCRA) permit. If direct shipment off-site was not permitted, the secondary wastes were either placed into on-site storage or were decontaminated or thermally treated in the Metal Parts Furnace (MPF) followed by off-site shipment and disposal of the treatment residues. In order to support timely closure of the facility, additional on-site treatment capability is necessary. This Environmental Assessment (EA) evaluates the proposed addition of an autoclave treatment unit to augment the current on-site treatment capabilities for secondary (hazardous) waste, prior to off-site shipment for disposal.

1.1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

Throughout chemical agent storage and destruction activities, generation of agent-contaminated secondary waste has been on-going, consisting of a variety of types of wastes including metal parts, dunnage (wooden pallets and packing boxes used to store munitions), plastic sheeting, demilitarization protective ensemble (DPE) suits, monitoring equipment, and filters (including carbon) used in ventilation systems. The primary existing treatment capability for such material is thermal treatment utilizing the MPF. Although the MPF has been used whenever it has been available for secondary waste processing, its

primary priority is thermal decontamination of metal munition parts and agent containers to support U.S. treaty commitments as part of the CWC. In addition, the MPF is capable of processing the secondary wastes with a proven destruction efficiency, but some secondary wastes (e.g., wood and carbon) would require a lower processing rate.

Secondary wastes will continue to be generated throughout the operational lifetime. The current estimate of secondary wastes during the operational lifetime is approximately 2,000 tons and includes wastes generated from the storage and destruction of chemical agents. For the remainder of the mustard campaign, the MPF is the critical furnace supporting agent destruction and therefore there will be limited opportunities to utilize the MPF for secondary waste processing.

In order to minimize the potential for significantly extending the operational lifetime of the facility, additional on-site treatment capability is required to support secondary waste treatment and disposal in conjunction with completion of its chemical agent munition storage and destruction mission. Specifically, the proposed autoclave system would provide a capability for decontaminating some of the secondary wastes so that those wastes can be shipped directly off-site for further management or disposal. The use of such a new system would eliminate the need to treat these wastes in the MPF thereby reducing the dependence on the MPF for that purpose.

1.2 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

This EA has been prepared by the CMA to evaluate the significance of the potential environmental impacts associated with installation and operation of a hazardous waste treatment unit, consisting of two autoclaves, for the purpose of thermally treating secondary waste prior to their shipment to permitted off-site hazardous waste treatment, storage and disposal facilities (TSDFs). This EA has been prepared in compliance with Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA) of 1969 (see 40 CFR Parts 1500-1508) and Army Regulation 200-2 on *Environmental Analysis of Army Actions* (see 32 CFR Part 651).

The potential impacts associated with the destruction of the DCD chemical weapons stockpile at the TOCDF have been previously reviewed in an Environmental Impact Statement (U.S. Army 1989) and in three subsequent reviews of that document (PMCD 1996; Gant and Zimmerman 1999; Zimmerman et al. 2008). These four previous documents each concluded that TOCDF operations would not result in significant adverse environmental impacts; however, they did not specifically address potential impacts associated with the addition of a new hazardous waste treatment unit, as contemplated by the proposed action. As such, they also did not include a detailed assessment of the off-site

shipment and disposition of the decontaminated residues resulting from the autoclave treatment. This EA addresses both of these topics.

To avoid redundancy and to comply with the intent of the Council on Environmental Quality's guidance at 40 CFR 1500.4 on reducing paperwork, this EA relies upon the findings of the Army's previous assessments, where appropriate, rather than presenting new analyses.

2. PROPOSED ACTION AND ALTERNATIVES

This section describes the proposed action (installation and operation of a hazardous waste treatment unit, consisting of two autoclaves, for the purpose of thermally treating secondary waste), as well as the alternatives considered by the Army. Section 2.1 describes the proposed action, Section 2.2 discusses the no-action alternative (not installing additional treatment capability at the TOCDF), and Section 2.3 identifies other alternatives that were considered but eliminated from further detailed evaluation in this EA.

2.1 THE PROPOSED ACTION: INSTALLATION AND OPERATION OF AN AUTOCLAVE SYSTEM TO SUPPORT AGENT-CONTAMINATED SECONDARY WASTE PROCESSING

The CMA proposes to use a combination of new and existing equipment and infrastructure to decontaminate secondary wastes prior to off-site shipment and disposal of the waste residues at a permitted disposal facility. The existing MPF is capable of treating or decontaminating the secondary wastes and has a proven agent destruction efficiency. However, decontamination of certain secondary wastes, including spent carbon from the heating, ventilation, and air conditioning (HVAC) filters and wood, may have a higher throughput in the autoclave than the MPF, because the objective is to destroy the agent contamination, not the bulk of the waste itself. The use of autoclaves (see the text box on the next page) is proposed to supplement the processing capabilities of the MPF.

