

U.S. ARMY
MATERIEL COMMAND

—COMMITTED TO PROTECTION OF THE ENVIRONMENT—

FINAL DETAILED ANALYSIS OF ALTERNATIVES REPORT

Version 4.1

Structures DAA
Volume VI of VII

October 1995

Contract No. DAAA 05-92-D-0002

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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TECHNICAL SUPPORT FOR
ROCKY MOUNTAIN ARSENAL

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LIST OF ACRONYMS AND ABBREVIATIONS

14DCLB	1,4-Dichlorobenzene
3-D	three-dimensional
ACGIH	American Conference of Governmental Industrial Hygienists
ACM	asbestos–containing material
ALDRN	Aldrin
AMC	Army Materiel Command
AOC	Area of Contamination
AOPs	advanced oxidation processes
AR	Army Regulations
ARARs	applicable or relevant and appropriate requirements
Army	U.S. Army
atm-m^3/mol	atmospheres per cubic meter per mole
ATP	Anaerobic Thermal Processor
ATSDR	Agency for Toxic Substances and Disease Registry
B	Soil Density
BCRL	Below Certified Reporting Limit
BCS	Boundary Containment System
BCY	bank cubic yard
BDA	Bilateral Destruction Agreement
BDAT	best demonstrated available technology
BEST	Basic Extraction Sludge Treatment
BFI	Browning Ferris Industries
BOD	Biological Oxygen Demand
BRRN	North Bedrock Ridge Plume
BRRS	South Bedrock Ridge Plume
BTEX	benzene, toluene, ethylbenzene, and xylenes
BTU	British thermal unit
CAMU	Corrective Action Management Unit
CAR	Contamination Assessment Report
CCA	chromated-copper-arsenate
CCR	Code of Colorado Regulations
CD	Cadmium
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CFS	Confined Flow System
CH2CL2	Methylene Chloride
CHCL3	Chloroform
CL6BZ	Hexachlorobenzene
CLC2A	Chloroacetic Acid
cm/sec	centimeters per second

cm^2	centimeters squared
CMP	Comprehensive Monitoring Program
COC	contaminant of concern
CPE	chlorinated polyethylene
CPMS	p-Chlorophenylmethyl Sulfide
CPRP	Chemical Personnel Reliability Program
CRL	certified reporting limit
CSI	Conservation Services, Inc.
CSPE	chlorosulfonated polyethylene
Cu	copper
CWA	Clean Water Act
CWC	Chemical Weapons Convention
CY	cubic yards
DA	Department of the Army
DAA	Detailed Analysis of Alternatives
DADS	Denver Arapahoe Disposal Service, Inc.
db(A)	decibels
DBCP	dibromochloropropane
DCE	Dichoroethylene
DCPD	dicyclopentadiene
DDE	2,2-bis(p-Chlorophenyl)-1,1-dichloroethene
DDT	2,2-bis(p-Chlorophenyl)-1,1,1-trichloroethane
DHHS	Department of Health and Human Services
DIMP	diisopropylmethyl phosphonate
DMMP	Dimethylmethylphosponate
DNAPL	dense nonaqueous phase liquid
DOD	Department of Defense
DOT	Department of Transportation
DRE	destruction/removal efficiency
DRMO	Defense Reutilization and Marketing Office
DSA	Development and Screening of Alternatives
DTG	Design treatment goal
DWELS	Drinking Water Equivalent Levels
EA	Endangerment Assessment
Ecology	U.S. Ecology, Inc.
EDSVEP	Enhanced Deep Soil Vapor Extraction Process
EIF	enter into force
ENSCO	Environmental Systems Company
Envirosafe	Envirosafe Services of Idaho, Inc.
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ERC	Ecological Risk Characterization
ESSVEP	Enhanced Surface Soil Vapor Extraction Process

ETTS	Ecotechniek Thermal Treatment System
FC2A	fluoroacetic acid
FFA	Federal Facility Agreement
FML	flexible membrane liner
foc	Fraction Organic Carbon in Soil
fpm	feet per minute
FRP	fiber - reinforced plastic
FRG	final remediation goal
FS	feasibility study
ft	feet or foot
ft/day	feet per day
ft^3	cubic feet
GAA	granulated activated alumina
GAC	granular activated carbon
GB	isopropylmethylphosphonofluoridate (nerve agent-sarin)
GIS	Geographical Information System
GMP	Groundwater Monitoring Program
gpm	gallons per minute
H:V	horizontal to vertical
H_2O_2	hydrogen peroxide
HA	Health Advisories
HBCs	Health based criteria
HBr	hydrogen bromide
HCCPD	hexachlorocyclopentadiene
HCL	hydrochloric acid
HCPD	Hexachloropentadiene
HD	mustard
HDPE	high-density polyethylene
HE	high explosive(s)
HEP	habitat evaluation protocol
HEPA	high efficiency particulate air
HF	hydrofluoric acid
HHEA	Human Health Exposure Assessment
HHRC	Human Health Risk Characterization
HI	hazard index
ICP	inductively coupled plasma
ICS	Irondale Containment System
IDLH	Immediately Dangerous to Life and Health
IEA	Integrated Endangerment Assessment
IITRI	IIT Research Institute
IMPA	Isopropyl Methylphosponic Acid
INCS	Internal Containment System
IRA	interim response action

IT	International Technology
IWT	International Waste Technologies
Kg	Kilogram
K_{oc}	partition coefficient
Kp	Partitioning Coefficient for Soil
kW	Kilowatt
kWh	Kilowatt hour
L	Lewisite
lbs	pounds
lbs/acre	pounds per acre
LCY/hr	loose cubic yards per hour
LCY	loose cubic yards
LDR	land disposal restriction
LF	linear foot
LNAPL	light nonaqueous phase liquid
LT^3	Low-Temperature Thermal Treatment
LTTA	Low-Temperature Thermal Aeration
MCL	Maximum Containment Level
MEXCLR	Methoxychlor
mg/l	milligrams per liter
mg/m^3	milligrams per cubic meter
mg/kg	milligrams per kilogram
mg/cm^3	milligrams per cubic centimeter
MGL	milligrams per liter
MKE	Morrison–Knudsen Engineering
ml/g	milliliters per gram
mm	millimeters
MMBTU	million British thermal units
MOU	Memorandum of Understanding
MPA	Methylphosphonic Acid
mph	miles per hour
MTR	minimum technology requirement
n	Total Porosity
NaOH	sodium hydroxide
NAPL	Nonaqueous Phase Liquid
NBCS	North Boundary Containment System
NCP	National Contingency Plan
NDMA	Nitrosodimethylamine
NEPA	National Environmental Policy Act
NNDMEA	N-Nitrosodimethylamine
NWBCS	Northwest Boundary Containment System
O&M	operations and maintenance
OAS	Organizations and State

°C	degrees Centigrade
OCP	organochlorine pesticides
°F	degrees Fahrenheit
OPHGB	organophosphorus compounds, GB-agent related
OPHP	organophosphorus compounds; pesticide related
OSCH	organosulfur compounds; herbicide related
OSCM	organosulfur compounds; mustard agent related
OSHA	Occupational Safety and Health Administration
PAHs	polynuclear aromatic hydrocarbons
PBC	probabalistic biota criteria
PCB	polychlorinated biphenyl
pcf	pounds per cubic foot
PCP	pentachlorophenol
PDA	Pilot Demolition Assessment
PEC	plume evaluation criteria
PKPP	potassium pyrophosphate
ppb	parts per billion
PPDDE	dichlorodiphenyldichloroethylene
PPDDT	dichlorodiphenyltrichloroethane
PPE	personal protective equipment
PPLV	preliminary pollutant limit value
ppm	parts per million
ppt	Parts per Trillion
PQL	practical quantitation limit
PRG	preliminary remediation goal
psi	pounds per square inch
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RAO	remedial action objective
RC	Risk Characterization
RCRA	Resource Conservation and Recovery Act
RF	radio frequency
Ri	Retardation Factor
RI	remedial investigation
RISR	Remedial Investigation Summary Report
RMA	Rocky Mountain Arsenal
ROD	Record of Decision
RPO	representative process option
SACWSD	South Adams County Water and Sanitation District
SAR	Study Area Report
SARA	Superfund Amendments and Reauthorization Act
SCC	Secondary Combustion Chamber
SEC	Site evaluation criteria

SF	square feet
SFS	Supplemental Field Study
Shell	Shell Oil Company
SHO	Semivolatile halogenated organics
SITE	Superfund Innovative Technology Evaluation
SPNP	South Plants North Plume
SPNS	South Plants North Source Plume
SPSE	South Plants Southeast Plume
SQI	submerged quench incinerator
STC	Silicate Technology Corporation
STF	South Plants Tank Farm
SVE	soil vapor extraction
SVOCs	semivolatile organic compounds
SY	square yards
TBCs	to be considered criteria
TCLP	toxicity characteristic leaching procedure
TEA	triethylamine
TEC	Target Effluent Concentration
TIS	transportable incineration system
TMV	toxicity, mobility, and volume
TOC	total organic carbon
tpd	tons per day
TSCA	Toxic Substances Control Act
TSD	Treatment Storage and Disposal
TSGM	two-step geometric mean
UFS	Unconfined Flow System
µg/g	micrograms per gram
µg/l	micrograms per liter
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USPCI	U.S. Pollution Control, Inc.
UST	Underground Storage Program
UV	ultraviolet
UXO	unexploded ordnance
VAO	volatile aromatic organic compounds
VHC	volatile hydrocarbon compounds
VHO	volatile halogenated organics
Vi	Velocity of Component i in Aquifer
VOC	volatile organic compound
VX	ethyl s-dimethyl aminoethyl methyl phosphonothiolate
WES	Waterways Experimental Station

Section 1

1.0 INTRODUCTION

The objective of the Detailed Analysis of Alternatives (DAA) for the structures medium is to analyze the remedial alternatives retained from the Development and Screening of Alternatives (DSA) (EBASCO 1992) and select a preferred sitewide alternative for the structures medium. The objectives of the DAA include the following:

- Outline the remedial action objectives (RAOs), preliminary remediation goals (PRGs), and contaminants of concern (COCs) for the structures medium (Section 1.1).
- Outline any modifications made to the structures medium groups and remedial alternatives since the DSA was completed (Sections 1.2 and 1.3).
- Describe the methodology for the detailed analysis of the remedial alternatives and the selection of a preferred sitewide alternative for the structures medium (Section 2).
- Describe the interactions of the structures medium with the other media at Rocky Mountain Arsenal (RMA) (Section 2).
- Develop volume and surface area estimates for each of the structures medium groups (Section 3).
- Describe and analyze the retained alternatives for each of the structures medium groups (Sections 4 through 7).
- Perform a comparative analysis of the retained remedial alternatives and select a preferred sitewide alternative for the structures medium (Section 8).

1.1 REMEDIAL ACTION OBJECTIVES, PRELIMINARY REMEDIATION GOALS, AND CONTAMINANTS OF CONCERN

1.1.1 Remedial Action Objectives

RAOs were developed in the DSA to focus the evaluation and selection of remedial alternatives on reducing potential threats to human health and the environment. RAOs were developed broadly enough in scope to be applicable to the range of remedial alternatives analyzed.

Preliminary RAOs were developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the National Contingency Plan (NCP) (EPA 1990), the Federal Facility Agreement (FFA) (EPA et al. 1989), and the process for

developing final remediation goals (FRGs). These RAOs have been re-examined and modified, as necessary, throughout the feasibility study (FS) process.

RAOs for structures were developed based on potential risks, both physical and chemical, to human and biotic receptors through the potential exposure pathways of inhalation, dermal contact, or ingestion of contaminants potentially present in, or emanating from, structures at RMA. RAOs were also based on the potential for the movement of contaminants through soil, air, or water from structures. The RAOs for the structures medium are as follows:

Human Health

- Prevent contact with the physical hazards and contaminant exposure associated with structures.
- Limit inhalation of asbestos fibers to applicable regulatory standards.
- Limit releases or migration of COCs[1] from structures to soil or water in excess of remediation goals for those media or to air in excess of risk-based criteria for inhalation as developed in the On-Post Human Health Risk Characterization.

Ecological Protection

- Prevent contact with the physical hazards associated with structures.
- Prevent biota from entering structures that are potentially contaminated.

1.1.2 Preliminary Remediation Goals

PRGs are quantitative or qualitative criteria that support the development and evaluation of remedial alternatives that achieve the RAOs. The development of PRGs, in accordance with the NCP, is an ongoing process requiring continual evaluation of site-specific conditions and evolving regulatory standards. The PRGs may change as the FS progresses and information becomes available about the site, new standards or guidance emerge, or additional data about the

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[1] COCs are identified in the On-Post Endangerment Assessment. Reference to the Endangerment Assessment process is intended to include the Exposure Assessment, the Risk Characterization, and the Integrated Endangerment Assessment. This process is summarized in the Final Integrated Endangerment Assessment/Risk Characterization (IEA/RC), Version 4.2 (EBASCO 1994).

performance of remedial alternatives become available. Remediation goals will be finalized as part of the Record of Decision (ROD). The following are the PRGs for the structures medium:

- Identify structures that may present hazards to humans or biota and implement actions to mitigate these hazards.
- Identify and remediate asbestos and polychlorinated biphenyl (PCB) hazards in structures.
- Ensure that the structures alternatives will prevent contaminant migration to soil, water, air, and other media.

FRGs identified in the ROD may be based on, but not limited to, parameters such as health-based criteria (HBCs), applicable or relevant and appropriate requirements (ARARs), advisories and to-be-considered criteria (TBCs), ambient concentrations of naturally occurring or anthropogenic chemicals, and practical quantitation limits (PQLs).

1.1.3 Contaminants of Concern

The limited sampling that has been performed on the structures indicates that pesticides and metals are the most common COCs associated with the structures medium. This is consistent with the COCs found in RMA soil as described below. The historical structures sampling programs are detailed in the DSA (EBASCO 1992). During the Human Health Exposure Assessment (HHEA), an initial list of 38 COCs was selected for evaluation of contamination in soil (EBASCO 1990). The list was reduced to 27 COCs, listed in Table 1.1-1, which are expected to contribute to the majority of the projected soil risks at RMA. These COCs were used for the IEA/RC (EBASCO 1994) evaluations.

In general, the contaminants contributing most to potential carcinogenic risks are aldrin, dibromochloropropane (DBCP), arsenic, and dieldrin. Aldrin, DBCP, and arsenic are the major contributors to potential noncarcinogenic health effects.

1.2 STRUCTURES MEDIUM GROUPS

As described in the DSA, the structures medium is heterogeneous due to the wide variety of structural types and materials it encompasses, i.e., all aboveground structures, buildings, and foundations, and basements, tanks (including underground storage tanks), tank farms, process and nonprocess equipment (including bone yards), aboveground chemical and nonchemical pipelines, asbestos-containing material (ACM), and other miscellaneous human-made objects placed at RMA since it was acquired by the U.S. Army (Army) in May 1942. The structures medium also includes a few houses and barns constructed before 1942 that still exist at RMA.

To facilitate the development and analysis of alternatives, four structures medium groups were developed during the DSA: Future Use, No Potential Exposure; No Future Use, Nonmanufacturing History; No Future Use, Manufacturing History (which was subdivided into two groups—Process History and Nonprocess History); and No Future Use, Agent History. Since the release of the Proposed Final DAA, the structures medium groups have been reconfigured as follows: Future Use, No Potential Exposure (Future Use); No Future Use, Significant Contamination History (Significant Contamination History Group); No Future Use, Other Contamination History (Other Contamination History Group); and No Future Use, Agent History (Agent History Group). As is evident from these titles, structures with similar use histories were grouped together so that similar remedial options could be more efficiently applied and evaluated for each of the 796 structures currently standing at RMA (the count had been 952 structures upon publication of the Proposed Final DAA, but 156 structures have been removed since then as part of the interim response action (IRA) process and other activities. Section 3 defines and details the characteristics of all of the medium groups. Plate 1.2-1 shows the locations of the structures medium groups.

1.3 REMEDIAL ALTERNATIVES

During the preparation of the DSA, remedial alternatives were developed and screened for each of four structures medium groups, which at that time were labeled Future Use, No Potential Exposure; No Future Use, Nonmanufacturing History; No Future Use, Manufacturing History;

and No Future Use, Agent History. At the conclusion of the DSA (EBASCO 1992), the most promising alternatives were retained for further evaluation. As part of the DAA process, alternatives rejected or retained during the DSA for each medium group (Figures 1.3-1 through 1.3-4) were examined to determine whether any of the rejected alternatives should be re-evaluated or whether any of the retained alternatives should be modified. The rationale for changing the list of retained alternatives and the medium group classifications during the DAA process is based on several factors, including changes in site conditions, changes in information regarding the structures, changes in information concerning technologies contained in the retained alternatives, changes in regulations, comments from the Organizations and State (OAS), and changes in interactions of structures remedial alternatives with alternatives for soil remediation. As discussed in Section 1.2, the classification of structures medium groups has changed since the Proposed Final DAA was completed, so the titles used in the DSA and DAA will differ. The No Future Use, Manufacturing History and No Future Use, Nonmanufacturing History medium groups of the DSA (EBASCO 1992) were reclassified as the Significant Contamination History and Other Contamination History groups of the Final DAA.

During the DAA, the alternative classification system developed in the DSA (EBASCO 1992) was revised to identify alternatives by number only. In some cases, alternatives were added during the DAA. When this occurred, an "a" was attached to the number. For example, Alternative 9, which was developed for the Significant Contamination History Group, originally included vacuum dusting or steam cleaning followed by salvage, dismantling, and landfilling. This alternative could not be effectively analyzed in detail because it contained two different in situ treatment technologies: vacuum dusting and steam cleaning. To simplify the detailed analysis, Alternative 9a was added and Alternative 9 modified such that Alternative 9 provides for vacuum dusting and Alternative 9a for steam cleaning.

To evaluate and select the most effective remedial alternatives for all of the media at RMA, interactions between media were examined (Section 2.3). As a result, for the Significant and Other Contamination History Groups, Alternative 21a was added to the list of retained alternatives

and Alternative 21 was modified. Alternative 21a includes salvaging, dismantling, and consolidating the resulting structural debris in Basin A, creating an alternative that combines the consolidation of both soil and structural debris. This is consistent with some soil alternatives. Other alternatives for contaminated soil in South Plants include the capping of soil in the Central Processing Area, so Alternative 21 was modified to include placement of all of the structural debris from South Plants and outlying areas with soil under the cap, which is to be located in the Central Processing Area. In addition, to further minimize the amount of capped area, all structural debris from the North Plants and outlying areas is to be collected and placed under a single cap in North Plants and all structural debris from the Railyard and outlying structures is to be collected and placed in a single cap in the Railyard, in accordance with Alternative 21a.

For the Agent History Group, one alternative that was rejected during the DSA was reconsidered in the DAA. Alternative 18 was rejected in the DSA because of implementation concerns associated with the caustic treatment of structural debris containing Army chemical agent. Further analysis of this treatment technology conducted for the soil medium indicated that many of the implementation concerns outlined in the DSA (EBASCO 1992) had been eliminated through the development of applications for treatment of soil and in the demilitarization of agent-contaminated materials. This prompted the re-evaluation of Alternative 18 in the DAA for the structures medium. Moreover, Alternative 18a, which adds in situ sand blasting to Alternative 18, was developed so that a treatment technology applicable to contaminants other than Army chemical agents could be evaluated.

Aldrin

Arsenic

Benzene

2,2-bis(p-chlorophenyl)-1,1-dichloroethane

2,2-bis(p-chlorophenyl)-1,1,1-trichloroethane

Cadmium

Carbon Tetrachloride

Chlordane

Chloroacetic Acid

Chlorobenzene

Chloroform

Chromium

Dibromochloropropane

1,2-Dichloroethane

1,1-Dichloroethylene

Dicyclopentadiene

Dieldrin

Endrin

Hexachlorocyclopentadiene

Isodrin

Lead

Mercury

Methylene Chloride

1,1,2,2-Tetrachloroethane

Tetracholoroethylene

Toluene

Trichlororethylene

Total Number of COCs = 27

Reference: EBASCO 1994

DEVELOPED ALTERNATIVE	RETAINED ALTERNATIVE

No Action



Figure 1.3-1 SUMMARY OF ALTERNATIVES RETAINED IN THE DSA FUTURE USE, NO POTENTIAL EXPOSURE GROUP

REJECTED
RETAINED

DEVELOPED ALTERNATIVE	RETAINED ALTERNATIVE

No Action



Figure 1.3-2 SUMMARY OF ALTERNATIVES RETAINED IN THE DSA NO FUTURE USE, NONMANUFACTURING HISTORY GROUP

REJECTED
RETAINED

DEVELOPED ALTERNATIVE	RETAINED ALTERNATIVE

Reclamation, Containment, Institutional Controls

NA1. No Action	1. No Action
NA2. Salvage, Buildings/Pipe Plugs, Locks/Boards/Fences/Signs	2. Salvage, Buildings/Pipe Plugs, Locks/Boards/Fences/Signs
NA3. Salvage, Room Closure, Locks/Boards/Fences/Signs	

In Situ Treatment, Reclamation, Institutional Controls

NA4. Hot Gas, Salvage, Locks/Boards/Fences/Signs	
NA5. Sand Blasting, Salvage, Locks/Boards/Fences/Signs	
NA6. Vacuum Dusting or Steam Cleaning, Salvage, Locks/Boards/Fences/Signs	
NA7. Acid Etching/Neutralization, Salvage, Locks/Boards/Fences/Signs	

In Situ Treatment, Reclamation, Demolition, Landfill

NA8. Hot Gas, Salvage, Dismantling or Detonation, On-Post Nonhazardous Waste Landfill	8. Hot Gas, Salvage, Dismantling or Detonation, On-Post Nonhazardous Waste Landfill
NA9. Vacuum Dusting or Steam Cleaning, Salvage, Dismantling or Detonation, On-Post Nonhazardous Waste Landfill	9. Vacuum Dusting or Steam Cleaning, Salvage, Dismantling or Detonation, On-Post Nonhazardous Waste Landfill
NA10. Sand Blasting, Salvage, Dismantling or Detonation, On-Post Nonhazardous Waste Landfill	10. Sand Blasting, Salvage, Dismantling or Detonation, On-Post Nonhazardous Waste Landfill
NA11. Acid Etching/Neutralization, Salvage, Dismantling or Detonation, On-Post Nonhazardous Waste Landfill	

Figure 1.3-3 SUMMARY OF ALTERNATIVES RETAINED IN THE DSA NO FUTURE USE, MANUFACTURING HISTORY GROUP

REJECTED
RETAINED

DEVELOPED ALTERNATIVE	RETAINED ALTERNATIVE
No Action	
NA12. Salvage, Dismantling or Detonation, Off-post Rotary Kiln Incineration, Off-Post Hazardous Waste Landfill	12. Salvage, Dismantling or Detonation, Off-Post Rotary Kiln Incineration, Off-Post Hazardous Waste Landfill
Reclamation, Demolition, Treatment of Debris and Waste, Landfill	
NA13. Salvage, Dismantling or Detonation, On-post Rotary Kiln Incineration, On-Post Nonhazardous Waste Landfill	13. Salvage, Dismantling or Detonation, On-Post Rotary Kiln Incineration, On-Post Nonhazardous Waste Landfill
NA14. Salvage, Dismantling or Detonation, Classification, On-Post Nonhazardous Waste Landfill	
NA15. Salvage, Dismantling or Detonation, Hot Gas, On-Post Nonhazardous Waste Landfill	
NA16. Salvage, Dismantling or Detonation, Vacuum Dusting or Steam Cleaning, On-Post Nonhazardous Waste Landfill	
NA17. Salvage, Dismantling or Detonation, Acid Etching/Neutralization, On-Post Nonhazardous Waste Landfill	
NA18. Salvage, Dismantling or Detonation, Thermoplastic Microencapsulation, On-Post Nonhazardous Waste Landfill	
Reclamation, Demolition, Landfill	
NA19. Salvage, Dismantling or Detonation, On-Post Hazardous Waste Landfill	19. Salvage, Dismantling or Detonation, On-Post Hazardous Waste Landfill
NA20. Salvage, Dismantling or Detonation, Off-Post Hazardous Waste Landfill	20. Salvage, Dismantling or Detonation, Off-Post Hazardous Waste Landfill
Reclamation, Demolition, Containment	
NA21. Salvage, Dismantling or Detonation, Clay Cap with Geotextile Base	21. Salvage, Dismantling or Detonation, Clay Cap with Geotextile Base

Figure 1.3-3 SUMMARY OF ALTERNATIVES RETAINED IN THE DSA NO FUTURE USE, MANUFACTURING HISTORY GROUP

REJECTED
RETAINED

DEVELOPED ALTERNATIVE	RETAINED ALTERNATIVE
No Action	
NH1. No Action	1. No Action
In Situ Treatment, Institutional Controls	
NH2. Hot Gas, Locks/Boards/Fences/Signs	
NH3. Peroxide/Hypochlorite, Locks/Boards/Fences/Signs	
In Situ Treatment, Demolition, Landfill	
NH4. Hot Gas, Dismantling or Detonation, On-Post Hazardous Waste Landfill	4. Hot Gas, Dismantling or Detonation, On-Post Hazardous Waste Landfill
NH5. Peroxide/Hypochlorite, Dismantling or Detonation, On-Post Nonhazardous Waste Landfill	
In Situ Treatment, Demolition, Treatment of Debris and Waste, Landfill	
NH6. Hot Gas, Dismantling or Detonation, On-post Rotary Kiln Incineration, On-Post Nonhazardous Waste Landfill	6. Hot Gas, Dismantling or Detonation, On-Post Rotary Kiln Incineration, On-Post Hazardous Waste Landfill
NH7. Hot Gas, Dismantling or Detonation, Glassification, On-Post Hazardous Waste Landfill	
NH8. Hot Gas, Dismantling or Detonation, Hot Gas, On-Post Hazardous Waste Landfill	
NH9. Hot Gas, Dismantling or Detonation, Peroxide/Hypochlorite, On-Post Hazardous Waste Landfill	
NH10. Peroxide/Hypochlorite, Dismantling or Detonation, On-Post Rotary Kiln Incineration, On-Post Nonhazardous Waste Landfill	
NH11. Peroxide/Hypochlorite, Dismantling or Detonation, Glassification, On-Post Nonhazardous Waste Landfill	
NA12. Peroxide/Hypochlorite, Dismantling or Detonation, Hot Gas, On-Post Hazardous Waste Landfill	
NA13. Peroxide/Hypochlorite, Dismantling or Detonation, Peroxide/Hypochlorite, On-Post Hazardous Waste Landfill	

Figure 1.3-4 SUMMARY OF ALTERNATIVES RETAINED IN THE DSA
NO FUTURE USE, AGENT HISTORY GROUP

REJECTED
RETAINED

DEVELOPED ALTERNATIVE	RETAINED ALTERNATIVE

Demolition, Landfill

NH14. Dismantling or Detonation, On-Post Hazardous Waste Landfill	14. Dismantling or Detonation, On-Post Hazardous Waste Landfill

Demolition, Treatment of Debris and Waste, Landfill

NH15. Dismantling or Detonation, On-Post Rotary Kiln Incineration, On-Post Nonhazardous Waste Landfill	15. Dismantling or Detonation, On-Post Rotary Kiln Incineration, On-Post Nonhazardous Waste Landfill
NH16. Dismantling or Detonation, Gasification, On-Post Nonhazardous Waste Landfill	
NH17. Dismantling or Detonation, Hot Gas, On-Post Hazardous Waste Landfill	17. Dismantling or Detonation, Hot Gas, On-Post Hazardous Waste Landfill
NH18. Dismantling or Detonation, Peroxide/Hypochlorite, On-Post Hazardous Waste Landfill	

Figure 1.3-4 SUMMARY OF ALTERNATIVES RETAINED IN THE DSA NO FUTURE USE, AGENT HISTORY GROUP

REJECTED
RETAINED

Section 2

2.0 DAA METHODOLOGY FOR THE STRUCTURES MEDIUM

The DAA procedure for the structures medium is consistent with the U.S. Environmental Protection Agency (EPA) Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, Interim Final (OERR-EPA 1988). The Executive Summary, Volume I, provides a general summary of the overall DAA procedure. The structures medium is complex, however, and contains unique concerns that must be addressed during the DAA in addition to following standard CERCLA guidance. The following sections describe the concerns that are unique to the structures medium:

- Section 2.1—Volume and Area Estimates
- Section 2.2—Description and Analysis of Remedial Alternatives
- Section 2.3—Media Interactions
- Section 2.4—Waste Characterization

2.1 VOLUME AND AREA ESTIMATES

As a basis for estimating and comparing alternative costs in the DSA (EBASCO 1992), a single RMA structure was identified to represent each medium group. The cost of each alternative was estimated for that structure and that cost was then used to represent costs for the entire medium group. Although this was an effective approach during the screening process, it did not provide an estimate of the total cost of implementing an alternative for all of the structures contained within a medium group.

Consequently, during the DAA, total volume and surface area estimates for all of the structures in each medium group were calculated. To derive the information necessary to estimate costs, the following volumes and areas were estimated for each medium group:

- Standing and collapsed volume of buildings
- Interior and exterior surface areas
- Volumes of construction material (e.g., brick, wood, metal)
- Treatable surface areas

These estimates were calculated using the information provided in the Task 24 Final Structures Survey Report (EBASCO 1988), which was produced as part of the 1987 remedial investigation (RI) at RMA. Section 3 details the volume and area estimates for each of the structures medium groups, and Appendix B contains the formulas used to estimate these quantities.

2.2 DESCRIPTION AND ANALYSIS OF REMEDIAL ALTERNATIVES

Sections 4 through 7 describe and analyze the alternatives retained for the structures medium. Descriptions and analyses presented in these sections focus on the treatment train for an entire alternative within a medium group. The Technology Descriptions Volume (Volume VII) details the mechanics of all of the individual process options that make up the alternatives. Section 8 describes the preferred alternative for RMA sitewide structures remediation. The following sections outline the approach used to describe and analyze alternatives for the structures medium.

2.2.1 Alternative Descriptions

In contrast to the soil and water media, most of the alternatives retained for the structures medium are very similar; in many cases, there is only one process option that distinguishes one alternative from another. Accordingly, the descriptions and analyses for most of the alternatives focus only on these differences. For example, the common elements of demolishing the structures and placing the debris in the landfill are shared by the Significant and Other Contamination History Groups, Alternatives 8, 9, 9a, 1, 12, 13, 19, and 20; and by the Agent History Medium Group, Alternatives 4, 6, 14, 15, 17, 18, and 18a. To avoid redundancy in describing the alternatives, Section 5 provides a description of the general alternative that includes demolition and landfilling. The subsequent descriptions of the individual alternatives focus on the differences of each specific alternative from the general alternative. For example, the description of Significant Contamination History Group Alternative 9—vacuum dusting followed by demolition and landfilling—focuses on how vacuum dusting and the type of landfilling distinguish the alternative from the general description.

2.2.2 Detailed Analysis of Alternatives

As is the case with the descriptions of the alternatives, most of the analyses of the alternatives are very similar. Therefore, in addition to the description of the general alternatives (Section 2.2.1), a general analysis of the seven EPA evaluation criteria is also provided. (For a discussion of these criteria—overall protection of human health and the environment; compliance with ARARs; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume (TMV) through treatment; short-term effectiveness; implementability; and cost—see the Executive Summary, Volume I.) For example, for the Significant Contamination History Group, an analysis of salvage, demolition, and landfilling is provided (Section 5.3) for all of the criteria except cost, which is discussed separately for each alternative. For the Agent History Group, an analysis of demolition and landfilling is provided (Section 7.0) for all of the criteria except cost, which is discussed separately for each alternative. The individual analysis of each alternative focuses on the differences from the general analysis.

2.2.3 Ongoing Actions Affecting Structures Remedial Alternatives

There are several ongoing activities that affect the structures remedial alternatives, the most significant of which are the following:

- Asbestos IRA
- Chemical-process-related activities
- Underground storage tank removal
- Aboveground storage tank removal

The scope of the Asbestos IRA is to remove and dispose all asbestos-containing material (ACM) from RMA structures, piping, and tanks. For the DAA, it was assumed that all costs associated with removing and disposing ACM are included as part of the Asbestos IRA. The Asbestos IRA may not be complete before the structures remediation begins, so any asbestos remaining in the structures will be removed as an integral part of the remediation process. However, the asbestos removal costs are accounted for under the Asbestos IRA.

The current scope of the chemical-process-related activities includes removing all Army chemical agent and easily accessible nonagent process equipment and piping from structures at RMA and stockpiling them on post. For the DAA, it was assumed that all process equipment and pipes will be removed and cleaned prior to structures remediation. There is a possibility that some of the process piping and equipment will be present during the structures remediation and these will be handled as an integral part of the remediation process. The cost for removing these items is included under the appropriate IRA and was not included as part of the remediation costs developed in the DAA. Because the scope of the chemical-process-related activities does not include disposal, the applicable costs for salvaging, transporting, and disposing process equipment and pipes are included as part of structures remediation.

Currently, the scopes for both the aboveground and underground storage tank IRAs and the costs associated with these actions entail the removal of all aboveground and underground tanks at RMA. The underground storage tanks and aboveground storage tanks are to be disposed as scrap metal wherever possible.

The total estimated cost for the structures IRAs is $76,000,000. These costs must be added to the costs projected in the DAA to obtain realistic remediation costs for the structures medium at RMA.

2.2.4 PCB Remediation in Structures

Army structures have been subject to a comprehensive sampling program under the PCB IRA to identify all PCB-contaminated equipment and structure materials. The results of this program are to be presented in the PCB IRA completion report. Concentrations used to determine PCB contamination and action levels are discussed in Section A.5.0, Volume VII of this report (ARARs Section). Materials that are noted as PCB contaminated in this report will be disposed of in a landfill which meets TSCA requirements. Potential PCB contamination in Shell structures are to be identified through visual evidence, and will be disposed in accordance with TSCA

requirements and guidance. The remediation activities for identified materials are discussed below.

2.2.4.1 Army Structures

Equipment and structures for which the Army has responsibility will be handled as follows:

- Equipment: PCB fluids will be drained and sent off post for disposal in compliance with applicable TSCA regulations. PBC-contaminated equipment will be disposed of in a landfill which meets TSCA requirements. The equipment will be disposed under one of three possible scenarios:

  — Identified and disposed as part of the ongoing PCB IRA.

  — Identified under the PCB IRA, but disposed under the final structures cleanup.

  — Agent-decontaminated materials that will be disposed under the final structures cleanup.

- Structures: The PCB contamination in No Future Use structure materials will be identified in the PCB IRA completion report. Based on a 50 ppm action level, structure material will be addressed in one of two ways:

  — Structure materials with PCB concentrations of 50 ppm or above which exist above the ground elevation, as well as contaminated parts of ground floor slabs and foundations that will be removed, will be identified prior to demolition, segregated during demolition, and disposed of in a landfill which meet TSCA requirements. Similar materials with PCB concentrations below 50 ppm will not require disposal in a TSCA landfill.

  — PCB-contaminated sections of ground floor slabs or foundations that are not required to be demolished as part of the remediation, and which have PCB concentrations of less than 50 ppm, will be left in place. However, if such slab or foundation material has PCB concentrations of 50 ppm or greater, it will be removed during demolition and disposed of in a landfill which meets TSCA design requirements.

Army Future Use structures have been managed for occupancy under current environmental and worker protection regulations. There is no evidence of PCB contamination in this medium group.

2.2.4.2 Shell Structures

Structures and equipment for which Shell has responsibility will be handled as follows:

- All Shell buildings to be demolished during the final remedy will be inspected for equipment containing fluids potentially contaminated with PCBs prior to demolition. Suspected fluids will be drained and sent off post for disposal in compliance with applicable TSCA regulations. Equipment that contained these fluids as well as all other equipment will be disposed of in a landfill which meets TSCA requirements. Significant Contamination History structures will be demolished and the resulting debris will be placed in a landfill which meets TSCA requirements. Other Contamination History structures will be evaluated by Shell and EPA for any visual evidence of leaks or spills. If observed in areas where potential PCB releases may be reasonably have been expected to occur, the affected structures debris will be disposed of in a landfill which meets TSCA requirements. Examples of this type of visual evidence would include stains near equipment potentially containing PCB fluids or stains in buildings where there are numerous instances of equipment potentially containing PCB-contaminated fluids. Further details of this work will be addressed at the remedial design stage.

- All fluorescent light ballasts will be disposed at an off post-disposal facility in accordance with applicable TSCA regulations.

Shell does not have responsibility for any structures within the Future Use or Agent History Medium Groups.

2.3 MEDIA INTERACTIONS

Remedial alternatives selected for each medium must be compatible with one another to facilitate their combination into a single remediation scenario that encompasses all of RMA. Accordingly, it is important to determine the interaction between the media and evaluate this information on both a medium-specific and an RMA-wide basis. There are no alternatives developed for the water medium that directly impact the alternative selection for the structures medium, but there are several points of intersection between the structures and soil media that must be taken into consideration.

Several soil alternatives affect the structures alternative selection for the Significant Contamination History, Other Contamination History, and Agent History Groups. For example,

if the sites within the soil Toxic Storage Yard and South Plants Medium Groups are capped, this precludes the choice of no action or containment alternatives for structures in all three structures medium groups; the structures must be removed to cap these areas. Conversely, if the contaminated soil in South Plants and North Plants is capped, then in-place capping of structural debris becomes a possible remedial alternative. Plate 1.2-1 displays the interaction between the structures and soil media. When a structures alternative includes demolition, the foundations of the structure involved are to be removed if they interfere with soil alternatives. This situation occurs in the South Plants Central Processing Area for areas with principal threat or human health soil exceedances. In other areas, slabs and foundations for Significant and Other Contamination History Groups will generally be left in place after demolition, after the slabs have been fractured. For the purposes of the DAA, if the foundation is part of an Agent History structure, it is assumed to be removed.

2.4 WASTE CHARACTERIZATION

Limited-scope sampling programs have been completed for the structures medium as detailed in Section 1.3.2 in the DSA (EBASCO 1992). The detection of an analyte in structural material does not necessarily imply that the analyte poses a risk to human health or the environment. The words "contaminant" and "contamination," when used with respect to structures, indicate only the presence or potential presence of analytes as detected in a specific sampling program.

In support of the Structures FS, an expert panel was convened to recommend sampling and analysis protocols for sampling the structures at RMA. The panel recommended protocols for sampling Future Use (not listed for disposal) and No Future Use structures (listed for disposal) which were subsequently implemented. The Future Use Structures Pilot Study (WCC 1993a) was conducted in Buildings 311, 321, 331, 612, and 1701. Air and surficial dust samples were collected in each structure in accordance with the sampling protocol developed by the expert panel. The No Future Use Structures Pilot Study (WCC 1993b) included sampling of Buildings 373B, 515, 616, and 1611. Table 2.4-1 summarizes the sampling results. Sampling of the structural materials (e.g., concrete, wood, etc.) was conducted using the sampling protocols

developed by the expert panel. Composite samples were formed from aliquots obtained by drilling and coring. The aliquots represented varying volumes of structural material. The composites were analyzed by total analysis and toxicity characteristic leaching procedure (TCLP) analysis for structure-specific analytes. The results of the Future Use Sampling Pilot Study indicated that low levels of metals and pesticides were present in some of the dust samples. The results of the No Future Use Sampling Pilot Study also indicated that the majority of detections were pesticides and metals. The concentrations were generally low and only a few of the samples detected any target analytes.

Additional sampling was conducted in conjunction with the Army's pilot demolition program. The results of this effort are presented in the final Pilot Demolition Assessment (PDA) (JEG 1994) and summarized in Table 2.4-2. Six structures were sampled, including five manufacturing structures (Buildings 317, 431, 433, 523F, and 523G) and one chemical agent manufacturing structure (Building 412). Various building materials were sampled as well as the surficial soil surrounding each structure. The purpose of the sampling effort was to determine whether there were any portions of the structures at which various treatment technologies could be tested. The results indicated that the majority of the detections occurred at low concentrations. Analytes detected included metals, such as cadmium, chromium, and lead; pesticides such as 2,2-bis(p-chlorophenyl)-1,1-dichloroethene (PPDDE), 2,2-bis(p-chlorophenyl)-1,1,1-trichloroethane (PPDDT), aldrin, and dieldrin; and some PCBs. This study is also intended to examine various structure demolition techniques. Study results will not become final until late in the DAA process; however, whenever possible pilot study findings will be incorporated into the Structures DAA.

No pre- or postdemolition structure characterization sampling is planned because sufficient historical knowledge is available to determine whether hazardous wastes are present in a particular structure. This decision was made consistent with federal and state regulations. Both the Resource Conservation and Recovery Act (RCRA) (40 Code of Federal Regulations [CFR] 262.11) and the Colorado Hazardous Waste Management Regulations (Code of Colorado

Regulations [CCR] 1007-3 Part 262.11) allow the use of historical and process history knowledge to determine whether a waste is hazardous. This is done by: (1) determining whether the waste is excluded, (2) determining whether the waste is listed, and (3) determining whether the waste is characteristic by testing or applying knowledge of the materials or the processes used.

Analytical Results for Structure 1611

Site Number	Sample Number	Analyte	Method	Uncorrected Result	Units
2501611101	01611011	Barium	T601	6.95E-01	MGL
		Cadmium	T601	1.72E-02	MGL
		Zinc	T601	4.91E-01	MGL
		Mercury	T747	4.60E-04	MGL
		1,4-Dichlorobenzene	T827	4.40E-02	MGL
		PPDDT	W808	2.78E-02	UGG
2501611102	01611021	Barium	T601	3.72E-01	MGL
		PPDDE	W808	8.80E-03	UGG
		PPDDT	W808	1.90E-02	UGG
2501611103	01611031	Barium	T601	4.97E-01	MGL
		PPDDE	W808	1.40E-02	UGG
		PPDDT	W808	1.50E-02	UGG
2501611104	01611041	Barium	T601	4.35E-01	MGL
		Chromium	T601	6.46E-02	MGL
		Chloroform	T824	2.50E-03	MGL
		Arsenic	W601	1.81E+01	UGG
		Arsenic	W601	2.27E+01	UGG
		PPDDT	W808	1.20E-02	UGG
2501611204	01611042	Barium	T601	5.19E-01	MGL
		Chromium	T601	7.25E-02	MGL
		Zinc	T601	6.61E-02	MGL
		Chloroform	T824	2.60E-03	MGL
		Arsenic	W601	2.45E+01	UGG

Reference: Woodward-Clyde 1993b

Analytical Results for Structure 1611					
2501611105	01611051	Barium	T601	7.09E-01	MGL
		Chromium	T601	8.35E-02	MGL
		Mercury	T747	2.44E-04	MGL
		PPDDT	W808	5.30E-03	UGG
2501611105	01611060	Arsenic	W601	2.17E+01	UGG
2501611106	01611061	Barium	T601	5.92E-01	MGL
		Mercury	T747	3.53E-04	MGL
2501611107	01611071	Barium	T601	3.88E-01	MGL
		Mercury	T747	9.76E-04	MGL
2501611207	01611072	Barium	T601	3.76E-01	MGL
		Mercury	T747	7.80E-04	MGL
		Mercury	W747	1.90E+00	UGG
2501611108	01611081	Barium	T601	4.99E-01	MGL
		Chromium	T601	2.30E-04	MGL
		Mercury	T747	2.06E-04	MGL

Reference: Woodward-Clyde 1993b

Analytical Results for Structure 616

Site Number	Sample Number	Analyte	Method	Uncorrected Result	Units
0300616101	00616011	Barium	T601	6.00E-01	MGL
		Methylene Chloride	T824	2.70E-03	MGL
		Toluene	T824	7.00E-04	MGL
		Chromium	W601	1.50E+01	UGG
		Lead	W601	5.00E+00	UGG
		Zinc	W601	4.90E+01	UGG
		Methylene Chloride	W824	2.70E+00	UGG
		Toluene	W824	9.00E+00	UGG
		Hexachlorobenzene	W824	3.30E+02	UGG
0300616201	00616012	Barium	T601	4.00E-01	MGL
		Methoxychlor	T808	1.00E-02	MGL
		Toluene	T824	2.10E-03	MGL
		Chromium	W601	1.30E+01	UGG
		Lead	W601	4.00E+00	UGG
		Zinc	W601	4.30E+01	UGG
		Toluene	W824	1.10E+01	UGG
		Trichloroethylene	W824	1.60E+00	UGG
		Hexachlorobenzene	W827	3.30E+02	UGG

Reference: Woodward-Clyde 1993b

Analytical Results for Structure 515

Site Number	Sample Number	Analyte	Method	Uncorrected Result	Units
0100515101	00515011	Barium	T601	6.26E-01	MGL
		Chromium	T601	1.69E-01	MGL
		Mercury	T747	8.70E-04	MGL
		Aldrin	T808	9.95E-04	MGL
		Dieldrin	T808	1.15E-02	MGL
		Endrin	T808	1.29E-01	MGL
		Isodrin	T808	1.16E-02	MGL
		p-Chlorophenyl-methyl sulfoxide	T827	4.90E-02	MGL
		Chromium	W601	1.72E+01	MGL
		Chromium	W601	1.66E+01	UGG
		Lead	W601	3.40E+02	UGG
		Lead	W601	1.14E+03	UGG
		Zinc	W601	5.86E+01	UGG
		Zinc	W601	6.42E+01	UGG
		Endrin	W808	1.40E+01	UGG
		Isodrin	W808	1.30E+01	UGG
		PPDDT	W808	5.30E-01	UGG
0100515102	00515021	Barium	T601	5.18E-01	MGL
		Chromium	T601	1.69E-01	MGL
		Mercury	T747	4.35E-04	MGL
		Dieldrin	T808	4.38E-03	MGL
		Endrin	T808	4.15E-02	MGL
		Isodrin	T808	9.80E-04	MGL
		1,4-Dichlorobenzene	T827	7.70E-02	MGL

Reference: Woodward-Clyde 1993b

Analytical Results for Structure 515

Site Number	Sample Number	Analyte	Method	Uncorrected Result	Units
		p-Chlorophenyl-methyl sulfoxide	T827	5.40E-02	MGL
		Chromium	W601	1.98E+01	UGG
0100515102	00515021	Lead	W601	3.86E+01	UGG
		Zinc	W601	8.10E+01	UGG
		Endrin	W808	1.90E+01	UGG
		Isodrin	W808	7.10E+00	UGG
0100515103	00515031	Barium	T601	5.66E-01	MGL
		Chromium	T601	1.46E-01	MGL
		Mercury	T747	2.30E-04	MGL
		Endrin	T808	1.63E-02	MGL
		p-Chlorophenyl-methyl sulfone	T827	2.90E+00	MGL
		p-Chlorophenyl-methyl sulfoxide	T827	6.50E-01	MGL
		Cadmium	W601	1.07E+00	UGG
		Chromium	W601	3.28E+01	UGG
		Lead	W601	2.19E+01	UGG
		Zinc	W601	9.56E+01	UGG
		Endrin	W808	4.10E+00	UGG
		Isodrin	W808	1.20E+00	UGG
		PPDDT	W808	1.90E+00	UGG
Rinse Blank	00515033	Dieldrin	W808	2.32E-02	UGL
		Isodrin	W808	1.09E-02	UGL
Trip Blank	00515036	Chloroform	W824	2.60E+00	UGL

Reference: Woodward-Clyde 1993b

Analytical Results for Structure 373B

Site Number	Sample Number	Analyte	Method	Uncorrected Result	Units
020373B101	0373B011	Barium	T601	9.00E-01	MGL
		Zinc	T601	5.20E-01	MGL
020373B201	0373B012	Barium	T601	8.00E-01	MGL
		Zinc	T601	3.90E-01	MGL
		Mercury	T747	1.00E-04	MGL

Reference: Woodward-Clyde 1993b

Table 2.4-2 Pilot Demolition Assessment Analytical Results

Structure Sample Results, Buildings 523F and 523G

Analytes Detected in Structure Matrices (Concrete)

Compound	No. of Samples Analyzed	No. Above Detection Limit	Concentration Range in Structure Matrices in ppb
Aluminum	2	2	6,100,000 – 6,680,000
Chromium*	2	2	9,800 – 10,700
Lead*	2	2	9,100 – 13,700
Arsenic*	15	15	18,700 – 5,580,000
Dieldrin*	2	2	5.2 – 12

Reference: Jacobs 1994

All concentrations reported in micrograms per kilogram (parts per billion).

* Chemicals of concern for the Integrated Endangerment Assessment/Risk Characterization evaluations (EBASCO 1994)

Structure Sample Results, Building 431

Analytes Detected in Structure Matrices (Concrete or Brick)

Compound	No. of Samples Analyzed	No. Above Detection Limit	Concentration Range in Structure Matrices in ppb
Aluminum	20	20	8,600,000 – 15,000,000
Cadmium*	20	20	700 – 8,800
Chromium*	20	20	7,800 – 39,000
Copper	20	20	3,000 – 59,000
Lead*	20	20	8,000 – 45,000
Zinc	20	20	16,000 – 91,000
Arsenic*	20	20	1,000 – 11,000
Total PCBs	20	4	69 – 1,000
Aldrin*	20	1	6
DDT*	20	5	3.6 – 41
Dieldrin*	20	17	3.5 – 420
Endosulfan Sulfate	20	1	31
beta-Endosulfan	20	1	15
Endrin*	20	2	23 – 92
Endrin Ketone	20	1	8.1
Methoxychlor	20	1	13
Pyrene	20	8	870 – 5,000
Fluoranthene	20	8	760 – 5,700
Phenanthrene	20	5	1,200 – 4,800

Reference: Jacobs 1994

All concentrations reported in micrograms per kilogram (parts per billion).

* Chemicals of concern for the Integrated Endangerment Assessment/Risk Characterization evaluations (EBASCO 1994)

Structure Sample Results, Building 433

Analytes Detected in Structure Matrices (Concrete, Wood, Brick, or Wallboard)

Compound	No. of Samples Analyzed	No. Above Detection Limit	Concentration Range in Structure Matrices in ppb
Aluminum	56	56	37,000 – 15,000,000
Barium	4	4	610 – 940
Cadmium*	35	27	400 – 1,400
Chromium*	60	54	36 – 32,900
Copper	31	31	1,300 – 23,000
Lead*	60	55	7,300 – 180,000
Selenium	4	1	72
Zinc	31	31	5,100 – 2,300,000
Arsenic*	35	24	400 – 8,600
Mercury*	29	5	0.22 – 2,400
Total PCBs	56	13	40 – 4,000
Aldrin*	56	11	3.5 – 5,100
Altrazine	31	1	86
DDD	56	1	38
DDT*	56	7	69 – 3,500
Dieldrin*	56	50	2.5 – 16,000
alpha-Endosulfan	56	1	68
beta-Endosulfan	56	1	21
Endrin*	60	11	0.09 – 410
Endrin Ketone	56	10	4.3 – 890
Heptachlor	60	1	0.64
Isodrin*	56	5	19 – 53,000
Methoxychlor	60	8	21 – 1,600

Reference: Jacobs 1994

All concentrations reported in micrograms per kilogram (parts per billion).

* Chemicals of concern for the Integrated Endangerment Assessment/Risk Characterization evaluations (EBASCO 1994)

Structure Sample Results, Building 412

Analytes Detected in Structure Matrices (Concrete)

Compound	No. of Samples Analyzed	No. Above Detection Limit	Concentration Range in Structure Matrices in ppb
Aluminum	30	30	740,000 – 32,100,000
Cadmium*	30	25	600 – 18,000
Chromium*	30	30	11,800 – 33,300
Copper	30	30	13,900 – 7,100,000
Lead*	30	29	12,000 – 119,000
Zinc	30	30	5,800 – 1,800,000
Arsenic*	30	30	1,900 – 5,400
Total PCBs	33	30	95 – 22,000
Chlorophenyl-Methyl Sulfone	38	1	330
PPDDE*	30	1	1,600
PPDDT*	30	10	10 – 160
Dieldrin*	31	21	5 – 3,800
Endrin*	30	1	1,100
alpha-Endosulfan	30	3	13 – 220
Pyrene	38	16	330 – 4,000
Fluoranthene	38	13	390 – 2,900
Methylnaphthalene	38	1	580
Phenanthrene	38	4	550 – 1,900

Reference: Jacobs 1994

All concentrations reported in micrograms per kilogram (parts per billion)

* Chemicals of concern for the Integrated Endangerment Assessment/Risk Characterization evaluations (EBASCO 1994)

Structure Sample Results, Building 317

Analytes Detected in Structure Matrices (Concrete or Wallboard)

Compound	No. of Samples Analyzed	No. Above Detection Limit	Concentration Range in Structure Matrices in ppb
Aluminum	14	14	230,000 – 10,000,000
Cadmium*	14	2	800 – 5,200
Chromium*	14	14	1,800 – 19,000
Copper	14	14	2,200 – 18,000
Lead*	14	14	16,000 – 8,200,000
Zinc	14	14	40,000 – 3,800,000
Arsenic*	14	14	900 – 6,800
Total PCBs	14	8	5,000
PPDDE*	14	4	6.9 – 130
PPDDT*	14	9	3,4 – 600
Dieldrin*	14	13	10 – 380
Endrin*	14	7	5 – 130
Heptachlor Epoxide	14	1	34
Phenanthrene	14	1	420

Reference: Jacobs 1994

All concentrations reported in micrograms per kilogram (parts per billion).

* Chemicals of concern for the Integrated Endangerment Assessment/Risk Characterization evaluations (EBASCO 1994)

Section 3

3.0 STRUCTURES MEDIUM GROUPS

3.1 INTRODUCTION

This section summarizes the background information relevant to the structures medium at RMA, describes how and why the structures medium groups were developed, and provides the quantity estimates that were developed for costing. The primary background document providing information on structures at RMA is the Task 24 Final Structures Survey Report (EBASCO 1988).

3.2 BACKGROUND INFORMATION

Based on extensive field observations and takeoffs from available drawings, the structures survey performed in 1986 identified 982 structures at RMA. The 982 structures encompassed roughly 2.6 million square feet, and the total volume of structural materials was approximately 250,000 bank cubic yards (BCY). Structural materials, as used in this report, refer to all materials associated with the structures, not just load-bearing materials.

Of the 982 structures, 725 were located in three clusters: 524 (53.4 percent) were in South Plants, Sections 1 and 2; 118 (12.0 percent) were located in North Plants, Section 25; and 83 (8.4 percent) were located in the Railyard, Sections 3 and 4. The remaining 257 structures (26.2 percent) were distributed individually or in small clusters throughout RMA. The distribution of material volumes among clusters of structures roughly corresponded to the percentages provided above. The history and use of the structures are summarized in the Structures DSA report (EBASCO 1992). Since the 1988 structures survey, 40 new structures have been added and 227 structures have been removed. In addition, one structure, the Toxic Storage Yard, contains only berms and is being handled as part of the soil medium remediation, and the designation of one structure has been changed from a single unit to three individual units. Therefore, 796 structures currently remain standing at RMA and are addressed in this document. Appendix A, Tables A.1-1 through A.1-4 list all the existing RMA structures. Appendix A, Table A.1- 5 lists those structures that have been removed since 1986. Appendix A, Table A.1- 6 lists the structures that may be used during the remediation process. Finally, Appendix A, Table A.1- 7 lists the history

of each structure and the rationale used for placing it in a given medium group. All of the new structures have already been added to the appropriate structures medium groups, as discussed in Section 3.3.

3.3 STRUCTURES DAA MEDIUM GROUPS

Because of the complexity of the structures medium, all RMA structures were divided into medium groups during the DSA (EBASCO 1992) to aid in the development and initial screening of remedial alternatives. These medium groups have been revised for the Final DAA. The new groups reflect the relative contamination levels expected in the structures, based primarily on use history. The four new medium groups are: Future Use, Significant Contamination History, Other Contamination History, and Agent History. Some structures in the No Future Use medium groups were determined to be eligible for inclusion on the National Register of Historic Buildings. However, they will not be nominated for inclusion on the list because of environmental considerations. Extensive documentation, including records and photographs, is being prepared and archived to establish a permanent record of these buildings.

3.3.1 Future Use, No Potential Exposure

The Future Use, No Potential Exposure Medium Group consists of structures that are currently in use and are anticipated to have a postremediation use. Future use is defined as having a long-term function after the RMA remediation is complete. There is no historical evidence to indicate structures within this medium group are contaminated; therefore, no action was the only alternative retained for this medium group. There are 47 structures in this medium group.

3.3.2 No Future Use, Significant Contamination History

The No Future Use, Significant Contamination History Group includes all nonagent history structures at which concentrations of contamination are high enough that the structures require special handling. Included in this group are structures that were directly involved in the manufacture or storage of pesticides or have use histories indicating the potential for significant contamination. There are 49 structures in this group.

3.3.3 No Future Use, Other Contamination History

The No Future Use, Other Contamination History Group consists of all other structures not included in the Agent History, Future Use, or Significant Contamination History groups. These structures may contain contamination, but at such low concentrations that they are considered to present a limited threat. This is the largest structures medium group, totaling 630 structures in all.

3.3.4 No Future Use, Agent History

The No Future Use, Agent History Medium Group consists of 70 structures that are associated with production, distillation, munitions filling, demilitarization of the Army chemical agents mustard (H, HD, HS, or HT), sarin (GB), VX, or Lewisite (L).

Many of the structures in this medium group come under the authority of three current or pending international agreements on chemical weapons. The provisions of these agreements will affect the waste management and remediation activities for structures in this medium group. The agent treaty agreements are as follows:

- Wyoming Memorandum of Understanding (MOU)—The first phase of this bilateral cooperative agreement between the United States and the Russian Federation was signed in September 1989. This phase of the MOU establishes a mechanism by which data on chemical weapons production facilities and stockpiles can be exchanged and provides for on-site inspections to verify the data that has been submitted. The second phase of this MOU was signed in January 1994. Under the stipulations delineated in the Wyoming MOU, inspections were concluded in December 1994.

- Bilateral Destruction Agreement (BDA)—This proposed agreement between the United States and Russia would provide for the destruction of large chemical agent stockpiles, allowing each of the Parties no more than 5,000 tons as reserve, and for the cessation of chemical agent production. Its objective is to facilitate the multilateral banning of chemical weapons. The BDA has yet to be ratified by either nation and is not expected to be approved until all Wyoming MOU issues are resolved.

- Chemical Weapons Convention (CWC)—The multilateral CWC, which has as its origin a United Nations document published in September 1992, prohibits the development, production, stockpiling, or use of chemical weapons. Its objective is to completely destroy chemical weapons and chemical weapons production facilities. As of May 1995,

this convention has been signed by 159 countries, including the United States. The CWC will enter into force (EIF) only after being ratified by 65 nations; to date, 25 nations have ratified it. EIF is presently estimated to occur no earlier than the second quarter of 1996. The CWC applies to chemical weapons facilities designed, built, or used since January 1946. It allows for on-site inspections and direct monitoring of destruction activities.

These agreements apply only to those structures specifically named by the individual agreement. RMA structures named by the Wyoming MOU are shown on Plate 3.3-1 and listed in Appendix A, Table A.1-4. The importance of these agreements is that international inspection teams have access to the structures and their records and that the structures and their process equipment will be destroyed. Any remedial actions involving these structures must comply with the terms of the agreements, including demolishing the structures and equipment, cooperating with inspection teams, and preparing acceptable documentation.

As shown on Plate 3.3-1, the agreements also include support structures that are not classified as part of the Agent History Group (although these structures were not directly related to Army chemical agent production). These structures will be handled as part of their respective medium groups, but additional disposal documentation will be necessary for these structures to comply with the agreements. All structures governed by the treaties are noted in the Treaty column in Appendix A, Table A.1-4.

Structures in the Agent History Group may also contain other contamination that may be considered hazardous. The Army has determined that this group of structures must be remediated in accordance with Army Regulation (AR) 385-61 (Army 1992a) and Department of the Army (DA) PAM 385-61 (Army 1992b), which govern the handling, decontamination, and disposal of agent-contaminated materials.

3.4 STRUCTURAL MATERIAL QUANTITY ESTIMATES

Quantity estimates for the structures medium were prepared to develop remedial alternative costs for the DAA. These data are based on field reconnaissance estimates and are considered sufficient for the purposes of this report. There are no survey data available for the 40 new structures added since the Task 24 survey; these structures are currently not included in the material quantity estimates. When this information becomes available, it may be incorporated into the cost estimates if it appears to have a significant cost impact. In addition, all structures associated with the former Basin F and the submerged quench incinerator are included in a RCRA closure plan that will separate it from the FS process.

The Task 24 survey collected a variety of information on each structure—including standing and collapsed volumes, material types, number of floors, etc.—which was used to create the Task 24 database. For the purposes of the DAA, a number of assumptions and algorithms were applied to the database to estimate the quantities of materials for use in developing cost estimates for the various treatment alternatives. Appendix B details the quantity estimating process, and Tables 3.5-1 through 3.5-3 summarize the material quantity estimates.

Some of the DAA quantity data were taken directly from the Task 24 database, including the following:

- Standing volume of the structure
- Collapsed volume of the structure
- Square footage of the structure (structure footprint)
- Collapsed volume of the process equipment
- Collapsed volume of the piping

Costs for hot gas, steam cleaning, vacuum dusting, and sand blasting treatments and estimates of salvage quantities of individual material types (e.g., wood, metal, concrete) were calculated by applying algorithms to the Task 24 database, which identified material types for walls, roofing,

and foundations, and by applying the following assumptions. The roof material was assumed to be composed entirely of the reported type, as was the foundation material. The reported wall material was assumed to make up the remainder of the structure, including floors. The roof was assumed to be 0.1 foot (ft) thick and to have an area that is the same as the building footprint. The volume of the roof material was subtracted from the total structure volume to determine the volume of the walls and interior materials. Foundation materials were reported separately. Structural material types were then added together and reported as total volumes for each type of material for each medium group.

The treatable surface areas for the treatment alternatives were calculated from volume estimates, based on the following assumptions. The in situ treatment of structures was assumed to be limited to the production area of a building, which was assumed to be 30 percent of its interior surface. This percentage was estimated based on the evaluation of the structural blueprints of several production buildings contaminated with pesticides or other toxic constituents. Within that 30 percent, treatment was assumed to be applied to the floors and 5 ft up the walls. The treatable surface area for in situ sand blasting and vacuum dusting was assumed to include the production areas of buildings, which were assumed to be constructed of metal, concrete, tile, brick, or masonry. The treatable surface area for in situ steam cleaning was assumed to be similar to that for sand blasting and vacuum dusting; however, the wall types were limited to metal, concrete, tile, or masonry because steam cleaning is not applicable to surfaces that tend to absorb water. The treatable surface areas for in situ hot gas treatment were assumed to be nonflammable surfaces only within production areas. The interior and exterior surface areas for hot gas treatment of nonflammable debris were calculated assuming each story of a structure is 15 ft tall.

Quantities regarding the footprint area (the square footage of the structure) and the perimeter length areas were derived for the containment options. The footprint area was derived from the square footage of the structure, which was divided by the number of stories. The perimeter length was derived from the footprint area. The values of the factors depended on the size of the footprint area (Appendix B).

3.5 ESTIMATES OF SALVAGEABLE MATERIALS

It was assumed that the only salvageable material from the structures medium with resale value is metal. Any nonhazardous concrete debris could be salvaged for use as biota barriers in caps/covers constructed on site. The data from the Task 24 structure survey were used to determine quantities of salvageable metals. The volume of metal was calculated based on the following assumptions. Salvageable metals included sheet metal and structural steel as well as cleaned equipment and piping. The total estimated volume of salvageable stockpiled material was decreased by 20 percent to account for wastage. Metal will be salvaged from the Significant and Other Contamination History groups to the extent practical with the total estimated volume also decreased by 20 percent to account for wastage. It was assumed for costing purposes that salvage is not applicable for the Agent History Group.

Table 3.5-1 Material Volumes for No Future Use, Significant Contamination History Medium Group

Total Number of Structures	47
Total Standing Volume	224,548 BCY
Total Collapsed Volume	27,216 CY
Total Collapsed Volume of Process Equipment	1,148 CY
Total Collapsed Volume of Piping	267 CY
Scrap Metal Salvage Volume	905 CY
Total Structure Footprint	282,299 CY
Capping Area	34,061 SF
Total Structure Perimeter with 10-Foot Buffer	15,250 LF
Treatable Surface Area for Sand Blasting and Vacuum Dusting	149,224 SF
Treatable Surface Area for Steam Cleaning	127,625 SF
Interior Surface Area	841,600 SF
Exterior and Interior Surface Area	1,264,199 SF

Table 3.5-2 Material Volumes for No Future Use, Other Contamination History Medium Group

Total Number of Structures	630
Total Standing Volume	627,346 CY
Total Collapsed Volume	108,700 CY
Total Collapsed Volume of Process Equipment	3,037 CY
Total Collapsed Volume of Piping	3,446 CY
Scrap Metal Salvage Volume	9,165 CY
Total Structure Footprint	994,976 SF
Capping Area	219,338 SF
Total Structure Perimeter with 10-Foot Buffer	79,304 LF
Treatable Surface Area for Sand Blasting and Vacuum Dusting	581,771 SF
Treatable Surface Area for Steam Cleaning	409,731 SF
Interior Surface Area	3,140,214 SF
Exterior and Interior Surface Area	4,920,771 SF

Table 3.5-3 Material Volumes for No Future Use, Agent History Medium Group

Total Number of Structures	70
Total Standing Volume	600,064 CY
Total Collapsed Volume	74,972 CY
Total Collapsed Volume of Process Equipment	5,347 CY
Total Collapsed Volume of Piping	1,188 CY
Total Structure Footprint	541,507 SF
Total Structure Perimeter with 10-Foot Buffer	25,385 LF
Treatable Surface Area for Sand Blasting and Vacuum Dusting	391,970 SF
Treatable Surface Area for Steam Cleaning	278,563 SF
Interior Surface Area	1,849,194 SF
Exterior and Interior Surface Area	2,751,691 SF

Section 4

4.0 FUTURE USE, NO POTENTIAL EXPOSURE MEDIUM GROUP

Structures in the Future Use, No Potential Exposure Medium Group include those structures with a history of administrative, utility, or support use; those currently in use; and those with a continued long-term usefulness to the future wildlife refuge following remediation. The structures in this group will remain in use at RMA indefinitely. These structures have been evaluated as part of the CERCLA process and have been found to require no remediation. If these structures are eventually removed, such action will be directed by the U.S. Fish and Wildlife Service (USFWS). These structures are neither contaminated nor in or near areas of soil contamination. They are not a current or potential source of contamination. The only alternative retained for analysis in the DAA is the No Action alternative.

4.1 ALTERNATIVE 1: NO ACTION

4.1.1 Description of Alternative

The No Action alternative involves no further action beyond existing measures. Any actions required for the structures in this medium group will be performed by USFWS in concert with the RMA refuge management plan.

4.1.2 Analysis of Alternative

4.1.2.2 Overall Protection of Human Health and the Environment

Alternative 1 is protective of human health and the environment because the structures in this group do not present the potential for exposure to contamination. Physical hazards are eliminated by regular maintenance, in keeping with their continuing mission at RMA. This alternative achieves human health and biota RAOs.

Action-specific ARARs do not apply to this alternative because no action is taken. This alternative complies with location-specific ARARs.

4.1.2.3 Long-Term Effectiveness and Permanence

Alternative 1 provides long-term effectiveness and permanence. The structures in this group do not pose a risk of contamination, and physical hazards are avoided with regular maintenance.

4.1.2.4 Reduction of TMV

Reduction of TMV does not apply to this alternative because the structures in this group are not considered contaminated.

4.1.2.5 Short-Term Effectiveness

Because no CERCLA actions are taken under this alternative, no worker or community protection is necessary and no environmental impacts are caused by remediation.

4.1.2.6 Implementability

Alternative 1 is implementable and administratively feasible. Implementation of this alternative would involve continuing already existing maintenance and operation programs.

4.1.2.7 Cost

The cost of this alternative to the CERCLA process is $0.00.

Section 5

5.0 NO FUTURE USE, SIGNIFICANT CONTAMINATION HISTORY MEDIUM GROUP

Structures in the No Future Use, Significant Contamination History Medium Group include those structures that were directly involved with manufacturing pesticides at RMA or those that were sites of significant chemical spills. The use histories of the structures in this group include pesticide production and storage and various chemical manufacturing and handling activities. Alternatives involving no action, containment, treatment, and disposal process options are considered for this medium group. Each alternative was described and analyzed according to the seven EPA evaluation criteria (see the Executive Summary, Volume I). As described in Section 2, most of the alternatives and analyses developed for the structures medium are very similar. Accordingly, following the description and analysis of the No Action alternative and Alternative 2 (Sections 5.1 and 5.2), a description of the general alternative for this medium group (demolition and landfilling) and a general analysis of the alternative as measured against the seven EPA evaluation criteria are presented (Section 5.3). The subsequent descriptions and analyses (Sections 5.4 through 5.13) focus on the differences between each alternative and the general alternative. A comparative analysis of the alternatives developed for this medium group is presented in Section 5.14 and is presented in Table 5.0-1. ARARs are discussed for each alternative as part of the analysis of alternatives section. Waste characterization issues related to this medium are discussed in Section 2.4.

It was assumed that ACM, process equipment, piping, and tanks will be handled under the scope of other ongoing IRAs and will be removed from the structures prior to initiating the structures remediation. If any of these items are encountered during the structures remediation, they will be handled as an integral part of the remediation process. Moreover, the cost of removal and disposal of any of these items was included under the appropriate IRA and was not included as part of the remediation costs developed for the DAA. As described in Section 2, PCB-contaminated equipment will be removed under the scope of the PCB IRA. As confirmed in earlier studies, there is expected to be very little PCB-contaminated structural material associated with the structures medium. Any remaining PCB-contaminated structural material will be handled as part of the structures remediation.

For the No Future Use, Significant Contamination History Medium Group, it was assumed for costing purposes that 30 percent of the debris is contaminated and 70 percent is uncontaminated (see Section 3). Based on this assumption, waste segregation during demolition is possible for structures in this medium group. Under alternatives that include treatment (Alternatives 8, 9, 9a, 10, 12, and 13), waste can be segregated to reduce the volume that requires treatment. Under alternatives that propose the conservative option of hazardous waste landfills (Alternatives 12, 19, and 20), waste segregation is not necessary, but can be used to reduce the volume of material classified as hazardous. Under any of the alternatives, waste segregation may be practical if there is a need to use uncontaminated waste as a biota barrier or in an on-post landfill.

5.1 ALTERNATIVE 1: NO ACTION

5.1.1 Description of Alternative

The No Action alternative involves no further action beyond existing measures; it may apply to this medium group only if IRAs conducted prior to the issuance of the ROD have adequately remediated the structures in this medium group.

5.1.2 Analysis of Alternative

5.1.2.1 Overall Protection of Human Health and the Environment

Alternative 1 does not provide protection to human health and the environment because the potential for exposure to contamination and physical hazards remains unchanged. This alternative does not achieve Human Health or Biota RAOs.

5.1.2.2 Compliance with ARARs

If PCBs or asbestos are present, this alternative may not comply with action-specific ARARs. Other action-specific ARARs do not apply to this alternative because no action is taken. This alternative complies with location-specific ARARs.

5.1.2.3 Long-Term Effectiveness and Permanence

Alternative 1 does not provide long-term effectiveness or permanence. The residual risk for human health and biota increases with time because there is a greater chance for the release of contaminants as the structures deteriorate. The current access controls are inadequate for the long term and the existing habitat remains unchanged.

5.1.2.4 Reduction of TMV

Alternative 1 does not reduce contaminant TMV because this alternative does not include treatment or containment.

5.1.2.5 Short-Term Effectiveness

Because there are no actions taken under this alternative, no worker or community protection is necessary and no environmental impacts are caused by the remediation. Alternative 1 does not achieve RAOs.

5.1.2.6 Implementability

Alternative 1 is not implementable in many of the manufacturing areas of RMA because the structures will need to be removed to remediate the underlying soil. It is also not administratively feasible because further deterioration of the structures may pose a physical and chemical hazard to human health and the environment.

5.1.2.7 Cost

The present worth cost of this alternative is $0.00.

5.2 ALTERNATIVE 2: PIPE PLUGS, LOCKS/BOARDS/FENCES/SIGNS

5.2.1 Description of Alternative

Alternative 2 includes plugging pipes within the structure to immobilize contaminants and using a combination of locks, boards, fences, and signs to prevent access to the structure. Alternative 2, as retained in the DSA, included the option of filling entire rooms or structures with grout to

immobilize contamination. The initial DAA analysis determined that filling an entire building with grout had a high cost and was difficult to implement without offering significantly better permanence, protectiveness, or reduction in TMV compared to pipe plugs in combination with locks, boards, fences, and signs. Therefore, only pipe plugs are considered as part of Alternative 2. Pipe plugs are described in detail in the Technology Descriptions Volume, Section 13, and locks, boards, fences, and signs are described in the Technology Descriptions Volume, Section 3.

As discussed in Section 2, it was assumed that all process piping is to be removed from structures during the chemical-process-related activities IRA, As with all ongoing activities, the possibility exists that the IRA will not be completed prior to the structures remediation and any remaining pipes would be remediated under this alternative. The intent of this alternative is to provide a containment option that would leave the structures intact and that can be compared to alternatives involving removal and disposal. For costing purposes, it was assumed that all of the process piping are plugged. Even if all of the process piping is removed prior to remediation, the remainder of this alternative is still applicable.

Before Alternative 2 can be implemented, each structure in this medium group must be visually examined. An interior and exterior examination is performed to determine the structural integrity of the building. It was assumed that there is no ACM associated with these structures at the time of remediation because the scope of the Asbestos IRA, currently in progress, includes removal of ACM from structures. This task is scheduled to be completed prior to the structures remediation. The visual inspection of the structures will also determine whether any residual ACM is present.

Following the examination of the structure, pipe plugging is implemented as necessary. Any process piping is filled with grout to immobilize and contain contaminants. Concurrent with the pipe plugging operations, locks, boards, fences, and signs are installed as appropriate to prevent access to the structure. Due to the unique configuration and varying accessibility of structures

in this medium group, the types and quantities of locks, boards, fences, or signs are evaluated separately for each structure.

Because Alternative 2 is a containment option, the structures remains intact indefinitely; therefore, inspections are performed on a regular basis as part of this alternative.

5.2.2 Analysis of Alternative

5.2.2.1 Overall Protection of Human Health and the Environment

Alternative 2 is somewhat protective of human health and the environment because it prevents contaminant migration and eliminates contact with contaminants by plugging pipes and preventing access to the structures. Although the contaminants in pipes are immobilized and access to structures is controlled, overall protectiveness is limited because the structures remain intact and no contamination is removed from the structure. Further deterioration of the structures increases the physical hazards related to the structures. This alternative achieves both Human Health and Biota RAOs.

5.2.2.2 Compliance with ARARs

Alternative 2 complies with applicable action- and location-specific ARARs. Action-specific ARARs regarding pipe plugging, which are unique to this alternative, are presented in the Technology Descriptions Volume, Appendix A. Other applicable action-specific ARARs related to this alternative address institutional controls such as access restrictions, land use/deed restrictions. and monitoring (Technology Descriptions Volume, Appendix A), as well as potential PCB and asbestos removal actions. The location-specific ARARs applicable to this alternative are also listed in the Technology Descriptions Volume, Appendix A.

5.2.2.3 Long-Term Effectiveness and Permanence

The long-term effectiveness and permanence of this alternative is questionable. The residual risk for both human and biota exposure is moderate because the structures remain intact and no contamination is removed from the structures. The source of the residual risk arises from the

potential of the contained contamination to migrate from the structures and from physical hazards as the structures deteriorate over time.

The controls are adequate assuming that preventive maintenance and long-term monitoring, which prevent the re-establishment of contaminant migration pathways from the pipes and structure and the subsequent exposure to humans or wildlife, occur for an indefinite period of time. Maintenance and monitoring for an indefinite period of time, however, is impractical.

The existing low-quality habitat remains unchanged, and it may actually be reduced for species that currently use the structures. However, some burrowing or invasive species (e.g., rodents, birds, insects) may eventually regain access to the structure and re-establish habitat.

5.2.2.4 Reduction of TMV

Plugging pipes in combination with locks, boards, fences, and signs to prevent access is effective in reducing mobility of contaminants; however, it does not reduce the volume or toxicity of any contaminants present. The volume of contaminated materials is increased by exposing the grout to the contamination residing in the pipes. Toxicity remains unchanged because contaminants are immobilized, not treated. The reduction in mobility could be reversed should the access restrictions or pipe plugs fail.

Pipe plugging produces a very small quantity of solid waste consisting of used grout that could potentially be hazardous. Locks, boards, fences, and signs produce no treatment residuals.

5.2.2.5 Short-Term Effectiveness

Standard worker protection is necessary during pipe plugging and access-restriction operations. Alternative 2 has a minimal effect on the community. Biota habitat, for those species currently using the structures, is lost during remediation. It is anticipated that RAOs would be attained within 3 to 4 years under this alternative.

5.2.2.6 Implementability

Alternative 2 is both administratively and technically implementable, with services and materials readily available. Pipe plugging is technically simple, relatively inexpensive, and easily implementable for most piping runs. Services and materials for structural repair as well as for the locks, boards, fences, and signs are readily available.

5.2.2.7 Cost

It was assumed for cost-estimating purposes that pipe plugs are applied to the entire piping volume of each structure under remediation. The cost of Alternative 2 includes annual ambient air monitoring of the structure, which is performed using a dedicated high-volume air sampler. Alternative 2 is amenable to the 49 structures in the Significant Contamination History Group. The present worth cost of Alternative 2 is approximately $12,400,000. These costs include monitoring and long-term maintenance for a 30-year period, after which the need for maintenance and monitoring is re-evaluated. It is anticipated that maintenance and monitoring will continue past the 30-year period at an approximate annual cost of $92,000.

5.3 GENERAL ALTERNATIVE: DEMOLITION, CONTAINMENT

As described in Sections 2.2 and 5.0, most of the alternatives developed for this medium group, as well as the Other Contamination History and Agent History groups, are very similar, i.e., they incorporate the options of demolition and landfilling, consolidating, or capping in place. This section describes the general application of these process options to this medium group. Subsequent discussions focus on the distinct components of each of the developed alternatives.

5.3.1 Description of Alternative

The general alternative for this medium group includes demolishing the structure and stockpiling, transporting, and disposing the debris. Demolition and transportation are described in detail in Section 4 and containment in Section 6 of the Technology Descriptions Volume.

Before any of the alternatives can be implemented, each structure in the medium group must be visually examined. An interior and exterior examination is performed to determine the structural integrity of the building. It was assumed that there is no ACM associated with the structures at the time of remediation because the scope of the Asbestos IRA, currently in progress, includes removal of ACM from structures prior to post-ROD remediation. It was also assumed that all PCB-contaminated equipment, process equipment, piping, and tanks are removed prior to the structures remediation.

Once the structure is determined to be safe for remedial activities (based on inspections and repairs), demolition commences. In the DSA (EBASCO 1992), detonation and dismantling were both retained as possible demolition techniques. The initial DAA analysis determined, however, that detonation was not as widely applicable as dismantling and that it would not allow for efficient waste segregation, if required. In many applications, detonation is costly and poses a greater threat to the community and workers than dismantling because of the potential for dust releases associated with structure collapse. Limited use of detonation may be appropriate in some cases. Decisions will be left to the remedial design. For the purposes of the Structures DAA, dismantling is the demolition technique selected for all of the alternatives.

Dismantling consists of a combination of techniques using equipment such as a backhoe with a thumb attachment, a wrecking ball and crane, or a clamshell, or by performing piece-by-piece disassembly, sawing, or crushing. Standard dust-suppression measures are used throughout the demolition process to protect workers and the community. These include wetting the working area with water or surfactants. Materials not salvaged are placed in a bermed dirt or concrete staging area. If necessary, the debris is segregated into potentially hazardous and nonhazardous waste as the building is dismantled and placed in separate containment areas. The debris is sized for disposal concurrent with stockpiling. The debris is transported by truck to the disposal site. For costing purposes, for the Significant Contamination History Group, 30 percent of the structure was assumed to be contaminated (see Section 3). The varying requirements for on-post versus off-post disposal and for hazardous versus nonhazardous disposal are discussed below in the

specific alternative analyses. Structural debris for alternatives that do not involve treatment is disposed in the on-post hazardous waste landfill, consolidated, or capped in place. Under most alternatives involving treatment, the disposal option of choice is on-post nonhazardous waste landfilling. However, the debris could also be consolidated and used as fill in a containment area (as in Alternative 21a), and concrete and masonry debris may be used as a biota barrier in capping and consolidation alternatives. In most cases, floor slabs and foundations are left behind after demolition. Floor slabs are broken to prevent water ponding. The slabs and foundations of structures located in the South Plants Central Processing Area within principal threat or human health soil exceedance areas are removed to a depth of 5 ft.