Autoclaves would be capable of processing many of the same wastes as the MPF. It is anticipated that the MPF would continue to be used, as it is available, to decontaminate some agent-contaminated secondary wastes and for treatment of the types of such wastes for which it is particularly well suited (e.g., more highly contaminated metal equipment and parts). The environmental effects of operation of the existing MPF have already been studied and found to be insignificant (U.S. Army 1989; Zimmerman et al. 2008). This EA focuses on the environmental effects of the operation of an autoclave system to supplement the operation of the existing MPF for the on-site treatment of secondary wastes.

The proposed action consists of installing and operating two commercially available autoclave units to decontaminate secondary wastes prior to shipment of the wastes off-site for disposal. Both units would be installed within one of two existing sampling igloos currently being utilized for mustard ton container sampling, located within the boundary of

AUTOCLAVES

An autoclave is a sealable vessel or chamber which uses heat to sterilize, decontaminate, or treat the materials placed inside. Autoclaves use pressurized steam as the heat source. In an open container, liquid water cannot be heated above 212°F; however, the high pressure in an autoclave allows water (in the form of steam) to reach the higher temperatures required for sterilization and decontamination processes to occur. In an autoclave, the steam might be allowed to come into direct contact with the contents inside, or the steam might be circulated inside a metal jacket such that the steam would not come into contact with the autoclave's contents. Autoclaves are widely used in medicine, dentistry, veterinary science, and metallurgy.

DCD's Area 10. To support waste characterization and segregation activities, three drum ventilation units would be installed within the second existing sampling igloo.

The autoclaves are batch feed units which would use steam to heat the wastes to approximately 300°F, or higher, and operate under pressure (which would correspond to the steam temperature) to thermally treat the chemical agent. Two types of autoclaves are being considered. The first type allows the steam to enter the autoclave and circulate around the wastes. The thermal energy from the steam would heat the agent-contaminated wastes and the moisture from the steam would desorb and/or react and hydrolyze the chemical agent to decontaminate the wastes. The second type of autoclave would circulate steam in a jacket around the waste treatment chamber such that the steam would not directly come into contact with the contaminated wastes; however, the steam would still provide the heat necessary to complete the thermal decontamination operation.

The existing igloos that would house the autoclaves and the drum ventilation units are equipped with a carbon filtration system suitable to address the proposed secondary waste treatment operations. Unlike combustion processes, autoclaves, by their very nature, do not have a significant exhaust gas volume. Once wastes are loaded into the autoclave chamber and the autoclave is sealed shut, a vacuum would be drawn on the autoclave to remove the residual air in the autoclave chamber. The residual air would flow through the carbon filters to remove any organic vapors, monitored to verify that no chemical agent is present, and exhausted to the atmosphere. During the thermal treatment of the wastes in the autoclave, the autoclave would be pressurized by the steam which contacts the wastes directly, or by dry air for the type of autoclave which uses a steam jacket. Once thermal treatment is completed, the pressure in the autoclave would be reduced by venting the gas in the autoclave through a chiller to cool the gases before they are slowly exhausted and monitored through the carbon filters. The chiller would cool the autoclave exhaust gas and collect steam condensate (which has come into direct contact with the treated wastes) for disposal.

Heat to produce the steam used in the autoclaves would be supplied by a new packaged steam boiler. The boiler would be fired with natural gas from an existing natural gas pipeline. The existing gas pipeline in Area 10 has a capacity of 6,500 ft^3/hr, which is 1.5 to 2 times greater than needed to fuel the boiler for the autoclaves. Water to produce the steam would be supplied by the existing water supply infrastructure at DCD, which uses pumped groundwater as the water source. Worst-case water usage assumes that all the water used to produce steam would be discharged as wastewater, for a maximum of 12,000 gallons per month. Boiler feed water would be treated with commercially available water treatment chemicals to prevent scale and corrosion of the boiler tubes. Electrical supply for the autoclaves and supporting equipment (approximately 2.5 kW increase over existing electrical usage) would be provided by the existing electric power infrastructure within DCD, which has 500 KVA available. An existing natural gas fired emergency generator would be used to provide electrical power for essential equipment in the event of commercial power interruption.

Wastewater from the autoclave operation would consist of steam condensate or condensate "blow down" (see the next paragraph), depending on the type of autoclave selected. Steam condensate that comes into direct contact with the wastes would be collected and shipped off-site for hazardous waste disposal, using the same disposal techniques already used for the scrubber brines from the TOCDF's existing stack gas pollution abatement systems (PASs). The volume of the steam condensate would be approximately 300 gallons per autoclave cycle, and a maximum of 12,000 gallons per month.

If the autoclaves use a steam jacket, the steam would not come into direct contact with the wastes, and the steam condensate would be collected and reused in the boiler to make steam in a closed-loop circuit. In order to avoid the buildup of scale and deposits in the boiler, some of the condensate would periodically be removed, or "blown down" from the steam circuit, and fresh water would be added to make up the water volume lost from the steam loop. The condensate blow down would not meet the characteristics of a hazardous waste, and disposal options would include discharge to the existing wastewater pond, off-site disposal at a wastewater treatment works, or disposal with other liquid hazardous wastes from the site (to simplify waste handling).

Wastes generated as a result of agent storage and destruction would need to be disposed of at an off-site disposal facility regardless of whether the wastes were first treated in the proposed autoclaves or in the MPF before off-site disposal. Wastes which have been treated in the autoclave would be sampled and analyzed to verify that they meet the requirements for off-site shipment and disposal at a hazardous waste disposal facility. The wastes would be packaged and labeled in accordance with the requirements of the U.S. Department of Transportation (DOT).

Treatment of wastes in the proposed autoclaves would increase the amount of hazardous waste to be disposed off-site by less than 10% above the amount of waste that would be treated in the autoclaves. The additional 10% volume would be secondary to the secondary waste treated in the autoclave (autoclave operating waste, such as personal protective equipment, sampling waste, sample containers, cleaning waste, etc.). The 10% is an estimate based upon operational experience and does not include condensate waste.

Labor to operate the autoclaves and supporting equipment would be provided by existing trained workers within the operations workforce. Installation of the autoclaves would be performed by existing staff, with support from local vendors and contractors. There would be an insignificant increase in local jobs as a result of installation and operation of the autoclave systems.

It is anticipated that the autoclaves would be installed in the 2008-2009 time frame. Operation of the autoclaves would continue on an as-needed basis through closure. There are currently secondary wastes stored in Area 10 which will ultimately require off-site shipment and disposal. Some of the wastes would be monitored and shipped directly to an appropriate TSDF. Other wastes, which contain too much agent contamination for direct off-site shipment or for treatment in the autoclaves, would be treated in the MPF. The remaining secondary wastes would be treated in the autoclaves prior to off-site disposal at a permitted hazardous waste facility.

Although the exact amount of wastes to be treated in the autoclaves cannot be immediately quantified, wastes would continue to be treated until closure is complete. In order to differentiate how the wastes would be managed (off-site, autoclave or MPF) each drum of stored waste would need to be monitored to determine contamination levels. Even if all waste required autoclave treatment, the entire inventory of secondary waste could be treated in the autoclave prior to closure. Therefore, the capacity of the autoclave is not expected to be a limiting factor in the overall operational schedule.

2.2 THE NO-ACTION ALTERNATIVE: CONTINUED USE OF THE MPF TO TREAT SECONDARY WASTES

Under the no-action alternative, the two autoclaves and three drum ventilation units would not be installed or operated. The facility would be limited to existing capabilities for disposition of all its secondary waste. The types of secondary wastes to be treated by the autoclave system under the proposed action would be treated in the MPF as it becomes available. The MPF is capable of treating carbon and wood; however, the throughput would be lower due to the increased residence time needed to thermally oxidize any residual agent

and the waste itself, rather than destruction of the agent alone by desorption and/or hydrolysis, as would occur during treatment in the autoclave. The wastes would remain in storage until they could be processed in the MPF. Continued use of the MPF to manage all current and future inventories of secondary waste in storage could potentially add two years or more to the operational lifetime.