5.3.2 Analysis of Alternative

5.3.2.1 Overall Protection of Human Health and the Environment

This general alternative, consisting of demolition and landfilling and consolidation or capping in place, achieves Human Health and Biota RAOs. Overall, this alternative provides adequate protection for both human health and the environment. The degree of protection changes slightly for each specific alternative based on the degree of treatment used and the specific type of disposal. The potential impacts from the Significant Contamination History structures to soil, water, and air are reasonably controlled by removing the structures and containing the debris.

5.3.2.2 Compliance with ARARs

Action-specific ARARs that apply to all of the alternatives in the Significant Contamination History Group include those related to demolition of structures, conventional excavation and backfill, and transportation of wastes. ARARs regarding demolition address worker protection, waste characterization, waste management, including PCB and asbestos removals, if required, stormwater management, and air emission controls. ARARs regarding excavation and backfill address worker protection, air emission control, waste characterization and management, and stormwater management. ARARs regarding on-post transportation of wastes address transportation, loading, and unloading of hazardous wastes. All alternatives, with the exception of the No Action alternative, are in compliance with these action-specific ARARs. Location-

specific ARARs are identified in the Technology Descriptions Volume, Appendix A. Unique action-specific ARARs that apply to individual alternatives within the medium group are described below.

5.3.2.3 Long-Term Effectiveness and Permanence

Residual risk for human health and biota is low because any contamination associated with the structural debris are is controlled by containment, thereby eliminating exposure pathways. This discussion only concerns the risk associated with structural debris. There may also be residual risk associated with the surrounding soil, which is handled as part of the soil medium remediation. Regular reviews, monitoring, and maintenance will be used to evaluate the adequacy and reliability of the controls. Monitoring includes leak detection systems for the landfill liner as well as groundwater monitoring. Habitat at the on-post disposal area is diminished because burrowing animals will be excluded from the disposal area.

5.3.2.4 Reduction of TMV

The volume and toxicity of contaminants associated with the structures medium is expected to be low. Containment of structural debris reduces the mobility of contaminants, but it does not change the toxicity or volume of any contaminants present. In general, the reduction in contaminant mobility is permanent, but should the integrity of the disposal area be breached, contaminant mobility may be reduced. Long-term monitoring and maintenance of the disposal area help ensure the permanence of mobility reduction. Containment of structural debris produces no treatment residuals.

5.3.2.5 Short-Term Effectiveness

Standard worker protection is necessary during demolition, transportation, and containment. The greatest potential threat to the community is the migration of potentially contaminated dust off post. Dust controls are implemented throughout the remedial activities to minimize the quantity of dust produced. Given the assumption that adequate dust-control measures are used, the impact to the environment is minimal because the remedial actions are short in duration. In general,

RAOs are achieved in 3 to 4 years. For the on-post incineration alternatives, RAOs are achieved in 5 to 6 years.

5.3.2.6 Implementability

Demolition, transportation, and containment are standard, reliable technologies. They are technically feasible, with services and materials readily available. Demolition, transportation, and containment are also administratively feasible, but long-term liability concerns associated with off-post disposal at facilities not directly controlled by the Army may arise.

5.3.2.7 Cost

The costs are unique to each alternative and are discussed individually in the following sections.

5.4 ALTERNATIVE 8: HOT GAS, DISMANTLING, SALVAGE, ON-POST HAZARDOUS WASTE LANDFILL

5.4.1 Description of Alternative

Alternative 8 includes administering in situ hot gas treatment, dismantling the structure, salvaging scrap metal, and transporting and disposing the resulting debris in an on-post hazardous waste landfill. Hot gas treatment is described in the Technology Descriptions Volume, Section 8.

In situ hot gas treatment for structures is limited to those areas of a structure where production operations or documented spills occurred. Hot gas is an aggressive treatment method that is limited to organic contaminants on nonflammable surfaces such as metal and masonry. Hot gas treatment consists of injecting hot gases into a sealed room to thermally desorb contaminants from structural surfaces. Pretreatment of the structure includes isolating the treatment area and constructing off-gas treatment and collection systems. The treatment produces a gaseous sidestream in which the entrained contaminants are treated by incineration. Due to the limited applicability of hot gas treatment, treatment by this method will not be possible for some portions of some structures.

5.4.2 Analysis of Alternative

5.4.2.1 Overall Protection of Human Health and the Environment

Due to the limited applicability of hot gas treatment, Alternative 8 may not fully treat contaminated structures because nonvolatile metals are not accessible. Therefore, this alternative is protective of human health and the environment because the structural debris is disposed in a controlled hazardous waste landfill, limiting migration and exposure pathways.

5.4.2.2 Compliance with ARARs

The alternative complies with action- and location-specific ARARs. ARARs regarding hot gas treatment of structures and nonhazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4.

5.4.2.3 Long-Term Effectiveness and Permanence

If the COCs are not successfully treated by hot gas, residual risk may not be significantly lowered as compared to containment without treatment. So long as the landfill is maintained and monitored, however, this alternative has adequate long-term effectiveness and permanence.

5.4.2.4 Reduction of TMV

This alternative is effective in irreversibly reducing organic contaminant TMV through the hot gas treatment process and treatment of contaminated off gases. The TMV of inorganic contaminants is not affected by hot gas treatment.

5.4.2.5 Short-Term Effectiveness

Extensive worker protection is required during hot gas treatment due to the aggressive nature of the process. The potentially hazardous off gases must be collected and treated to ensure the safety of the workers and the community. Hot gas treatment has the potential to cause additional environmental impacts due to the risk of fire during treatment. Demolition operations present physical hazards to workers. RAOs are achieved within 3 to 4 years.

5.4.2.6 Implementability

Implementation of hot gas treatment is limited to treating organic contaminants. The suitability of this option must be determined on a case-by-case basis due to the limited number of structures and compounds where this treatment may be applied. Materials undergoing treatment must be stable at the high operating temperatures of the process, and combustible materials must be removed before application of the process. The inability to completely seal the structure may limit the effectiveness of hot gas treatment due to heat loss or gas leakage through gaps in the structure. Structural repair to eliminate leakage may be required prior to treatment. In addition, the complexity of the physical configuration of the structure (i.e., the inaccessibility of corners or recesses) may prevent the even distribution of heat, and the physical properties of the structure may reduce the diffusion of contaminants into the gas stream (e.g., smooth steel may release contaminants more readily than porous concrete).

To date, hot gas technology has only been developed at pilot scale; its effectiveness at full scale is unknown. In addition, it is not a commercially available technology and technical expertise is limited. The alternative is administratively feasible.

5.4.2.7 Cost

The cost estimate of Alternative 8 includes an assumption that off gases are incinerated. The cost is based on the assumption that only interior surfaces are treated. It is likely that some additional cost may be incurred to seal or repair structures before treatment. There are 49 structures amenable to treatment by this process. The structural debris is loaded on trucks and transported to the on-post landfill located between North Plants and Basin F; therefore, the material is hauled an average of 4.5 miles, one way. The present worth cost of this alternative, including transportation, is approximately $34,200,000.

5.5 ALTERNATIVE 9: VACUUM DUSTING, DISMANTLING, SALVAGE, ON-POST HAZARDOUS WASTE LANDFILL

5.5.1 Description of Alternative

Alternative 9 includes performing in situ vacuum dusting, dismantling the structure, salvaging scrap metal, and transporting and disposing the resulting debris in an on-post hazardous waste landfill. Vacuum dusting is discussed in the Technology Descriptions Volume, Section 13.

In situ vacuum dusting removes dust and particulates from structural surfaces. The dust and particulates are collected in a high-efficiency particulate (HEPA) filter that is then drummed and disposed. No pretreatment of the structure is necessary, but measures will be taken to ensure the safety of the workers and to ensure that all surfaces to be treated are accessible. Vacuum dusting does not remove any contamination that is physically or chemically bound to a surface. Due to this limitation, some contamination may not be removed using this method.

5.5.2 Analysis of Alternative

5.5.2.1 Overall Protection of Human Health and the Environment

Alternative 9 is protective of human health and the environment because contaminated dust is removed and the structural debris disposed in a controlled hazardous waste landfill, limiting migration and exposure pathways.

5.5.2.2 Compliance with ARARs

Alternative 9 complies with action- and location-specific ARARs. The ARARs regarding vacuum dusting and hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4.

5.5.2.3 Long-Term Effectiveness and Permanence

The implementation of vacuum dusting prior to landfilling somewhat lowers the residual risk of contaminant migration or exposure related to contaminated dust in structures. So long as the landfill is maintained, this alternative has adequate long-term protectiveness and permanence.

5.5.2.4 Reduction of TMV

Alternative 9 is effective in reducing the mobility of particulate contaminants through vacuum dusting and in reducing the mobility of residual contamination associated with structures through containment; however, it does not reduce volume or toxicity. Vacuum dusting produces a low-volume solid waste stream that must be treated and disposed. There are 49 structures amenable to this option.

5.5.2.5 Short-Term Effectiveness

The complexity of the physical configuration of the structure could limit the effectiveness of vacuum dusting due to the inaccessibility of corners or recesses. Standard worker protection is required during vacuum dusting. The necessary use of ladders or scaffolding for vacuuming presents a physical hazard to workers in addition to the physical hazards posed by demolition. Implementation of this alternative is not anticipated to have any adverse effects on the environment. RAOs are achieved within 3 to 4 years.

5.5.2.6 Implementability

Alternative 9 is both technically and administratively feasible for structures in this medium. Vacuum dusting is limited to removing contaminants associated with dust or particulates. As a result, the effectiveness of this alternative for all structures in this medium is limited and must be evaluated on a structure-by-structure basis. Vacuum dusting is a proven technology, with materials and services readily available for use.

5.5.2.7 Cost

The cost estimate for Alternative 9 includes the assumptions that treatment and disposal of waste generated during vacuum dusting and demolition occurs and that only interior surfaces are treated by vacuum dusting. This alternative treats 49 structures. The present worth cost of this alternative is approximately $13,900,000.

5.6 ALTERNATIVE 9a: STEAM CLEANING, DISMANTLING, SALVAGE, ON-POST HAZARDOUS WASTE LANDFILL

5.6.1 Description of Alternative

Alternative 9a includes in situ steam cleaning, dismantling the structure, salvaging decontaminated scrap metal, and transporting and disposing the resulting debris in an on-post hazardous waste landfill. Steam cleaning is discussed in the Technology Descriptions Volume, Section 13.

In situ steam cleaning for structures is limited to areas of a structure where production operations or documented spills occurred. Steam cleaning removes contaminants from building materials and surfaces using heated water applied under pressure; however, it is limited to surfaces such as metal and concrete. The treatment produces a liquid sidestream containing the removed contaminants; this sidestream is treated on site by filtration and carbon adsorption and the liquid is recycled back into the steam-cleaning process, minimizing the volume of waste produced and the amount of water needed for treatment. Pretreatment of the structure includes containing the treatment area and collecting and treating the liquid waste produced. Some portions of the structure may not be amenable to this treatment because steam cleaning is not applicable to porous surfaces. In addition, contamination that has migrated below the surface of the materials to be steam cleaned cannot be removed by this process.

5.6.2 Analysis of Alternative

5.6.2.1 Overall Protection of Human Health and the Environment

Although steam cleaning only treats contamination on nonporous surfaces, Alternative 9a is protective of human health and the environment because the structural debris is partially

decontaminated and disposed in a controlled hazardous waste landfill, limiting migration and exposure pathways.

5.6.2.2 Compliance with ARARs

Alternative 9a complies with action- and location-specific ARARs. ARARs regarding steam cleaning and hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4.

5.6.2.3 Long-Term Effectiveness and Permanence

Alternative 9a lowers the residual risk of contaminant migration or exposure for structures with contamination on nonporous surfaces compared to containment without treatment. So long as the landfill is maintained, this alternative has adequate long-term protectiveness and permanence.

5.6.2.4 Reduction of TMV

Steam cleaning irreversibly reduces the mobility and volume of contaminants on nonporous surfaces. Contaminants exhibiting toxicity are simply transferred from the structure to the wastewater, which must be treated or disposed.

5.6.2.5 Short-Term Effectiveness

Worker exposure controls are needed during steam cleaning. Standard worker protection is required during steam cleaning and demolition operations, including using dust control during demolition. Demolition operations present physical hazards to workers. Implementation of this alternative is not anticipated to have any additional adverse effects on the environment or surrounding community. RAOs are achieved in 3 to 4 years.

5.6.2.6 Implementability

Alternative 9a is both technically and administratively feasible for structures in this medium group. Implementation of the steam cleaning option is limited to removing surface contamination associated with nonporous materials. Although steam cleaning can be customized to include solvents or grit to enhance removal efficiencies, the complexity of the physical configuration of the structure (e.g., corners, recesses) could limit the effectiveness of this treatment. As a result, the effectiveness of this alternative for all structures in this medium group must be evaluated on a structure-by-structure basis. Steam cleaning is a proven technology, with materials and services readily available for use.

5.6.2.7 Cost

The cost estimate for Alternative 9a includes the assumption that only interior surfaces are treated and that the wastewater generated during the process is treated and disposed. There are 49 structures amenable to treatment by this option. The present worth cost of this alternative is approximately $14,400,000.

5.7 ALTERNATIVE 10: SAND BLASTING, DISMANTLING, SALVAGE, ON-POST HAZARDOUS WASTE LANDFILL

5.7.1 Description of Alternative

Alternative 10 includes in situ sand blasting, dismantling the structure, salvaging scrap metal, and transporting and disposing the resulting debris in an on-post hazardous waste landfill. Sand blasting is discussed in the Technology Descriptions Volume, Section 13.

In situ sand blasting for structures is limited to areas of a structure where production operations or documented spills occurred. Sand blasting consists of the physical removal of contaminated surfaces via abrasion and is effective at removing surface contamination that has not penetrated the material to a depth greater than 1/2 inch. Sand blasting is applicable to most surfaces except wood, glass, or certain polymers (e.g., transite, or Plexiglas). Sand blasting is an acceptable best demonstrated available technology (BDAT) for both inorganic and organic contaminants regulated

by RCRA. The treatment produces a solid waste sidestream of used grit, removed surface materials, and removed contaminants. During implementation, the grit is separated from the other particles on site and recycled back into the sand-blasting process, thereby minimizing the volume of waste produced and the amount of grit needed for treatment. Pretreatment of the structure includes containing the treatment area and collecting and treating the solid waste produced. Sand blasting is the most widely applicable in situ treatment with respect to both structural materials and potential contaminants, although some potentially contaminated materials in the structure (e.g., wood, glass) may not be amenable to this treatment.

5.7.2 Analysis of Alternative

5.7.2.1 Overall Protection of Human Health and the Environment

Sand blasting is protective as it removes the highest potential surface contamination from structural materials. The resulting structural debris is disposed in an on-post controlled hazardous waste landfill. The treatment residuals are disposed in the on-post hazardous waste landfill.

5.7.2.2 Compliance with ARARs

Alternative 10 complies with action- and location-specific ARARs. The ARARs regarding sand blasting and nonhazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4.

5.7.2.3 Long-Term Effectiveness and Permanence

Sand blasting lowers residual risk by removing surface contamination, and it satisfies the BDAT standard for both organic and inorganic contaminants associated with structural material. However, the effectiveness of this alternative varies based on the accessibility of the structural surfaces.

5.7.2.4 Reduction of TMV

Sand blasting irreversibly reduces the mobility and volume of surface contamination. As mentioned previously, the treatment is not applicable to wood, glass, and certain polymers such as transite or plexiglas. Contaminant TMV can be reduced by removing contaminated materials from the underlying clean materials. The treatment residuals, consisting of a solid waste stream containing any removed contaminants from the structure and grit, must be properly disposed, further limiting their toxicity and mobility.

5.7.2.5 Short-Term Effectiveness

Standard worker protection is required during sand-blasting operations. The additional environmental risks are low so long as the contaminated grit is effectively contained and collected. Demolition operations present physical hazards to workers. RAOs are attained within 3 to 4 years.

5.7.2.6 Implementability

Alternative 10 is both technically and administratively feasible for structures in this medium group. Sand blasting is limited to removing near-surface contamination on most surfaces. Implementability of this alternative varies from structure to structure. The complexity of the physical configuration of the structure (e.g., corners, recesses) could limit the effectiveness of this treatment. Depending on the configuration of each structure, therefore, not all contaminated surfaces can be treated. Sand blasting is a proven technology, with materials and services readily available for use.

5.7.2.7 Cost

The cost estimate for Alternative 10 involves the assumptions that removed materials are disposed in an on-post hazardous waste landfill or consolidated as gradefill and that only interior surfaces are treated. Spent abrasives and treatment residuals are disposed in an on-post hazardous waste landfill. There are 49 structures that are amenable to treatment under this alternative. The present worth cost of this alternative is $14,800,000.

5.8 ALTERNATIVE 12: DISMANTLING, SALVAGE, OFF-POST ROTARY KILN INCINERATION, OFF-POST HAZARDOUS WASTE LANDFILL

5.8.1 Description of Alternative

Alternative 12 includes dismantling the structure, shredding the structural material, salvaging scrap metal, transporting the debris to an on-post transfer station, transporting and incinerating nonsalvageable debris in an off-post rotary kiln incinerator, and disposing the incinerator ash in an off-post hazardous waste landfill. Incineration is discussed in the Technology Descriptions Volume, Section 7.

Alternative 12 treats all nonsalvageable contaminated debris material through off-post incineration. Oversize debris is sized to less than 1-ft by 1-ft pieces, and all rebar is removed from concrete using an on-site crusher. Off-post transportation requires the waste to be manifested in accordance with RCRA and Department of Transportation (DOT) and state regulations. Certificates of destruction are provided for all waste materials that are to be incinerated. It was assumed that the resulting ash is disposed in an off-post hazardous waste landfill, with transportation between the incinerator and the landfill being the responsibility of the incinerator operator.

5.8.2 Analysis of Alternative

5.8.2.1 Overall Protection of Human Health and the Environment

Alternative 12 offers increased protection of human health and the environment compared to containment without treatment because, in this process, debris is incinerated and contained in an off-post hazardous waste landfill. However, off-post treatment or disposal is less protective than on-post treatment or disposal due to the potential for accidental releases during long-distance transportation of debris.

5.8.2.2 Compliance with ARARs

Alternative 12 complies with action- and location-specific ARARs. ARARs regarding off-post rotary kiln incineration and hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A.

5.8.2.3 Long-Term Effectiveness and Permanence

This alternative has a very low residual risk, effectively destroying all organic contaminants. Inorganic contaminants are not treated. There are adequate controls for landfilled ash—which is to be disposed by the incinerator operator—but there is no direct control over long-term maintenance and monitoring, leading to potential future liability should the landfill fail. Wildlife habitat is improved at the site.

5.8.2.4 Reduction of TMV

This alternative irreversibly reduces contaminant TMV through the complete thermal destruction of organic contaminants. Off gases produced during the incineration process must be treated. The rotary kiln, a well-demonstrated type of hazardous waste incinerator, effectively processes demolition debris. This process is effective in treating organic contaminants but ineffective in treating inorganic contaminants. Air emissions from the process must be treated before discharge into the atmosphere.

5.8.2.5 Short-Term Effectiveness

No additional worker protection is necessary because incineration occurs off post. Because the waste is being transported a significant distance (at least several hundred miles) off post, there is a much greater potential for environmental impacts due to accidental releases during transportation. Demolition operations present physical hazards to workers. RAOs are attained within 3 to 4 years.

5.8.2.6 Implementability

This alternative is technically and administratively feasible, although technical feasibility concerns include extensive materials handling and limited reduction of total material handling; administrative feasibility concerns include availability of commercial incineration capacity and long-term liability associated with off-post incineration and disposal. Materials and services readily available for use. Off-post treatment and disposal options offer no direct control over the processes and the long-term monitoring and maintenance of the off-post landfill.

5.8.2.7 Cost

For cost-estimating purposes, it was assumed that dismantling is used to demolish the structure and that the entire structure volume is shreddable and is incinerated. There are 49 structures amenable to this alternative. Costs include transportation to an off-post incinerator and subsequent disposal of the ash by the incinerator operator in a hazardous waste landfill. The present worth cost of this alternative is approximately $308,000,000, making Alternative 12 the most expensive alternative for this medium group.

5.9 ALTERNATIVE 13: DISMANTLING, SALVAGE, ON-POST ROTARY KILN INCINERATION, ON-POST HAZARDOUS WASTE LANDFILL

5.9.1 Description of Alternative

Alternative 13 includes dismantling the structure, shredding structural material, salvaging scrap metal, and stockpiling them until the on-post rotary kiln incinerator comes on line, incinerating the debris, and disposing the resulting ash in an on-post hazardous waste landfill. This alternative is very similar to Alternative 12 (Section 5.8), except that the incineration and disposal activities occur on post.

This alternative treats the materials by on-post incineration. Oversize debris is sized to less than 1-ft by 1-ft pieces, and all rebar is removed from concrete using an on-site crusher.

5.9.2 Analysis of Alternative

5.9.2.1 Overall Protection of Human Health and the Environment

Alternative 13 is protective of human health and the environment because organic contaminants are destroyed through incineration and debris is contained in an on-post landfill. The alternative is less protective during the stockpiling period. On-post treatment and disposal eliminates long-distance transportation of large volumes of debris, which makes this alternative more protective than Alternative 12.

5.9.2.2 Compliance with ARARs

Alternative 12 complies with action- and location-specific ARARs. ARARs regarding on-post rotary kiln incineration and hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4.

5.9.2.3 Long-Term Effectiveness and Permanence

Because of the effectiveness of incineration at destroying organic contaminants, there is in general a low level of residual risk associated with Alternative 13. The residual risk may increase, however, if there are inorganic contaminants present in the structural materials. Adequate and reliable controls are ensured by long-term monitoring and maintenance of the on-post landfill. Wildlife habitat is temporarily eliminated at the stockpile and the incineration site, and limited at the landfill.

5.9.2.4 Reduction of TMV

This alternative irreversibly reduces contaminant TMV through the complete thermal destruction of organic contaminants. It is, however, ineffective in treating inorganic contaminants. Off gases produced during the incineration process must be treated. The rotary kiln, currently the most conventional design type for hazardous waste incineration, effectively processes demolition debris. Air emissions from the process must be treated before discharge into the atmosphere.

5.9.2.5 Short-Term Effectiveness

Worker protection is necessary for stockpile and incineration operations, and off gases in the air emissions must be effectively controlled. Demolition operations present physical hazards to workers. RAOs are achieved in 5 to 6 years.

5.9.2.6 Implementability

This alternative is administratively and technically feasible, with materials and services readily available for use. However, this alternative may be difficult to implement due to the need for materials handling, possibly extensive fuel requirements, and potential air emissions and ash disposal concerns for structures contaminated with inorganics. Furthermore, regulatory and community acceptance is a potential concern.

5.9.2.7 Cost

It was assumed that the entire structure volume is shredded and incinerated. There are 49 structures that are amenable to treatment under this alternative. The present worth cost of this alternative is approximately $34,100,000.

5.10 ALTERNATIVE 19: DISMANTLING, SALVAGE, ON-POST HAZARDOUS WASTE LANDFILL

5.10.1 Description of Alternative

Alternative 19 includes dismantling the structure, salvaging scrap metal, and transporting and disposing the debris in an on-post hazardous waste landfill. This alternative is basically the same as the general alternative described in Section 5.3 because no additional treatment is involved.

5.10.2 Analysis of Alternative

5.10.2.1 Overall Protection of Human Health and the Environment

Without treatment, the disposal of the structural debris in an on-post hazardous waste landfill offers greater protection of human health and the environment than does disposal of the debris

in a nonhazardous waste landfill. On-post disposal is more protective than off-post disposal because it minimizes the potential for accidental releases during transportation.

5.10.2.2 Compliance with ARARs

This alternative complies with action- and location-specific ARARs. ARARs regarding hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4.

5.10.2.3 Long-Term Effectiveness and Permanence

The disposal of the structural debris in an on-post hazardous waste landfill results in low residual risk.

5.10.2.4 Reduction of TMV

Because there is no treatment involved in this alternative, there is no reduction in contaminant toxicity or volume; contaminant mobility, however, is minimized by containment in the landfill. There are no treatment residuals.

5.10.2.5 Short-Term Effectiveness

Demolition operations present physical hazards to workers. In addition, dust controls are necessary during demolition to protect both workers and the surrounding community. During landfill construction and demolition, wildlife habitat is affected. RAOs are achieved in 3 to 4 years.

5.10.2.6 Implementability

This alternative is technically and administratively feasible, with materials and services readily available for use.

5.10.2.7 Cost

The cost of Alternative 19 includes transportation to the landfill as well as long-term monitoring and maintenance of the landfill. There are 49 structures that are amenable to this alternative. The present worth cost of this alternative is $13,300,000.

5.11 ALTERNATIVE 20: DISMANTLING, SALVAGE, OFF-POST HAZARDOUS WASTE LANDFILL

5.11.1 Description of Alternative

Alternative 20 includes dismantling the structure, salvaging scrap metal, and transporting and disposing the debris in an off-post hazardous waste landfill. This alternative is similar to Alternative 19 (Section 5.10), except that under this alternative the disposal occurs off post.

5.11.2 Analysis of Alternative

5.11.2.1 Overall Protection of Human Health and the Environment

The disposal of the structural debris in an off-post hazardous waste landfill is protective of human health and the environment. However, off-post disposal is not so protective as on-post disposal because of the potential for accidents during transportation. Off-post disposal does not allow direct control over long-term monitoring and maintenance of the landfill, which, compared to on-post disposal, may result in long-term liability should the landfill fail.

5.11.2.2 Compliance with ARARs

Alternative 20 complies with action- and location-specific ARARs. ARARs regarding hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A.

5.11.2.3 Long-Term Effectiveness and Permanence

Disposing debris in an off-post hazardous waste landfill results in low residual risk, although there is an increase in the potential for future liability. Because the disposal of debris occurs off post, wildlife habitat is improved at the site.

5.11.2.4 Reduction of TMV

Because there is no treatment of the structural debris, this alternative is ineffective in reducing toxicity or volume; contaminant mobility, however, is minimized by containment. There are no treatment residuals.

5.11.2.5 Short-Term Effectiveness

Off-post transportation of the debris increases the potential for environmental impacts to the community. Demolition operations present physical hazards to workers. RAOs are achieved in 3 to 4 years.

5.11.2.6 Implementability

This alternative is technically and administratively feasible, with materials and services readily available for use. Long-term liability is a concern for off-post disposal.

5.11.2.7 Cost

The cost of Alternative 20 includes transportation to the off-post landfill. There are 49 structures that are amenable to this alternative. The present worth cost of this alternative is $28,200,000.

5.12 ALTERNATIVE 21: DISMANTLING, SALVAGE, CLAY CAP

5.12.1 Description of Alternative

Alternative 21 includes dismantling the structure, salvaging scrap metal, and capping the debris in place. Buildings 616, 624, 627, 631, 643, and 646 are disposed in the on-post hazardous waste landfill, because they are located outside the on-post AOC defined in Volume II, Section 1.4, and placing them with the other debris under a cap may violate LDRs. Capping is discussed in the Technology Descriptions Volume, Section 6.

The debris-sizing requirements for placement under a cap are similar to those for landfilling. Once the debris is placed into the capping area, fill is used to raise the level of the debris pile so that surface-water runoff is directed as desired. The cap covers an area 30 percent larger in

extent than the debris pile. Because many of the structures are located in proximity to each other, it is not practical to place individual caps over each structure, nor is it practical to cap single outlying structures. Therefore, outlying structures are consolidated into areas of high structure density and groups of structures are contained by a single cap where applicable. For Alternative 21, it was assumed that two capped areas would be formed: South Plants and North Plants.

All of the structures in and around South Plants are placed under the Central Processing Area proposed cap in conjunction with the overall containment alternative for the Central Processing Area at South Plants. Structures near the Railyard will be moved to South Plants. All structures in and around the North Plants region are consolidated into a single capped area within North Plants. This approach minimizes the amount of capped area that is necessary to monitor and maintain and is compatible with the alternatives proposed for the soil medium. The North Plants cap will be revegetated as part of the structures remediation.

5.12.2 Analysis of Alternative

5.12.2.1 Overall Protection of Human Health and the Environment

Demolition and capping the majority of the group in place and disposing Buildings 616, 624, 627, 631, 643, and 646 in the on-post hazardous waste landfill achieves Human Health and Biota RAOs. Capping structures in place provides adequate protection of both human health and the environment. The degree of protection depends on the type of cap used as well as the engineering controls employed to monitor and maintain the cap. The risks of contaminant migration from the structures to air are removed by demolishing and containing the structures. Risks of contaminant migration to soil and water diminish because the cap isolates the structures, but some residual risk of contaminant migration remain.

5.12.2.2 Compliance with ARARs

Alternative 21 complies with action- and location-specific ARARs. Placing the debris from Buildings 616, 624, 627, 631, 643, and 646 in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4. Capping the remaining debris from this group does not trigger LDRs since all the remaining structures lie within the on-post AOC, as defined in Volume II, Section 1.4. ARARs regarding caps and covers are presented in the Technology Descriptions Volume, Appendix A.

5.12.2.3 Long-Term Effectiveness and Permanence

The residual risk for human health and biota is low because any contamination associated with the structural debris is isolated by capping or landfilling. The migration pathways to air and biota are effectively mitigated by the caps. The pathways to soil and water are minimized by using a low permeability cap. As discussed in Section 5.3, there may be residual risk from the surrounding soil, but the remediation of the surrounding soil will be handled as part of the soil medium. Regular site reviews, monitoring, and maintenance are used to evaluate the adequacy and reliability of controls. Groundwater and possibly vadose zone monitoring may be necessary to detect contaminant migration from the capped area. The habitat in the vicinity of the capped area is improved by revegetating the capped area, but the area excludes burrowing animals.

5.12.2.4 Reduction of TMV

This alternative is effective in reducing contaminant mobility through containment but is ineffective in reducing toxicity and volume. Contaminant mobility may change should the cap leak, but contaminated structures are otherwise isolated by the cap. There are no treatment residuals associated with this alternative. This alternative does require long-term maintenance and monitoring, thereby increasing overall costs.

5.12.2.5 Short-Term Effectiveness

The greatest potential environmental impact during remediation is the spread of contamination by fugitive dusts. Standard dust-control measures are used to minimize this impact. There is a loss of habitat during construction, although currently it is considered poor habitat. The greatest potential impact to workers is from fugitive dusts. Workers are protected by use of a combination of engineering controls and personal protective equipment (PPE). Demolition operations present physical hazards to workers. RAOs are achieved within 3 to 4 years.

5.12.2.6 Implementability

The alternative is technically and administratively feasible, with materials and services readily available for use. Regulatory opposition to the alternative applied to this medium group reduces the administrative feasibility.

5.12.2.7 Cost

There are 49 structures that can be addressed under this alternative. The present worth cost of this alternative is $13,100,000.

5.13 ALTERNATIVE 21a: DISMANTLING, SALVAGE, CONSOLIDATION

5.13.1 Description of Alternative

Alternative 21a includes dismantling the structure, salvaging scrap metal, and transporting and consolidating the debris in Basin A. Buildings 616, 624, 627, 631, 643, and 646 are disposed in the on-post hazardous waste landfill because they are located outside the on-post AOC, defined in Volume II, Section 1.4. Consolidation refers to using the structural debris as gradefill in an area such as Basin A where alternatives developed for the soil medium are implemented to fill and cap the area. This can be an effective use of the structural debris because the available amount of gradefill required by any of the proposed soil caps/covers alternatives far exceeds the volume of structural material. It is estimated that structural debris would only supply approximately 1 percent of the gradefill needed. Consolidation is discussed in the Technology Descriptions Volume, Section 6.

5.13.2 Analysis of Alternative

5.13.2.1 Overall Protection of Human Health and the Environment

Demolition and consolidation of the majority of the group, and landfilling Buildings 616, 624, 627, 631, 643, and 646 achieves Human Health and Biota RAOs. Consolidation of structures provides adequate protection of both human health and the environment. The degree of protection depends on the type of cap used as well as the engineering controls employed to monitor and maintain the cap. The risks of contaminant migration from the structures to air are removed by demolishing and containing the structures. Risks of contaminant migration to soil and water are minimized because the cap isolates the structures. Based on the use history of the structures, it is unlikely that the structural debris would introduce new sources of contamination to these not already present in the consolidation area.

5.13.2.2 Compliance with ARARs

The alternative complies with action- and location-specific ARARs. Placing the majority of debris from this medium group in Basin A does not trigger LDRs, since they all lie within the on-post AOC as defined in Volume II, Section 1.4. Placing the debris from Buildings 627 and 631 in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4. ARARs regarding caps and covers and consolidation are presented in the Technology Descriptions Volume, Appendix A.

5.13.2.3 Long-Term Effectiveness and Permanence

The residual risk for human health and biota is low because any contamination associated with the structural debris is isolated by consolidation and capping or landfilling. The migration pathways to the air and biota are effectively mitigated by capping. The pathways to soil and water are minimized by using an impermeable cap. As discussed in Section 5.3, there may be residual risk from the surrounding soil, but the remediation of the surrounding soil is handled as part of the soil medium. Regular site reviews, monitoring, and maintenance are used to evaluate the adequacy and reliability of controls. Groundwater and possibly vadose zone monitoring may be necessary to detect contaminant migration from the capped area. The habitat in the vicinity

of the capped area is improved by revegetating the capped area, but the area excludes burrowing animals.

5.13.2.4 Reduction of TMV

The volume and toxicity of contaminants associated with structural material is expected to be low. Containment of the debris by consolidation reduces contaminant mobility, but toxicity remains unchanged. The volume of contaminated material may increase if other consolidated materials contaminate structural material. There are no treatment residuals. This alternative requires long-term maintenance and monitoring, which are addressed under the preferred Basin A remedial alternative for soil.

5.13.2.5 Short-Term Effectiveness

RAOs are achieved in within 3 or 4 years. The greatest potential environmental impact during remediation is the spread of contaminants by fugitive dusts. Standard dust-control measures are used to minimize this impact. There will be a loss of biota habitat during construction, though currently it is considered poor habitat. The greatest potential impact to workers is from fugitive dusts. The workers will be protected by a combination of engineering controls and PPE.

5.13.2.6 Implementability

This alternative is technically and administratively feasible, with materials and services readily available for use. Regulatory opposition to the alternative applied to this medium group reduces the administrative feasibility.

5.13.2.7 Cost

The cost of this alternative includes transportation to Basin A as well as prorated long-term monitoring and maintenance of the area. There are 49 structures amenable to this alternative. The present worth cost of this alternative is $12,200,000.

5.14 COMPARATIVE ANALYSIS OF ALTERNATIVES

Twelve alternatives were analyzed for the Significant Contamination History Group (Table 5.0-1). Alternative 1, No Action and Alternative 2, Pipe Plugs, Locks/Boards/Fences/Signs were removed from the selection process because these alternatives are not compatible with the alternatives proposed for the soil medium; the alternatives require the structures to be removed before soil remediation can begin (Section 2.3). The remaining 10 alternatives, which involve the removal and disposal of the structures, are compared in the following sections.

5.14.1 Overall Protection of Human Health and the Environment

All of the alternatives provide adequate protection of human health and the environment because the resulting structure debris is contained by landfilling, capping, or consolidation. Stockpiling of debris prior to treatment in the on-post rotary kiln represents a delay in attaining protection. On-post disposal of the debris is more protective than off-post disposal because on-post disposal offers direct control over long-term waste management and because transportation off post is not necessary, further protecting the community. Treatment alternatives provide additional protection, although no treatment alternatives will remove all of the contaminants from the structural debris.

5.14.2 Compliance with ARARs

As described in the individual analyses of the alternatives, each of the remaining alternatives is in compliance with all ARARs.

5.14.3 Long-Term Effectiveness and Permanence

The residual risk for each of the alternatives is low because the debris, whether disposed in a landfill, placed in a cap, or consolidated as gradefill for a cap or cover, is ultimately contained and migration pathways reduced. Treatment of the structures prior to demolition lowers the residual risk somewhat, although the in situ treatments do not destroy the contaminants present but merely remove them from structure surfaces. Incineration of the debris does destroy contaminants, but the resulting ash may still be hazardous if elevated inorganic concentrations are present.

Landfilling, capping, or consolidation of the structure debris provides adequate control of the debris. If the ultimate disposal area is on post, prorated long-term monitoring and maintenance of the disposal area is necessary to maintain adequate controls. If the ultimate disposal area is off post, long-term monitoring and maintenance is included in the disposal cost, although there is no direct control of the off-post disposal site management.

Because each of the 10 alternatives includes the removal of structures, the habitat is improved at the location of the structure. If the ultimate disposal area is on post, the habitat is limited at the disposal location due to the need to exclude burrowing animals from the landfill or capping area.

5.14.4 Reduction of TMV

All of the treatments offer some degree of irreversible reduction in contaminant TMV, but each of the treatment technologies has limitations in that they are only applicable to certain contaminants on certain surfaces. Hot gas treatment is only applicable to organic contaminants on nonflammable surfaces. Vacuum dusting is only effective for contaminants associated with dust that is not bound to a surface. Steam cleaning can only be applied to nonporous surfaces. Sand blasting is amenable to near-surface contamination on most surfaces and is the most universally applicable in situ treatment for the structures medium. Incineration, which treats structure debris, is not effective for wastes contaminated with inorganics, although it offers the greatest degree of irreversible reduction in contaminant TMV.

Landfilling, capping, or consolidation offers a reduction in mobility for all contaminants through containment. The reduction in mobility may be reversed should the disposal area leak. Proper long-term monitoring and maintenance of the disposal area can prevent leakage from occurring.

Hot gas treatment produces large quantities of potentially toxic off gases that must be collected and treated. Vacuum dusting and sand blasting produce potentially hazardous solid waste streams. Sand blasting produces more waste than vacuum dusting because the process removes

part of the surface being treated and produces degraded blast media. Steam cleaning produces a potentially hazardous liquid sidestream. Incineration not only produces a gaseous sidestream that must be treated but also ash that may still be considered hazardous.

5.14.5 Short-Term Effectiveness

For demolition, standard worker protection is necessary both for physical and chemical hazards. All treatments require worker protection. Worker protection for hot gas treatment is a concern due to the aggressive nature of the treatment.

The off gases produced from hot gas treatment and incineration must be captured and treated to ensure the health and safety of the community, but the controls used to treat air emissions are not foolproof. The risk increases as the concentrations of the contaminants in the incinerated materials increase. Contaminated dust is the greatest concern for the community. Dust controls during demolition and transportation activities are necessary to protect the community during remedial actions.

The environmental impacts associated with these remedial alternatives are low if the dust that is produced is adequately controlled. The time needed to complete the nonincineration alternatives is short, with RAOs attained within 3 to 4 years, lessening the environmental impact. The incineration alternative is complete and achieves RAOs within 5 to 6 years. Alternatives that do not involve treatment have less of an impact because the period of performance is shorter and because there are no potentially hazardous treatment sidestreams and residuals produced. RAOs are achieved most rapidly by disposing the debris on post and without treatment.

5.14.6 Implementability

All of the alternatives are technically feasible to some degree. Demolition, transportation, and landfilling or capping are all standard technologies that are technically feasible. Section 8 describes the limitations of the treatment technologies. For hot gas treatment, isolation of the

treatment area and the possibility for compromising the integrity of a structure limit the technical feasibility of this technology.

All of the alternatives are administratively feasible. There are long-term liability concerns associated with off-post disposal of debris because there is no direct control over long-term waste management. On-post incineration, consolidation, or capping in place may be difficult to implement due to regulatory and/or community concerns.

Services and materials are readily available for all options except hot gas. Because hot gas treatment is still under development, expertise and services are limited.

5.14.7 Cost

The majority of the cost for these alternatives (except for incineration) is related to activities associated with demolition, transportation, and disposal. Off-post transportation and disposal is significantly more expensive than on-post disposal. In situ treatments (vacuum dusting, steam cleaning, and sand blasting) do not add appreciably to the costs. Hot gas treatment and incineration are capital-intensive treatment technologies that add significantly to the cost of an alternative. Off-post incineration is the most expensive treatment option. Costs range from a high of $308,000,000 for Alternative 12 (which involves off-post incineration and disposal) to $12,200,000 for Alternative 21a (which involves demolition and disposal of the debris in the Basin A consolidation area). The costs of IRAs and ongoing actions described in Sections 2.2.3 and 2.2.4 and listed in Table 8.3-1 are not included in the remediation costs.

5.14.8 Selection of Sitewide Options

In summary, the treatment of a structure in this medium group does not add significantly to the overall protectiveness and permanence of the alternatives because of the low concentrations of contamination expected to be present. On-post disposal is preferred to off-post disposal due both to cost savings associated with on-post disposal and to the reduced long-term liability due to the direct control over long-term monitoring and maintenance. Consequently, three alternatives were

chosen for consideration as sitewide options discussed in Section 8. The alternatives for this medium group include:

- Alternative 19: Dismantling, Salvage, On-Post Hazardous Waste Landfill
- Alternative 21: Dismantling, Salvage, Clay Cap
- Alternative 21a: Dismantling, Salvage, Consolidation

Table 5.0-1 Comparative Analysis of Alternatives, No Future Use, Significant Contamination History Medium Group

Criteria	ALT. 1: No Action	ALT. 2: Pipe Plugs, Locks/Boards/Fences/Signs
1. Overall protection of human health and environment	Does not provide any increase in protectiveness.	Limited protectiveness, eliminates contact with contaminants by preventing access to structure; prevents contaminant migration.
2. Compliance with ARARs	Action-specific ARARs do not apply because no action is taken. Complies with location-specific ARARs.	Complies with action- and location-specific ARARs.
3. Long-term effectiveness and permanence	Does not provide long-term effectiveness or permanence. Residual risk increases with time as structures deteriorate. Current access controls are inadequate for the long term. Habitat remains unchanged.	Moderate residual risk; contaminants are sealed inside pipes, and access to structure is prevented. Adequate controls, long-term monitoring, and maintenance required. Habitat not improved.
4. Reduction in TMV	Does not reduce TMV.	Pipe plugging reduces mobility but may be reversible if pipe plugs fail. Toxicity remains unchanged. Volume of waste is increased. Restricting access reduces mobility. There are no treatment residuals for this alternative.
5. Short-term effectiveness	No worker or community protection is necessary because no action is taken. Habitat not improved. Does not achieve RAOs.	Worker protection necessary during pipe plugging and access restriction operations. Habitat impacted during remediation. RAOs are attained within 3 to 4 years.
6. Implementability	Not administratively feasible because further structure deterioration may pose a physical and chemical hazard.	Technically and administratively feasible. Services and materials are readily available.
7. Present worth cost[1]	None	$12,400,000
Summary	Not retained: does not achieve RAOs.	Not retained: leaving structures in place is inconsistent with soil remedial alternatives.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1.

Table 5.0-1 Comparative Analysis of Alternatives, No Future Use, Significant Contamination History Medium Group

Criteria	ALT. 8: Hot Gas, Dismantling, Salvage, On-Post Hazardous Waste Landfill	ALT. 9: Vacuum Dusting, Dismantling, Salvage, On-Post Hazardous Waste Landfill
1. Overall protection of human health and environment	Protective; treatment limited to organics on nonflammable surfaces. Debris contained by landfilling.	Protective; treatment only applicable to removing contaminated dust. Debris contained by landfilling.
2. Compliance with ARARs	Complies with action- and location-specific ARARs.	Complies with action- and location-specific ARARs.
3. Long-term effectiveness and permanence	Low residual risk for structures with surface organic contamination on nonflammable surfaces only. Adequate controls for structural debris that can be placed in a hazardous waste landfill. Long-term maintenance required. Habitat improved at site but limited at landfill.	Low residual risk for structures with dust contamination only. Adequate controls for structural debris that can be placed in a hazardous waste landfill. Long-term maintenance required. Habitat improved at site but limited at landfill.
4. Reduction in TMV	Hot gas irreversibly reduces TMV of organics on nonflammable surfaces. Off gases are produced and treated by carbon adsorption. TMV of inorganics not affected. Landfilling reduces mobility but may be reversible if landfill leaks.	Vacuum dusting irreversibly reduces contaminant mobility for surfaces contaminated with dust. Volume and toxicity not affected. Treatment residuals consist of contaminated dust.
5. Short-term effectiveness	Worker exposure controls necessary during hot gas treatment. toxic off gases produced. Worker protection necessary for physical hazards associated with dismantling. Dust controls needed for demolition. Positive habitat impacts at site. RAOs are achieved within 3 to 4 years.	Worker exposure controls and physical protection required during vacuuming. Worker protection necessary for physical hazards associated with dismantling. Dust controls needed for demolition. Habitat improved at site. RAOs are achieved within 3 to 4 years.
6. Implementability	Limited to organics on nonflammable surfaces. May compromise structural integrity. Isolation of treatment area difficult and has never been implemented on such a large scale. Administratively feasible. Hot gas services and expertise limited.	Treatment limited to dust contamination only. Administratively and technically feasible. Materials and services readily available.
7. Present worth cost[1]	$34,200,000	$13,900,000
Summary	Not retained: hot gas does not treat all expected contaminants, implementability limited.	Not retained: on-post hazardous waste landfill (Alt. 19) offers similar protection with lower potential for worker exposure.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1.

Table 5.0-1 Comparative Analysis of Alternatives, No Future Use, Significant Contamination History Medium Group

Criteria	ALT. 9a: Steam Cleaning, Dismantling, Salvage, On-Post Hazardous Waste Landfill	ALT. 10: Sand Blasting, Dismantling, Salvage, On-Post Hazardous Waste Landfill
1. Overall protection of human health and environment	Protective; treatment limited to contamination on nonporous surfaces. Debris contained by landfilling.	Protective; treatment limited to surface contaminants.
2. Compliance with ARARs	Complies with action- and location-specific ARARs.	Complies with action- and location-specific ARARs.
3. Long-term effectiveness and permanence	Low residual risk for structures with contamination on nonporous surfaces only.	Low residual risk for structures with surface contamination only.
	Adequate controls for structural debris that can be placed in a hazardous landfill. Long-term maintenance required.	Adequate controls for structural debris that can be placed in a hazardous waste landfill. Sand blasting satisfies BDAT for contaminated structural material. Long-term maintenance is required.
	Habitat improved at site but limited at landfill.	Habitat improved at site but limited at landfill.
4. Reduction in TMV	Steam cleaning irreversibly reduces mobility and volume of contaminants on nonporous surfaces.	Sand blasting irreversibly reduces the mobility and volume of surface contamination. Treatment is not applicable to wood, glass, and certain polymers.
	Treatment residuals consist of contaminated washwater.	The treatment residual consists of contaminated grit.
5. Short-term effectiveness	Worker exposure controls during steam cleaning and protection needed for physical hazards associated with dismantling. Dust controls needed for demolition.	Worker exposure controls during sand blasting and protection needed for physical hazards associated with dismantling. Dust controls needed for demolition.
	Habitat improved at site.	Habitat is improved at the site.
	RAOs are achieved within 3 to 4 years.	RAOs are achieved within 3 to 4 years.
6. Implementability	Treatment limited to contaminants on nonporous surfaces. Administratively feasible.	Treatment limited to accessible surface contaminants, not applicable to wood surfaces, glass, and certain polymers. Administratively feasible.
	Materials and services readily available.	Materials and services readily available.
7. Present worth cost[1]	$14,400,000	$14,800,000
Summary	Not retained: not applicable to porous surfaces, implementability limited.	Not retained: not applicable to some surfaces, accessibility of structures limits scope of treatment.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1.

Table 5.0-1 Comparative Analysis of Alternatives, No Future Use, Significant Contamination History Medium Group

Criteria	ALT. 12: Dismantling, Salvage, Off-Post Rotary Kiln Incineration, Off-Post Hazardous Waste Landfill	ALT. 13: Dismantling, Salvage, On-Post Rotary Kiln Incineration, On-Post Hazardous Waste Landfill
1. Overall protection of human health and environment	Protective; debris treated by incineration and contained by landfilling.	Protective; debris treated by incineration and contained by landfilling. Protectiveness delayed by stockpiling until incinerator available.
2. Compliance with ARARs	Complies with action- and location-specific ARARs.	Complies with action- and location-specific ARARs.
3. Long-term effectiveness and permanence	Low residual risk; structural debris treated by incineration and contained by landfilling. Adequate controls for landfilled structural debris. Habitat improved at site.	Low residual risk. Adequate controls, long-term maintenance required. Habitat improved at site but limited at landfill.
4. Reduction in TMV	Incineration irreversibly reduces TMV. Treatment produces off gases. Landfill reduces mobility but may be reversible if landfill leaks. Does not treat inorganics.	Incineration irreversibly reduces TMV, renders debris nonhazardous. Off gases are produced. Does not treat inorganics.
5. Short-term effectiveness	Dust controls needed during demolition. Worker protection necessary for physical hazards associated with dismantling. Habitat improved at site. RAOs are achieved within 3 to 4 years.	Dust controls needed for demolition. Air controls needed for incineration. Worker protection necessary for physical hazards associated with dismantling. Habitat improved at site. RAOs are achieved within 5 to 6 years.
6. Implementability	Technically feasible. Administratively feasible, but long-term liability issues a concern with off-post disposal. Materials and services readily available. Off-post transportation-related accidents a concern.	Technically and administratively feasible. Materials and services are readily available.
7. Present worth cost[1]	$308,000,000	$34,100,000
Summary	Not retained: high cost, potential for community impacts during transportation.	Not retained: public and regulatory opposition to on-site incinerator a concern, implementability limited.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1.

Table 5.0-1 Comparative Analysis of Alternatives, No Future Use, Significant Contamination History Medium Group

Criteria	ALT. 19: Dismantling, Salvage, On-Post Hazardous Waste Landfill	ALT. 20: Dismantling, Salvage, Off-Post Hazardous Waste Landfill
1. Overall protection of human health and environment	Protective; debris is contained by landfilling.	Protective; debris contained by landfilling.
2. Compliance with ARARs	Complies with action- and location-specific ARARs.	Complies with action- and location-specific ARARs.
3. Long-term effectiveness and permanence	Low residual risk; structural debris is contained by landfilling. Adequate controls, long-term monitoring required. Habitat improved at site but limited at landfill.	Low residual risk; structural debris contained by landfilling. Adequate controls for landfilled debris. Habitat improved at site.
4. Reduction in TMV	Landfilling reduces mobility. Mobility reduction may be reversed if landfill leaks. No treatment residuals.	Landfilling reduces mobility. Mobility reduction may be reversible if landfill leaks. No treatment residuals.
5. Short-term effectiveness	Dust controls needed for demolition. Worker protection necessary for physical hazards associated with dismantling. Habitat improved at site. RAOs are achieved in 3 to 4 years.	Dust controls needed for demolition. Worker protection necessary for physical hazards associated with dismantling. Habitat improved at site. RAOs are achieved in 3 to 4 years.
6. Implementability	Technically and administratively feasible. Materials and services readily available.	Technically and administratively feasible, but long-term liability a concern for off-post disposal. Off-post transportation-related accidents a concern. Materials and services readily available.
7. Present worth cost[1]	$13,300,000	$28,200,000
Summary	Retained: hazardous waste landfill offers greater protection; consistent with soil remedial alternatives.	Not retained: community impacts from transportation and long-term liability a concern.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1.

Table 5.0-1 Comparative Analysis of Alternatives, No Future Use, Significant Contamination History Medium Group

Criteria	ALT. 21: Dismantling, Salvage, Clay Cap	ALT. 21a: Dismantling, Salvage, Consolidation
1. Overall protection of human health and environment	Protective; debris contained by capping.	Protective; debris contained through consolidation.
2. Compliance with ARARs	Complies with action- and location-specific ARARs.	Complies with action- and location-specific ARARs.
3. Long-term effectiveness and permanence	Low residual risk; structural debris contained by capping. Adequate controls, long-term maintenance, and monitoring of caps required.	Low residual risk; structural debris consolidated and capped in Basin A or other suitable area. Adequate controls, long-term maintenance, and monitoring required.
	Habitat improved but restriction needed for burrowing animals.	Habitat improved but restriction needed for burrowing animals.
4. Reduction in TMV	Capping reduces mobility but may be reversible if cap leaks.	Consolidation reduces mobility. Mobility reduction may be reversible if cap leaks.
	No treatment residuals.	No treatment residuals.
5. Short-term effectiveness	Dust controls needed for demolition, worker protection necessary for physical hazards associated with dismantling.	Dust controls needed for demolition, worker protection necessary for physical hazards associated with dismantling.
	Habitat improved at site but burrowing animals excluded.	Habitat improved at site but burrowing animals excluded in consolidation area.
	RAOs achieved in 3 to 4 years.	RAOs achieved in 3 to 4 years.
6. Implementability	Technically and administratively feasible.	Technically and administratively feasible.
	Materials and services readily available.	Materials and services readily available.
	Public and/or regulatory opposition a concern	Public and/or regulatory opposition a concern
7. Present worth cost[1]	$13,100,000	$12,200,000
Summary	Retained: cost-effective alternative that is consistent with soil remedial alternatives.	Retained: cost-effective alternative that is consistent with soil remedial alternatives.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1.

Section 6

6.0 NO FUTURE USE, OTHER CONTAMINATION HISTORY MEDIUM GROUP

Structures in the Other Contamination History Medium Group are those No Future Use structures not included in the Future Use, Agent History, and Significant Contamination History groups. Based upon their use histories, the structures in this group are considered to have low contamination levels. The use histories of these buildings include administrative, utility, and industrial support functions. Alternatives involving no action, containment, physical treatment, and disposal process options are considered for this medium group. Thermal treatments were not evaluated for this medium group because of the low contaminant levels indicated by their use histories. Each alternative was described and analyzed according to the seven EPA evaluation criteria (see the Executive Summary, Volume I). As described in Section 2, most of the alternatives and analyses developed for the structures medium are very similar. Accordingly, following the description and analysis of the No Action Alternative and Alternative 2 (Sections 6.1 and 6.2), the subsequent descriptions and analyses (Sections 6.3 through 6.9) focus on the differences between each alternative and the general alternative. A comparative analysis of the alternatives developed for this medium group is presented in Section 6.10 and is presented in tabular format in Table 6.0-1. ARARs are discussed for each alternative as part of the analysis of alternatives section. Waste characterization issues related to this medium group are discussed in Section 2.4.

Most of the alternatives developed for this medium group include demolition and landfilling. Refer to Section 5.3 for a general discussion of these options. It was assumed that ACM, process equipment, piping, and tanks will be handled under the scope of other ongoing IRAs and will be removed from the structures prior to initiating the structures remediation. If any of these items are encountered during the structures remediation, they will be handled as an integral part of the remediation process. Moreover, the cost of removal and disposal of any of these items was included under the appropriate IRA and was not included as part of the remediation costs developed for the DAA. As described in Section 2, PCB-contaminated equipment will be removed under the scope of the PCB IRA. As confirmed in earlier studies, there is expected to be very little PCB-contaminated structural material associated with the structures medium. Any

be very little PCB-contaminated structural material associated with the structures medium. Any remaining PCB-contaminated structural material will be handled as part of the structures remediation.

As discussed in Section 5, waste segregation during demolition is possible for structures in this medium group. Under alternatives that include treatment (Alternatives 9, 9a, and 10), waste can be segregated to reduce the volume that requires treatment. Under alternatives that propose the conservative option of hazardous waste landfills (Alternatives 19 and 20), waste segregation is not necessary, but can be used to reduce the volume of material classified as hazardous. Under any of the alternatives, waste segregation may be practical if there is a need to use uncontaminated waste as a biota barrier or in an on-post landfill.

6.1 ALTERNATIVE 1: NO ACTION

6.1.1 Description of Alternative

The No Action alternative involves no further action beyond existing measures; it may apply to this medium group only if IRAs conducted prior to the issuance of the ROD have adequately remediated the structures in this medium group.

6.1.2 Analysis of Alternative

6.1.2.1 Overall Protection of Human Health and the Environment

Alternative 1 does not provide protection to human health and the environment because the potential for exposure to contamination and physical hazards remains unchanged. This alternative does not achieve Human Health or Biota RAOs.

6.1.2.2 Compliance with ARARs

If PCBs or asbestos are present, this alternative may not comply with action-specific ARARs. Other action-specific ARARs do not apply to this alternative because no action is taken. This alternative complies with location-specific ARARs.

6.1.2.3 Long-Term Effectiveness and Permanence

Alternative 1 does not provide long-term effectiveness or permanence. The residual risk for human health and biota increases with time because there is a greater chance for the release of contaminants as the structures deteriorate. The current access controls are inadequate for the long term and the existing poor-quality habitat remains unchanged.

6.1.2.4 Reduction of TMV

Alternative 1 does not reduce contaminant TMV because this alternative does not include treatment or containment.

6.1.2.5 Short-Term Effectiveness

Because there are no actions taken under this alternative, no worker or community protection is necessary and no environmental impacts are caused by remediation. Alternative 1 does not achieve RAOs.

6.1.2.6 Implementability

Alternative 1 is not implementable in many of the manufacturing areas of RMA because the structures will need to be removed to remediate the underlying soil It is also not administratively feasible because further deterioration of the structures may pose a physical and chemical hazards to human health and the environment.

6.1.2.7 Cost

The present worth cost of this alternative is $0.00.

6.2 ALTERNATIVE 2: PIPE PLUGS, LOCKS/BOARDS/FENCES/SIGNS

6.2.1 Description of Alternative

Alternative 2 includes plugging pipes within the structure to immobilize contaminants and using a combination of locks, boards, fences, and signs to prevent access to the structure. Alternative 2, as retained in the DSA (EBASCO 1992), included the option of filling entire rooms or

structures with grout to immobilize contamination. The initial DAA analysis determined that filling an entire building with grout had a high cost and was difficult to implement without offering significantly better permanence, protectiveness, or reduction in TMV compared to pipe plugs in combination with locks, boards, fences, and signs. Therefore, only pipe plugs are considered as part of Alternative 2. Pipe plugs are described in detail in the Technology Descriptions Volume, Section 13, and locks, boards, fences, and signs are described in the Technology Descriptions Volume, Section 3.

As discussed in Section 2, it was assumed that, during the chemical-process-related activities IRA, all process piping is to be removed from structures. As with all ongoing activities, the possibility exists that the IRA will not be completed prior to the structures remediation and any remaining pipes would be remediated under this alternative. The intent of this alternative is to provide a containment option that would leave the structures intact and that can be compared to alternatives involving removal and disposal. For costing purposes, it was assumed that all of the process piping are plugged. Even if all of the process piping is removed prior to remediation, the remainder of this alternative is still applicable.

Before Alternative 2 can be implemented, each structure in this medium group must be visually examined. An interior and exterior examination is performed to determine the structural integrity of the building. It was assumed that there is no ACM associated with these structures at the time of remediation because the scope of the Asbestos IRA, currently in progress, includes removal of ACM from structures. This task is scheduled to be completed prior to the structures remediation. The visual inspection of the structures will also determine whether any residual ACM is present.

Following the examination of the structure, pipe plugging is implemented as necessary. Any process piping is filled with grout to immobilize and contain contaminants. Concurrent with the pipe plugging operations, locks, boards, fences, and signs are installed as appropriate to prevent access to the structure. Due to the unique configuration and varying accessibility of structures

in this medium group, the types and quantities of locks, boards, fences, or signs are evaluated separately for each structure.

Because Alternative 2 is a containment option, the structures remains intact indefinitely; therefore, inspections are performed on a regular basis as part of this alternative.

6.2.2 Analysis of Alternative

6.2.2.1 Overall Protection of Human Health and the Environment

Alternative 2 is somewhat protective of human health and the environment because it prevents contaminant migration and eliminates contact with contaminants by plugging pipes and preventing access to the structures. Although the contaminants in pipes are immobilized and access to structures is controlled, overall protectiveness is limited because the structures remain intact and no contamination is removed from the structure. Further deterioration of the structures increases the physical hazards related to the structures. This alternative achieves both Human Health and Biota RAOs.

6.2.2.2 Compliance with ARARs

Alternative 2 complies with applicable action- and location-specific ARARs. Action-specific ARARs regarding pipe plugging, which are unique to this alternative, are presented in the Technology Descriptions Volume, Appendix A. Other applicable action-specific ARARs related to this alternative address institutional controls, such as access restrictions, land use/deed restrictions, and monitoring, and PBC or asbestos removals (Technology Descriptions Volume, Appendix A). The location-specific ARARs applicable to this alternative are also listed in the Technology Descriptions Volume, Appendix A.

6.2.2.3 Long-Term Effectiveness and Permanence

The long-term effectiveness and permanence of this alternative is questionable. The residual risk for both human and biota exposure is moderate because the structures remain intact and no contamination is removed from the structures. The source of the residual risk arises from the

potential of the contained contamination to migrate from the structures and from physical hazards as the structures deteriorate over time.

The controls are adequate assuming that preventive maintenance and long-term monitoring, which prevent the re-establishment of contaminant migration pathways from the pipes and structure and to humans or wildlife, occur for an indefinite period of time. Maintenance and monitoring for an indefinite period of time, however, is impractical.

The existing low-quality habitat remains unchanged, and it may actually be reduced for species that currently use the structures. However, some burrowing or invasive species (e.g., rodents, birds, and insects) may eventually regain access to the structure and re-establish habitat.

6.2.2.4 Reduction of TMV

Plugging pipes in combination with locks, boards, fences, and signs to prevent access is effective in reducing mobility of contaminants; however, it does not reduce the volume or toxicity of any contaminants present. The volume of contaminated materials is increased by exposing the grout to the contamination in the pipes. Toxicity remains unchanged because contaminants are immobilized, not treated. The reduction in mobility, however, could be reversed should the access restrictions or pipe plugs fail.

Pipe plugging produces a very small quantity of solid waste consisting of used grout that could potentially be hazardous. Locks, boards, fences, and signs produce no treatment residuals.

6.2.2.5 Short-Term Effectiveness

Standard worker protection is necessary during pipe plugging and access restriction operations. Alternative 2 has a minimal effect on the community. Biota habitat, for those species currently using the structures, is affected during remediation. RAOs are attained within 3 to 4 years under this alternative.

6.2.2.6 Implementability

Alternative 2 is both administratively and technically implementable, with services and materials readily available. Pipe plugging is technically simple, relatively inexpensive, and easily implementable for most piping runs. Services and materials for structural repair as well as for the locks, boards, fences, and signs are readily available.

6.2.2.7 Cost

It was assumed for cost-estimating purposes that pipe plugs are applied to the entire piping volume of each structure under remediation. The cost of Alternative 2 includes annual ambient air monitoring of the structure performed with a dedicated high-volume air sampler. Alternative 2 is amenable to 630 structures in the Other Contamination History Medium Group The present worth cost of Alternative 2 is approximately $64,100,000. These costs include monitoring and long-term maintenance for a 30-year period, after which the need for maintenance and monitoring is re-evaluated. It is anticipated that maintenance and monitoring will continue past the 30-year period at an approximate annual cost of $412,000.

6.3 ALTERNATIVE 9: VACUUM DUSTING, DISMANTLING, SALVAGE, ON-POST NONHAZARDOUS WASTE LANDFILL

6.3.1 Description of Alternative

Alternative 9 includes performing in situ vacuum dusting, dismantling the structure, salvaging scrap metal, and transporting and disposing the resulting nonhazardous debris in an on-post nonhazardous waste landfill. Vacuum dusting is discussed in the Technology Descriptions Volume, Section 13.

In situ vacuum dusting removes dust and particulates from structural surfaces. The dust and particulates are collected in a HEPA filter that is then drummed and disposed. No pretreatment of the structure is necessary, but measures will be taken to ensure the safety of the workers and to ensure that all surfaces to be treated are accessible. Vacuum dusting does not remove any

contamination that is physically or chemically bound to a surface. Due to this limitation, some contamination may not be removed using this method.

6.3.2 Analysis of Alternative

6.3.2.1 Overall Protection of Human Health and the Environment

Alternative 9 is moderately protective of human health and the environment because contaminated dust is removed and the structural debris is disposed in a controlled nonhazardous materials landfill, limiting migration and exposure pathways.

6.3.2.2 Compliance with ARARs

Alternative 9 complies with action- and location-specific ARARs. The ARARs regarding vacuum dusting and nonhazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs since the historical evidence indicates the structures in this medium group do not contain hazardous wastes.

6.3.2.3 Long-Term Effectiveness and Permanence

The implementation of vacuum dusting prior to landfilling somewhat lowers the residual risk of contaminant migration or exposure related to contaminated dust in structures. So long as the landfill is maintained, this alternative has adequate long-term protectiveness and permanence.

6.3.2.4 Reduction of TMV

Alternative 9 is effective in reducing the mobility of particulate contaminants through vacuum dusting and in reducing the mobility of residual contamination associated with structures through containment; however, it does not reduce volume or toxicity. Vacuum dusting produces a low-volume solid waste stream that must be treated and disposed. There are 630 structures amenable to this option.

6.3.2.5 Short-Term Effectiveness

The complexity of the physical configuration of the structure could limit the effectiveness of vacuum dusting due to the inaccessibility of corners or recesses. Standard worker protection is required during vacuum dusting. The necessary use of ladders or scaffolding for vacuuming presents a physical hazard to workers in addition to the physical hazards posed by demolition. Implementation of this alternative is not anticipated to have any adverse effects on the environment. RAOs are achieved within 3 to 4 years.

6.3.2.6 Implementability

Alternative 9 is both technically and administratively feasible for structures in this medium. Vacuum dusting is limited to removing contaminants associated with dust or particulates. As a result, the effectiveness of this alternative for all structures in this medium is limited and must be evaluated on a structure-by-structure basis. Vacuum dusting is a proven technology, with materials and services readily available for use.

6.3.2.7 Cost

The cost estimate for Alternative 9 includes the assumption that treatment and disposal of waste generated during vacuum dusting and demolition occurs and that only interior surfaces are treated by vacuum dusting. This alternative treats 630 structures. The present worth cost of this alternative is approximately $39,900,000.

6.4 ALTERNATIVE 9a: STEAM CLEANING, DISMANTLING, SALVAGE, ON-POST NONHAZARDOUS WASTE LANDFILL

6.4.1 Description of Alternative

Alternative 9a includes performing in situ steam cleaning, dismantling the structure, salvaging decontaminated scrap metal, and transporting and disposing the resulting nonhazardous debris in an on-post nonhazardous waste landfill. Steam cleaning is discussed in the Technology Descriptions Volume, Section 13.

In situ steam cleaning for structures is limited to areas of a structure where production operations or documented spills occurred. Steam cleaning removes contaminants from building materials and surfaces using heated water applied under pressure; however, it is limited to surfaces such as metal and concrete. The treatment produces a liquid sidestream containing the removed contaminants; this sidestream is treated on site by filtration and carbon adsorption and the liquid is recycled back into the steam-cleaning process, minimizing the volume of waste produced and the amount of water needed for treatment. Pretreatment of the structure includes containing the treatment area and collecting and treating the liquid waste produced. Some portions of the structure with potential contamination may not be amenable to this treatment because steam cleaning is not applicable to porous surfaces. In addition, contamination that has migrated below the surface of the materials to be steam cleaned cannot be removed by this process.

6.4.2 Analysis of Alternative

6.4.2.1 Overall Protection of Human Health and the Environment

Although steam cleaning only treats contamination on nonporous surfaces, Alternative 9a is moderately protective of human health and the environment because the structural debris is partially decontaminated and disposed in a controlled nonhazardous waste landfill, limiting migration and exposure pathways.

6.4.2.2 Compliance with ARARs

Alternative 9a complies with action- and location-specific ARARs. ARARs regarding steam cleaning and nonhazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs since the historical evidence indicates the structures in this medium group do not contain hazardous wastes.

6.4.2.3 Long-Term Effectiveness and Permanence

Alternative 9a lowers the residual risk of contaminant migration or exposure for structures with contamination on nonporous surfaces compared to containment without treatment. So long as the

landfill is maintained, this alternative has adequate long-term protectiveness and permanence. Habitat is improved at the site but limited at the landfill.

6.4.2.4 Reduction of TMV

Steam cleaning irreversibly reduces the mobility and volume of contaminants on nonporous surfaces. Contaminants exhibiting toxicity are simply transferred from the structure to the wastewater, which must be treated or disposed.

6.4.2.5 Short-Term Effectiveness

Worker exposure controls are needed during steam cleaning. Standard worker protection is required during steam cleaning and demolition operations, including using dust controls during demolition. Demolition operations present physical hazards to workers. Implementation of this alternative is not anticipated to have any additional adverse effects on the environment or surrounding community. RAOs are achieved in 3 to 4 years.

6.4.2.6 Implementability

Alternative 9a is both technically and administratively feasible for structures in this medium group. Implementation of the steam cleaning option is limited to removing surface contamination associated with nonporous materials. Although steam cleaning can be customized to include solvents or grit to enhance removal efficiencies, the complexity of the physical configuration of the structure (e.g., corners, recesses) could limit the effectiveness of this treatment. As a result, the effectiveness of this alternative for all structures in this medium group must be evaluated on a structure-by-structure basis. Steam cleaning is a proven technology, with materials and services readily available for use.

6.4.2.7 Cost

The cost estimate for Alternative 9a includes the assumptions that only interior surfaces are treated and that the wastewater generated during the process is treated and disposed. There are

630 structures amenable to treatment by this option. The present worth cost of this alternative is approximately $41,100,000.

6.5 ALTERNATIVE 10: SAND BLASTING, DISMANTLING, SALVAGE, ON-POST NONHAZARDOUS WASTE LANDFILL

6.5.1 Description of Alternative

Alternative 10 includes performing in situ sand blasting, dismantling the structure, salvaging scrap metal, and transporting and disposing the resulting nonhazardous debris to an on-post nonhazardous waste landfill. Sand blasting is discussed in the Technology Descriptions Volume, Section 13.

In situ sand blasting for structures is limited to areas of a structure where production operations or documented spills occurred. Sand blasting consists of the physical removal of contaminated surfaces via abrasion and is effective at removing surface contamination that has not penetrated the material to a depth greater than one-half inch. Sand blasting is applicable to most surfaces except wood, glass, or certain polymers (e.g., transite or Plexiglas). Sand blasting is an acceptable BDAT for both inorganic and organic contaminants regulated by RCRA. The treatment produces a solid waste sidestream of used grit, removed surface materials, and removed contaminants. The grit is separated from the other particles and recycled back into the sand-blasting process, thereby minimizing the volume of waste produced and the amount of grit needed for treatment. Pretreatment of the structure includes containing the treatment area and collecting and treating the solid waste produced. Sand blasting is the most widely applicable in situ treatment with respect to both structural materials and potential contaminants, although some potentially contaminated materials in the structure (e.g., wood, glass) may not be amenable to this treatment.

6.5.2 Analysis of Alternative

6.5.2.1 Overall Protection of Human Health and the Environment

Sand blasting is protective as it removes the highest potential surface contamination from structural materials. If only surface contamination is present, the resulting structural debris is rendered nonhazardous and is disposed in an on-post nonhazardous waste landfill. The treatment residuals are disposed in the on-post hazardous waste landfill.

6.5.2.2 Compliance with ARARs

Alternative 10 complies with action- and location-specific ARARs. The ARARs regarding sand blasting and nonhazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs since the historical evidence indicates the structures in this medium group do not contain hazardous wastes.

6.5.2.3 Long-Term Effectiveness and Permanence

Sand blasting lowers residual risk by removing surface contamination, and it satisfies the BDAT standard for both inorganic and organic contaminants associated with structural material. However, the effectiveness of this alternative varies based on the accessibility of the structural surfaces. Habitat is improved at the site by limited at the landfill.

6.5.2.4 Reduction of TMV

Sand blasting irreversibly reduces the mobility and volume of surface contamination. As mentioned previously, the treatment is not applicable to wood, glass, and certain polymers such as transite or plexiglas. Contaminant toxicity, mobility, and volume can be reduced by removing contaminated materials from the underlying clean materials. The treatment residuals, consisting of a solid waste stream containing any removed contaminants from the structure and grit, must be characterized and properly disposed, further limiting their toxicity and mobility.

6.5.2.5 Short-Term Effectiveness

Standard worker protection is required during sand-blasting operations. The additional environmental risks are low so long as the contaminated grit can be effectively contained and collected. Demolition operations present physical hazards to workers. RAOs are attained within 3 to 4 years.

6.5.2.6 Implementability

Alternative 10 is both technically and administratively feasible for structures in this medium group. Sand blasting is limited to removing near-surface contamination on most surfaces. Implementability of this alternative varies from structure to structure. The complexity of the physical configuration of the structure (e.g., corners, recesses) could limit the effectiveness of this treatment. Depending on the configuration of each structure, therefore, not all contaminated surfaces can be treated. Sand blasting is a proven technology, with materials and services readily available for use.

6.5.2.7 Cost

The cost estimate for Alternative 10 includes the assumptions that removed materials are disposed in an on-post nonhazardous waste landfill or consolidated as gradefill and that only interior surfaces are treated. Spent abrasives and treatment residuals are disposed in an on-post hazardous waste landfill. There are 630 structures that are amenable to treatment under this alternative. The present worth cost of this alternative is $43,200,000.

6.6 ALTERNATIVE 19: DISMANTLING, SALVAGE, ON-POST HAZARDOUS WASTE LANDFILL

6.6.1 Description of Alternative

Alternative 19 includes dismantling the structure, salvaging scrap metal, and transporting and disposing the debris in an on-post hazardous waste landfill. This alternative is basically the same as the general alternative described in Section 5.3 because no additional treatment is involved.

6.6.2 Analysis of Alternative

6.6.2.1 Overall Protection of Human Health and the Environment

Without treatment, the disposal of the structural debris in an on-post hazardous waste landfill offers greater protection of human health and the environment than does disposal of the debris in a nonhazardous waste landfill. On-post disposal is more protective than off-post disposal because it minimizes the potential for accidental releases during transportation.

6.6.2.2 Compliance with ARARs

This alternative complies with action- and location-specific ARARs. ARARs regarding hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs since the historical evidence indicates the structures in this medium group do not contain hazardous wastes.

6.6.2.3 Long-Term Effectiveness and Permanence

The disposal of the structural debris in an on-post hazardous waste landfill results in low residual risk. Habitat is improved at the site but limited at the landfill.

6.6.2.4 Reduction of TMV

Because there is no treatment involved in this alternative, there is no reduction in contaminant toxicity or volume; contaminant mobility, however, is minimized by containment in the landfill. There are no treatment residuals.

6.6.2.5 Short-Term Effectiveness

Demolition operations present physical hazards to workers. In addition, dust controls are necessary during demolition to protect both workers and the surrounding community. During landfill construction and demolition, wildlife habitat is affected. RAOs are achieved in 3 to 4 years.

6.6.2.6 Implementability

This alternative is technically and administratively feasible, with materials and services readily available for use.

6.6.2.7 Cost

The cost of Alternative 19 includes transportation to the landfill as well as long-term monitoring and maintenance of the landfill. There are 630 structures that are amenable to this alternative. The present worth cost of this alternative is $38,900,000.

6.7 ALTERNATIVE 20: DISMANTLING, SALVAGE, OFF-POST HAZARDOUS WASTE LANDFILL

6.7.1 Description of Alternative

Alternative 20 includes dismantling the structure, salvaging scrap metal, and transporting and disposing the debris in an off-post hazardous waste landfill. This alternative is similar to Alternative 19 (Section 6.6), except that under this alternative the disposal occurs off post.

6.7.2 Analysis of Alternative

6.7.2.1 Overall Protection of Human Health and the Environment

The disposal of the structural debris in an off-post hazardous waste landfill is protective of human health and the environment. However, off-post disposal is not so protective as on-post disposal because of the potential for accidents during transportation. Off-post disposal does not allow direct control over long-term monitoring and maintenance of the landfill, which, compared to on-post disposal, may result in long-term liability should the landfill fail.

6.7.2.2 Compliance with ARARs

Alternative 20 complies with action- and location-specific ARARs. ARARs regarding hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs since the historical evidence indicates the structures in this medium group do not contain hazardous wastes.

6.7.2.3 Long-Term Effectiveness and Permanence

Disposing debris in an off-post hazardous waste landfill results in low residual risk, although there is an increase in the potential for future liability. Because the disposal of debris occurs off post, wildlife habitat is improved at the site.

6.7.2.4 Reduction of TMV

Because there is no treatment of the structural debris, this alternative is ineffective in reducing toxicity or volume; contaminant mobility, however, is minimized by containment. There are no treatment residuals.

6.7.2.5 Short-Term Effectiveness

Off-post transportation of the debris increases the potential for environmental impacts to the community. Demolition operations present physical hazards to workers. RAOs are achieved in 3 to 4 years.

6.7.2.6 Implementability

This alternative is technically and administratively feasible, with materials and services readily available for use. There is a concern regarding accidental releases that might occur during transportation and for long-term liability regarding the practices of off-post waste management.

6.7.2.7 Cost

The cost of Alternative 20 includes transportation to the off-post landfill. There are 630 structures amenable to this alternative. The present worth cost of this alternative is $95,500,000.

6.8 ALTERNATIVE 21: DISMANTLING, SALVAGE, CLAY CAP

6.8.1 Description of Alternative

Alternative 21 includes dismantling the structure, salvaging scrap metal, and capping the debris in place. Capping is discussed in the Technology Descriptions Volume, Section 6.

The debris-sizing requirements for placement under a cap are similar to those for landfilling. Once the debris is placed into the capping area, fill is used to raise the level of the debris pile so that surface-water runoff is directed as desired. The cap covers an area 30 percent larger in extent than the debris pile. Because many of the structures are located in proximity to each other, it is not practical to place individual caps over each structure, nor is it practical to cap single outlying structures. Therefore, outlying structures are consolidated into areas of high structure density and groups of structures are contained by a single cap where applicable. For Alternative 21, it was assumed that three capped areas would be formed: South Plants, North Plants, and the Railyard.

All of the structures in and around South Plants are placed under the Central Processing Area cap in conjunction with the overall containment alternative for the Central Processing Area at South Plants. All structures in and around the North Plants region are consolidated into a single capped area within North Plants. All structures in and around the Railyard area are placed under a single cap within the Railyard. This approach minimizes the amount of capped area that is necessary to monitor and maintain and is compatible with the alternatives proposed for the soil medium. The North Plants and Railyard caps will be revegetated as part of the structures remediation.

6.8.2 Analysis of Alternative

6.8.2.1 Overall Protection of Human Health and the Environment

Demolition and capping in place achieves Human Health and Biota RAOs. Capping of structures in place provides adequate protection of both human health and the environment. The degree of protection depends on the type of cap used as well as the engineering controls employed to monitor and maintain the cap. The risks of contaminant migration from the structures to air are removed by demolishing and containing the structures. Risks of contaminant migration to soil and water diminish because the cap isolates the structures, but some residual risk of contaminant migration remain.

6.8.2.2 Compliance with ARARs

Alternative 21 complies with action- and location-specific ARARs. ARARs regarding caps and covers are presented in the Technology Descriptions Volume, Appendix A. Consolidation under caps does not trigger LDRs since the historical evidence indicates the structures in this medium group do not contain hazardous waste.

6.8.2.3 Long-Term Effectiveness and Permanence

The residual risk for human health and biota is low because any contamination associated with the structural debris is isolated by capping. The migration pathways to air and biota are effectively mitigated by the soil cap. The pathways to soil and water are minimized by using a low-permeability cap. As discussed in Section 5.3, there may be residual risk from the surrounding soil, but the remediation of the surrounding soil will be handled as part of the soil medium. Regular site reviews, monitoring, and maintenance will be used to evaluate the adequacy and reliability of controls. Groundwater and possibly vadose zone monitoring may be necessary to detect contaminant migration from the capped area. The habitat in the vicinity of the capped area is improved by revegetating the capped area, but the area excludes burrowing animals.

6.8.2.4 Reduction of TMV

This alternative is effective in reducing contaminant mobility through containment but is ineffective in reducing toxicity and volume. Contaminant mobility may change should the cap leak, but contaminated structures are otherwise isolated by the cap. There are no treatment residuals associated with this alternative. This alternative does require long-term maintenance and monitoring, thereby increasing overall costs.

6.8.2.5 Short-Term Effectiveness

The greatest potential environmental impact during remediation is the spread of contamination by fugitive dusts. Standard dust-control measures are used to minimize this impact. There is a loss of biota habitat during construction, although currently it is considered poor habitat. The

greatest potential impact to workers is from fugitive dusts. Workers are protected by a combination of engineering controls and PPE. Demolition operations present physical hazards to workers. RAOs are achieved in 3 to 4 years.

6.8.2.6 Implementability

The alternative is technically and administratively feasible, with materials and services readily available for use. Potential public and regulatory opposition reduces the administrative feasibility.

6.8.2.7 Cost

There are 630 structures that can be addressed under this alternative. The present worth cost of this alternative is $35,800,000.