2.3 ALTERNATIVES TO THE PROPOSED ACTION

This section describes alternatives to the proposed installation and operation of two autoclave units to provide additional treatment capability for the management of secondary waste, while continuing to utilize the MPF whenever it is available for processing appropriate wastes, as well as direct shipment of secondary wastes off-site for disposal without treatment in the MPF or autoclaves, in compliance with the RCRA permit. In addition to the autoclave technology, four other technologies were evaluated for possible application for secondary waste treatment (note that several of the items below are vendor-specific technologies):

- Incineration Systems
- Chemical Reduction Waste Treatment Process
- Steam Reforming Process
- Plasma Arc Based Waste Treatment

The advantages and disadvantages of each of these four technologies is discussed in the following subsections. Use of the proposed autoclave technology, in combination with continued use of the MPF for those waste categories that can be efficiently processed in the MPF, was found to be most advantageous.

2.3.1 Incineration Systems

Use of the TOCDF's Deactivation Furnace System. The existing deactivation furnace system (DFS) at TOCDF has demonstrated that it can safely and effectively destroy chemical agent. However, the DFS feed and ash removal systems were designed for small pieces of hazardous wastes (e.g., projectile nose closures, bursters, mines, etc.) to be fed to the DFS in small batches. Use of the DFS for secondary waste treatment at TOCDF would be very labor-intensive to unpack and resize the secondary wastes. This would present an increased risk to TOCDF workers. Also the DFS would be limited by many of the same

incineration effectiveness constraints faced by the MPF. Therefore, this alternative was not considered for further evaluation.

Use of the TOCDF's Dunnage Furnace. The original design of the TOCDF included a dunnage furnace (DUN) for the treatment of combustible scrap materials and secondary wastes. The corresponding PAS for the DUN was based on a dry pollution abatement concept that included an exhaust gas quench tower and a baghouse, but the PAS for the DUN did not include a wet scrubber. A similar, prototype DUN installed at the Army's Johnston Atoll Chemical Agent Disposal System (JACADS)[1] encountered numerous technical problems that caused frequent shutdowns. After extensive attempts to resolve the technical issues, the use of the DUN at JACADS was discontinued prior to the closure of JACADS. The lack of a wet, acid scrubbing unit in the PAS and the unfavorable cost for operation and maintenance of the DUN were contributing factors to that decision. The same types of operational problems existed for the DUN at the TOCDF; hence, prior to hazardous waste operation of the DUN, a decision was made not to use the DUN at the TOCDF, even though the DUN had already been constructed. The DUN has since been removed; hence, this alternative was not considered for further evaluation.

Use of an Alternate Furnace System. This vendor-specific alternative would involve installation and operation of a high-temperature furnace system very similar to the existing MPF. The only significant difference would be that the material to be treated would enter and leave the bottom of the chamber by way of a scissor lift. Off-gas would be routed to a secondary combustion chamber, then into a PAS. Based upon available vendor information, and the fact that this unit would likely have similar process efficiency challenges as the current MPF for many of the secondary waste streams to be treated, this alternative was not considered for further evaluation.

2.3.2 Chemical Reduction Waste Treatment Process

This vendor-specific process utilizes a molten aluminum bath for chemical reduction of waste materials. An evaluation performed by the CMA Project Manager for Alternative Technologies and Approaches concluded that this process is not considered sufficiently technically mature for application at the TOCDF. Test data from the U.S. Department of

[1] The Army's prototype chemical weapons destruction facility, JACADS, operated on Johnston Atoll in the Pacific Ocean from 1990 until 2000. The processes employed at JACADS facility served as the basis for the design of the Army's chemical agent and munition destruction facilities in the continental United States, including the TOCDF.

Energy's Savannah River Site was reviewed to determine potential applicability for the secondary waste streams. It was concluded that the secondary waste carbon material could present a challenge to the system, since it appeared to be designed to reject elemental carbon to the off-gas stream without further treatment. It is also not known whether the carbon would have sufficient residence time in the molten aluminum reaction to destroy chemical agents. Thus, this alternative was not considered for further evaluation.

2.3.3 Steam Reforming Process

This vendor-specific process employs three distinct unit operations to break the waste down into constituents that can ultimately be oxidized to an inert gaseous effluent or converted to a solid effluent. This alternative was determined to provide only a partial solution to the secondary waste treatment objectives, since it required additional treatment steps to be taken to address treatment of the effluents/treatment byproducts. The capital costs for this process were also the highest of all alternatives evaluated, while the processing rates were the lowest. In addition, the process would be labor intensive, and the estimated duration to bring a system online is over two years. Thus, this alternative was not considered for further evaluation.