6.9 ALTERNATIVE 21a: DISMANTLING, SALVAGE, CONSOLIDATION

6.9.1 Description of Alternative

Alternative 21a includes dismantling the structure, salvaging scrap metal, and transporting and consolidating the debris in Basin A. Consolidation refers to using the structural debris as gradefill in an area such as Basin A where alternatives developed for the soil medium are implemented to fill and cap the area. This can be an effective use of the structural debris because the amount of gradefill required by any of the proposed soil cap/covers alternatives far exceeds the available volume of structural material. It is estimated that structural debris would only supply approximately 1 percent of the gradefill needed. Consolidation is discussed in the Technology Descriptions Volume, Section 6.

6.9.2 Analysis of Alternative

6.9.2.1 Overall Protection of Human Health and the Environment

Demolition and consolidation achieves Human Health and Biota RAOs. Consolidation of structures provides adequate protection of both human health and the environment. The degree of protection will depend on the type of cap used as well as the engineering controls employed to monitor and maintain the cap. The risks of contaminant migration from the structures to air

are removed by demolishing and containing the structures. Risks of contaminant migration to soil and water are minimized because the cap isolates the structures. Based on the use history of the structures, it is unlikely that the structural debris would introduce new sources of contamination to those already present in the consolidation area.

6.9.2.2 Compliance with ARARs

The alternative complies with action- and location-specific ARARs. ARARs regarding caps and covers and consolidation are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs since the historical evidence indicates the structures in this medium group do not contain hazardous wastes.

6.9.2.3 Long-Term Effectiveness and Permanence

The residual risk for humans and biota is low because any contamination associated with the structural debris is isolated by consolidation and capping. The migration pathways to the air and biota are effectively mitigated by capping. The pathways to soil and water are minimized by using an impermeable cap. As discussed in Section 5.3, there may be residual risk from the surrounding soil, but the remediation of the surrounding soil is handled as part of the soil medium. Regular site reviews, monitoring, and maintenance are used to evaluate the adequacy and reliability of controls. Groundwater and possibly vadose zone monitoring may be necessary to detect contaminant migration from the capped area. The habitat in the vicinity of the capped area is improved by revegetating the capped area, but the area will exclude burrowing animals.

6.9.2.4 Reduction of TMV

The volume and toxicity of contaminants associated with structural material is expected to be low. Containment of the debris by consolidation reduces contaminant mobility, but toxicity remains unchanged. The volume of contaminated material may increase if other consolidated materials contaminate structural material. There are no treatment residuals. This alternative does require long-term maintenance and monitoring.

6.9.2.5 Short-Term Effectiveness

RAOs are achieved in 3 to 4 years. The greatest potential environmental impact during remediation is the spread of contaminants by fugitive dusts. Standard dust-control measures are used to minimize this impact. There is a loss of biota habitat during construction, though currently it is considered poor habitat. The greatest potential impact to workers is from fugitive dusts. The workers are protected by a combination of engineering controls and PPE.

6.9.2.6 Implementability

This alternative is technically and administratively feasible, with materials and services readily available for use.

6.9.2.7 Cost

The cost of this alternative includes transportation to Basin A as well as prorated long-term monitoring and maintenance of the area. There are 630 structures amenable to this alternative. The present worth cost of this alternative is $34,000,000.

6.10 COMPARATIVE ANALYSIS OF ALTERNATIVES

Nine alternatives were analyzed for the Other Contamination History Group (Table 6.0-1). Alternative 1, No Action and Alternative 2, Pipe Plugs, Locks/Boards/Fences/Signs were removed from the selection process because these alternatives are not compatible with the alternatives proposed for the soil medium; these alternatives require structures to be removed before soil remediation can begin (Section 2.3). The remaining seven alternatives, which involve the removal and disposal of the structures, are compared in the following sections.

6.10.1 Overall Protection of Human Health and the Environment

All of the alternatives provide adequate protection of human health and the environment because the resulting structural debris is contained by landfilling, capping, or consolidation. On-post disposal of the debris is more protective than off-post disposal because on-post disposal offers direct control over long-term waste management and because transportation off post is not

necessary, further protecting the community. Treatment alternatives provide minimal additional protection due to the low levels of contamination in this medium group and because no treatments will remove all of the contaminants from the structural debris.

6.10.2 Compliance with ARARs

As described in the individual analyses of the alternatives, each of the remaining alternatives is in compliance with all ARARs.

6.10.3 Long-Term Effectiveness and Permanence

The residual risk for each of the alternatives is low because the ultimate disposition of the debris is performed by landfilling, capping, or consolidation. Treatment of the structures prior to demolition does not lower the residual risk significantly because the contaminant concentrations are low in this medium group and the in situ treatments do not destroy the contaminants present but merely remove them from structural surfaces.

Landfilling, capping, or consolidation of the structural debris provides adequate control of the debris. If the ultimate disposal area is on post, prorated long-term monitoring and maintenance of the disposal area is necessary to maintain adequate controls. If the ultimate disposal area is off post, long-term monitoring and maintenance is included in the disposal cost, although there is no direct control of the off-post disposal site management.

Because each of the seven alternatives includes the removal of structures, the habitat is improved at the location of the structure. If the ultimate disposal area is on post, the habitat is limited at the disposal location due to the need to exclude burrowing animals from the landfill or capping area.

6.10.4 Reduction of TMV

All of the treatments offer some degree of irreversible reduction in contaminant TMV, but each of the treatment technologies has limitations in that they are only applicable to certain

contaminants on certain surfaces. Vacuum dusting is only effective for contaminants associated with dust that is not bound to a surface. Steam cleaning can only be applied to nonporous surfaces. Sand blasting is amenable to near-surface contamination on most surfaces and is the most universally applicable in situ treatment for the structures medium.

Landfilling, capping, or consolidation offers a reduction in mobility for all contaminants through containment. The reduction in mobility may be reversed should the disposal area leak. Proper long-term monitoring and maintenance of the disposal area can prevent leakage from occurring.

Vacuum dusting and sand blasting produce potentially hazardous solid waste streams. Sand blasting produces more waste than vacuum dusting because the process removes part of the surface being treated and produces degraded blast media. Steam cleaning produces a potentially hazardous liquid sidestream.

6.10.5 Short-Term Effectiveness

For demolition and stockpiling, standard worker protection is necessary both for physical and chemical hazards. All treatments require worker protection. Contaminated dust is the greatest concern for the community. Dust controls during demolition and transportation activities are necessary to protect the community during remedial actions.

The environmental impacts associated with these remedial alternatives are low if the dust that is produced is adequately controlled. The time needed to complete any of these alternatives is short, within 3 to 4 years, which lessens the environmental impact. Alternatives that do not involve treatment have less of an impact because the period of performance is shorter and because there are no potentially hazardous treatment sidestreams and residuals produced.

For all 7 of the alternatives, RAOs are achieved in 3 to 4 years. RAOs are achieved most rapidly by disposing the debris on post and without treatment.

6.10.6 Implementability

All of the alternatives are technically feasible to some degree. Demolition, transportation, and landfilling or capping are all standard technologies that are technically feasible. Section 8 describes the limitations of the treatment technologies.

All of the alternatives are administratively feasible. There are long-term liability concerns associated with off-post disposal of debris because there is no direct control over long-term waste management.

Services and materials are readily available for all options.

6.10.7 Cost

The majority of the cost for these alternatives is related to activities associated with demolition, transportation, and disposal. Off-post transportation and disposal is significantly more expensive than on-post disposal. In situ treatments (vacuum dusting, steam cleaning, and sand blasting) do not add appreciably to the costs. Costs range from a high of $95,500,000 for Alternative 20 (which involves demolition and disposal of the debris in an off-post hazardous waste landfill) to $34,000,000 for Alternative 21a (which involves demolition and disposal of the debris in the Basin A consolidation area). The costs of IRAs and ongoing actions described in Sections 2.2.3 and 2.2.4 and listed in Table 8.3-1 are not included in the remediation costs.

6.10.8 Selection of Sitewide Options

In summary, the treatment of structures in this medium group does not add significantly to the overall protectiveness and permanence of the alternatives because of the low concentrations of contamination expected to be present. On-post disposal is preferred over off-post disposal due both to cost savings associated with on-post disposal and to the reduced long-term liability due to the direct control over long-term monitoring and maintenance. Consequently, three alternatives were chosen for consideration as sitewide options. The sitewide options are discussed in Section 8. Alternatives for this medium group include the following:

- Alternative 19: Dismantling, Salvage, On-Post Hazardous Waste Landfill
- Alternative 21: Dismantling, Salvage, Clay Cap
- Alternative 21a: Dismantling, Salvage, Consolidation

Table 6.0-1 Comparative Analysis of Alternatives, No Future Use, Other Contamination History Medium Group

Criteria		ALT. 1: No Action	ALT. 2: Pipe Plugs, Locks/Boards/Fences/Signs
1.	Overall protection of human health and environment	Does not provide any increase in protectiveness.	Limited protectiveness, eliminates contact with contaminants by preventing access to structure.
2.	Compliance with ARARs	Action-specific ARARs do not apply because no action is taken. Complies with location-specific ARARs.	Complies with action- and location-specific ARARs.
3.	Long-term effectiveness and permanence	Does not provide long-term effectiveness or permanence. Residual risk increases with time as structures deteriorate. Current access controls are inadequate for the long term. Habitat remains unchanged.	Moderate residual risk; contaminants are sealed inside pipes, and access to structure is prevented. Adequate controls, long-term monitoring, and maintenance required. Habitat not improved.
4.	Reduction in TMV	Does not reduce TMV.	Pipe plugging reduces mobility but may be reversible if pipe plugs fail. Toxicity remains unchanged. Volume of waste is increased. Restricting access reduces mobility. There are no treatment residuals for this alternative.
5.	Short-term effectiveness	No worker or community protection is necessary because no action is taken. Habitat not improved. Does not achieve RAOs.	Worker protection necessary during pipe plugging and access restriction operations. Habitat impacted during remediation. RAOs are attained within 3 to 4 years.
6.	Implementability	Not administratively feasible because further structure deterioration may pose a physical and chemical hazard.	Technically and administratively feasible. Services and materials are readily available.
7.	Cost[1] –Present worth cost	None	$64,100,000
Summary		Not retained: does not achieve RAOs.	Not retained: leaving structures in place is inconsistent with soil remedial alternatives.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1.

Table 6.0-1 Comparative Analysis of Alternatives, No Future Use, Other Contamination History Medium Group

Criteria		ALT. 9: Vacuum Dusting, Dismantling, Salvage, On-Post Nonhazardous Waste Landfill	ALT. 9a: Steam Cleaning, Dismantling, Salvage, On-Post Nonhazardous Waste Landfill
1.	Overall protection of human health and environment	Moderately protective; treatment only applicable to removing contaminated dust. Debris contained by landfilling.	Moderately protective; treatment limited to contamination on nonporous surfaces. Debris contained by landfilling.
2.	Compliance with ARARs	Complies with action- and location-specific ARARs.	Complies with action- and location-specific ARARs.
3.	Long-term effectiveness and permanence	Low residual risk for structures with dust contamination only.	Low residual risk for structures with contamination on nonporous surfaces only.
		Adequate controls for structural debris that can be placed in a nonhazardous waste landfill. Long-term maintenance required.	Adequate controls for structural debris that can be placed in a nonhazardous landfill. Long-term maintenance required.
		Habitat improved at site but limited at landfill.	Habitat improved at site but limited at landfill.
4.	Reduction in TMV	Vacuum dusting irreversibly reduces contaminant mobility for surfaces contaminated with dust. Volume and toxicity not affected.	Steam cleaning irreversibly reduces mobility and volume of contaminants on nonporous surfaces.
		Treatment residuals consist of contaminated dust.	Treatment residuals consist of contaminated washwater.
5.	Short-term effectiveness	Worker exposure controls and physical protection required during vacuuming. Worker protection necessary for physical hazards associated with dismantling. Dust controls needed for demolition.	Worker exposure controls during steam cleaning and protection needed for physical hazards associated with dismantling. Dust controls needed for demolition.
		Habitat improved at site.	Habitat improved at site.
		RAOs are achieved within 3 to 4 years.	RAOs are achieved within 3 to 4 years.
6.	Implementability	Treatment limited to dust contamination only. Administratively and technically feasible.	Treatment limited to contaminants on nonporous surfaces. Administratively feasible.
		Materials and services readily available.	Materials and services readily available.
7.	Cost[1] –Present worth cost	$39,900,000	$41,100,000
Summary		Not retained: treatment not necessary, consolidation provides for more suitable use of structural debris as fill.	Not retained: not applicable to porous surfaces, treatment not necessary.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1.

Table 6.0-1 Comparative Analysis of Alternatives, No Future Use, Other Contamination History Medium Group

Criteria		ALT. 10: Sand Blasting, Dismantling, Salvage, On-Post Nonhazardous Waste Landfill	ALT. 19: Dismantling, Salvage, On-Post Hazardous Waste Landfill
1.	Overall protection of human health and environment	Protective; treatment limited to surface contaminants.	Protective; debris is contained by landfilling.
2.	Compliance with ARARs	Complies with action- and location-specific ARARs.	Complies with action- and location-specific ARARs.
3.	Long-term effectiveness and permanence	Low residual risk for structures with surface contamination only. Adequate controls for structural debris that can be placed in a nonhazardous waste landfill. Sand blasting satisfies BDAT for contaminated structural material. Long-term maintenance is required. Habitat improved at site but limited at landfill.	Low residual risk; structural debris is contained by landfilling. Adequate controls, long-term monitoring required. Habitat improved at site but limited at landfill.
4.	Reduction in TMV	Sand blasting irreversibly reduces the mobility and volume of surface contamination. Treatment is not applicable to wood, glass, and certain polymers. The treatment residual consists of contaminated grit.	Landfilling reduces mobility. Mobility reduction may be reversed if landfill leaks. No treatment residuals.
5.	Short-term effectiveness	Worker exposure controls during sand blasting and protection needed for physical hazards associated with dismantling. Dust controls needed for demolition. Habitat is improved at the site. RAOs are achieved within 3 to 4 years.	Dust controls needed for demolition. Worker protection necessary for physical hazards associated with dismantling. Habitat improved at site. RAOs are achieved in 3 to 4 years.
6.	Implementability	Treatment limited to accessible surface contaminants, not applicable to wood surfaces, glass, and certain polymers. Administratively feasible. Materials and services readily available.	Technically and administratively feasible. Materials and services readily available.
7.	Cost[1] –Present worth cost	$43,200,000	$38,900,000
Summary		Not retained: not applicable to some structures, treatment not necessary.	Retained: hazardous waste landfill is protective; consistent with soil remedial alternatives.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1.

Table 6.0-1 Comparative Analysis of Alternatives, No Future Use, Other Contamination History Medium Group

Criteria		ALT. 20: Dismantling, Salvage, Off-Post Hazardous Waste Landfill	ALT. 21: Dismantling, Salvage, Clay Cap
1.	Overall protection of human health and environment	Protective; debris contained by landfilling.	Protective; debris contained by capping.
2.	Compliance with ARARs	Complies with action- and location-specific ARARs.	Complies with action- and location-specific ARARs.
3.	Long-term effectiveness and permanence	Low residual risk; structural debris contained by landfilling. Adequate controls for landfilled debris. Habitat improved at site.	Low residual risk; structural debris contained by capping. Adequate controls, long-term maintenance, and monitoring of caps required. Habitat improved but restriction needed for burrowing animals.
4.	Reduction in TMV	Landfilling reduces mobility. Mobility reduction may be reversible if landfill leaks. No treatment residuals.	Capping reduces mobility but may be reversible if cap leaks. No treatment residuals.
5.	Short-term effectiveness	Dust controls needed for demolition. Worker protection necessary for physical hazards associated with dismantling. Habitat improved at site. RAOs are achieved in 3 to 4 years.	Dust controls needed for demolition. worker protection necessary for physical hazards associated with dismantling. Habitat improved at site but burrowing animals excluded. RAOs achieved in 3 to 4 years.
6.	Implementability	Technically and administratively feasible, but long-term liability a concern for off-post disposal. Off-post transportation-related accidents a concern. Materials and services readily available.	Technically and administratively feasible. Materials and services readily available.
7.	Cost[1] –Present worth cost	$95,500,000	$35,800,000
Summary		Not retained: community impacts from transportation and long-term liability a concern.	Retained: cost-effective alternative that is consistent with soils remedial alternatives.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1.

Table 6.0-1 Comparative Analysis of Alternatives, No Future Use, Other Contamination History Medium Group

Criteria		ALT. 21a: Dismantling, Salvage, Consolidation
1.	Overall protection of human health and environment	Protective; debris contained through consolidation.
2.	Compliance with ARARs	Complies with action- and location-specific ARARs.
3.	Long-term effectiveness and permanence	Low residual risk; structural debris consolidated and capped in Basin A or other suitable area. Adequate controls, long-term maintenance, and monitoring required. Habitat improved but restriction needed for burrowing animals.
4.	Reduction in TMV	Consolidation reduces mobility. Mobility reduction may be reversible if cap leaks. No treatment residuals.
5.	Short-term effectiveness	Dust controls needed for demolition, worker protection necessary for physical hazards associated with dismantling. Habitat improved at site but burrowing animals excluded in consolidation area. RAOs achieved in 3 to 4 years.
6.	Implementability	Technically and administratively feasible. Materials and services readily available.
7.	Cost[1] –Present worth cost	$34,000,000
Summary		Retained: cost-effective alternative that is consistent with soil remedial alternatives: consolidation permits for use of structural debris as fill material for soil caps.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1.

Section 7

7.0 NO FUTURE USE, AGENT HISTORY MEDIUM GROUP

Structures in the No Future Use, Agent History Medium Group include those with a history of producing, processing, testing, storing, or destroying Army chemical agents. Plate 3.3-1 shows the locations of these structures. These structures must be handled in compliance with AR 385-61 (Army 1992a) and DA PAM 385-61 (Army 1992b) and DOD regulations in effect at the time of remediation. Action must be taken to treat the agent contamination within the structure or debris to a level consistent with Army regulations (3X or 5X) so it may be properly disposed. Many of the structures in this medium group are covered under chemical weapons treaties as described in Section 3.3.4.

The remedial alternatives (Table 7.0-1) developed for this group encompass the range of treatment and disposal options necessary to address the wide range of contaminants potentially associated with these structures. Due to Army regulations, containment or institutional control options, without treatment, are not suitable response actions for the structures in this medium group. Likewise, surface cleaning and surface removal technologies are not suitable for this medium group unless the agent-contaminated structural material is chemically treated to the 3X standard so the materials can be placed in a hazardous waste landfill. Alternatively, materials thermally treated to the 5X standard can be released from the government's control. Although some steel vessels that had previously contained agent (ton containers) have been salvaged at an Army facility (Rock Island Arsenal), commercial salvage is not a suitable process option for agent-contaminated structural materials due to potential regulatory and community concerns unless these materials have been treated to the 5X standard. If the Rock Island Arsenal facility is available at the time of remediation and salvage appears to be cost effective, this option will be reconsidered. The analysis of the alternatives according to the seven EPA evaluation criteria (see the Executive Summary, Volume I) are presented in Sections 7.1 through 7.8. A comparative analysis of the alternatives developed for this medium group is presented in Section 7.9.

All of the alternatives considered for the Agent History Group have demolition and landfilling in common with those developed for the Significant Contamination History Group. Section 5.3 provides a general discussion and analysis of these options. Because structures in this medium group are regulated under AR 385-61 (Army 1992a) and DA PAM 385-61 (Army 1992b), certain aspects of the remedial alternatives (e.g., air monitoring, worker protection) are unique to this medium group. For example, the slabs and foundations of agent structures will be dismantled and removed. In addition, as discussed in Section 5, it was assumed that all ACM is removed from the structures prior to the initiation of the structures remediation under the Asbestos IRA. As described in Section 2.2.3, the cost of ACM removal is covered by the Asbestos IRA. As described in Section 2, PCB-contaminated equipment will be removed under the scope of the PCB IRA. As demonstrated in earlier studies, there is expected to be very little PCB-contaminated structural material associated with the structures medium. Any remaining PCB-contaminated structural material will be handled as part of the structures remediation. It was assumed that all process equipment, piping, and tanks are removed and treated to the 3X standard prior to the structures remediation under the chemical-process-related activities.

Before any of the alternatives can be implemented, air monitoring of the interior of the structure must be performed to determine whether agent is present. If agent is detected, suitable treatments such as caustic washing and worker protection are implemented in accordance with AR 385-61 (Army 1992a) and DA PAM 385-61 (Army 1992b) and visual inspection repairs and demolition are conducted (Section 5.3). After the debris is sized for placement in a hazardous waste landfill, it is confined and the interior air space monitored for the presence of agent. Should agent be detected at or above action levels, additional treatment such as caustic washing will be necessary. Debris that passes monitoring standards is classified 3X and may be transported to a RCRA Subtitle C landfill for disposal.

As with the Significant Contamination History Group, action-specific ARARs that apply to all alternatives in the Agent History Group (with the exception of Alternative 1, No Action) include those ARARs related to demolition of structures (Technology Descriptions Volume, Appendix

A). ARARs regarding demolition address worker protection, wildlife protection, noise control, and air emission control. ARARs regarding stockpiling address waste characterization and management, wildlife protection, and worker protection. All alternatives, with the exception of the No Action alternative, are in compliance with these action-specific ARARs as well as location-specific ARARs, which are listed in the Technology Descriptions Volume, Appendix A. Unique action-specific ARARs that apply to individual alternatives within the medium group are described below.

7.1 ALTERNATIVE 1: NO ACTION

7.1.1 Description of Alternative

The No Action alternative is generally not a suitable alternative for this medium group because of the potential presence of Army agent contamination.

7.1.2 Analysis of Alternative

7.1.2.1 Overall Protection of Human Health and the Environment

Alternative 1 does not provide protection of human health and the environment if agent contamination is present. Structures are permitted to deteriorate and potentially release agent under this alternative.

7.1.2.2 Compliance with ARARs

Alternative 1 does not comply with location-specific ARARs. If PCBs or asbestos are present, this alternative may not comply with action-specific ARARs. Other action-specific ARARs do not apply to this alternative because no action is taken.

7.1.2.3 Long-Term Effectiveness and Permanence

Alternative 1 does not provide long-term effectiveness or permanence. Potential physical hazards of deteriorating structures are not addressed and there is a possibility for exposure of humans and biota to agent compounds and their breakdown products.

7.1.2.4 Reduction of TMV

Alternative 1 does not reduce contaminant TMV.

7.1.2.5 Short-Term Effectiveness

Because there is no action taken, there are no environmental impacts to the community. RAOs are not achieved.

7.1.2.6 Implementability

This alternative is technically and administratively feasible.

7.1.2.7 Cost

The present worth cost of this alternative is $0.00.

7.2 ALTERNATIVE 4: HOT GAS, DISMANTLING, ON-POST HAZARDOUS WASTE LANDFILL

7.2.1 Description of Alternative

This alternative includes administering in situ hot gas treatment, dismantling the structure, consolidating the resulting debris in an on-post hazardous waste landfill, and backfilling the structure excavation.

In situ hot gas treatment for structures is limited to nonflammable surfaces (e.g., metals, masonry) where agent production or handling operations occurred, where documented spills occurred, or where air monitoring procedures have detected agent. Hot gas treatment consists of injecting hot gases into a sealed room to thermally desorb contaminants from structural surfaces. The treatment produces a gaseous sidestream with entrained contaminants that are then captured and treated by incineration. Pretreatment of the structure includes isolating the treatment area, and post-treatment includes collecting and treating the off gases produced. Due to the limited applicability of hot gas treatment, some potentially contaminated portions of structures may not be amenable to this treatment. Following hot gas treatment, the structure is again monitored for

agent prior to dismantling. If agent is still detected, the structure is retreated by hot gas to the 3X standard before dismantling occurs. For the purposes of the DAA, it is assumed that retreatment will not be required. Hot gas treatment is described in the Technology Descriptions Volume, Section 8.

7.2.2 Analysis of Alternative

7.2.2.1 Overall Protection of Human Health and the Environment

Alternative 4 is protective of human health and the environment, although treatment is limited to organic contaminants on nonflammable surfaces. Pilot-scale tests have proven that hot gas is an effective treatment for structures contaminated with mustard. Debris is contained by landfill.

7.2.2.2 Compliance with ARARs

The alternative complies with action- and location-specific ARARs. ARARs regarding hot gas decontamination of structures and debris and hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4.

7.2.2.3 Long-Term Effectiveness and Permanence

Alternative 4 has a low residual risk for structures with surficial organic and Army chemical agent contamination on nonflammable surfaces. Hot gas treatment removes Army chemical agent and other organic contaminants from the surfaces of structures, thereby decreasing the residual risk and enhancing the effectiveness and permanence of the alternative. Habitat is improved at the site but limited at the landfill.

7.2.2.4 Reduction of TMV

Hot gas treatment of nonflammable surfaces irreversibly reduces the TMV of organic contaminants and Army chemical agent. Based on sampling results, inorganic contaminants are not expected to be present. There will be no reduction in TMV of inorganics using hot gas

treatment. Treatment residuals include potentially hazardous off gases that must be collected and treated as part of the process. Landfill controls are only reversible should the landfill leak.

7.2.2.5 Short-Term Effectiveness

Worker-protection controls are instituted during hot gas treatment. Due to the aggressive nature of this treatment and the possibility of liberating Army chemical agent, all off gases must be collected and treated to protect the health and safety of the community. The work area must be completely sealed because leakage of potentially toxic off gases is a concern. This alternative assumes that all agent-contaminated structures are effectively treated to the 3X standard. The debris is monitored for Army chemical agent after demolition. If agent is detected, additional treatment will be necessary, which may limit the effectiveness of this alternative. Demolition operations present physical hazards to workers. RAOs are achieved within 3 to 4 years. Positive impacts to habitats at the site would result from this treatment.

7.2.2.6 Implementability

There are limits to the technical feasibility of this alternative because isolation of the treatment area is difficult and because hot gas treatment may compromise structural integrity. The inability to completely seal the structure may limit the effectiveness of hot gas treatment due to heat loss or gas leakage through gaps in the structure. Structural repair to eliminate leakage pathways may be required prior to treatment. In addition, the complexity of the physical configuration of the structure (i.e., the inaccessibility of corners or recesses) may prevent even heating, and the physical properties of the structure may inhibit the diffusion and release of contaminants to the gas stream (e.g., smooth steel may release contaminants more readily than porous concrete). The alternative is administratively feasible. To date, hot-gas technology has only been developed at the pilot scale and its effectiveness at full field scale is unknown. It is not a commercially available technology, and technical expertise is limited.

7.2.2.7 Cost

For cost-estimating purposes, it was assumed that dismantling is used to demolish the structure and that only interior surfaces are treated. There are 70 structures amenable to this alternative. The cost of this alternative also includes air monitoring for analytical verification of the effectiveness of the treatment and incineration treatment of the emitted gas. The present worth cost of this alternative is approximately $107,000,000.

7.3 ALTERNATIVE 6: HOT GAS, DISMANTLING, ON-POST ROTARY KILN INCINERATION, ON-POST HAZARDOUS WASTE LANDFILL

7.3.1 Description of Alternative

Alternative 6 includes administering in situ hot gas treatment, dismantling the structure, stockpiling the structure debris until the on-post rotary kiln comes on line, monitoring the debris for the presence of agent prior to incineration, incinerating the debris, transporting and disposing of the ash in the on-post hazardous waste landfill, and backfilling the excavation. This alternative is similar to Alternative 4 except for the addition of rotary kiln incineration to treat the debris. Salvage of materials treated to the 5X standard by this alternative may be possible.

7.3.2 Analysis of Alternative

7.3.2.1 Overall Protection of Human Health and the Environment

Alternative 6 is protective of human health and the environment through destruction of organic contaminants, including Army chemical agent, by means of hot gas treatment and incineration. The alternative is less protective during the stockpiling period. Incinerating agent-contaminated wastes allows the waste to be classified as nonhazardous (i.e., 5X).

7.3.2.2 Compliance with ARARs

The alternative complies with action- and location-specific ARARs. ARARs regarding hot gas and chemical ARARs for agent decontamination of structures and debris, ARARs regarding on-post rotary kiln incineration, and ARARs regarding hazardous waste landfills are presented in the

Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4.

7.3.2.3 Long-Term Effectiveness and Permanence

Because incinerated debris is defined as nonhazardous with regard to agent (i.e., the 5X standard), there is low residual risk with this alternative. Adequacy and reliability of controls are enhanced by the destruction of contaminants through incineration. Wildlife habitat is limited at the landfill.

7.3.2.4 Reduction of TMV

This alternative irreversibly reduces contaminant TMV through the complete thermal destruction of organic contaminants, including Army chemical agent. Hot gas irreversibly reduces the TMV of organic contaminants on nonflammable surfaces and produces off gases that require treatment. Rotary kiln incineration achieves complete decontamination of agent (i.e., the 5X standard) through treatment at temperatures exceeding 1,000 degrees Fahrenheit (°F). Off gases produced during the incineration process must be treated. The rotary kiln is the most commonly used type of hazardous waste incinerator and can effectively process demolition debris. Supplemental fuels are required due to the low heating value of the material. Although inorganics are not treated by incineration, based on sampling results, inorganic contaminant levels are not expected to be a problem.

7.3.2.5 Short-Term Effectiveness

Worker protection is a concern for hot gas treatment because potentially toxic off gases might be produced (Section 7.2.2.5), and during the stockpiling operation. To protect the community, air controls are required during the conduct of both hot gas treatment and incineration. Demolition operations present physical hazards to workers. RAOs are achieved in 5 to 6 years. Positive habitat impacts occur at the site.

7.3.2.6 Implementability

This alternative is administratively and technically feasible. However, it is limited to nonflammable surfaces and is difficult to implement due to the need for materials handling, the need to isolate the hot-gas treatment area, and the fact that the treatment may compromise the integrity of the structure. For structures contaminated with inorganics, there are potential ash disposal concerns. Furthermore, there are concerns regarding community acceptance of the incinerator. Professional expertise and services for the rotary kiln are readily available. Professional expertise and services for hot gas treatment are limited because the process has only been developed at the pilot-scale level and its implementability in a full-scale operation is unknown.

7.3.2.7 Cost

The cost of this alternative includes the assumptions that representative air monitoring for analytical verification of the effectiveness of the treatment and for incineration treatment of the emitted gas are both conducted. It was assumed that only interior surfaces are treated with hot gas and that all of the structural debris is to be incinerated. The present worth cost of this alternative is approximately $196,000,000.

7.4 ALTERNATIVE 14: DISMANTLING, ON-POST HAZARDOUS WASTE LANDFILL

7.4.1 Description of Alternative

Alternative 14 includes dismantling the structure, placing the debris and waste in the on-post hazardous waste landfill and backfilling the structure excavation. Alternative 14 has limited applicability to the No Future Use, Agent History Medium Group. Dismantling and disposing of agent-contaminated structures without treatment is only possible if Army regulations concerning agent handling (i.e., the 3X standard) are satisfied, i.e., if Army chemical agent is detected neither before nor after demolition of the structure.

7.4.2 Analysis of Alternative

7.4.2.1 Overall Protection of Human Health and the Environment

Alternative 14 offers adequate protection of human health and the environment if Army chemical agent is not detected during pre- and post-demolition monitoring. If agent is detected, treatment is necessary prior to landfilling, which limits the applicability of this alternative.

7.4.2.2 Compliance with ARARs

Alternative 14 complies with action- and location-specific ARARs but may not satisfy Army regulations concerning the handling of agent if any material does not meet the 3X standard. ARARs regarding hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4.

7.4.2.3 Long-Term Effectiveness and Permanence

There is low residual risk associated with the alternative if Army chemical agent is not detected. If Army chemical agent is detected in monitoring, Alternative 14 is not applicable. Habitat is improved at the site but limited at the landfill.

7.4.2.4 Reduction of TMV

Because Alternative 14 does not include treatment of the structures, it is not effective in reducing toxicity or volume; however, contaminant mobility is minimized by containment but may be reversible should the landfill leak. There are no treatment residuals.

7.4.2.5 Short-Term Effectiveness

Dust controls are necessary for community protection. There is a potential for impacts on workers and on the community because no treatment of Army chemical agent is included in this alternative. Demolition operations present physical hazards to workers. RAOs are achieved in

3 to 4 years if no Army chemical agent is detected during monitoring. Positive habitat impacts occur at the site.

7.4.2.6 Implementability

This alternative is not administratively feasible if debris does not meet Army decontamination criteria, and there is always a possibility that some structural debris will contain Army agent at a level that will require treatment. Materials and services for demolition are readily available for use.

7.4.2.7 Cost

The cost of this alternative includes transportation to the landfill as well as long-term monitoring and maintenance of the landfill. There are 70 structures amenable to this alternative. The present worth cost for this alternative is $48,900,000.

7.5 ALTERNATIVE 15: DISMANTLING, ON-POST ROTARY KILN INCINERATION, ON-POST HAZARDOUS WASTE LANDFILL

7.5.1 Description of Alternative

Alternative 15 involves dismantling the structure, stockpiling the structure debris until the on-post rotary kiln comes on line, monitoring the debris for the presence of agent prior to incineration, incinerating the debris, disposing of the incinerator ash in an on-post hazardous waste landfill, and backfilling the structure excavation. This alternative is similar to Alternative 6 (Section 7.3) except that it does not include hot gas treatment. Salvage of materials treated to the 5X standard may be possible.

7.5.2 Analysis of Alternative

7.5.2.1 Overall Protection of Human Health and the Environment

Alternative 15 is protective of human health and the environment because it destroys organic contaminants, including Army chemical agent, through incineration and debris is contained in a landfill or under a cap. The alternative is less protective during the stockpiling period.

7.5.2.2 Compliance with ARARs

Alternative 15 complies with action- and location-specific ARARs. ARARs regarding on-post rotary kiln incineration and ARARs regarding hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4.

7.5.2.3 Long-Term Effectiveness and Permanence

Alternative 15 results in low residual risk because incinerated debris is assumed to be nonhazardous. Residual risk for this alternative may be higher if inorganic contaminants are present in the structural materials. Because organic contaminants are destroyed during the incineration process, adequacy and reliability of controls are enhanced by incineration. Wildlife habitat is limited at the landfill.

7.5.2.4 Reduction of TMV

This alternative irreversibly reduces contaminant TMV through the complete thermal destruction of organic contaminants at temperatures exceeding 1,000°F. This treatment results in decontamination of the debris to the 5X standard. Off gases produced during the incineration process must be treated. The rotary kiln, the most commonly used type of hazardous waste incinerator, can effectively process demolition debris. This process is effective in treating organic contaminants but ineffective in treating inorganic contaminants. However, based on sampling results, inorganics are not expected to be a problem.

7.5.2.5 Short-Term Effectiveness

To ensure the health and safety of the community, air monitoring and controls are required during incineration. Demolition operations present physical hazards to workers. Stockpiling operations present chemical hazards to workers. RAOs are achieved in 5 to 6 years. Positive habitat impacts occur at the site.

7.5.2.6 Implementability

This alternative is administratively and technically feasible, with materials and services readily available for use. However, it is difficult to implement due to the need for materials processing, extensive fuel requirements, and concerns over disposal of ash from structures contaminated with inorganics. Furthermore, there are concerns regarding community acceptance of the incinerator.

7.5.2.7 Cost

The cost estimate for this alternative includes the assumption that all of the structural debris is incinerated. There are 70 structures amenable to this alternative. The present worth cost for this alternative is approximately $132,000,000.

7.6 ALTERNATIVE 17: DISMANTLING, HOT GAS, ON-POST HAZARDOUS WASTE LANDFILL

7.6.1 Description of Alternative

This alternative includes dismantling the structure, administering hot gas treatment to the debris and waste if required to achieve 3X standard, disposing of the treated material in the on-post hazardous waste landfill established for contaminated RMA soils, and backfilling the structure excavation. This alternative is similar to Alternative 4 except that hot gas treatment is performed on the debris.

Dismantled materials are loaded into sealable 20-cubic yard (CY) rolloffs in preparation for hot gas treatment. Debris in each rolloff is monitored for agent, and those rolloffs containing agent-contaminated debris (i.e., if the debris fails the 3X standard) are designated for treatment. For the purpose of costing, it was conservatively assumed that 5 percent of the materials would require treatment. Debris that tests negative (i.e., 3X) for agent is directly disposed at the on-post hazardous waste landfill. Debris that tests positive for agent is transported in the rolloffs to an on-post facility for hot gas treatment. This facility includes a structure designed and built specifically for the treatment. The debris is treated in the rolloff containers and the off gases collected and treated. Following hot gas treatment, the debris is monitored for agent. If agent

is detected, the debris undergoes further hot gas treatment until agent is no longer detected (i.e., 3X). When the debris tests negative for agent, it is transported to the on-post hazardous waste landfill for disposal.

7.6.2 Analysis of Alternative

7.6.2.1 Overall Protection of Human Health and the Environment

Alternative 17 is protective of human health and the environment, although hot gas treatment is limited to nonflammable debris.

7.6.2.2 Compliance with ARARs

The alternative complies with action- and location-specific ARARs. ARARs regarding hot gas decontamination of structures and debris and ARARs regarding hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4.

7.6.2.3 Long-Term Effectiveness and Permanence

This alternative has a low residual risk if the contaminants, including Army chemical agent, are associated with nonflammable debris. If contaminants are associated with flammable surfaces, hot gas treatment is not applicable because the controls are not adequate. Wildlife habitat is limited at the landfill.

7.6.2.4 Reduction of TMV

If the contaminants are associated with nonflammable surfaces, this alternative is effective in irreversibly reducing organic contaminant TMV of organics through the hot gas treatment. This technology does not treat inorganics. Treatment residuals include off gases that must be collected and treated. Landfill controls are only reversible should the landfill leak.

7.6.2.5 Short-Term Effectiveness

Demolition operations present physical hazards to workers. Worker protection controls are instituted during hot gas treatment. To ensure the health and safety of the community, air monitoring and emission controls are needed during hot gas treatment. RAOs are achieved within 3 to 4 years if the treatment is applicable to all of the contaminated surfaces.

7.6.2.6 Implementability

The technical feasibility of Alternative 17 is limited because materials undergoing treatment must be stable at operating temperatures and the debris segregated so that combustible materials are removed before the process begins. Alternative 17 assumes that all potential agent-contaminated debris is effectively treated to the 3X standard by the hot gas treatment. The debris must be monitored for agent after demolition. If agent is detected on combustible materials, hot gas treatment will not be applicable and other treatment will be necessary, which limits the effectiveness of this alternative. To date, hot gas treatment has only been developed at the pilot scale, and its effectiveness at full scale is unknown. In addition, the technology is not commercially available and technical expertise is limited. The alternative is administratively feasible.

7.6.2.7 Cost

The cost estimate for this alternative includes the assumptions that air monitoring for analytical verification of the effectiveness of the treatment and the incineration treatment of the emitted gas are both conducted. There are 70 structures amenable to this alternative. The present worth cost of this alternative is approximately $59,900,000.

7.7 ALTERNATIVE 18: DISMANTLING, CAUSTIC TREATMENT, ON-POST HAZARDOUS WASTE LANDFILL

7.7.1 Description of Alternative

This alternative includes dismantling the structure, administering caustic treatment to the debris as necessary, disposing the debris in an on-post hazardous waste landfill, and backfilling the structure excavation.

The design of the postdemolition treatment system for this alternative is very similar to the one described in Alternative 17 (Section 7.6). Dismantled materials are loaded into sealable 20-CY rolloffs in preparation for caustic treatment. Debris in each rolloff is monitored for agent, and those rolloffs containing agent-contaminated debris are designated for treatment. For the purpose of costing, it was conservatively assumed that 5 percent of the materials would require treatment. Debris that tests negative for agent (3X standard) is directly disposed at the on-post hazardous waste landfill. Debris that tests positive for agent is transported in the rolloffs to an on-post facility for caustic treatment. The facility is a structure designed and built specifically for this treatment. The debris is treated by filling the rolloffs with a caustic solution. Spent caustic solution from the treatment is drained from the rolloffs, collected, and treated as required. Analysis for potentially toxic byproducts in the spent caustic is performed before it is treated or disposed. Following caustic treatment, the debris is monitored for agent. If agent is detected, the debris undergoes further caustic treatment until agent is no longer detected. When the debris tests negative for agent (i.e., the 3X standard), it is transported to the on-post hazardous waste landfill for disposal.

7.7.2 Analysis of Alternative

7.7.2.1 Overall Protection of Human Health and the Environment

This alternative is protective of human health and the environment through the treatment of structural debris using caustic treatment. Caustic treatment is the most commonly used surface treatment process for agent-contaminated materials to attain the 3X standard. Some other organic contaminants will also be chemically treated in the process. Debris is contained by landfilling.

7.7.2.2 Compliance with ARARs

Alternative 18 complies with action- and location-specific ARARs. ARARs regarding hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4.

7.7.2.3 Long-Term Effectiveness and Permanence

There is low residual risk associated with this alternative due to the effective treatment of Army chemical agent. Because agent-contaminated materials are neutralized prior to landfilling, the adequacy and reliability of controls are enhanced by the caustic treatment. Wildlife habitat is limited at the landfill.

7.7.2.4 Reduction of TMV

Alternative 18 is effective in irreversibly reducing Army chemical agent TMV through the caustic treatment process. While the TMV of some organic and inorganic contaminants is not affected by caustic treatment, this alternative effectively reduces the mobility of these contaminants through the landfilling and long-term monitoring of the debris; however, this may be reversible should the landfill leak. A toxic liquid sidestream is produced that must be tested and properly disposed.

7.7.2.5 Short-Term Effectiveness

Demolition operations present physical hazards to workers. Worker protection is a concern during caustic washing, as is containment and disposal of the spent caustic. The nature of the debris (porous versus nonporous) may necessitate re-treatment to achieve the 3X standard. Off gases and liquid treatment residuals need to be treated and disposed properly to ensure the health and safety of the community during remediation. RAOs are achieved in 3 to 4 years. Positive habitat impact occurs at the site.

7.7.2.6 Implementability

Alternative 18 is technically and administratively feasible. Containment and disposal of spent caustic is an implementation concern. Services and expertise for caustic washing are available.

7.7.2.7 Cost

The cost of Alternative 18 includes air monitoring for analytical verification of the effectiveness of the treatment, transportation and treatment of the liquid sidestream at an off-site facility, and activated carbon adsorption treatment of the emitted gas. There are 70 structures that are amenable to this alternative. The present worth cost of this alternative is approximately $56,900,000.

7.8 ALTERNATIVE 18a: SAND BLASTING, DISMANTLING, CAUSTIC TREATMENT, ON-POST HAZARDOUS WASTE LANDFILL

7.8.1 Description of Alternative

Alternative 18a includes sand blasting, dismantling the structure and treating the debris as necessary using caustic, disposing the debris in an on-post hazardous waste landfill, and backfilling the structure excavation. This alternative is similar to Alternative 18, although in situ sand blasting has been added to facilitate the treatment of contaminants other than Army chemical agent.

7.8.2 Analysis of Alternative

7.8.2.1 Overall Protection of Human Health and the Environment

Alternative 18a is protective of human health and the environment as described in Section 7.7. Sand blasting is effective in removing other contaminants from structural surfaces in this medium group that are not treated by caustic washing.

7.8.2.2 Compliance with ARARs

This alternative complies with action- and location-specific ARARs, and it meets the BDAT for debris treatment. ARARs regarding sand blasting and hazardous waste landfills are presented in the Technology Descriptions Volume, Appendix A. Disposal in the landfill does not trigger LDRs, since the landfill is a CAMU as defined in Volume II, Section 1.4.

7.8.2.3 Long-Term Effectiveness and Permanence

There is low residual risk associated with this alternative as discussed in Section 7.7. The residual risk and adequacy of controls are enhanced by sand blasting if contaminants other than Army chemical agent are present. Habitat is improved at the site but limited at the landfill.

7.8.2.4 Reduction of TMV

A solid waste stream is produced from the grit and removed structural material. This alternative is effective in irreversibly reducing Army chemical agent TMV through the caustic treatment process, although a toxic liquid sidestream is produced. Conversely, sand blasting removes surficial contaminants, reducing only the mobility and volume of the contaminants by removing them from the structure. Furthermore, waste sand-blasting materials may require caustic treatment, so the resulting waste stream must be characterized before being disposed.

7.8.2.5 Short-Term Effectiveness

Demolition operations present physical hazards to workers. Worker protection is a concern during sand blasting and caustic washing, as is containment and disposal of spent caustic. Sand blasting may release more Army chemical agent (if present) to the air than simple demolition. Air controls and monitoring are needed for community protection during treatment. RAOs are achieved in 3 to 4 years. Positive habitat impacts occur at site.

7.8.2.6 Implementability

Sand blasting is a concern in Army chemical agent structures because there is a possibility of liberating additional agent contamination from the subsurface during treatment, requiring more extensive containment. In addition, the complexity of the physical configuration of the structure (i.e., the inaccessibility of corners or recesses) could limit the effectiveness of the treatment. As a result, not all contaminated surfaces may be treated, depending on the configuration of each structure. Effectiveness of this alternative varies from structure to structure. The nature of the debris (porous versus nonporous) may necessitate re-treatment to achieve the 3X standard. Off gases and liquid treatment residuals must be treated and disposed properly. Caustic treatment

technology is the most commonly used decontamination method for Army chemical agent, and materials are readily available. The alternative is administratively feasible.

7.8.2.7 Cost

The cost of this alternative includes air monitoring for analytical verification of the effectiveness of the treatment and activated carbon adsorption treatment of the emitted gas. There are 70 structures amenable to this alternative. The present worth cost of Alternative 18a is approximately $60,500,000.

7.9 COMPARATIVE ANALYSIS OF ALTERNATIVES

Eight alternatives were analyzed for the Agent History Medium Group (Table 7.0-1). Alternative 1, No Action was removed from the selection process because, by leaving the structures in place, this alternative does not provide a permanent solution; the structures require long-term maintenance and present a continued physical and potential chemical hazard. In addition, many of the structures in this medium group must be removed to allow soil remediation to proceed. The remaining seven alternatives, which involve removing the structures and disposing of the debris, are compared in the following sections.

7.9.1 Overall Protection of Human Health and the Environment

The seven remaining alternatives can potentially satisfy AR 385-61 (Army 1992a) and DA PAM 385-61 (Army 1992b) and therefore provide adequate protection of human health and the environment. The resulting structure debris is contained in an on-post hazardous waste landfill.

7.9.2 Compliance with ARARs

Each of the alternatives is in compliance with all applicable ARARs. It should be noted that Alternative 14 is only in compliance if no Army chemical agent is detected above action levels.

7.9.3 Long-Term Effectiveness and Permanence

The residual risk for all of the alternatives is low because the ultimate disposition of the debris occurs at an on-post landfill. The disposal of the structural debris in an on-post landfill provides adequate controls for the debris. Because the ultimate disposal area is on post, long-term monitoring and maintenance of the disposal area is necessary to maintain adequate controls.

Because all alternatives include the removal of structures, the habitat is improved at the former location of the structure for all alternatives. The habitat is limited, however, in the landfill area because of the need to restrict burrowing animals from the site.

7.9.4 Reduction of TMV

All of the treatments offer some degree of irreversible reduction in contaminant TMV. All of the treatment technologies have limitations because they are only applicable to certain contaminants on certain surfaces, and most of the treatment technologies are designed to treat Army chemical agent. Hot gas treatment is only amenable to Army chemical agent and other organic contaminants on nonflammable surfaces. Caustic treatment is the most commonly used method for treating agent-contaminated material. Sand blasting is amenable to near-surface contamination on most surfaces. Sand blasting is the most universally applicable in situ treatment for the structures medium, although additional treatment of the waste may be necessary if Army chemical agent is present. Caustic treatment and hot gas treatment may result in a 3X classification of agent-contaminated debris, which allows the debris to be disposed in a hazardous waste landfill. Incineration, however, results in a 5X classification for agent-contaminated debris. Incineration, therefore, offers the greatest degree of irreversible reduction in chemical agent TMV.

Landfilling offers a reduction in mobility for all contaminants through containment. The mobility reduction can be reversed should the landfill leak. Proper long-term monitoring and maintenance of the landfill can prevent leakage from occurring.

Hot gas treatment produces large quantities of potentially toxic off gases that must be collected and treated. Sand blasting produces potentially hazardous solid waste streams that may contain Army chemical agent. Incineration not only produces a gaseous sidestream that must be treated but also ash that may still be considered hazardous.

7.9.5 Short-Term Effectiveness

Worker protection is necessary during demolition and stockpiling for both physical and chemical hazards and must include protection for possible agent contamination. All treatments require worker protection from potential Army chemical agent. Worker protection during hot gas treatment is a concern due to the aggressive nature of the treatment.

The off gases produced from hot gas treatment and incineration must be captured and treated to ensure the health and safety of the community. Contaminated dust, however, is the greatest concern for the community. Dust controls during demolition and transportation activities are necessary to protect the community during the remedial action.

The environmental impacts associated with these remedial alternatives are low assuming that the dust produced is adequately controlled. Alternatives that do not involve treatment have a lower impact because these alternatives are completed more rapidly and because there are no potentially hazardous treatment sidestreams and residuals produced. RAOs are achieved in 3 to 4 years for the five alternatives, which do not include the on-post rotary kiln incinerator. The two incineration alternatives achieve RAOs within 5 to 6 years. Positive habitat impacts occur at the site but are limited at the landfill.

7.9.6 Implementability

All of the alternatives are technically feasible to some degree. Demolition, transportation, and landfilling are all standard technologies that are technically feasible. Section 8 describes the technical limitations of the treatment technologies. Isolation of the treatment area and the possibility of compromising the integrity of a structure during hot gas treatment limits the

technical feasibility of that treatment technology, and the possibility of liberating additional Army chemical agent contamination from the subsurface during sand blasting limits the technical feasibility of that treatment technology. All of the alternatives are administratively feasible. Services and materials are readily available except for those associated with hot gas treatment. Because hot gas treatment is still under development, expertise and services are very limited. Caustic washing produces a liquid sidestream that requires treatment prior to disposal.

7.9.7 Cost

The majority of the costs for these alternatives are related to demolition, transportation, and disposal. In situ treatment by sand blasting does not appreciably add to the costs. Hot gas treatment and incineration are capital-intensive treatment technologies that significantly add to the cost of alternatives. The costs range from $196,000,000 for Alternative 6 (which involves hot gas treatment, demolition, on-post rotary kiln incineration, and disposal) to $48,900,000 for Alternative 14 (which involves demolition and disposal of the waste in an on-post hazardous waste landfill). The costs of IRAs and ongoing actions described in Sections 2.2.3 and 2.2.4 and listed in Table 8.3-1 are not included in these remediation cost estimates.

7.9.8 Development of Sitewide Structures Alternatives

In summary, for the Agent History Medium Group, Alternative 1 (No Action) is not suitable because it does not achieve Human Health and Biota RAOs. In addition the chemical weapons treaties dictate that all chemical agent manufacturing complexes be demolished and removed. The cost, the chemical hazards to workers during stockpiling, and the potential public and regulatory opposition to an incinerator limit the implementability of Alternatives 6 and 15. Because 3X classification is necessary for disposal, it was assumed that some treatment will be necessary to ensure that all debris may be classified 3X. Although hot gas treatment is a promising technique, it has not been implemented at full scale to date and there are several implementability concerns. Therefore, Alternatives 4, 6, and 17 have questionable implementability. Sand blasting prior to decontamination for agent may release agent compounds; therefore Alternative 18a may not be protective during implementation. Caustic

treatment is a proven and reliable treatment for agent-contaminated material. Therefore, Alternative 18 (Dismantling, Caustic Treatment, On-Post Hazardous Waste Landfill) is retained for developing sitewide alternatives for structures at RMA.

Table 7.0-1 Comparative Analysis of Alternatives, No Future Use, Agent History Medium Group

Criteria	ALT. 1: No Action	ALT. 4: Hot Gas, Dismantling, On-Post Hazardous Waste Landfill
1. Overall protection of human health and environment	Not protective; does not achieve RAOs.	Protective; treatment limited to organics on nonflammable surfaces. Debris contained by landfilling.
2. Compliance with ARARs	Does not comply with location-specific ARARs; action-specific ARARs do not apply.	Complies with action- and location- specific ARARs
3. Long-term effectiveness and permanence	Risk and habitat unchanged. No controls used.	Low residual risk, structural debris contained by landfilling. Adequate controls, long-term monitoring required. Habitat improved at site but limited at landfill.
4. Reduction in TMV	No reduction in TMV.	Hot gas irreversibly reduces TMV of organics and Army chemical agent on nonflammable surfaces. Landfill reduces mobility but may be reversible if landfill leaks. Off gases produced.
5. Short-term effectiveness	No worker protection necessary and no habitat improvement because no action taken. RAOs are not achieved.	Worker protection a concern for hot gas treatment, potentially toxic off gases produced. Dust controls needed for demolition. Worker protection necessary for physical hazards associated with demolition. Positive habitat impacts at site. RAOs are achieved in 3 to 4 years.
6. Implementability	Technically and administratively feasible.	Limited to nonflammable surfaces. May compromise structural integrity. Isolation of treatment area may be difficult. Administratively feasible. Hot gas services and expertise limited.
7. Cost[1] -Present worth cost	$0	$107,000,000
Summary	Not retained: does not achieve RAOs.	Not retained: treatment limited to organics and nonflammable surfaces.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1

Table 7.0-1 Comparative Analysis of Alternatives, No Future Use, Agent History Medium Group

Criteria		ALT. 6: Hot Gas, Dismantling, On-Post Rotary Kiln Incineration, On-Post Hazardous Waste Landfill	ALT. 14: Dismantling, On-Post Hazardous Waste Landfill
1.	Overall protection of human health and environment	Protective, debris treated by incineration, contained by landfilling.	Protectiveness limited, debris contained by landfilling, requires detected agent to be treated.
2.	Compliance with ARARs	Complies with action- and location-specific ARARs.	Complies with action- and location-specific ARARs but will not satisfy Army regulations concerning agent handling if agent detected.
3.	Long-term effectiveness and permanence	Low residual risk, incinerated debris nonhazardous. Adequate controls, long-term maintenance required.	Low residual risk only if agent not detected; structural debris contained by landfilling. Adequate controls, long-term monitoring required.
		Habitat improved at site but limited at landfill.	Habitat improved at site but limited at landfill.
4	Reduction in TMV	Hot gas irreversibly reduces TMV of organics on nonflammable surfaces. Off gases produced.	Debris not treated, no reduction in toxicity or volume.
		Does not treat inorganics.	
		Incineration irreversibly reduces TMV, renders debris nonhazardous; off gases are produced.	Landfilling reduces mobility but may be reversible if landfill leaks.
5.	Short-term effectiveness	Worker protection a concern for hot gas treatment, potentially toxic off gases produced. Dust controls needed for demolition. Worker protection a concern during stockpiling. Air controls needed for incineration. Positive habitat impacts at site.	Dust control needed for demolition.
		Worker protection necessary for physical hazards associated with demolition.	Positive habitat impacts at site. Worker protection necessary for physical hazards associated with demolition.
		RAOs are achieved in 5 to 6 years.	RAOs are achieved in 3 to 4 years.
6.	Implementability	May compromise structural integrity. Isolation of treatment area difficult. Administratively feasible but may meet public opposition. Hot gas services and expertise limited.	Technically and administratively feasible but may not satisfy Army regulations concerning agent handling. Materials and services readily available.
7.	Cost[1] –Present worth cost	$196,000,000	$48,900,000
Summary		Not retained: community and regulatory opposition to alternative.	Not retained: not consistent with Army regulations if agent detected.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1

Table 7.0-1 Comparative Analysis of Alternatives, No Future Use, Agent History Medium Group

Criteria	ALT. 15: Dismantling, On-Post Rotary Kiln Incineration, On-Post Hazardous Waste Landfill	ALT. 17: Dismantling, Hot Gas, On-Post Hazardous Waste Landfill
1. Overall protection of human health and environment	Protective, debris is treated by incineration, contained by landfilling.	Protective, treatment limited to organics on nonflammable debris surfaces. Debris contained by landfilling.
2. Compliance with ARARs	Complies with action- and location-specific ARARs.	Complies with action- and location-specific ARARs
3. Long-term effectiveness and permanence	Low residual risk, incinerated debris nonhazardous. Adequate controls, long-term maintenance required.	Low residual risk, structural debris contained by landfilling. Adequate controls, long-term monitoring required.
	Habitat improved at site but limited at landfill.	Habitat improved at site but limited at landfill.
4. Reduction in TMV	Incineration irreversibly reduces TMV. Debris is rendered nonhazardous. Off gases are produced.	Hot gas irreversibly reduces TMV of organics on nonflammable debris surfaces. Off gases are produced.
	Does not treat inorganics.	
	Landfilling reduces mobility but may be reversible if landfill leaks.	Landfilling reduces mobility but may be reversible if landfill leaks.
5. Short-term effectiveness	Dust controls needed for demolition. Worker protection a concern during stockpiling. Air controls needed for incineration.	Worker protection a concern for hot gas treatment, potentially toxic off gases produced. Dust controls needed for demolition.
	Positive habitat impacts at site.	Positive habitat impacts at site.
	RAOs are achieved in 5 to 6 years.	RAOs are achieved in 3 to 4 years.
	Worker protection necessary for physical hazards associated with demolition.	Worker protection necessary for physical hazards associated with demolition.
6. Implementability	Technically and administratively feasible but may meet public opposition.	Hot gas limited to nonflammable debris surfaces. May compromise structural integrity. Administratively feasible.
	Services and materials readily available.	Hot gas services and expertise limited.
7. Cost[1] –Present worth cost	$132,000,000	$59,900,000
Summary	Not retained: community and regulatory opposition to alternative.	Not retained: treatment limited to nonflammable surfaces.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1

Table 7.0-1 Comparative Analysis of Alternatives, No Future Use, Agent History Medium Group

Criteria	ALT. 18: Dismantling, Caustic Treatment, On-Post Hazardous Waste Landfill	ALT. 18a: Sand Blasting, Dismantling, Caustic Treatment, On-Post Hazardous Waste Landfill
1. Overall protection of human health and environment	Protective, treatment limited to surface Army chemical agent, debris contained by landfilling.	Protective, surface contaminants and Army chemical agent treated, debris contained by landfilling.
2. Compliance with ARARs	Complies with action- and location-specific ARARs.	Complies with action- and location-specific ARARs.
3. Long-term effectiveness and permanence	Low residual risk, structural debris contained by landfilling. Adequate controls, long-term monitoring required. Habitat improved at site but limited at landfill.	Low residual risk, structural debris contained by landfilling. Adequate controls, long-term monitoring required. Habitat improved at site but limited at landfill.
4. Reduction in TMV	Caustic wash irreversibly reduces TMV of Army chemical agent on surfaces of materials. Some other organic contaminants may be treated. Toxic liquid side stream produced. Landfilling reduces mobility but may be reversible if landfill leaks.	Sand blasting removes surface contaminants. Solid waste stream produced. Caustic wash irreversibly reduces TMV of surface Army agent. Toxic liquid side stream produced. Landfilling reduces mobility but may be reversible if landfill leaks.
5. Short-term effectiveness	Worker protection a concern for caustic washing. Containment and disposal of spent caustic a concern. Dust controls needed for demolition. Positive habitat impact at site. RAOs are achieved in 3 to 4 years. Worker protection necessary for physical hazards associated with demolition.	Worker protection a concern for caustic washing and sand blasting. Containment and disposal of spent caustic a concern. Sand blasting may release agent prior to treatment. Dust controls needed for demolition. Positive habitat impacts at site. RAOs are achieved in 3 to 4 years. Worker protection necessary for physical hazards associated with demolition.
6. Implementability	Containment and disposal of caustic a concern. Administratively and technically feasible. Caustic washing services available.	Containment and disposal of caustic a concern. Sand blasting a concern for Army chemical agent structures. Administratively feasible. Caustic washing services available.
7. Cost[1] –Present worth cost	$56,900,000	$60,500,000
Summary	Retained: complies with Army regulations and RAOs. Consistent with soil remedial alternatives.	Not retained: greater worker hazard and higher cost for similar compliance as Alternative 18.

[1] Cost does not include ongoing activities described in Section 2.2.3 and listed in Table 8.3-1

Section 8

8.0 RMA SITEWIDE REMEDIAL ALTERNATIVES FOR STRUCTURES

Sections 5 through 7 analyzed a range of potential remedial alternatives for the Significant Contamination History, Other Contamination History, and Agent History Medium Groups against the two threshold and five balancing EPA evaluation criteria. At the end of each of these sections, the alternatives for each medium group were compared and one or more alternatives from each medium group were retained for consideration in developing RMA sitewide remedial alternatives for structures. For the No Future Use, Significant Contamination History Medium Group, the following alternatives were retained:

Alternative 19: Dismantling, Salvage, On-Post Hazardous Waste Landfill

Alternative 21: Dismantling, Salvage, Clay Cap

Alternative 21a: Dismantling, Salvage, Consolidation

For the No Future Use, Other Contamination History Medium Group, the following alternatives were retained:

Alternative 19: Dismantling, Salvage, On-Post Hazardous Waste Landfill

Alternative 21: Dismantling, Salvage, Clay Cap

Alternative 21a: Dismantling, Salvage, Consolidation

For the No Future Use, Agent History Medium Group, the following alternative was retained:

Alternative 18: Dismantling, Caustic Treatment, On-post Hazardous Waste Landfill

Because the remediation of RMA structures needs to be integrated with soil remediation, it is appropriate to develop RMA sitewide alternatives for the structures medium that complement the sitewide alternatives developed for the soil medium.

The three potential sitewide alternatives that incorporate the alternatives retained for each of the structures medium groups and that are consistent with the soil remedial alternatives are as follows:

- Sitewide Structures Alternative 1
  Dismantling, Salvage, Capping for Other Contamination History Group, On-Post Hazardous Waste Landfill for Significant Contamination History Group and Agent History Group

- Sitewide Structures Alternative 2
  Dismantling, Salvage, Consolidation for Other Contamination History Group, On-Post Hazardous Waste Landfill for Significant Contamination History Group and Agent History Group

- Sitewide Structures Alternative 3
  Dismantling, Salvage, On-Post Hazardous Waste Landfill for All No Future Use Structures Medium Groups.

The three structures sitewide alternatives are compared in Table 8.0-1. The following sections discuss risk management and media interaction issues that are pertinent to the selection of a preferred sitewide alternative for the structures medium.

8.1 RISK MANAGEMENT ISSUES

Because high-level contamination is not expected to be associated with the majority of the structures, the risks associated with short-term worker and community exposure, as well as the long-term risks associated with waste management, are expected to be low. Selected portions of the Significant Contamination History Group structures, however, have the potential for containing low levels of organochlorine pesticides (OCPs) and metals, and there is potential for encountering chemical residues in process piping and tanks that are being removed under chemical-process-related activities. Moreover, unique concerns are associated with the potential presence of Army chemical agent in some structures. Accordingly, this section addresses pertinent issues associated with the selection of an RMA sitewide alternative for the structures medium that includes the No Future Use, Significant Contamination History, No Future Use,

Other Contamination History, and No Future Use, Agent History medium groups. Many of the structures in the No Future Use, Other Contamination History Group are expected to have only low levels of contamination so the debris from these structures can be used to support other activities, such as the formation of a biota barrier in a capped area.

All of the sitewide alternatives include the demolition of structures. Dust suppression is necessary for the protection of site workers and the community. Removing and disposing of the structures involves significantly less long-term risk than leaving the structures in place and restricting access to them. In addition, the majority of the structures must be removed to accommodate the soil remedial alternatives.

Treating Significant Contamination History or Other Contamination History Group debris prior to disposal may increase the short-term exposure potential for site workers and does not provide assurance that the material is completely decontaminated given its heterogeneity. There are unique concerns for structures with potential Army chemical agent presence. After demolishing the structures, caustic treatment is administered to debris as necessary to comply with Army regulations, and disposing of the debris in an on-post hazardous waste landfill is necessary to comply with Army agent regulations. Air monitoring and dust controls are necessary for the protection of site workers and the surrounding community. Because the highest probability of encountering agent residues is in process piping and tanks, which are currently being treated and removed as part of the chemical-process-related activities, the potential for encountering agent associated with building materials is low. Thus, short-term risks during such remediation activities are considered low.

Because the majority of Other Contamination History Group structure debris is expected to have a low potential for contamination, the difference in risk associated with landfilling, capping, or consolidation is minimal. Sampling and analysis of the structure debris is not performed due to the lack of standards for interpreting the data. The contamination status of the groups is based

on their use histories. Under these circumstances, the ultimate disposal method for the structures medium groups is chosen based on the following conservative approach:

- The Agent History Group must be disposed in the hazardous waste landfill to comply with Army regulations.

- The Significant Contamination History Group contains structures with use histories that indicate a significant possibility of contamination. This group is disposed in the hazardous waste landfill.

- For the Other Contamination History Group, the disposal options include capping in place, consolidation in Basin A, or the on-post hazardous waste landfill. Disposal of structural debris in either the hazardous landfill or the Basin A consolidation area is more protective than capping in place. Regulatory and community concerns are thereby limited, and the need for sampling is removed.

8.2 MEDIA INTERACTIONS

The remediation of RMA is an integrated process involving soil, water, and structures media (Section 2.3). Because the time frame during which structures are to be demolished is relatively short, structures remediation should not hinder the remainder of the remediation efforts. The structures demolition must begin in the areas in which soil remediation is planned so that the soil remediation schedule is not delayed. Structures covered under any chemical weapons agreements may need to be removed to comply with the requirements of these agreements.

Significant Contamination History and Agent History Group structure debris is expected to be placed into the on-post hazardous waste landfill as demolition proceeds. This requires that the landfill be constructed and in operation prior to the commencement of demolition activities. Other Contamination History Group debris may be placed in the Basin A consolidation area, which requires minimal preparation; in the on-post hazardous waste landfill, which must be ready before demolition begins; or in the areas to be capped, which require minimal preparation. In general, structures must be removed first to ensure the efficient execution of the remediation of the soil medium.

8.3 SELECTION OF PREFERRED SITEWIDE ALTERNATIVE

Considered before the selection of alternatives for the structures medium were the statutory requirements of CERCLA and the expectations of the NCP, which state that the selected alternative must provide the following:

- Protect human health and the environment
- Comply with ARARs unless a waiver is justified
- Be cost effective
- Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable
- Satisfy the preference for treatment as a principal element (of the remedy) or provide an explanation in the ROD of why the preference was not met

All three sitewide alternatives meet the conditions outlined above. Treatment technologies are generally not included because of the exposure risks to workers and the limited benefits for all but the Agent History Group. On-post hazardous waste landfilling for the Significant Contamination History Group is a protective remedy that is included in all three sitewide alternatives. For Sitewide Alternative 1, regulatory concerns remain about capping Other Contamination History Group debris, and the cost is not competitive. For Sitewide Alternative 2, consolidation of Other Contamination History Group debris is protective and cost effective. For Sitewide Alternative 3, landfilling Other Contamination History Group debris is protective but not cost effective. For these reasons, Sitewide Alternative 2 is the preferred structures alternative and represents the general alternative that will be applied to all No Future Use structures.

There are specific handling requirements associated with individual structures that must be addressed during the remediation (such as salvage not being applicable to agent structures or caustic treatment being applied to agent-contaminated structures when necessary). In addition, the dismantling techniques vary for different types of structures. Placement of Significant Contamination History and Agent History group debris in the on-post RCRA landfill and

placement of Other Contamination History Group debris in the Basin A consolidation area is considered a conservative approach, ensuring fully protective containment. This alternative achieves RAOs and is protective of human health and the environment. This alternative complies with ARARs and is cost-effective. Resource recovery (salvage of recyclable materials) will be used to the maximum extent practicable. Treatment of Army agent debris will be performed as necessary. In addition, on-post hazardous waste landfilling is required for the agent history structures and is compatible with the soil remediation alternatives. Completion of the ongoing IRAs is integral to the structures remediation.

8.3.1 Cost

All costs for the structures medium were developed in accordance with EPA guidance (OERR-EPA 1988). There are several ongoing IRAs that are not included in the remediation cost developed in this document. The costs of these IRAs, listed in Table 8.3-1, contribute significantly to the total cost of structures remediation. The total estimated structures IRA costs is $76,000,000, of which $41,000,000 will be spent by the ROD date, and an additional $35,000,000 will be spent in post-ROD removal actions. In addition, there are several other indirect costs that are not reflected in this cost estimate. These include the following:

- The cost of operating and maintaining the future use structures
- The cost of operating RMA throughout the duration of the remediation

The costs discussed above are applicable to program management of the RMA remediation effort.

The costs for the structures medium were developed in the DAA to provide detailed estimates for the structures remediation. An independent check was performed on estimates for the preferred sitewide alternative for structures using the commercially available cost estimating program Micro-Computer Aided Cost Estimating System (MCACES), which was developed by Building Systems Design Co. for the U.S. Army Corps of Engineers. The independent check has indicated that the costs presented in this document are reasonably accurate. Specific costs for

cleanup are developed during remedial design and are expected to fall within the costs developed in the Structures DAA.

Table 8.0-1 Summary of Comparative Analysis of Structures Sitewide Alternatives

Criteria	Alternative 1	Alternative 2	Alternative 3
Overall Protection of Human Health and the Environment	Protective. Debris is contained by capping or landfilling. Agent debris is treated as necessary.	Protective. Debris is contained by consolidation or landfilling. Agent debris is treated as necessary.	Protective. Debris is contained by landfilling. Agent debris is treated as necessary.
Compliance with ARARs	Complies with action- and location-specific ARARs.	Complies with action- and location-specific ARARs.	Complies with action- and location-specific ARARs.
Long-Term Effectiveness and Permanence	Low residual risk. Structural debris is contained by capping or landfilling. Adequate controls; long-term monitoring is required. Habitat is improved at site but limited at landfill.	Low residual risk. Structural debris is contained by consolidation or landfilling. Adequate controls; long-term monitoring is required. Habitat is improved at site but limited at landfill.	Low residual risk. Structural debris is contained by landfilling. Adequate controls; long-term monitoring is required. Habitat is improved at site but limited at landfill.
Reduction in Toxicity, Mobility, or Volume	Reduced. Capping or landfilling reduces mobility. Reduction in mobility may be reversed if cap or landfill leaks. Caustic wash irreversibly reduces TMV of agent, but produces a hazardous liquid sidestream that must be treated.	Reduced. Consolidation or landfilling reduces mobility. Reduction in mobility reversed if consolidation area or landfill leaks. Caustic wash irreversibly reduces TMV of agent, but produces a hazardous liquid sidestream that must be treated.	Reduced. Landfilling reduces mobility. Reduction in mobility may be reversed if landfill leaks. Caustic wash irreversibly reduces TMV of agent, but produces a hazardous liquid sidestream that must be treated.
Short-Term Effectiveness	Effective. Dust controls needed for demolition. Worker protection necessary for physical hazards associated with dismantling and for chemical hazards associated with caustic washing and handling agent-contaminated debris. Habitat improved at site, limited at disposal areas. RAOs achieved in 3 to 4 years.	Effective. Dust controls needed for demolition. Worker protection necessary for physical hazards associated with dismantling and for chemical hazards associated with caustic washing and handling agent-contaminated debris. Habitat improved at site, limited at disposal areas. RAOs achieved in 3 to 4 years.	Effective. Dust controls needed for demolition. Worker protection necessary for physical hazards associated with dismantling and for chemical hazards associated with caustic washing and handling agent-contaminated debris. Habitat improved at site, limited at disposal areas. RAOs achieved in 3 to 4 years.
Implementability	Technically and administratively feasible. Regulatory concerns with capping.	Technically and administratively feasible.	Technically and administratively feasible.
Present Worth Cost	$106 million	$104 million	$109 million
Conclusion	Not selected. Meets evaluation criteria and is consistent with soil remedial alternatives. Not identified as the preferred alternative due to regulatory concerns over capping debris from Other Contamination History structures.	Selected. Meets evaluation criteria and is consistent with soil remedial alternatives. Identified as the preferred alternative.	Not selected. Meets evaluation criteria and is consistent with soil remedial alternatives. Not identified as the preferred alternative because it is less cost effective than Alternative 2.

Table 8.3-1 Cost Summary of RMA Sitewide Alternatives for Structures

Medium Group/Subgroup	Alternative 1[1]		Alternative 2[2]		Alternative 3[3]	
	1995 $	Present Worth	1995 $	Present Worth	1995 $	Present Worth
No Future Use—Significant Contamination History Medium Group	14,300,000	13,300,000	14,300,000	13,300,000	14,300,000	13,300,000
No Future Use—Other Contamination History Medium Group	38,800,000	35,800,000	36,600,000	34,000,000	42,000,000	38,900,000
No Future Use—Agent History[4]	61,200,000	56,900,000	61,200,000	56,900,000	61,200,000	56,900,000
Subtotal	114,000,000	106,000,000	112,000,000	104,000,000	118,000,000	109,000,000
Post-ROD Removal Actions	35,000,000	35,000,000	35,000,000	35,000,000	35,000,000	35,000,000
Subtotal	149,000,000	141,000,000	147,000,000	139,000,000	153,000,000	144,000,000
Pre-ROD IRAs	41,000,000	41,000,000	41,000,000	41,000,000	41,000,000	41,000,000
Total Costs for Structures Medium	190,000,000	182,000,000	188,000,000	180,000,000	194,000,000	185,000,000

[1] Alternative 1—Dismantling, Salvage, Capping Other Contamination History, On-Post Hazardous Waste Landfill for Significant Contamination History and Agent History
[2] Alternative 2—Dismantling, Salvage, Consolidate Other Contamination History, On-Post Hazardous Waste Landfill for Significant Contamination History and Agent History
[3] Alternative 3—Dismantling, Salvage, On-Post Hazardous Waste Landfill for All
[4] For the Agent History Group, caustic washing will be used as necessary and disposal will be in a RCRA Subtitle C landfill.

IRA Costs	Pre-ROD Costs	Post-ROD Costs	Total Costs
Asbestos/PCB Removal	10,000,000	15,000,000	25,000,000
Chemical-Process-Related Activities	20,000,000	20,000,000	40,000,000
Tank Removal	11,000,000	0	11,000,000
Total IRA Costs	41,000,000	35,000,000	76,000,000

Section 9

9.0 REFERENCES

Army (Department of the Army)

1992a (November) AR 385-61 Safety Studies and Reviews of Chemical Agents and Associated Weapon Systems (Draft).

1992b (November) DA PAM (Department of the Army Pamphlet) 385-61. The Army Toxic Chemical Agent Safety Program (Draft).

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 [SARA]), Public Law 99-499.

EBASCO

1994 (July) Integrated Endangerment Assessment/Risk Characterization, Final, Version 4.2. 4 v. RTIC 94266R01.

1992 (December) Development and Screening of Alternatives Report, Final, Version 4.1, RTIC 92363R01. (DSA)

1990 (September) Human Health Exposure Assessment for Rocky Mountain Arsenal, Final, Version 4.1, 8 v. RTIC 90277R01.

1989 (June) Remedial Investigation Report, Volume IX, North Plants Study Area, Final, Version 3.3, 3 parts. RTIC 89166R05.

1988 (October) Summary of Results, Structures Survey Report, Task 24, Final, 3 v. RTIC 88306R02.

EPA (Environmental Protection Agency)

1990 (March 8) National Oil and Hazardous Substance Pollution Contingency Plan, Final Rule. 40 CFR Part 300 (Federal Register 55(46):8666-8865. (NCP)

EPA et. al.

1989 (February) Federal Facility Agreement for Rocky Mountain Arsenal), RTIC 89068R01. (FFA)

JEG (Jacobs Engineering Group Inc.)

1994 (October) Pilot Building Demolition Project, Task 92-01, Final, Pilot Demolition Assessment, Version 3.1. RTIC 94305R03.