2.3.4 Plasma Arc Based Waste Treatment

Several types of plasma arc technology-based systems were evaluated. A fully oxidizing plasma arc technology was found to be very suitable for addressing all secondary waste categories. However, the installation costs are expected to be higher, and the time for startup was estimated to be significantly longer (up to 20 months). Thus, this alternative was not considered for further evaluation.

3. THE AFFECTED ENVIRONMENT AND POTENTIAL ENVIRONMENTAL CONSEQUENCES

This EA addresses proposed modifications to augment the TOCDF's current on-site treatment capabilities for secondary waste, prior to off-site shipment for disposal. The TOCDF has been examined in four previous environmental reviews (see Section 1.2). In comparison to the impacts previously assessed, the proposed action would create negligible or no new environmental impacts upon the following categories of environmental resources. Therefore, these categories of environmental resources are not discussed further in this EA.

- **Land use.** The proposed new equipment would be installed within the footprint of the existing storage igloo area and would therefore not affect current land use.
- **Air quality impacts from construction activities.** There would be no disturbance of surface soils and negligible generation of dust from construction and/or equipment-installation activities.
- **Air quality impacts during operations.** The proposed action would not result in a significant increase in the emissions of criteria pollutants (i.e., nitrogen oxides, carbon monoxide, sulfur dioxide, volatile organic compounds, particulate matter, and lead). A new package boiler system would provide steam for the proposed autoclave units; however, worst-case air emissions from the proposed boiler are estimated to be less than 0.5 tons per year of NO_x and CO and less than 0.1 tons per year of particulate matter, which is well below the federal and state significance thresholds. There would be no significant exhaust gas emissions from the proposed autoclaves. Furthermore, even with the addition of the new equipment that is part of this proposed action, operations would still be in compliance with applicable air emission standards under the terms and conditions of the existing Title V Clean Air permit.
- **Surface water resources.** The nearest surface waters (i.e., the ephemeral Ophir Creek) are located more than two miles from the proposed autoclave location. No surface water would be consumed, diverted or affected by the proposed action.
- **Groundwater resources.** Process water is currently supplied by wells at the DCD. The use of additional water to supply steam for the proposed autoclave units would represent an increase of up to 144,000 gal/yr in the existing water use of about 79.91 million gal/yr at the DCD (Zimmerman et al. 2008); hence, there would be no significant impacts from the proposed action upon groundwater resources.

- **Wetlands.** The nearest wetlands (i.e., Clover Pond) are located more than two miles away and would not be disturbed or affected by the proposed activities.
- **Ecological resources.** The proposed action would not generate any significant atmospheric emissions or liquid effluents that would impact ecological species or their habitats.
- **Threatened and endangered species.** Bald eagles, which over-winter in the Tooele and Rush Valleys, are the only threatened or endangered species known to potentially occur within the DCD installation boundaries (Zimmerman et al. 2008). As with other ecological resources, they would not be expected to be impacted by the proposed action.
- **Socioeconomic resources.** The existing labor force is adequate for the installation and operation of the proposed new equipment. There would be no influx of new workers, nor would the proposed action have any significant effects upon existing infrastructures, utilities or other socioeconomic resources in the vicinity of the DCD.
- **Cultural (i.e., archaeological and historic) resources.** Because all of the proposed activities would occur within the footprint of the existing storage area and TOCDF, no potential exists for the proposed action to disturb or affect cultural resources.
- **Environmental justice populations.** The nearest private residence is located more than two miles away. The proposed action would not create any significant impacts to populations near the depot. In the absence of such impacts, there would be no disproportionately high and adverse impacts to low-income or minority populations.
- **Safety and risks.** The hazards of installing the new equipment would be similar to those of any small-scale industrial construction project and would not be significant or unique. The high-pressure and high-temperature hazards associated with operating the proposed autoclave unit are well understood and, likewise, would not represent any significant or unique hazards. The Army would develop and implement engineering barriers (such as protective clothing), procedures, and administrative controls to deal appropriately with these hazards.
- **Transportation impacts.** The proposed action envisions shipping treated wastes of the same types and characteristics as those analyzed in the 1989 EIS (U.S. Army 1989).

The analysis conducted for this EA has determined that a more detailed examination of the potential environmental impacts is necessary in three additional resource categories: **waste management** (see Section 3.1), potential impacts to **human health** (see Section 3.2), and potential **transportation impacts** associated with off-site waste shipments, including impacts to traffic on local roads and the risks of cross-country transportation (see Section 3.3).