Appendix A

APPENDIX A
MEDIUM GROUP STRUCTURES LISTS

LIST OF TABLES

Table A.1-1 Future Use, No Potential Exposure

Table A.1-2 No Future Use, Significant Contamination History

Table A.1-3 No Future Use, Other Contamination History

Table A.1-4 No Future Use, Agent History

Table A.1-5 Buildings Removed

Table A.1-6 Remediation Use Structures

Table A.1-7 Inventory List of Rocky Mountain Arsenal Structures

TABLE A.1-1: Future Use, No Potential Exposure											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
1	0105	Bus Shelter			33					Not in Task 24	
2	0111	RMA Administration, Hqs, Offices	770	39,000	35						
3	0112	Communication Headquarters	290	2,300	35		Short-Term				
4	0120	Facilities Maintenance Headquarters			35					Not in Task 24	
5	0121				35					Not in Task 24	
6	0124				35					Not in Task 24	
7	0129				35					Not in Task 24	
8	0130				35				Remediation Use	Not in Task 24	
9	0133				35					Not in Task 24	
10	0135	Guardhouse			04					Not in Task 24	
11	0143	West Gate Guardhouse	23	180	04						
12	0145	South Gate Guardhouse	46	170	11						
13	0211	Gas Meter House	21	240	02		Short-Term		Remediation Use		
14	0312	Fire Station Headquarters	860	12,000	36						
15	0361	Primary Electrical Substation	54	380	02		Short-Term		Remediation Use		
16	0369	Lower Derby Valve Gate	20	49	01		Long-Term		Remediation Use		
17	0370	Restroom			02		Long-Term			Not in Task 24	
18	0371	Water Pumping Station	820	1,800	02		Long-Term		Remediation Use		
19	0372	Million Gallon Reservoir (Potable)	530	21,000	02		Short-Term				
20	0383	Community Club	340	6,100	02		Short-Term				
21	0385	Water Pump Station	14	140	04		Long-Term		Remediation Use		
22	0386	Water Pump Station	14	140	04		Long-Term		Remediation Use		
23	0387	Water Pump Station	14	140	04		Long-Term		Remediation Use		
24	0551	Elevated Storage Tank	620		01		Long-Term		Remediation Use		Tanks or Pipes
25	0552	Valve Pit	55	310	01		Long-Term		Remediation Use		
26	0618	Warehouse	5,300	110,000	03				Remediation Use		
27	0619	Warehouse	5,200	110,000	03		Long-Term		Remediation Use		
28	0702	Bald Eagle Observation Platform			05		Long-Term			Not in Task 24	
29	NN0501	Abandoned School-fdn & wall	45	1,300	05						
30	NN0903	VORTAC Station	110	1,000	09						
31	SS 0370	Substation-1T-150'W of C			03		Long-Term				
32	SS 0371	Substation-10T-N of 371			02		Long-Term				
33	SS 0385	Substation-3T-N of 385			04		Long-Term				
34	SS 0386	Substation-3T-N of 386			04		Long-Term				
35	SS 0387	Substation-3T-W of 387			04		Long-Term				
36	SS 0619	Substation-4T-N of 619			03		Long-Term				
37	Z-28	Trailer			23				Remediation Use	Not in Task 24	
38	Z-3	Trailer			35				Remediation Use	Not in Task 24	
39	Z-38	Trailer			04				Remediation Use	Not in Task 24	
40	Z-39	Trailer			04				Remediation Use	Not in Task 24	
41	Z-40	Trailer			25				Remediation Use	Not in Task 24	
42	Z-41	Trailer			25				Remediation Use	Not in Task 24	
43	Z-42	Trailer			25				Remediation Use	Not in Task 24	
44	Z-58	Trailer			35				Remediation Use	Not in Task 24	

TABLE A.1-1: Future Use, No Potential Exposure											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
45	Z-68	Trailer			35				Remediation Use	Not in Task 24	
46	Z-69	Trailer			35				Remediation Use	Not in Task 24	
47	Z-70	Trailer			04				Remediation Use	Not in Task 24	

TABLE A.1-2: No Future Use, Significant Contamination History

PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
1	0242	Chlorine Production/US Mint Storage	3,100	42,000	02						
2	0243	Chlorine Production Compressor Bldg	1,000	9,200	02						
3	0247	Salt Storage Building & foundation	1,100	58,000	02						
4	0251	Chlorine Evaporator/Storage	1,100	23,000	02						
5	0342	Warehouse/M74 I. B. Storage	1,000	13,000	02						
6	0411	SM & SD Manufacturing/Storage	1,500	16,000	01						
7	0411A	Steam Meter House	6	72	01						
8	0424A	Aldrin Unit Control House-Foundation	10	720	01						
9	0424C	Aldrin Filter Building-foundation	16	750	01						
10	0451	Warehouse/Production Filling	900	11,000	01	Leased					
11	0471	TC Reactor/Pesticide Production	580	5,100	01	Leased					
12	0473	TC Drum Loading/Pesticide Packaging	86	1,900	01	Leased					
13	0475	Railroad Car Warmer Shed	180	980	01	Leased					
14	0502	West Chemical Metering Pump	41	700	01	Owned					
15	0503	East Chemical Metering Pump	37	290	01	Owned					
16	0505	DET Pretreatment Feed Pump House	30	510	01	Owned					
17	0507	DET Separator Pumphouse	41	520	01	Owned					
18	0515	CP/DDT/Pesticide Production	1,600	15,000	01	Leased					
19	0515A	Nudrin/Endrin Storage	202	1,900	01	Owned					
20	0521	Acetylene Compressor/Pesticide Mfg.	220	1,100	01	Leased					
21	0521A	Refrigeration/DCPD Cracking	36	320	01	Owned					
22	0523	AT Mfg. Bldg /Igniter Tube Filling	300	4,000	01						
23	0523C	Arsenic Trioxide Dry Storage Silo	71	210	01	Leased					
24	0523D	Arsenic Trioxide Dry Storage Silo	96	360	01	Leased					
25	0523E	Arsenic Trioxide Dry Storage Silo	96	360	01	Leased					
26	0523F	Arsenic Trioxide Dry Storage Silo	96	360	01	Leased					
27	0523G	Arsenic Trioxide Dry Storage Silo	96	360	01	Leased					
28	0525	Product Development Lab/Nudrin Mfg.	380	8,100	01	Leased					
29	0526	Pesticide Filter-foundation	26	900	01						
30	0532	Pesticide Storage/Warehouse	1,100	12,000	01	Leased					
31	0533	Flammable Materials Storehouse	19	130	01	Leased					
32	0534	Pumphouse/Storage	330	930	01	Leased					
33	0534A	Drum Storage/Field Shop/Office	250	2,700	01	Owned					
34	0534B	Planavin Manufacture	470	13,000	01	Owned					
35	0542	Drummed Product Storage/Gen.Storage	1,000	11,000	01						
36	0544	Heavy Equipment Maintenance Shop	180	3,300	01						
37	0561	BCH Unit Control House	170	1,600	01	Owned					
38	0571	Vent Gas Burner	140	520	01						
39	0571B	Tank Room/HCCPD Drum Storage	130	2,600	01	Owned					
40	0616	Warehouse	910	11,000	03						
41	0624	Repair/Salvage/Surplus Facility	850	24,000	04				Remediation Use		
42	0627	Vehicle Maintenance Shop	620	16,000	04		Short-Term		Remediation Use		
43	0631	Railcar Maintainence/Roundhouse	350	4,500	04				Remediation Use		
44	0643	Flammable Materials Storehouse	55	400	03						

TABLE A.1-2: No Future Use, Significant Contamination History											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
45	0646	Rodent Control Building-foundation	5	840	04						
46	0724	Incinerator/Electostatic Preciptator	460	2,600	01	Owned					
47	0741	Refrigeration Building	880	6,300	01						
48	0834	Incinerator	120	3,800	36						
49	0884	Igloo Storage	210	1,600	06						

TABLE A.1-3: No Future Use, Other Contamination History											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
1	0112A	Emergency Generator Plant	35	240	35				Remediation Use		
2	0112B	BBQ-N of 112	2	16	35						
3	0114	Security Incinerator	8	34	35						
4	0116	Bus Stop Shelter	4	140	01						
5	0132	Shell/MKE Field Headquarters			35				Remediation Use	Not in Task 24	
6	0136	Garage-to 134-foundation	3	130	35						
7	0137	Garage-to 131-foundation	3	130	35						
8	0148	Storage/Pass Office-NW of 166	1	410	34						
9	0169B	Gas Station House-fdn-S of 150	4	100	34						
10	0176	5-Unit Garage & Unused Apt-foundation	24	1,500	03						
11	0213	Calibration Facility/X Ray Lab	680	4,600	02						
12	0241	Administration/Lab/Change House	290	3,000	02						
13	0244	3 Liquid Chlorine Tank Saddles	30	200	02						
14	0245	Substation Building	23	210	02						
15	0246	HCl Production Facility	56	1,600	02						
16	0248	Brine Treatment Plant-foundation	180	4,200	02						
17	0249	Brine Storage & Pump House-foundation	260	9,300	02						
18	0252	Cell Liquor Storage-foundation	29	2,900	02						
19	0253	50% NaOH Storage-foundation	36	4,500	02						
20	0254	Caustic Fusion Plant/Drum Storage	1,200	16,000	02	Leased					
21	0255	Fuel Oil Pump Station & 2 tank pads	23	300	02	Leased					
22	0256	Fuel Oil Tank-SE corner of 254	6	65	02						
23	0282	Guard Station-foundation-NW of NN0102	7	64	01						
24	0286	Guard Station-SE of 557-foundation	6	64	01						
25	0287	Guard Tower-foundation	6	64	01						
26	0291	Guard Station-foundatn-735'W of 362	6	64	02						
27	0295	Guard Tower-SE of 112-foundation	6	64	02						
28	0296	Guard Tower-foundation	6	64	02						
29	0307	Potable Water Valve & Meter Pit	11	130	36						
30	0309	Maintainence/Storage-S of 545	10	420	01						
31	0311	Sterns-Rogers Office/Sample Storage	350	4,400	02				Remediation Use		
32	0313A	Sewage Pump Station	3	38	01						
33	0314	Fixed Laundry Service Building	770	8,600	01						
34	0315A	Steam Meter Pit-W of 315	7	100	01				Remediation Use		
35	0316	Plants Dispensary/Clinic	240	3,200	01	Leased					
36	0316	Wood Shed-W of 727	2	100	01						
37	0316A	Morrison-Knudsen/Change House	340	5,100	01	Owned					
38	0317A	Pipe Shop/Grease Pit	48	2,600	01						
39	0318				35				Remediation Use	Not in Task 24	
40	0321	Boiler Plant-Central Gas Heat Plant	6,000	56,000	02				Remediation Use		
41	0321C	Pumphouse	37	580	02				Remediation Use		
42	0321D	Fuel Oil Pumphouse	38	480	02				Remediation Use		
43	0322	Coal Sampling Building	30	340	02						
44	0322A	Tractor Storage Shed	34	410	02						

TABLE A.1-3: No Future Use, Other Contamination History

PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
45	0323	Ash (Coal) Storage Silo-Hopper	350	500	02						
46	0324	Coal Hopper Structure	6	160	02						
47	0325	Electrical Power Plant	3,100	12,000	02						
48	0326	Power Plant Pumphouse & Spray Pond	720	15,000	02						
49	0327	Cafeteria-foundation	29	1,600	02						
50	0328	Goop Mixing and Filling Building	2,300	16,000	02						
51	0328A	Toilet House	15	130	02						
52	0329	Gasoline Pump Building	46	400	02						
53	0331	Phosgene Filling Warehouse	1,000	12,000	02				Remediation Use		
54	0332	Warehouse	1,000	12,000	02				Remediation Use		
55	0333	Warehouse	980	11,000	02				Remediation Use		
56	0334	Warehouse	980	11,000	02				Remediation Use		
57	0335	Warehouse	990	11,000	02				Remediation Use		
58	0336	General Purpose Warehouse	990	11,000	02				Remediation Use		
59	0337	Locker Room/Change House	57	590	02						
60	0338	Storage Magazine	12	54	02						
61	0339	Storage Magazine	14	54	02						
62	0340	Magazine	14	54	02						
63	0341	Change House	1,000	12,000	02						
64	0341A	Condensate Pump House	15	160	02				Remediation Use		
65	0341B	Sewage Lift Station-covered pit	8	71	02						
66	0343	Manuf. Bldg.-PreClustering Warehous	1,000	11,000	02						
67	0343A	Flammable Materials Storehouse	29	240	02						
68	0344	Mfg Assembly/Warehouse	1,200	11,000	02						
69	0345	Mfg Assembly/Storage/Warehouse	1,000	11,000	02						
70	0346	Warehouse	920	11,000	02				Remediation Use		
71	0347	Warehouse/Chemical Storage	1,900	27,000	02	Leased			Remediation Use		
72	0351	Change House	920	9,000	02						
73	0352	Open Storage-foundation	250	12,000	02						
74	0352A	Quonset Storage	19	970	02						
75	0353	Open Storage-foundation	760	13,000	02						
76	0354	Warehouse	1,000	12,000	02						
77	0355	Warehouse	1,000	13,000	02						
78	0356	Warehouse	1,000	13,000	02						
79	0362	Warehouse	4,000	59,000	02				Remediation Use		
80	0364	Sewage Lift Station-SE of 354	21	85	02						
81	0365	Explosive Blending Building	490	3,200	02						
82	0368	Swimming Pool & Filter House	640	1,900	02						
83	0372A	Chlorinator Station	56	380	02		Short-Term		Remediation Use		
84	0373	Officer's Quarters	130	1,100	02						
85	0373B	Garage-to 373	42	720	02						
86	0374	Water Treatment Plant-W o'Lr Derby-fdn	110	890	02						
87	0378	Chlorinating Station (on airport)	16	150	10		Short-Term		Remediation Use		
88	0379	Chlorinating Station	20	210	03		Short-Term		Remediation Use		

TABLE A.1-3: No Future Use, Other Contamination History

PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
89	0381				02				Remediation Use	Not in Task 24	
90	0382	Chlorinating Station	7	56	03						
91	0383A	Officer's Club Storage	16	82	02						
92	0391	Sewage Disposal & Treatment Plant	88	1,100	24						
93	0392	Sewage Lift Station	46	260	34		Short-Term		Remediation Use		
94	0393	Sewage Lift Station	46	260	34		Short-Term		Remediation Use		
95	0394	West Gate Sewage Treatment Plant	3	140	33						
96	0395	Toxic Yard Sewage Plant-NW of 867B	7	88	06						
97	0409	Condensate Pump House	4	130	01						
98	0413	WP Storage/SM Storage	670	5,500	01						
99	0413A	Phossy Water Tank-W of 413	120		01						Tanks or Pipes
100	0415	Caustic Makeup Tank-foundation	79	290	01						
101	0432	Sand Blasting Pad/Change House-fdn	180	9,200	01	Leased					
102	0435	East Gas Holder	720		01	Leased					Tanks or Pipes
103	0459	Acetylene Generator Building	229	3,200	01	Owned					
104	0459A	Lime Slurry Pumphouse	24	81	01	Owned					
105	0459B	Lime Slurry Pumphouse	36	170	01	Owned					
106	0459C	Small Building-N of 459	6	140	01						
107	0461	Tank Farm Pumphouse	51	430	01	Leased					
108	0464	Sample Building	2	55	01						
109	0471B	Electrical Vault	9	160	01	Owned					
110	0471C	TC Refrigeration	66	730	01	Owned					
111	0472	TC Refrigeration	110	1,200	01	Leased					
112	0472A	Lunchroom/Maintainence Equipmt Stor	24	320	01	Owned					
113	0474	Electrical Control House	16	80	01	Leased					
114	0504	DET Emergency Diesel Generator	31	330	01	Owned					
115	0506	DET Control House	68	830	01	Owned					
116	0508	DET Copper Sulfate Treatment	160	4,700	01	Owned					
117	0509	DET Methyl Chem Ion Compressor/Liquifier	69	430	01	Owned					
118	0510	Methyl Isocyanate Refrigeration	28	300	01	Owned					
119	0511	Chlorinated Paraffin Mfg./Storage	2,500	23,000	01	Leased					
120	0511A	Chlorinated Paraffin/Change House	160	1,700	01	Leased					
121	0512A	Flammable Solvent Storage Shed	7	250	01	Owned					
122	0514C	Pumphouse	1	96	01	Owned					
123	0514D	Refrigeration Compressor	13	200	01	Owned					
124	0514E	Monomethylamine Dilution Control	4	92	01	Owned					
125	0516B	Misc Electrical Equipment Storage	34	210	01	Owned					
126	0518A	Emergency Fire Protection Pumphouse	22	290	01	Owned			Remediation Use		
127	0519	Hydrogen Peroxide Storage	82	290	01	Owned					
128	0519A	Hydrogen Peroxide Pumphouse	4	160	01	Owned					
129	0520	Sample Pump/pH Probes Storehouse	1	36	01	Owned					
130	0521B	Compressor House/Maintainence	93	670	01	Owned					
131	0521C	Lunchroom/Field Foreman Office	41	640	01	Owned					
132	0522	WP Cup Filling/Acetylene Mfg	890	9,400	01						

TABLE A.1-3: No Future Use, Other Contamination History											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
133	0522A	Phossy Water Tank	17	112	01						Tanks or Pipes
134	0522B	Change House/Administration Bldg	420	5,100	01						
135	0523A	WP Storage Tank House	140	1,500	01						
136	0524	WP Filling Building-fndatn	27	1,400	01						
137	0525A	Refrig Compressor/Electrical Vault	31	440	01	Owned					
138	0527	Change House/Quonset Hut	16	1,000	01						
139	0529	NaOH Make Up/Azodrin Support Struct	87	750	01	Leased					
140	0531	Warehouse	970	11,000	01	Leased					
141	0534C	Emergency Generator/Electric Vault	27	210	01	Owned					
142	0534D	Emergency Generator	46	440	01	Owned					
143	0538A	Compressor Building	67	690	01						
144	0539	Electrical Substation Builiding	17	430	01						
145	0541A	Magazine	9	88	01						
146	0543	Maintainence Shops/Instrument Lab	2,000	25,000	01				Remediation Use		
147	0543A	Steam Meter Pit	12	93	01				Remediation Use		
148	0543B	Maintenance/Office	590	8,700	01				Remediation Use		
149	0545	Paint Shop	22	800	01						
150	0546	Sewage Lift Station	12	72	01						
151	0548	Water Pumping Station	370	2,300	01						
152	0549	Reservoir and Cooling Tower	630	4,500	01						
153	0550	Lift Station	6	280	01						
154	0553	Vault	8	64	01						
155	0555	Guardhouse/Gas Mask Training(TW-14)	5	210	01						
156	0557	Salvage Yard Storage/Maintenance	51	1,000	01	Owned					
157	0561A	Acetylene Compressor-foundation	400	5,000	01						
158	0571A	Electrical Vault	21	85	01	Owned					
159	0605	Flammable Materials Storehouse	2	170	03						
160	0606	Flammable Materials Storehouse-fdn	1	170	03						
161	0607	Flammable Materials Storehouse	2	210	03						
162	0608	Flammable Materials Storehouse	2	210	03						
163	0611	Data Processing Building	440	4,600	04		Short-Term				
164	0612	Courier Building	240	5,100	04		Short-Term				
165	0613	Management Information Systems	480	6,500	04		Short-Term				
166	0614	Warehouse	920	11,000	03						
167	0615	Warehouse	920	11,000	03						
168	0617	Warehouse	920	11,000	03						
169	0621	Property Disposal/Salvage Ofice	890	19,000	04				Remediation Use		
170	0621A	Truck Scale Platform	56	740	04				Remediation Use		
171	0622	Paint Shop/General Storage	160	1,700	04						
172	0623	Carpenter Shop/Hobby Shop/Auto Shop	230	4,200	04						
173	0625	Warehouse	870	11,000	04				Remediation Use		
174	0626	Machine and Welding Shop-foundation	100	6,000	04						
175	0626C	Heavy Equipment Shop-foundation	10	580	04						
176	0627B	Flammable Materials Storehouse	5	240	04						

TABLE A.1-3: No Future Use, Other Contamination History											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
177	0629	Service Station	44	290	04						
178	0629E	Service Station Shelter	35	25	04						
179	0630	Gas Meter House	37	240	03		Short-Term		Remediation Use		
180	0631A	Flammable Materials Storehouse	5	240	04						
181	0632	Gas-Fired Heating Plant	420	1,400	04		Short-Term		Remediation Use		
182	0633	Cafeteria/Bug Lab/Movie Theatre	130	2,500	04						
183	0633A	Laboratory/Storehouse	56	680	04						
184	0633B	Hazardous Materials Storage	140	640	04				Remediation Use		
185	0634	Flammable Materials Storehouse	58	400	04				Remediation Use		
186	0635	Admin Offices-Rocky Mtn Railcar	48	590	03						
187	0639	Lumber Storage	94	4,500	04						
188	0641	Warehouse-foundation	95	900	03						
189	0644	NCO Quarters-foundation	17	1,400	03						
190	0644A	Garage/Storage-foundation	1	40	03						
191	0647A	Motor Pool Dispatch Office	35	1,000	04						
192	0647B	Motor Pool Vehicle Storage	100	9,600	04						
193	0647C	Motor Pool Vehicle Storage	29	3,000	04						
194	0647D	Motor Pool Vehicle Storage	29	3,000	04						
195	0648	Road Oil Pump and Boiler House	56	350	04						
196	0670				03				Remediation Use	Not in Task 24	
197	0673	Railcar Scale House	2	88	03				Remediation Use		
198	0679	Warehouse/Can Scouring-foundation	62	780	10						
199	0680	Radio Range B-foundation	2	49	09						
200	0684	Guard Tower-E of 644, N of 675-fndn	6	64	03						
201	0685	Guard Tower-SE of 673-foundation	6	64	03						
202	0688	Guard Tower-E of 615-foundation	6	64	03						
203	0727	Facilities Maintenance	98	3,600	01	Owned			Remediation Use		
204	0729	General Purpose Warehouse	1,600	23,000	01	Leased			Remediation Use		
205	0731	Reserve Center/Office/Change House	770	12,000	01						
206	0732	Army Reserve Warehouse/M19 Bomb Rew	3,900	47,000	01						
207	0733A	Magazine	34	400	01						
208	0733B	Magazine	34	400	01						
209	0733C	Magazine	34	400	01						
210	0733D	Magazine	58	400	01						
211	0733E	General Purpose Magazine	65	400	01						
212	0733F	General Purpose Magazine	69	400	01						
213	0735	Foamite/Oil Product Storage	37	440	01						
214	0743	RMA Laboratory/Change House/Office	360	5,400	01						
215	0743A	Chemical Sewer Lift Station	4	36	01						
216	0744	Gasoline/Benzol Pumphouse	78	760	01						
217	0745	Fire Fighting Manifolds for 745ABC	21	24	01						
218	0746	Gasoline Unloading Rack	2	1	01	Leased					
219	0748	Flammable Materials Storehouse	49	400	01						
220	0751	Paint and Process Shop	640	5,500	01						

TABLE A.1-3: No Future Use, Other Contamination History												
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
221	0752	Carpenter Shop/Storage	610	4,900	01						
222	0752A	Lumber Storage	110	1,000	01						
223	0753	Steam Fitter Maintenance/Storage	52	1,000	01						
224	0754	Lumber Storage	49	840	01						
225	0765	Potable Water Purificaton			01				Remediation Use	Not in Task 24	
226	0784	Guard Station-SE of 742-foundation	6	64	01						
227	0787	Warehouse	480	9,600	06				Remediation Use		
228	0801	Radio Relay Station-N of 1726	12	180	25				Remediation Use		
229	0808	No Bdry Groundwater Treatment Plant	650	3,900	23				Remediation Use		
230	0809	Irondale Groundwater Treatment Sys.	320	3,000	33				Remediation Use		
231	0810	NW Bndry Groundwater Treatment Bldg	490	3,100	27				Remediation Use		
232	0825	Basin A Neck Treatment Bldg.			35				Remediation Use	Not in Task 24	
233	0831	Technical Escort/Officer's Quarters	120	1,100	35				Remediation Use		
234	0831A	Garage/Storage Shed	27	360	35				Remediation Use		
235	0833	Lumber Storage Shed	82	580	35						
236	0836	Air Force Seismic Monitoring	590	7,100	24						
237	0840	Air Monitoring Station			25				Remediation Use	Not in Task 24	
238	0841	CO Public Service Co Meter House	82	200	12						
239	0851	Pistol Range House	6	250	19						
240	0853	Observation Pit/Mortar Range	94	2,000	30						
241	0854	Concrete Wall	12	200	26						
242	0863	Target Range House	5	260	12						
243	0864	General Storehouse	10	400	06						
244	0865	Warehouse	41	1,000	06						
245	0866	Toxic Yard Office & Change House	140	2,400	06				Remediation Use		
246	0867A	Toxic Yard Metal and Wood Shop	67	1,600	06						
247	0867B	Flammable Materials Storehouse	13	190	06						
248	0871A	Magazine	66	600	06						
249	0871B	Magazine	66	600	06						
250	0871C	Magazine	66	600	06						
251	0871D	Magazine	86	800	06						
252	0872A	Magazine	86	800	06						
253	0872B	Magazine	86	800	06						
254	0872C	Magazine	86	800	06						
255	0872D	Magazine	86	800	06						
256	0873A	General Purpose Magazine	86	800	06						
257	0873B	General Purpose Magazine	86	800	06						
258	0873C	General Purpose Magazine	86	800	06						
259	0874A	Magazine	86	800	06						
260	0874B	Magazine	86	800	06						
261	0874C	Magazine	86	800	06						
262	0874D	Magazine	86	800	06						
263	1403	2-HF Storage Tanks & Unloading Dock	83		25						Tanks or Pipes
264	1404	Carbon Tetrachloride Storage Tank	83		25						Tanks or Pipes

TABLE A.1-3: No Future Use, Other Contamination History											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
265	1405	Hydrochloride Acid Storage Tanks	83		25						Tanks or Pipes
266	1502	Unloading Dock-Isopropanol Storage	83		25						Tanks or Pipes
267	1504A	Monitoring Shed	7	220	25						
268	1505A	Sentry Station	2	85	25						
269	1507	Methanol Storage Tank	83		25						Tanks or Pipes
270	1508	TBA Storage Tank	84		25						Tanks or Pipes
271	1509	Isopropanol Dehydration Unit	76	400	25			Treaty Bldg			
272	1510	Fuel Oil Tank	1,200		25						Tanks or Pipes
273	1510A	Fire Apparatus Buildng/Foam Storage	16	130	25						
274	1512	Sentry Station/Gate House	18	130	25			Treaty Bldg			
275	1611A	Sentry Station	4	84	25						
276	1618	General Storehouse-N of North Plant	36	1,000	25						
277	1619	Administration Building-N o'N Plant	8	320	25						
278	1622	General Storehouse-N of North Plant	34	970	25						
279	1701	Warehouse	2,300	26,000	25			Treaty Bldg	Remediation Use		
280	1704	Compressed Air Plant	1,400	9,100	25			Treaty Bldg			
281	1705	Instruction Building/Cafeteria	250	4,000	25			Treaty Bldg			
282	1706	Sentry Station/Gatehouse	44	360	25			Treaty Bldg			
283	1707	Cooling Tower	560	2,800	25			Treaty Bldg			
284	1710	Clinic and Administration Building	920	15,000	25				Remediation Use		
285	1711	Gas Meter House	6	170	25				Remediation Use		
286	1712	Gas Heating Plant	320	2,300	25						
287	1713	Standby Generator Plant	100	2,500	25			Treaty Bldg	Remediation Use		
288	1715				25				Remediation Use	Not in Task 24	
289	1717	Chlorinating Station	11	120	25				Remediation Use		
290	1718	Valve Pit & Chlorinating Station	24	260	25				Remediation Use		
291	1719	Electrical Distribution System	13	130	25				Remediation Use		
292	1726	Elevated Process Water Tank	270		25		Short-Term				Tanks or Pipes
293	1728	Potable Water Tank	69		25						Tanks or Pipes
294	1730	Guardhouse	13	110	31						
295	1734	Change House	48	470	31						
296	NN0101	Valve Gate-W side of Upper Derby	20	49	01						
297	NN0102	Foundation-N of 534B	19	750	01						
298	NN0103	Bathroom-N of 533	3	120	01						
299	NN0104	Flare Tower-N of 571B, NW of 571	17	660	01						
300	NN0105	Gas Meter House-SW of 508	5	200	01						
301	NN0106	Fertil & Waste Loadng Fac-N of 728	78	99	01						
302	NN0107	Metal Shed-W of 733B	1	310	01						
303	NN0108	Metal Shed-W of 733C	1	310	01						
304	NN0109	Guard Station-NE of 732	1	64	01						
305	NN0110	Metal Shed-S of 521B	3	80	01						
306	NN0111	Three Metal Incinerator-NW of 541	150	440	01						
307	NN0112	Stack Observation Station-E of 527	12	280	01						
308	NN0113	2 Metal Sheds-S of 474 SS	27	250	01						

TABLE A.1-3: No Future Use, Other Contamination History											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
309	NN0114	Wooden Hut-SW of 461	2	22	01						
310	NN0115	Flare Tower-N of Lime Pond	17	660	01						
311	NN0116	Long Metal Shed-S of 544	47	6,000	01						
312	NN0117	2 Sheds-SW of 557	4	130	01						
313	NN0201	Concrete Silo-NW of 254	350	1,300	02						
314	NN0202	Brick Structure-E of SS 361	15	140	02						
315	NN0204	Coal Hopper foundation-N of 334	38	1,100	02						
316	NN0205	Brick Valve House-S of 321B	27	150	02						
317	NN0300				03				Remediation Use	Not in Task 24	
318	NN0301	Metal Shed-N of 618	1	410	03						
319	NN0302	Metal Shed-N of 618	1	410	03						
320	NN0303	Metal Shed-N of 619	1	2,400	03						
321	NN0304	Metal Shed-N of 619	1	1,900	03						
322	NN0601	Loading Dock-W of 866	150	11,000	06						
323	NN0602	Long Metal Shed-W of 865	1	3,500	06						
324	NN0603	Metal Shed-E of 867A	1	510	06						
325	NN0902	Survey Tower-N of Post Office	1	140	09				Remediation Use		
326	NN1208	Brick Structure-900'SW of 846	9	81	12						
327	NN1209	Concrete Bunker-1100'S of 846	14	68	12						
328	NN1210	Concrete Bunker-1250'S of 846	10	56	12						
329	NN1211	Concrete Bunker-1300'S of 846	14	68	12						
330	NN1212	Concrete Bunker-1350'S of 846	6	64	12						
331	NN1213	AMSA/OMS Maintenance Shop-N of 841	780	10,000	12						
332	NN2001	Antenna Installation-1/2 mi N o'9th	17	44	20						
333	NN2002	Tank Pad-N of 9th, 2/3 mi E of F St	14	380	20				Remediation Use		
334	NN22	36 GW Wells-NW Boundary Treatment			22						
335	NN23	36 GW Wells-N Boundary Treatment			23						
336	NN2301	Abandoned Water Purification Plant	60	1,600	23						
337	NN24	56 GW Wells-N Boundary Treatment			24						
338	NN2401	Concrete Structure-E of Bog	3	25	24						
339	NN2402	Wooden Shed-N of Trickling Filters	7	170	24						
340	NN2403	2 Trickling Filters-S of 391	1,800	17,000	24						
341	NN2404	Imhoff Tank-S of 391	410	2,800	24						
342	NN2405	Antenna Installation-N of 836	12	44	24						
343	NN2501	Shed-NW of 1618	8	300	25						
344	NN2502	Gas Pump & Pad-NE of 1618	32	950	25						
345	NN2503	Pumping Station-S of 1510	4	72	25						
346	NN2601	Decon Pad/Tank-NE of Basin F	58	2,300	26						
347	NN2602	Valve gate-N end of Reservoir C	19	56	26						
348	NN28	2 GW Wells-Irondale Treatment			28						
349	NN3001	Metal Shed-E of 853	1	580	30						
350	NN3002	Metal Shed-E of 853	1	580	30						
351	NN3101	Metal Shed-N of 1734	1	80	31						
352	NN3102	3 Sets Shed Siding-1100'SE of 1735	2,400	59,000	31						

TABLE A.1-3: No Future Use, Other Contamination History

PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
353	NN3103	Storage Bldg-Toxic Storage Yard	1	1,500	31						
354	NN3104	Shack-W of Berms-Toxic Storage Yard	1	70	31						
355	NN3105	Shed-NW End of Berms-Toxic Storg Yd	1	110	31						
356	NN3106	Shed-NE End Berms-Toxic Storage Yd	2	4,000	31						
357	NN3107	Antenna Station-Toxic Storage Yard	4	32	31						
358	NN3108	Shed-SW End of 1st Berm-Toxic Yard	1	110	31						
359	NN3109	Shed-SE End of 1st Berm-Toxic Yard	2	4,000	31						
360	NN33	45 GW Wells-Irondale Treatment			33						
361	NN3501	3 Communications Antenna Pits	6	48	35						
362	NN3601	Incinerator-500'NE of 834	30	350	36						
363	NN3602	Incinerator-1000'SE of 834	6	100	36						
364	NN3603	Metal Shed-NW of 725	4	140	36						
365	NN3604	Metal Shed-SW of 725	6	200	36						
366	NN3605	Metal Shed-SE of 725	2	200	36						
367	NNT0101	Vertical Tank-TF0101	21		01						Tanks or Pipes
368	NNT0103	Vertical Tank-TF0106	1		01						Tanks or Pipes
369	NNT0105	Horizontal Tank-TF0108	1		01						Tanks or Pipes
370	NNT0106	Vertical Tank-TF0109	2		01						Tanks or Pipes
371	NNT0107	Horizontal Tank-E of 471C	1		01						Tanks or Pipes
372	NNT0110	Horizontal Tank-E of 536	1		01						Tanks or Pipes
373	NNT0111	Vertical Tank-TF0105	5		01						Tanks or Pipes
374	NNT0201	Undrground Oil Tank w/DCPD-W of 321	1		02						Tanks or Pipes
375	PR01	Pipe Runs in Section 1	2,000		01						Tanks or Pipes
376	PR02	Pipe Runs in Section 2	520		02						Tanks or Pipes
377	PR04	Pipe Runs in Section 4	100		04						Tanks or Pipes
378	PR25	Pipe Runs in Section 25	820		25						Tanks or Pipes
379	PR36	Pipe Runs in Section 36	470		36						Tanks or Pipes
380	SS 0100	Substation-1T-30'N of 866			06						
381	SS 0101	Substation-2T-200'NE of 866			06						
382	SS 0102	Substation-1T-500'W of 867A			06						
383	SS 0103	Substation-1T-700'W of 865			06						
384	SS 0104	Substation-1T-400'N of 872A			06						
385	SS 0105	Substation-1T-NE of 867A			06						
386	SS 0111	Substation-2T-N side 111			35						
387	SS 0112	Substation-1T-150'S of 112			02		Short-Term				
388	SS 0121	Substation-1T-NW corner of section			03						
389	SS 0141	Substation-3T-E of 141			04						
390	SS 0176	Substation-1T-W of Staff Quarters			03						
391	SS 0213	Substation-3T-SE of 213			02		Short-Term				
392	SS 0232	Substation-3T-SW of 254			02						
393	SS 0243	Substation-1T-W of 243			02						
394	SS 0245	Substation-3T-S of 245			02						
395	SS 0311	Substation-1T-S of 311			02						
396	SS 0312	Substation-1T-S of 312			01						

TABLE A.1-3: No Future Use, Other Contamination History											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
397	SS 0312A	Substation-1T-NE of 312			36						
398	SS 0313	Substation-3T-W of 313			01						
399	SS 0313-2	Substation-3T-W of 313			01						
400	SS 0314	Substation-3T-NW of 314			01						
401	SS 0315	Substation-3T-SW of 315			01						
402	SS 0316	Substation-1T-S of 316			01						
403	SS 0316A	Substation-3T-S of 316A			01						
404	SS 0317	Substation-1T-NW of 433			01						
405	SS 0321	Substation-6T-S of 321			02						
406	SS 0321A	Substation-3T-SW of 242			02						
407	SS 0321B	Substation-1T-SE of 242			02						
408	SS 0325	Substation-14T-between 325 & 311			02						
409	SS 0327	Substation-3T-W of 332			02						
410	SS 0328	Substation-3T-N of 328			02						
411	SS 0330	Substation-1T-SW of 337			02						
412	SS 0335	Substation-3T-S of 336			02						
413	SS 0342	Substation-3T-ENE of 342			02						
414	SS 0344	Substation-5T-E of 344			02						
415	SS 0355	Substation-3T-E of 356			02						
416	SS 0361	Primary Substation-68T-SE of 112			02						
417	SS 0362	Substation-3T-N of 362			02						
418	SS 0363	Substation-3T-N of 362			02						
419	SS 0365	Substation-3T-N of 365			02						
420	SS 0368	Substation-1T-1/4 mi SSE of 351			01						
421	SS 0371A	Substation-1T-S of 372			02		Short-Term				
422	SS 0371B	Substation-1T-N of SS 371			02		Short-Term				
423	SS 0378	Substation-1T-N of 378			03		Short-Term				
424	SS 0379	Substation-1T-SE of 379			03		Short-Term				
425	SS 0383	Substation-3T-E of 383			02		Short-Term				
426	SS 0391	Substation-3T-SE of 391			24						
427	SS 0392	Substation-2T-W of 392			34		Short-Term				
428	SS 0393	Substation-2T-S of 393			34		Short-Term				
429	SS 0411	Substation-3T-NE of 411			01						
430	SS 0422	Substation-3T-W of 422			01						
431	SS 0451	Substation-1T-SE of 413			01						
432	SS 0461	Substation-2T-S of 459			01						
433	SS 0464	Substation-2T-SE of 464			01						
434	SS 0474	Substation-7T-W of 472			01						
435	SS 0510	Substation-3T-SE of 510			01						
436	SS 0512	Substation-3T-NW of 517			01						
437	SS 0514	Substation-3T-200'E of 561			01						
438	SS 0515	Substation-6T-NW of 515			01						
439	SS 0516	Substation-3T-W of 519			01						
440	SS 0517	Substation-2T-NW of 517			01						

TABLE A.1-3: No Future Use, Other Contamination History											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
441	SS 0517A	Substation-3T-N of 512			01						
442	SS 0517B	Substation-3T-SW corner of 517			01						
443	SS 0521	Substation-3T-SW of 521			01						
444	SS 0523	Substation-3T-S of 803			26						
445	SS 0525A	Substation-1T-SW of 525			01						
446	SS 0527	Substation-1T-S of 527			01						
447	SS 0528	Substation-1T-S of 529			01						
448	SS 0529	Substation-3T-S of 540			01						
449	SS 0531	Substation-1T-W of 531			01						
450	SS 0534	Substation-3T-200'N of 534A			01						
451	SS 0539	Substation-2T-SE of 537			01						
452	SS 0541	Substation-3T-W of 541			01						
453	SS 0543	Substation-5T-W of 543			01						
454	SS 0548	Substation-1T-N of 548			01						
455	SS 0548A	Substation-1T-101'W of 548			01						
456	SS 0556	Substation-1T-N of 541			01						
457	SS 0571	Substation-3T-75'W of 504A			01						
458	SS 0575	Substation-1T-N of 504			01						
459	SS 0575A	Substation-1T-N of 505			01						
460	SS 0611	Substation-3T-S of 611			04		Short-Term				
461	SS 0612	Substation-1T-E of 612			04		Short-Term				
462	SS 0613	Substation-3T-NW of 613			04		Short-Term				
463	SS 0614	Substation-1T-W of 614			03						
464	SS 0616	Substation-3T-N of 614			03						
465	SS 0618	Substation-3T-N of 618			03						
466	SS 0618-2	Substation-1T-W of 618			03						
467	SS 0622	Substation-1T-NE of 621			04						
468	SS 0624	Substation-3T-E of 624			04						
469	SS 0625	Substation-1T-E of 624			04						
470	SS 0627	Substation-3T-E of 627			04		Short-Term				
471	SS 0627A	Substation-1T-E of SS 627			04		Short-Term				
472	SS 0629	Substation-3T-NE of 629			04						
473	SS 0631	Substation-3T-N of 631			04						
474	SS 0632	Substation-1T-NE of 632			04		Short-Term				
475	SS 0633	Substation-3T-S of 633			04						
476	SS 0634	Substation-3T-SE of 634			04						
477	SS 0635	Substation-1T-W of 635			03						
478	SS 0647	Substation-1T-E of 647A			03						
479	SS 0673	Substation-1T-1200'NNE of 619			03						
480	SS 0725	Substation-3T-S of SS 726			36						
481	SS 0726	Substation-3T-200'S of 725			36						
482	SS 0727	Substation-1T-W side of 727			01						
483	SS 0728	Substation-3T-E of 728			01						
484	SS 0729	Substation-6T-E of 729			01						

TABLE A.1-3: No Future Use, Other Contamination History											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
485	SS 0732	Substation-6T-S of 732			01						
486	SS 0742	Substation-6T-N of 742			01						
487	SS 0747	Substation-1T-75'S of 729			01						
488	SS 0755	Substation-3T-S of 868C			01						
489	SS 0756	Substation-1T-W of 868C			01						
490	SS 0757	Substation-1T-S of 463D			01						
491	SS 0780	Substation-1T-N of T 1505			01						
492	SS 0781	Substation-1T-NE of T 1507			01						
493	SS 0782	Substation-1T-N of 732			01						
494	SS 0791-2	Substation-1T-E of 145			11						
495	SS 0806D	Substation-1T-SE of 806			26						
496	SS 0806G	Substation-1T-0.25 mi SW of 9 & D			26						
497	SS 0808ABC	Substation-3T-NE of 808			23						
498	SS 0808D	Substation-1T-0.3 mi SW of 808			23						
499	SS 0808E	Substation-1T-0.2 mi SW of 808			23						
500	SS 0808F	Substation-1T-427'SSE of 808			24						
501	SS 0808G	Substation-1T-800'SE of 808			24						
502	SS 0808H	Substation-1T-0.36 mi ESE of 808			24						
503	SS 0808I	Substation-1T-0.49 mi ESE of 808			24						
504	SS 0808K	Substation-1T-0.68 mi ESE of 808			24						
505	SS 0808L	Substation-1T-0.65 mi E of 808			24						
506	SS 0809	Substation-3T-S of 809			33						
507	SS 0809A	Substation-3T-300'SW of 809			33						
508	SS 0809B	Substation-3T-200'W of 809			33						
509	SS 0809C	Substation-3T-400'N of 809			33						
510	SS 0809D	Substation-3T-700'NE of 809			33						
511	SS 0809E	Substation-3T-500'E of 809			33						
512	SS 0809F	Substation-3T-0.2 mi S of 809			33						
513	SS 0831	Substation-3T-200'S of 8th & D St			35						
514	SS 0831E	Substation-1T-538'SSE of 8th & D St			36						
515	SS 0832	Substation-1T-300'E of 159			34						
516	SS 0836	Substation-3T-S of 836			24						
517	SS 1402	Substation-3T-150'W of 1601/1701			25						
518	SS 1403	Substation-3T-S of 1701			25						
519	SS 1404	Substation-3T-130'S of 1501			25						
520	SS 1501	Substation-7T-SE of 1501			25						
521	SS 1505	Substation-3T-E of 1505			25						
522	SS 1506	Substation-2T-NW corner of 1506			25						
523	SS 1510	Substation-2T-150'W of 1601			25						
524	SS 1601-1	Substation-1T-E of 1601			25						
525	SS 1601-2	Substation-1T-E of 1601			25						
526	SS 1602	Substation-2T-100'SE of 1606			25						
527	SS 1603	Substation-3T-100'NE of 1602			25						
528	SS 1605	Substation-1T-between 1605 & 1608			25						

TABLE A.1-3: No Future Use, Other Contamination History											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
529	SS 1606-1	Substation-3T-100'E of 1606			25						
530	SS 1606-2	Substation-1T-100'NE of 1606			25						
531	SS 1607	Substation-3T-100'E of 1607			25						
532	SS 1609	Substation-1T-150'NE of 1609			25						
533	SS 1611	Substation-1T-E of 1611			25						
534	SS 1611AB	Substation-2T-S of 1611			25						
535	SS 1614	Substation-2T-NE o'1615			25						
536	SS 1616	Substation-2T-NE of 1616			25						
537	SS 1701	Substation-3T-100'E of 1701			25						
538	SS 1702	Substation-2T-W of 1702			25						
539	SS 1703	Substation-1T-S of 1703			25						
540	SS 1704-1	Substation-3T-E of 1704			25						
541	SS 1704-2	Substation-2T-E of 1704			25						
542	SS 1704-3	Substation-3T-E of 1704			25						
543	SS 1706	Substation-1T-N of 1706			25						
544	SS 1707	Substation-1T-S of 1704			25						
545	SS 1710	Substation-3T-100'E of 1710			25						
546	SS 1711	Substation-3T-100'E of 1706			25						
547	SS 1724	Substation-3T-200'N of 1706			25						
548	SS 1730	Substation-2T-NW of 1730			31						
549	SS 1731	Substation-1T-200'NW of 1730			31						
550	SS 1732	Substation-1T-NW corner of section			31						
551	SS 1735	Substation-3T-E of 1736			31						
552	SS 1736	Substation-2T-200'S of 1736			31						
553	SS 6C	Substation-1T-SW corner of section			02						
554	SS 7215	Substation-1T-fenced railcar area			36						
555	SS 7C	Substation-1T-112'ESE 7th & C			02						
556	SS AL338	Substation-1T-SE corner of section			31						
557	SS AWL021	Substation-1T-S of pool rd			02						
558	SS CPR 1	Rectifier-1R-130'SSE of 254			02						
559	SS CPR 10	Rectifier-1R-S of 742A			01						
560	SS CPR 2	Rectifier-1R-W of 313			01						
561	SS CPR 3	Rectifier-1R-146'W of 326			02						
562	SS CPR 4	Rectifier-1R-E of 352A			02						
563	SS CPR 5	Rectifier-1R-with SS 514			01						
564	SS CPR 6	Rectifier-1R-with SS 515			01						
565	SS CPR 7	Rectifier-1R-NE of SS 411			01						
566	SS CPR 8	Rectifier-1R-W of 433			01						
567	SS CPR 9	Rectifier-1R-W of 542			01						
568	SS F182	Substation-1T-500'W of T 1512			36						
569	SS FL842	Substation-1T-N of 1618			25						
570	SS GA	Substation-1T-0.1 mi N of 732			36						
571	SS H-1	Substation-2T-SE of 319			01						
572	SS LDLA	Substation-1T-W of Lower Derby			01						

TABLE A.1-3: No Future Use, Other Contamination History											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
573	SS NN2201	Substation-1T-640'NNW of 810			22						
574	SS NN2202	Substation-1T-960'NNW of 810			22						
575	SS NN2203	Substation-1T-1260'NW of 810			22						
576	SS NN2204	Substation-1T-1600'NW of 810			22						
577	SS NN2205	Substation-1T-2050'NW of 810			22						
578	SS NN2206	Substation-1T-2500'NW of 810			22						
579	SS NN2207	Substation-1T-800'WNW of 810			22						
580	SS NN2208	Substation-1T-1100'WNW of 810			22						
581	SS NN2209	Substation-1T-1350'WNW of 810			22						
582	SS NN2210	Substation-1T-1670'WNW of 810			22						
583	SS NN2211	Substation-1T-2370'WNW of 810			22						
584	SS NN2301	Substation-3T-200'N of 808			23						
585	SS NN2501	Substation-1T-SE corner of 1602			25						
586	SS NN2601	Substation-1T-S of 806			26						
587	SS NN2701	Substation-3T-W of 810			27						
588	SS PSCOST	Substation-1T-1/8 mi S of 7th on C			02						
589	SS PT56/57	Substation-2T-NE of 510			01						
590	SS SBA	Substation-3T-SE side of 834			36						
591	SS SWIM	Substation-1T-W of pool/on C			02						
592	SS WR	Substation-1T-600'NE of 732			36						
593	T 0026	Horizontal Tank-TF0107	1		01	Owned					Tanks or Pipes
594	T 0064	Horizontal Tank-TF0107	1		01	Owned					Tanks or Pipes
595	T 0065	Caustic Soda Storage Tank-TF0103	31		01						Tanks or Pipes
596	T 0075	Vertical Tank-TF0103	1		01						Tanks or Pipes
597	T 0076	Vertical Tank-TF0103	1		01						Tanks or Pipes
598	T 0078	Vertical Tank-TF0103	1		01						Tanks or Pipes
599	T 0139	Horizontal Tank-TF0107	1		01						Tanks or Pipes
600	T 0190	Horizontal Tank-TF0107	3		01						Tanks or Pipes
601	T 0289	Air Receiver/Surge Tank-NE of 516	1		01						Tanks or Pipes
602	T 1040	Vertical Tank-TF0107	1		01	Owned					Tanks or Pipes
603	T 1128	Methanol Tank-TF0104	1		01						Tanks or Pipes
604	T 1129	MMAA Tank-TF0104	1		01						Tanks or Pipes
605	T 1132	Trimethylphosphite(TMP) Tank-TF0103	1		01						Tanks or Pipes
606	T 1133	MMA Tank-TF0104	1		01						Tanks or Pipes
607	T 1140	Chloroform Tank-TF0104	1		01						Tanks or Pipes
608	T 1146	Dicetene Tank-TF0110	2		01				Remediation Use		Tanks or Pipes
609	T 1147	Dicetene Tank-TF0110	2		01				Remediation Use		Tanks or Pipes
610	T 1168	Brine Storage Tank-SE corner 528	5		01						Tanks or Pipes
611	T 1178	Acetone Storage Tank-TF0103	1		01						Tanks or Pipes
612	T 1216	Mother Liquor/Dinitro Tank-TF0102	6		01						Tanks or Pipes
613	T 1324	Brine Storage Tank-TF0103	1		01						Tanks or Pipes
614	T 1327	Vertical Tank-TF0103	17		01						Tanks or Pipes
615	T 1340	Crystal, Acetone Tank-TF0102	16		01						Tanks or Pipes
616	T 1392	Vertical Tank-E of 512	5		01						Tanks or Pipes

TABLE A.1-3: No Future Use, Other Contamination History

PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
617	T 1463	Vertical Tank-TF0104	2		01						Tanks or Pipes
618	T 1570	Vertical Tank-TF0105	5		01						Tanks or Pipes
619	T 1606	Horizontal Tank-TF0109	5		01						Tanks or Pipes
620	T 1973	Vertical Tank-TF0103	2		01						Tanks or Pipes
621	TF0107	Tank Farm-W & S of 514A	110		01						Tanks or Pipes
622	TF2501	Tank Farm-W of 1704	25		25						Tanks or Pipes
623	TW-13	Open Storage-foundation-N of 1611	120	5,800	25						
624	V 1064	Vertical Tank-TF0109	1		01						Tanks or Pipes
625	V 1214	Vertical Tank-TF0106	2		01						Tanks or Pipes
626	V 1220	Vertical Tank-TF0106	6		01						Tanks or Pipes
627	V 1250	Horizontal Tank-TF0104	1		01						Tanks or Pipes
628	V 1253	Horizontal Tank-TF0104	1		01						Tanks or Pipes
629	V 1267	Surge Vessel-TF0105	2		01						Tanks or Pipes
630	V 1270	Horizontal Tank-TF0105	1		01						Tanks or Pipes

TABLE A.1-4: No Future Use, Agent History

PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
1	0313	Laboratory	1,000	10,000	01						
2	0315	Warehouse-Laundry	1,000	10,000	01						
3	0319	Magazine/Flammable Material Storage	52	400	01						
4	0414	Mustard Scrubber Unit-foundation	79	310	01						
5	0416	H/Dichlor Disposal Reactor-foundatn	79	300	01						
6	0417	H/Dichlor Decon Pit-foundation	79	280	01						
7	0422	H Manufacture/Aldrin Production	2,100	23,000	01	Leased					
8	0426	Mustard Disposal Reactor-foundation	59	1,600	01	Leased					
9	0427	Decontamination Pit-fdn	4	80	01	Leased					
10	0428	Incinerator	6	56	01						
11	0429	H Brine Mixing/Pesticide Mfg.	15	560	01						
12	0512	Filling/Pesticide Production	610	3,800	01	Leased		Treaty Bldg			
13	0514	Lewisite/HD/Pesticide Manufacturing	3,200	27,000	01	Leased		Treaty Bldg			
14	0514A	L/M-1 Storage/Dowtherm Boiler	110	1,700	01	Leased		Treaty Bldg			
15	0516	Lewisite Distillation/Pest. Prod	1,400	13,000	01	Leased					
16	0517	Offices/Change House/Laboratory	1,300	18,000	01	Leased					
17	0528	HD Burning/Pesticide Manufacture	380	2,200	01	Leased					
18	0536	Ammo Dem Facility/Crude Mustard Sto	990	4,100	01						
19	0537	Thaw House	2,300	16,000	01			Treaty Bldg			
20	0538	Ton Container Reconditioning Plant	1,200	15,000	01			Treaty Bldg			
21	0540	Ton Container Renovation Plant	330	4,900	01						
22	0541	Warehouse/White Phosphorous Filling	770	11,000	01						
23	0725	Bomb Testing Station	99	460	36						
24	0726	Bomb Test Building	40	430	36						
25	0728	HD Filling/Pesticide Storage/Warehouse	1,400	21,000	01				Remediation Use		
26	0742	Warehouse	4,800	49,000	01			Treaty Bldg	Remediation Use		
27	0742A	Tank House	330	1,300	01			Treaty Bldg			
28	0785	Warehouse	1,400	29,000	06						
29	0786	Warehouse	480	9,600	06				Remediation Use		
30	0788	Warehouse	480	9,600	06				Remediation Use		
31	0791	Warehouse	480	9,600	31				Remediation Use		
32	0792	Drum Storage Warehouse	440	9,600	31				Remediation Use		
33	0793	Drum Storage Warehouse	470	9,600	31				Remediation Use		
34	0794	Drum Storage Warehouse	520	9,600	31				Remediation Use		
35	0795	Drum Storage Warehouse	480	9,600	31				Remediation Use		
36	0796	Warehouse	480	9,600	31				Remediation Use		
37	0797	Drum Storage Warehouse	480	9,600	31				Remediation Use		
38	0798	Drum Storage Warehouse	480	9,600	31				Remediation Use		
39	0881	Igloo Storage	210	1,600	06				Remediation Use		
40	0882	Igloo Storage	210	1,600	06				Remediation Use		
41	0883	Igloo Storage	210	1,600	06						
42	0885	Igloo Storage	210	1,600	06				Remediation Use		
43	0886	Igloo Storage	210	1,600	06				Remediation Use		
44	1501	GB Manufacturing/Demil. Building	9,000	81,000	25			Treaty Bldg			

TABLE A.1-4: No Future Use, Agent History											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
45	1503A	Scrubber Facility-1503A/B/C=1503	440	580	25			Treaty Bldg			
46	1503B	Scrubber Facility-1503=1503A/B/C	88	580	25			Treaty Bldg			
47	1503C	Scrubber Facility-1503=1503A/B/C	79	580	25			Treaty Bldg			
48	1504	200-ft Steel Stack	630	710	25			Treaty Bldg			
49	1506	GB Storage	1,900	9,000	25			Treaty Bldg			
50	1601	GB Filling	7,700	69,000	25			Treaty Bldg			
51	1601A	Ammunitions Demilitarization Facility	670	2,800	25			Treaty Bldg			
52	1602	Paint Storage	620	2,200	25			Treaty Bldg			
53	1603A	Scrubber Facility	89	580	25						
54	1603B	Scrubber System-1603=1603A/B	89	580	25						
55	1605	Munitions Storage Igloo	150	1,000	25						
56	1606	Cluster Assembly Buildinge	14,000	60,000	25			Treaty Bldg			
57	1607	Warehouse	1,700	26,000	25			Treaty Bldg	Remediation Use		
58	1608	Munitions Storage Igloo	150	1,000	25						
59	1609	Munitions Storage Igloo	150	1,000	25						
60	1610	Munitions Storage Igloo	150	1,000	25						
61	1611	Demilitarization Facility	3,100	32,000	25						
62	1613	Explosive Unpacking Building	77	750	25			Treaty Bldg			
63	1614	Warehouse	260	7,800	25						
64	1615	Warehouse	170	4,000	25			Treaty Bldg			
65	1616	Warehouse	85	4,000	25			Treaty Bldg			
66	1702	Weld Shop	49	2,400	25						
67	1703	Spray Dryer Facility	2,700	28,000	25			Treaty Bldg			
68	1727	Industrial Waste Sewer	36	700	25			Treaty Bldg			
69	1735	Loading Dock	670	11,000	31						
70	T 0027	Vertical Tank-TF0107	1		01						Tanks or Pipes

TABLE A.1-5: Buildings Removed

PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	SHELL USE	FWS USE	TREATY	REMEDIATION USE	ADDED AFTER TASK 24	PIPE RUNS & TANKS
1	0113	Gardner's Tool Shed			35						
2	0121	WCW School									
3	0122	WCW School									
4	0123	WCW School									
5	0124	WCW School									
6	0125	WCW School									
7	0126	WCW School									
8	0127	WCW School									
9	0128	WCW School									
10	0129	Lavatory									
11	0130	Filling Station Bldg-SW of 7th & C			03						
12	0131	NCO Family Quarters	56	840	35						
13	0131	WCW School									
14	0132	NCO Quarters-Family			35						
15	0132	WCW School									
16	0133	Community Facility			35						
17	0133	WCW School									
18	0134	Family Housing	87	1,200	35						
19	0134	WCW School									
20	0135	Garage/Laundry-to 133 & 132			35						
21	0135	WCW School									
22	0141	West Gate Security Police Building	130	6,300	04						
23	0142	Administration & Offices			04						
24	0144	Gate House N. Gate									
25	0146	Toilet Building-to 145			11						
26	0147	Guard Gatehouse			11						
27	0148	Storage			04						
28	0148A	No Information-50'N of 148			34						
29	0149	Administration	110	5,100	04						
30	0150	Tennis Courts	120	13,000	34						
31	0151	B.O.Q. Barracks	190	8,200	34						
32	0152	Apartments-Family Quarters			34						
33	0153	Classrooms/Special Services			34						
34	0154	Bachelor Officers Quarters-foundatn	51	8,200	34						
35	0155	Barracks & Classrooms-fdn-N of 151	52	8,200	34						
36	0156	Mess Hall-NW of 151			34						
37	0157	Men's Barracks-foundation-S of 159	54	8,200	34						
38	0158	NCO Service Club-fnd-SW of 159	36	8,200	34						
39	0159	Mens Barracks	190	8,200	34						
40	0160	12 Unit Garage-to 162 & 164			34						
41	0161	Gate House									
42	0162	NCO Apts-fdn-SW of 166	37	4,100	34						
43	0163	Bowling Alley	140	2,700	34						
44	0164	Officer's Apts-foundation-W of 166	63	8,200	34						

NUMBER	NUMBER	DESCRIPTION OF STRUCTURE	(BCY)	(SF)	SECTION	USE	FWS USE	TREATY	USE	TASK 24	& TANKS
45	0165	Troop Supply Building-E of 166	46	1,300	34						
46	0166	Vault Storage Building	110	1,100	34						
47	0167	Hobby Shop/Recreation	58	620	34						
48	0168	Sunday School & VIP Quarters			34						
49	0169	Gas Chambers (A-D)									
50	0170	16-Unit Garage to 152 & 154			34						
51	0171	Staff Quarters			03						
52	0172	Staff Quarters			03						
53	0173	Staff Quarters			03						
54	0174	Staff Quarters			03						
55	0175	Staff Quarters			03						
56	0181	Officer Club-Rose Hill/P.O.W. Area			03						
57	0181A	Sentry Box-Rose Hill/P.O.W. Area			03						
58	0182	Shop & Storage-Rose Hill/P.O.W Area			03						
59	0183	CO Quarters-Rose Hill/P.O.W. Area			10						
60	0184	Building-Rose Hill/P.O.W. Area			10						
61	0184A	Garage to 184-Rose Hill/P.O.W. Area			10						
62	0185	POW Building-Rose Hill/P.O.W. Area			03						
63	0186	Garage/Storge-Rose Hill/P.O.W. Area			03						
64	0187	Guard Tower, Rose Hill/P.O.W. Area									
65	0188	Guard Tower, Rose Hill/P.O.W. Area									
66	0189	POW Building-Rose Hill Area			03						
67	0191	POW Building-Rose Hill Area			03						
68	0192	POW Building-Rose Hill Area			03						
69	0193	POW Building-Rose Hill Area			03						
70	0194	POW Building-Rose Hill Area			03						
71	0195	POW Building-Rose Hill Area			03						
72	0196	POW Building-Rose Hill Area			03						
73	0197	Toilet & Wash Room-Rose Hill Area			03						
74	0198	POW Building-Rose Hill Area			03						
75	0199	POW Building-Rose Hill Area			03						
76	0244A	Track Scale House			02						
77	0253A-F	Six 50% NaOH Storage Tanks			02						
78	0253G-H	Two Centrifugal Pumps			02						
79	0253K	Car Puller			02						
80	0255A-B	Two Fuel Oil Storage Tanks			02						
81	0257	Structure in Chlorine Plant			02						
82	0281	Guard Gatehouse			02						
83	0283	Guard Station			01						
84	0284	Guard Station			01						
85	0288	Guard Gatehouse			02						
86	0289	Guard Station			02						
87	0292	Guard Station			02						
88	0293	Guard Station			02						
89	0294	Guard Station			02						
90	0305	Meter Station-Contaminated Sewer			35						
91	0306	Meter Station-Contaminated Sewer			35						

NUMBER	NUMBER	DESCRIPTION OF STRUCTURE	(BCY)	(SF)	SECTION	USE	FWS USE	TREATY	USE	TASK 24	& TANKS
92	0310	Loading Ramp			01						
93	0312A	216th Motor Pool			34						
94	0314A	Storage-Laundry			01						
95	0316B	Temporary Contractor Storage			01						
96	0317	Vehicle Maintenance/Storage/Offices	450	11,000	01	Leased					
97	0318	Plants Service Station			02						
98	0321A	Tank	4		02				Remediation Use		Tanks or Pipes
99	0321B	Fuel Oil Tank-SE of 321C	4		02						Tanks or Pipes
100	0321E	Fuel Oil Storage Tank	12		02						Tanks or Pipes
101	0343B	Fuse Detonator Magazine			02						
102	0345A	Structure-M-74 Incendiary Bomb Plnt			02						
103	0363	Warehouse-now part of 362			02						
104	0367	Storage			02						
105	0368	No Information-S of SS368			12						
106	0373A	Garage/Storage-to 373			02						
107	0375	Well Pit			04						
108	0376	Well Pump House			34						
109	0377	Well Pump House			34						
110	0381	Chlorinating Station-Rose Hill Area			03						
111	0389	No Information									
112	0396	Septic Tank-Staff Quarters									
113	0397	Septic Tank-Water Pumping Station									
114	0402	Unloading Docks									
115	0411B	Steam Meter House	4	64	01						
116	0411C-J	Sulfur Mono/Dichloride tanks-in 413			01						
117	0412	Mustard Filling, Manuf., and Storag	1,600	12,000	01						
118	0424	H Scrubber Bldg			01						
119	0424B	Benzene Dryer Building			01						
120	0425	H NaOH Makeup			01						
121	0426B	Structure in Aldrin Plant			01						
122	0428	Incinerator			01						
123	0431	Ethylene Dryer/Comprssr/Refrigeration	660	6,300	01						
124	0433	Ethylene Generator/R&D Office	2,900	29,000	01						
125	0434	West Gas Holder	730		01	Leased					Tanks or Pipes
126	0462A	Fuel Oil Storage Tank	1,700		01						
127	0462B	Fuel Oil Storage Tank-now 321E			01						
128	0463A	Storage Tank	1,000		01						
129	0463B	Storage Tank	1,000		01						
130	0463C	DCPD/Alcohol Storage Tank	920		01						
131	0463D	Waste Storage Tank(US-4)	220		01						
132	0463E	Storage Tank	1,000		01						
133	0463F	Storage Tank	1,000		01						
134	0463G	Storage Tank	1,000		01						
135	0463H	Storage Tank	1,000		01						
136	0464A	Storage Tank	11,000		01	Owned					Tanks or Pipes
137	0464B	Storage Tank	11,000		01	Owned					Tanks or Pipes
138	0469	Wash Shed			01						

NUMBER	NUMBER	DESCRIPTION OF STRUCTURE	(BCY)	(SF)	SECTION	USE	FWS USE	TREATY	USE	TASK 24	& TANKS
139	0471A	Motor Control Building			01						
140	0476	No Information			01						
141	0478	Related to TC Plant-in lease doc.									
142	0504A	DET Maintenance Shop/Storage	45	840	01						
143	0513	L/H/HD Product Disposal			01						
144	0514B	Storage Shed			01						
145	0515E	Structure-Atrazine,Bladex,Nudrin Pt			01						
146	0518	Cafeteria-Acetylene,Lewisite Plants			01						
147	0523B	Sulfur Monochloride Recovery Bldg			01						
148	0535	Fanhouse			01						
149	0537A	Condensate Pump Pit			01						
150	0547	Storage			01						
151	0550A	Valve Pit			01						
152	0556	Hazardous Waste Tank	69		01						
153	0560	Structure in Aldrin Plant			01						
154	0562	Structure in Aldrin Plant			01						
155	0563	Renumbered to 459			01						
156	0564	Renumbered to 459A			01						
157	0576	Structure in Aldrin Plant			01						
158	0578	Structure in Aldrin Plant			01						
159	0618A	Open Storage			03						
160	0621B	Open Storage			04						
161	0625A	R&U Storage-W of 625			04						
162	0625B	Paint Storage-W of 625			04						
163	0625D	No Information-320'N of 165			34						
164	0626A	No Information-E of 626			04						
165	0626B	No Information-W of 626			04						
166	0627A	Paint Shop			04						
167	0628	Grease Rack			04						
168	0628A	Diesel Fuel/Waste Oil Storage Tank	1		04						Tanks or Pipes
169	0629A	Diesel Oil/Gasoline Storage Tank	1		04						Tanks or Pipes
170	0629B	Diesel Oil/Gasoline Storage Tank	1		04						Tanks or Pipes
171	0629C	Diesel Oil/Gasoline Storage Tank	1		04						Tanks or Pipes
172	0629D	Diesel Oil Storage Tank	1		04						Tanks or Pipes
173	0633C	Structure near Bioassy Lab			04						
174	0636	Lumber Storage Shed			04						
175	0637	Railroad Maintenance Office			03						
176	0642	Railroad Classification Office			03						
177	0645	No Information-E of 647A, SE of 643			03						
178	0645A	No Information-E of 647A, SE of 643			03						
179	0645B	No Information-E of 647A, SE of 643			03						
180	0645C	Equipment Storage-SW of 643			03						
181	0648A	Road Oil Tank	41		04						Tanks or Pipes
182	0648B	Road Oil Tank	46		04						Tanks or Pipes
183	0651	Salvage Yard Scales & Offce			04						
184	0652	No Info-380'S of 7th, 360 W of B St			04						
185	0653	Salvge Yd Strge-S of 7th, W of B St			04						

NUMBER	NUMBER	DESCRIPTION OF STRUCTURE	(BCY)	(SF)	SECTION	USE	FWS USE	TREATY	USE	TASK 24	& TANKS
186	0654	Salvge Yd Strge-S of 7th, W of B St			04						
187	0674	Paper Bailng House-NW of 696			04						
188	0675	R.R. Locker Room-E of 617			03						
189	0676	R.R. Tool House-E of 617			03						
190	0676A	R.R. Gas & Oil Storage Shed			03						
191	0677	R.R. Equipment & Machine Shed			03						
192	0678	R.R. Yard Office-SE of 675			03						
193	0678A	No Information-SE of 675			03						
194	0681	Gatehouse-250'S of 7th,W side of B			04						
195	0683	Meter Station-SE of 643, E of 644A			03						
196	0686	Guard Tower-S of 379			03						
197	0687	Guard Tower-W of 614, W of B St			04						
198	0689	Meter Station			03						
199	0691	No Information-100'SE of 621			04						
200	0692	No Information-60'SW of 621			04						
201	0693	Guard Tower-400'WSW of 621			04						
202	0695	Guard Tower-SW of 639			04						
203	0696	Guard Tower			04						
204	0697	No Information-870'W of 681			04						
205	0698	No Information-240'S of 7th			04						
206	0734	WP Pumphouse			01						
207	0744A	Storage Tank-now 745B			01						
208	0744B	Storage Tank-now 745C			01						
209	0745A	DCPD/Diesel/Benzol/Gasoline Tank	21		01						
210	0745B	Gasoline/Benzol/DCPD/Diesel Tank	21		01						
211	0745C	Gasoline Storage Tank	39		01						
212	0747	Cafeteria			01						
213	0749	No Information-SSE of 732			01						
214	0755	Change House/Storage	41	480	01						
215	0756	Blender/Scrubber Metering House	140	84	01						
216	0757	UDMH Storage Tank Farm	490		01						
217	0758	Tanks 463D and 805 in hydrazine			01						
218	0758A	Fire Protection Valve Pit	11	91	01						
219	0759	Drum Cleaning	32	800	01						
220	0760	Drum Storage Facility	9	200	01						
221	0761	Drum Loading Station	10	150	01						
222	0781	Sentry Station			01						
223	0782	Guard Station-SE of 732			01						
224	0783	Warehouse-now part of 785			06						
225	0784	Warehouse-now part of 785			06						
226	0802	Treatment Plant			26						
227	0803	Clarifier Tank			26						
228	0804	Main Sump-NE of Basin F			26						
229	0805	Storage Tank	79		01						
230	0806	Pump House			26						
231	0807	Well House			26						
232	0811	House(Farm)									

NUMBER	NUMBER	DESCRIPTION OF STRUCTURE	(BCY)	(SF)	SECTION	USE	FWS USE	TREATY	USE	TASK 24	& TANKS
233	0812	Officer's Quarters			33						
234	0812A	Garage			33						
235	0813	House-btwn 5th & 6th Ave/A & B Sts.			09						
236	0814	House-5th Ave/btwn A & B Sts.			09						
237	0815	Basin F Liquid Tank			26				Remediation Use	Not in Task 24	Tanks or Pipes
238	0816	Basin F Liquid Tank			26				Remediation Use	Not in Task 24	Tanks or Pipes
239	0817	Basin F Liquid Tank			26				Remediation Use	Not in Task 24	Tanks or Pipes
240	0822	Barn & Buildings-location unknown									
241	0822A	Milk House-location unknown									
242	0831B	Windmill/Pump Pit			35						
243	0831C	No Information									
244	0832	House-C St. & 8th Ave									
245	0833A	Building(Chicken House)									
246	0841A	Buildings(Garage)									
247	0842	House(Chicken House)-5th Ave & E St									
248	0842A	House(Brooder House)									
249	0843	Proving Ground Shelter			12						
250	0844	Latrine									
251	0845	Change House/Miscellaneous Storage			12						
252	0846	Recreation Building	100	8,800	12						
253	0847	Range House			12						
254	0852	House-6th Ave & E St									
255	0863	Shed in Toxic Area 1736			31						
256	0867	Tile House & Building-N of Toxic Yd									
257	0868	Magazines(A to E)									
258	0868B	Gas Training Building-location unkn									
259	0868C	Office/Ton Container Storage Shed	24	290	01						
260	0868D	Storehouse-216th Motor Pool			34						
261	0868D	Storehouse-W of 867B			06						
262	1402	8 Dichloro Tanks & Unloading Dock	200		25			Treaty Bldg			Tanks or Pipes
263	1503	Scrubber Building-see 1503A/B/C			25						
264	1505	Caustic Tank Farm	6		25						Tanks or Pipes
265	1511	Storage Building			25						
266	1603	Scrubber System-see 1603A/B			25						
267	1603C	GB Demil/Manufacuring			25						
268	1617	GB Manufacturing/Filling			25						
269	1621	Gatehouse-GB Plants Parking Lot			25						
270	1706B	Service Station			25						
271	1709	Underground Pipe Trenches			25						
272	1718A	Process Distribution System			25						
273	1718B	Caustic Distribution System			25						
274	1721	Compressed Air Lines			25						
275	1732A	Yard Fire Protection Building			25						
276	1732B	Yard Fire Protection Building			25						
277	1732C	Yard Fire Protection Building			25						
278	1736	Storage Area			31						
279	1740	No Info-NE of 1614, SE of 1608			25						

NUMBER	NUMBER	DESCRIPTION OF STRUCTURE	(BCY)	(SF)	SECTION	USE	FWS USE	TREATY	USE	TASK 24	& TANKS
280	41104	Dichloro Tank-TF 1402	1		25						Tanks or Pipes
281	41115	Dichloro Tank-TF 1402	1		25						Tanks or Pipes
282	49368	Dichloro Tank-TF 1402	1		25						Tanks or Pipes
283	49369	Dichloro Tank-TF 1402	1		25						Tanks or Pipes
284	49370	Dichloro Tank-TF 1402	1		25						Tanks or Pipes
285	49371	Dichloro Tank-TF 1402	1		25						Tanks or Pipes
286	49372	Dichloro Tank-TF 1402	1		25						Tanks or Pipes
287	49373	Dichloro Tank-TF 1402	1		25						Tanks or Pipes
288	CS-1	Hydrazine Storage	67		01						
289	F 40007	Horizontal Tank-TF2501	1		25						Tanks or Pipes
290	F 4039	Vertical Tank-TF 1402			25						
291	F 4040	Vertical Tank-TF 1402			25						
292	F 4041	Vertical Tank-TF 1402			25						
293	F 4042	Vertical Tank-TF 1402			25						
294	F 4597	Vertical Tank-TF 1402			25						
295	F 4598	Vertical Tank-TF 1402			25						
296	F 4599	Vertical Tank-TF 1402			25						
297	F 4786	Vertical Tank-TF 1402			25						
298	F 4789	Vertical Tank-TF 1402			25						
299	F 4790	Vertical Tank-TF 1402			25						
300	F 4791	Vertical Tank-TF 1402			25						
301	F 4792	Vertical Tank-TF 1402			25						
302	F 50097	Caustic Blending Tank-TF 1505	21		25						Tanks or Pipes
303	F 50098	Caustic Blending Tank-TF 1505	21		25						Tanks or Pipes
304	F 50099	Caustic Blending Tank-TF 1505	21		25						Tanks or Pipes
305	F 50117	Vertical Tank-TF2501	7		25						Tanks or Pipes
306	F 50120	Vertical Tank-TF2501	7		25						Tanks or Pipes
307	F 50123	Vertical Tank-TF2501	7		25						Tanks or Pipes
308	F 50393	Vertical Tank-TF2501	5		25						Tanks or Pipes
309	F 50394	Vertical Tank-TF2501	3		25						Tanks or Pipes
310	F 50670	Vertical Tank-TF2501	2		25						Tanks or Pipes
311	F 5102	Caustic Blending Tank-TF 1505	21		25						Tanks or Pipes
312	F 5103	Caustic Blending Tank-TF 1505	21		25						Tanks or Pipes
313	F 5104	Caustic Blending Tank-TF 1505	21		25						Tanks or Pipes
314	F 5105	Caustic Blending Tank-TF 1505	21		25						Tanks or Pipes
315	F 5106	Caustic Blending Tank-TF 1505	21		25						Tanks or Pipes
316	F 5107	Caustic Blending Tank-TF 1505	21		25						Tanks or Pipes
317	F 5108	Caustic Blending Tank-TF 1505	21		25						Tanks or Pipes
318	F 58987	Horizontal Tank-TF2501	5		25						Tanks or Pipes
319	G 50830	Vertical Tank-TF2501	1		25						Tanks or Pipes
320	G 50831	Vertical Tank-TF2501	1		25						Tanks or Pipes
321	HAS-1	Hydrazine or Aerozine Tank	67		01						
322	HAS-2	Hydrazine or Aerozine Tank	67		01						
323	HAS-3	Hydrazine or Aerozine Tank	67		01						
324	NN0203	Fire Equipment Storage-SW of 254	29	80	02						
325	NN0901	Con.Struc-1300'SE of 6th & A St	8	96	09						
326	NN1201	Long Metal Shed-25'W of 846	4	850	12						

NUMBER	NUMBER	DESCRIPTION OF STRUCTURE	(BCY)	(SF)	SECTION	USE	FWS USE	TREATY	USE	TASK 24	& TANKS
327	NN1202	Square Metal Shed-W of 846	5	410	12						
328	NN1203	Wooden Shed-W of 846	5	200	12						
329	NN1204	Wooden Frame/fdn-S of 846	4	100	12						
330	NN1205	Wooden Shed-S of 846	3	85	12						
331	NN1206	Shooting Bunker-S of 846	6	76	12						
332	NN1207	Shooting Bunker #2-S of 846	14	76	12						
333	NNT0108	Horizontal Tank-E of 314	1		01						Tanks or Pipes
334	NNT2601	3 Tanks for Basin F Liquid Holding			26						
335	NO #	Structure-SW of Demolition Area			29						
336	NO #	Antenna Installation-NW corner			23						
337	NO #	Antenna Installation-0 4 mi W of C			34						
338	NO #	Volleyball Court-NE of 163			34						
339	R 0019	Vertical Tank-TF0109-on fdn 426	1		01						Tanks or Pipes
340	R 0038	Vertical Tank-TF0106	4		01						Tanks or Pipes
341	SQI-1	SQI Facility			26				Remediation Use	Not in Task 24	
342	SQI-2	SQI Facility			26				Remediation Use	Not in Task 24	
343	SQI-3	SQI Facility			26				Remediation Use	Not in Task 24	
344	SQI-4	SQI Facility			26				Remediation Use	Not in Task 24	
345	SQI-5	SQI Facility			26				Remediation Use	Not in Task 24	
346	SQI-6	SQI Facility			26				Remediation Use	Not in Task 24	
347	SQI-7	SQI Facility			26				Remediation Use	Not in Task 24	
348	SQI-8	SQI Facility			26				Remediation Use	Not in Task 24	
349	SQI-9	SQI Facility			26				Remediation Use	Not in Task 24	
350	SS 0122	Substation-NW corner of section			03						
351	SS 0139	Substation-NW corner of section			10						
352	SS 0152	Substation-SW of 165			34						
353	SS 0162	Substation-WSW of 165			34						
354	SS 0163	Substation-E of 159			34						
355	SS 0165	Substation-N of 166			34						
356	SS 0166	Substation-SW corner of section			10						
357	SS 0174	Substation-E of 176			03						
358	SS 0176	Substation-W of 145			10						
359	SS 0181	Substation-W of 181			03						
360	SS 0183	Substation-W of 381			03						
361	SS 0252	Substation-S of 254			02						
362	SS 0270	Substation-NE of 538			01						
363	SS 0306	Substation-1/4 mi N of 7th on D St			35						
364	SS 0307	Substation-1/8 mi N of 7th on D St			35						
365	SS 0326	Substation-N of 326			02						
366	SS 0337	Substation-SW of 337			02						
367	SS 0343	Substation-ENE of 342			02						
368	SS 0368A	Substation-N of 846			01						
369	SS 0412	Substation-E of 412			01						
370	SS 0431	Substation-N of 431			01						
371	SS 0433	Substation-W of 433			01						
372	SS 0511	Substation-N of 511			01						
373	SS 0511A	Substation			01						

NUMBER	NUMBER	DESCRIPTION OF STRUCTURE	(BCY)	(SF)	SECTION	USE	FWS USE	TREATY	USE	TASK 24	& TANKS
374	SS 0518	Substation-WNW of 518			01						
375	SS 0523	Substation-E if 523			01						
376	SS 0524	Substation-N of 524			01						
377	SS 0525	Substation			01						
378	SS 0623	Substation-E of 634			04						
379	SS 0626	Substation-E of 627			04						
380	SS 0636	Substation-NE corner of Sec 9			09						
381	SS 0638	Substation-175'S of 6th, E of B St			10						
382	SS 0641	Substation-S of 641			03						
383	SS 0644	Substation-N of 644A			03						
384	SS 0651	Substation-NE corner of section			04						
385	SS 0783	Substation-NW of 785			06						
386	SS 0791	Substation-S of 112			02						
387	SS 0812	Substation-S of 7th, 1/2 mi W of B			04						
388	SS 0832	Substation-NE of 131			35						
389	SS 1515	Substation-250'W of 1601/06			25						
390	SS 1613	Substation-NE of 1613			25						
391	SS 1705	Substation-SW corner of 1705			25						
392	SS 1712	Substation-280'S of SS 1706			36						
393	SS NO	Transformer-N end of Res F			26						
394	SS NO	Transf-NE corner of Reserve Center			12						
395	SS NO	Transformer-between Res C & F			26						
396	SS NO #	Transformer-S of 373			02						
397	SS NO #	Transformer-NE corner of Res C			26						
398	SS NO #	Transformer-N of 412			01						
399	SS NO #	Transformer-NW corner of section			11						
400	SS NO #	Transformer-300'SE of 1710			25						
401	SS NO #	Transformer-200'SW of 433			01						
402	SS TW-2	Substation-SE of TW-2/1615			25						
403	SS TW-4	Substation-now SS 1616			25						
404	T 0014	Acetone Tank-TF0102	1		01						Tanks or Pipes
405	T 0015	Hexane Tank-TF0102	1		01						Tanks or Pipes
406	T 0019	MBA Storage Tank-TF0104	1		01						Tanks or Pipes
407	T 0032	Horizontal Tank-TF0109-on fdn 426	1		01						Tanks or Pipes
408	T 0058	Horizontal Tank-TF0106	1		01						
409	T 0066	Vertical Tank-TF0103	38		01						Tanks or Pipes
410	T 0077	Vertical Tank-TF0103	1		01						Tanks or Pipes
411	T 0079	Vertical Tank-TF0103	1		01						Tanks or Pipes
412	T 0080	Vertical Tank-TF0103	1		01						Tanks or Pipes
413	T 0081	Vertical Tank-TF0103	2		01						Tanks or Pipes
414	T 0082	Vertical Tank-TF0103	2		01						Tanks or Pipes
415	T 0130	Horizontal Tank-TF0109	1		01						Tanks or Pipes
416	T 0131	Horizontal Tank-TF0109	1		01						Tanks or Pipes
417	T 0132	Horizontal Tank-TF0109	1		01						Tanks or Pipes
418	T 0133	Horizontal Tank-TF0109	1		01						Tanks or Pipes
419	T 0160	Chlorinated Paraffin Tank-TF0102	3		01						Tanks or Pipes
420	T 0161	Acetone Tank-TF0102	4		01						Tanks or Pipes

NUMBER	NUMBER	DESCRIPTION OF STRUCTURE	(BCY)	(SF)	SECTION	USE	FWS USE	TREATY	USE	TASK 24	& TANKS
421	T 0164	Chlorinated Paraffin Tank-TF0102	1		01						Tanks or Pipes
422	T 0165	Aqueous Urea Tank-TF0102	1		01						Tanks or Pipes
423	T 0208	Vertical Tank-TF0109	6		01						Tanks or Pipes
424	T 0257	Vertical Tank-TF0106	1		01						
425	T 0273	Horizontal Tank-TF0109	9		01						Tanks or Pipes
426	T 1010	Hexane Tank-TF0102	1		01						Tanks or Pipes
427	T 1027	Mother Liqour Storage Tank-TF0106	1		01						
428	T 1048	Vertical Tank-TF0109	1		01						Tanks or Pipes
429	T 1124	Vertical Tank-TF0103	1		01						Tanks or Pipes
430	T 1127	Vertical Tank-TF0110	7		01						Tanks or Pipes
431	T 1134	Vertical Tank-TF0110	3		01						Tanks or Pipes
432	T 1135	Sulfuryl Chloride Tank-TF0104	1		01						Tanks or Pipes
433	T 1139	Sulfuryl Chloride Tank-TF0104	1		01						Tanks or Pipes
434	T 1142	Horizontal Tank-TF0109	2		01						Tanks or Pipes
435	T 1148	Diketene Storage Tank-TF0104	1		01						Tanks or Pipes
436	T 1149	Diketene Tank-TF0104	1		01						Tanks or Pipes
437	T 1150	Monomethylamine Tank-TF0104	1		01						Tanks or Pipes
438	T 1151	Monomethylamine Tank-TF0104	1		01						Tanks or Pipes
439	T 1171	Horizontal Tank-TF0110	1		01						Tanks or Pipes
440	T 1173	Horizontal Tank-TF0110	1		01						Tanks or Pipes
441	T 1202	Chlorine Tank-TF0103	1		01						Tanks or Pipes
442	T 1203	Ammonia Storage Tank-TF0103	2		01						Tanks or Pipes
443	T 1204	Urea Storage Tank-TF0103	3		01						Tanks or Pipes
444	T 1215	Vertical Tank-TF0110	3		01						Tanks or Pipes
445	T 1219	Mixed Acid Tank-TF0101	22		01						Tanks or Pipes
446	T 1220	Mixed Acid Tank-TF0101	22		01						Tanks or Pipes
447	T 1222	MMA Blending Tank-TF0104	1		01						Tanks or Pipes
448	T 1235	Glycol Storage Tank-TF0108	1		01						
449	T 1246	Diketene Tank-TF0104	1		01						Tanks or Pipes
450	T 1247	Diketene Tank-TF0104	1		01						Tanks or Pipes
451	T 1253	Acetaldoxime Storage Tank-TF0108	1		01						
452	T 1267	Caustic Tank-TF0101	1		01						Tanks or Pipes
453	T 1272	Vertical Tank-TF0103	15		01						Tanks or Pipes
454	T 1273	Vertical Tank-TF0103	16		01						Tanks or Pipes
455	T 1279	Methylene Chloride Tank-TF0108	1		01						
456	T 1288	Methyl Mercaptan Surge Tank-TF0108	1		01						
457	T 1289	Dibrom/MIBK Storage Tank-TF0108	1		01						
458	T 1290	Vertical Tank-TF0108	4		01						
459	T 1291	Acetaldoxime Dilution Tank-TF0108	5		01						
460	T 1296	Spent Acid Tank-TF0101	22		01						Tanks or Pipes
461	T 1305	Water Surge Tank-TF0108	4		01						
462	T 1307	Spent Acid Tank-TF0101	17		01						Tanks or Pipes
463	T 1322	Sulfuryl Chloride Tank-TF0104	2		01						Tanks or Pipes
464	T 1323	Sulfuryl Chloride Tank-TF0104	2		01						Tanks or Pipes
465	T 1390	Vertical Tank-E of 512	5		01						Tanks or Pipes
466	T 1391	Vertical Tank-E of 512	5		01						Tanks or Pipes
467	T 1433	Caustic Storage Tank-TF0108	11		01						