3.1 WASTE MANAGEMENT

All wastes would be disposed of in compliance with applicable federal, state, and local regulations. Both the solid wastes and the liquid wastes to be shipped off-site would be characterized and packaged in accordance with applicable DOT specifications. These wastes would then be transported to licensed and permitted commercial TSDFs for final treatment and disposal in compliance with the waste acceptance criteria established for those respective TSDFs.

This section examines the quantities of wastes to be generated under the proposed action and compares them to the quantities of other TOCDF wastes. The potential for the combined quantities of such wastes to impact regional waste management capabilities is evaluated.

3.1.1 Waste Quantities

Two categories of wastes are generated: secondary wastes and the wastes from baseline operations at the TOCDF. Both categories of wastes require disposition. From a worst-case perspective, the analysis of potential impacts to existing regional waste management systems and capabilities must focus upon the potential cumulative impacts of disposing of the treated secondary wastes in conjunction with other wastes associated with the TOCDF baseline process.

The anticipated annual quantities of TOCDF baseline wastes generated during the in-progress mustard campaign are: 323 tons/yr of incinerator ash and slag; 23,000 tons/yr of liquid brines from the PAS's wet scrubbers; and 1,450 tons/yr of decontaminated metal parts (i.e., 24,773 total tons of annual baseline wastes) (see Zimmerman et al. 2008).

The anticipated quantities of existing secondary wastes and those expected to be generated are shown in Table 1. If all of the 2,801 tons of secondary wastes were to be managed in a single one-year period, they would represent an 11% increase in the quantity of the other annual TOCDF baseline wastes that are already adequately managed. Furthermore, if all of these wastes were to be treated in the proposed autoclave units, and if such treatment resulted in a 10% increase in the quantities of those wastes, then the resulting 3,081 tons of treated secondary waste would be about 12% of the other annual baseline wastes generated at the TOCDF. Thus, the management of the secondary wastes would not be expected to create any significant impacts over the lifetime of the proposed autoclave operations.

Table 1. Estimates of secondary waste quantities and autoclave wastes to be generated at the Tooele Chemical Agent Disposal Facility

Type of secondary waste	Quantity (in tons)
Existing wastes	
Secondary wastes in storage	810
Secondary wastes to be generated from mustard and other chemical agents	1,190
Subtotal existing secondary wastes	***2,000***
Additional secondary wastes from autoclave operations	
Rags, bin liners, sampling equipment, etc.	200
Wastewater from autoclaves (annually)	601 [a]
Subtotal additional secondary wastes	***801***
Grand Total	**2,801**

[a] Based on an upper-bound estimate of 12,000 gal/month over a one-year period.

3.1.2 Cumulative Waste Management Impacts

This section examines the potential cumulative impacts of managing the wastes under the assumption that all of the treated secondary wastes would be shipped off-site during the same one-year period in which TOCDF baseline wastes would also be shipped off-site. The following paragraphs describe the quantities of wastes already managed by TSDFs in the region and the extent to which anticipated increases in hazardous waste generation under the proposed action might affect the ability those TSDFs to manage additional wastes.

Table 2 shows the best available data from the U.S. Environmental Protection Agency (EPA) for the types of hazardous waste management facilities in Utah and the six surrounding states (i.e., Arizona, Colorado, Idaho, Nevada, New Mexico and Wyoming) (EPA 2006). The following analysis compares the anticipated annual waste quantities with the quantities of similar wastes already managed within this seven-state region.

Table 2. RCRA hazardous waste managed in Utah and six nearby states during 2005 [numerical units are in tons]

Management method	Arizona	Colorado	Idaho	Nevada	New Mexico	Utah	Wyoming	Total [a]
Aqueous inorganic treatment	52	49	3	1,560	0	0	N/A [b]	**1,664**
Aqueous organic treatment	N/A	6,736	N/A	N/A	N/A	21	206,155	**212,912**
Deep-well or underground injection	N/A	N/A	N/A	N/A	904,501	N/A	N/A	**904,501**
Energy recovery	0	323	N/A	N/A	N/A	2,330	N/A	**2,653**
Fuel blending	1,199	21,518	N/A	N/A	N/A	N/A	N/A	**22,717**
Incineration	69	440	N/A	N/A	2	103,593	N/A	**104,104**
Land Treatment/Application/Farming	N/A	150	N/A	N/A	N/A	0	N/A	**150**
Landfill/surface impoundment [b]	N/A	6,605	113,266	51,487	8,434	222,322	N/A	**402,114**
Metals recovery	96	27	N/A	5	N/A	N/A	N/A	**128**
Other disposal	N/A	97	N/A	N/A	34,494	N/A	N/A	**34,591**
Other recovery	1	174	0	N/A	N/A	N/A	N/A	**175**
Other treatment	32,231	34,146	879	5,283	337	982	755	**74,613**
Sludge treatment	N/A	1,340	95	225	N/A	36	N/A	**1,696**
Solvents recovery	472	7,463	N/A	0	N/A	18	N/A	**7,953**
Stabilization	N/A	26,089	1	379	104	N/A	N/A	**26,573**
Total [a]	**34,121**	**105,157**	**114,245**	**58,939**	**947,872**	**329,301**	**206,910**	**1,796,544**