NUMBER	NUMBER	DESCRIPTION OF STRUCTURE	(BCY)	(SF)	SECTION	USE	FWS USE	TREATY	USE	TASK 24	& TANKS
468	T 1446	Horizontal Tank-TF0103	1		01						Tanks or Pipes
469	T 1500	Caustic Tank-TF0105	21		01						Tanks or Pipes
470	T 1501	Separator Tank-TF0105	130		01						Tanks or Pipes
471	T 1502	Vertical Tank-TF0105	25		01						Tanks or Pipes
472	T 1503	Vertical Tank-TF0105	15		01						Tanks or Pipes
473	T 1504	Vertical Tank-TF0105	15		01						Tanks or Pipes
474	T 1505	Caustic Tank-TF0105	240		01						Tanks or Pipes
475	T 1506	Surge Tank-TF0105	240		01						Tanks or Pipes
476	T 1507	Quench Water Tank-TF0105	86		01						Tanks or Pipes
477	T 1508	Quench Water Tank-TF0105	81		01						Tanks or Pipes
478	T 1509	Cuprous Sulfide Storage Tank-TF0105	490		01						Tanks or Pipes
479	T 1510	DET Effluent Storage Tank-TF0105	110		01						Tanks or Pipes
480	T 1511	Fuel Oil Storage Tank-TF0105	47		01						Tanks or Pipes
481	T 1512	Incinerator Feed Stor Tank-N of 7th	120		36				Remediation Use		Tanks or Pipes
482	T 1513	Incinerator Feed Stor Tank-N of 7th	120		36				Remediation Use		Tanks or Pipes
483	T 1514	Atmospheric Storage Tank-TF0105	8		01						Tanks or Pipes
484	T 1515	Atmospheric Storage Tank-TF0105	17		01						Tanks or Pipes
485	T 1516	Cuprous Sulfide Settler Tank-TF0105	36		01						Tanks or Pipes
486	T 1566	Liquid Fertilizer Tank-N of 7th	450		36				Remediation Use		Tanks or Pipes
487	TD-1	No Info-SE of 1611, NE of 1704			25						
488	TD-2	No Info-NE of 1611, SE of 1616			25						
489	TD-3	No Info-NE of 1608, W of NS-3 Road			25						
490	TD-4	No Info-NE of 1611, SE of 1616			25						
491	TF0101	Planavin Tank Farm-N of 534B	200		01						Tanks or Pipes
492	TF0102	515 Tank Farm-E of 534	200		01						Tanks or Pipes
493	TF0103	BCH Tank Farm-W of 514D	120		01						Tanks or Pipes
494	TF0104	514 Tank Farm-N of 509	370		01						Tanks or Pipes
495	TF0105	DET System Tank Farm-N of 728	790		01						Tanks or Pipes
496	TF0106	Tank Farm-NE of 515	57		01						Tanks or Pipes
497	TF0108	Tank Farm-N of & btwn 525 & 521	200		01						Tanks or Pipes
498	TF0109	Tank Farm-surrounding 471	360		01						Tanks or Pipes
499	TF0110	471 Tank Farm-S of 472A	200		01						Tanks or Pipes
500	TW-1	Warehouse/Now 1614			25						
501	TW-10	No Info-E of 1608 and NS-3 Road			25						
502	TW-11	No Info-E of 1616 and NS-3 Road			25						
503	TW-12	No Info-SE of 1615, NE of 1616			25						
504	TW-14	Gas Mask Training-now 555			25						
505	TW-15	Open Storage-SW of 1615, NW of 1616			25						
506	TW-16	No Info-NE of 1608, SE of 1610			25						
507	TW-2	Warehouse/Now 1615			25						
508	TW-3	No Info-between 1615 and 1616			25						
509	TW-4	Warehouse/Now 1616			25						
510	TW-5	No Info-W of 1615, SW of 1614			25						
511	TW-6	No Info-W of 1615, E of pipe yard			25						
512	TW-7	No Info-SW of 1615, NW of 1616			25						
513	TW-8	No Info-E of 1614 and NS-3 Road			25						
514	TW-9	No Info-SE of 1614, NE of 1615			25						

NUMBER	NUMBER	DESCRIPTION OF STRUCTURE	(BCY)	(SF)	SECTION	USE	FWS USE	TREATY	USE	TASK 24	& TANKS
515	US 1	UDMH Storage	110		01						
516	US 2	UDMH Storage	110		01						
517	V 1001	Vinyl Chloride Tank-W of 512	1		01	Owned					Tanks or Pipes
518	V 1002	Vinyl Chloride Tank-W of 512	2		01	Owned					Tanks or Pipes
519	V 1147	Horizontal Tank-TF0103	1		01						Tanks or Pipes
520	V 1156	Horizontal Tank-TF0106	6		01						
521	V 1186	Methyl Mercaptan Relief Tank-TF0108	1		01						
522	V 1187	MIC Relief Knockout Vessel-TF0106	1		01						
523	V 1230	Horizontal Tank-TF0102	1		01						
524	V 1254A	Methyl Chloride Tank-TF0104	1		01						Tanks or Pipes
525	V 1254B	Horizontal Tank-TF0104	1		01						Tanks or Pipes
526	V 1255	DET Effluent Suction Vessel-TF0105	10		01						Tanks or Pipes
527	V 1259	DET Wastewater Storage Tank-TF0105	11		01						Tanks or Pipes
528	V 1264	Horizontal Tank-TF0105	1		01						
529	V 1265	Horizontal Tank-TF0105	91		01						
530	V 1313	Horizontal Tank-TF0105	30		01						Tanks or Pipes
531	Z-36	Trailer			01				Remediation Use	Not in Task 24	
532	Z-56	Trailer			35				Remediation Use	Not in Task 24	
533	Z-57	Trailer			35				Remediation Use	Not in Task 24	

TABLE A.1-6: Remediation Use Structures

PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	FS MEDIUM TYPE	SHELL USE	FWS USE	TREATY	ADDED AFTER TASK 24	PIPE RUNS & TANKS
1	0112A	Emergency Generator Plant	35	240	35	Other Contamination History					
2	0130				35	Future Use				Not in Task 24	
3	0132	Shell/MKE Field Headquarters			35	Other Contamination History				Not in Task 24	
4	0211	Gas Meter House	21	240	02	Future Use		Short-Term			
5	0311	Stems-Rogers Office/Sample Storage	350	4,400	02	Other Contamination History					
6	0315A	Steam Meter Pit-W of 315	7	100	01	Other Contamination History					
7	0318				35	Other Contamination History				Not in Task 24	
8	0321	Boiler Plant-Central Gas Heat Plant	6,000	56,000	02	Other Contamination History					
9	0321A	Tank	4		02	Buildings Removed					Tanks or Pipes
10	0321C	Pumphouse	37	580	02	Other Contamination History					
11	0321D	Fuel Oil Pumphouse	38	480	02	Other Contamination History					
12	0331	Phosgene Filling Warehouse	1,000	12,000	02	Other Contamination History					
13	0332	Warehouse	1,000	12,000	02	Other Contamination History					
14	0333	Warehouse	980	11,000	02	Other Contamination History					
15	0334	Warehouse	980	11,000	02	Other Contamination History					
16	0335	Warehouse	990	11,000	02	Other Contamination History					
17	0336	General Purpose Warehouse	990	11,000	02	Other Contamination History					
18	0341A	Condensate Pump House	15	160	02	Other Contamination History					
19	0346	Warehouse	920	11,000	02	Other Contamination History					
20	0347	Warehouse/Chemical Storage	1,900	27,000	02	Other Contamination History	Leased				
21	0361	Primary Electrical Substation	54	380	02	Future Use		Short-Term			
22	0362	Warehouse	4,000	59,000	02	Other Contamination History					
23	0369	Lower Derby Valve Gate	20	49	01	Future Use		Long-Term			
24	0371	Water Pumping Station	820	1,800	02	Future Use		Long-Term			
25	0372A	Chlorinator Station	56	380	02	Other Contamination History		Short-Term			
26	0378	Chlorinating Station (on airport)	16	150	10	Other Contamination History		Short-Term			
27	0379	Chlorinating Station	20	210	03	Other Contamination History		Short-Term			
28	0381				02	Other Contamination History				Not in Task 24	
29	0385	Water Pump Station	14	140	04	Future Use		Long-Term			
30	0386	Water Pump Station	14	140	04	Future Use		Long-Term			
31	0387	Water Pump Station	14	140	04	Future Use		Long-Term			
32	0392	Sewage Lift Station	46	260	34	Other Contamination History		Short-Term			
33	0393	Sewage Lift Station	46	260	34	Other Contamination History		Short-Term			
34	0518A	Emergency Fire Protection Generator	22	290	01	Other Contamination History	Owned				
35	0543	Maintainence Shops/Instrument Lab	2,000	25,000	01	Other Contamination History					
36	0543A	Steam Meter Pit	12	93	01	Other Contamination History					
37	0543B	Facilities Engineers	590	8,700	01	Other Contamination History					
38	0551	Elevated Storage Tank	620		01	Future Use		Long-Term			Tanks or Pipes
39	0552	Valve Pit	55	310	01	Future Use		Long-Term			
40	0618	Warehouse	5,300	110,000	03	Future Use					
41	0619	Warehouse	5,200	110,000	03	Future Use		Long-Term			
42	0621	Property Disposal/Salvage Ofice	890	19,000	04	Other Contamination History					
43	0621A	Truck Scale Platform	56	740	04	Other Contamination History					
44	0624	Repair/Salvage/Surplus Facility	850	24,000	04	Significant Contamination History					

TABLE A.1-6: Remediation Use Structures

PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	FS MEDIUM TYPE	SHELL USE	FWS USE	TREATY	ADDED AFTER TASK 24	PIPE RUNS & TANKS
45	0625	Warehouse	870	11,000	04	Other Contamination History					
46	0627	Vehicle Maintenance Shop	620	16,000	04	Other Contamination History		Short-Term			
47	0630	Gas Meter House	37	240	03	Other Contamination History		Short-Term			
48	0631	Railcar Maintainence/Roundhouse	350	4,500	04	Other Contamination History					
49	0632	Gas-Fired Heating Plant	420	1,400	04	Other Contamination History		Short-Term			
50	0633B	Hazardous Materials Storage	140	640	04	Other Contamination History					
51	0634	Flammable Materials Storehouse	58	400	04	Other Contamination History					
52	0670				03	Other Contamination History				Not in Task 24	
53	0673	Railcar Scale House	2	88	03	Other Contamination History					
54	0727	Facilities Maintenance	98	3,600	01	Other Contamination History	Owned				
55	0728	HD Filling/Pesticide Storage/Wareh.	1,400	21,000	01	Agent History					
56	0729	General Purpose Warehouse	1,600	23,000	01	Other Contamination History	Leased				
57	0742	Warehouse	4,800	49,000	01	Agent History			Treaty Bldg		
58	0765	Potable Water Purificaton			01	Other Contamination History				Not in Task 24	
59	0786	Warehouse	480	9,600	06	Agent History					
60	0787	Warehouse	480	9,600	06	Other Contamination History					
61	0788	Warehouse	480	9,600	06	Agent History					
62	0791	Warehouse	480	9,600	31	Agent History					
63	0792	Drum Storage Warehouse	440	9,600	31	Agent History					
64	0793	Drum Storage Warehouse	470	9,600	31	Agent History					
65	0794	Drum Storage Warehouse	520	9,600	31	Agent History					
66	0795	Drum Storage Warehouse	480	9,600	31	Agent History					
67	0796	Warehouse	480	9,600	31	Agent History					
68	0797	Drum Storage Warehouse	480	9,600	31	Agent History					
69	0798	Drum Storage Warehouse	480	9,600	31	Agent History					
70	0801	Radio Relay Station-N of 1726	12	180	25	Other Contamination History					
71	0808	No Bdry Groundwater Treatment Plant	650	3,900	23	Other Contamination History					
72	0809	Irondale Groundwater Treatment Sys.	320	3,000	33	Other Contamination History					
73	0810	NW Bndry Groundwater Treatment Bldg	490	3,100	27	Other Contamination History					
74	0815	Basin F Liquid Tank			26	Buildings Removed				Not in Task 24	Tanks or Pipes
75	0816	Basin F Liquid Tank			26	Buildings Removed				Not in Task 24	Tanks or Pipes
76	0817	Basin F Liquid Tank			26	Buildings Removed				Not in Task 24	Tanks or Pipes
77	0825	Basin A Neck Treatment Bldg.			35	Other Contamination History				Not in Task 24	
78	0831	Technical Escort/Officer's Quarters	120	1,100	35	Other Contamination History					
79	0831A	Garage/Storage Shed	27	360	35	Other Contamination History					
80	0840	Air Monitoring Station			25	Other Contamination History				Not in Task 24	
81	0866	Toxic Yard Office & Change House	140	2,400	06	Other Contamination History					
82	0881	Igloo Storage	210	1,600	06	Agent History					
83	0882	Igloo Storage	210	1,600	06	Agent History					
84	0885	Igloo Storage	210	1,600	06	Agent History					
85	0886	Igloo Storage	210	1,600	06	Agent History					
86	1607	Warehouse	1,700	26,000	25	Agent History			Treaty Bldg		
87	1701	Warehouse	2,300	26,000	25	Other Contamination History			Treaty Bldg		
88	1710	Clinic and Administration Building	920	15,000	25	Other Contamination History					

TABLE A.1-6: Remediation Use Structures											
PLACE NUMBER	STRUCTURE NUMBER	DESCRIPTION OF STRUCTURE	BANK VOL (BCY)	SIZE (SF)	SECTION	FS MEDIUM TYPE	SHELL USE	FWS USE	TREATY	ADDED AFTER TASK 24	PIPE RUNS & TANKS
89	1711	Gas Meter House	6	170	25	Other Contamination History					
90	1713	Standby Generator Plant	100	2,500	25	Other Contamination History			Treaty Bldg		
91	1715				25	Other Contamination History				Not in Task 24	
92	1717	Chlorinating Station	11	120	25	Other Contamination History					
93	1718	Valve Pit & Chlorinating Station	24	260	25	Other Contamination History					
94	1719	Electrical Distribution System	13	130	25	Other Contamination History					
95	NN0300				03	Other Contamination History				Not in Task 24	
96	NN0902	Survey Tower-N of Post Office	1	140	09	Other Contamination History					
97	NN2002	Tank Pad-N of 9th, 2/3 mi E of F St	14	380	20	Other Contamination History					
98	SQI-1	SQI Facility			26	Buildings Removed				Not in Task 24	
99	SQI-2	SQI Facility			26	Buildings Removed				Not in Task 24	
100	SQI-3	SQI Facility			26	Buildings Removed				Not in Task 24	
101	SQI-4	SQI Facility			26	Buildings Removed				Not in Task 24	
102	SQI-5	SQI Facility			26	Buildings Removed				Not in Task 24	
103	SQI-6	SQI Facility			26	Buildings Removed				Not in Task 24	
104	SQI-7	SQI Facility			26	Buildings Removed				Not in Task 24	
105	SQI-8	SQI Facility			26	Buildings Removed				Not in Task 24	
106	SQI-9	SQI Facility			26	Buildings Removed				Not in Task 24	
107	T 1146	Dicetene Tank-TF0110	2		01	Other Contamination History					Tanks or Pipes
108	T 1147	Dicetene Tank-TF0110	2		01	Other Contamination History					Tanks or Pipes
109	T 1512	Incinerator Feed Stor Tank-N of 7th	120		36	Buildings Removed					Tanks or Pipes
110	T 1513	Incinerator Feed Stor Tank-N of 7th	120		36	Buildings Removed					Tanks or Pipes
111	T 1566	Liquid Fertilizer Tank-N of 7th	450		36	Buildings Removed					Tanks or Pipes
112	Z-28	Trailer			23	Future Use				Not in Task 24	
113	Z-3	Trailer			35	Future Use				Not in Task 24	
114	Z-38	Trailer			04	Future Use				Not in Task 24	
115	Z-39	Trailer			04	Future Use				Not in Task 24	
116	Z-40	Trailer			25	Future Use				Not in Task 24	
117	Z-41	Trailer			25	Future Use				Not in Task 24	
118	Z-42	Trailer			25	Future Use				Not in Task 24	
119	Z-58	Trailer			35	Future Use				Not in Task 24	
120	Z-68	Trailer			35	Future Use				Not in Task 24	
121	Z-69	Trailer			35	Future Use				Not in Task 24	
122	Z-70	Trailer			04	Future Use				Not in Task 24	

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
105	Bus Shelter	Post 1987 Structure		Future Use, No Potential Exposure	Bus stop. No direct use or storage of chemicals.
111	RMA Administration, Headquarters Office/NCSA	No prior chemical use reported.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, chlordane, PPDDE, PPDDT, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, lead, mercury, zinc	Future Use, No Potential Exposure	Administration Building. No direct use or storage of chemicals.
112	Communications Headquarters/NCSA	The basement was possibly used as a photographic laboratory.	HISTORICAL: Photographic chemicals SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin	Future Use, No Potential Exposure	Photographic laboratory. No direct use or storage of other than photographic chemicals.
112A	Emergency Generator Plant/ Communications/NCSA	The building was used as a communication storage building; precise contents stored are unavailable in Task 24.	HISTORICAL: Historically associated chemicals not available SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin	No Future Use, Other Contamination History	Industrial Support Building.
112B	Barbecue - north of 112/ NCSA	No prior chemical use reported. Historical Information not available in Task 24.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
114	Security Incinerator/NCSA	No prior chemical use reported. The structure was a brick incinerator used to burn papers from Bldg. 111.	HISTORICAL: None	No Future Use, Other Contaminant History	Industrial Support Building.
116	Bus Stop Shelter/SPSA-1g	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contaminant History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
120	Administration/NCSA	Built since 1986, additional information available from PMRMA.		Future Use, No Potential Exposure	Administration Building. No direct use or storage of chemicals.
121	Administration/NCSA	Built since 1986, additional information available from PMRMA.		Future Use, No Potential Exposure	Administration Building. No direct use or storage of chemicals.
124	Administration/NCSA	Built since 1986, additional information available from PMRMA.		Future Use, No Potential Exposure	Administration Building. No direct use or storage of chemicals.
129	Administration/NCSA	Built since 1986, additional information available from PMRMA.		Future Use, No Potential Exposure	Administration Building. No direct use or storage of chemicals.
130	Administration/NCSA-8a	Built since 1986, additional information available from PMRMA.		Future Use, No Potential Exposure	Administration Building. No direct use or storage of chemicals.
132	Shell/MKE Field Headquarters	Built since 1986, additional information available from PMRMA.		No Future Use, Other Contamination History	Industrial Support Building.
133	Facilities Maintenance Headquarters			Future Use, No Potential Exposure	No direct use or storage of chemicals.
135	Guard House/WSA	Built since 1986, additional information available from PMRMA.		Future Use, No Potential Exposure	No direct use or storage of chemicals.
136	Garage to 134/NCSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
137	Garage to 131/NCSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
143	West Gate Guardhouse Security/WSA	No prior chemical use reported.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): PPDDT, dieldrin, isodrin Surficial Soil (0 - 2 ft): PPDDT, dieldrin, hexachlorocyclopentadiene, isodrin, lead, zinc	Future Use, No Potential Exposure	No direct use or storage of chemicals.
145	South Gate Guardhouse Security/SSA	The building had a liquid propane gas heating system.	HISTORICAL: Liquid propane SAMPLING: Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): NSC	Future Use, No Potential Exposure	No direct use or storage of chemicals.
148	Storage/Pass Office - northwest of 166/NCSA	Diesel fuel leak occurred near exterior of the building. The leaks occurred at the west gate near the former location of Bldg. 148.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
169B	Gas Station House - south of 150/WSA	The building was used by Western Chemical Warfare school as gas chambers and meter pit.	HISTORICAL: Gas chambers, gas meter pit	No Future Use, Other Contamination History	Industrial Support Building.
176	Five-Unit Garage and Apartments/WSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
211	Gas Meter House/ Utility/SPSA-3e	The building was a natural gas metering and regulating station. Later the building was tied into the Isopropyl methylphosphonofluoridate (GB) plant area. Task 24 states that the potential for contamination is "quite low" since the building was only used for natural gas metering.	HISTORICAL: Natural gas SAMPLING: Surficial Soil (0 -2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, hexachlorocyclopentadiene, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, atrazine, cadmium, chlordane, chlorophenylmethyl sulfide, chlorophenylmethyl sulfone, chromium, copper, PPDDE, PPDDT, DBCP, DCPD, dieldrin, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, thiodiglycol, zinc Groundwater: Benzene, carbon tetrachloride, chloroform, tetrachloroethylene, trichloroethylene	Future Use, No Potential Exposure	No direct use or storage of chemicals.
213	Calibration/X-Ray Laboratory/SPSA-3e	The building was used as an X-ray facility to determine the height of fill in GB (which consisted of sodium chloride, sodium hydroxide, sodium fluoride, phosphorus, sodium methyl phosphonate, and isopropanol) munitions. Also used in processing and developing X-ray film which used film developing chemicals, developer, fixer, and wetting solutions.	HISTORICAL: Film developing chemicals, fixer, wetting solutions, developer.	No Future Use, Other Contamination History	Used as x-ray and film processing facility.
241	Administration/Laboratory/ Change House/SPSA-3e	The building was used as a change house for the chlorine plant and laboratory. Specific information on the use of the laboratory is unavailable in Task 24.	HISTORICAL: Chlorine, other associated chemicals not available SAMPLING: Dust - Chlorophenylmethyl sulfone, dieldrin, Cd, Cr, Cu, Pb, Zn, As, PPDDE	No Future Use, Other Contamination History	Change house for chlorine plant.
242	Chlorine Production/United States Mint Storage/ SPSA-3c,3e	Electrolytic cell building which contained a rectifier room with cathodes containing Hg. Chlorine and caustic (sodium hydroxide) were used in the plant for processing GB brine in an effort to remove fluorides and phosphates. In 1956, a tarpit ignited a firebox causing minor damage. The Denver Mint used the building as storage for copper penny stock.	HISTORICAL: Hg, chlorine, sodium hydroxide, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid, phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), GB brine, fluoride, phosphate, tar, sulfuric acid SAMPLING: Dust - Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Used for processing GB brine.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
243	Chlorine Production Compressor/SPSA-3c,3e	Building was used for experiments with oleum (sulfuric acid, fuming) and sulfuric acid as a sealing medium. Sulfuric acid also used for the drying of chlorine gas. Ammonia and freon were used in the cooling process. Later used for processing brine from the GB plant and used caustic (sodium hydroxide) and bleach. Spent acid was spilled onto the ground damaging the foundation.	HISTORICAL: Chlorine, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), GB brine, sulfuric acid, oleum, sodium hydroxide, ammonia, freon, bleach, spent acid SAMPLING: Liquid - Chloroform Dust - Dieldrin, Cr, Cu, Pb, Zn	No Future Use, Significant Contamination History	Used for processing brine from the GB plant and chlorine gas experiments.
244	Three Liquid Chlorine Tank Saddles/SPSA-3c	Building was used for liquid chlorine storage.	HISTORICAL: Chlorine	No Future Use, Other Contamination History	Building used for chlorine storage.
245	Substation/SPSA-3c	Built to house transformers and used as an electric substation.	HISTORICAL: PCBs	No Future Use, Other Contamination History	Industrial Support Building.
246	Hydrochloric Acid Production Compressor/SPSA-3e	Sniff gas (hydrogen, chlorine, carbon dioxide) was burned in hydrogen to form hydrochloric acid. Chemicals were neutralized with sodium hydroxide for sewer disposal.	HISTORICAL: Hydrochloric acid, sniff gas (hydrogen, chlorine, carbon dioxide), sodium hydroxide	No Future Use, Other Contamination History	Used in the production of hydrochloric acid.
247	Salt Storage/SPSA-3c	The building acted as raw salt storage for chlorine plant complex. Several tank cars of GB scrubber brine which consisted of sodium chloride, sodium hydroxide, sodium fluoride, phosphorus, sodium methyl phosphate, sodium sulfate, sodium phosphate, sodium carbonate, and isopropyl alcohol were emptied onto the pad at one time. Building was also used as a settling basin for calcium treated brine and clariflocculator sludge which consisted of sodium chloride, sodium hydroxide, sodium fluoride, sodium methyl phosphate, calcium chloride, calcium fluoride, calcium methyl phosphite, and calcium carbonate. Shell discharged aldrin and dieldrin filter cake onto the salt pad, and stored drummed waste in building. Aldrin filter cake consists of aldrin, diaduct, toluene, isodrin, and endrin. Used by Shell as a staging area for off-site drum shipments. Contaminated pipe, wooden pallets, soil, and concrete are also stored here.	HISTORICAL: GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), GB brine, sodium chloride, sodium hydroxide, sodium fluoride, phosphorus, sodium methyl phosphate, sodium phosphate, sodium sulfate, sodium carbonate, isopropyl alcohol, calcium chloride, calcium fluoride, calcium methyl phosphite, calcium carbonate, aldrin and dieldrin filter cakes, isodrin, aldrin, toluene, diaduct, endrin, clariflocculator sludge, calcium treated brine, raw salt	No Future Use, Significant Contamination History	Pesticide Production Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
248	Brine Treatment Plant/ SPSA-3c	The building was part of the chlorine plant used to treat raw brine consisting of sodium carbonate, calcium sulfates, calcium chlorides, magnesium chlorides, and sodium sulfates in reaction tanks by adding soda ash (sodium carbonate) and solution. Any excess sodium hydroxide in the brine was neutralized with muriatic acid. Later, GB brine was stored in the tanks.	HISTORICAL: Sodium carbonate, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), GB brine, sodium chloride, sodium hydroxide, sodium fluoride, phosphorus, sodium methyl phosphonate, isopropanol, calcium sulfates, calcium chlorides, magnesium chlorides, sodium sulfates, muriatic acid, raw brine	No Future Use, Other Contamination History	Used for raw brine treatment and storage of GB brine.
249	Brine Storage and Pumphouse/SPSA-3c	The building consisted of ten redwood storage tanks used to store treated brine from Building 248. Also used in the production of chlorine and caustic (sodium hydroxide). Brine was further agitated and clarified and later used in the GB brine operations.	HISTORICAL: Treated brine, sodium hydroxide, sodium phosphate, sodium sulfate, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), GB brine, sodium chloride, sodium fluoride, chlorine, phosphorus, sodium methyl phosphate, sodium carbonate, isopropyl alcohol	No Future Use, Other Contamination History	Used for storage of treated brine and GB brine operations. Also in production of chlorine and caustic.
251	Chlorine Evaporator/Storage/SPSA-3c	Evaporative building used for brine feed (sodium chloride) in chlorine manufacture plant. The sodium hydroxide content of cell liquor was concentrated and undecomposed salt content removed. Also used to remove undesirable sodium sulfate from cell liquor and for GB Plant Step IV and V scrubber effluents brine feed. In 1951, a damaged drain line resulted in the discharge of caustic soda through the process water system to the south lakes. Shell later used the building as a RCRA licensed warehouse for handling and storing contaminated wastes prior to being shipped off site.	HISTORICAL: Sodium hydroxide, unknown contaminated wastes, sodium sulfate, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), GB brine, sodium chloride, cell liquor, salt, sodium hydroxide soda, sodium fluoride, sodium methyl phosphate, sodium carbonate, chlorine, herbicides (bladex, planavin) SAMPLING: Dust - Aldrin, atrazine, dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Pesticide Production Building.
252	Cell Liquor Storage/SPSA-3c	The building was part of chlorine plant evaporation unit consisting of tanks used for storage of sodium chloride and sodium hydroxide. In 1952, a tank car accident resulted in a spill of approximately 3,700 lbs of liquid chlorine and chlorine gas.	HISTORICAL: Chlorine, sodium chloride, sodium hydroxide	No Future Use, Other Contamination History	Liquid chlorine and chlorine gas spill history.
253	50 Percent Sodium Hydroxide Storage/SPSA-3c	The building was part of chlorine plant evaporation unit used for storage, to concentrate caustic solution, and to produce chlorine, caustic soda, and other unspecified chemicals. A spill of caustic on the ground occurred sometime prior to 1960.	HISTORICAL: Sodium hydroxide, possibly an insecticide, chlorine, sodium hydroxide soda, unspecified chemicals	No Future Use, Other Contamination History	Used for production of chlorine and caustic soda. Spill history-caustic.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
254	Caustic Fusion Plant/Drum Storage/SPSA-3e	Sodium hydroxide received from the evaporator building was concentrated into 100 percent fused sodium hydroxide where it was discharged into shipping drums for the chlorine manufacturing plant. Later used as a warehouse, leaks or spills of dibrom and bidrin occurred. Azodrin, monomethylchloroacetoacetamide, dieldrin, and ciodrin were stored here. In 1980, a laboratory analysis of water from a waste pad near the building contained aldrin, dieldrin, and endrin.	HISTORICAL: Monomethylchloro-acetoacetamide, sodium hydroxide, dibrom, aldrin, dieldrin, endrin, azodrin, bidrin, ciodrin, SAMPLING: Dust - Dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Dibrom and bidrin spill history while used as warehouse. Also used for storage of organochlorine pesticides.
255	Fuel Oil Pump Station and Two Tank Pads/SPSA-3d	The building acted as a pump house and fuel oil storage for chlorine plant. Tanks moved south of Building 472 in 1962.	HISTORICAL: Fuel oil	No Future Use, Other Contamination History	Fuel storage.
256	Fuel Oil Tank-SE corner of 254	In 1952, the underground storage tank overflowed, distributing to the surrounding area.		No Future Use, Other Contamination History	Fuel storage.
282	Guard Station - northwest of NN0102/SPSA-1g	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
286	Guard Station - southeast of 557/SPSA-2c	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
287	Guard Tower/SPSA-2e	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
291	Guard Station - 735 ft west of 362/SSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
295	Guard Tower - southeast of 112/SPSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
296	Guard Tower/SPSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
307	Potable Water Valve and Meter Pit/NCSA	The building was used as a meter pump and sewer pit for the contaminated sewer system.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
309	Maintenance/Storage - south of 545/SPSA-1g	The building served as a gas mask distribution structure, an active maintenance area storage building, and a miscellaneous storage structure.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
311†	Stearns-Roger Office/Sample Storage/SPSA-3e	Shell used the building to store core samples from their exploration and production division. Later the building was listed as an active storehouse with precise contents stored unavailable in Task 24.	HISTORICAL: Core samples, other historically associated chemicals not available SAMPLING: Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chlorophenylmethyl sulfide, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (5 - 20 ft) *m*-xylenes, xylenes Groundwater: Benzene, carbon tetrachloride, chloroform, m-xylene, tetrachloroethylene, toluene, trichloroethylene, xylenes, 1,1-dichloroethylene Air: Mercury, carbon tetrachloride, chloroform, tetrachloroethylene, copper, zinc Dust/Vacuum: Cadmium, chromium, copper, lead, zinc, mercury	No Future Use, Other Contamination History	Office, Shell exploration and production core storage; no chemical process activities here.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
312	Fire Station Headquarters Fire Protection/NCSA	No prior chemical use reported.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): Aldrin, chlordane, PPDDE, PPDDT, dieldrin, endrin, hexachlorocyclopentadiene, mercury, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, atrazine, cadmium, chlordane, chloroacetic acid, chlorophenylmethyl sulfide, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, copper, PPDDE, PPDDT, DBCP, DCPD, dieldrin, endrin, fluoranthene, fluoracetic acid, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, thiodiglycol, zinc Groundwater: Benzene, bicycloheptadiene, carbon tetrachloride, chlorobenzene, chloroform, methyl isobutyl ketone, tetrachloroethylene, trichloroethylene, toluene	Future Use, No Potential Exposure	No direct use or storage of chemicals.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
313	Laboratory/SPSA-1a	The building acted as a central analytical laboratory for HD, L, white phosphorus, GB, phosgene, and hydrazine, chlorine, sodium hydroxide, chlorinated paraffin, and compounds used in manufacturing processes. Tested a wide variety of products, including paints, petroleum products, raw materials, decontamination agents, bleaches, and napalm. During the 1950s, analyzed the above, as well as oleum (sulfuric acid, fuming), caustic, sulfur monochloride, sulfur dichloride, alcohol, salt, acetylene tetrachloride, dextrin, red phosphorus, CAIS, incendiary mixes, magnesium powder, blasting caps, methanol, benzene, and impregnite. Shell plant effluent samples were also analyzed. The laboratory supported ongoing RMA activities through analysis of sewage influent and effluent, sludge, fuel oil, and industrial hygiene work (including toxic vapors and dusts). Other identified chemicals include Hg, acid, alkalines, chloroform, p-nitroaniline, benzidine, 1-naphthylamine, hydrochloride, perchloric acid, and chemical reagents. Wastes, including As were disposed of according to the composition. Laboratory sink water drained into open ditch on the east side of the building. In March 1982, drums containing a mixture of solvents and laboratory reagents stored behind the building leaked. Task 24 reports the only reference that addresses spills stated that all spills were promptly decontaminated. More specific information on chemical use and analytical samples are unavailable in Task 24 due to voluminous nature.	HISTORICAL: Chemical reagents, acid, alkalines, hydrazine, benzene, oleum, chloroform, p-nitroaniline, benzidine, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), VX, hydrochloride, perchloric acid, 1-naphthylamine, chlorine, salt, sodium hydroxide, sulfur monochloride, sulfur dichloride, phosgene, alcohol, dextrin, 1,1,2,2-tetrachloroethane, red phosphorus, napalm, white phosphorus, methanol, impregnite, As, fluorine, nitric acid, magnesium powder, blasting caps, tetrachloroethylene, carbon tetrachloride, trichloroethylene, laboratory reagents, chlorinated paraffin, paints, fuel oil, bleach, Hg, L, CAIS, incendiary mixes, sewage, decontamination agents, various unidentified compounds, solvents, petroleum products, raw materials, Shell plant effluent samples, sludge, toxic vapors, toxic dust, impregnite, sodium chloride[7]	No Future Use, Agent History	Laboratory analyzed all agent products and incendiary mixtures
313A	Sewage Pump Station/ SPSA-1a	The building was part of the South Plants Liquid Waste Collection System used for collecting waste from Buildings 313 and 314.	HISTORICAL: Chemicals used in Buildings 313 and 314 SAMPLING: Liquid - Chloroform, methylene chloride, tetrachloroethane, calcium, Cr, Cu, Pb, magnesium, potassium, sodium, Zn, As, Hg, thiodiglycol, nontarget compounds	No Future Use, Other Contamination History	Used as part of waste collection system.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
314	Fixed Laundry Service/ SPSA-1a	The building was used as the Army's laundry and clothing treatment plant which received, decontaminated, repaired, laundered, impregnated, dyed, and reissued apparel and equipment used to protect personnel working with chemical agents during production, tactical, demilitarization, and disposal operations. The building also housed a laboratory. The following chemicals were used: perchloroethylene or acetylene tetrachloride, chlorinated paraffin, daxad, duponal, polyvinyl alcohol, octachlorocarbanilide (both with and without Zn oxide), sodium hypochlorite or paraformaldehyde, acetone, ammonium sulphate, benzene, monochloride, bleach, caustic soda, chloride of lime, chloroethane, diammonium phosphate, dibasic ammonium sulphate, formaldehyde, monochlorobenzene, naphtha, soda ash, and tetrachloroethane. Although mentioned, specific use or occurrence of ammonium chloride, polyvinyl chloride and trichloroethylene are not described in Task 24.	HISTORICAL: Trichloroethylene, Zn oxide, daxad, sodium hypochlorite, ammonium chloride, diammonium phosphate, sodium carbonate, polyvinyl alcohol, phosphate detergents, tetrachloroethylene, 1,1,2,2-tetrachloroethane, chlorinated paraffin, duponal, polyvinyl chloride, bleach, paraformaldehyde, acetone, sodium hydroxide, chloride of lime, chloroethane, naphtha, ammonium sulphate, formaldehyde, monochlorobenzene, monochloride, octachlorocarbanilide (both with and without Zn oxide), benzene, dibasic ammonium sulphate	No Future Use, Other Contamination History	Chemical used for treatment of personal protection clothing.
315	Warehouse/Laundry/SPSA-1a	The building stored approximately 160 55-gallon drums of perchloroethylene contaminated with GB; other specific contents unavailable in Task 24.	HISTORICAL: GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), tetrachloroethylene	No Future Use, Agent History	Building was used for storage of agent.
315A†	Steam Meter Pit - west of 315/SPSA-1g	No prior chemical use reported.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Aldrin, arsenic, atrazine, cadmium, chlordane, chloroacetic acid, chlorophenylmethyl sulfide, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, DCPD, dieldrin, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, thiodiglycol, zinc Groundwater: Benzene, carbon tetrachloride, chloroform, m-xylene, tetrachloroethylene, trichloroethylene, toluene, xylenes	No Future Use, Other Contamination History	Industrial Support Building.
316	Plant Dispensary/Clinic/ SPSA-1a	The building was used as an infirmary or dispensary (chemicals used unavailable in Task 24).	HISTORICAL: Historically associated chemicals not available SAMPLING: Dust - Hexachlorocyclopentadiene, supona, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
316A	Morrison-Knudsen/ Change House/SPSA-1a	A change house which had two locker facilities to separate possible contaminated clothing from personal clothing.	HISTORICAL: Not available SAMPLING: DCPD, Cd, Cr, Cu, Pb, Zn	No Future Use, Other Contamination History	No direct use or storage of chemicals, however, possible temporary storage of contaminated clothing.
317A	Pipe Shop/Grease Pit/Storage/SPSA-1a	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
318	Remediation Use Structure	Structure added since 1986, not part of Task 24.		No Future Use, Other Contamination History	Industrial Support Building.
319	Flammable Material Storage/SPSA-1a	The building stored M108 bomb fuses, flammable materials, volatile chemicals, crystallized picric acid, and two M1A1 chlorine cylinders.	HISTORICAL: Chemical agent, chlorine, flammable material, hazardous material, fuses, picric acid, CAIS	No Future Use, Agent History	Building was used for storage of agent.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
321†	Boiler Plant/Central Gas/SPSA-3e	The building contained a natural gas line and used coal. Shell installed fuel oil pumps, oil heaters, and two fuel oil tanks in building. In 1969 a test burning of bicycloheptadiene bottoms mixed with fuel oil was possibly carried out in the building. In 1974 the building was used to determine the feasibility of substituting coal for No. 6 fuel oil and natural gas for boiler fuel.	HISTORICAL: Bicycloheptadiene, coal, fluoranthene, fuel oil, oil, methyl naphthalene, natural gas, No. 6 fuel oil, phenanthrene, pyrene SAMPLING: Dust: Arsenic, cadmium, chromium, copper, lead, zinc Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Aldrin, arsenic, atrazine, cadmium, chlordane, chlorophenylmethyl sulfide, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (5 - 20 ft) methylene chloride, *m*-xylenes, xylenes Groundwater: Carbon tetrachloride, chloroform, ethylbenzene, tetrachloroethylene, toluene, trichloroethylene, xylenes, 1,2-dichloroethylenes Air: Benzene, carbon tetrachloride, chloroform, toluene, copper, ethylbenzene, methylene chloride, tetrachloroethylene, xylenes Dust/Vacuum: Arsenic, cadmium, chromium, copper, lead, zinc, toluene, benzene, mercury, thiodiglycol, methylisobutyl ketone, xylenes Dust/Wipe: Zinc, chromium, copper, lead	No Future Use, Other Contamination History	Used for storage of fuel tanks.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
321C†	Pumphouse/SPSA-3e	The pumphouse functioned as a truck and railroad car unloading facility, pumping fuel oil to Buildings 821A and 321B for storage.	HISTORICAL: Fuel oil, natural gas SAMPLING: Surficial Soil (0 -2 in): NSC Surficial Soil (0 - 2 ft): Aldrin, arsenic, atrazine, cadmium, chlordane, chlorophenylmethyl sulfide, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (5 - 20 ft) methylene chloride, *m*-xylenes, xylenes	No Future Use, Other Contamination History	Gas and fuel tanks.
321D†	Fuel Oil Pumphouse/SPSA-3e	The building was used as a pumphouse for fuel oil. The building was also used to heat fuel oil.	HISTORICAL: Fluoranthene, fuel oil, methyl naphthalene, phenanthrene, pyrene SAMPLING: Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chlorophenylmethyl sulfide, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (5 - 20 ft) methylene chloride, *m*-xylenes, xylenes Groundwater: Benzene, carbon tetrachloride, chloroform, ethylbenzene, tetrachloroethylene, toluene, trichloroethylene, xylenes, 1,2-dichloroethylenes	No Future Use, Other Contamination History	Fuel oil pumphouse. No chemical process activities.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
322	Coal Sampling/SPSA-3e	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Handled coal samples for power generation, later used as storage facility. No chemical process activities.
322A	Tractor Storage Shed/ SPSA-3e	No prior chemical use reported. Building used to store ash generated by burning coal at the power plants (Buildings 321 and 325).	HISTORICAL: None	No Future Use, Other Contamination History	Storage shed-no chemical process activities
323	Ash (Coal) Storage Silo-Hopper/SPSA-3e	No prior chemical use reported. Building used to store ash generated by burning coal at the power plants (Buildings 321 and 325).	HISTORICAL: None	No Future Use, Other Contamination History	Coal ash hopper. No chemical process activities.
324	Coal Hopper/SPSA-3e	No prior chemical use reported. Building stored coal for boiler systems.	HISTORICAL: None	No Future Use, Other Contamination History	Coal ash hopper. No chemical process activities.
325	Electrical Power Plant/ SPSA-3e	No prior chemical use reported. Structure used to house boilers to generate stream.	HISTORICAL: None	No Future Use, Other Contamination History	Steam electric power plant. No chemical process activities.
326	Power Plant Pump house/SPSA-12a	The building was constructed to provide a source of cooling water to the South Plants area.	HISTORICAL: None SAMPLING: Liquid - Calcium, magnesium, potassium, sodium, Hg, chloroform, nontarget compounds Dust - Chlorophenylmethyl sulfone, dieldrin, Cd, Cr, Cu, Pb, Zn, As Structure Matrices[d] - TCLP: Ba, Cr, chloroform, atrazine, CL6CP, CPMSO, DBCP, Hg, methylene chloride, methylethyl ketone, benzene, methylisobutyl ketone, CPMSO2 Total Waste Methods: Cr, dieldrin, Hg, trichloroethene	No Future Use, Other Contamination History	Used for housing of water cooling pump-no direct use or storage of chemicals
327	Cafeteria/SPSA-4b	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
328	Goop Mixing and Filling Building/SPSA-4b	The building acted as the pyrotechnic incendiary (PTI) mixing and filling building for M74 bombs which used goop (impure magnesium dust protected from rapid oxidation by an oil asphalt mixture), coarse magnesium metal, dried ground sodium nitrate, gasoline, phenol petroleum oil extract, and isobutyl methacrylate polymer. Also used for the conversion of M1 thickener and napalm to an M2 thickener (a mixture of santocel and napalm). A drawing indicates that the building was also to be used for manufacturing micrograval bombs containing the explosives RDX and Pb azide. The building may have also been used for filling operation of 100 lb. bombs with white phosphorus (no information was located to substantiate that this operation transpired).	HISTORICAL: Magnesium dust, goop, Pb azide, cyclonite, white phosphorus, napalm, santocel, benzene, oil asphalt mixture, magnesium metals, sodium nitrate, gasoline, phenol petroleum oil extract, isobutyl methacrylate polymer	No Future Use, Other Contamination History	Building used for bomb production.
328A	Change House/SPSA-4b	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
329	Gasoline Pump Building/SPSA-4b	The building stored and pumped gasoline into the M74 production facility. Thickening agents and benzene were mixed with goop (magnesium dust paste) in the building.	HISTORICAL: Gasoline, benzene, magnesium paste, goop, thickening agents	No Future Use, Other Contamination History	Used for fuel storage

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
331†	Phosgene-Filling Warehouse/SPSA-4b	This warehouse was used to steam-clean and refurbish Shrike and Sparrow missile containers and to fill bombs with phosgene, during which time leakage of phosgene was frequently reported. This warehouse was also used for heresite coating of burst tubes used for M70 Mustard (HD)-filled bombs. The liquid waste from the filling process consisted mainly of spent sodium hydroxide (caustic), naphtha, paint thinner, and some oils. The solid waste consisted of spent coke and caustic sludge. Naphtha was used to wash the outside of bomb casings which were then painted and stenciled. The warehouse was also used for Post Exchange (PX) storage and U.S. Geological Survey (USGS) core samples. Later the building was used as a general purpose warehouse with precise storage in the building unavailable in Task 24.	HISTORICAL: Core sample, heresite coating, hydroxide sludge, naphtha, oil, paint, paint thinner, phosgene, spent sodium hydroxide, sodium spent coke, other historically associated chemicals not available SAMPLING: Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (0 - 2 ft) tetrachloroethylene, (2 - 5 ft) methylene chloride, (5 - 20 ft) 1,1,2-trichloroethane, methylene chloride, trichloroethylene, (> 20 ft) carbon tetrachloride, tetrachloroethylene, 1,1,1-trichloroethane Groundwater: Benzene, carbon tetrachloride, chloroform, m-xylene, tetrachloroethylene, toluene, trichloroethylene, xylenes, 1,2-dichloroethylenes Air: Chromium, zinc, mercury, arsenic, copper, benzene, carbon tetrachloride, ethylbenzene, tetrachloroethylene, toluene, xylenes, chloroform Dust/Vacuum: Arsenic, cadmium, chromium, copper, lead, zinc, mercury	No Future Use, Other Contamination History	Warehouse used for storage and processing phosgene-filled incendiary devices.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
332†	Warehouse/SPSA-4b	The warehouse was used to store and conduct final leakage testing on phosgene-filled bombs. Shrike and Sparrow missile containers were steam-cleaned and refurbished. The building was used by Fitzsimmons Army Medical Center and Sterns and Rogers for storage with precise contents unavailable in Task 24. The USGS used the building for core sample storage.	HISTORICAL: Core samples, PCB oil, phosgene, other historically associated chemicals not available SAMPLING: Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Aldrin, arsenic, atrazine, chlordane, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (0 -2 ft) tetrachloroethylene, (2 - 5 ft) methylene chloride, (5 - 20 ft) methylene chloride, 1,1,2-trichloroethane, trichloroethylene, (>20 ft) carbon tetrachloride, 1,1,1-trichloroethane, tetrachloroethylene Groundwater: Benzene, carbon tetrachloride, chloroform, tetrachloroethylene, trichloroethylene	No Future Use, Other Contamination History	Used as a bomb storage, testing, and filling facility

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
333†	Warehouse/SPSA-4b	The warehouse was identified as the Bomb Assembly Branch facility which was used to rework M69 bombs. The building served as a storage and processing warehouse for isobutylmethacrylate and a thickening agent for the gasoline used in M74 incendiary bombs. Drums that contained aldrin, azodrin, nemagon, bidrin, vapona, and other pesticides were also stored in the warehouse. Fitzsimmons Medical Center used building for storage of medical supplies with precise contents unavailable in Task 24.	HISTORICAL: Aldrin, azodrin, bidrin, DBCP, gasoline, isobutylmethacrylate, pesticides, thickening agent, vapona, white phosphorous, other historically associated chemicals not available SAMPLING: Dust: Aldrin, cadmium, chlorophenyl methyl sulfone, chromium, dieldrin, endrin, isodrin, lead, zinc Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Aldrin, arsenic, chlordane, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, PPDDE, PPDDT, DBCP, dieldrin, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (0 - 2 ft) tetrachloroethylene, (2 - 5 ft) methylene chloride, (5 - 20 ft) methylene chloride, 1,1,2-trichloroethane, trichloroethylene, (>20 ft) 1,1,1-trichloroethane Groundwater: Benzene, carbon tetrachloride, chloroform, tetrachloroethylene, trichloroethylene	No Future Use, Other Contamination History	Used for bomb assembly, pesticide, and medical storage.
334†	Warehouse/SPSA-4b	A storage warehouse for the Bomb Assembly Branch.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soils (0 - 2 in): Aldrin, chlordane, PPDDE, dieldrin, endrin, isodrin Surficial Soils (0 - 2 ft): Aldrin, arsenic, atrazine, cadmium, chlordane, chlorophenylmethyl sulfone, chlorophenylmethyl sulfide, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, isodrin, lead, mercury, zinc Groundwater: Carbon tetrachloride, chloroform, ethylbenzene, tetrachloroethylene	No Future Use, Other Contamination History	Storage warehouse.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
335†	Warehouse/SPSA-4b	A storage warehouse for the Bomb Assembly Branch. This building was also used as a storage and processing warehouse for the M74 incendiary bomb filling and clustering plant. Drums of pesticides were stored in the warehouse. The building was also used to package chlorinated hydrocarbons including aldrin, dieldrin, DBCP, and endrin. Five-gallon pails of nemagon 12.1 EC were stored in the building. Ambient air quality samples had concentrations up to 17.6 parts per billion of DBCP in 1977; subsequent improvements to the ventilation system reduced DBCP levels to 0.1 parts per billion. The building was also used for storage of unknown medical supplies by the Fitzsimmons Medical Center.	HISTORICAL: Aldrin, chlorinated hydrocarbons, DBCP, DBCP 12.1EC, dieldrin, endrin, pesticides, unknown medical supplies, vapona, white phosphorous SAMPLING: Dust: Aldrin, arsenic, cadmium, chromium, dieldrin, hexachlorocyclopentadiene, isodrin, lead, zinc Surficial Soils (0 - 2 ft): Aldrin, arsenic, atrazine, cadmium, chlordane, chlorophenylmethyl sulfide, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, lead, mercury, zinc Groundwater: Carbon tetrachloride, chloroform, ethylbenzene, tetrachloroethylene	No Future Use, Other Contamination History	Storage warehouse and pesticide packaging.
336†	General Purpose Warehouse/SPSA-4b	This warehouse was used to store empty drums and pesticides, including nemagon, aldrin, azodrin, bidrin, ciodrin, phosdrin, dibrom, and vapona. The building was used by Fitzsimmons Medical Center for storage of unknown medical supplies.	HISTORICAL: Aldrin, azodrin, bidrin, chlorinated hydrocarbons, ciodrin, nemagon, dibrom, pesticides, phosdrin, unknown medical supplies, vapona SAMPLING: Dust: Cadmium, chromium, copper, lead, zinc Surficial Soil (0 - 2 ft): Aldrin, arsenic, atrazine, cadmium, chlordane, chlorophenylmethyl sulfide, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, lead, mercury, zinc	No Future Use, Other Contamination History	Warehouse used to store pesticides and medical supplies.
337	Locker Room/Change House/SPSA-4b	Toilet facility, locker room, and change house for warehouse.	HISTORICAL: None SAMPLING: Chlorophenylmethyl sulfone, dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Industrial Support Building.
338	Storage/SPSA-4b	The building stored M74 bomb parts and components such as fuses, M142A1, and powder bags.	HISTORICAL: Fuses, M142A1, powder bags	No Future Use, Other Contamination History	Used for storage of bomb parts.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
339	Storage/SPSA-4b	A pyrotechnic incendiary plant magazine used for storage of black powder and primacord.	HISTORICAL: Primacord, black powder	No Future Use, Other Contamination History	Used for storage of primacord and black powder.
340	Magazine/SPSA-4b	The building stored primacord used in the production of M74 bombs.	HISTORICAL: Primacord	No Future Use, Other Contamination History	Used for storage of primacord.
341	Change House/SPSA-4b	Used as a change house for the Bomb Assembly Branch. Later the building was utilized by the U.S. Post Office for metal container storage.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
341A†	Condensate Pump House/SPSA-4b	The building was originally a sewage disposal pump house. Later it was a condensate pump house.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Aldrin, chlordane, chlorophenylmethyl sulfone, chromium, copper, PPDDE, PPDDT, DBCP, DCPD, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, lead, mercury, zinc Groundwater: Benzene, carbon tetrachloride, chloroform, chlorobenzene, tetrachloroethylene, trichloroethylene	No Future Use, Other Contamination History	Industrial Support Building.
341B	Sewage Lift Station - Covered Pit/SPSA-4b	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
342	Warehouse/M74 Incendiary Bomb Storage/SPSA-4b	The building was used to rework M69 incendiary bombs (M13 cluster) and for storage of M74 bomb casings, tail cups, tail plugs, adapters, white phosphorus cups, and off-specification incendiary mixes. On November 11, 1944, an M69 bomb exploded causing several minor injuries. A trichloroethylene degreaser and recovery still, used to degrease empty M74 casings was installed in 1952. The still recovered trichloroethylene from the oil solvent discharge of the degreaser and piped the solvent back to the degreaser for reuse. An estimated six gallons of trichloroethylene were lost during each 8-hour shift. Nontoxic, nonhazardous dry materials were stored in the building.	HISTORICAL: White phosphorus cups, off-specification incendiary mixes, trichloroethylene degreaser, oil solvent, tail cups, adapters, tail plugs	No Future Use, Significant Contamination History	Building housed a solvent still and also produced incendiary munitions.
343	Manufacturing/ Preclustering Warehouse/SPSA-4b	The building was used for final assembling, preclustering, inspecting, painting, and installing fuses and tail cups on the M74 and E48 bombs. Also used to paint and packout 105mm white phosphorus shells.	HISTORICAL: Fuses, magnesium dust paste, oil-asphalt mixtures, petroleum oil extract, white phosphorus, paint, tailcups	No Future Use, Other Contamination History	Used for bomb fuse production.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
343A	Flammable Materials Storage/SPSA-4b	A paint storage annex and flammable materials storehouse.	HISTORICAL: Paint, flammable materials	No Future Use, Other Contamination History	Used for storage of flammable materials.
344	Manufacturing Assembly/ Warehouse/SPSA-4b	The building acted as part of the M74 Incendiary Bomb Plant which conducted the final clustering operations and drop testing. Paint booths were installed in the building. From at least 1971 to 1987, the building was used to store nonhazardous, nontoxic, nonmilitary materials.	HISTORICAL: White phosphorus, paint	No Future Use, Other Contamination History	Used to store white phosphorus and paint.
345	Manufacturing Assembly/ Warehouse/SPSA-4b	The building was used for the final assembly of tail fins and release wires; packing, labeling, and palletizing M74 incendiary bombs; and painting and storing M31 cluster casings. Nonhazardous, nontoxic, nonmilitary materials were stored in the building.	HISTORICAL: White phosphorus, paint	No Future Use, Other Contamination History	Used for bomb assembly and miscellaneous storage.
346†	Warehouse/SPSA-4b	The warehouse was used as part of M74 Incendiary Bomb Plant. It was used to store bomb clusters, munition components and containers, unspecified materials, and salt drums.	HISTORICAL: Unspecified salt drums, white phosphorous, other historically associated chemicals not available SAMPLING: Surficial Soil (0 - 2 in): Aldrin, dieldrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, atrazine, cadmium, chlordane, chlorophenylmethyl sulfone, chromium, copper, PPDDE, PPDDT, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, lead, mercury, zinc Subsurface Soil: (2 - 5 ft) methylene chloride, methyl isobutyl ketone, (5 - 20 ft) tetrachloroethylene Groundwater: Chloroform	No Future Use, Other Contamination History	Used for bomb storage.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
347†	Warehouse/Chemical Storage/SPSA-4b	The east side of the warehouse was used for storage of methyl parathion. In the west side, aldrin, azodrin, dieldrin, endrin, bidrin, nudrin, and DBCP were stored. Organophosphates (insecticides) and oil drums were also stored in the warehouse. Approximately 60 gallons of DBCP were spilled on the south loading docks in 1973. In 1982, the walls, ceilings, and floors were washed; water samples were then analyzed for pesticides, all of which were below the detection limit.	HISTORICAL: Aldrin, azodrin, bidrin, DBCP, dieldrin, endrin, fluoranthene, methyl naphthalenes, methyl parathion, nudrin, oil, organophosphates, phenanthrene, pyrene SAMPLING: Dust: Aldrin, atrazine, cadmium, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, chromium, copper, dieldrin, lead, zinc Surficial Soil (0 - 2 ft): Aldrin, arsenic, atrazine, cadmium, chlordane, chlorophenylmethyl sulfide, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, lead, mercury, zinc Subsurface Soil: (2 - 5 ft) methyl isobutyl ketone, (5 - 20 ft) methylene chloride, tetrachloroethylene Groundwater: Carbon tetrachloride, chloroform, ethylbenzene, tetrachloroethylene	No Future Use, Other Contamination History	Used for pesticide and insecticide storage. Spill history-DBCP.
351	Change House/SPSA-4b	The building stored nontoxic, nonhazardous, military dry materials and equipment.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
352	Open Storage/SPSA-4b	The building was used to repair and recondition Chemical Warfare Service equipment; disassemble power driven decontaminating apparatus and smoke generators; and remove rust from tanks and white phosphorus igniter tubes. Building burned down and foundation was used for open storage of barrels, tanks, drums, containers, and equipment used in pesticide production by Nostrip Chemical Works. Chemicals used by Nostrip include tallow fatty acids, amida amine, tall oil, amino amine soap, rosin acids, hydrochloric acid, ethylene amines, alkylene amines, heterocyclic and aliphatic amines, Amine AL-7, aminoethylpiperazine process residue, and decyl alcohol bottoms. A spill of an oily substance thought to be a mixture of RPB and a cleaning agent were reported at the ditch behind the building, and a spill of an unspecified substance was reported in the building.	HISTORICAL: Tallow fatty acids, amida amine, tall oil, amino amine soap, rosin acids, hydrochloric acid, ethylene amines, heterocyclic and alipathic amines, alkylene amines, Amine AL-7, aminoethylpiperazine process residue, decyl alcohol bottoms, RPB, cleaning agent, white phosphorus, unspecified substance	No Future Use, Other Contamination History	Used for equipment repair-spill history.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
352A	Quonset Storage/SPSA-4b	The building was initially used for oil and grease, and possible acid storage. Later, leased to Nostrip Chemical Works and used as a storage house and office. Nostrip's production process reacted a long chain fatty acid, such as tall oil, with a short chain amine such as diethylenetriamine which produced an amido amine soap and waste water. A green liquid was observed coming from a tank east of the building, and discharge to a ditch of material described as containing various amines, including aminoethylpiperazine, and Bromine 20 was also reported.	HISTORICAL: Amines, aminoethylpiperazine, bromine 20, a long chain fatty acid, tall oil, short chain amine, diethylenetriamine, amido amine soap, waste water, oil, grease, acid, unspecified green liquid	No Future Use, Other Contamination History	Used for oil, grease, and chemical storage. Discharge history.
353	Open Storage/SPSA-4b	Initially the building was used as a receiving warehouse and contractor storehouse. In 1954 the building was destroyed by fire. The concrete foundation was used for open storage of containers of process chemicals such as sulfuric acid.	HISTORICAL: Sulfuric acid	No Future Use, Other Contamination History	Used for open storage of process chemicals.
354	Warehouse/SPSA-4b	The building was used to refuse approximately 8,000, 4.2 inch high explosive shells. Later used as a general purpose warehouse which may have stored raccine rings for the GB area.	HISTORICAL: Explosive material, raccine rings, fuses, other historically associated chemicals not available	No Future Use, Other Contamination History	Used in shell production and general warehousing.
355	Warehouse/SPSA-4b	The building was initially used for storage with precise contents unavailable in Task 24. In 1968, Shrike and Sparrow munitions components and CNU-80 containers were being stored. In 1984, 134 drums of silicon transformer liquid, 23 drums of chrome oxide or alumina catalyst, 6 drums of unidentified soil or mineral samples, and 1 drum of water were stored in the building.	HISTORICAL: Silicon transformer liquid, chrome oxide or alumina catalyst, other historically associated chemicals not available	No Future Use, Other Contamination History	Insufficient historical chemical storage information. Used to store transformer liquids and various chemicals.
356	Warehouse/SPSA-4b	The building was used for processing and storing incoming equipment for the Firth Echelon Repair Shop. Shell leased the building to store pesticides that were drummed in Building 422 and Building 451, planvin, azodrin, and nudrin, empty drums, and other packing material. Also stored medical supplies, but precise information unavailable in Task 24.	HISTORICAL: Aldrin, pydrin, azodrin, nudrin, medical supplies, DBCP, aldrin-EC, bidrin, ciodrin, dibrom, phosdrin, vapona, phosdrin-E, planavin, herbicides (bladex, atrazine), other associated chemicals not available SAMPLING: Dust - Aldrin, dieldrin, Cu, Pb, Zn	No Future Use, Other Contamination History	Used for drummed pesticide storage and equipment repair.
361†	Primary Electrical Substation/ SPSA	Possible high levels of PCBs in transformers were at one time suspected in the substation.	HISTORICAL: PCB SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin	Future Use, No Potential Exposure	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
362†	Warehouse/SPSA-7c	The warehouse was used as a support warehouse for the manufacturing of incendiary bombs. Later the building stored Titan missiles, 1961, and then M78 and M79 cyanogen chloride bombs, 1965. Production and testing of XM40 sandwich button bombs (consisting of potassium chlorate, red phosphorous, silica gel, magnesium oxide, and silica) was conducted.	HISTORICAL: Magnesium oxide, potassium chlorate, red phosphorous, silica, silica gel, white phosphorous, other historically associated chemicals not available SAMPLING: Surficial Soil (0 - 2 in): Aldrin, dieldrin, endrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chlorophenylmethyl sulfone, chromium, copper, PPDDE, PPDDT, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, lead, mercury, zinc Subsurface Soil: (2 - 5 ft) methylene chloride, (5 - 20 ft) methylene chloride, tetrachloroethylene Groundwater: Benzene, carbon tetrachloride, chloroform, chlorobenzene, tetrachloroethylene, 1,1-dichloroethane	No Future Use, Other Contamination History	Industrial Support Building.
364	Sewage Lift Station - southeast of 354/SPSA-4b	A lift station for the sanitary sewer system. No chemicals are suspected to have been used except those associated with routine pump maintenance such as lubricants.	HISTORICAL: Lubricants, sanitary sewage	No Future Use, Other Contamination History	Industrial Support Building.
365	Explosive Blending Building/SPSA-7c	The building was utilized as a preparation building for the individual chemical components (red phosphorus, magnesium oxide, and potassium chlorate) of the pyrotechnic mixture used in sandwich button bombs. Also used as part of the M4 burster filling program.	HISTORICAL: Red phosphorus, magnesium oxide, potassium chlorate SAMPLING: Liquid - Chlorophenylmethyl sulfone, calcium, magnesium, potassium, sodium, Zn, nontarget compounds	No Future Use, Other Contamination History	Used in preparation of button bomb materials.
368	Swimming Pool and Filter House/Recreational Facility/ SSA	Chlorine was used for the chlorination process and soda ash was used in the pool.	HISTORICAL: Chlorine, soda ash SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, chlordane, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, lead, mercury, zinc	No Future Use, Other Contamination History	Building housed swimming pool filter and related chemicals.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
369†	Lower Derby Valve Gate and Concrete Vault/SSA-1c	As part of the water system, sulfate alumina was added to maintain an acceptable clarification level.	HISTORICAL: Sulfate alumina SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Aldrin, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, lead, mercury	Future Use, No Potential Exposure	USFWS long-term-use structure.
370	Restroom			Future Use, No Potential Exposure	USFWS long-term-use structure.
371†	Water Pumping Station/ SSA-1e	The station was used for pumping both process and potable water in which chlorine was added to both water systems. Sulfate alumina was also added to the potable water system. A leak occurred in a process water line in 1957 just north of the building.	HISTORICAL: Aldrin, chlordane, chlorine, PPDDE, PPDDT, dieldrin, endrin, isodrin, sulfate alumina SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, copper, DBCP, PPDDE, PPDDT, dieldrin, endrin, isodrin, lead, mercury, zinc	Future Use, No Potential Exposure	USFWS long-term-use structure.
372	Million Gallon Reservoir (Potable) Water Supply/SSA	Chlorine was added to the potable water system. The reservoir acted as a back-up supply for the process and potable water system.	HISTORICAL: Chlorine SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, chlordane, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, lead, mercury, zinc	Future Use, No Potential Exposure	No direct use or storage of chemicals.
372A†	Chlorinating Station/SSA	Chlorine (hypochlorite solution) was in the potable water chlorination station in the 1940s.	HISTORICAL: Chlorine (hypochlorite solution) SAMPLING: Surficial Soil (0 - 2 ft): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, chlordane, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, lead, mercury, zinc	No Future Use, Other Contamination History	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
373	Officers' Quarters USFWS/SSA	No prior chemical use reported.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, chlordane, copper, PPDDE, PPDDT, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, lead, mercury, zinc	No Future Use, Other Contamination History	No direct use or storage of chemicals.
373B	Garage to 373/SSA	No prior chemical use reported.	HISTORICAL: None SAMPLING: Structure Matrices[d]: TCLP: Ba, Zn, Hg	No Future Use, Other Contamination History	No direct use or storage of chemicals.
374	Water Treatment Plant - west of Lower Derby Lake/ SSA	A water treatment plant for adding aluminum sulfate to lake water; however, treatment operation was never necessary and aluminum sulfate was removed.	HISTORICAL: Aluminum sulfate	No Future Use, Other Contamination History	Water treatment plant.
378†	Chlorinating Station/off-post, south of WSA	At this station, chlorine (hypochlorite solution) was injected into the main water pipelines to maintain proper clarification levels.	HISTORICAL: Chlorine (hypochlorite solution) SAMPLING: Surficial Soil (0 - 2 in): NSC	No Future Use, Other Contamination History	Water system chemicals added at this station.
379†	Chlorinating Station - Number 2/WSA	Chlorine and ammonia were used for potable water treatment at this station.	HISTORICAL: Ammonia, chlorine SAMPLING: Surficial Soil (0 - 2 in): PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Aldrin, PPDDT, DBCP, dieldrin, endrin Subsurface Soil: (2 - 5 ft, 5 - 20 ft, > 20 ft) methylene chloride	No Future Use, Other Contamination History	Station used for addition of water treatment chemicals-ammonia and chlorine.
381	Remediation Use Structure	Structure added since 1986, not part of Task 24		No Future Use, Other Contamination History	Industrial Support Building.
382	Chlorinating Station/WSA	A chlorinating station which used chlorine and ammonia for potable water treatment.	HISTORICAL: Chlorine, ammonia	No Future Use, Other Contamination History	Presence of water treatment chemicals-ammonia and chlorine.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
383	Community Club Visitor Center/WSA	No prior chemical use reported.	HISTORICAL: No historically associated chemicals Surficial Soil (0 - 2 ft): Aldrin, chlordane, copper, PPDDE, PPDDT, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, lead, mercury, zinc	Future Use, No Potential Exposure	No direct use or storage of chemicals.
383A	Officer's Club Storage	No prior chemical use reported.		No Future Use, Other Contamination History	Industrial Support Building.
385†	Water Pump Station - Well Number 1/WSA	Used as a pump and control house for process water system Well 1.	HISTORICAL: Unknown if water from well was contaminated SAMPLING: Surficial Soil (0 - 2 in): PPDDT, dieldrin, isodrin Surficial Soil (0 - 2 ft): PPDDT, dieldrin, hexachlorocyclopentadiene, isodrin, lead, zinc	Future Use, No Potential Exposure	No direct use or storage of chemicals.
386†	Water Pump Station - Well Number 2/WSA	Used as a pump and control house for process water system Well 2.	HISTORICAL: Unknown if water from well was contaminated SAMPLING: Surficial Soil (0 - 2 in): PPDDT, dieldrin, isodrin Surficial Soil (0 - 2 ft): PPDDT, dieldrin, hexachlorocyclopentadiene, isodrin, lead, zinc	Future Use, No Potential Exposure	No direct use or storage of chemicals.
387†	Water Pump Station - Well Number 3/WSA	Used as a pump and control house for process water system Well 3.	HISTORICAL: Unknown if water from well was contaminated SAMPLING: Surficial Soil (0 - 2 in): Dieldrin Surficial Soil (0 - 2 ft): Dieldrin, hexachlorocyclopentadiene	Future Use, No Potential Exposure	No direct use or storage of chemicals.
391	Sewage Disposal and Treatment Plant/NCSA-8b	Sanitary sewage treatment plant where plant effluent was chlorinated prior to discharge into First Creek during 1943. The plant was discharging DBCP into First Creek in 1977. In 1979, a skid-mounted carbon filtration unit was installed to remove contaminants.	HISTORICAL: DBCP, chlorine, carbon, sanitary sewage	No Future Use, Other Contamination History	Used for chlorination of sewage effluent.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
392†	Sewage Lift Station - Number 2/NCSA (Sanitary Sewer System)	The station received sewage from the temporary administration area.	HISTORICAL: Sewage SAMPLING: Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Copper, lead, mercury, zinc	No Future Use, Other Contamination History	Industrial Support Building.
393†	Sewage Lift Station - Number 3/WSA-7b	The station received sewage from Rose Hill and the warehouse area.	HISTORICAL: Sewage SAMPLING: Surficial Soil (0 - 2 in): Dieldrin Surficial Soil (0 - 2 ft): Copper, dieldrin, mercury, zinc	No Future Use, Other Contamination History	Industrial Support Building.
394	West Gate Sewage Treatment Plant/WSA	Septic tank for west gate area.	HISTORICAL: Sanitary sewage	No Future Use, Other Contamination History	Industrial Support Building.
395	Toxic Yard Sewage Plant - northwest of 867B/ESA	Septic tank and drain field associated with the toxic yard treatment plant.	HISTORICAL: Sanitary sewage	No Future Use, Other Contamination History	Industrial Support Building.
409	Condensate Pumphouse/ SPSA-1a	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
411	Sulfur Dichloride and Sulfur Monochloride Manufacturing/Storage/ SPSA-1a	The building was used as a sulfur monochloride and sulfur dichloride manufacturing and sulfur storage facility. Mesa Chemical Company produced resorcinol (a benzene derivative), sulfonated detergents, resins, and plastics. The resorcinol waste steam consisting of a sodium sulfate, sodium sulfite solution, and smaller percentages of quinones, hydroxyquinones, and phenolic and polymer residues was stored in a 500-gallon sump.	HISTORICAL: Sulfur monochloride, sulfur dichloride, sulfur, chlorine, As trichloride, resorcinol (benzene derivative), sulfonated detergents, sodium sulfate, sodium sulfite, quinones, resins, hydroxyquinones, phenolic and polymer residues, thionyl chloride, plastics, sodium hydroxide	No Future Use, Significant Contamination History	Large-scale production building.
411A	Steam Meter House/SPSA-1a	A steam flow metering facility with several Hg leaks due to steam pressure surges on metering instrumentation.	HISTORICAL: Hg SAMPLING: Dust - Cd, Cr, Cu, Pb, Zn	No Future Use, Significant Contamination History	Significant spill history.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
413	White Phosphorus/ Sulfur Monochloride Storage/SPSA-1a	The building was used to store white phosphorus in the storage tank bottom covered by a blanket of "phossy water" (water that was in contact with elemental phosphorus). Colorado Fuel and Iron leased the building and requested permission to install a sulfuric supply line (further details are not found in Task 24). In 1950, a heavy, dirty residue composed of organic materials had built up on the internal pipe. Shell rectified the problem. In 1951, white phosphorus cup filling operations were resumed. Approximately 16,000 gallons of an aldrin and benzene solution were spilled west of the building although historical data do not indicate the proximity of the spill to the building; Shell excavated the solidified aldrin.	HISTORICAL: White phosphorus, sulfuric acid, sodium monochloride, phossy water, heavy dirty residue composed of organic materials, phosphorus	No Future Use, Other Contamination History	Used for storage of white phosphorus-pesticide spill history.
413A	Phossy Water Tank-W of 413/SPSA-1a	Stored Phossy water (water that is in contact with elemental phosphorus slab only).		No Future Use, Other Contamination History	Industrial Support Building.
414	Dichloride/H Scrubber Unit/SPSA-1a	H and HS vent gas scrubber units that neutralized all vent gas wastes resulting from normal H operations and noncondensable vent gases from decontamination activities in Building 416. Process vent gases passed through coke-packed scrubber. Later, the building was used in production of dichloro, in which vent gases, consisting primarily of hydrochloric acid and solvents, were pumped to Building 414 scrubbers for neutralization and solvent removal. Following production, equipment was decontaminated with water and sodium bicarbonate. Although mentioned, chemical use of methylene chloride was not described in Task 24.	HISTORICAL: HD, coke, sodium hydroxide, chlorine, ethylene, sulfur, sulfur monochloride, chlorinated carbon tetrachloride, bleach, fuel oil, hydrochloric acid, methylene chloride, dichloro, dichloro solvents, HD vent gas wastes, dichloro vent gases	No Future Use, Agent History	Building was directly used for agent-related purposes.
415	Caustic Make-up Tank/ SPSA-1a	The building was used as a caustic make-up tank which made and supplied caustic for the H manufacturing plant (maintained a minimum of 1,500 gallon caustic reserve in tank) and the dichlor production unit.	HISTORICAL: Sodium hydroxide	No Future Use, Other Contamination History	Used for storage of caustic.
416	H/Dichloride Disposal Reactor/SPSA-1a	HD decontamination reactor for the HD disposal facility was used to neutralize waste resulting from HD manufacturing operations, including off-specification HD lots, runaway HD production reactions, and decontamination washes from Building 412. Equipment considered contaminated by production residues composed of HD, sulfur monochloride, sulfur, and chlorine where neutralized by using chlorinated carbon tetrachloride washes, chlorine caustic soda flushes, bleach, and water. Sludge containing free-standing HD was neutralized by a carbon tetrachloride, fuel oil saturated with chlorine, and caustic. Although Building 416 is pictured as a part of the dichloro production unit, detailed information regarding reactor's activities is not described in Task 24. It is also uncertain if the building was used for production of Super Tropical Bleach.	HISTORICAL: HD, sodium hydroxide, sulfur monochloride, chlorine, dichloro, bleach, chlorinated carbon tetrachloride, fuel oil, sulfur, chlorine, sodium hydroxide soda, HD operation waste, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), carbon tetrachloride	No Future Use, Agent History	Building was used to neutralize HD wastes.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
417	H/Dichloride Decon Pit/SPSA-1a	HD decontamination pit was used to neutralize waste from HD manufacturing operations with a caustic solution. Effluent piped to Building 417 pit for final decontamination included: spent caustic from scrubber reservoir; resultant effluent neutralized from Building 415; production residues, consisting of caustic and bleach residues reactor resultant vent gases; and disposal washes. The specific chemical composition of resulting effluents that entered and exited the decontamination pit is unavailable in Task 24. Several sources assert that HD contaminated effluents also entered the pit. Pit identified as part of the dichloro unit, but specific information regarding operations was not reported in Task 24.	HISTORICAL: HD breakdown products (chloroacetic acid; dithiane, 1,4-oxathiane; thiodiglycol), sodium hydroxide, ethylene, dichloro, bleach, sulfur monochloride, chlorine, sulfur, sodium bicarbonate, chlorinated carbon tetrachloride, fuel oil, HD operation wastes, caustic, vent gases, caustic chlorine	No Future Use, Agent History	Building was used to neutralize HD wastes.
422	H Manufacturing/ Aldrin Production/SPSA-1a	HD manufacturing facility which housed equipment for HD manufacture, storage, and filling. Ethylene and sulfur monochloride were used to produce HD. Internal maintenance consisted of decontamination of residues of HD, sulfur monochloride, chlorine, and sulfur by a wash of chlorinated carbon tetrachloride and caustic chlorine treatment. In 1950, aldrin, pydrin, was drummed and stored in Building 422. DBCP-EC was stored in the building. In the building, a spill of approximately 1,500 gallons of aldrin-benzene occurred which caused an explosion. Shell indicated that a basement sump collected the resulting aldrin-benzene, bicycloheptadiene, and hexachlorocyclopentadiene mixture, and pumped it to the waste ditch. A leak in the spent acid line spilled 100 gallons west of building.	HISTORICAL: HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), sulfur, chlorine, ethylene, sulfur monochloride, aldrin, chlorinated carbon tetrachloride, pydrin, DBCP-EC, benzene, bicycloheptadiene, acid, hexachlorocyclopentadiene, caustic chlorine, raw materials SAMPLING: Liquid - PPDDE, aldrin, dieldrin, hexachlorocyclopentadiene, isodrin, nontarget compounds Dust - Aldrin, dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Agent History	Building was directly used for manufacturing and storing agent. Acid spill history.
424A	Aldrin Control House-Foundation/SPSA-1a	The building housed a control room, laboratory, and part of aldrin manufacturing facility. Several leaks of approximately 200 gallons of bicycloheptadiene occurred east of the building. Process water line leaked near building. Manhole west of building was filled with liquid aldrin which had partially solidified.	HISTORICAL: Aldrin, bicycloheptadiene	No Future Use, Significant Contamination History	Used for aldrin manufacturing. VHC leak history.
424C	Aldrin Filter Building/SPSA-1a	The building was used to filter dissolved aldrin which was mixed with benzene or toluene to remove solids. Waste were produced in the form of filter cake. The building was the source of aldrin contamination in a ditch at southwest corner of building. Unknown quantity of aldrin filter cake spilled.	HISTORICAL: Aldrin, benzene, toluene	No Future Use, Significant Contamination History	Building used for pesticide filtration-filter cake spill history.
426	Aldrin/H Disposal Reactor/SPSA-1a	HD decontamination reactor for the disposal facility servicing the HD manufacturing plant which neutralized off-specification HD, runaway HD production reactions and decontamination washes from Building 422. The reactor neutralized solutions with caustic. The building was also used in the manufacturing of aldrin. A diaphragm blew out on a tank adjacent to the building causing a noxious chemical spread in the South Plants area.	HISTORICAL: HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), aldrin, sodium hydroxide, bicycloheptadiene, sulfur, chlorine, ethylene, sulfur monochloride, chlorinated carbon tetrachloride, pydrin, DBCP-EC, benzene, pydrin, hexachlorocyclopentadiene, toluene, DCPD	No Future Use, Agent History	Agent disposal and decontamination. Spill history.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
427	Pesticide/H/ Decontamination Pit/SPSA-1a	Neutralized wastes from the HD disposal reactor and waste products were piped to the pit for decontamination. The pit was neutralized with a solution of caustic and bleach. Task 24 suggests that the building may be contaminated with pesticides.	HISTORICAL: HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), aldrin, sodium hydroxide, bicycloheptadiene, sulfur, chlorine, ethylene, sulfur monochloride, chlorinated carbon tetrachloride, pydrin, DBCP-EC, benzene, pydrin, bleach, hexachlorocyclopentadiene, pesticides, HD operation wastes, toluene, DCPD, potential pesticides	No Future Use, Agent History	Agent decontamination pit. Possibility of pesticide presence.
428	Incinerator/SPSA-1a	Used to burn rags and sawdust from the H manufacturing plant.	HISTORICAL: None	No Future Use, Agent History	Support facility for agent production.
429	H/Brine Mixing/ Pesticide Manufacturing/SPSA-1a	Facility used for salt storage, brine mixing, and calcium chloride brine make-up for the crude HD Manufacturing Plant. Task 24 data assert that possible contamination of HD exists. The building also possibly stored aldrite pesticide.	HISTORICAL: Calcium chloride brine, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thicdiglycol), salts, aldrin, aldrite pesticides, brine SAMPLING: Dust - PPDDE, aldrin	No Future Use, Agent History	Used for chemical storage for use in agent manufacturing. Possible pesticides.
431	Ethylene Dryer/ Compressor/Refrigeration/ SPSA-1a	Intermediate facility between ethylene and HD manufacturing units which prepared ethylene for HD production and refrigerated calcium carbonate brine. Methylene dichloride was substituted for calcium chloride brine and used as a chilling agent for dichloro production. The building was possibly used for HD refrigeration and drying. Slab only.	HISTORICAL: Calcium chloride brine, ethylene, methylene dichloride, dichloro, calcium carbonated brine SAMPLING: Dust - Dieldrin, Cd, Cr, Cu, Pb, Zn	No Future Use, Other Contamination History	No direct contact with agent.
432	Sand Blasting Pad/Change House/SPSA-1a	The building was used to provide HD plant facility workers with an area to change contaminated clothing. After being destroyed by fire the building's foundation was used for a cleaning pad/sand blasting area.	HISTORICAL: None	No Future Use, Other Contamination History	Change house for workers from agent areas.
433	Ethylene Generator/ Research and Development Office/SPSA-1a	The building was used to form ethylene gas for the HD manufacturing complex utilizing ethyl alcohol and aluminum oxide. Waste products generated include lime acetylene. Spills of 55-gallons of DCPD and 350 gallons D-D soil fumigant (1,2-dichloropropane) occurred near the building. Building later converted to research facility. Slab only.	HISTORICAL: Ethylene, ethyl alcohol, aluminum oxide, DCPD, D-D soil fumigant, lime acetylene, herbicides (bladex, planavin) SAMPLING: Dust - PPDDE, aldrin, atrazine, dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Used in the production of ethylene gas. Spill history.
451	Warehouse/Production Filling/SPSA-1a	The building was used to store reserve stocks of napalm, maintain field equipment, and package liquid pesticides (aldrin-EC, azodrin, bidrin, ciodrin, dibrom, DBCP, phosdrin, phosdrin E, and vapona) into drums. Additional materials used in the building include acetone, hexylene glycol, methanol, and xylene. Spills of DBCP and azodrin occurred in and near the building, respectively. Soda ash was spread on the azodrin spill and the affected material was removed.	HISTORICAL: DBCP, azodrin, napalm, aldrin-EC, bidrin, ciodrin, dibrom, phosdrin, phosdrin E, vapona, acetone, hexylene glycol, methanol, xylene, soda ash SAMPLING: Dust - Aldrin, atrazine, dieldrin	No Future Use, Significant Contamination History	Used for drumming pesticides, solvent use, spill history.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
459	Acetylene Generator Building/SPSA-1g,2a	The building was used to produce acetylene from calcium carbide for the aldrin production process.	HISTORICAL: Acetylene, calcium carbide, herbicides (bladex, planavin) SAMPLING: Dust - Atrazine, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Used for acetylene production.
459A	Lime Slurry Pumphouse/SPSA-1g	The building was used to transfer slurry of lime and water resulting from acetylene production into lime storage basins.	HISTORICAL: Lime slurry, acetylene	No Future Use, Other Contamination History	Lime slurry and water pumphouse.
459B	Lime Slurry Pumphouse/SPSA-1g	The building housed hydraulic equipment for acetylene production (an intermediate for aldrin production).	HISTORICAL: Lime slurry, acetylene SAMPLING: Dust - Aldrin, dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Industrial Support Building.
459C	Small Building - north of 459/SPSA-1g	The building housed new hydraulic equipment for the crane at the acetylene generator.	HISTORICAL: Acetylene	No Future Use, Other Contamination History	Used for acetylene production.
461	Tank Farm Pumphouse/SPSA-2a	Pumphouse for the storage tank. Fuel oil and ethyl alcohol were unloaded through the pumphouse. Also used to pump DBCP, which was stored in tanks.	HISTORICAL: Fuel oil, ethyl alcohol, DBCP SAMPLING: Dust - Dieldrin, Cd, Cr, Cu, Pb, Zn	No Future Use, Other Contamination History	Pumphouse used for fuels, DBCP.
464	Sample Building/SPSA-2b	The building was used for collection and storage of various products (air, water, and soil samples); and to hold samples of ammonium sulfates and spent acid. Specific information on samples is unavailable in Task 24.	HISTORICAL: Ammonium sulfates, spent acid	No Future Use, Other Contamination History	Used for storage of samples and various chemicals.
471	Thionyl Chloride Reactor/ Pesticide Production/ SPSA-1a	The plant was originally used for manufacturing thionyl chloride which used sulfur dichloride, antimony trichloride oleum, chlorine, monochlorobenzene, and caustic. Finished thionyl chloride was stored in a 10,000 gallon tank. A request to install a line for sulfuric acid was submitted, but no information is available to substantiate approval or completion of work. Plant also used to manufacture PPDDT, chlorinated paraffin, dibrom, supona, vapona, epon adhesives, pydrin, DBCP, gardona, akton, Bisphenol A (phenol, acetone, hydrochloric acid, and methyl mercaptan), Phosdrin 4-EC, and ionol flaker. The dibrom process involved peroxide-catalyzed bromination of vapona in carbon tetrachloride. In 1972, a nalgene vent line from the azodrin unit replaced the trimethyl phosphite line. The following spills occurred in or along the railroad tracks north of Building 471: numerous spills of bromine and bromine vapors, chlorothiophenol, DBCP, allylchloride, chloral distillation bottoms containing sulfuric acid, sodium hydroxide and acid, trimethyl phosphite, and brown liquid.	HISTORICAL: Thionyl chloride, sulfur dichloride, antimony trichloride, oleum, chlorine, monochlorobenzene, sodium hydroxide, chlorinated paraffin, PPDDT, sulfuric acid, dibrom, supona, vapona, epon adhesives, pydrin, DBCP, gardona, akton, Bisphenol A, phenol, acetone, hydrochloric acid, methyl mercaptan, ionol flaker, carbon tetrachloride, Phosdrin 4-EC, bromine, trimethyl phosphite, chlorothiophenol, allylchloride, chloral distillation bottoms, sulfuric acid, sodium hydroxide, acid, nalgene, brown liquid SAMPLING: Dust - PPDDE, DBCP, aldrin, chlorophenylmethyl sulfone, dieldrin, supona, vapona, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Used for manufacturing of thionyl chloride and pesticides. Spill history.
471B	Electrical Vault/SPSA-1a	Supplied power to Building 471 for manufacturing various compounds.	SAMPLING: Dust - Dieldrin	No Future Use, Other Contamination History	Power vault-no direct use or storage of chemicals.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
471C	Thionyl Chloride Refrigeration/SPSA-1a	No prior chemical use reported.	HISTORICAL: Organochlorine compounds	No Future Use, Other Contamination History	Industrial Support Building.
472	Thionyl Chloride Refrigeration/SPSA-1a	Refrigeration building for thionyl chloride manufacturing complex which used monochlorobenzene as a refrigerant and ammonia compressors.	HISTORICAL: Thionyl chloride, monochlorobenzene, ammonia SAMPLING: Dust - Aldrin, dieldrin	No Future Use, Other Contamination History	Used chlorobenzene as refrigerant.
472A	Lunchroom/Maintenance Equipment Storage/SPSA-1a	The building was used for maintenance equipment, storage, and a lunch room.	HISTORICAL: None SAMPLING: Dust - Aldrin	No Future Use, Other Contamination History	Industrial Support Building.
473	Thionyl Chloride/Pesticide Packaging/SPSA-1a	Thionyl chloride drum loading facility, also used to store and package DBCP, dibrom, and supona; store chlordane; and package vapona. The building was potentially contaminated with unspecified industrial chemicals.	HISTORICAL: Thionyl chloride, DBCP, chlordane, vapona, supona, dibrom, industrial chemicals SAMPLING: Dust - Aldrin, dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Used to store and package pesticides-potential of additional chemicals.
474	Electrical Control House/SPSA-1a	The building was used to provide electricity to transformers and switch gear in the thionyl chloride complex.	HISTORICAL: None SAMPLING: Dust - Aldrin, chlorophenylmethyl sulfone, dieldrin	No Future Use, Other Contamination History	Industrial Support Building.
475	Railroad Car Warmer Shed/SPSA-1a	Part of Thionyl Chloride Plant used to heat carloads of solid material. Also possibly used to thaw carloads of dichloro and hydrazine. Fifty-five gallons of azodrin exploded in warming shed. Soda ash was spread on affected area and area was excavated and removed.	HISTORICAL: Thionyl chloride, hydrazine, azodrin, dichloro, soda ash SAMPLING: Dust - Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Possibly used to thaw nitrogen compounds. History of azodrin explosion.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
502	West Chemical Metering Pump/SPSA-1a	Part of Denver Effluent Treatment Facility used to collect and transfer the chemical waste stream to the pretreatment operation of the Denver Effluent Treatment facilities. Chemical wastes were neutralized with sodium hydroxide.	HISTORICAL: Chemical sewer contaminants which could include: carbon tetrachloride, chlorobenzene, chloroform, methylene chloride, 1,1,2,2-tetrachloroethylene, trichloroethylene, tetrachloroethylene, bicycloheptadiene, DCPD, benzene, chloroacetic acid, dithiane, 1,4-oxathiane, thiodiglycol, benzothiazole, chlorophenylmethyl sulfide, chlorophenylmethyl sulfone, dimethyldisulfide, atrazine, supona, vapona, DBCP, hydrazine, hexachlorobenzene, hexachlorocyclopentadiene, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethylene, trans-1,2-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloropropene, 2-butoxyethanol, 4-hydroxy-4-2-pentanone, methylcyclohexane, 1-methyl-1,3-cyclopentadiene, methylisobutyl ketone, 2,2-oxybisethanol, 2-pentanone, ethylbenzene, toluene, m-xylene, o- and p-xylene, chlorophenylmethyl sulfoxide, DIMP, DMMP, isopropylmethyl phosphonic acid, methylphosphonic acid, phosphoric acid-tributyl ester, phosphoric acid-triphenyl ester, malathion, parathion, caprolactam, methylhydrazine, n-nitrosodimethylamine, n-nitrosodi-n-tapropylamine, fluoracetic acid, fluoranthene, methylnaphthalene, phenanthrene, pyrene, hexachlorobutadiene, pentachlorobenzene, tetrachlorobenzene, trichlorobenzene, aldrin, chlordane, PPDDE, PPDDT, dieldrin, endrin, isodrin, As, Hg, Cd, Cr, Cu, Pb, Zn SAMPLING: Dust - Aldrin, atrazine, chlorophenylmethyl sulfone, dieldrin	No Future Use, Significant Contamination History	Used in chemical waste collection, neutralization, and transfer as part of pesticide production.
503	East Chemical Metering Pump/SPSA-1a	Part of Denver Effluent Treatment Facility used to collect and transfer the chemical waste stream to the pretreatment operation of the Denver Effluent Treatment facilities. Chemical wastes were neutralized with sodium hydroxide.	HISTORICAL: Chemical sewer contaminants which could include the same compounds listed for Building 502, herbicides (bladex, planavin) SAMPLING: Dust - Aldrin, atrazine, chlorophenylmethyl sulfone, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Used in chemical waste collection, neutralization, and transfer as part of pesticide production.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
504	Denver Effluent Treatment Emergency Diesel Generator/SPSA-1a	Diesel operated electric generator used to provide back-up power for Denver Effluent Treatment Facility.	HISTORICAL: Diesel fuel SAMPLING: Dust - Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Power generator, no direct use or storage of chemicals.
505	Denver Effluent Treatment Pretreatment Feed Pumphouse/SPSA-1a	Pretreatment pumps built to treat chemical waste effluent as part of the Denver Effluent Treatment Facility. Chemical wastes were neutralized with sodium hydroxide.	HISTORICAL: Chemical sewer contaminants which could include the same compounds listed for Building 502, herbicides (bladex, planavin) SAMPLING: Dust - Aldrin, atrazine, chlorophenylmethyl sulfone, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Used for waste treatment as part of pesticide production.
506	Denver Effluent Treatment Control House/SPSA-1a	The building was used to house instrumentation that controlled Denver Effluent Treatment process equipment. A spill of 200 hundred gallons of Shell fertilizer 8-0-0-1S occurred on ground north of the building. The liquid was recovered with a vacuum and the contaminated soil removed.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
507	Denver Effluent Treatment Separator Pumphouse/ SPSA-1g	The building was part of the chemical waste treatment facility and housed three pumps which alternately transferred heavy organics (mainly chloroform and light organics) to vent gas burner liquid storage tanks. Also used to transfer clarified effluent to final treatment surge tank. Chemical wastes were neutralized with sodium hydroxide.	HISTORICAL: Chemical sewer contaminants which could include the same compounds listed for Building 502, herbicides (bladex, planavin) SAMPLING: Dust - Aldrin, atrazine, chlorophenylmethyl sulfone, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Chemical waste transfer facility as part of pesticide production.
508	Denver Effluent Treatment/ Copper Sulfate Treatment/SPSA-1g	The building was part of the chemical waste effluent treatment facility used to precipitate Cu by reaction with hydrogen sulfide creating cuprous sulfide. The Cu-free raffinate was then piped to the tanks. The principle waste stream from azodrin production was monomethylacetoacetamide.	HISTORICAL: Cu sulfate, Cu sulfide, monomethylacetoacetamide, hydrogen sulfide, Cu-free raffinate SAMPLING: Dust - Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Chemical waste transfer facility.
509	Denver Effluent Treatment Methyl Chemical Ionization Compressor/Liquifier/ SPSA-1a	The compress or liquifier served as a methyl chloride recovery unit for the chemical waste effluent treatment facility. Waste vapor stream was composed of 86 percent methyl chloride, 12 percent chloride, and small amounts of other impurities. Freon-22 refrigerant, liquid methyl chloride and noncondensables were also used.	HISTORICAL: Methyl chloride, chloride, Freon-22, unspecified impurities SAMPLING: Dust - Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Methyl chloride recovery unit for waste treatment facility.
510	Methyl Isocyanate Refrigeration/SPSA-1a	The building was used as a methyl isocyanate refrigeration storage unit. Liquid MIC was fed into the nudrin insecticide unit using nitrogen pressure. The building was not provided with any sewer connections.	HISTORICAL: Methyl isocyanate	No Future Use, Other Contamination History	Refrigeration storage unit.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
511	Chlorinated Paraffin Manufacturing/Storage/ SPSA-1a	The facility was used to manufacture chlorinated paraffin and later used as offices, formulation laboratory, and storage area for chemicals. North of the building were minor spills of toluene and hexane. The eastern courtyard surface drainage sump was used by Shell to discharge condensate. The following are chemicals that were stored in building: acetic acid, acetone, acetonitrile, acetonitrile-UV, alcozme, ammonium hydroxide, barium oxide, calcium carbonate, calcium chloride, dihydrate, chloroform, chloroform-nanograde cyclohexanone, dibromomethane, methylene chloride AR, methylene chloride-nanograde, methylene chloride-spectar, dimethyformanide, emulsifiers, ethyl acetate, ethylene dichloride, ethylene glycol, heptane, hexane, hydrochloric acid, magnesium oxide, methyl alcohol, methyl alcohol-spectar, N-amyl alcohol, nitric acid, nitrobenzene, nonane, normal octane, phosphoric acid, potassium hydroxide, potassium thiocyanate, propanol 2, pyridine, silicic acid, sodium chromate, sodium thiosulfate, sulfuric acid, thionyl chloride, thiethylamine, 1,1,2-trichloroethane, and uranine.	HISTORICAL: Chlorinated paraffin, toluene, hexane, acetic acid, acetone, acetonitrile, acetonitrile-UV, alcozyme, ammonium hydroxide, barium oxide, calcium carbonate, calcium chloride dihydrate, chloroform, chloroform-nanograde, cyclohexanone, dibromomethane, methylene chloride, dimethylformaldehyde, emulsifiers, ethyl acetate, ethylene dichloride, ethylene glycol, heptane, hexane, hydrochloric acid, magnesium oxide, methyl alcohol, methyl alcohol-spectar, N-amyl alcohol, nitric acid, nitrobenzene, nonane, normal octane, phosphoric acid, potassium hydroxide, potassium thiocyanate, propanol 2, pyridine, silicic acid, sodium chromate, sodium thiosulfate, sulfuric acid, thionyl chloride, triethylamine, 1,1,2-trichloroethane, uranine, isopropyl alcohol SAMPLING: Dust - Aldrin, dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Used for manufacture of paraffin and chemical storage-mostly chlorinated compounds.
511A	Chlorinated Paraffin/Change House/SPSA-1a	The building was used as part of the chlorinated paraffin manufacturing facility. It was later used by Shell as a change house to include showers, lavatories, and a hot water tank.	HISTORICAL: Chlorinated paraffin	No Future Use, Other Contamination History	Used to manufacture chlorinated paraffin.
512	Filling/Pesticide Production/SPSA-1a	The building was part of the L plant used to fill ton containers and 55-gallon drums with L and later to fill containers with distilled HD. Shell used the building for manufacturing chlordane, other unspecified pesticides, endrin intermediates, and bicycloheptadiene. Spills of hexane, heptachlorobicycloheptene, hexachlorocyclopentadiene, isopropanol, and chlorothiophenol occurred.	HISTORICAL: L, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), chlordane, pesticides, endrin intermediates, bicycloheptadiene, heptachlorobicycloheptene, hexachlorocyclopentadiene, hexane, isopropanol, chlorothiophenol, Compound SD-15803, Compound 773 SAMPLING: Dust - Chlorophenylmethyl sulfone, dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Agent History	Used as agent filling station and pesticide manufacturing. Spill history.
512A	Flammable Solvent Storage Shed/SPSA-1a	The building stored flammable solvents.	HISTORICAL: Flammable solvents	No Future Use, Other Contamination History	Storage of flammable solvents.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
514	Lewisite/HD/Pesticide Production/SPSA-1a	The building was used for L and HD manufacturing, and pesticide production including chlordane, endrin, phosdrin, methyl parathion, vapona, ciodrin, bidrin, ethyl parathion, and azodrin. The reactors were charged with mercuric chloride catalyst, As trichloride, gaseous acetylene, and thionyl chloride for L manufacturing. Noxious gases and excess contaminated acetylene were vented to refrigerated condensers, then to caustic scrubber towers for decontamination, and finally vented to the atmosphere. Crude L was piped to tanks in the basement. The reactors were also used as part of the distilled HD plant with batches of HD piped to storage tanks and the demulsifying agent "Tret-O-Lite" added. Crude H was also separated with water and the contaminated mixture was discharged to a decontamination pit near the southeast corner of the building. Chemicals associated with these operations include: hexachlorocyclopentadiene, vinyl chloride, sodium hydroxide, cyclopentadiene, acetic acid, hydrogen peroxide, methylacetoacetate, sulfuryl chloride, trimethyl phosphite, p-nitro sodium phenolate, chloral, sulfuric acid, alphamethylbenzyl alcohol, diketene sulfuryl chloride, diketene, dimethylamine, urea, chlorine, 0,0-diethylphosphorochloridethionate, methylamine, sulfur dioxide, copper sulfate, soluble iron, sulfur compounds, HD, L, and other toxic impurities. Shell also installed a bicycloheptadiene bottoms flasher unit. A leaking contaminated sewer line was abandoned near the building. A concrete sump which adjoins the building contained acetic acid, aldrin, benzene, caustic soda, dieldrin, endrin, and toluene. Spills of crude azodrin, monomethylchloroacetoacetamide, acetone, chloroform, trimethyl phosphite, L, hexachlorocyclopentadiene, and a solution comprised of crude azodrin, bidrin, azodrin acetone, chloroform, monomethylchloroacetoacetamide, trimethyl phosphite, and monomethylamine occurred.	HISTORICAL: L, As trichloride, thionyl chloride, acetylene, mercuric chloride, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), Tret-O-Lite, soluble iron, sulfur compounds, chlordane, heptachlor, strauss hex, aldrin, sodium hypochlorite, azodrin, dieldrin, napalm, toluene, DCPD, Hg, As oxide, benzene, acetic acid, sodium hydroxide, cyclopentadiene, endrin, monomethylchloroacetoacetamide, chloroform, bidrin, dimethylamine, acetone, monomethylamine, phosdrin, methyl parathion, vapona, ciodrin, ethyl parathion, hexachlorocyclopentadiene, vinyl chloride, hydrogen peroxide, methylacetoacetate, sulfuryl chloride, p-nitro sodium phenolate, chloral, trimethyl phosphite, sulfuric acid, alphamethylbenzyl alcohol, diketene, diketene sulfuryl chloride, chlorine, pesticides, urea, 0,0-diethylphosphoro-chlorideothionate, methylamine, bicycloheptadiene, sulfur dioxide, copper sulfate, toxic impurities, caustic soda, bleach (calcium hypochlorite) SAMPLING: Liquid - Chloroform, methylene chloride, chlorophenylmethyl sulfone, dieldrin, endrin, nontarget compounds Dust - Dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Agent History	Used to manufacture agent and pesticides. Spill history
514A	Lewisite M-1 Storage Dowtherm Boiler/SPSA-1a	The building contained eight 3,900-gallon lined storage tanks that initially provided storage for crude L. It later was refurbished as a Dowtherm boiler unit for the HD distillation plant. Shell rebuilt the building after an explosion in Building 516 destroyed it and used the Dowtherm boilers for aldrin production. A tube ruptured causing liquid Dowtherm to spray in the building. The building also contained an 8,000-gallon fuel oil tank. An unidentified liquid substance was observed on the floor beneath the sump pump in 1985. Specific use or occurrence of As oxide and napalm are not described in Task 24 although As oxide could be associated with As trichloride manufacturing.	HISTORICAL: L, mercuric chloride, As oxide, acetylene, Dowtherm, napalm, fuel oil, As trichloride SAMPLING: Dust - Cd, Cr, Cu, Pb, Zn, As	No Future Use, Agent History	Used for agent storage, pesticide production, and storage of various chemicals.
514C	Pumphouse/SPSA-1a	The building housed pumps for transferring raw material to Building 514. Precise chemicals in the raw material unavailable in Task 24. Specific use or occurrence of acetic acid and chlorine are not described in Task 24.	HISTORICAL: Acetic acid, chlorine gas, raw material assumed to consist of same chemicals historically associated with Building 514	No Future Use, Other Contamination History	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
514D	Refrigeration Compressor/SPSA-1a	The building housed refrigeration compressors for coolants used within the 514 complex. Specific use or occurrence of white residue are is not described in Task 24.	HISTORICAL: White residue SAMPLING: Dust - Dieldrin	No Future Use, Other Contamination History	Compressor housing-no chemicals associated with this building.
514E	Monomethylamine Dilution Control/SPSA-1a	The building was used for monomethylamine dilution (an intermediate used in the azodrin process).	HISTORICAL: Monomethylamine SAMPLING: Dust - Chlorophenylmethyl sulfone, dieldrin	No Future Use, Other Contamination History	Used for chemical dilution processes.
515	Chlorinated Paraffin/ Dichlorodiphenyltrichloro-ethane/Pesticide Production/SPSA-1a	The building was initially constructed as a distillation facility for L but was only used for storage and contractor shop space. The building is identified as a chlorinated paraffin manufacturing structure, but Task 24 states that chlorinated paraffin was not produced in the building. Later the building was used to produce PPDDT, monochlorobenzene, endrin, nudrin, planavin, and bladex herbicide. Intermediates of endrin include DCPD, bicycloheptadiene, hexachlorocyclopentadiene, and isodrin. A flash fire in the isodrin centrifuge and a chemical fire involving crystalline endrin occurred and caused an explosion. Due to decomposition in Vessel 1033, endrin and toluene were discharged into the chemical sewers. A spill of 3,000 gallons of benzene was reported north of the building. Specific use or occurrence of napalm, HD, and triethanolamine are not described in Task 24 although triethanolamine is associated with chlorinated paraffin manufacturing.	HISTORICAL: Napalm, chlorinated paraffin, triethanolamine, PPDDT, planavin, endrin, isodrin, bladex, nudrin, toluene, benzene, hexachlorocyclopentadiene, monochlorobenzene, DCPD, bicycloheptadiene, Tret-O-Lite SAMPLING: Dust - Atrazine, monochlorobenzene, Cd, Cr, Cu, Pb, Zn, As Structure Matrices[d] - TCLP: Ba, Cr, Hg, aldrin, dieldrin, endrin, isodrin, CPMSO2, 1,4-DCLB, chlordane, heptachlor, heptachlor epoxide, lindane, methoxychlor, PPDDE, PPDDT, CPMSO Total Waste Methods: Cr, endrin, isodrin, PPDDT, Cd, dieldrin, chloroform	No Future Use, Significant Contamination History	Used for production of herbicides and pesticides. Fire and spill history.
515A	Nudrin/Endrin Storage/ SPSA-1a	The building was used in conjunction with operations in the pesticide production facility and originally stored endrin and nudrin. A pipe coil has deteriorated and leaked process water.	HISTORICAL: Endrin, nudrin SAMPLING: Dust - Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Used for pesticide storage.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
516	Lewisite Distillation/ Pesticide Production/ SPSA-1a	The building was used to distill crude L into finished L. It also manufactured and drummed chlordane, aldrin, isodrin, dieldrin, azodrin, and endrin. Also produced in the building was chlordene (an intermediate of chlordane); the sulfone oxidation phase of planavin production; and the amino isobutylronitrile reaction and flashing phase of bladex. A leak of semi-finished dieldrin consisting of aldrin crystals, benzene, acetic acid, and peroxide occurred. Spills of sulfuric acid, hydrogen peroxide, benzene, liquid chlorine, aldrin, chlorine gas, acetic acid, caustic soda, dieldrin, endrin, toluene, and sulfone also occurred. The building is the suspected source of the chloroform detected in ground- water in a nearby well. Vapona scatter bait was leaking. Leaks of dieldrin dust and toluene were also noted. Although mentioned, specific use or occurrence of muriatic acid is not described in Task 24.	HISTORICAL: L, chlordene, chlordane, aldrin, dieldrin, muriatic acid, endrin, isodrin, azodrin, amino isobutylronitrile, benzene, peroxide, sulfuric acid, hydrogen peroxide, chlorine, toluene, chlorophenylmethyl sulfone, vapona, sodium hydroxide soda, chloroform, acetic acid, bladex, chlorinated paraffin, hydrogen chloride (hydrochloric acid), supona, planavin SAMPLING: Dust - Aldrin, dieldrin, chlorophenylmethyl sulfone, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Agent History	Agent manufacturing. Used to manufacture and store pesticides, various chemical processes. Spill history and potential cause of chloroform in nearby groundwater well.
516B	Electrical Equipment Storage/SPSA-1a	The building was used for storage of miscellaneous electrical equipment.	HISTORICAL: None SAMPLING: Dust - Aldrin, chlordane, chlorophenylmethyl sulfone, dieldrin, endrin, hexachlorocyclopentadiene, isodrin, supona, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Used for electrical equipment storage, no direct use or storage of chemicals.
517	Offices/Change House/Laboratory/SPSA-1a	The building was used as a change house and control laboratory for the L plant, white phosphorus cup filling, chlorinated paraffin plant, and HD plant.	HISTORICAL: HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), L, white phosphorus, chlorinated paraffin	No Future Use, Agent History	Used as a support structure for agent manufacturing.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
518A†	Emergency Fire Protection Pumphouse/SPSA-1a	The building housed a diesel engine and pump.	HISTORICAL: Diesel fuel SAMPLING: Surficial Soil (0 - 2 in): Aldrin, chlordane, PPDDE, dieldrin, endrin, mercury, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, atrazine, cadmium, chlordane, chloroacetic acid, chlorophenylmethyl sulfide, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, DCPD, dieldrin, dithiane, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, supona, thiodiglycol, zinc Subsurface Soil: (2 - 5 ft) methylene chloride, tetrachloroethylene, toluene, (5 - 20 ft) benzene, bicycloheptadiene, carbon tetrachloride, chloroform Groundwater: Benzene, bicycloheptadiene, carbon tetrachloride, chlorobenzene, chloroform, ethylbenzene, m-xylene, methylene chloride, methyl isobutyl ketone, tetrachloroethylene, toluene, trichloroethylene, xylenes, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethylenes, 1,1,1-trichloroethane, 1,1,2-trichloroethane	No Future Use, Other Contamination History	Pumphouse, no direct chemical activities.
519	Hydrogen Peroxide Storage/SPSA-1a	The building was originally used as an acetylene gas holder used in conjunction with L production but was dismantled and used as a tankage for a chlorinated paraffin plant to dilute and store hydrogen peroxide.	HISTORICAL: Hydrogen peroxide, acetylene SAMPLING: Dust - Aldrin, dieldrin, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Used for hydrogen peroxide storage.
519A	Hydrogen Peroxide Pumphouse/SPSA-1a	The building was used to transfer and pump hydrogen peroxide.	HISTORICAL: Hydrogen peroxide SAMPLING: Dust - Aldrin, chlorophenylmethyl sulfone, chlorophenylmethyl sulfoxide, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Used to process hydrogen peroxide.
520	Sample Pump/pH Probes Storehouse/SPSA-1a	The building was used to store sample pumps and pH probes. No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
521	Acetylene Compressor/ Pesticide Manufacturing/SPSA-1a	The building was part of the acetylene plant for the L complex. Sulfuric acid and caustic were used in the building. It was also used for storage and to house testing facilities for the white phosphorus cup filling plant. Later, it was used for fuel oil for DCPD and cyclopentadiene production. Shell installed a Thermal Hex (hexachlorocyclopentadiene) and hydrochloric acid unit. Later the building was used for miscellaneous storage and laboratory facilities. Spills of hexachlorocyclopentadiene, DCPD, and cyclopentadiene, and a leak of octachlor occurred. Although mentioned, specific use or occurrence of chlordane is not described in Task 24.	HISTORICAL: Sulfuric acid, sodium hydroxide, acetylene, white phosphorus, fuel oil, hydrochloric acid, chlordane, DCPD, cyclopentadiene, octachlor, hexachlorocyclopentadiene SAMPLING: Dust - Dieldrin, hexachlorocyclopentadiene	No Future Use, Significant Contamination History	Used for pesticide production, laboratory facilities and storage. Hydrocarbon and halogenated organic compound spill history.
521A	Refrigeration/ Dicyclopentadiene Cracking/SPSA-1a	The building was part of the DCPD unit which produced cyclopentadiene and also possibly used in the Thermal Hex (hexachlorocyclopentadiene) Unit. Although mentioned, specific use or occurrence of ammonia is not described in Task 24.	HISTORICAL: Ammonia, cyclopentadiene, DCPD, hexachlorocyclopentadiene SAMPLING: Dust - Dieldrin	No Future Use, Significant Contamination History	Used for pesticide production.
521B	Compressor House/ Maintenance/SPSA-1a	The building was originally built as a compressor building for the Thermal Hex (hexachlorocyclopentadiene) Unit. Later used as a field maintenance shop and shift shack for maintenance employees.	HISTORICAL: Hexachlorocyclopentadiene SAMPLING: Dust - Dieldrin, endrin	No Future Use, Other Contamination History	Housed compressor and maintenance shop. No direct chemical use.
521C	Lunchroom/Field Foreman Office/SPSA-1a	The building was used as a lunchroom and field foreman office.	SAMPLING: Dust - Chlorophenylmethyl sulfone, dieldrin	No Future Use, Other Contamination History	Industrial Support Building.
522	White Phosphorus Cup Filling/Acetylene Manufacturing/SPSA-1a	The building acted as an acetylene manufacturing plant which used calcium carbide to produce acetylene gas, by-products included quick lime and lime sludge (calcium oxide, calcium hydroxide). Later converted to a filling and assembly building for the white phosphorus cup filling plant which used sodium silicate, alcohol, white phosphorus, and Cu sulfate. The building also stored filling equipment and produced M23 fire bomb igniters and M15 grenades. M15 grenades went through tanks containing phosphate and oakite. Decontamination and disposal for white phosphorus filling equipment including white phosphorus and phossy water occurred. White phosphorus contaminated scrap metal was stored in the building.	HISTORICAL: White phosphorus, acetylene, calcium carbide, calcium oxide, calcium hydroxide, sodium silicate, alcohol, Cu sulfate, oakite, bomb igniters, phosphate, phossy water	No Future Use, Other Contamination History	Used to manufacture acetylene and production of explosives.
522A	Phossy Water Tank	The building was used to store sulfuric acid for L manufacturing. Later, it was converted to a phossy water storage tank. White phosphorous-contaminated scrap metal was incinerated in Building 1611.		No Future Use, Other Contamination History	Industrial Support Building.
522B	Change House/ Administration Building/ SPSA-1a	The building acted as a change house for white phosphorus and HD demilitarization operations.	HISTORICAL: White phosphorus	No Future Use, Other Contamination History	Building used as change house-no direct chemical processes.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
523	Arsenic Trichloride Manufacturing Building/ Igniter Tube Filling/SPSA-1a	The building was originally an arsenic trichloride manufacturing plant which used As oxide and sulfur monochloride. Later converted for white phosphorus, igniter filling, and producing an insulating plaster base composed of perlite. Other operations included white phosphorus filling pipettes, paint booth, phosphate, stripping and water tanks.	HISTORICAL: As oxide, sulfur monochloride, As trichloride, white phosphorus, paint, perlite, phosphate	No Future Use, Significant Contamination History	Used to manufacture incendiary munitions.
523A	White Phosphorus and Arsenic Trichloride Storage Tank House/SPSA-1a	The building originally stored arsenic trichloride; later converted for use in white phosphorus storage and white phosphorus cup filling and igniter filling operations. White phosphorus tanks were used in the demilitarization of M78 and M79 white phosphorus filled bombs and in dry filling of demilitarized HD shells with white phosphorus.	HISTORICAL: As trichloride, white phosphorus	No Future Use, Other Contamination History	Used for the storage of arsenic trioxide.
523C	Arsenic Trioxide Dry Storage Silo/SPSA-1a	The building was used to store As trioxide for As trichloride manufacturing operations. Later used by Shell for miscellaneous storage. The silos were not dust-tight and dust was a problem during loading/unloading of the silos.	HISTORICAL: As trioxide	No Future Use, Significant Contamination History	Used for the storage of arsenic trioxide.
523D	Arsenic Trioxide Dry Storage Silo/SPSA-1a	The building was used to store As trioxide for As trichloride manufacturing operations. Later used by Shell for miscellaneous storage. The silos were not dust-tight and dust was a problem during loading/unloading of the silos.	HISTORICAL: As trioxide	No Future Use, Significant Contamination History	Used for the storage of arsenic trioxide.
523E	Arsenic Trioxide Dry Storage Silo/SPSA-1a	The building was used to store As trioxide for As trichloride manufacturing operations. Later used by Shell for miscellaneous storage. The silos were not dust-tight and dust was a problem during loading/unloading of the silos.	HISTORICAL: As trioxide	No Future Use, Significant Contamination History	Used for the storage of arsenic trioxide.
523F	Arsenic Trioxide Dry Storage Silo/SPSA-1a	The building was used to store As trioxide for As trichloride manufacturing operations. Later used by Shell for miscellaneous storage. The silos were not dust-tight and dust was a problem during loading/unloading of the silos.	HISTORICAL: As trioxide	No Future Use, Significant Contamination History	Used for the storage of arsenic trioxide.
523G	Arsenic Trioxide Dry Storage Silo/SPSA-1a	The building was used to store As trioxide for As trichloride manufacturing operations. Later used by Shell for miscellaneous storage. The silos were not dust-tight and dust was a problem during loading/unloading of the silos.	HISTORICAL: As trioxide	No Future Use, Significant Contamination History	Used for the storage of arsenic trioxide.
524	White Phosphorus Filling and Sulfur Dioxide Disposal/ SPSA-1a	The building originally housed sulfur dioxide and sulfur monochloride auxiliary reactor vent gas disposal equipment. Later converted to a heavy equipment shop; also used to fill empty M78 and M79 bomb casings with white phosphorus. Utilized in the demilitarization of M78 and M79 white phosphorus bombs.	HISTORICAL: Sulfur dioxide, sulfur monochloride, white phosphorus	No Future Use, Other Contamination History	Equipment shop and explosive filling operations.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
525	Product Development Laboratory/Nudrin Manufacturing/SPSA-1a	The building acted as an acetylene scrubber and compressor house used to pump raw acetylene gas through scrubbers containing sulfuric acid and caustic. The building later was converted to a process development laboratory used for development and/or production of phosdrin, bidrin, ciodrin, supona, hexacetylene, gardona, akton, landrin, and rabon and revap emulsible concentrates. The building also used in the first two phases in nudrin process involving the chlorinator reactor and crystallization steps. Spills of hexachlorocyclopentadiene, cyclopentadiene bottoms, methylisobutyl ketone, and caustic water containing mercaptan occurred. Although mentioned, specific use or occurrence of bleach is not described in Task 24.	HISTORICAL: Acetylene, sulfuric acid, sodium hydroxide, phosdrin, bidrin, ciodrin, supona, hexacetylene, gardona, akton, landrin, rabon and revap emulsible concentrates, nudrin, hexachlorocyclopentadiene, cyclopentadiene, methylisobutyl ketone, mercaptan, bleach (calcium hypochlorite, sodium hypochlorite), herbicides (bladex, planavin) SAMPLING: Dust - Atrazine, Cd, Cr, Cu, Pb, Zn	No Future Use, Significant Contamination History	Pesticide production and development laboratory. Spill history.
525A	Refrigeration Compressor/ Electrical Vault/SPSA-1a	The building was used as a refrigeration building associated with Building 525.	HISTORICAL: Historically associated chemicals not available	No Future Use, Other Contamination History	Industrial Support Building.
526	Pesticide Filter/SPSA-1a	The building filtered solutions of aldrin/benzene, aldrin/toluene, and isodrin/toluene for aldrin, dieldrin, and endrin production. Spills of dieldrin noted, and Task 24 reported that dieldrin in the air exceeded threshold limits.	HISTORICAL: Aldrin, dieldrin, endrin, benzene, toluene, isodrin	No Future Use, Significant Contamination History	Used in pesticide filtering operations.
527	Change House/Quonset Hut/SPSA-1b	The building acted as a lunchroom, supply building, and change room for contaminated clothing for personnel involved with H demilitarization operations.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
528	Dichlorodiethyl Sulfide (HD) Burning/Pesticide Manufacturing/SPSA-1a	The building was used as a residue burning area for HD distillation. Residue was disposed in the furnace and by combustion supplemented by fuel oil. Combustion gases contained sulfur dichloride, hydrogen chloride, carbon dioxide, and carbon monoxide. Spills of DCPD, sodium hypochlorite, and sulfuryl chloride occurred.	HISTORICAL: HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol) distillation residues, fuel oil, sulfur dichloride, hydrogen chloride, DCPD, sodium hypochlorite, sulfuryl chloride, carbon monoxide, carbon dioxide, bleach (calcium, hypochlorite) SAMPLING: Dust - Dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Agent History	Agent residue burning area.
529	Sodium Hydroxide Make-up/Azodrin Support Structure/SPSA-1a	The building housed caustic make-up tanks and pH control equipment used in the neutralization of the effluent from the distilled HD decontamination pit. Shell claimed they encountered H between Buildings 514 and 529.	HISTORICAL: Sodium hydroxide	No Future Use, Other Contamination History	Used as a support structure, no direct agent contact.
531	Warehouse/SPSA-1a,1g	The building stored process chemicals such as iron sulfate and clay.	HISTORICAL: Process chemicals such as iron sulfate SAMPLING: Dust - Aldrin, dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Used for chemical storage-no direct chemical processes occurred here.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
532	Pesticide Storage/ Warehouse/SPSA-1a,1g	Shell stored dieldrin; formulated and packaged atrazine; and mixed chemical SMA-1044OH[3] with emulphosgene, maraperse, bentonite, formalin, ethylene glycol, kelzan, and technical atrazine to produce Atrazine 4L in the building. Filled containers with phosdrin, planavin, and bladex in building. Previously used for storage with precise contents unavailable in Task 24.	HISTORICAL: Planavin, bladex, atrazine, phosdrin, dieldrin, sulfur monochloride, emulphosgene, maraperse, formalin, ethylene glycol, kelzan, SMA-10440H, Atrazine 4L SAMPLING: Dust - Aldrin, atrazine, dieldrin, endrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Used for storage and packaging of pesticides.
533	Flammable Materials Storehouse/SPSA-1a	Inflammable storehouse used in conjunction with chlorinated paraffin operations with precise contents unavailable in Task 24. Shell used the building for paint, solvent, and planavin storage.	HISTORICAL: Paints, cleaning solvent, planavin, chlorinated paraffin, herbicides (bladex) SAMPLING: Dust - Aldrin, atrazine, chlorophenylmethyl sulfone, dieldrin, isodrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Pesticide manufacturing.
534	Pumphouse/Storage/ SPSA-1a	Pumphouse for chlorinated paraffin plant and also used to store paraffin in storage tanks. Later used in association with hydrochloric acid, Thermal Hex (hexachlorocyclopentadiene), and to store equipment used to support planavin process. It was later used for storage of miscellaneous items and drums used in Cu removal. Benzol and heptane leaks occurred near the building.	HISTORICAL: Heptane, Hg, paraffin, mixed acid, hexane, acetone, benzene, hydrochloric acid, chlorinated paraffin, hexachloro-cyclopentadiene, planavin, Cu, herbicides (bladex) SAMPLING: Dust - PPDDE, atrazine, chlorophenylmethyl sulfone, dieldrin, Cd, Cr, Cu, Pb, Zn, As Structure Matrices[d] - TCLP: Ba, aldrin, dieldrin, benzene, methylene chloride, methylethyl ketone Total Waste Methods: Cr, Zn, Hg, dieldrin	No Future Use, Significant Contamination History	Pesticide manufacturing.
534A	Drum Storage/Field Shop/Office/SPSA-1a	Two storage tanks used for paraffin storage were removed from the site so that Building 534A could be built. Building was used as a drum storage facility with precise contents unavailable in Task 24.	HISTORICAL: Paraffin, herbicides (bladex, planavin) SAMPLING: Dust - Aldrin, atrazine, chlorophenylmethyl sulfone, dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Pesticide manufacturing.
534B	Planavin Manufacturing/SPSA-1a	The building housed nitration process maintenance and pipe fitting equipment for the planavin unit. Acid spills occurred and a puddle was reported containing 65 percent sulfuric acid. Contaminated sump and sewer fumes, and sulfone vent vapors were reported to enter the building. Building operations emitted nitrogen emissions. A heavy bromine vapor, a leak of sulfone, and a leak of dinitro and acid occurred. Shell applied soda ash to a spill of dinitro and mixed acid.	HISTORICAL: Planavin, dinitro, mixed acid, sulfuric acid, sulfone vent vapors, bromine vapors, sewer fumes, nitrogen vapors, soda ash, sulfone, herbicides (bladex), supona SAMPLING: Dust - Atrazine, chloro-phenylmethyl sulfone, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Housed equipment for planavin process. Spill history.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
534C	Emergency Generator/ Electrical Vault/SPSA-1a	The building was used as an electrical vault which housed electrical switch gear.	HISTORICAL: Herbicides (bladex, planavin) SAMPLING: Dust - Aldrin, atrazine, chlorophenylmethyl sulfone, dieldrin, parathion, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Housed electrical gear. No direct chemical processes took place.
534D	Emergency Generator/ SPSA-1a	The building used to house an emergency generator.	SAMPLING: Dust - Dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Generator housing. No direct use or storage of chemicals.
536	Ammunition Demolition Facility/Crude H Storage/SPSA-1a	The building stored liquid crude H in storage tanks. After HD operations, storage tanks were decontaminated with sulfuric acid. Later the building was used to store acid, caustic, and mixed acid (sulfuric and nitric). 155mm, 105mm, and 75mm shells filled with crude H were drained in the building, and oleum (fuming sulfuric acid) was used to decontaminate the shells.	HISTORICAL: Mixed acid (sulfuric and nitrogen acid), oleum, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), sulfuric acid, acid, caustic, L	No Future Use, Agent History	Used for storage of liquid agent.
537	Thaw House/SPSA-1a	The building acted as a thaw house in which levinstein H was purified and "Tret-O-Lite" was added to crude H. The building was also used to recondition ton containers previously filled with H, phosgene, and L, and to demilitarize munitions by extracting agent and pumping the agent into ton containers. The munition shells were dropped into decontamination tanks containing oleum nitric acid. Cyanogen chloride bombs were demilitarized in the building. Equipment was decontaminated with sulfuric acid and caustic following mustard operations. A spill of H was decontaminated with Super Tropical Bleach.	HISTORICAL: HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), Tret-O-Lite, phosgene, L, sulfuric acid, sodium hydroxide, oleum nitric acid, cyanogen chloride, Super Tropical Bleach	No Future Use, Agent History	Used for agent purification.
538	Ton Container Reconditioning Plant/SPSA-1a,1b,1g	The building was used to thermally decontaminate containers which previously contained crude H. Following operations, the facility was decontaminated with sulfuric acid. Building was later used to recondition containers which previously stored mustard, phosgene, and L. Sulfuric acid and caustic were used in the operations. It was also used to demilitarize H bombs and cyanogen chloride bombs. Mustard agent was incinerated in oil fired furnaces and shells were decontaminated in sulfuric and nitric acid. Off-specification hydrazine and HD were burned in the hydrazine furnace. Sodium hydroxide, sulfur dioxide, and hydrogen chloride were used in building operations.	HISTORICAL: HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), hydrazine, sulfuric acid, nitric acid, phosgene, cyanogen chloride, L, GB, sodium hydroxide, sulfur dioxide, hydrogen chloride, oil	No Future Use, Agent History	Used for agent decontamination operations.
538A	Compressor Building/ SPSA-1b,1g	The building acted as a change house where personnel from H bomb demilitarization operations could change clothing and take breaks.	HISTORICAL: HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol)	No Future Use, Other Contamination History	Used as change house. No direct use or storage of chemicals.
539	Electrical Substation Building/SPSA-1a	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
540	Ton Container Renovation Plant/SPSA-1b,1g	The building was used in renovation (chemical neutralization, cleaning, and painting) of ton containers that temporarily stored H. Empty cyanogen chloride bomb casings were cleaned in the building by removing a sodium metaphosphate compound. Empty H shell casings went through several chemical filled vats including chromic acid. Building contained ash residue (primarily of iron carbide, oxides, and sulfur) from operations that occurred in the building. It was also used to vaporize brine from scrubbing effluent and to store brine salt from H demilitarization operations.	HISTORICAL: HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), brine salts, chromic acid, cyanogen chloride, paint, iron carbide, oxides, sulfur, sodium metaphosphate compound, phosgene brine	No Future Use, Agent History	Used for renovation of agent containers.
541	Warehouse/White Phosphorus Filling/ SPSA-1a,1g	Originally a warehouse for L later converted to a white phosphorus filling facility which used a solution of sodium silicate. Building was converted back to a warehouse to store and paint grenades. Phossy water was diverted to a surface drainage ditch north of the building.	HISTORICAL: White phosphorus, L, paint, phossy water, sodium silicate	No Future Use, Agent History	Used for agent storage.
541A	Magazine/SPSA-1g	The building stored GF (o-cyclohexyl methlphosphono-fluoridate) fuses for M15 grenades.	HISTORICAL: GF	No Future Use, Other Contamination History	Used to store fuses and grenades.
542	Drummed Product Storage/ General Storage/SPSA-1a,1g	A storage warehouse for L and white phosphorus complex and Shell-drummed products with precise contents unavailable in Task 24. Fitzsimmons Army Medical Center stored miscellaneous products, including 16 gallons of acetone.	HISTORICAL: White phosphorus, acetone, other historically associated chemicals not available SAMPLING: Dust - aldrin, dieldrin, chlorophenylmethyl sulfone, isodrin, Cd, Cr, Cu, Pb, Zn, As, Hg	No Future Use, Significant Contamination History	Pesticide warehouse.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
543†	Maintenance Shops/Instrument Lab/ SPSA-1g	As a maintenance shop, petroleum products, paints, thinners, and other solvents were utilized. A spill of mercury was reported in 1983 in the instrument lab.	HISTORICAL: Mercury, paints, petroleum products, solvents, thinners SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, DCPD, dieldrin, dithiane, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, supona, thiodiglycol, zinc Subsurface Soil: (2 - 5 ft) 1,1,1-trichloroethane, (5 - 20 ft) benzene, bicycloheptadiene, chloroform, tetrachloroethylene Groundwater: Benzene, bicycloheptadiene, carbon tetrachloride, chlorobenzene, chloroform, ethylbenzene, m-xylene, tetrachloroethylene, toluene, trichloroethylene, xylenes, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethylenes, 1,1,1-trichloroethane, 1,1,2-trichloroethane	No Future Use, Other Contamination History	Maintenance shop, used for storage of various products. Site of mercury spill.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
543A†	Steam Meter Pit/SPSA-1g	In the steam meter station, mercury was used and was reported as spilled in 1975. A Shell survey of this pit indicated that mercury leaked from instruments during steam pressure surges; however, air samples did not indicate any presence of mercury.	HISTORICAL: Mercury SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chlorophenylmethyl sulfide, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, DCPD, dieldrin, dithiane, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, supona, thiodiglycol, zinc Subsurface Soil: (2 - 5 ft) 1,1,1-trichloroethane, (5 - 20 ft) methylene chloride, tetrachloroethylene Groundwater: Benzene, bicycloheptadiene, carbon tetrachloride, chlorobenzene, chloroform, m-xylene, tetrachloroethylene, toluene, trichloroethylene, xylenes, 1,1,1-trichloroethane	No Future Use, Other Contamination History	Steam meter that used mercury.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
543B†	Maintenance/Office/SPSA-1g	In the maintenance shop, chemicals used consisted of petroleum products, paints, thinners, and solvents.	HISTORICAL: Paints, petroleum products, solvents, thinners SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chlorophenylmethyl sulfide, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, DCPD, dieldrin, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, supona, zinc Subsurface Soil: (2 - 5 ft) methylene chloride, 1,1,1-trichloroethane, (5 - 20 ft) benzene, bicycloheptadiene, chloroform, methylene chloride, tetrachloroethylene Groundwater: Benzene, bicycloheptadiene, chloroform, methylene chloride, tetrachloroethylene, 1,1,1-trichloroethane	No Future Use, Other Contamination History	Maintenance shop-stored various chemicals.
544	Heavy Equipment Maintenance Shop/SPSA-1g	The building served as a heavy equipment and maintenance repair shop. It also stored petroleum products, paints, thinners, solvents, degreasers, trichloroethylene, and the following pesticides: Cu acetoarsenite, chlordane, lindane, PPDDT, dieldrin, malathion, diazinon, vapona, naled, carbaryl, propoxur, baygon propoxur, pyrethrum, warfarin, strychnine grain, poison grain, anticoagulant dusting powder, calcium cyanide, diquat, diuron, borate-bromacil mixture, simazine, bordeaux mixture, 2,4,5-T, 2,4-D, sodium 2,2-dichloropropionate, thiram, boric acid, dalapon, endrin, pyrethrins, de-pester, ded-weed, diquate water weed killer, insecticide chlordane, insecticide naled, insecticide strip dichlorovos, 797-A powdered insecticide, pyrethrine, silica gel, aranan, thiram, arsenate of Pb, baygon roach, propoxur, cyanogas, calcium cyanide, herbicide dimethyl tetrachloroterephalate, and Zn phosphide.	HISTORICAL: Petroleum products, paints, thinners, solvents, degreasers, trichloroethylene, kerosene, Cu acetoarsenite, chlordane, lindane, PPDDT, dieldrin, malathion, diazinon, vapona, naled, carbaryl, propoxur, baygon propoxur, pyrethrum, warfarin, strychnine grain, poison grain, anticoagulant dusting powder, calcium cyanide, diquat, diuron, borate-bromacil mixture, simazine, bordeaux mixture, 2,4,5-T, 2,4-D, sodium 2,2-dichloropropionate, thiram, boric acid, dalapon, endrin, pyrethrins, de-pester, ded-weed, diquate water weed killer, insecticide chlordane, insecticide naled, insecticide strip dichlorovos, 797-A powdered insecticide, pyrethrine, silica gel, aranan, thiram, arsenate of Pb, baygon roach, propoxur, cyanogas, calcium cyanide, herbicide dimethyl tetrachloroterephalate, malathion, Zn phosphide	No Future Use, Significant Contamination History	Maintenance shop also used for pesticide and insecticide storage.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
545	Paint Shop/SPSA-1g	Maintenance shop which used petroleum products, paints, thinners, and solvents to paint and clean equipment.	HISTORICAL: Petroleum products, paints, thinners, solvents	No Future Use, Other Contamination History	Maintenance shop used to store various chemicals.
546	Sewage Lift Station/SPSA-1g	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
548	Water Pumping Station/ SPSA-1g	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	No direct use or storage of chemicals.
549	Reservoir and Cooling Tower/SPSA-1g	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	No direct use or storage of chemicals.
550	Lift Station/SPSA-1d,1g	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	No direct use or storage of chemicals.
551	Elevated Storage Tank	No prior chemical use reported.		Future Use, No Potential Exposure	No direct use or storage of chemicals. USFWS long-term-use structure.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
552†	Valve Pit (control station for Building 551, the elevated water storage tank)/SPSA-1g	No prior chemical use reported.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soils (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soils (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chlorophenylmethyl sulfide, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, DCPD, dieldrin, dithiane, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, supona, thiodiglycol, zinc Subsurface Soil: (5 - 20 ft) methylene chloride Groundwater: Benzene, bicycloheptadiene, carbon tetrachloride, chlorobenzene, chloroform, tetrachloroethylene, toluene, trichloroethylene	Future Use, No Potential Exposure	No direct use or storage of chemicals. USFWS long-term-use structure.
553	Vault/SPSA-1g	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
555	Guardhouse/Gas Mask Training/SPSA-1g	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
557	Salvage Yard Storage/Maintenance/ SPSA-2c	The building stored salvage yard equipment with precise contents unavailable in Task 24.	HISTORICAL: Historically associated chemicals not available SAMPLING: Dust - Aldrin, chlorophenylmethyl sulfone, dieldrin	No Future Use, Other Contamination History	Industrial Support Building.
561	Bicyclo[2,2,1]hepta-2,5-diene Unit Control House/SPSA-1a	The building acted as the process unit for bicycloheptadiene and intermediate product used in aldrin production. Chemicals used in production include: cyclopentadiene, hexachlorocyclopentadiene, No. 2 fuel oil, and bicycloheptadiene bottoms. The area around the building was often hydrocarbon soaked and weekly cleaning procedures were implemented.	HISTORICAL: Bicyclopentadiene, cyclopentadiene, acetylene, DCPD, hexachlorocyclopentadiene, bicyclopentadiene bottoms, No. 2 fuel oil, hydrocarbons, aldrin intermediates	No Future Use, Significant Contamination History	Used in pesticide production.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
561A	Acetylene Compressor/ SPSA-1a	The building acted as an acetylene compressor unit. An unknown quantity of Hg spilled near the building.	HISTORICAL: Acetylene, calcium carbide, Hg, bicycloheptadiene, cyclopentadiene	No Future Use, Other Contamination History	Used as acetylene compressor. Mercury spill near building.
571	Vent Gas Burner/SPSA-1a	The building was used to burn and scrub vent gases and waste liquids comprised of acetone, methanol, hexane, chloroform, carbon tetrachloride, methyl chloride, trimethyl phosphite, azodrin, vapona, nudrin. A spill of 50 percent methylisobutyl ketone and other related process impurities occurred.	HISTORICAL: Methylisobutyl ketone, azodrin, nudrin, vapona, methylbutyl ketone, acetaldehyde, natural gas, acetone, methanol, hexane, chloroform, carbon tetrachloride, methyl chloride, trimethyl phosphite SAMPLING: Dust - Dieldrin	No Future Use, Significant Contamination History	Used to burn solvent liquids and pesticides and vent gases. Solvent spill history.
571A	Electrical Vault/SPSA-1a	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
571B	Tank Room/ Hexachlorocyclo-pentadiene Drum Storage/SPSA-1a,1f	A storage tank area for heavy and light organic liquids, drums of hexachlorocyclopentadiene bottoms, acetone washes from the azodrin and vapona production, and recovered chloroform. Building was also used for emergency storage of possible waste of nudrin, DET knockout pots, and azodrin and vapona vent line knockout pots. Spills of hexachlorocyclopentadiene, sulfuryl chloride, and methylisobutyl ketone mixture occurred.	HISTORICAL: Azodrin, hexachloro-cyclopentadiene, heavy and light organic liquids, sulfuryl chloride, methylisobutyl ketone, bleach, azodrin, vapona, acetone, chloroform, nudrin, DET knockout pots SAMPLING: Dust - Aldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Used for tank storage of organic materials and drums of pesticides.
605	Flammable Materials Storehouse/WSA	The building stored cylinders of compressed gases such as nitrogen, oxygen, and acetylene and flammable material.	HISTORICAL: Gas cylinders of nitrogen, oxygen, acetylene, flammable material	No Future Use, Other Contamination History	Used for storage of flammable gases.
606	Flammable Materials Storehouse/WSA	The building stored gas cylinders of compressed gases such as nitrogen, oxygen, acetylene, and empty gas cylinders.	HISTORICAL: Gas cylinders of nitrogen, oxygen, acetylene	No Future Use, Other Contamination History	Used for storage of flammable gases.
607	Flammable Materials Storehouse/WSA	The building stored flammable materials and cylinders of compressed gas such as nitrogen, oxygen, and acetylene.	HISTORICAL: Flammable materials, gas cylinders of nitrogen, oxygen, acetylene	No Future Use, Other Contamination History	Used for storage of flammable gases.
608	Flammable Materials Storehouse/WSA	The building stored flammable materials and cylinders of compressed gas such as nitrogen, oxygen, and acetylene.	HISTORICAL: Gas cylinders of nitrogen, oxygen, acetylene	No Future Use, Other Contamination History	Used for storage of flammable gases.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
611	Data Processing Building Logistics Area Administration/ WSA	No prior chemical use reported.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc	No Future Use, Other Contamination History	Industrial Support Building.
612	Courier Building Logistics Area Administration/ WSA	The building was originally constructed as an infirmary. Although unspecified chemicals were used for blood and urine analyses and wash water from X-ray processing were reported in Task 24, no further information was given.	HISTORICAL: Unspecified chemical used for blood and urine analysis, X-ray chemicals SAMPLING: Surficial Soil (0 - 2 in): PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Air: Mercury, chromium, toluene, copper, zinc Dust/Vacuum: Cadmium, chromium, copper, lead, zinc, toluene, mercury	No Future Use, Other Contamination History	Used for laboratory analytical processes.
613	Management Information/ Data Processing Logistics Area Administration/ WSA	No prior chemical use reported.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chromium, copper, PPDDE, PPDDT, dieldrin, endrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc	No Future Use, Other Contamination History	Industrial Support Building.
614	Warehouse/WSA-7a	The building stored materials such as solvents, paints, oils, thinners, and possibly trichloroethylene.	HISTORICAL: Solvents, paints, thinners, trichloroethylene, oils	No Future Use, Other Contamination History	Used for storage of solvents.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
615	Warehouse/WSA-7a	The building stored solvent, paints, oils, and railroad box cars. Later, NOAA stored nontoxic, nonhazardous, nonflammable materials and equipment.	HISTORICAL: Solvents, paints, oils	No Future Use, Other Contamination History	Used for storage of solvents, toxic, and nontoxic materials.
616	Warehouse/WSA	The building stored bulk quantities of pesticides and other material including paint, thinners, solvents, oxygen gas cylinders, acetylene gas cylinders, PPDDT, granular polyvinyl alcohol, laboratory reagents, ether, acetone, RTV[3], DB-3[3], sodium carbonate, tetrachloroethylene, methanol, xylol, and toluene.	HISTORICAL: Pesticides, paint, solvents, thinners, gas cylinders - acetylene and oxygen, PPDDT, polyvinyl alcohol, laboratory reagents, ether, acetone, RTV, DB-3, sodium carbonate, tetrachloroethylene, methanol, xylol, toluene Structure Matrices[d] - TCLP: Ba, methylene chloride, toluene, methoxychlor Total Waste Methods: Cr, Pb, Zn, methylene chloride, toluene, hexachlorobenzene, tetrachloroethene	No Future Use, Significant Contamination History	Used to store solvents, pesticides, various chemicals.
617	Warehouse/WSA	The building stored solvents, paints, oils, equipment, and field survey material. It also was used as a cold storage warehouse with precise contents unavailable in Task 24.	HISTORICAL: Solvents, paints, oils, other historically associated chemicals unavailable	No Future Use, Other Contamination History	Used for storage of solvents.
618†	Warehouse/WSA	The warehouse stored a variety of contaminated drums (unknown contents), various chemicals containing chlorinated lime, supertropical bleach, calcium hypochlorite, and pesticides such as Bordeaux mixture, boric acid, Caw Caw Rope-bird repellent, DED-Weed, Dowpon-dalapon, herbicide 2,4-D, insecticide diazinon, insecticide lindane, insecticide naled concentrate, poison grain strychnine, Torodon 101 mixture-picloram, and Wilco Ground Squirrel Bait chlorophacinon. PCBs may also be present in electrical transformers.	HISTORICAL: Bleach, Bordeaux mixture - copper 12.75 percent, boric acid, calcium hypochlorite, chlorinated lime, Caw Caw Rope-bird repellent, DED-Weed (2,4-D; 2,4, 5-T), diazinon 2 percent, Dowpon-dalapon 85 percent, herbicide 2,4-D 50 percent, lindane, naled concentrate, PCBs, poison grain strychnine 0.5 percent, Torodon 101 mixture-picloram 39 percent, Wilco Ground Squirrel Bait chlorophacinon 0.5, pesticides SAMPLING: Surficial Soil (0 - 2 in): PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc	Future Use, No Potential Exposure	Facility operations warehouse.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
619†	Warehouse/WSA	The building was used for storage with precise contents unavailable in Task 24.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Aldrin, cadmium, chromium, copper, PPDDT, DBCP, dieldrin, endrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (2 - 5 ft, 5 - 20 ft), (> 20 ft) methylene chloride Groundwater: Benzene, chlorobenzene, chloroform, toluene, trichloroethylene	Future Use, No Potential Exposure	Facility operation warehouse. USFWS long-term-use structure
621†	Property Disposal/Surplus-Salvage Office/WSA	Chemical wastes stored in the building included paints, thinners, lacquers, chemical solvents, and industrial chemicals. Transformers and decontaminated hardware from chemical agent production facilities were also stored here. Defense Property Disposal Office used building for storage of nontoxic, nonhazardous, and nonflammable material.	HISTORICAL: Industrial chemicals, lacquers, paints, solvents, thinner SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chromium, copper, PPDDT, dieldrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc	No Future Use, Other Contamination History	Used for storage of solvents and other chemical wastes.
621A†	Truck Scale Platform/WSA	Reportedly weighed trucks carrying substances such as hydrazine; no other information was provided in Task 24.	HISTORICAL: Hydrazine, N-nitrosodimethylamine, N-nitrosodi-n-propylamine, other historically associated chemicals not available SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chromium, copper, PPDDT, dieldrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc	No Future Use, Other Contamination History	Truck scale-no associated chemical processes.
622	Paint Shop/ General Storage/WSA	The building was used as a paint shop and to store equipment, nontoxic nonhazardous supplies, solvents, and possible pesticides and insecticides. Precise contents unavailable in Task 24.	HISTORICAL: Solvents, paints, may have contained pesticides and insecticides	No Future Use, Other Contamination History	Used for storage of chemicals.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
623	Carpenter Shop/Hobby and Auto Shop/WSA	The building was used as an engineer maintenance building, hobby shop, automobile garage, and storage facility.	HISTORICAL: Oil, grease	No Future Use, Other Contamination History	Industrial Support Building.
624†	Repair/Salvage/Surplus Facility/WSA-6d	The facility was used for cleaning, repairing, and refurbishing field equipment. Grease, paint, and rust stripping was done here using oakite and turko. Painting and phosphatizing (phosphonic acid) of equipment was also conducted. Additional chemicals used in the shop were organochlorine degreaser solvents, thinners, solvents, gear oil, paint strippers, rust inhibitors and removers, lubricating oil, grease, and other petroleum products. Defense Logistics Agency stored nontoxic, nonhazardous, and nonflammable materials in building. Spills of trichloroethane, trichloroethylene, phosphate, and cold solvent No.1600A occurred. A truck driver was burned by contaminated rubber gloves in building. The injury reports states the burns were possibly due to H; however, no information could be found on the source or true nature of the contaminant.	HISTORICAL: Cold solvent No. 1600A, gear oil, grease, lubricating oil, oakite, organochlorine degreaser solvents, paints, paint strippers, petroleum products, phosphate, phosphonic acid, rust removers, solvents, thinners, trichloroethane, turko SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (2 - 5 ft) trichloroethylene, (5 - 20 ft) methylene chloride, tetrachloroethylene Groundwater: Benzene, chloroform, trichloroethylene, 1,2-dichloroethylenes, 1,1,2-trichloroethane	No Future Use, Significant Contamination History	Used for refurbishing field equipment. Solvent use and spill history.
625†	Warehouse/WSA-6a	The warehouse was used for storage of paint, solvents, thinners, and acids. Later the building was used for storage of nontoxic, nonhazardous, and nonflammable materials.	HISTORICAL: Acids, paints, solvents, thinners SAMPLING: Surficial Soil (0 - 2 in): PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Arsenic, cadmium, chlordane, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (2 - 5 ft) trichloroethylene, (> 20 ft) tetrachloroethylene Groundwater: Benzene, chloroform, trichloroethylene, 1,2-dichloroethylenes, 1,1,2-trichloroethane	No Future Use, Other Contamination History	Used for storage of solvents and acids.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
626	Machine and Welding Shop/ WSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
626C	Heavy Equipment Shop/WSA	The building was used as a heavy equipment service facility, a facilities shop, a post engineer shop, and an oil house. No information was found concerning any leaks or spills within the facility.	HISTORICAL: Oil, grease	No Future Use, Other Contamination History	Industrial Support Building.
627†	Vehicle Maintenance Shop/Storehouse/WSA	The Maintenance Shop was used for repair, painting, cleaning, and maintenance of U.S. Army (Army) vehicles and equipment and contained an underground waste oil tank and degreasing agents. By early 1985, the use of degreasing agents in the wash bay was halted. Samples from the maintenance shop drainage ditch for water and sludge contained penetone-superlode, butoxy ethanol, trime benzene, trime phenol, nonyl phenols, substituted naphthalenes, and probable tridecane.	HISTORICAL: Butoxy ethanol, degreasers, nonyl phenols, paint, penetone-superlode, substituted naphthalenes, tridecane, trime benzene, trime phenols, waste oil SAMPLING: Surficial Soil (0 - 2 in): PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Arsenic, atrazine, cadmium, chlordane, chromium, copper, PPDDE, PPDDT, DBCP, dieldrin, endrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (0 - 2 ft) toluene, (2 - 5 ft) ethyl benzene, methylene chloride, *m*-xylenes, toluene, (5 - 20 ft) tetrachloroethylene Groundwater: Benzene, carbon tetrachloride, chlorobenzene, chloroform, tetrachloroethylene, toluene, trichloroethylene, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethylenes, 1,1,1-trichloroethane, 1,1,2-trichloroethane	No Future Use, Significant Contamination History	Used to repair and clean field vehicles. Underground oil tank. Presence of various chemicals.
627B	Flammable Materials Storehouse/WSA-6a	The building stored pesticides, herbicides, paint, and flammable material.	HISTORICAL: Paints, pesticides, herbicides, flammable materials	No Future Use, Other Contamination History	Used to store pesticides, herbicides, and flammable materials.
629	Service Station/WSA	Prior to 1954 may have been used as a pesticides control building. The building was a service station which has had several spills of diesel gasoline and regular gasoline. One spill was covered with a substance called ATCAFF[3]; however, no details are in Task 24 regarding ATCAFF[3]. A kerosene pump was possibly installed.	HISTORICAL: Gasoline, kerosene, diesel, ATCAFF	No Future Use, Other Contamination History	Service station-diesel and regular fuels.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
629E	Service Station Shelter/WSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
630†	Gas Meter House/WSA	The building was a natural gas metering and regulating station.	HISTORICAL: Natural gas SAMPLING: Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chromium, copper, PPDDT, dieldrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc	No Future Use, Other Contamination History	Industrial Support Building.
631†	Railcar Maintenance/ Roundhouse (Railroad Car Engine Shop)/WSA-6c,6d	Building used for maintenance, repair, cleaning, and storage of locomotives and railcars. Some solvents possibly were used in the cleaning and repair of locomotives and railcars, and the liquid wastes were discharged to a ditch east of the facility. Around 1955 the building may have been used as a rodent control building.	HISTORICAL: Solvents SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chromium, copper, DBCP, PPDDE, PPDDT, dieldrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (2 - 5 ft) trichloroethylene, (5 - 20 ft) methylene chloride, tetrachloroethylene Groundwater: Benzene, chloroform, trichloroethylene, 1,2-dichloroethylene, 1,1,2-trichloroethane	No Future Use, Significant Contamination History	Solvent usage, however, wastes were drained elsewhere.
631A	Flammable Materials Storehouse/WSA-6c	The building stored paint, oil, parts for diesel engine facility, flammable materials, cleaning solvents, and paint thinners.	HISTORICAL: Paint, oil, cleaning solvents, paint thinner, flammable material, acid	No Future Use, Other Contamination History	Used for storage of paints, solvents, and thinners.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
632†	Gas-Fired Heating Plant/WSA	The plant at one time had coal and fired boiler heat but was converted to accommodate natural gas and fuel oil heat. There is also an underground storage tank containing diesel fuel and fuel oil.	HISTORICAL: Coal, diesel fuel, fuel oil, natural gas SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chromium, copper, PPDDE, PPDDT, dieldrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc	No Future Use, Other Contamination History	Industrial Support Building.
633	Cafeteria/Bug Laboratory/ Movie Theater/WSA	The building was initially used as a laboratory to test insecticides and later stored semi-hazardous materials such as paints and thinners.	HISTORICAL: Insecticides, paints, thinners	No Future Use, Other Contamination History	Used as test laboratory for insecticides.
633A	Laboratory/Storehouse/WSA	The building was used as part of an insecticide testing laboratory. It was later used to store semi-hazardous materials such as paints and thinners.	HISTORICAL: Insecticides, paints, thinners, acid	No Future Use, Other Contamination History	Used as test laboratory for insecticides.
633B†	Hazardous Material Storage/ WSA	The building was originally used as a pathology laboratory and greenhouse. Task 24 does not describe any chemicals used in the laboratory. The building was later used for storage of paints, solvents, thinners, and acids.	HISTORICAL: Acids, laboratory chemicals, paints, solvents, thinners SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chromium, copper, PPDDT, dieldrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc	No Future Use, Other Contamination History	Historical laboratory use-then storage of flammable materials.
634†	Flammable Materials Storehouse/WSA	The building was originally equipped with oil dispensing and storage tanks and was later used for storage of paint, alcohol, ether, and chloroform.	HISTORICAL: Alcohol, chloroform, ether, oil, paints SAMPLING: Surficial Soil (0 -2 in): Aldrin, PPDDT, dieldrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chromium, copper, PPDDE, PPDDT, dieldrin, fluoranthene, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc	No Future Use, Other Contamination History	Used for storage of flammable materials.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
635	Administration Offices/ Rocky Mountain Railcar/WSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
639	Lumber Storage/WSA	No prior chemical use reported. Used for storage of lumber and building materials.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
641	Warehouse/WSA	Initially the building was used to store cable, wire, poles, and communication supplies. Later it was used as a magazine. The building was then used as a warehouse with precise contents unavailable in Task 24.	HISTORICAL: Historically associated chemicals not available	No Future Use, Other Contamination History	Warehouse foundation only. No chemical manufacturing process.
643	Flammable Materials Storehouse/WSA	The building was used to store small arms ammunition, PPDDT, DED-Weed, a rodenticide, wilco ground squirrel bait, diazinon insecticide, Tordon 101 mixture, bordeaux mixture, aldrin insecticide, and herbicide 2,4-D[3]; and repackage metal drums containing 85 percent naled.	HISTORICAL: PPDDT, naled, wilco ground squirrel bait, aldrin, DED-Weed, diazinon, Tordon 10i mixture, bordeaux mixture, herbicide 2,4-D	No Future Use, Significant Contamination History	Used to store ammunition and pesticides.
644	Noncommissioned Officers' Quarters/WSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
644A	Garage/Storage/WSA	The building was used as a noncommissioned officers' garage and storage shed with precise contents unavailable in Task 24.	HISTORICAL: Historically associated chemicals not available	No Future Use, Other Contamination History	Industrial Support Building.
646	Rodent Control Building/WSA	The building was used for storage and mixing of pesticides and herbicides with precise contents unavailable in Task 24.	HISTORICAL: Pesticides, herbicides	No Future Use, Significant Contamination History	Used to store pesticides and herbicides.
647A	Motor Pool Dispatch Office/ WSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
647B	Motor Pool Vehicle Storage/WSA-7a	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
647C	Motor Pool Vehicle Storage/WSA-7a	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
647D	Motor Pool Vehicle Storage/WSA-6a	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
648	Road Oil Pump and Boiler House/WSA-6a	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
670	Remediation Use Structure			No Future Use, Other Contamination History	Industrial Support Building.
673†	Railroad Scale House/ WSA-1c	The building stored nontoxic, nonhazardous, nonmilitary boxcars. Other materials stored are unavailable in Task 24.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Dieldrin, fluoranthene, methyl naphthalenes, phenanthrene, pyrene Subsurface Soil: (2 - 5 ft, 5 - 20 ft, > 20 ft) methylene chloride	No Future Use, Other Contamination History	Industrial Support Building.
679	Warehouse/Can Scouring/off-post, south of WSA	The building was used to dispose sanitary waste from chemical toilets and to wash and disinfected containers; precise chemicals used unavailable in Task 24.	HISTORICAL: Sanitary wastes from chemical toilets	No Future Use, Other Contamination History	Used for disposal of sanitary wastes.
680	Radio Range B/WSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
684	Guard Tower - east of 644, north of 675/WSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
685	Guard Tower - southeast of 673/WSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
688	Guard Tower - east of 615/ WSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
702	Bald Eagle Observation Platform			Future Use, No Potential Exposure	No direct use or storage of chemicals. USFWS long-term-use structure.
724	Incinerator/Electrostatic Precipitator/SPSA-1g	The building was used to incinerate effluent from the Denver Effluent Treatment Plant, and treated liquid effluent with sulfuric acid. By-products included carbon monoxide and salts.	HISTORICAL: Denver Effluent Treatment wastes could include the same compounds listed for Building 502, PCBs SAMPLING: Dust - Chlorophenylmethyl sulfone, dieldrin, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Significant Contamination History	Used as pesticide production effluent incinerator.
725	Bomb Testing Station/ CSA-2a	The building was used as a testing structure for bombs including M69, incendiary bomblets, M13 and M19 clusters, goop, M74 incendiary bomblets, E48 clusters, M50 incendiary bomblets, M17A1 clusters, M139 GB bomblets, and numerous other types of munitions. It was also used for detonation of munitions including white phosphorus grenades. It stored various conventional and chemical agent[1] munitions. Leaks from GB-filled E139 Lance Warhead bomblets occurred.	HISTORICAL: White phosphorus, napalm, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), goop, chemical agent	No Future Use, Agent History	Used for testing and storage of agent munitions.
726	Bomb Testing Building/ CSA-2a,4	Test building for sandwich button bombs (red phosphorus and potassium chlorate) loaded in freon filled canisters. Also possibly conducted vibration testing on agent-filled munitions. H agent detected in the building.	HISTORICAL: HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), VX, freon, red phosphorus, potassium chlorate	No Future Use, Agent History	Used for agent munitions testing.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
727†	Facilities Maintenance/ SPSA-1b	The building was used to house electrical, automotive, and carpenter shops. Any chemical use in this building is not described in Task 24.	HISTORICAL: Other historically associated chemicals not available SAMPLING: Dust: Dieldrin Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chloroacetic acid, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, DCPD, dieldrin, dithiane, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, supona, thiodiglycol, zinc Subsurface Soil: (2 - 5 ft) tetrachloroethylene, 1,1,1-trichloroethane Groundwater: Benzene, carbon tetrachloride, chlorobenzene, chloroform, m-xylene, tetrachloroethylene, toluene, trichloroethylene, xylenes, 1,1,1-trichloroethane	No Future Use, Other Contamination History	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
728†	Dichlorodiethyl Sulfide Filling/Pesticide Storage/Warehouse/SPSA-1g	The warehouse was used for storage of 105 mm shells and sandwich button bomb wooden kits and pesticides such as pydrin, azodrin, and planavin. Building was used to recover mustard from containers.	HISTORICAL: Azodrin, magnesium oxide, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), pesticides, planavin, potassium chlorate, pydrin, red phosphorous, silica, silica gel SAMPLING: Dust: Aldrin, arsenic, cadmium, chlordane, chlorophenylmethyl sulfone, chromium, copper, DBCP, PPDDT, dieldrin, endrin, lead Surficial Soil (0 - 2 in): Aldrin, chlordane, PPDDE, PPDDT, dieldrin, endrin, hexachlorocyclopentadiene, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chloroacetic acid, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, DCPD, dieldrin, dithiane, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, thiodiglycol, zinc Subsurface Soil: (2 - 5 ft) tetrachloroethylene, 1,1,1-trichloroethane Groundwater: Benzene, carbon tetrachloride, chlorobenzene, chloroform, tetrachloroethylene, toluene, trichloroethylene, xylenes, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethane, 1,2-dichloroethylenes, 1,1,1-trichloroethane	No Future Use, Agent History	Used for agent munitions kit storage.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
729†	General Purpose Warehouse/SPSA-1g	The warehouse was used to store miscellaneous equipment and office supplies. Specific use of cupric sulfate and sodium nitrate are not described in Task 24.	HISTORICAL: Cupric sulfate, sodium nitrate SAMPLING: Dust: Arsenic, cadmium, chromium, copper, lead, zinc Surficial Soil (0 - 2 in): Aldrin, chlordane, PPDDE, PPDDT, dieldrin, endrin, hexachlorocyclopentadiene, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chlorophenylmethyl sulfoxide, chromium, copper, PPDDE, PPDDT, DBCP, DCPD, dieldrin, dithiane, endrin, fluoranthene, hexachlorocyclopentadiene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, thiodiglycol, zinc Subsurface Soil: (2 - 5 ft) tetrachloroethylene, 1,1,1-trichloroethane Groundwater: Benzene, carbon tetrachloride, chlorobenzene, chloroform, tetrachloroethylene, trichloroethylene, 1,1,1-trichloroethane	No Future Use, Other Contamination History	Used as general warehouse. No direct chemical processes.
731	Reserve Center/Office/ Change House/SPSA-5b	The building was used as a fifth echelon repair shop, and training and meeting facility. It later stored equipment such as earth movers, tractors, graders, and cranes.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
732	Army Reserve Warehouse/ M19 Bombs Reworked/ SPSA-5b	The building was used to paint, rework, and/or disassemble M19 (napalm, white phosphorus) incendiary clusters, M69 (white phosphorus) bomblets, and M25 casing adapters (M31 cluster). Installation of a white phosphorus shell-filling line was initiated but never completed. The building was later used for storage of equipment and supplies. NOAA stored equipment and supplies for a research laboratory, but specified no flammable, toxic, or dangerous materials were stored. In 1983, oil filled capacitors, transformers, photographic chemicals, and reactants were stored in the building. The building also stored black powder and magnesium.	HISTORICAL: White phosphorus, napalm, black powder, magnesium, oil, photographic chemicals, paint	No Future Use, Other Contamination History	Used for processing munitions, storage of supplies, black powder and magnesium.
733A	Magazine/SPSA-5b	The building stored picric acid, black powder, metal and plastic adapter sleeves, arming wire assemblies, and M108 fuse seats, and was used as magazine for M19 incendiary bomb operations.	HISTORICAL: Picric acid, black powder, napalm, white phosphorus, fuses	No Future Use, Other Contamination History	Used to store chemicals from bomb operations.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
733B	Magazine/SPSA-5b	The building stored signal flares, smoke grenades, and small arms ammunition, and was used as a magazine for M19 incendiary bomb operations.	HISTORICAL: Napalm, white phosphorus	No Future Use, Other Contamination History	Used to store munitions assembly items.
733C	Magazine/SPSA-5b	The building stored bleach and was used as a magazine for M19 incendiary bomb operations.	HISTORICAL: Napalm, bleach, white phosphorus	No Future Use, Other Contamination History	Used to store munitions items.
733D	Magazine/SPSA-5b	The building stored bleach, small arms ammunition, and was used as a magazine for M19 incendiary bomb operations.	HISTORICAL: Napalm, bleach, white phosphorus	No Future Use, Other Contamination History	Used to store munitions items.
733E	General Purpose Magazine/SPSA-5b	The building stored bleach and was used as magazine for M19 incendiary bomb operations.	HISTORICAL: Napalm, bleach, white phosphorus	No Future Use, Other Contamination History	Used to store munitions items.
733F	General Purpose Magazine/SPSA-6	The building stored bleach, grenades, small arms; also used as a magazine for M19 incendiary bomb operations. Later used by the Reserves Fort Carson Medical Detach with precise contents unavailable in Task 24.	HISTORICAL: Napalm, bleach, white phosphorus, other historically associated chemicals not available	No Future Use, Other Contamination History	Used to store munitions items.
735	Foamite/Oil Product Storage/SPSA-5b	The building was used as a foamite storage facility.	HISTORICAL: Foamite, oil products, alcofoam SAMPLING: Dust - Aldrin, dieldrin, chlorophenylmethyl sulfone	No Future Use, Other Contamination History	Used to store foam products.
741	Refrigeration Building/ SPSA-1g,5b	The building was part of the incendiary oil bomb plant which manufactured and stored napalm and bombs. Used gasoline, benzene, napalm powder, napalm gel, and nitrogen in production. Also used hoist mechanism equipment previously used to lift thionyl chloride drums in the L plant; and compressor condenser and evaporator system from the thionyl chloride plant. The building was possibly used to manufacture and package sodium hypochlorite and renovate M70 HD-filled bombs. Later used as a processing plant in the development and later demilitarization of the microbiological anticrop agent wheat rust which used nitrogen, ethylene oxide, Freon 12, jet fuel, and carboxide gas. A small spill of wheat rust was decontaminated by paraformaldehyde fumigation. Later used as soils and biological specimen laboratory. Building contains possible Basin A dust (contaminants found in the dust include aldrin, dieldrin, endrin, isodrin, PPDDT, Cu, and As). The building sump contained DCPD, pesticides such as aldrin, dieldrin, endrin, isodrin, DBCP, and heavy metals. The building was also used as a battery charging facility.	HISTORICAL: Napalm, wheat rust, aldrin, dieldrin, endrin, isodrin, As, DCPD, benzene, sulfuric acid, gasoline, ammonia, sodium hypochloride, ethylene oxide, Freon 12, paraformaldehyde, DBCP, carboxide gas, nitrogen, thionyl chloride, jet fuel, PPDDT, Basin A dust, heavy metals (Cd, Cr, Cu, Pb, Zn, Hg), Freon (22) SAMPLING: Liquid - Chloroform, methylene chloride, toluene, nontarget compounds	No Future Use, Significant Contamination History	Used for incendiary bomb assembly, pesticide processing, and battery charging operations.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
742†	Warehouse/SPSA-1g,5a,5b	The warehouse was used for M47 incendiary bomb production and contains napalm and gasoline, clean empty bombs, and paint-filled bombs. The Army used the warehouse to fill 105 mm shells with HD. The Air Force stored Titan Missiles in the warehouse; precise contents unavailable in Task 24. Pesticides, insecticides, herbicides, and naled were also stored here. Drums of wheat rust were emptied and decontaminated with paraformaldehyde. Herbicides were also mixed here.	HISTORICAL: Gasoline, herbicides, insecticides, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), naled, napalm, paint, paraformaldehyde, pesticides, wheat rust, other historically associated chemicals not available SAMPLING: Surficial Soil (0 - 2 in): Aldrin, chlordane, PPDDE, PPDDT, dieldrin, endrin, hexachlorocyclopentadiene, isodrin Surficial Soil 0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, chromium, copper, PPDDE, PPDDT, DBCP, DCPD, dieldrin, dithiane, endrin, fluoranthene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, thiodiglycol, zinc Subsurface Soil: (2 - 5 ft) methylene chloride, methyl isobutyl ketone, 1,1,1-trichloroethane, (5 - 20 ft) ethyl benzene, toluene, trichloroethylene Groundwater: Benzene, carbon tetrachloride, chlorobenzene, chloroform, m-xylene, tetrachloroethylene, toluene, trichloroethylene, xylenes, 1,1,1-trichloroethane	No Future Use, Agent History	Used for bomb production and storage of agent-filled shells. Also used for pesticide and herbicide storage.
742A	Tank House/SPSA-5b	The building was used as a tank storage house for HD and was decontaminated with mixed acids, sodium hydroxide, and fuel oil. Spills of HD and mixed acid occurred.	HISTORICAL: HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), mixed acid, sodium hydroxide, fuel oil	No Future Use, Agent History	Used for agent storage.
743	Rocky Mountain Arsenal Laboratory/Change House/ Office/SPSA-1g,5b	The building acted as an office, laboratory, and supply room for M47 incendiary oil bombs and used gasoline, benzol, and napalm. Also used as a change house for H operations.	HISTORICAL: Gasoline, benzene, napalm, chloroform, carbon tetrachloride, formaldehyde, Cd, As, dimethyl sulfate, DBCP, beryllium	No Future Use, Other Contamination History	Used as a multiuse building, fuel supply, laboratory, and changehouse.
743A	Chemical Sewer Lift Station for Buildings 741, 742, and 743/SPSA-1g	The building was constructed as a sewage pumping system. Specific use as a chemical lift station for Buildings 741, 742 (Future Use Structure), and 743 is not described in Task 24.	HISTORICAL: Chemicals associated with Buildings 741, 742, 743	No Future Use, Other Contamination History	Used as a sewage pumping unit. Possible chemicals include pesticides, and metals.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
744	Gasoline/Benzol Pumphouse/SPSA-5b	The building acted as a pump house for the incendiary oil bomb plant which delivered gasoline and benzol to plant. Later used by Shell to store DCPD.	HISTORICAL: Gasoline, benzene, DCPD SAMPLING: Dust - DCPD, Cd, Cr, Cu, Pb, Zn, As	No Future Use, Other Contamination History	Used as pumphouse and DCPD storage.
745	Fire Fighting Manifolds for 745 A, B, and C/SPSA-5b	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
746	Gasoline Unloading Rack/ SPSA-5b	The building was used to unload gasoline shipments and possibly by Shell in DCPD operations. A spill of diesel fuel occurred near building.	HISTORICAL: Gasoline, diesel fuel, DCPD	No Future Use, Other Contamination History	Used for fuel unloading, no direct chemical processes.
748	Flammable Materials Storehouse/SPSA-1g	The building stored oil, paint, lacquer, thinner, and other flammables. Possibly used in the M47 Incendiary Oil Bomb Filling Plant for storage of paint and other contents (not described in Task 24).	HISTORICAL: Oil, paint, lacquer, thinner, flammable material, other historically associated chemicals not available	No Future Use, Other Contamination History	Used to store flammable materials.
751	Paint and Process Shop/SPSA-5b	The building was initially used for storage of bombs manufactured in the Incendiary Oil Bomb Plant. Later used for heavy equipment renovation which included cleaning and preparing heavy machinery for storage. The building contained two tanks for degreasing and paint stripping. Oakite was generally used in the tanks, although chloroethene stoddard and strippant panther were also used. Additional chemical materials used in the building include organochlorine degreaser solvents, paint strippers such as Turco, rust removers, paints, thinners, solvents, rust inhibitors, gear oil, lubricating oil, grease, and other petroleum products.	HISTORICAL: Oakite, chloroethene stoddard, panther, organochlorine degreasing solvents, paint strippers, Turco, rust removers, paints, thinners, solvents, gear oil, rust inhibitors, lubricating oil, grease, petroleum products, chloride	No Future Use, Other Contamination History	Used for bomb and solvent tank storage. Miscellaneous other flammables.
752	Carpenter Shop/Storage/ SPSA-5b, 9b	The building stored miscellaneous equipment and manufacturing supplies with precise contents unavailable in Task 24.	HISTORICAL: Historically associated chemicals not available	No Future Use, Other Contamination History	Storage building and carpenter shop. No chemical manufacturing process activities.
752A	Lumber Storage/SPSA-5b, 9b	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
753	Steam Filter Maintenance/Storage/ SPSA-5b	The building was used to store paint. Later used as steam fitting shop; maintenance shop for miscellaneous storage with precise contents unavailable in Task 24.	HISTORICAL: Herbicides, pesticides, paint, other associated chemicals not available	No Future Use, Other Contamination History	Used to store paint. No direct use or storage of additional chemicals.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
765	Remediation Use Structure/SPSA-6			No Future Use, Other Contamination History	Industrial Support Building.
784	Guard Station - southeast of 742/SPSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
785	Warehouse/ Remediation Storage/ESA	The warehouse stored various items such as GB-filled bombs (nine leaking bombs were removed), GB-filled T-77 (two leaking shells removed) and T-173 shells, sodium hydroxide, GB salts, Chemical Agent Identification Set (CAIS) salts, CAIS, salt dryer residue, quench-EP salt drums, phosgene scrubber packing material, H salt, arsenic, PPDDT residue, salt-ammo, dry caustic cleanup, M34 salt, methylene chlorite, herbicides, para-formaldehyde, antifreeze, and drums containing contaminated water, soil, and clothing. The building was decontaminated with a high pressure water and detergent solution and was certified as nonhazardous.	HISTORICAL: Antifreeze, arsenic, bleach, bleach detergent solution, CAIS, CAIS salts, calcium hypochlorite, chlorinated lime, PPDDT, EP salts, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), herbicides, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), HD salts, methylene chlorite, M34 GB salts, Oxy Borocil IV pesticides, paraformaldehyde, phosgene, residue, salt-ammo, sodium carbonate, sodium hydroxide, weteye salt SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Aldrin, cadmium, chlordane, PPDDE, PPDDT, dieldrin, endrin, isodrin, lead, mercury, zinc Groundwater: Benzene, chlorobenzene, chloroform, tetrachloroethylene	No Future Use, Agent History	Used for storage of agent-filled bombs and pesticides. Building has been decontaminated and is currently certified as nonhazardous.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
786†	Warehouse/ESA	The warehouse stored chemical munitions, torpedo propellant, GB salt from M31 and thionyl chloride (TC) drain, HJ salt, M34 GB salt and H salt The building was decontaminated with a high pressure water and detergent solution and was certified as nonhazardous.	HISTORICAL: Chemical munitions, detergent solution, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), HJ salts, hydrogen salts, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), HD salts, M31 salts, M34 GB salts,torpedo propellant SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Aldrin, PPDDT, dieldrin, endrin, mercury	No Future Use, Agent History	Used for storage of agent and munitions. Building has been decontaminated and is currently certified as nonhazardous.
787†	Warehouse/ESA	H and GB salts, M34 salt, TC salts, and drums of "hazardous waste," precise contents unavailable in Task 24. The building was decontaminated with a high pressure water and detergent solution and was certified as nonhazardous.	HISTORICAL: Detergent solution, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), HD salts, M34 GB salts, TC salts, unspecified hazardous waste drums SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, PPDDT, dieldrin, endrin, isodrin	No Future Use, Other Contamination History	Warehouse for agent salts and unknown chemicals. Building has been decontaminated and is currently certified as nonhazardous.
788†	Warehouse/ESA	The warehouse stored GB munitions, M78 and M79, phosgene bombs, M34 white phosphorous grenades, wet and dry HD salts (three leaking drums removed), H salts contaminated with arsenic and decontaminated GB or phosgene ton containers. Phosgene was drained from bombs pressurized with nitrogen gas and transferred into ton containers. Soil samples taken near perimeter of building contained lead. The building was decontaminated with a high pressure water and detergent solution and was certified as nonhazardous.	HISTORICAL: Arsenic, detergent solution, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), lead, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), M34, phosgene, white phosphorous SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, chromium, copper, PPDDT, dieldrin, endrin, isodrin, lead, zinc	No Future Use, Agent History	Used for storage of agent munitions. Building has been decontaminated and is currently certified as nonhazardous.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
791†	Warehouse/ESA	The warehouse stored drums of GB-filled ton containers or munitions, unspecified salts, H salts (three leaking drums removed), H salts contaminated with arsenic, and miscellaneous storage. The building was decontaminated with a high pressure water and detergent solution and was certified as nonhazardous.	HISTORICAL: Arsenic, detergent solutions, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), sodium bicarbonate, sodium chloride, sodium fluoride, sodium sulfate, sodium sulfite, unspecified salts SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, PPDDT, dieldrin, endrin, isodrin	No Future Use, Agent History	Used for storage of agent and munitions. Building has been decontaminated and is currently certified as nonhazardous.
792†	Drum Storage Warehouse/ ESA	The warehouse stored GB-filled ton containers or munitions, XM40 sandwich button bombs stored in freon, and nonhazardous, nontoxic nonexplosive materials.	HISTORICAL: Freon, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), magnesium oxide, potassium chlorate, red phosphorous, silica, silica gel SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Aldrin, PPDDT, dieldrin, endrin	No Future Use, Agent History	Used for storage of agent, munitions, agent, and additional nonhazardous materials.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
793†	Drum Storage Warehouse/ ESA	The warehouse stored GB-filled ton containers or munitions, unspecified salts, phosgene salts (which contained sodium chloride and sodium carbonate), laboratory waste solvents, dry and wet salts, GB salts, GB weteye salt, GB-contaminated hydraulic oil, pesticides, waste fuel oil and miscellaneous salts. The building was decontaminated with a high pressure water and detergent solution.	HISTORICAL: Caustic, detergent solutions, fuel oil, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), laboratory wastes solvents, Heptachlor, hydraulic oil, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), HD salts, sodium fluoride, sodium carbonate, sodium chloride, sodium isopropyl methyl phosphonic, sodium sulfate, sodium sulfite, pesticides, phosgene salts, unspecified salts, waste solvents, weteye salts SAMPLING: Surficial Soil (0 - 2 in): Aldrin, chlordane, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, chlordane, PPDDT, dieldrin, endrin, isodrin	No Future Use, Agent History	Used for storage of agent and munitions, pesticides, and solvents. Building has been decontaminated and is currently certified as nonhazardous.
794†	Drum Storage Warehouse/ ESA	The warehouse stored GB-filled ton containers or munitions, scrubber residue, unspecified salts, arsenic-contaminated salts, wet and dry H salts, contaminated, CAIS wastes, GB salts, phosgene scrubber packing, burned HD residue, and ash residue. In April of 1982, it was noted that ten drums of HD salts were corroded and apparently leaking. In 1983, leakers were found of wet HD salts, burned HD residue, and GB salts. The building was decontaminated with a high pressure water and detergent solution.	HISTORICAL: Arsenic, caustic, detergent solution, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), HD residue, phosgene, sodium bicarbonate, sodium carbonate, sodium chloride, sodium fluoride, sodium sulfate, sodium sulfite, unspecified salts SAMPLING: Surficial Soil (0 - 2 in): Aldrin, chlordane, PPDDE, PPDDT, dieldrin, endrin, hexachlorocyclopentadiene, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, chlordane, PPDDE, PPDDT, dieldrin, endrin, isodrin, hexachlorocyclopentadiene, lead, mercury Groundwater: Benzene, chloroform	No future use, Agent History	Used for storage of agent and munitions. Building has been decontaminated and is currently certified as nonhazardous.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
795†	Drum Storage Warehouse/ ESA	The warehouse stored GB-filled ton containers or munitions, spray-dried salts from H neutralization military equipment, munitions, unspecified salts, and H salts contaminated with arsenic. The H salts consisted of sodium chloride, sodium sulphite, sodium carbonate, and iron oxide. The building was decontaminated with a high pressure water and detergent solution.	HISTORICAL: Arsenic, caustic, detergent solutions, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), iron oxide, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), sodium bicarbonate, sodium carbonate, sodium chloride, sodium fluoride, sodium sulfate, sodium sulfite, unspecified salts SAMPLING: Surficial Soil (0 - 2 in): Aldrin, chlordane, PPDDT, dieldrin, endrin, hexachlorocyclopentadiene, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, chlordane, PPDDE, PPDDT, dieldrin, endrin, isodrin, hexachlorocyclopentadiene, mercury	No Future Use, Agent History	Used for storage of agent and munitions. Building has been decontaminated and is currently certified as nonhazardous.
796†	Warehouse/ ESA	The warehouse stored GB-filled ton containers or munitions, rocket propellant, H salts, H salts contaminated with arsenic, unspecified salts, and waste salts. In 1983, several drums of H salts were reported to be leaking. The building was decontaminated with a high pressure water and detergent solution.	HISTORICAL: Arsenic, detergent solutions, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), rocket propellant, unspecified salts SAMPLING: Surficial Soil (0 - 2 in): Aldrin, chlordane, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, cadmium, chlordane, PPDDE, PPDDT, dieldrin, endrin, isodrin, hexachlorocyclopentadiene, mercury Groundwater: Benzene, chlorobenzene, chloroform, 1,1-dichloroethane, 1,1,1-trichloroethane	No Future Use, Agent History	Used for storage of agent and munitions. Building has been decontaminated and is currently certified as nonhazardous.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
797†	Drum Storage Warehouse/ ESA	The warehouse stored GB-filled ton containers or munitions, M55 rocket propellant, unspecified salts, dried salts, GB salts, and GB salts stabilized with diisopropyl-carbodiimide were stored here. The building was decontaminated with a high pressure water and detergent solution.	HISTORICAL: Caustic, detergent solutions, diisopropyl carbodiimide, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), rocket propellant, sodium bicarbonate, sodium carbonate, sodium chloride, sodium fluoride, sodium isopropyl methyl phosphonate, sodium sulfate, sodium sulfite, unspecified salts SAMPLING: Surficial Soil (0 - 2 in): Aldrin, chlordane, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, cadmium, chlordane, PPDDT, dieldrin, endrin, isodrin, mercury Groundwater: Benzene, chlorobenzene, chloroform, 1,1-dichloroethane, 1,1,1-trichloroethane	No Future Use, Agent History,	Used for storage of agent and munitions. Building has been decontaminated and is currently certified as nonhazardous.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
798†	Drum Storage Warehouse/ ESA	The warehouse stored GB-filled ton containers or munitions, MC1 GB bombs, sandwich button bombs in CDU 10/B canisters, unspecified salts, GB salts, caustic, M34 GB salts, MK-116 (Weteye) salts, GB salts with stabilizer diisopropyl carbodiimide. Late in 1982, it was noted that there were two leaking drums of unspecified content. The building was decontaminated with a high-pressure water and detergent solution.	HISTORICAL: Caustic, detergent solutions, diisopropyl carbodiimide, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), magnesium oxide, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), M34 salts, potassium chloride, red phosphorous, silica, silica gel, sodium bicarbonate, sodium carbonate, sodium chloride, sodium fluoride, sodium isopropyl methyl phosphonate, sodium sulfite, sodium sulfate, unspecified salts, weteye salts SAMPLING: Surficial Soil (0 - 2 in): Aldrin, chlordane, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, cadmium, chlordane, PPDDT, dieldrin, endrin, isodrin, mercury Groundwater: Benzene, chlorobenzene, chloroform, tetrachloroethylene, trichloroethylene, 1,1-dichloroethane, 1,1-dichloroethylene, 1,1,1-trichloroethane	No Future Use, Agent History	Used for storage of agent and munitions. Building has been decontaminated and is currently certified as nonhazardous.
801†	Radio Relay Station/NPSA	No prior chemical use reported.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, chromium, PPDDE, PPDDT, dieldrin, endrin, isodrin, mercury, zinc	No Future Use, Other Contamination History	No direct use or storage of chemicals.
808†	North Boundary Groundwater Treatment Plant/NCSA	The treatment system removes diisopropylmethyl phosphonate and dicyclopentadiene from groundwater plumes by using dewatering wells, a bentonite barrier, a calgon treatment plant, recharge wells, and monitoring wells.	HISTORICAL: Bentonite, calgon treatment, DCPD, diisopropylmethyl phosphonate SAMPLING: Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Aldrin, chlordane, PPDDE, PPDDT, dieldrin, endrin, isodrin, mercury	No Future Use, Other Contamination History	Filter and treatment plant.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
809†	Irondale Groundwater Treatment Plant/WSA	The treatment system removed DBCP from groundwater by using activated carbon columns.	HISTORICAL: Carbon, DBCP SAMPLING: Surficial Soil (0 - 2 in): NSC	No Future Use, Other Contamination History	Filter and treatment plant.
810†	Northwest Boundary Groundwater Treatment Plant/NCSA	VHOs, benzene , and DBCP removed from groundwater.	HISTORICAL: Benzene, carbon tetrachloride, chlorobenzene, chloroform, DBCP, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethylene, *trans*-1,2-dichloroethylene, methylene chloride, 1,1,2,2-tetrachloroethane, tetrachloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethylene, trichloropropene SAMPLING: Surficial Soil (0 - 2 in): NSC Surficial Soil (0 - 2 ft): Arsenic, cadmium	No Future Use, Other Contamination History	Treatment plant.
825	Basin A Neck Treatment Building			No Future Use, Other Contamination History	Treatment building for contaminated groundwater.
831†	Technical Escort/Officer's Quarters/NCSA	Building was used as a garage and general purpose storage shed with precise contents unavailable in Task 24.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, PPDDE, PPDDT, dieldrin, diisopropylmethyl phosphonate, endrin, isodrin, lead, mercury	No Future Use, Other Contamination History	Industrial Support Building.
831A†	Garage/Storage Shed/NCSA	Building was used as a garage and general purpose storage shed with precise contents unavailable in Task 24.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDT, dieldrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, PPDDE, PPDDT, dieldrin, diisopropylmethyl phosphonate, endrin, isodrin, lead, mercury	No Future Use, Other Contamination History	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
833	Lumber Storage/NCSA	The building was used for storage with precise contents unavailable in Task 24.	HISTORICAL: Historically associated chemicals not available	No Future Use, Other Contamination History	Industrial Support Building.
834	Incinerator/CSA-1d	The building was used to incinerate sanitary waste, and for disposal of contaminated solid waste and chemical waste, including spent acid filter cartridges; scrap metal and drums contaminated with aldrin, dieldrin, planavin, and endrin; allyl chloride filters; chlorophenylmethyl sulfone; solid aldrin and dieldrin; azodrin; bidrin; gardona; supona; hexane; unspecified flammable solvents; isopropyl alcohol; substance contaminated with acetone, benzene, hexane, and methanol; trash contaminated with paraformaldehyde; wood; and metals. Also used to decontaminate glass-lined HD reactor vessel which also used methyl cellosolve and solution containing calcium hypochlorite.	HISTORICAL: Spent acid filter cartridges, aldrin, dieldrin, planavin, endrin, allyl chloride filters, chlorophenylmethyl sulfone, azodrin, bidrin, gardona, supona, unspecified flammable solvents, isopropyl alcohol, acetone, benzene, methanol, HD, calcium hypochlorite, hexane, wheat rust trash, methyl cellosolve, metal, chemical waste, herbicides (bladex, atrazine)	No Future Use, Significant Contamination History	Incinerator for sanitary waste, solid waste, and chemical waste-pesticides and solvents.
836	Air Force Seismic Monitoring Facility/NCSA-4b,8a	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
840	Air Monitoring Station			No Future Use, Other Contamination History	Industrial Support Building.
841	CO Public Service Co. Meter House	Gas metering station.		No Future Use, Other Contamination History	Industrial Support Building.
851	Pistol Range House/ESA	Pistol range target house.	HISTORICAL: Pb	No Future Use, Other Contamination History	Target house-lead.
853	Observation Pit/Mortar Range/ESA	The building was used as an observation bunker. It was also used to store blasting caps.	HISTORICAL: Blasting caps	No Future Use, Other Contamination History	Storage of blasting caps-no direct chemical process associated.
854	Concrete Wall/NCSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
863	Target Range House/SSA	The building was used for miscellaneous storage with precise contents unavailable in Task 24.	HISTORICAL: Other associated chemicals not available	No Future Use, Other Contamination History	Target range house. No chemical manufacturing process activities.
864	General Storehouse/ESA-3b	In 1973 after the toxic storage yard operations, the building was moved near the former toxic gas storage yard. In 1980, the building was moved away from the toxic gas storage area. Precise contents stored are unavailable in Task 24.	HISTORICAL: Other associated chemicals not available	No Future Use, Other Contamination History	Industrial Support Building.
865	Warehouse/ESA-3b	The building acted as a storage warehouse for the toxic storage yard; precise contents stored are unavailable in Task 24. A spill of fuel oil occurred within the structure from a decon truck that was stored there.	HISTORICAL: HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), phosgene, fuel oil, other historically associated chemicals not available	No Future Use, Other Contamination History	Used for equipment storage
866†	Office and Change House/ Toxic Yard Office/ESA-3b	Materials contained in the storage yard outside the office and change house included H, phosgene, and Heptachlor. Calcium hypochlorite powder and unspecified solutions were used for decontamination. Spills of H and distilled H were reported; however, no dates were listed.	HISTORICAL: Calcium hypochlorite powder, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), Heptachlor, phosgene, unspecified solutions SAMPLING: Surficial Soil (0 - 2 in): Aldrin, chlordane, PPDDE, PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chlordane, PPDDE, PPDDT, dieldrin, dithiane, endrin, oxathiane, thiodiglycol	No Future Use, Other Contamination History	Used as a support building.
867A	Toxic Yard/Metal and Wood Shop/ESA	The building acted as a carpenter shop used for cutting lumber for the toxic storage yard. Later used for miscellaneous storage with precise contents unavailable in Task 24.	HISTORICAL: Other associated chemicals not available	No Future Use, Other Contamination History	No direct chemical processes associated.
867B	Flammable Materials Storehouse/ESA	The building stored paint and flammable materials.	HISTORICAL: Paint, flammable material	No Future Use, Other Contamination History	Storage of flammable materials
871A	Magazine/ESA	The building stored powder bags, M142 fuses, ignition cartridges, and blasting caps.	HISTORICAL: Powder bags, fuses, ignition cartridges, blasting caps	No Future Use, Other Contamination History	Used to store munitions.
871B	Magazine/ESA	The building acted as a loading facility for M74 programs and stored powder, M142 fuses, shells, propellant charges, and tail assemblies.	HISTORICAL: Powder bags, fuses, propellant charges, tail assembles	No Future Use, Other Contamination History	Used to store munitions.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
871C	Magazine/ESA	The building acted as a loading facility for M74 programs and stored powder, M142 fuses, 209 primers, and fuse splitters.	HISTORICAL: Powder bags, fuses, primers, fuse splitters	No Future Use, Other Contamination History	Used to store munitions.
871D	Magazine/ESA	The building stored munitions, explosive devices, powder bags, fuses, and miscellaneous items.	HISTORICAL: Powder bags, fuses, explosive devices, other associated chemicals not available	No Future Use, Other Contamination History	Used to store munitions.
872A	Magazine/ESA	The building stored ammunition, explosives, powder bags, M142 fuses, M115A2, booster adapters, M76, M12, M13, M12B, M4, and M14 bursters, and M76 boosters.	HISTORICAL: Explosives, powder bags, fuses, bursters, booster adapters, boosters	No Future Use, Other Contamination History	Used to store munitions.
872B	Magazine/ESA	The building stored ammunition, explosives, powder bags, M142 fuses, M115A2, booster adapters, M76, M12, M13, M12B, M4, and M14 bursters, and M76 boosters.	HISTORICAL: Powder bags, explosives, fuses, bursters, booster adapters, boosters	No Future Use, Other Contamination History	Used to store munitions.
872C	Magazine/ESA	The building stored ammunition, explosives, powder bags, M142 fuses, M115A2, booster adapters, M76, M12, M13, M12B, M4, and M14 bursters, M76 boosters, and M126A1 fuses.	HISTORICAL: Powder bags, explosives, fuses, bursters, booster adapters, boosters	No Future Use, Other Contamination History	Used to store munitions.
872D	Magazine/ESA	The building stored ammunition, explosives, powder bags, M142 fuses, tetryl cups with high explosive material, cups for M69X bombs, and white phosphorus items.	HISTORICAL: Explosives, powder bags, fuses, tetryl cups, white phosphorus	No Future Use, Other Contamination History	Used to store munitions.
873A	General Purpose Magazine/ESA	The building stored powder bags, M142 fuses, M106 detonators from M69X bombs, M142A and M126A1 fuses, highly explosive materials, components of Honest John GB Warhead, including M421 fuses, composition "B" M45 bursters, XM912 fuses, and M140 cyclonite pellets.	HISTORICAL: Powder bags, fuses, explosives, cyclonite pellets, detonators, bursters	No Future Use, Other Contamination History	Used to store munitions.
873B	General Purpose Magazine/ESA	The building stored powder bags, M142 fuses, and cases of plastic TNT.	HISTORICAL: Powder bags, fuses, primacord, demolition blocks	No Future Use, Other Contamination History	Used to store munitions.
873C	General Purpose Magazine/ESA	The building stored powder bags, M142 fuses, and primacord and demolition blocks.	HISTORICAL: Powder bags, fuses, TNT	No Future Use, Other Contamination History	Used to store munitions.
874A	Magazine/ESA	The building stored powder bags, M142 fuses, black powder bursters, white phosphorus shells, high explosive material, M45 bursters, composition "B" M45 burster, and components for Honest John GB-filled munitions.	HISTORICAL: White phosphorus, powder bags, fuses, black powder bursters, explosives	No Future Use, Other Contamination History	Used to store munitions.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
874B	Magazine/ESA	The building stored powder bags, M142 fuses, and M126A1 fuses.	HISTORICAL: Powder bags, fuses	No Future Use, Other Contamination History	Used to store munitions.
874C	Magazine/ESA	The building stored powder bags, M142 fuses, MX912 bomb fuses, and components of Honest John GB-filled munitions.	HISTORICAL: Powder bags, fuses	No Future Use, Other Contamination History	Used to store munitions.
874D	Magazine/ESA	The building stored powder bags, M142 fuses, and M69X fuses, M206A1 hand grenade fuses, highly explosive material, M62 rocket igniters, and components for M55 rockets and Honest John GB-filled munitions.	HISTORICAL: Powder bags, fuses, explosives, rocket ignitors	No Future Use, Other Contamination History	Used to store munitions.
881†	Igloo Storage/ESA	The building was used to store white phosphorous-filled igniters, Honest John GB M180 Warheads, M139 GB bomblets, PPDDT contaminated ammunition, wet and dry adamsite, GB scrubber salt drums, GB wet salts, M34 GB salts, fuses, bursters, explosives, and waste salt drums. Floor decontaminated with detergent solution and resultant water was tested and certified as nonhazardous.	HISTORICAL: Adamsite, bursters, PPDDT, explosives, fuses, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), M34 GB salts, waste salts, white phosphorous SAMPLING: Surficial Soil (0 - 2 in): Dieldrin Surficial Soil (0 - 2 ft): Copper, dieldrin	No Future Use, Agent History	Used to store agent munitions and explosives.
882†	Igloo Storage/ESA	The igloo was used for storage of mortar rounds containing phosgene, white phosphorous-filled grenades, Honest John GB M190 Warheads, M139 GB bomblets, adamsite, grenades, tear gas, bomb components, fuses, bursters, explosives, and chloroacetophenenone. Floor decontaminated with detergent solution and resultant water was tested and certified as nonhazardous.	HISTORICAL: Adamsite, arsenic, bursters, chloroacetophenone, explosives, fuses, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), phosgene, tear gas, white phosphorous SAMPLING: Surficial Soil (0 - 2 in): PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Copper, PPDDT, dieldrin, endrin	No Future Use, Agent History	Used to store agent munitions and explosives.
883	Igloo Storage/ESA	The building stored bomb components, fuses, bursters, highly explosive material, mortar shells, white phosphorus-filled igniters, burster tubes for M34 cluster bombs, blasting fuses, M6 electric and M7 nonelectric blasting caps, and GB-contaminated hydraulic oil. Floor decontaminated with detergent solution and resultant water was tested and certified as nonhazardous.	HISTORICAL: White phosphorus, GB-contaminated hydraulic oil, fuses, bursters, explosives, ignitors, blasting caps	No Future Use, Agent History	Used to store agent munitions; floor has been decontaminated.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
884	Igloo Storage/ESA	The building stored bomb components, fuses, bursters, mortar shells containing phosgene and smoke filler, white phosphorus, igniters, explosive components including M34 cluster bombs burster tubes, PPDDT-contaminated ammunition, steel drums of GB scrubber salts, and overpack drums of GB wet salts. The floor was decontaminated with detergent water and resultant water was tested and certified as nonhazardous.	HISTORICAL: PPDDT, white phosphorus, phosgene, smoke filler, fuses, bursters, ignitors, explosives, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester)	No Future Use, Significant Contamination History	Used to store munitions and explosives; floor has been decontaminated.
885†	Igloo Storage/ESA	The igloo was used for storage of mortar rounds filled with white phosphorous, igniters, Honest John GB M190 Warheads, GB M139 bomblets, PPDDT contaminated ammunition, bursters, fuses, bomb components, adamsite.	HISTORICAL: Adamsite, arsenic, bursters, PPDDT, fuses, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), white phosphorous SAMPLING: Surficial Soil (0 - 2 in): PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Aldrin, PPDDT, dieldrin, endrin	No Future Use, Agent History	Used to store agent munitions.
886†	Igloo Storage/ESA	The igloo was used for storage of bleach, white phosphorous igniters, Honest John GB M190 Warheads, M139 bomblets, and PPDDT contaminated ammunition. Adamsite and adamsite-related grenades, tablets, purification agent, M2 candles, adamsite-1 agent, tear gas grenades, drums containing adamsite, 37mm projectiles, fuses, bursters. The floor was decontaminated with detergent water and resultant water was tested and certified as nonhazardous.	HISTORICAL: Adamsite, arsenic, bleach, bursters, PPDDT, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), white phosphorous, fuses, white phosphorous, tear gas, unspecified chemical agent SAMPLING: Surficial Soil (0 - 2 in): PPDDT, dieldrin, endrin Surficial Soil (0 - 2 ft): Aldrin, PPDDT, dieldrin, endrin	No Future Use, Agent History	Used to store agent munitions and for agent manufacturing.
1403	2-HF Storage Tanks and Unloading Dock	Tanks were constructed to store hydrogen fluoride, alcohol, and fuel oil for use in the GB manufacturing process.		No Future Use, Other Contamination History	Industrial Support Building.
1404	Carbon Tetrachloride Storage Tank	Tank was constructed to store carbon tetrachloride for equipment washing and testing. Tank may have also held fuel oil between 1977 and 1984.		No Future Use, Other Contamination History	Industrial Support Building.
1405	Hydrochloric Acid Storage Tanks	Tank was constructed to store hydrochloric acid produced during GB production. Tank may have also held fuel oil between 1977 and 1984.		No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
1501	GB Manufacturing/ Demilitarization Building/NPSA-3	GB manufacturing facility used to manufacture GB from raw chemicals. Some chemicals used in the process include caustic, deobase oil, methylene chloride, hydrofluoric acid, diisopropyl carbodiimide. Spills of xylene, GB, dichloro, methylene chloride, and hydrofluoric acid occurred. The building was also used to demilitarize VX-filled ton containers with a chlorinated mixture and caustic. Also demilitarized M34 clusters and neutralized GB with caustic and brine solutions which resulted in GB brine salts. In 1977, all caustic, steam, and water lines were drained; tanks and reactors were flushed with caustic and water; pipe connections for Buildings 1501 and 1703 were flushed, and glycol was poured into all water traps. Although mentioned, specific use or occurrence of Dowtherm A is not described in Task 24.	HISTORICAL: GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), tributylamine, halide salts, tributylammonium salts, xylene, vapona, sodium hydroxide, deobase oil, methylene chloride, hydrofluoric acid, Dowtherm A, dichloro, diisopropyl carbodiimide, chlorinated mixture, VX, glycol SAMPLING: Liquid - DIMP	No Future Use, Agent History	Used to manufacture agent-spill history.
1502	Unloading Dock-Isopropanol Storage	Consisted of six 18,000-gallon storage tanks which were used to store isopropanol.		No Future Use, Other Contamination History	Industrial Support Building.
1503A	Scrubber Facility/NPSA-3	Part of GB complex scrubber system which neutralized residual toxic gas from GB processing and storage facilities. Upper and lower scrubber chambers and drain system were considered to be contaminated with GB.	HISTORICAL: Toxic gases from the GB processing and storage facilities which could include: sodium hydroxide, solvents, dichloro, diisopropyl carbodiimide, chlorinated water, VX, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), tributylamine, halide salts, caustic, tributyl ammonium salts, xylene, chloroform, deobase oil, hydrofluoric acid, Dowtherm A	No Future Use, Agent History	Agent processing system.
1503B	Scrubber Facility/NPSA-3	Part of GB complex scrubber system which neutralized residual toxic gas from GB processing and storage facilities.	HISTORICAL: Same compounds listed for Building 1503A SAMPLING: Liquid - Chloroform, DIMP, DMMP	No Future Use, Agent History	Agent processing system.
1503C	Scrubber Facility/NPSA-3	Part of GB complex scrubber system which neutralized residual toxic gas from GB processing and storage facilities.	HISTORICAL: Same compounds listed for Building 1503A	No Future Use, Agent History	Agent processing system.
1504	Steel Stack/NPSA-3	Tall stack which vented air from the GB scrubber facilities (i.e., Buildings 1503A, 1503B, and 1503C) into the atmosphere. Stack emission contained GB emissions in the early 1970s.	HISTORICAL: Same compounds listed for Building 1503A	No Future Use, Agent History	Agent processing system.
1504A	Monitoring Shed/NPSA-3	Initially located in North Plants with precise use unavailable in Task 24. Later moved and used as part of a gas station. Moved back to North Plants where it was used as a monitoring station.	HISTORICAL: Gasoline, other historically associated chemicals not available	No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
1505A	Sentry Station/NPSA	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
1506	GB Storage/ NPSA-3,9c	The building was used to fill, store, and load GB and to demilitarized M125 GB-filled bombs, M139 bomblets, and M56 warheads. Bombs were decontaminated by draining the agent, washing shell with caustic and water, and burning in pit. Building also used to store off-specification GB. In 1971, HD- and GB-filled ton containers were stored in building. Stored GB from Honest John GB demilitarization project and M34 GB cluster bombs. Several leaks and spills of GB occurred. Detectable limits of GB were found in air from prescrubber exhaust duct in 1978.	HISTORICAL: GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), sodium hydroxide SAMPLING: Liquid - Nontarget compound	No Future Use, Agent History	Used for agent munitions production-agent spill history.
1507	Methanol Storage Tank	Consisted of one 18,000-gallon tank used to store methyl alcohol and may have been converted to store iscpropanol.		No Future Use, Other Contamination History	Industrial Support Building.
1508	TBA Storage Tank	Consisted of one 10,000-gallon storage tank used to store tributylamine for use in GB production. Fuel oil for the North Plants incinerator was stored in Building 1403 tank farm which included Building 1508		No Future Use, Other Contamination History	Industrial Support Building.
1509	Isopropanol Dehydration Unit/NPSA-2	Dehydration unit for isopropanol used in GB manufacturing process. Unit used isopropanol and ethyl ether.	HISTORICAL: Isopropanol, ethyl ester, freon	No Future Use, Other Contamination History	Used for manufacturing support.
1510	Fuel Oil Tank	Structure was built to store isopropyl alcohol. In 1980 and 1984 building surveys indicated the tank was actively being used as a diesel storage tank. Fuel oil was spilled around the tank.		No Future Use, Other Contamination History	Used for oil storage.
1510A	Fire Apparatus Building/Foam Storage/NPSA-1	The building stored a foam blanket for fire fighting.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
1512	Sentry Station/Gate House/NPSA-9d	No prior chemical use reported.	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
1601	GB Filling/NPSA-9b	The building was used to fill munitions with GB, assemble 155mm rocket, and fill M34 cluster bombs. Industrial X-rays using radioactive isotopes were used in the building. The X-ray machine was a sealed source that contained Cesium 27 and produced no wastes. Shells were filled with GB, sprayed with caustic, and painted in the building. Later, phosgene demilitarization operations occurred; weteye bombs were filled with a simulated ferolal representing GB; and GB demilitarization/ disposal operation involving ton containers of GB and M34 bombs occurred in building. Several spills of GB, phosgene, a small leak of Pb azide, and a large Hg spill occurred. Some of the spills and leaks were treated with caustic, water, and bleach.	HISTORICAL: GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester, phosphoric acid, triphenyl ester), phosgene, Pb azide, Hg, sodium hydroxide, simulated ferolal, bleach, Cesium 27, paint	No Future Use, Agent History	Used for agent munitions assembly-agent spill history.
1601A	Ammunitions Demilitarization Facility/NPSA-9c	The building was used as a ton container storage and unloading facility for GB operations attached to Building 1601. Later used in demilitarization of bulk GB agent and munitions. Several spills of GB occurred and were cleaned with caustic solutions. Prior chemical use includes all compounds listed for Building 1601.	HISTORICAL: Same compounds as listed for Building 1601	No Future Use, Agent History	Used in agent operations.
1602	Paint Storage/NPSA-3	The building was constructed as a paint storage and cleaning facility containing stripper tanks that contained caustic solution (possibly oakite). Later used in microgravel mine production activities which used an acid tank to mix raw ingredients, including cyclonite, Pb azide, ethyl-water mixture, and caustic. Building contained packed scrubbers used to process ventilation air from Buildings 1601A and 1506 and to remove GB scrubber brine (containing sodium hydroxide). Test show scrubber was contaminated with GB.	HISTORICAL: Same compounds listed for Building 1601, acid, powder, cyclonite, ethyl-water, oakite, raw ingredients, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), GB scrubber brine	No Future Use, Agent History	Contained stripper tanks and scrubbers-used in agent operations.
1603A	Scrubber Facility/NPSA-3	Scrubber facility used for GB operations to reduce GB ventilations. Also used in demilitarization activities of GB munitions. A 1977 assessment states lower chamber scrubbers, drain system, and upper chambers were considered to be GB contaminated. Caustic solution was used in operations.	HISTORICAL: Same compounds listed for Building 1503A	No Future Use, Agent History	Scrubber used for agent operations.
1603B	Scrubber Facility/NPSA-3	Scrubber facility used for GB operations to reduce GB ventilations. Also used in demilitarization activities of GB munitions. A 1977 assessment states lower chamber scrubbers, drain system, and upper chambers were considered to be GB contaminated. Caustic solution was used in operations.	HISTORICAL: Same compounds listed for Building 1503A	No Future Use, Agent History	Scrubber used for agent operations.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
1605	Munitions Storage Igloo/NPSA	Building 1605 stored CAIS which included X545 (triphosgene, phosgene simulant), X546 chloroacetophenone; X549 adamsite; X550 nitrogen H; X551 nitrogen H; X552 chloropicrin; K955 L, H, chloropicrin, triphosgene, chloroacetophenone, adamsite; K945 GB, L, phosgene simulant, potassium cyanide simulant, simulants for G-, V-, H-type[3] agents; X302 nitrogen H; X547 H gas; and X548 L. The following material was stored in unspecified igloos in the North Plants which may include Building 1605: chemical ammunition, contaminated material from Basin A including scrap metal and chemical agent[1] bombs, miscellaneous chemical agent materials, laboratory materials and chemicals, fuses, piggybacks, tetryl explosives, Pb azide, cyclonite, PPDDT-contaminated small arms munitions, possible weteye bombs, and CAIS.	HISTORICAL: Fuses, Pb azide, stimulants for chemical agents, PPDDT, laboratory chemicals, piggybacks, tetryl explosives, triphosgene, chloroacetophenone, adamsite, nitrogen HD, chloropicrin, L, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), VX, potassium cyanide simulant, CAIS, phosgene simulant, cyclonite, chemical agent materials, Basin A material	No Future Use, Agent History	Used to store, agent identification kits, explosives and ammunition
1606	Cluster Assembly Building/NPSA-9a	The building was used for production and packaging of GB-filled munitions: assembly of M34, M29, M125 bombs; rocket-filling assembly; production of microgravel and XM47 mines which contained Pb azide, cyclonite, potassium chlorate, red phosphorus, and silica. Demilitarization of GB-filled munitions occurred in building. Building was decontaminated with caustic and water detergent solution. During demilitarization, there were several chemical agent exposures and explosions.	HISTORICAL: GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), Pb azide, sodium hydroxide, cyclonite, potassium chlorate, red phosphorus, silica	No Future Use, Agent History	Used for agent munitions production-exposure/ explosion history. Building has been decontaminated.
1607†	Warehouse/NPSA	The warehouse stored CAIS, GB, lewisite, phosgene simulant, potassium cyanide, H, chloropicrin, chloracetophenone, triphosgene, adamsite, nitrogen H, tear gas, raw materials, storage acids.	HISTORICAL: Acids, adamsite, arsenic, CAIS, chemical agent salts, chloroacetophenone, chloropicrin, PPDDT, gallium simulant, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), lewisite, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), nitrogen HD, phosgene simulant, potassium cyanide, tear gas, triphosgene, waste salts SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, cadmium, chloroacetic acid, chromium, PPDDE, dieldrin, endrin, fluoranthene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (2 - 5 ft) benzene Groundwater: Chloroform	No Future Use, Agent History	Used for agent storage.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
1608	Munitions Storage Igloo/NPSA-4	Building 1608 stored conventional explosives, primacord, chemical agent materials, filled munitions, CNU-80s containing liquid-filled munitions, nonburstered and burstered munitions, nonstandard chemical agent items, microgravel mines containing Pb azide and cyclonite, 300-gallon vessel and contaminated materials from H operations, recovered chemical munitions, six CNU-80[3] containers which contain unknown agent[1], and liquid samples from Basin A. The following material was stored in unspecified igloos in the North Plants which may include Building 1608: chemical ammunition contaminated material from Basin A including scrap metal, chemical agent[1] bombs, miscellaneous chemical agent materials, laboratory materials and chemicals, fuses, piggybacks, tetryl explosives, Pb azide, cyclonite, PPDDT-contaminated small arms munitions, possible weteye bombs, and CAIS.	HISTORICAL: Pb azide, cyclonite, PPDDT, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), L, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), VX, chemical agent materials, explosives, primacord, Basin A materials, Basin A liquid samples, laboratory chemicals, fuses, piggybacks, tetryl explosives, CAIS	No Future Use, Agent History	Used for storage of ammunition, explosives, and agent materials.
1609	Munitions Storage Igloo/ NPSA	The building stored conventional ammunition and explosives; CAIS containing H, L, chloropicrin, phosgene, cyanogen chloride, nitrogen H, tabun stimulant, chloroacetophenone, adamsite, triphosgene; fuse igniters; time blasting fuses; 50 caliber shells; 45 caliber ammunition; M16 ammunition; blasting cord; and M72A2 light antitank weapons. The following materials were stored in unspecified igloos in the North Plants which may include Building 1609: chemical ammunition, contaminated material from Basin A including scrap metal and chemical agent[1] bombs, miscellaneous chemical agent materials, laboratory materials and chemicals, fuses, piggybacks, tetryl explosives, Pb azide, cyclonite, ammunition suspected of containing chemical agent[1] as filler, PPDDT-contaminated small arms ammunitions, possible weteye bombs, and CAIS.	HISTORICAL: Fuses, piggybacks, tetryl explosives, Pb azide, cyclonite, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), L, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), VX, chloropicrin, phosgene, cyanogen chloride, nitrogen HD, tabun stimulant, chloroacetophenone, adamsite, triphosgene, PPDDT, CAIS, blasting cord, laboratory chemicals, chemical agent materials, Basin A material, CAIS	No Future Use, Agent History	Used for storage of ammunition, explosives, and agent materials.
1610	Munitions Storage Igloo/ NPSA	The building stored conventional explosives; chemical agent materials including the following: laboratory samples, L, and H; and nonstandard chemical agent items (not specifically identified). The following materials were stored in unspecified igloos in the North Plants which may include Building 1610: contaminated materials from Basin A including scrap metal and chemical agent[1] bombs; miscellaneous chemical agent materials; fuses, piggybacks, tetryl explosives, Pb azide, cyclonite, ammunition suspected of containing chemical agent[1] as filler, PPDDT-contaminated small arms ammunitions, weteye bombs, and CAIS.	HISTORICAL: L, HD, GB, VX, Pb azide, cyclonite, PPDDT, fuses, piggybacks, tetryl explosives, weteye, CAIS, Basin A materials	No Future Use, Agent History	Used to store explosives and agent materials.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
1611	Demilitarization Facility/ NPSA-5	The building was used for an instrument shop; gymnasium; demilitarization of GB-filled M190 (Honest John) warheads; demilitarization of PPDDT-contaminated small arms; incineration of M-34 clusters inert parts; destruction of CAIS containing H, L, GB, adamsite, potassium cyanide, triphosgene, chloroacetophenone, chloropicrin, cyanogen chloride, nitrogen HD, and simulated tabun; Basin A contaminated equipment, and white phosphorus facility pipes and equipment. Incineration and decontamination wastes included sodium carbonate, sodium chloride, fly ash, heavy metals and As contaminated dust, As pentoxide, As oxides, and As trioxide. Spills of fuel oil and No. 2 fuel oil occurred.	HISTORICAL: As oxides, As pentoxide, As trioxide, sodium carbonate, No. 2 fuel oil, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), PPDDT, CAIS, L, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), adamsite, potassium cyanide, triphosgene, chloroacetophenone, chloropicrin, cyanogen chloride, nitrogen HD, simulated tabun, white phosphorus equipment, fly ash, As oxides, ammonia, hydrogen chloride, fuel oil, heavy metals, sodium chloride, hydrogen chloride, As-contaminated dust, Basin A equipment SAMPLING: Liquid - As, Hg, thiodiglycol, thiodiglycolic acid, nontarget compounds Structure Matrices[d] - TCLP: Ba, Cd, Zn, Hg, 1,4-DCLB, Cr, chloroform Total Waste Methods: PPDDT, PPDDE, As, Hg	No Future Use, Agent History	Used for agent demilitarization and contaminated equipment. Oil spill history.
1611A	Sentry Station/NPSA	No prior chemical use reported	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
1613	Explosive Unpacking Building/NPSA	The building was used to unload fuses and bursters. Potentially contaminated with GB; however, Task 24 located no potential source for this contamination.	HISTORICAL: GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), fuses, bursters[1]	No Future Use, Agent History	Building used to unload fuses-potential agent contamination.
1614	Warehouse/NPSA	The building stored contaminated equipment including spare items for the GB plant and GB munitions filling equipment. Other contaminated equipment not specified in Task 24.	HISTORICAL: GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester); other historically associated chemicals not available	No Future Use, Agent History	Used to store agent-contaminated equipment.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
1615	Warehouse/NPSA	The building stored contaminated equipment including spare items for the GB plant and GB munitions filling equipment. Other contaminated equipment not specified in Task 24.	HISTORICAL: GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester); other historically associated chemicals not available	No Future Use, Agent History	Used to store agent-contaminated equipment.
1616	Warehouse/NPSA	The building stored contaminated equipment including spare items for the GB plant and GB munitions filling equipment. Other contaminated equipment not specified in Task 24.	HISTORICAL: GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester); other historically associated chemicals not available	No Future Use, Agent History	Used to store agent-contaminated equipment.
1618	General Storehouse - north of North Plants/NPSA	The building originally acted as an oil and grease house. Later the building was moved and used by personnel involved in the wheat rust program as a miscellaneous shop. A 1977 report indicates that no potential contamination exists.	HISTORICAL: Oil, grease, wheat rust	No Future Use, Other Contamination History	Oil and grease storage.
1619	Administration Building - north of North Plants/NPSA	The building originally served as a railroad office. Later building was moved and possibly involved in the wheat rust program with precise use unavailable in Task 24.	HISTORICAL: Wheat rust	No Future Use, Other Contamination History	Industrial Support Building.
1622	General Storehouse - north of North Plants/NPSA	The building was used as a miscellaneous building and by personnel involved in the wheat rust program with precise use unavailable in Task 24.	HISTORICAL: Wheat rust	No Future Use, Other Contamination History	Industrial Support Building.
1701†	Warehouse/NPSA	The warehouse stored munitions components and diisopropylcarbodiimide. In 1977, ten drums of diisopropyl carbodiimide were reported leaking.	HISTORICAL: Diisopropyl carbodiimide SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chromium, PPDDE, PPDDT, dieldrin, endrin, fluoranthene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Air: Mercury, benzene, carbon tetrachloride, chloroform, tetrachloroethylene, copper, zinc Dust/Vacuum: Arsenic, cadmium, chromium, copper, lead, zinc, dieldrin, mercury	No Future Use, Other Contamination History	Used to store munitions components.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
1702	Weld Shop/NPSA	The building was used as a welding shop and erected from dismantled components of the North Plants structure TW-8. The building may have been contaminated with GB according to a 1977 report.	HISTORICAL: GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester)	No Future Use, Agent History	Used as welding shop-historical evidence of agent.
1703	Spray Dryer Facility Ammunition Demilitarization/ Maintenance Shop/NPSA-6	The building contained caustic bath tank, TM oil bath, decontamination pit, and spray dryer. The building was used as a warehouse; maintenance shop; and for demilitarization of CAIS sets; heavy metals; carcinogenics; possibly H, L, adamsite; and PPDDT-contaminated small arms. The building stored diisopropyl carbodiimide brine consisting of scrubber and quench liquids created during neutralization of GB munitions and demilitarization operations. The brine was spray dried in the building and produced sodium carbonate and sodium chloride salts which consisted of sodium isopropylmethyl phosphonate, organic phosphorus compounds, sodium fluoride, sodium hydroxide, Hg, Cd, Cr, Cu, Pb, Zn, manganese, silver, molybdenum, and by-products of adamsite. The building used Building 1727 chemical sump water. The building also stored effluent from brines from demilitarization of potentially contaminated H and GB materials that were withdrawn from Basin A; Building 1501 sodium hydroxide neutralized product; and Pb-contaminated brine from PPDDT ammunition. Brine from the adamsite disposal spray contaminated the dryer with As. The soil was removed and replaced.	HISTORICAL: GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester), GB brine, sodium hydroxide, dried salts, sodium carbonate salts, sodium chloride salts, phosphates, fluorine, sodium isopropylmethyl phosphonate, sodium fluoride, Hg, Cd, Cr, Cu, Zn, Pb, manganese, silver, molybdenum, As, organic phosphorus compounds, HD, L, adamsite, cyanogen chloride, tabun stimulant, PPDDT, phosgene, diisopropyl carbodiimide brine, CAIS, heavy metals, carcinogenics, adamsite by-products, VX, GB, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), HD brine, TM oil, heavy metals, chemical sewer fluid SAMPLING LIQUID: 1,1-Dichloroethane, calcium, Cu, Pb, potassium, sodium, Hg, Zn, As	No Future Use, Agent History	Used for storage and maintenance of agent munitions.
1704	Compressed Air Plant/ NPSA-6	The building was constructed as a compressed air and refrigeration building for the GB complex. Although mentioned, specific use of freon, Dowtherm A, and fuel oil is not reported in Task 24.	HISTORICAL: Fuel oil, freon, Dowtherm A	No Future Use, Other Contamination History	Used as a support facility.
1705	Instruction Building/Cafeteria/ NPSA	No prior use of chemicals reported	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
1706	Sentry Station/Gatehouse/ NPSA	No prior use of chemicals reported	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.
1707	Cooling Tower/NPSA-1	No prior use of chemicals reported	HISTORICAL: None	No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
1710†	Clinic and Administration Building/NPSA	The building contained an X-ray and extensive laboratory facilities, and blood analysis equipment. Any chemical usage in Building is not described in Task 24.	HISTORICAL: Other historically associated chemicals not available SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chromium, copper, PPDDE, PPDDT, dieldrin, endrin, fluoranthene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (2 - 5 ft) benzene, (5 - 20 ft) benzene, chloroform, tetrachloroethylene	No Future Use, Other Contamination History	Used for laboratory facilities.
1711†	Gas Meter House/NPSA-6	This building was used as a gas metering station. It was reported in Task 24 that on April 1982, a fuel oil spill occurred along the southeast side of Buildings 1711 and 1712.	HISTORICAL: Fluoranthene, fuel oil, methyl naphthalene, phenanthrene, pyrene SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chromium, copper, PPDDE, PPDDT, dieldrin, endrin, fluoranthene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (2 - 5 ft, 5 - 20 ft) benzene Groundwater: Benzene, carbon tetrachloride, chloroform, tetrachloroethylene, trichloroethylene, 1,1-dichloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane	No Future Use, Other Contamination History	Used as fuel storage-no direct chemical processes. Spill history.
1712	Gas Heating Plant/NPSA-6	The building acted as a boiler plant. Contaminated soil was removed and replaced.	HISTORICAL: None SAMPLING: Liquid - Carbon tetrachloride, tetrachloroethane, nontarget compounds	No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
1713†	Standby Generator Plant/NPSA-1,6	Each generator skid in the plant holds a fuel oil tank and gauge and an oil cooler.	HISTORICAL: Fuel oil, oil SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, cadmium, chromium, copper, PPDDE, PPDDT, dieldrin, endrin, fluoranthene, isodrin, lead, mercury, methyl naphthalenes, phenanthrene, pyrene, zinc Subsurface Soil: (2 - 5 ft) benzene, (5 - 20 ft) benzene, chloroform, tetrachloroethylene Groundwater: Chloroform, tetrachloroethylene, 1,2-dichloroethane	No Future Use, Other Contamination History	Used for fuel storage.
1715	Remediation Use Structure			No Future Use, Other Contamination History	Industrial Support Building.
1717†	Chlorinating Station/Water Purification/NPSA	Chlorine was used in the process of chlorinating water in the structure.	HISTORICAL: Chlorine SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, chromium, PPDDE, PPDDT, dieldrin, endrin, isodrin, mercury, zinc	No Future Use, Other Contamination History	Chlorinating station.
1718†	Valve Pit and Chlorinating Station/NPSA	Chlorine was used in the process of chlorinating water in the structure.	HISTORICAL: Chlorine SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, chromium, PPDDE, PPDDT, dieldrin, endrin, isodrin, mercury, zinc	No Future Use, Other Contamination History	Chlorinating station.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
1719†	Electrical Distribution System/ NPSA	No prior chemical use reported.	HISTORICAL: No historically associated chemicals SAMPLING: Surficial Soil (0 - 2 in): Aldrin, PPDDE, PPDDT, dieldrin, endrin, isodrin Surficial Soil (0 - 2 ft): Aldrin, arsenic, chlordane, copper, PPDDE, PPDDT, dieldrin, endrin, isodrin, lead, mercury, zinc	No Future Use, Other Contamination History	Industrial Support Building.
1726	Elevated Process Water Tank	The structure is a 500,000-gallon water storage tank. No prior chemical use reported.		No Future Use, Other Contamination History	Industrial Support Building.
1727	Industrial Waste Sewer Chemical Sump/NPSA-6	Liquid and process wastes generated during GB production and demilitarization operations were collected and neutralized in the 1727 chemical sump prior to discharge in the chemical sewer system and later Basin F. This waste consisted of all industrial chemicals used in North Plants washdown water, scrubber overflow and some water from the heat exchangers. In 1956, liquid leaked from the sump onto the walkway between Buildings 1703 and 1710. In 1982, all liquid in the sump was spray dried. In 1982, waste water was hauled from South Plants to the 1727 sump. After 1982, the sump occasionally overflowed and migrated along a drainage ditch towards First Creek.	HISTORICAL: All liquid wastes generated in North Plants, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester)	No Future Use, Agent History	Used for neutralization of agent wastes.
1728	Potable Water Tank	The structure is a 10,000 gallons water storage tank. No prior chemical use reported.		No Future Use, Other Contamination History	Industrial Support Building.
1730	Guard Station/ESA-3c	A water well associated with this building contained elevated nitrate levels in 1975, but the source of nitrate contamination was not established.	HISTORICAL: Nitrate	No Future Use, Other Contamination History	Industrial Support Building.
1734	Change House/ESA	The building was constructed as a change house and personnel decontamination facility for individuals working in chemical agent operations. Precise chemical agents are unavailable in Task 24.	HISTORICAL: Chemical agents	No Future Use, Other Contamination History	Used as change house.
1735	Loading Dock/ESA-3f	Due to its proximity to the new toxic gas storage yard, it is possible that chemicals such as L, H, phosgene, VX, and GB may have passed through this building. It has been indicated that weteye bombs were moved through the building. However, no reports were located in Task 24 confirming contamination of this building.	HISTORICAL: L, HD breakdown products (chloroacetic acid; dithiane; 1,4-oxathiane; thiodiglycol), phosgene, VX, GB breakdown products (diisopropylmethyl phosphonate; dimethylmethyl phosphonate; isopropylmethyl phosphonic acid; methylphosphonic acid; phosphoric acid, tributyl ester; phosphoric acid, triphenyl ester)	No Future Use, Agent History	Possible presence of agent.