[a] Waste quantities may not sum to the number shown due to rounding.

[b] "N/A" indicates that no data are available for the indicated waste management category.

[c] EPA no longer distinguishes between landfill and surface impoundment in the biennial reports.

Source: *State Detail Analysis: The National Biennial RCRA Hazardous Waste Report (Based on 2005 Data)*, EPA530-R-06-007, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C., December 2006, available on-line at http://www.epa.gov/epaoswer/hazwaste/data/br05/index.htm (Note: The waste quantities used in the above table are from data in state-specific Table 11 in the EPA report).

Table 3. Disposal of hazardous waste from baseline TOCDF operations plus disposal of secondary wastes and autoclave wastes

Type of waste	Waste quantity (tons per year)	Wastes managed in Utah and six nearby states [a]: Waste quantities managed in 2005 (tons per year)	Wastes managed in Utah and six nearby states [a]: Incremental increase as a percentage of 2005 quantities
POTENTIAL WASTES MANAGED BY LANDFILL/SURFACE IMPOUNDMENT:			
Incinerator ash and slag	323 [b]	402,114	0.08 %
Decontaminated metal parts	1,450 [b]	402,114	0.4 %
Secondary wastes	2,420 [c]	402,114	0.6 %
Total	*4,193*	*402,114*	*1.0 %*
POTENTIAL WASTES MANAGED BY DEEP-WELL OR UNDERGROUND INJECTION:			
PAS scrubber brines	23,000	904,501	2.5 %
Wastewater from autoclave	601	904,501	0.07 %
Total	*23,601*	*904,501*	*2.6 %*

[a] Idaho, Nevada, Wyoming, Colorado, New Mexico, and Arizona. Numerical entries represent the sum of state-specific data obtained from U.S. Environmental Protection Agency, *State Detail Analysis; The National Biennial RCRA Hazardous Waste Report (Based on 2005 Data)*, EPA-530-R-06-007, Office of Solid Waste and Emergency Response, Washington, D.C., December 2006; available on-line at http://www.epa.gov/epaoswer/hazwaste/data/br05/index.htm. The EPA's waste management source data provide only a single numerical entry for the combined categories of "landfill" and "surface impoundment." Hence, no further breakdown is available for use in this analysis.

[b] Data obtained from Zimmerman et al., *Tooele Chemical Agent Disposal Facility: Second Review and Evaluation of Information for Updating the 1989 Final Environmental Impact Statement*, prepared by Oak Ridge National Laboratory, Oak Ridge, Tenn., prepared for U.S. Army Chemical Materials Agency, Aberdeen Proving Ground, Md., March 2008.

[c] The numerical values from Table 1 have been increased by 10% to account for additional waste resulting from autoclave treatment.

Table 3 shows the quantities of hazardous wastes generated by the TOCDF under baseline operations that are disposed of by landfill, as well as the incremental quantities of treated secondary wastes that will require management. Note that, in Table 3, an increase of 10% has been applied to the secondary wastes that might be treated in the proposed autoclave units. If the quantities of treated secondary wastes are combined with the wastes generated by baseline processing at the TOCDF, about 4,193 tons/yr of solid wastes

would need to be disposed of in landfills. Table 3 shows that this quantity is only about 1% of the total amount of hazardous waste already disposed of by regional landfills or surface impoundments[2]. The addition of such a small fraction of waste to what is already managed by regional hazardous waste landfills would not produce any significant cumulative impacts to those landfills.

Table 3 also shows the combined quantities of TOCDF liquid process wastes from baseline operations and the worst-case quantities of wastewater from the proposed autoclaves. According to the table, about 23,601 tons/yr of such wastes would require management. However, the table shows this quantity to be only about 2.6% of the amount of wastes already managed by existing deep-well/underground injection facilities in the region. Thus, disposal of both the anticipated liquid process effluents from the TOCDF and the condensate from the proposed new autoclaves would not be expected to create any cumulative effects that would adversely impact the management of such wastes in the region.

3.2 HUMAN HEALTH IMPACTS

The chemical warfare agents which contaminate some of the secondary wastes are hazardous to human health; however, these hazards are well-understood and have been previously documented for the TOCDF (U.S. Army 1989; Zimmerman et al. 2008). The proposed autoclave treatment would reduce these hazards in the secondary wastes to levels that are acceptable for the off-shipment and management of such wastes. The following paragraph discusses the potential impacts to human health from TOCDF operations.

A human health risk assessment (HHRA), which included a multi-chemical, multi-pathway exposure analysis, was completed for the TOCDF in 2003 (UDEQ 2003). The HHRA included the emissions from the TOCDF's incinerators. The results of the HHRA indicated that the potential emissions from the TOCDF were considered to be safe. Furthermore, even with the addition of the new equipment that is part of this proposed action, the operations would still be in compliance with applicable air emission requirements under the terms and conditions of its existing Title V Clean Air permit. Thus, no significant human health impacts would be expected from the emissions as a result of the proposed action.

[2] The EPA's waste management source data (EPA 2006) provide only a single numerical entry for the combined categories of "landfill" and "surface impoundment." Therefore, no further breakdown is available for use in this analysis, even though some types of wastes from the TOCDF which would be appropriate for landfill disposal might not be appropriate for disposal by surface impoundment.

3.3 IMPACTS OF THE NO-ACTION ALTERNATIVE

Under the no-action alternative (see Section 2.2), the proposed autoclaves would not be installed. The existing MPF would be used to treat and manage those secondary wastes that are not already suitable for shipping off-site for further management or disposal. Because the MPF is also needed for the in-progress mustard agent and munitions destruction campaign at the TOCDF, use of the MPF would be limited to an "as available" basis. This alternative could potentially add two years or more to the operational lifetime.

A delay in the chemical weapons destruction schedule could potentially cause the United States to miss a key CWC Treaty deadline to complete destruction of all chemical agent munitions by April 2012. Also, extension of the operational lifetime could result in millions of taxpayer dollars spent at the rate of about $400,000 per day, assuming the TOCDF's current rate.

Under the no-action alternative, there would be no changes in land use and no potential for disturbance of cultural (i.e., historic and archaeological) resources. Nor would there be any adverse effects from modifications to or disturbances of existing terrestrial and/or aquatic communities, wetlands, or threatened and endangered species habit areas. Impacts to such resources would therefore be negligible. There would be no new water consumption requirements for the no-action alternative; hence, there would be no effects on water resources. No additional workers would be required under the no-action alternative, and no socioeconomic impacts would be anticipated. No disproportionate impacts to minority or low-income populations would be expected.

No additional solid or liquid wastes—beyond those currently generated during baseline operations or anticipated from the MPF's treatment and management of secondary wastes—would be produced under the no-action alternative. Thus, there would be no need for additional treatment or disposal of any new wastes.

4. CONCLUSIONS

The information and analyses presented in this EA indicate that the proposed action (installation and operation of a hazardous waste treatment unit, consisting of two autoclaves for the purpose of thermally treating secondary waste), would have no significant environmental impacts. Installation and operation of the proposed new equipment would ensure the treatment and management of secondary wastes could be completed in a timely and efficient manner.

Consumption of resources, such as electricity and water, to support the proposed action would involve incremental quantities that are mere fractions of the TOCDF's baseline consumption requirements. The additional waste streams to be created by the proposed action are primarily limited to (1) a small (about 10%) increase in the resulting quantity of wastes after treatment in the autoclave units and (2) wastewater in the form of condensate from the steam used in autoclave operations. The emissions with the new equipment in operation would not result in significant impacts to human health or to ecological resources.

An evaluation of the no-action alternative (i.e., continued use of the MPF for treatment of some secondary wastes) also indicates that no significant impacts would occur; however, the no-action alternative could add two years or more to the operational lifetime thereby delaying the date on which closure and decommissioning would be completed.

Based on the above considerations and the lack of significant adverse environmental effects, it is concluded that the most desirable course of action is to proceed with the installation of the autoclave units and to use the new units to treat those secondary wastes that cannot be effectively managed by the MPF.

This proposed action would create no significant impacts. A finding indicating this conclusion will be prepared and published for public comment.

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