Note: A symbol and acronym list is provided on the last page of this table.

Table A.1-7 Inventory List of Rocky Mountain Arsenal Structures

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
NN0101	Valve Gate - west side of Upper Derby/SSA-1b	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0102	Foundation - north of 534B/ SPSA-1a	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0103	Bathroom - north of 533/SPSA-1a	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0104	Flare Tower - north of 571B, northwest of 571/SPSA-1a,1f	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0105	Gas Meter House - southwest of 508/SPSA-1a	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0106	Fertilizer and Waste Loading Facility - north of 728/ SPSA-1g	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0107	Metal Shed - west of 733B/SPSA-5b	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0108	Metal Shed - west of 733C/SPSA-5b	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0109	Guard Station - northeast of 732/SPSA-5b	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0110	Metal Shed - south of 521B/SPSA-1a	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0111	3 Metal Incinerators NW of S41	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
NN0112	Stack Observation Station - east of 527/SPSA-1b	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0113	Two Metal Sheds - south of 474/SPSA-1a	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0114	Wooden Hut - southwest of 461/SPSA-2a	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0115	Flare Tower - north of Lime Pond/SPSA-1g	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0116	Long Metal Shed - south of 544/SPSA-1g	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0117	Two Sheds - southwest of 557/SPSA-2c	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0201	Concrete Silo - northwest of 254/SPSA-3e	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0202	Brick Structure - east of 361/ SPSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0204	Coal Hopper - north of 334/ SPSA-3a	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0205	Brick Valve House - south of 321B/SPSA-3e	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0300	Slated as remediation use structure.	Structure added since 1986, not part of Task 24.		No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
NN0301	Metal Shed - north of 618/ WSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0302	Metal Shed - north of 618/ WSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0303	Metal Shed - north of 619/ WSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0304	Metal Shed - north of 619/ WSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0501	Abandoned School/ESA	NA	NA	Future Use, No Potential Exposure	No direct use or storage of chemicals.
NN0601	Loading Dock - west of 866/ ESA-3b	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0602	Long Metal Shed - west of 865/ESA-3b	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0603	Metal Shed - east of 867A/ ESA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0902	Survey Tower - north of Post Office/WSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN0903	VORTAC Station/WSA	NA	NA	Future Use, No Potential Exposure	No direct use or storage of chemicals.
NN1208	Brick Structure - 900 ft southwest of 846/SSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.

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STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
NN1209	Concrete Bunker - 1,100 ft south of 846/SSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN1210	Concrete Bunker - 1,250 ft south of 846/SSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN1211	Concrete Bunker - 1,300 ft south of 846/SSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN1212	Concrete Bunker - 1,350 ft south of 846/SSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN1213	AMSA/OMS Maintenance Shop - north of 841/SSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN2001	Antenna Installation - 1/2 mile north of 9th Street/ESA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN2002	Tank Pad - north of 9th, 2/3 mile east of F Street/ESA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN22	36 GW Wells-NW Boundary Treatment			No Future Use, Other Contamination History	Industrial Support Building.
NN23	36 GW Wells-N Boundary Treatment			No Future Use, Other Contamination History	Industrial Support Building.
NN24	56 GW Wells-N Boundary Treatment			No Future Use, Other Contamination History	Industrial Support Building.
NN28	2 GW Wells-Irondale Treatment			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

Table A.1-7 Inventory List of Rocky Mountain Arsenal Structures

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
NN33	45 GW Wells-Irondale Treatment			No Future Use, Other Contamination History	Industrial Support Building.
NN2301	Abandoned Water Purification Plant/NCSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN2401	Concrete Structure - east of Bog/NCSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN2402	Wooden Shed - north of Trickling Filters/NCSA-8b	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN2403	Two Trickling Filters - south of 391/NCSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN2404	Imhoff Tank - south of 391	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN2405	Antenna Installation - north of 836/NCSA-8a	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN2501	Shed - northwest of 1618/ NPSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN2502	Gas Pump and Pad - northeast of 1618/NPSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN2503	Pumping Station - south of 1510/NPSA-7	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN2601	Decon Pad/Tank - northeast of Basin F/NCSA-4a,4b	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
NN2602	Valve Gate - north End of Reservoir C/NCSA-2a	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3001	Metal Shed - east of 853/ESA-5	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3002	Metal Shed - east of 853/ESA-5	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3101	Metal Shed - north of 1734/ ESA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3102	Three Sets of Shed Siding - 1,100 ft southeast of 1735/ ESA-3d	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3103	Storage Building/Toxic Storage Yard/ESA-3d	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3104	Shack - west of Berms/Toxic Storage Yard/ESA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3105	Shed - northwest end of Berms/Toxic Storage Yard/ ESA-3d	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3106	Shed - northeast end of Berms/Toxic Storage Yard/ ESA-3d	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3107	Antenna Station/ Toxic Storage Yard/ESA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3108	Shed - southwest end of 1st Berm/Toxic Storage Yard/ ESA-3d	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

Table A.1-7 Inventory List of Rocky Mountain Arsenal Structures

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
NN3109	Shed - southeast end of 1st Berm/Toxic Storage Yard/ ESA-3d	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3501	Three Communication Antenna Pits/NCSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3601	Incinerator-500 feet northeast of 834	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3602	Incinerator - 1,000 ft southeast of 834/CSA-1c	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3603	Metal Shed - northwest of 725/CSA-2a	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3604	Metal Shed - southwest of 725/CSA-2a	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NN3605	Metal Shed - southeast of 725/CSA-2a	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
NNT0101	Vertical Tank-TF0101			No Future Use, Other Contamination History	Industrial Support Building.
NNT0103	Vertical Tank-TF0106			No Future Use, Other Contamination History	Industrial Support Building.
NNT0105	Horizontal Tank-TF0108			No Future Use, Other Contamination History	Industrial Support Building.
NNT0106	Vertical Tank-TF0109			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
NNT0107	Horizontal Tank-E of 471C			No Future Use, Other Contamination History	Industrial Support Building.
NNT0110	Horizontal Tank-E of 536			No Future Use, Other Contamination History	Industrial Support Building.
NNT0111	Vertical Tank-TF0105			No Future Use, Other Contamination History	Industrial Support Building.
NNT0201	Underground Oil Tank w/DCPD-W of 321			No Future Use, Other Contamination History	Industrial Support Building.
PR01	Pipe Runs in Section 1			No Future Use, Other Contamination History	Industrial Support Building.
PR02	Pipe Runs in Section 2			No Future Use, Other Contamination History	Industrial Support Building.
PR04	Pipe Runs in Section 4			No Future Use, Other Contamination History	Industrial Support Building.
PR25	Pipe Runs in Section 25			No Future Use, Other Contamination History	Industrial Support Building.
PR36	Pipe Runs in Section 36			No Future Use, Other Contamination History	Industrial Support Building.
SS 0100	Substation-1T-30'N of 866			No Future Use, Other Contamination History	Industrial Support Building.
SS 0101	Substation-2T-200'NE of 866			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 0102	Substation-1T-500'W of 867A			No Future Use, Other Contamination History	Industrial Support Building.
SS 0103	Substation-1T-700'W of 865			No Future Use, Other Contamination History	Industrial Support Building.
SS 0104	Substation-1T-400'N of 872A			No Future Use, Other Contamination History	Industrial Support Building.
SS 0105	Substation-1T-NE of 867A			No Future Use, Other Contamination History	Industrial Support Building.
SS 0111	Substation-2T-N side 111			No Future Use, Other Contamination History	Industrial Support Building.
SS 0112	Substation-1T-150'S of 112			No Future Use, Other Contamination History	Industrial Support Building.
SS 0121	Substation-1T-NW corner of section			No Future Use, Other Contamination History	Industrial Support Building.
SS 0141	Substation-3T-E of 141			No Future Use, Other Contamination History	Industrial Support Building.
SS 0176	Substation-1T-W of Staff Quarters			No Future Use, Other Contamination History	Industrial Support Building.
SS 0213	Substation-3T-SE of 213			No Future Use, Other Contamination History	Industrial Support Building.
SS 0232	Substation-3T-SW of 254			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 0243	Substation-1T-W of 243			No Future Use, Other Contamination History	Industrial Support Building.
SS 0245	Substation-3T-S of 245			No Future Use, Other Contamination History	Industrial Support Building.
SS 0311	Substation-1T-S of 311			No Future Use, Other Contamination History	Industrial Support Building.
SS 0312	Substation-1T-S of 312			No Future Use, Other Contamination History	Industrial Support Building.
SS 0312A	Substation-1T-NE of 312			No Future Use, Other Contamination History	Industrial Support Building.
SS 0313	Substation-3T-W of 313			No Future Use, Other Contamination History	Industrial Support Building.
SS 0313-2	Substation-3T-W of 313			No Future Use, Other Contamination History	Industrial Support Building.
SS 0314	Substation-3T-NW of 314			No Future Use, Other Contamination History	Industrial Support Building.
SS 0315	Substation-3T-SW of 315			No Future Use, Other Contamination History	Industrial Support Building.
SS 0316	Substation-1T-S of 316			No Future Use, Other Contamination History	Industrial Support Building.
SS 0316A	Substation-3T-S of 316A			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 0317	Substation-1T-NW of 433			No Future Use, Other Contamination History	Industrial Support Building.
SS 0321	Substation-6T-S of 321			No Future Use, Other Contamination History	Industrial Support Building.
SS 0321A	Substation-3T-SW of 242			No Future Use, Other Contamination History	Industrial Support Building.
SS 0321B	Substation-1T-SE of 242			No Future Use, Other Contamination History	Industrial Support Building.
SS 0325	Substation-14T-between 325 & 311			No Future Use, Other Contamination History	Industrial Support Building.
SS 0327	Substation-3T-W of 332			No Future Use, Other Contamination History	Industrial Support Building.
SS 0328	Substation-3T-N of 328			No Future Use, Other Contamination History	Industrial Support Building.
SS 0330	Substation-1T-SW of 337			No Future Use, Other Contamination History	Industrial Support Building.
SS 0335	Substation-3T-S of 336			No Future Use, Other Contamination History	Industrial Support Building.
SS 0342	Substation-3T-ENE of 342			No Future Use, Other Contamination History	Industrial Support Building.
SS 0344	Substation-5T-E of 344			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 0355	Substation-3T-E of 356			No Future Use, Other Contamination History	Industrial Support Building.
SS 0361	Primary Substation-68T-SE of 112			No Future Use, Other Contamination History	Industrial Support Building.
SS 0362	Substation-3T-N of 362			No Future Use, Other Contamination History	Industrial Support Building.
SS 0363	Substation-3T-N of 362			No Future Use, Other Contamination History	Industrial Support Building.
SS 0365	Substation-3T-N of 365			No Future Use, Other Contamination History	Industrial Support Building.
SS 0368	Substation-1T-1/4 mi SSE of 351			No Future Use, Other Contamination History	Industrial Support Building.
SS 0370	Substation-1T-150'W of C			Future Use, No Potential Exposure	Industrial Support Building.
SS 0371	Substation-10T-N of 371			Future Use, No Potential Exposure	Industrial Support Building.
SS 0371A	Substation-1T-S of 372			No Future Use, Other Contamination History	Industrial Support Building.
SS 0371B	Substation-1T-N of SS 371			No Future Use, Other Contamination History	Industrial Support Building.
SS 0378	Substation-1T-N of 378			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 0379	Substation-1T-SE of 379			No Future Use, Other Contamination History	Industrial Support Building.
SS 0383	Substation-3T-E of 383			No Future Use, Other Contamination History	Industrial Support Building.
SS 0385	Substation-3T-N of 385			Future Use, No Potential Exposure	Industrial Support Building.
SS 0387	Substation-3T-W of 387			Future Use, No Potential Exposure	Industrial Support Building.
SS 0391	Substation-3T-SE of 391			No Future Use, Other Contamination History	Industrial Support Building.
SS 0392	Substation-2T-W of 392			No Future Use, Other Contamination History	Industrial Support Building.
SS 0393	Substation-2T-S of 393			No Future Use, Other Contamination History	Industrial Support Building.
SS 0411	Substation-3T-NE of 411			No Future Use, Other Contamination History	Industrial Support Building.
SS 0422	Substation-3T-W of 422			No Future Use, Other Contamination History	Industrial Support Building.
SS 0451	Substation-1T-SE of 413			No Future Use, Other Contamination History	Industrial Support Building.
SS 0461	Substation-2T-S of 459			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 0464	Substation-2T-SE of 464			No Future Use, Other Contamination History	Industrial Support Building.
SS 0474	Substation-7T-W of 472			No Future Use, Other Contamination History	Industrial Support Building.
SS 0510	Substation-3T-SE of 510			No Future Use, Other Contamination History	Industrial Support Building.
SS 0512	Substation-3T-NW of 517			No Future Use, Other Contamination History	Industrial Support Building.
SS 0514	Substation-3T-200'E of 561			No Future Use, Other Contamination History	Industrial Support Building.
SS 0515	Substation-6T-NW of 515			No Future Use, Other Contamination History	Industrial Support Building.
SS 0516	Substation-3T-W of 519			No Future Use, Other Contamination History	Industrial Support Building.
SS 0517	Substation-2T-NW of 517			No Future Use, Other Contamination History	Industrial Support Building.
SS 0517A	Substation-3T-N of 512			No Future Use, Other Contamination History	Industrial Support Building.
SS 0517B	Substation-3T-SW corner of 517			No Future Use, Other Contamination History	Industrial Support Building.
SS 0521	Substation-3T-SW of 521			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 0523	Substation-3T-S of 803			No Future Use, Other Contamination History	Industrial Support Building.
SS 0525A	Substation-1T-SW of 525			No Future Use, Other Contamination History	Industrial Support Building.
SS 0527	Substation-1T-S of 527			No Future Use, Other Contamination History	Industrial Support Building.
SS 0528	Substation-1T-S of 529			No Future Use, Other Contamination History	Industrial Support Building.
SS 0529	Substation-3T-S of 540			No Future Use, Other Contamination History	Industrial Support Building.
SS 0531	Substation-1T-W of 531			No Future Use, Other Contamination History	Industrial Support Building.
SS 0534	Substation-3T-200'N of 534A			No Future Use, Other Contamination History	Industrial Support Building.
SS 0539	Substation-2T-SE of 537			No Future Use, Other Contamination History	Industrial Support Building.
SS 0541	Substation-3T-W of 541			No Future Use, Other Contamination History	Industrial Support Building.
SS 0543	Substation-5T-W of 543			No Future Use, Other Contamination History	Industrial Support Building.
SS 0548	Substation-1T-N of 548			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 0548A	Substation-1T-101'W of 548			No Future Use, Other Contamination History	Industrial Support Building.
SS 0556	Substation-1T-N of 541			No Future Use, Other Contamination History	Industrial Support Building.
SS 0571	Substation-3T-75'W of 504A			No Future Use, Other Contamination History	Industrial Support Building.
SS 0575	Substation-1T-N of 504			No Future Use, Other Contamination History	Industrial Support Building.
SS 0575A	Substation-1T-N of 505			No Future Use, Other Contamination History	Industrial Support Building.
SS 0611	Substation-3T-S of 611			No Future Use, Other Contamination History	Industrial Support Building.
SS 0612	Substation-1T-E of 612			No Future Use, Other Contamination History	Industrial Support Building.
SS 0613	Substation-3T-NW of 613			No Future Use, Other Contamination History	Industrial Support Building.
SS 0614	Substation-1T-W of 614			No Future Use, Other Contamination History	Industrial Support Building.
SS 0616	Substation-3T-N of 614			No Future Use, Other Contamination History	Industrial Support Building.
SS 0618	Substation-3T-N of 618			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 0618-2	Substation-1T-W of 618			No Future Use, Other Contamination History	Industrial Support Building.
SS 0619	Substation-4T-N of 619			Future Use, No Potential Exposure	Industrial Support Building.
SS 0622	Substation-1T-NE of 621			No Future Use, Other Contamination History	Industrial Support Building.
SS 0624	Substation-3T-E of 624			No Future Use, Other Contamination History	Industrial Support Building.
SS 0625	Substation-1T-E of 624			No Future Use, Other Contamination History	Industrial Support Building.
SS 0627	Substation-3T-E of 627			No Future Use, Other Contamination History	Industrial Support Building.
SS 0627A	Substation-1T-E of SS 627			No Future Use, Other Contamination History	Industrial Support Building.
SS 0629	Substation-3T-NE of 629			No Future Use, Other Contamination History	Industrial Support Building.
SS 0631	Substation-3T-N of 631			No Future Use, Other Contamination History	Industrial Support Building.
SS 0632	Substation-1T-NE of 632			No Future Use, Other Contamination History	Industrial Support Building.
SS 0633	Substation-3T-S of 633			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 0634	Substation-3T-SE of 634			No Future Use, Other Contamination History	Industrial Support Building.
SS 0635	Substation-1T-W of 635			No Future Use, Other Contamination History	Industrial Support Building.
SS 0647	Substation-1T-E of 647A			No Future Use, Other Contamination History	Industrial Support Building.
SS 0673	Substation-1T-1200'NNE of 619			No Future Use, Other Contamination History	Industrial Support Building.
SS 0725	Substation-3T-S of SS 726			No Future Use, Other Contamination History	Industrial Support Building.
SS 0726	Substation-3T-200'S of 725			No Future Use, Other Contamination History	Industrial Support Building.
SS 0727	Substation-1T-W side of 727			No Future Use, Other Contamination History	Industrial Support Building.
SS 0728	Substation-3T-E of 728			No Future Use, Other Contamination History	Industrial Support Building.
SS 0729	Substation-6T-E of 729			No Future Use, Other Contamination History	Industrial Support Building.
SS 0732	Substation-6T-S of 732			No Future Use, Other Contamination History	Industrial Support Building.
SS 0742	Substation-6T-N of 742			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 0747	Substation-1T-75'S of 729			No Future Use, Other Contamination History	Industrial Support Building.
SS 0755	Substation-3T-S of 868C			No Future Use, Other Contamination History	Industrial Support Building.
SS 0756	Substation-1T-W of 868C			No Future Use, Other Contamination History	Industrial Support Building.
SS 0757	Substation-1T-S of 463D			No Future Use, Other Contamination History	Industrial Support Building.
SS 0780	Substation-1T-N of T 1505			No Future Use, Other Contamination History	Industrial Support Building.
SS 0781	Substation-1T-NE of T 1507			No Future Use, Other Contamination History	Industrial Support Building.
SS 0782	Substation-1T-N of 732			No Future Use, Other Contamination History	Industrial Support Building.
SS 0791-2	Substation-1T-E of 145			No Future Use, Other Contamination History	Industrial Support Building.
SS 0806D	Substation-1T-SE of 806			No Future Use, Other Contamination History	Industrial Support Building.
SS 0806G	Substation-1T-0.25 mi SW of 9 & D			No Future Use, Other Contamination History	Industrial Support Building.
SS 0808ABC	Substation-3T-NE of 808			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 0808D	Substation-1T-0.3 mi SW of 808			No Future Use, Other Contamination History	Industrial Support Building.
SS 0808E	Substation-1T-0.2 mi SW of 808			No Future Use, Other Contamination History	Industrial Support Building.
SS 0808F	Substation-1T-427'SSE of 808			No Future Use, Other Contamination History	Industrial Support Building.
SS 0808G	Substation-1T-800'SE of 808			No Future Use, Other Contamination History	Industrial Support Building.
SS 0808H	Substation-1T-0.36 mi ESE of 808			No Future Use, Other Contamination History	Industrial Support Building.
SS 0808I	Substation-1T-0.49 mi ESE of 808			No Future Use, Other Contamination History	Industrial Support Building.
SS 0808K	Substation-1T-0.68 mi ESE of 808			No Future Use, Other Contamination History	Industrial Support Building.
SS 0808L	Substation-1T-0.65 mi E of 808			No Future Use, Other Contamination History	Industrial Support Building.
SS 0809	Substation-3T-S of 809			No Future Use, Other Contamination History	Industrial Support Building.
SS 0809A	Substation-3T-300'SW of 809			No Future Use, Other Contamination History	Industrial Support Building.
SS 0809B	Substation-3T-200'W of 809			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 0809C	Substation-3T-400'N of 809			No Future Use, Other Contamination History	Industrial Support Building.
SS 0809D	Substation-3T-700'NE of 809			No Future Use, Other Contamination History	Industrial Support Building.
SS 0809E	Substation-3T-500'E of 809			No Future Use, Other Contamination History	Industrial Support Building.
SS 0809F	Substation-3T-0.2 mi S of 809			No Future Use, Other Contamination History	Industrial Support Building.
SS 0831	Substation-3T-200'S of 8th & D St.			No Future Use, Other Contamination History	Industrial Support Building.
SS 0831E	Substation-1T-538'SSE of 8th & D St.			No Future Use, Other Contamination History	Industrial Support Building.
SS 0832	Substation-1T-300'E of 159			No Future Use, Other Contamination History	Industrial Support Building.
SS 0836	Substation-3T-S of 836			No Future Use, Other Contamination History	Industrial Support Building.
SS 1402T	Substation-3T-150'W of 1601/1701			No Future Use, Other Contamination History	Industrial Support Building.
SS 1403T	Substation-3T-S of 1701			No Future Use, Other Contamination History	Industrial Support Building.
SS 1404T	Substation-3T-130'S of 1501			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 1501T	Substation-7T-SE of 1501			No Future Use, Other Contamination History	Industrial Support Building.
SS 1505T	Substation-3T-E of 1505			No Future Use, Other Contamination History	Industrial Support Building.
SS 1506T	Substation-2T-NW corner of 1506			No Future Use, Other Contamination History	Industrial Support Building.
SS 1510	Substation-2T-150'W of 1601			No Future Use, Other Contamination History	Industrial Support Building.
SS 1601-1	Substation-1T-E of 1601			No Future Use, Other Contamination History	Industrial Support Building.
SS 1601-2	Substation-1T-E of 1601			No Future Use, Other Contamination History	Industrial Support Building.
SS 1602	Substation-2T-100'SE of 1606			No Future Use, Other Contamination History	Industrial Support Building.
SS 1603	Substation-3T-100'NE of 1602			No Future Use, Other Contamination History	Industrial Support Building.
SS 1605	Substation-1T-between 1605 & 1608			No Future Use, Other Contamination History	Industrial Support Building.
SS 1606-1	Substation-3T-100'E of 1606			No Future Use, Other Contamination History	Industrial Support Building.
SS 1606-2	Substation-1T-100'NE of 1606			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 1607	Substation-3T-100'E of 1607			No Future Use, Other Contamination History	Industrial Support Building.
SS 1609	Substation-1T-150'NE of 1609			No Future Use, Other Contamination History	Industrial Support Building.
SS 1611	Substation-1T-E of 1611			No Future Use, Other Contamination History	Industrial Support Building.
SS 1611AB	Substation-2T-S of 1611			No Future Use, Other Contamination History	Industrial Support Building.
SS 1614	Substation-2T-NE o'1615			No Future Use, Other Contamination History	Industrial Support Building.
SS 1616	Substation-2T-NE of 1616			No Future Use, Other Contamination History	Industrial Support Building.
SS 1701	Substation-3T-100'E of 1701			No Future Use, Other Contamination History	Industrial Support Building.
SS 1702	Substation-2T-W of 1702			No Future Use, Other Contamination History	Industrial Support Building.
SS 1703	Substation-1T-S of 1703			No Future Use, Other Contamination History	Industrial Support Building.
SS 1704-1	Substation-3T-E of 1704			No Future Use, Other Contamination History	Industrial Support Building.
SS 1704-2	Substation-2T-E of 1704			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 1704-3	Substation-3T-E of 1704			No Future Use, Other Contamination History	Industrial Support Building.
SS 1706	Substation-1T-N of 1706			No Future Use, Other Contamination History	Industrial Support Building.
SS 1707	Substation-1T-S of 1704			No Future Use, Other Contamination History	Industrial Support Building.
SS 1710	Substation-3T-100'E of 1710			No Future Use, Other Contamination History	Industrial Support Building.
SS 1711	Substation-3T-100'E of 1706			No Future Use, Other Contamination History	Industrial Support Building.
SS 1724	Substation-3T-200'N of 1706			No Future Use, Other Contamination History	Industrial Support Building.
SS 1730	Substation-2T-NW of 1730			No Future Use, Other Contamination History	Industrial Support Building.
SS 1731	Substation-1T-200'NW of 1730			No Future Use, Other Contamination History	Industrial Support Building.
SS 1732	Substation-1T-NW corner of section			No Future Use, Other Contamination History	Industrial Support Building.
SS 1735	Substation-3T-E of 1736			No Future Use, Other Contamination History	Industrial Support Building.
SS 1736	Substation-2T-200'S of 1736			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS 6C	Substation-1T-SW corner of section			No Future Use, Other Contamination History	Industrial Support Building.
SS 7215	Substation-1T-fenced railcar area			No Future Use, Other Contamination History	Industrial Support Building.
SS 7C	Substation-1T-112'ESE 7th & C			No Future Use, Other Contamination History	Industrial Support Building.
SS AL338	Substation-1T-SE corner of section			No Future Use, Other Contamination History	Industrial Support Building.
SS AWL021	Substation-1T-S of pool rd			No Future Use, Other Contamination History	Industrial Support Building.
SS CPR 1	Rectifier-1R-130'SSE of 254			No Future Use, Other Contamination History	Industrial Support Building.
SS CPR 2	Rectifier-1R-W of 313			No Future Use, Other Contamination History	Industrial Support Building.
SS CPR 3	Rectifier-1R-146'W of 326			No Future Use, Other Contamination History	Industrial Support Building.
SS CPR 4	Rectifier-1R-E of 352A			No Future Use, Other Contamination History	Industrial Support Building.
SS CPR 5	Rectifier-1R-with SS 514			No Future Use, Other Contamination History	Industrial Support Building.
SS CPR 6	Rectifier-1R-with SS 515			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS CPR 7	Rectifier-1R-NE of SS 411			No Future Use, Other Contamination History	Industrial Support Building.
SS CPR 8	Rectifier-1R-W of 433			No Future Use, Other Contamination History	Industrial Support Building.
SS CPR 9	Rectifier-1R-W of 542			No Future Use, Other Contamination History	Industrial Support Building.
SS CPR 10	Rectifier-1R-S of 742A			No Future Use, Other Contamination History	Industrial Support Building.
SS F182	Substation-1T-500'W of T 1512			No Future Use, Other Contamination History	Industrial Support Building.
SS FL842	Substation-1T-N of 1618			No Future Use, Other Contamination History	Industrial Support Building.
SS GA	Substation-1T-0.1 mi N of 732			No Future Use, Other Contamination History	Industrial Support Building.
SS H-1	Substation-2T-SE of 319			No Future Use, Other Contamination History	Industrial Support Building.
SS LDLA	Substation-1T-W of Lower Derby			No Future Use, Other Contamination History	Industrial Support Building.
SS NN2201	Substation-1T-640'NNW of 810			No Future Use, Other Contamination History	Industrial Support Building.
SS NN2202	Substation-1T-960'NNW of 810			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS NN2203	Substation-1T-1260'NW of 810			No Future Use, Other Contamination History	Industrial Support Building.
SS NN2204	Substation-1T-1600'NW of 810			No Future Use, Other Contamination History	Industrial Support Building.
SS NN2205	Substation-1T-2050'NW of 810			No Future Use, Other Contamination History	Industrial Support Building.
SS NN2206	Substation-1T-2500'NW of 810			No Future Use, Other Contamination History	Industrial Support Building.
SS NN2207	Substation-1T-800'WNW of 810			No Future Use, Other Contamination History	Industrial Support Building.
SS NN2208	Substation-1T-1100'WNW of 810			No Future Use, Other Contamination History	Industrial Support Building.
SS NN2209	Substation-1T-1350'WNW of 810			No Future Use, Other Contamination History	Industrial Support Building.
SS NN2210	Substation-1T-1670'WNW of 810			No Future Use, Other Contamination History	Industrial Support Building.
SS NN2211	Substation-1T-2370'WNW of 810			No Future Use, Other Contamination History	Industrial Support Building.
SS NN2301	Substation-3T-200'N of 808			No Future Use, Other Contamination History	Industrial Support Building.
SS NN2501T	Substation-1T-SE corner of 1602			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
SS NN2601	Substation-1T-S of 806			No Future Use, Other Contamination History	Industrial Support Building.
SS NN2701	Substation-3T-W of 810			No Future Use, Other Contamination History	Industrial Support Building.
SS PSCOST	Substation-1T-1/8 mi S of 7th on C			No Future Use, Other Contamination History	Industrial Support Building.
SS PT56/57	Substation-2T-NE of 510			No Future Use, Other Contamination History	Industrial Support Building.
SS SBA	Substation-3T-SE side of 834			No Future Use, Other Contamination History	Industrial Support Building.
SS SWIM	Substation-1T-W of pool/on C			No Future Use, Other Contamination History	Industrial Support Building.
SS WR	Substation-1T-600'NE of 732			No Future Use, Other Contamination History	Industrial Support Building.
T0026	Horizontal Tank-TF0107			No Future Use, Other Contamination History	Industrial Support Building.
T 0027	Vertical Tank-TF0107			No Future Use, Agent History	Agent History.
T 0064	Horizontal Tank-TF0107			No Future Use, Other Contamination History	Industrial Support Building.
T 0065	Caustic Soda Storage Tank-TF0103			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
T 0075	Vertical Tank-TF0103			No Future Use, Other Contamination History	Industrial Support Building.
T 0076	Vertical Tank-TF0103			No Future Use, Other Contamination History	Industrial Support Building.
T 0078	Vertical Tank-TF0103			No Future Use, Other Contamination History	Industrial Support Building.
T0139	Horizontal Tank-TF0107			No Future Use, Other Contamination History	Industrial Support Building.
T 0190	Horizontal Tank-TF0107			No Future Use, Other Contamination History	Industrial Support Building.
T 0289	Air Receiver/Surge Tank-NE of 516			No Future Use, Other Contamination History	Industrial Support Building.
T 1040	Vertical Tank-TF0107			No Future Use, Other Contamination History	Industrial Support Building.
T 1128	Methanol Tank-TF0104			No Future Use, Other Contamination History	Industrial Support Building.
T 1129	MMAA Tank-TF0104			No Future Use, Other Contamination History	Industrial Support Building.
T 1132	Trimethylphosphite (TMP) Tank-TF0103			No Future Use, Other Contamination History	Industrial Support Building.
T 1133	MMA Tank-TF0104			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
T 1140	Chloroform Tank-TF0104			No Future Use, Other Contamination History	Industrial Support Building.
T 1146	Dicetene Tank-TF0110			No Future Use, Other Contamination History	Industrial Support Building.
T 1147	Dicetene Tank-TF0110			No Future Use, Other Contamination History	Industrial Support Building.
T 1168	Brine Storage Tank-SE corner 528			No Future Use, Other Contamination History	Industrial Support Building.
T 1178	Acetone Storage Tank-TF0103			No Future Use, Other Contamination History	Industrial Support Building.
T 1216	Mother Liquor/Dinitro Tank-TF0102			No Future Use, Other Contamination History	Industrial Support Building.
T 1324	Brine Storage Tank-TF0103			No Future Use, Other Contamination History	Industrial Support Building.
T 1327	Vertical Tank-TF0103			No Future Use, Other Contamination History	Industrial Support Building.
T 1340	Crystal, Acetone Tank-TF0102			No Future Use, Other Contamination History	Industrial Support Building.
T 1392	Vertical Tank-E of 512			No Future Use, Other Contamination History	Industrial Support Building.
T 1463	Vertical Tank-TF0104			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
T 1570	Vertical Tank-TF0105			No Future Use, Other Contamination History	Industrial Support Building.
T 1606	Horizontal Tank-TF0109			No Future Use, Other Contamination History	Industrial Support Building.
T 1973	Vertical Tank-TF0103			No Future Use, Other Contamination History	Industrial Support Building.
TF0107	Tank Farm-W & S of 514A			No Future Use, Other Contamination History	Industrial Support Building.
TF2501	Tank Farm-W of 1704			No Future Use, Other Contamination History	Industrial Support Building.
TW-13	Open Storage - north of 1611/NPSA	NA	NA	No Future Use, Other Contamination History	Industrial Support Building.
V 1064	Vertical Tank-TF0109			No Future Use, Other Contamination History	Industrial Support Building.
V 1214	Vertical Tank-TF0106			No Future Use, Other Contamination History	Industrial Support Building.
V 1220	Vertical Tank-TF0106			No Future Use, Other Contamination History	Industrial Support Building.
V 1250	Horizontal Tank-TF0104			No Future Use, Other Contamination History	Industrial Support Building.
V 1253	Horizontal Tank-TF0104			No Future Use, Other Contamination History	Industrial Support Building.

Note: A symbol and acronym list is provided on the last page of this table.

STRUCTURE NUMBER	STRUCTURE DESCRIPTION STUDY AREA-Subarea	HISTORICAL USE[a]	POTENTIAL ASSOCIATED CHEMICALS[b]	FS CATEGORY	FS REASON
V1267	Surge Vessel-TF0105			No Future Use, Other Contamination History	Industrial Support Building.
V 1270	Horizontal Tank-TF0105			No Future Use, Other Contamination History	Industrial Support Building.
Z-28	Trailer	Structure added since 1986. Not part of Task 24.		Future use, No Potential Exposure	No direct use or storage of chemicals.
Z-3	Trailer	Structure added since 1986. Not part of Task 24.		Future use, No Potential Exposure	No direct use or storage of chemicals.
Z-38	Trailer	Structure added since 1986. Not part of Task 24.		Future use, No Potential Exposure	No direct use or storage of chemicals.
Z-39	Trailer	Structure added since 1986. Not part of Task 24.		Future use, No Potential Exposure	No direct use or storage of chemicals.
Z-40	Trailer	Structure added since 1986. Not part of Task 24.		Future use, No Potential Exposure	No direct use or storage of chemicals.
Z-41	Trailer	Structure added since 1986. Not part of Task 24.		Future use, No Potential Exposure	No direct use or storage of chemicals.
Z-42	Trailer	Structure added since 1986. Not part of Task 24.		Future use, No Potential Exposure	No direct use or storage of chemicals.
Z-58	Trailer	Structure added since 1986. Not part of Task 24.		Future use, No Potential Exposure	No direct use or storage of chemicals.
Z-68	Trailer	Structure added since 1986. Not part of Task 24.		Future use, No Potential Exposure	No direct use or storage of chemicals.
Z-69	Trailer	Structure added since 1986. Not part of Task 24.		Future use, No Potential Exposure	No direct use or storage of chemicals.
Z-70	Trailer	Structure added since 1986. Not part of Task 24.		Future use, No Potential Exposure	No direct use or storage of chemicals.

Note: A symbol and acronym list is provided on the last page of this table.

> Greater than
† Structures classified in Feasibility Study as potential remediation support structures

1 Chemical agent not identified in Task 24 (EBASCO, 1988c/RTIC 88306R02)
2 All reactions may not have gone to completion and therefore similar chemicals may be present in downstream structures connected via pipelines.

Army	U.S. Army
As	Arsenic
Ba	Barium
Bldg	Building
CAIS	Chemical Agent Identification Set
Cd	Cadmium
CL6CP	Hexachlorocyolopentadiene
CPMSO	4-Chlorophenylmethyl Sulfoxide
CPMSO2	Chlorophenylmethyl Sulfone
Cr	Chromium
CSA	Central Study Area
Cu	Copper
DBCP	Dibromochloropropane
DCPD	Dicyclopentadiene
DET	Denver Effluent Treatment
DIMP	Diisopropylmethyl phosphonate
1,4-DCLB	1,4-Dichlorobenzene
DMMP	Dimethylmethyl phosphonate
E	East
ESA	Eastern Study Area
ENE	East north-east
ESE	East south-east
ft	foot or feet
GB (or Sarin)	Isopropyl methylphosphonofluoridate
GF	O-cyclohexyl methylphosphonofluoridate
GW	Groundwater
H	Mustard or Crude Mustard
HD	Distilled Mustard
Hg	Mercury
in	inch(es)
lb	pound(s)
L	Lewisite
MB	Masonry Block
mi	mile
mm	millimeter(s)
N	North
NA	Not available
NE	Northeast
NCSA	North Central Study Area
NNE	North north-east
NNW	North north-west
NN	No Number
NW	Northwest
NOAA	National Oceanic and Atmospheric Administration
NPSA	North Plants Study Area
NSC	No Surficial Soil Samples collected within 1,000 feet of building
MIC	Methyl isocyanate
Pb	Lead
PCB	Polychlorinated biphenyl
P/D	Plaster/Drywall
PMRMA	Project Manager Rocky Mountain Arsenal
PPDDE	Dichlorodiphenyldichloroethylene
PPDDT	Dichlorodiphenyltrichloroethane
	DibromPhosphoric acid 1,2-dibromo-2,2-dichloroethyl dimethylester
PTI	Pyrotechnic incendiary
PX	Post Exchange
RCRA	Resource Conservation and Recovery Act
RMA	Rocky Mountain Arsenal
SM	Sheet Metal
smv	standing material volume
So	South
SE	Southeast
SPSA	South Plants Study Area
SSA	Southern Study Area
SSE	South south-east
ST	Structural Tile
SW	Southwest
TC	Thionyl chloride
TCLP	Toxicity Characteristic Leaching Procedure
TNT	2,4,6-Trinitrotoluene
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UV	Ultraviolet
VX	Ethyl s-dimethyl aminoethyl methyl phosphonothiolate
W	West
WC	Wood Columns
WD	Wood
WNW	West north-west
WSA	Western Study Area
yd^3	cubic yard
Zn	Zinc

SOURCES:

a EBASCO 1988c/RTIC 88306R02, except where noted

b HISTORICAL: EBASCO 1988c/RTIC 88306R02
SAMPLING:
Dust - EBASCO 1988c/RTIC 88306R02
Liquid - EBASCO 1988c/RTIC 88306R02
Surficial Soil (0-2 in; Nonvolatile analytes detected within 1,000 ft of structure) - EBASCO, 1991/RTIC 91121R01
Surficial Soil (0-2 ft; Nonvolatile analytes detected within 1,000 ft of structure) - RMA Environmental Database, 1992b (Chemical Soil File)
Subsurface Soil (Volatile analytes detected within 300 ft of structure) - RMA Environmental Database, 1992b (Chemical Soil File)
Groundwater (Volatile analytes detected within 300 ft of structure) - RMA Environmental Database, 1992a (Chemical Groundwater File)
Air - Woodward-Clyde 1993a/RTIC 93095R02
Dust/Vacuum - Woodward-Clyde 1993a/RTIC 93095R02
Dust/Wipe - Woodward-Clyde 1993a/RTIC 93095R02

c EBASCO 1989a/RTIC 89166R05

d Woodward-Clyde 1993b/RTIC 93095R01

e EBASCO 1987

f Warren 1993

Appendix B

APPENDIX B: DEVELOPMENT OF STRUCTURE QUANTITIES

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B1.0 INTRODUCTION

Structure feasibility study (FS) remedial alternative total costs for Rocky Mountain Arsenal (RMA) were developed using spreadsheets that multiplied unit costs by material quantities. These quantities included standing and collapsed structure volumes, square feet of surface requiring treatment, and salvage and landfill volumes, among others. Estimates of structure quantities had been calculated as part of the 1987 Task 24 Structures Survey Report (EBASCO 1988) and form the basis for the FS information.

Because the Task 24 survey was completed before the needs of the Structures FS were defined, the data gathered were not specific enough to apply directly to the cost estimates. The Task 24 database fields are presented in Table B1.0-1. A series of algorithms was developed to estimate Structures FS quantities from the Task 24 material quantity data; these quantities are presented in Table B1.0-2. From the Structures FS quantities, another series of algorithms was applied to estimate the quantities used in the cost spreadsheets, which are presented in Table B1.0-3. This two-step process was necessary because the final format of the cost spreadsheets was not designed until the later stages of the FS. The Structures FS quantity estimate therefore represents an intermediate step prior to defining the final costing quantity needs.

In general, the estimation process consisted of applying a series of mathematical formulas and assumptions to a select group of Task 24 data. As the Task 24 data were specific to individual structures, a DBASE IV program was used that allowed the structures data to be reorganized by medium group. Once the data were reorganized, algorithms were applied to individuals within the groups and the the individual results summed for a group total. Because it is difficult to describe all the steps of the algorithms as written text, this appendix provides an illustration of the process in Plates B1.0-1, B1.0-2, and B1.0-3. Plate B1.0-1 shows the progression from the Task 24 data to the quantities derived during the Structures FS and from there to the data used in the quantity table for the cost spreadsheets. Plate B1.0-2 shows how the algorithms were applied to the Task 24 data to derive the Structures FS quantities. Plate B1.0-3 shows how the algorithms were applied to the Task 24 data and the Structures FS quantities to estimate the

quantities used in the quantity table for the cost spreadsheets. The key points of this process are discussed below, including the material quantity estimates used in the algorithm and the key assumptions used to derive the resulting quantity. The mathematical formulas that apply the quantities and assumptions are not described in this text, and the reader is referred to the plates that present this information.

B1.1 DEVELOPMENT OF STRUCTURES FS QUANTITIES

The following discussion refers to Plate B1.0-2. These quantities were developed during the initial stages of the Structures FS. Many of the derived quantities were then used to derive the cost table quantities.

B1.1.1 Total Structure Footprint

The total structure footprint area (TSF) was not provided in Task 24, so this value was derived using the total square feet of building floor space (SQ_FT) and the number of stories in the structure (STORIES).

B1.1.2 Volume Of Roof And Wall Material

Task 24 provided the collapsed building volume and the types of materials used for the foundation, roof, and walls. It did not distinguish between wall, floor, and roof materials volumes, which was necessary for some of the treatment processes being considered, nor did it provide volume estimates of materials like concrete, wood, tile, etc. An assumption was made that the walls and floors were made of the same materials, and algorithms were used to estimate the wall and roof materials. These estimates allowed the construction material volumes to be distinguished.

The volume of roof material (CYDROOF) was estimated based on the assumption that the roof area is the same as the structure footprint area and that its thickness is 0.1 ft. The volume of wall and floor material (CYDWALL) was estimated using CYDROOF as well as the Task 24

datafields C_BLDG_VOL (collapsed building volume), FDN_AB_GRD (foundation above ground), and FDN_BL_GRD (foundation below ground).

With the use of the volume estimates and material type information for foundations, walls and floors, and roofs, the total volume of construction material types was estimated as shown in Plate B1.0-2.

B1.1.3 Salvage Volumes For Scrap Metal And Aggregates

Salvage volumes for scrap metal and aggregates were estimated using selected material volumes. For scrap metal, it was assumed that 3 percent of the concrete volume represented salvageable reinforcing steel and that 80 percent of the tank metal, corrugated metal, and sheet metal were salvageable. For aggregate, it was assumed that 97 percent of the concrete and 80 percent of the tile, brick, and masonry/cinder block represented salvageable aggregate.

B1.1.4 Capping Area

The capping area was developed as if structural debris was consolidated in one area and capped. It was derived from the Task 24 C_BLDG_VOL (collapsed building volume). The area of debris was estimated based on the assumption that debris would be placed in a square area an average of 2.5 feet deep. The square root of the area was taken to find the length of a cap side, and 15 feet was added to the length to allow for tapering the cap to design grades. This composite length was then squared to estimate the cap area.

B1.1.5 Perimeter And Perimeter With 10-Foot Buffer

The square root of the TSF was used to calculate one side of a building's perimeter, assuming a perfectly square building. A 10-foot buffer was added to the side and the remaining three walls added to the perimeter estimate.

B1.1.6 Tank Standing Volume And Tank Treatable Surface

Estimates for the standing volume and treatable surfaces of tanks were derived by filtering the Task 24 standing structure volume (S_BLDGVOL) for tanks only. The resulting tank standing volume was used to derive the treatable surface of a tank as follows. The tank radius was estimated using the volume formula for a right circular cylinder, assuming the tank height is twice the tank radius. The radius was then used in conjunction with the formula for the area of a right circular cylinder to estimate interior surface area of the tank that is treatable.

B1.1.7 Treatable Surface Area For Sand Blasting And Vacuum Dusting, And Grit Blasting

Sand blasting and vacuum dusting are surficial treatment technologies that were assumed to be applicable to concrete, tile, brick, and masonry. Grit blasting is a surface treatment technology that was assumed to be applicable to concrete, tile, and masonry. The quantity estimate algorithm was the same for both types of technologies, after filtering for the appropriate construction material, and is summarized in Plate B1.0-2.

The treatable surface area algorithm used the Task 24 quantities for number of stories (STORIES), the foundation above ground (FDN_AB_GRD), and the foundation below ground (FDN_BL_GRD), as well as the FS-derived quantities for total structure footprint (TSF) and structure perimeter (PERIMETER). It was assumed that 30 percent of the following interior surface areas of the structure required treatment: the floors, the walls to a height of 5 feet, and the interior partitions to a height of 5 feet. It was also assumed that 30 percent of the foundation exterior surface would require treatment.

B1.1.8 Interior Surface Area And Interior And Exterior Surface Area

The surface area estimates were developed using the Task 24 quantity for structure stories (STORIES) and the FS quantity estimate for total structure footprint (TSF) and the structure perimeter (PERIMETER). The interior surface area algorithm was computed assuming that the walls were 15 feet tall and that the interior partitions were equivalent to 15 percent of the outside

wall area. The exterior surface area algorithm used the interior surface area and also included areas for the roof and wall exterior surfaces.

B1.2 DEVELOPMENT OF THE QUANTITY TABLE

The following discussion refers to Plate B1.0-3. These quantities were developed for application to the cost spreadsheets for structures alternatives. These quantity estimates were based on Task 24 data and Structures FS quantities and in some cases were derived using previous quantity table estimates. The quantity table items are numbered 1 through 41. The following items are not used in the final version of the cost spreadsheets and will not be described below: 7, 8, 10, 11, 12, 18, 23, 26, 33, 34, and 39.

B1.2.1 Unity For Lump Sum

This quantity is the number 1. Lump sum costs were multiplied by this quantity in the cost spreadsheets.

B1.2.2 Standing Building Volume

The standing building volume is the volume the intact structure occupies. This quantity was taken directly from the Task 24 S_BLDGVOL estimate.

B1.2.3 Collapsed Building Volume

The collapsed building volume is the volume of the debris resulting from demolition of the building only and does not include equipment or piping. This quantity was taken directly from the Task 24 C_BLDGVOL estimate.

B1.2.4 Building Footprint Area

The building footprint area is the ground surface occupied by the standing building. This quantity was taken directly from the TSF derived for the Structures FS.

B1.2.5 Open Piping Volume

The open piping volume is the volume that piping would occupy in situ, prior to demolition. This quantity was derived from the Task 24 collapsed piping volume (PIPING_VOL). Task 24 estimated collapsed piping volume from the open piping volume observed in the field by assuming the following: if a box was drawn around a pipe cross section, the area enclosed by the pipe would be 79 percent of the area enclosed by the box. Of that 79 percent, 10 percent of it would consist of the walls of the pipe. When field observations of piping were taken during Task 24, the volume of an imaginary box around the pipes was estimated and multiplied by the factor. The quantity table algorithm factor is intended to reconstruct the open piping volume by reversing the Task 24 estimation method.

B1.2.6 Collapsed Process Equipment Volume

The collapsed process equipment volume is the volume that equipment would occupy following demolition. This quantity was taken directly from the Task 24 C_EQUIPVOL estimate.

B1.2.7 Collapsed Scrap Metal Volume

The collapsed scrap metal volume is the volume of salvageable metals that can be reclaimed following demolition. This quantity was taken directly from the scrap metal volume derived for the Structures FS.

B1.2.8 Treatable Surface Area For Sand Blasting And Vacuum Dusting

The treatable surface area for sand blasting and vacuum dusting is the area upon which it is assumed these treatment techniques will be applied. This quantity was taken directly from the quantity of the same name derived for the Structures FS.

B1.2.9 Total Collapsed Volume

The total collapsed volume reflects the rubble pile that would be left after a building has been demolished. It is the sum of the collapsed building volume (C_BLDGVOL), collapsed piping

volume (PIPING_VOL), and the collapsed equipment volume (C_EQUIPVOL) estimated in Task 24.

B1.2.10 Two-Year Annual Cost

This quantity is the number 2. Annual costs for 2-year projects were multiplied by this quantity in the cost spreadsheets.

B1.2.11 Collapsed Metal Weight

The collapsed metal weight is the weight of the salvageable metals recovered after demolition. This quantity was derived from the scrap metal volume developed for the Structures FS. It was multiplied by factors to convert metal volume to metal weight.

B1.2.12 Three-Year Annual Cost

This quantity is the number 3. Annual costs for 3-year projects were multiplied by this quantity in the cost spreadsheets.

B1.2.13 Small Pipe Open Volume

The small pipe open volume is the volume of pipes with diameters of 2 inches or less. This quantity was derived from the open piping volume developed previously for the quantity table. It was assumed that small pipes represent 5 percent of the open piping volume.

B1.2.14 Medium Pipe Open Volume

The medium pipe open volume is the volume of pipes with diameters between 2 and 6 inches. This quantity was derived from the open piping volume developed previously for the quantity table. It was assumed that medium pipes represent 55 percent of the open piping volume.

B1.2.15 Large Pipe Open Volume

The large pipe open volume is the volume of pipes with diameters greater than 6 inches. This quantity was derived from the open piping volume developed previously for the quantity table. It was assumed that large pipes represent 40 percent of the open piping volume.

B1.2.16 Treatable Surface Area For Steam Cleaning

The treatable surface area for steam cleaning is the area upon which it is assumed this treatment technique will be applied. This quantity was taken directly from the quantity of the same name derived for the Structures FS.

B1.2.17 Building Perimeter With 10-Foot Buffer

The building perimeter with 10-foot buffer is the area around individual structures. This quantity was taken directly from the quantity of the same name derived for the Structures FS.

B1.2.18 Collapsed Total Volume - Metal Salvage Volume

The collapsed total volume minus the metal salvage volume results in the final disposal volume. This quantity was derived by subtracting the metal salvage volume derived for the Structures FS from the collapsed total volume developed previously for the quantity table.

B1.2.19 Interior Surface Area For Hot Gas

The interior surface area for hot gas is the area upon which it was assumed this treatment technique will be applied. This quantity was taken directly from the quantity of the same name derived for the Structures FS.

B1.2.20 Interior And Exterior Surface Area For Hot Gas Of Debris

The exterior and interior surface area for hot gas treatment of debris is the area upon which it was assumed this treatment technique will be applied. This quantity is taken directly from the quantity of the same name derived for the Structures FS.

B1.2.21 Agent Treatment Volume

The agent treatment volume is the volume of agent structure debris that requires caustic treatment to comply with Army regulations. This quantity was assumed to be 5 percent of the collapsed agent structure volume, based on the C_BLDGVOL estimate of Task 24 and filtered for the agent medium group.

B1.2.22 Volume For Structure Hole Fill

The volume for structure hole fill reflects the hole in the ground left after demolition is complete. It was derived using the TSF developed for the Structures FS. It was assumed that the hole is 1 foot deep over the entire structure footprint.

B1.2.23 Fifteen Percent Of Interior Surface

The quantity 15 percent of interior surface was used in the cost estimate for locks and boards to close up structures. It was derived from the interior surface area estimate for the Structures FS.

B1.2.24 Unity For Annual Costs

This quantity is the number 1. Annual costs for 1-year projects are multiplied by this quantity in the cost spreadsheets.

B1.2.25 Cap-In-Place Collapsed Total Volume

The cap-in-place collapsed total volume is the rubble pile left after demolition, including structure debris, piping, and process equipment. This quantity is used for the cap-in-place alternatives, which assume that structure debris from the Railyard area and North Plants regions of RMA will be grouped in two areas. It was derived from the total collapsed volume developed previously for the quantity table and filtered for the sections comprising these two regions.

B1.2.26 Cap-In-Place Metal Salvage Volume

The cap-in-place metal salvage volume is the volume of salvageable metals available from the debris of the Railyard area and North Plants regions. It was derived from the scrap metal volume developed for the Structures FS and filtered for the sections comprising these two regions.

B1.2.27 Central Processing Area Total Collapsed Volume

The central processing area total collapsed volume is the rubble pile left after demolition, including structure debris, piping, and process equipment. This quantity was used for input to the Soil Detailed Analysis of Alternatives (DAA). It was derived from the total collapsed volume developed previously for the quantity table and filtered for the sections comprising the South Plants region.

B1.2.28 Central Processing Area Metal Salvage Volume

The Central Processing Area metal salvage volume is the volume of salvageable metals available from the debris of the South Plants region. It was derived from the scrap metal volume developed for the Structures FS and filtered for the sections comprising the region.

B1.2.29 Cap-In-Place Disposal Volume

The cap-in-place disposal volume is the volume of debris to be capped in the Railyard and North Plants regions. It was derived from the cap-in-place metal salvage volume and the cap-in-place collapsed total volume, derived previously for the quantity table.

B1.2.30 Cap-In-Place Consolidation Area

This quantity is used for the cap-in-place alternatives, which assume that structural debris from the Railyard area and North Plants regions of RMA will be grouped in two areas. After filtering for the sections comprising these two areas, the algorithm is similar to the capping estimate of the Structures FS. It was derived from the cap-in-place disposal volume estimated above for the quantity table. The area of debris was estimated based on the assumption that debris would be placed in a square area an average of 2.5 feet deep. The square root of the area was taken to find

the length of a cap side, and 15 feet was added to the length to allow for tapering the cap out to grade. This composite length was then squared to estimate the cap area.

B1.2.31 Stockpile Volume

This quantity is used to represent demolition debris volumes to be stockpiled prior to on-post incineration. This volume includes materials used to construct a temporary facility on post. All materials that come into contact with structural material or runoff from the stockpile were included in the incineration volume.

Table B1.0-1 Task 24 Database Fields

BUILDING	structure number
S_BLDG_VOL	standing structure volume
C_BLDG_VOL	collapsed structure volume, neatly stacked
FDN_AB_GRD	foundation above ground surface
FDN_BL_GRD	foundation below ground surface
C_EQUIPVOL	collapsed equipment volume, neatly stacked
PIPING_VOL	collapsed piping volume, neatly stacked
SQ_FT	total square feet of structure floor space
STORIES	number of stories in a structure
ROOF_TYPE	type of roofing materials for a structure
WALL_TYPE	type of wall materials for a structure
FOUND_TYPE	type of foundation materials for a structure

The Task 24 Database presents field survey data for all structures at RMA. The surveys were conducted in 1987, and included estimates of structure material types and volumes. The database consists of 86 fields, 12 of which were used to calculate material quantities for the structures DAA. The 12 fields of interest are mentioned above.

Material Volumes for No Future Use, Other Contamination History Medium Group

Total Number of Structures:	630	
Total Standing Volume:	626,591	CY
Total Standing Volume Including Shell Equipment:	627,346	CY
Total Collapsed Volume of All:	108,700	CY
Total Collapsed Volume of Structures:	87,657	CY
Total Collapsed Volume of Process Equipment:	3,037	CY
Total Collapsed Volume of Piping:	3,446	CY
Total Collapsed Volume of:		
Concrete:	49,313	CY
Wood:	1,490	CY
Tile:	5,904	CY
Brick:	4,073	CY
Masonry/Cinder Blocks:	15,942	CY
Corrugated Metal:	3,693	CY
Corrugated Asbestos:	3,951	CY
Asbestos Board:	309	CY
Fiberglass:	0	CY
Asphalt Shingle:	941	CY
Built-up/Hot Tar:	379	CY
Sheet Metal:	14	CY
Wood and Asphalt:	2	CY
Salvage Volumes:		
Scrap Metal:	9,165	CY
Aggregate:	59,002	CY
Tank Standing Volume:	18,686	CY
Tank Collapsed Volume:	4,769	CY
Total Structure Footprint:	994,976	SF
Capping Area:	1,411,200	SF
Total Structure Footprint Perimeter with 10-ft buffer:	79,304	linear ft
Tank Treatable Surface:	76,220	SF
Treatable Surface Area for Sand Blasting and Vacuum Dusting:	581,771	SF
Treatable Surface Area for Steam Cleaning:	409,731	SF
Interior Surface Area:	3,140,214	SF
Exterior and Interior Surface Area:	4,920,771	SF
Collapsed Roof Volume:	2,215	CY

Material Volumes for No Future Use, Significant Contamination History Medium Group

Total Number of Structures:	49	
Total Standing Volume:	223,359	CY
Total Standing Volume Including Shell Equipment:	224,548	CY
Total Collapsed Volume of All:	22,216	CY
Total Collapsed Volume of Structures:	20,801	CY
Total Collapsed Volume of Process Equipment:	1,148	CY
Total Collapsed Volume of Piping:	267	CY
Total Collapsed Volume of:		
Concrete:	12,654	CY
Wood:	24	CY
Tile:	1,375	CY
Brick:	3,129	CY
Masonry/Cinder Blocks:	249	CY
Corrugated Metal:	1,004	CY
Corrugated Asbestos:	1,102	CY
Asbestos Board:	737	CY
Fiberglass:	0	CY
Asphalt Shingle:	132	CY
Built-up/Hot Tar:	176	CY
Sheet Metal:	0	CY
Wood and Asphalt:	156	CY
Salvage Volumes:		
Scrap Metal:	905	CY
Aggregate:	13,622	CY
Tank Standing Volume:	0	CY
Tank Collapsed Volume:	0	CY
Total Structure Footprint:	282,299	SF
Capping Area:	316,789	SF
Total Structure Footprint Perimeter with 10-ft buffer:	15,250	linear ft
Tank Treatable Surface:	0	SF
Treatable Surface Area for Sand Blasting and Vacuum Dusting:	149,224	SF
Treatable Surface Area for Steam Cleaning:	127,625	SF
Interior Surface Area:	841,600	SF
Exterior and Interior Surface Area:	1,264,199	SF
Collapsed Roof Volume:	553	CY

Material Volumes for No Future Use, Agent History Medium Group

Total Number of Structures:	70	
Total Standing Volume:	600,064	CY
Total Collapsed Volume of All:	74,972	CY
Total Collapsed Volume of Structures:	68,437	CY
Total Collapsed Volume of Process Equipment:	5,347	CY
Total Collapsed Volume of Piping:	1,188	CY
Total Collapsed Volume of:		
Concrete:	45,457	CY
Wood:	195	CY
Tile:	2,260	CY
Brick:	1,961	CY
Masonry/Cinder Blocks:	13,523	CY
Corrugated Metal:	2,994	CY
Corrugated Asbestos:	1,295	CY
Asbestos Board:	250	CY
Fiberglass:	0	CY
Asphalt Shingle:	136	CY
Built-up/Hot Tar:	289	CY
Sheet Metal:	3	CY
Wood and Asphalt:	74	CY
Salvage Volumes:		
Scrap Metal:	3,132	CY
Aggregate:	49,470	CY
Tank Standing Volume:	40	CY
Tank Collapsed Volume:	1	CY
Total Structure Footprint:	541,507	SF
Capping Area:	916,450	SF
Total Structure Footprint Perimeter with 10-ft buffer:	25,385	linear ft
Tank Treatable Surface:	583	SF
Treatable Surface Area for Sand Blasting and Vacuum Dusting:	391,970	SF
Treatable Surface Area for Steam Cleaning:	278,563	SF
Interior Surface Area:	1,849,194	SF
Exterior and Interior Surface Area:	2,751,691	SF
Collapsed Roof Volume:	1,716	CY

Material Volumes for No Future Use, Other Contamination History Medium Group, North Plants Group

Total Number of Structures:	121	
Total Standing Volume:	91,760	CY
Total Collapsed Volume of All:	13,559	CY
Total Collapsed Volume of Structures:	11,540	CY
Total Collapsed Volume of Process Equipment:	1,228	CY
Total Collapsed Volume of Piping:	791	CY
Total Collapsed Volume of:		
Concrete:	7,196	CY
Wood:	219	CY
Tile:	0	CY
Brick:	493	CY
Masonry/Cinder Blocks:	3,171	CY
Corrugated Metal:	101	CY
Corrugated Asbestos:	4	CY
Asbestos Board:	0	CY
Fiberglass:	0	CY
Asphalt Shingle:	44	CY
Built-up/Hot Tar:	186	CY
Sheet Metal:	1	CY
Wood and Asphalt:	0	CY
Salvage Volumes:		
Scrap Metal:	2,474	CY
Aggregate:	8,515	CY
Tank Standing Volume:	5,097	CY
Tank Collapsed Volume:	2,103	CY
Total Structure Footprint:	114,960	SF
Capping Area:	190,090	SF
Total Structure Footprint Perimeter with 10-ft buffer:	10,018	linear ft
Tank Treatable Surface:	23,023	SF
Treatable Surface Area for Sand Blasting and Vacuum Dusting:	76,476	SF
Treatable Surface Area for Steam Cleaning:	50,942	SF
Interior Surface Area:	330,634	SF
Exterior and Interior Surface Area:	526,647	SF
Collapsed Roof Volume:	255	CY

Material Volumes for No Future Use, Other Contamination History Medium Group, Railyard Group with Tanks

Total Number of Structures:	98	
Total Standing Volume:	82,580	CY
Total Collapsed Volume of All:	8,354	CY
Total Collapsed Volume of Structures:	7,881	CY
Total Collapsed Volume of Process Equipment:	344	CY
Total Collapsed Volume of Piping:	129	CY
Total Collapsed Volume of:		
Concrete:	5,040	CY
Wood:	369	CY
Tile:	0	CY
Brick:	1,279	CY
Masonry/Cinder Blocks:	314	CY
Corrugated Metal:	444	CY
Corrugated Asbestos:	199	CY
Asbestos Board:	216	CY
Fiberglass:	0	CY
Asphalt Shingle:	269	CY
Built-up/Hot Tar:	58	CY
Sheet Metal:	0	CY
Wood and Asphalt:	0	CY
Salvage Volumes:		
Scrap Metal:	410	CY
Aggregate:	5,185	CY
Tank Standing Volume:	0	CY
Tank Collapsed Volume:	12	CY
Total Structure Footprint:	133,420	SF
Capping Area:	145,200	SF
Total Structure Footprint Perimeter with 10-ft buffer:	13,075	linear ft
Tank Treatable Surface:	0	SF
Treatable Surface Area for Sand Blasting and Vacuum Dusting:	64,381	SF
Treatable Surface Area for Steam Cleaning:	47,012	SF
Interior Surface Area:	432,711	SF
Exterior and Interior Surface Area:	702,974	SF
Collapsed Roof Volume:	365	CY

Material Volumes for No Future Use, Other Contamination History Medium Group, South Plants Group

Total Number of Structures:	409	
Total Standing Volume:	452,168	CY
Total Collapsed Volume of All:	86,781	CY
Total Collapsed Volume of Structures:	68,230	CY
Total Collapsed Volume of Process Equipment:	1,465	CY
Total Collapsed Volume of Piping:	2,526	CY
Total Collapsed Volume of:		
Concrete:	37,077	CY
Wood:	897	CY
Tile:	5,904	CY
Brick:	2,301	CY
Masonry/Cinder Blocks:	12,457	CY
Corrugated Metal:	3,148	CY
Corrugated Asbestos:	3,748	CY
Asbestos Board:	93	CY
Fiberglass:	0	CY
Asphalt Shingle:	627	CY
Built-up/Hot Tar:	135	CY
Sheet Metal:	13	CY
Wood and Asphalt:	2	CY
Salvage Volumes:		
Scrap Metal:	6,281	CY
Aggregate:	45,301	CY
Tank Standing Volume:	13,589	CY
Tank Collapsed Volume:	2,654	CY
Total Structure Footprint:	746,346	SF
Capping Area:	1,075,379	SF
Total Structure Footprint Perimeter with 10-ft buffer:	56,068	linear ft
Tank Treatable Surface:	53,197	SF
Treatable Surface Area for Sand Blasting and Vacuum Dusting:	440,914	SF
Treatable Surface Area for Steam Cleaning:	311,777	SF
Interior Surface Area:	2,373,902	SF
Exterior and Interior Surface Area:	3,685,788	SF
Collapsed Roof Volume:	1,594	CY

Material Volumes for No Future Use, Significant Contamination History Medium Group, Railyard Group

Total Number of Structures:	6	
Total Standing Volume:	52,025	CY
Total Collapsed Volume of All:	2,793	CY
Total Collapsed Volume of Structures:	2,780	CY
Total Collapsed Volume of Process Equipment:	4	CY
Total Collapsed Volume of Piping:	9	CY
Total Collapsed Volume of:		
Concrete:	1,937	CY
Wood:	0	CY
Tile:	0	CY
Brick:	17	CY
Masonry/Cinder Blocks:	0	CY
Corrugated Metal:	189	CY
Corrugated Asbestos:	31	CY
Asbestos Board:	417	CY
Fiberglass:	0	CY
Asphalt Shingle:	100	CY
Built-up/Hot Tar:	89	CY
Sheet Metal:	0	CY
Wood and Asphalt:	0	CY
Salvage Volumes:		
Scrap Metal:	131	CY
Aggregate:	1,517	CY
Tank Standing Volume:	0	CY
Tank Collapsed Volume:	0	CY
Total Structure Footprint:	56,740	SF
Capping Area:	42,456	SF
Total Structure Footprint Perimeter with 10-ft buffer:	2,490	linear ft
Tank Treatable Surface:	0	SF
Treatable Surface Area for Sand Blasting and Vacuum Dusting:	21,581	SF
Treatable Surface Area for Steam Cleaning:	21,185	SF
Interior Surface Area:	152,212	SF
Exterior and Interior Surface Area:	242,522	SF
Collapsed Roof Volume:	190	CY

Material Volumes for No Future Use, Significant Contamination History Medium Group, South Plants with Tanks

Total Number of Structures	43	
Total Standing Volume:	171,334	CY
Total Collapsed Volume of All:	24,423	CY
Total Collapsed Volume of Structures:	18,021	CY
Total Collapsed Volume of Process Equipment:	1,144	CY
Total Collapsed Volume of Piping:	258	CY
Total Collapsed Volume of:		
Concrete:	10,717	CY
Wood:	24	CY
Tile:	1,375	CY
Brick:	3,112	CY
Masonry/Cinder Blocks:	249	CY
Corrugated Metal:	815	CY
Corrugated Asbestos:	1,071	CY
Asbestos Board:	320	CY
Fiberglass:	0	CY
Asphalt Shingle:	32	CY
Built-up/Hot Tar:	87	CY
Sheet Metal:	0	CY
Wood and Asphalt:	156	CY
Salvage Volumes:		
Scrap Metal:	775	CY
Aggregate:	12,105	CY
Tank Standing Volume:	0	CY
Tank Collapsed Volume:	0	CY
Total Structure Footprint:	225,559	SF
Capping Area:	274,333	SF
Total Structure Footprint Perimeter with 10-ft buffer:	12,760	linear ft
Tank Treatable Surface:	0	SF
Treatable Surface Area for Sand Blasting and Vacuum Dusting:	127,643	SF
Treatable Surface Area for Steam Cleaning:	106,440	SF
Interior Surface Area:	689,388	SF
Exterior and Interior Surface Area:	1,021,677	SF
Collapsed Roof Volume:	363	CY

	Future Use, No Potential Exposure	Other Contamination History	Significant Contamination History	Agent History Medium Group
Unity for Lump Sum	1	1	1	1
Standing Building Volume (w/tanks)	-	627,346 CY	224,548 CY	600,064 CY
Collapsed Building Volume (w/tanks)	-	108,700 CY	27,216 CY	74,972 CY
Building Footprint Area (w/tanks)	-	994,976 SF	282,299 SF	541,507 SF
Open Piping Volume (CPV/0.1) 0.79 (w/tanks)	-	27,223 CY	2,109 CY	9,385 CY
Collapsed Processing Equipment Volume (w/tanks)	-	3,037 CY	1,148 CY	5,347 CY
Collapsed Aggregate Volume (w/tanks)	-	-	-	-

	Future Use- No Potential Exposure	Other Contamination History	Significant Contamination History	Agent History
Collapsed Wood Volume (w/tanks)	-	-	-	-
Collapsed Scrap Metal Salvage Volume (w/tanks)	-	9,165 CY	905 CY	0 CY
Collapsed Fiberglass Volume (w/tanks)	-	-	-	-
Collapsed Bituminous Roofing Volume (w/tanks)	-	-	-	-
Collapsed Asbestos Volume (w/tanks)	-	-	-	-
Treatable Surf Area w/Aggr (SB&VD) (no tanks)	-	581,771 SF	149,224 SF	391,970 SF

	Future Use-No Potential Exposure	Other Contamination History	Significant Contamination History	Agent History
Total Collapsed Volume (w/tanks)	-	108,700 CY	27,216 CY	74,972 CY
2-yr Annual Costs	-	2 yr	2 yr	2 yr
Collapsed Metal Wt =[9]*490*27/2000	-	60,626 tons	5,987 tons	0 tons
3-yr Annual Costs	-	3 yr	3 yr	3 yr
Small Pipe = 0.05*[5] (w/tanks)	-	1,361 CY	105 CY	469 CY

	Future Use-No Potential Exposure	Other Contamination History	Significant Contamination History	Agent History
Medium Pipe = 0.55*[5] (w/tanks)	-	14,973 CY	1,160 CY	5,162 CY
Large Pipe = 0.4*[5] (w/tanks)	-	10,889 CY	844 CY	3,754 CY
Treatable Surf Area w/o Aggr. (SC) (no tanks)	-	409,731 SF	127,625 SF	278,563 SF
Building Perimeter w/10' Buff. (w/tanks)	-	79,304 linear ft	15,250 linear ft	25,385 linear ft
Collapsed Bldg & Equip. & Piping Vol-Sal Vol = [14]-[9] (w/tanks)	-	99,535 CY	26,311 CY	71,840 CY

	Future Use- No Potential Exposure	Other Contamination History	Significant Contamination History	Agent History
Interior Surface Area For In-Situ Hot Gas (no tanks)	-	3,140,214 SF	841,600 SF	1,849,194 SF
Exterior Surface Area for Hot Gas of Debris (no tanks)	-	4,920,771 SF	1,264,199 SF	2,751,691 SF
Agent Treatment Volumes [14]*0.05 (w/tanks)	-	0 CY	0 CY	3,749 CY
Volume for Structure Hole Fill [4]/27 (w/tanks)	-	36,851 CY	10,456 CY	20,056 CY

	Future Use- No Potential Exposure	Other Contamination History	Significant Contamination History	Agent History
15% of Interior Surface [27]*0.15 (no tanks)	-	471,032 SF	126,240 SF	277,379 SF
Unity for Annual Costs	-	1 yr	1 yr	1 yr
Air Sampling Units	-	-	-	-
Air Sampling Units per Time	-	-	-	-
Cap in Place Collapsed Total Vol. (NP+RY) (w/tanks)	-	21,913 CY	2,793 CY	0 CY

	Future Use-No Potential Exposure	Other Contamination History	Significant Contamination History	Agent History
Cap-in-Place Metal Salvage Vol. (NP+RY) (w/tanks)	-	2,884 CY	131 CY	0 CY
Cent. Proc. Area Total Collapsed Vol. (SP) (w/tanks)	-	86,781 CY	24,423 CY	-
Cent. Proc. Area Metal Salvage Vol. (SP) (w/tanks)	-	6,281 CY	775 CY	-
Capping Metal Salvage Vol. [36]+[38] (NP+RY+SP) (w/tanks)	-	9,165 CY	906 CY	-
Cap-in-Place Disposal Vol. [35]-[36] (NP+RY)(w/tanks)	-	19,029 CY	2,662 CY	-

	Future Use- No Potential Exposure	Other Contamination History	Significant Contamination History	Agent History
Cap-in-Place Consol. Area (([40](27)/(2.5))^0.5+15)^2 (NP+RY) (w/tanks)	-	219,338 SF	34,061 SF	
Stockpile Volume Significant Structure [25]+4630			30,941 CY	
Stockpile Volume Agent Structures [3]+13,700				88,672 CY

Appendix C

APPENDIX C
COSTS

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LIST OF ACRONYMS AND ABBREVIATIONS

A	annual
CY	cubic yard
DAA	Detailed Analysis of Alternatives
DSA	Development and Screening of Alternatives
EPA	U.S. Environmental Protection Agency
GRA	General Response Action
LF	linear foot
LS	lump sum
O&M	operations and maintenance
PPE	personal protective equipment
RMA	Rocky Mountain Arsenal
SF	square foot
UXO	unexploded ordnance

C1.0 INTRODUCTION

This appendix contains the cost estimates for the alternatives retained from the Development and Screening of Alternatives (DSA) (EBASCO 1992) for structures at Rocky Mountain Arsenal (RMA). A total of 30 cost estimates were developed for the structures medium: 1 cost estimate for the Future Use, No Potential Exposure (Table C-1); 12 cost estimates for the No Future Use, Significant Contamination History Medium Group (Tables C-2 through C-13); 9 cost estimates for the No Future Use, Other Contamination History Medium Group (Tables C-14 through C-22); and 8 cost estimates for the No Future Use, Agent History Medium Group (Tables C-23 through C-30).

The following sections explain the format of the cost estimate tables and discuss the methodology used to develop the unit rates and indirect cost factors.

C2.0 COST ESTIMATE TABLES

The detailed cost estimates for the structures Detailed Analysis of Alternatives (DAA) are presented in Tables C-1 through C-30 of this appendix. They are organized in terms of three main groups, capital costs, operations and maintenance (O&M) costs, and long-term activities costs. Both capital and O&M costs may include both prime contracts and subcontracts direct costs, and associated indirect costs. Long-term costs may include prime contractor direct costs and associated indirect costs. If a cost type did not apply to a given alternative, it was not included in the estimate. Under this organization, an individual cost table may contain up to ten subsections, including:

- Direct Capital Costs
- Indirect Capital Costs
- Direct Subcontract Capital Costs
- Indirect Subcontract Capital Costs
- Direct O&M Costs (Operations)
- Indirect O&M Costs (Operations)
- Direct Subcontract O&M Costs (Operations)
- Indirect Subcontract O&M Costs (Operations)
- Direct O&M Costs (Long-Term Activities)
- Indirect O&M Costs (Long-Term Activities)

Direct costs are those required to accomplish activities in the field. Direct capital costs are those incurred to prepare for remediation of structures, such as the construction of a landfill or incineration facility. Direct subcontract capital costs are costs incurred by specialty subcontractor for the construction of major treatment facilities such as an incineration facility. Direct O&M costs (Operations) are those costs incurred to actually remediate structures, such as demolition and placement of debris in a landfill. Direct subcontract O&M costs are operation costs incurred by these specialty subcontractors during treatment. O&M (Long-Term Activities) are those costs incurred for monitoring and/or routine maintenance after remediation is accomplished. An example of long-term O&M costs are monitoring and maintenance of a landfill.

Indirect costs are explained in Section C4.0. The elements of indirect costs may include:

- Mobilization/Demobilization
- Indirects, Overhead, and Profits; or Contractor Markup
- Engineering Design
- Resident Engineering
- Contingency

It should be noted, these estimates are structured solely to represent a comparative cost between sitewide alternatives and not as stand-alone estimates. Caution should be exercised in comparing individual alternative costs such as engineering design; resident engineering; and indirects, overhead, and profits since these costs represent only a comparative percentage of any individual alternative. Prior to implementation of the preferred alternatives developed in this document it will be necessary to re-evaluate the total estimated cost to provide a more detailed cost assessment.

The headings across the top of each cost estimate table are explained as follows:

Cost Item:

Each horizontal line represents a unit operation and its associated direct cost.

Cost Type:

There are two cost types indicated in this column: lump sum (LS) and annual (A). "LS" denotes a unit operation that occurs in only 1 year, while the "A" denotes the annual cost for a unit operation that occurs in more than 1 year.

Start Year:

This column denotes the starting year for the unit operation. Numbers are used to specify the calendar year, with year 1 representing 1995.

End Year:

This column denotes the ending year for the unit operation. Note that no ending year is specified for the lump sum cost type. Numbers are used to specify the calendar year with year 1 representing 1995.

1994 ($) Unit Cost:

This column denotes the unit cost for the particular unit operation in 1994 dollars.

Units:

This column denotes the units associated with 1994 ($) Unit Cost.

Quantity:

This column denotes the quantity for each unit operation.

Units:

This column denotes the units associated with Quantity.

Volume Factor:

Where appropriate, this column denotes the Volume Factor, which accounts for any expansion or reduction of a volume quantity, e.g., expansion of in-place soil as it is excavated. The Volume

Factor equals 1.000 for cost items where volume changes are not expected, which has no effect on the computed costs. For structural debris, the following volume factors were assumed, based on preliminary data from the structures demolition treatability study:

- After dismantling, the volume factor is 2.5,
- After placement and compaction in the landfill, the volume factor is 1.6,
- After shredding, the volume factor is 1.6,
- After incineration, the volume factor is reduced to 1.0.

Mileage Factor:

The Mileage Factor specifies the round-trip mileage for each transportation cost item. The Mileage Factor equals 1.000 for all non-transportation cost items, which has no effect on the computed costs. For transportation cost items, average mileage figures were developed and applied.

Other Factor:

The Other Factor is reserved for miscellaneous factors for which it would have been wasteful of presentation space to include a separate column, e.g., odor control. The Other Factor equals 1.000 for all other cost items, which has no effect on the computed costs.

Description

This column presents a brief explanation of the factors applied, and refers to more detailed notes presented at the bottom of the cost table.

1995 ($) Annual Cost:

Annual costs are presented only for the O&M (Long-Term Activities) portion of the cost estimates. These values are for informational purposes only and they provide only an approximation of the annual cost of the O&M (Long-Term Activities) after waste treatment has been completed. Note that each cost item may be applied at different times, thereby rendering the sum of the annual cost an approximate figure.

1995 ($) Total Cost:

The Total Cost is given in 1995 dollars. It is calculated by multiplying the following:

- 1994 ($) Unit Cost
- Quantity
- Volume Factor
- Mileage Factor
- Other Factor
- Single Payment Compound Amount Factor to convert the 1994 ($) Unit Cost to a 1995 ($) Unit Cost using a 3 percent discount rate. This factor equals 1.027.

1995 ($) PW Cost:

The Present Worth Cost in 1995 dollars is calculated by applying the appropriate fraction of the 1995 ($) Total Cost to the specified years, then discounting the applied value at each year back to Year 1 (1995) using a 3 percent discount rate.

Explanations for the calculations of subtotals and indirect costs are given on the cost estimate tables in the form of alphabetical references.

C3.0 UNIT RATE DEVELOPMENT

This section describes how unit rates were developed for the individual line items. The cost information is derived from vendor information, cost estimating manuals such as MEANS, the cost estimating programs MCACES, related project information, and engineering judgement. The cost of personal protective equipment (PPE) is included in the unit costs. The level of PPE was determined based on the process being performed and the expected nature of the debris. The levels of protection ranged from level D to Level B. Production rates were adjusted based on the level of worker protection.

C3.1 NO ACTION AND INSTITUTIONAL CONTROLS

No Action line items do not involve any capital, operations, or long-term costs and indicate that no additional action is proposed for all or part of the site.

The Institutional Controls General Response Action (GRA) can involve several different line items. The estimated capital cost of security fencing and signs is $16.27/linear foot (LF) for the installation of fence, a pedestrian gate, a swing gate, and signs at 200-foot intervals. The estimated annual maintenance cost for fences is estimated to be 10 percent of the installation cost, and the estimated cost of installing locks and boards includes the cost of boarding up all structure openings and restricting access using locks. The estimated capital cost for locks and boards is $1.88/square foot (SF), with an annual maintenance cost of 10 percent of the capital cost.

C3.2 DEMOLITION, BACKFILL, AND TRANSPORTATION

The Demolition line item covers site-specific activities such as dismantling structures and removing debris from a site, or dropping structures within a region so that they may be covered by an impermeable cover. Capital costs for demolition are covered under the Mobilization/Demobilization line item. The estimated operations costs for demolishing nonagent structures is $24.86/cubic yard (CY) of the standing structure volume. Demolishing structures with potential agent presence is higher because it requires the inclusion of costs for roll-away containers and a truck capable of loading the containers for agent monitoring purposes. Moreover, preliminary containment of agent demolition materials is required for agent monitoring, which elevates the estimate cost to $34.94/CY of the standing structure volume.

Shredding is the process of sizing structural materials, such as metal, brick, or concrete. Shredding is done to prepare structure debris for incineration. Estimated costs for shredding are $0.32/CY and $13.75/CY for the capital and operations cost, respectively, with reference to the collapsed building volume.

The dust and safety sampling line item covers the standard air monitoring necessary to monitor the effectiveness of dust and vapor emission controls. This will ensure the protection of both site workers and the community. The estimated operations cost for sampling is $3.78 for Significant and Other Contamination History group structures.

Sampling of structure demolition debris for disposal characterization is dependent on the disposal location. For off-post facilities a sampling interval of 100 CY is selected. For on-post disposal, no sampling is required. Analysis is performed for the toxicity characteristic leaching procedure. The cost per cubic yard of debris is $28.85 for sampling every 100 CY.

The Backfill line item covers the use of uncontaminated soils or other materials to fill holes created during the excavation of a structure. This process involves obtaining fill from uncontaminated on-post areas to backfill structural demolition/excavation sites, then compacting and grading the area. The estimated operations unit cost is $8.12/CY. After backfilling, the area will be revegetated, where necessary, at a cost of $0.03/SF.

The Transportation line items cover hauling demolition materials to on- or off-post treatment and disposal locations. The alternatives that involve transportation may consist of one or several different line items. The estimated operations costs for the off-post transportation of hazardous and nonhazardous material are $0.56/CY•MILE and $0.58/CY•MILE, respectively. The relative similarity of the costs is due to the distances to the respective facilities. The nonhazardous landfill is 25 miles away, and has a longer per-mile travel time than the hazardous facility, which is 70 miles away. The estimated operations costs for on-post transportation of hazardous and nonhazardous materials are $1.11/CY•MILE and $0.90/CY•MILE, respectively. There are two separate line items that cover the loading of debris prior to transporting. The estimated operations cost for loading hazardous debris is $1.56/CY and $1.29/CY for nonhazardous debris. The Transportation line items do not include capital costs, which were assumed to be covered in the Mobilization/Demobilization line item.

The Transfer station line item was employed to cover costs for a loading facility. This facility would transfer structural materials to off-post hauling vehicles. The estimated capital cost of this facility is $0.24/CY with a operating cost of $1.10/CY.

C3.3 STRUCTURES UNIQUE PROCESSES

The Structures Unique Processes line items cover treatment and action alternatives that apply only to the structures media. Capital and operations costs for treatment-based line items are based on the assumption of having enough equipment to clean the entire applicable surface area within 2 years. Structures Unique Processes line items include steam cleaning, sand blasting, vacuum dusting, pipe plugging, and salvage.

Steam cleaning is the process of removing contamination from building materials and equipment surfaces using heated water applied under pressure (PEI 1985). The estimated capital cost for steam cleaning is $0.29/SF and the operations costs are $2.57/SF. These line item costs include treatment unit purchase, labor, PPE, an accompanying water treatment system, system maintenance, and miscellaneous costs.

Sand blasting is a mechanical-scour treatment that involves the use of an abrasive such as sand or steel pellets to uniformly remove layers of superficial contamination. The estimated capital and operations unit costs for sand blasting are $0.42/SF and $3.61/SF respectively. Line item costs include treatment unit purchase, labor, PPE, an abrasive recycling system, system maintenance, and miscellaneous costs.

Vacuum dusting refers to the removal of superficial contamination using suction. The estimated capital cost for vacuum dusting is $0.03/SF which covers unit purchase costs, initial PPE, and other costs required to begin work. The estimated operation costs covering the system maintenance, labor, and miscellaneous costs are estimated at $0.78/SF.

Pipe plugging is the in situ solidification of contamination within a pipe to reduce contaminant mobility. The estimated operations costs were based on pipe diameter ranges to show the contrast in costs incurred by plugging differently sized pipes. Pipe volumes corresponding to the pipe plugging unit costs were calculated by dividing the Task 24 database totals by 10 percent and then multiplying by 60 percent. This algorithm changes collapsed pipe volume to standing pipe volume. The estimated operations costs estimate are $10,050/CY for pipe diameters of 2 inches or less, $2,138/CY for diameters ranging from 2 to 6 inches, and $681/CY for diameters of 6 inches or more. These cost estimates include labor, setup time, move time, pumping time, rental costs, and operations material cost.

Metals salvage is the recycling of uncontaminated materials such as nonprocess equipment and structural metals from Other Contamination History Group structures, or decontaminated process equipment and piping from Significant Contamination History Group structures. Salvage of metals has an estimated cost return of $25.00/ton.

C3.4 IN SITU THERMAL TREATMENT

The in situ thermal treatment alternative involves hot gas treatment. This process heats materials to temperatures of 750 degrees Fahrenheit, releasing adsorbed contaminants and directing them to an off-gas treatment system. Costs were developed for both manufacturing and agent history structure. For Significant and Other Contamination History and Agent History group structures the estimated capital cost for hot gas is $0.82/SF, which includes the purchase of the treatment system, building closure materials, and labor for the closure of the room/building prior to treatment. The estimated operations cost for Significant and Other Contamination History group structures is $12.60/SF and $16.10/SF for Agent History structures. These costs include treatment, fuel, and oversight during treatment.

C3.5 DIRECT THERMAL TREATMENT

The direct thermal treatment alternative involves off- and on-post rotary kiln incineration, i.e., the controlled combustion of organic wastes under oxidizing conditions. The treatment may also

partially volatilize some inorganics, so afterburners and scrubbers are used to treat off-gas emissions.

The off-post incineration line item cost estimate includes the cost of transportation to the facility and subsequent incineration. The operation costs are $3,404/CY.

On-post incineration capital cost estimates include the cost of purchasing a rotary kiln incinerator, afterburner, and scrubbers, which are assessed at $76.00/CY. The estimated labor, fuel, maintenance, and other operations costs are $172.50/CY.

C3.6 CONTAINMENT

Containment activities that require unit cost assessment are off- and on-post hazardous and nonhazardous waste landfills, on-post consolidation of materials in Basin A, and the use of capping of demolition materials within a region.

The On-Post Landfill line item costs were estimated based on the costs contained in the Task 27 report (EBASCO 1988). The Task 27 report contains a detailed analysis of the size and costs incurred by the construction, operation, and long-term maintenance of the conceptual landfill. The capital and operating costs for an on-post hazardous waste landfill are $8.26/CY and $5.78/CY, respectively. The capital and long-term costs to close the on-post hazardous landfill are $4.92/CY and $0.02/CY, respectively. The costs for an on-post nonhazardous waste landfill are assumed to be equivalent to those of the on-post hazardous landfill.

The Off-Post Landfill line item was estimated based on current rates quoted by current hazardous and nonhazardous landfill operators. These estimates are notably higher in the operations cost category, but involve no capital or long-term monitoring unit costs. The estimates for operations unit cost for hazardous and nonhazardous landfills are $165.25/CY and $22.19/CY, respectively.

The Consolidation line item covers the process of sizing, spreading, and compacting materials in a centralized location. Basin A is currently the selected location for consolidation of structural and other materials. The estimated operations costs are $5.04/CY. No capital or long-term costs were assumed.

The Capping line item covers capping structural demolition debris in place covered with a layer of clay and soil. Estimated costs for capping include a $0.70/SF for operations cost and $0.01/SF for long-term monitoring. The cost for revegetating the capped area is $0.03/SF. In addition, a 5-year site review will be performed at a cost of $2,700/year.

Alternatives utilizing on-site incineration of structures material with significant contamination or agent history will include an on-site stockpile facility line item. The on-site stockpile facility will be used to house contaminated structures materials prior to incineration. The estimate for operations unit cost for the stockpile facility is $21.40/CY.

C3.7 AGENT MATERIALS TREATMENT

Several treatment alternatives that were specifically chosen for agent-contaminated structures involve treating contaminated materials with a caustic wash, sampling large containers of demolition materials with agent-monitoring equipment, and performing real-time air monitoring at the site.

The Caustic Treatment line item covers treating agent contamination with a mixture of water, sodium hydroxide, and peroxide. The estimated capital cost, $121.54/CY, includes building a facility in which to treat the waste, initial chemicals costs, and other preliminary costs. The estimated operations costs for this process are $323.48/CY and cover chemical costs, labor costs, and facility maintenance.

The Agent Monitoring line item covers the determination of whether structural materials need to be treated by agent treatment methods. Agent monitoring is accomplished by placing demolition

materials in covered roll-away containers and sampling the contents for agent. The estimated capital cost for this line item is $0.82/LS, with an operations cost of $8.55/CY.

The Air Sampling line item covers the costs involved in taking real-time and environmental air samples in proximity to the demolition sites with potential agent presence. Capital and operations cost estimates rely upon the equipment required to ensure accurate detection of any airborne contamination. The estimated operations cost is $270,000/year.

C4.0 INDIRECT COSTS

Indirect costs are applied to the sum of the three main cost groups which include direct capital costs, direct O&M costs, and direct O&M long-term activities costs. To better evaluate and estimate the indirect costs, the capital and O&M operating costs were subdivided between direct costs and direct subcontract costs. The indirect costs include:

- Mobilization/Demobilization
- Indirects, Overhead, and Profit; or Contractor Markup
- Engineering Design
- Resident Engineering
- Contingency

The indirect costs vary due to the four consideration factors: medium group contamination; technologies selected; size of the project; and the duration. Based on the characteristics of each alternative as it is applied to the medium group, these factors assist in the development of indirect percentages as explained below. These indirect percentages are then applied to the direct costs to determine an overall total cost.

In order to provide a uniform basis of estimate, a cost markup matrix was developed based on the consideration factors to determine indirect costs percentages for direct capital and O&M costs. Percentages for these estimates have been modified to distinguish relative cost differences between on-post and off-post activities and subcontracts. In some instances these factors were individually adjusted to be more representative of the individual alternative's complexity. The following sections explain the indirect markup factors and the application rationale.

C.4.1 MOBILIZATION/DEMOBILIZATION

Mobilization activities include construction/setup of contractor's support facilities, mobilization of heavy equipment, and relocation of management/supervisory personnel. Demobilization consists of decontamination and removal of contractor's equipment and facilities from the site. Costs for these activities are applied as a percentage of direct cost. The percentages applied vary from 2 to 5.1 percent as shown in markup matrix. For subcontract costs these percentages have been adjusted on a case-by-case basis, based on vendor quotes, and past knowledge and experience with similar projects.

C.4.2 INDIRECTS, OVERHEAD, AND PROFIT; OR CONTRACTOR MARKUP

Indirect costs are calculated as a percentage of the sum of direct and mobilization/demobilization costs. Indirect costs cover the cost of on-site management, administrative, technical, health and safety, and supervisory staff, utilities for site support facilities (excluding production facilities), engineering tests, quality assurance/quality control program, preparation of work plans, submittals and as-built drawings, bonding costs, support facilities, and vehicle maintenance and operation. The range of percentages applied varies between 37.8 and 40.3 percent.

C.4.3 ENGINEERING DESIGN

The engineering design costs are estimated as a percentage of the sum of direct costs; mobilization/demobilization costs; and indirects, overhead, and profits. In general, engineering percentages were developed based on past experience of engineering costs on similar projects. These percentages are dependent upon the degree of complexity associated with the particularly alternative and the complexity of the treatment technology selected. Standard percentages ranging between 0 and 9 percent are applied to the estimates, however, certain alternatives required adjustments to reflect extenuating circumstances in the required design effort and were adjusted accordingly.

C.4.4 RESIDENT ENGINEERING

The resident engineering costs are estimated as a percentage of the sum of direct costs; mobilization/demobilization costs; and indirects, overhead, and profits. The alternative size, estimated project duration, and the remedial technology selected would determine the level of effort required for inspection and field engineering support to assure conformance and verification with the approved remedial design. Standard percentages ranging between 0.1 and 3 percent are applied to the estimates.

C.4.5 CONTINGENCY

Contingency accounts for unforeseeable cost elements within the defined project scope. Contingency is applied as a percentage of the sum of direct costs; mobilization/demobilization costs; indirects, overhead, and profits; and design and resident engineering costs. Experience with similar large-scale cleanup projects indicates that unforeseeable events will result in growth from the estimated to the actual cost. Individual contingencies were developed in the current estimates for the capital, operations and maintenance, and long-term activity cost categories. The sizes of the contingencies were primarily based on the following four parameters: level of contamination, complexity of treatment technology, project size, and estimated project duration. Additional considerations included the potential for changes in applicable regulations, the potential for changed site conditions, the type of environmental media to be addressed and other project-specific issues. Contingency percentages used in the estimates presented in this document range between 1.1 and 40 percent.

OERR-EPA (Office of Emergency and Remedial Response, EPA)
1988 (October) Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA: Interim Final. OSWER Directive 9355.3-01. EPA/540/G-89/004.

WCC (Woodward-Clyde Consultants)
1993a (March) Future Use Structures, Pilot Sampling and Analysis Report, Task 0005, Final, Version 1.0, RTIC 93095R02.

1993b (March) No Future Use Structures, Pilot Sampling and Analysis Report, Task 0005, Final, Version 1.0, RTIC 93095R01.

C5.0 REFERENCES

EBASCO (Ebasco Services, Incorporated)

1992 (December) Development and Screening of Alternatives Report, Final, Version 4.1. (DSA) RTIC 92363R01.

1988 (September) Hazardous Waste Land Disposal Facility Assessment, Task 27, Final Report. RTIC89026R01

PEI (PEI Associates, Inc., et al.)

1985 (March) Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites. EPA/600/2-85/028.

Table C-1 Cost Estimate - Future Use, No Potential Exposure
Alternative 1: No Action

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
No Action	LS	3	--	0.00	/EA	1	EA	1.000	1.000	1.000			0	0
				Subtotal (A)									0	0
INDIRECT CAPITAL COSTS				COST CODE Z										
Mob/Demob	0.0%			B = 0.000 * (A)									0	0
Indirects, Overhead & Profit	0.0%			C = 0.000 * (A+B)									0	0
Engineering Design	0.0%			D = 0.000 * (A+B+C)									0	0
Resident Engineering	0.0%			E = 0.000 * (A+B+C)									0	0
Contingency	0.0%			F = 0.000 * (A+B+C+D+E)									0	0
				Subtotal (G =B+C+D+E+F)									0	0
TOTAL CAPITAL COSTS (H = A+G)													0	0

Table C-1 Cost Estimate - Future Use, No Potential Exposure
Alternative 1: No Action

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
No Action			LS	3	--	0.00	/EA	1	EA	1.000	1.000	1.000			0	0
		Subtotal (I)													0	0
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	Z													
Mob/Demob	0.0%	J = 0.000 * (I)													0	0
Indirects, Overhead & Profit	0.0%	K = 0.000 * (I+J)													0	0
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	0.0%	M = 0.000 * (I+J+K)													0	0
Contingency	0.0%	N = 0.000 * (I+J+K+L+M)													0	0
		Subtotal (O = J+K+L+M+N)													0	0
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
No Action			LS	3	--	0.00	/EA	1	EA	1.000	1.000	1.000		0	0	0
		Subtotal (P)												0	0	0
INDIRECT O&M COSTS (LONG-TERM ACTIVITI		COST CODE	Z													
Indirects, Overhead & Profit	0.0%	Q = 0.000 * (P)												0	0	0
Contingency	0.0%	R = 0.000 * (P+Q)												0	0	0
		Subtotal (S)												0	0	0
TOTAL O&M COSTS (T = I+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														0	0	0
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															0	0

Table C-2 Cost Estimate - No Future Use, Significant Contamination History
Alternative 1: No Action

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
No Action	LS	3	--	0.00	/EA	1	EA	1.000	1.000	1.000			0	0
			Subtotal (A)										0	0
INDIRECT CAPITAL COSTS			COST CODE Z											
Mob/Demob	0.0%		B = 0.000 * (A)										0	0
Indirects, Overhead & Profit	0.0%		C = 0.000 * (A+B)										0	0
Engineering Design	0.0%		D = 0.000 * (A+B+C)										0	0
Resident Engineering	0.0%		E = 0.000 * (A+B+C)										0	0
Contingency	0.0%		F = 0.000 * (A+B+C+D+E)										0	0
			Subtotal (G =B+C+D+E+F)										0	0
TOTAL CAPITAL COSTS (H = A+G)													0	0

Table C-2 Cost Estimate - No Future Use, Significant Contamination History
Alternative 1: No Action

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
No Action			LS	3	--	0.00	/EA	1	EA	1.000	1.000	1.000			0	0
		Subtotal (I)													0	0
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	Z													
Mob/Demob	0.0%	J = 0.000 * (I)													0	0
Indirects, Overhead & Profit	0.0%	K = 0.000 * (I+J)													0	0
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	0.0%	M = 0.000 * (I+J+K)													0	0
Contingency	0.0%	N = 0.000 * (I+J+K+L+M)													0	0
		Subtotal (O = J+K+L+M+N)													0	0
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
No Action			LS	3	--	0.00	/EA	1	EA	1.000	1.000	1.000		0	0	0
		Subtotal (P)												0	0	0
INDIRECT O&M COSTS (LONG-TERM ACTIVITI		COST CODE	Z													
Indirects, Overhead & Profit	0.0%	Q = 0.000 * (P)												0	0	0
Contingency	0.0%	R = 0.000 * (P+Q)												0	0	0
		Subtotal (S)												0	0	0
TOTAL O&M COSTS (T = I+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														0	0	0
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															0	0

Table C-3 Cost Estimate - No Future Use, Significant Contamination History
Alternative 2: Pipe Plugs, Locks/Boards/Fences/Signs

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
Locks & Boards			LS	3	--	1.88	/SF	126,240	SF	1.000	1.000	1.000			244,000	230,000
Fences & Signs			LS	3	--	16.27	/LF	15,250	LF	1.000	1.000	1.000			255,000	240,000
		Subtotal (A)													499,000	470,000
INDIRECT CAPITAL COSTS		COST CODE LLSS														
Mob/Demob	3.3%	B = 0.033 * (A)													16,000	15,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)													201,000	189,000
Engineering Design	3.0%	D = 0.030 * (A+B+C)													21,000	20,000
Resident Engineering	1.3%	E = 0.013 * (A+B+C)													9,000	8,000
Contingency	27.5%	F = 0.275 * (A+B+C+D+E)													205,000	193,000
		Subtotal (G =B+C+D+E+F)													452,000	427,000
TOTAL CAPITAL COSTS (H = A+G)															951,000	896,000

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Table C-3 Cost Estimate - No Future Use, Significant Contamination History
Alternative 2: Pipe Plugs, Locks/Boards/Fences/Signs

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)														
Dust & Safety Samp of Manuf Structures	A	3	4	3.78	/CY	224,548	CY	1.000	1.000	1.000			872,000	810,000
Pipe Plugging - ID <= 2 in.	A	3	4	10,049.64	/CY	105	CY	1.000	1.000	1.000			1,088,000	1,011,000
Pipe Plugging - 2 in. < ID <= 6 in.	A	3	4	2,138.07	/CY	1,160	CY	1.000	1.000	1.000			2,547,000	2,366,000
Pipe Plugging - ID > 6 in.	A	3	4	681.08	/CY	844	CY	1.000	1.000	1.000			590,000	548,000
Subtotal (I)													5,097,000	4,735,000
INDIRECT O&M COSTS (OPERATIONS)		COST CODE HMMS												
Mob/Demob	5.1%	J = 0.051 * (I)											261,000	243,000
Indirects, Overhead & Profit	40.3%	K = 0.403 * (I+J)											2,157,000	2,003,000
Engineering Design	4.5%	L = 0.045 * (I+J+K)											338,000	314,000
Resident Engineering	2.0%	M = 0.020 * (I+J+K)											150,000	140,000
Contingency	33.8%	N = 0.338 * (I+J+K+L+M)											2,701,000	2,509,000
Subtotal (O = J+K+L+M+N)													5,608,000	5,209,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)														
Locks & Boards	A	4	30	0.19	/SF	126,240	SF	1.000	1.000	1.000		25,000	665,000	426,000
Fences & Signs	A	4	30	1.62	/LF	15,250	LF	1.000	1.000	1.000		25,000	685,000	438,000
Subtotal (P)												50,000	1,350,000	864,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITI		COST CODE LLSL												
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)										20,000	527,000	337,000
Contingency	32.5%	R = 0.325 * (P+Q)										23,000	610,000	390,000
Subtotal (S)												42,000	1,136,000	727,000
TOTAL O&M COSTS (T = I+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]												92,000	13,191,000	11,534,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)													14,100,000	12,400,000

Table C-4 Cost Estimate - No Future Use, Significant Contamination History
Alternative 8: Hot Gas, Dismantling, Salvage, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
Hot Gas for Manufacturing Structures			LS	3	--	0.82	/SF	841,600	SF	1.000	1.000	1.000			709,000	668,000
On-post Hazardous Waste Landfill			LS	3	--	8.26	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		357,000	337,000
On-post Hazardous Waste Landfill Closure			LS	4	--	4.92	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		213,000	195,000
		Subtotal (A)													1,279,000	1,199,000
INDIRECT CAPITAL COSTS		COST CODE	LHMS													
Mob/Demob	4.5%	B = 0.045 * (A)													58,000	54,000
Indirects, Overhead & Profit	37.8%	C = 0.378 * (A+B)													504,000	473,000
Engineering Design	6.5%	D = 0.065 * (A+B+C)													120,000	112,000
Resident Engineering	1.8%	E = 0.018 * (A+B+C)													32,000	30,000
Contingency	32.5%	F = 0.325 * (A+B+C+D+E)													648,000	607,000
		Subtotal (G =B+C+D+E+F)													1,361,000	1,277,000
TOTAL CAPITAL COSTS (H = A+G)															2,640,000	2,476,000

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Table C-4 Cost Estimate - No Future Use, Significant Contamination History
Alternative 8: Hot Gas, Dismantling, Salvage, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	224,548	CY	1.000	1.000	1.000			872,000	810,000
Hot Gas for Manufacturing Structures			A	3	4	12.60	/SF	841,600	SF	1.000	1.000	1.000			10,890,000	10,116,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	224,548	CY	1.000	1.000	1.000			5,733,000	5,325,000
Loading Hazardous Debris			A	3	4	1.56	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		109,000	101,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	26,311	CY	2.500	4.500	1.000	Expansion, Miles, (Note 1)		337,000	313,000
On-post Hazardous Waste Landfill			A	3	4	5.78	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		250,000	232,000
		Subtotal (I)													18,191,000	16,898,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	5,987	TON	1.000	1.000	1.000			(154,000)	(143,000)
		Subtotal (T)													(154,000)	(143,000)
INDIRECT O&M COSTS (OPERATIONS)		COST CODE MMLMST														
Mob/Demob	2.0%	J = 0.020 * (I)													364,000	338,000
Indirects, Overhead & Profit	37.8%	K = 0.378 * (I+J)													7,005,000	6,506,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	2.0%	M = 0.020 * (I+J+K)													511,000	475,000
Contingency	31.3%	N = 0.313 * (I+J+K+L+M)													8,147,000	7,568,000
		Subtotal (O = J+K+L+M+N)													16,027,000	14,887,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
On-post Hazardous Waste Landfill Closure			A	4	30	0.02	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)	1,000	28,000	18,000
		Subtotal (P)												1,000	28,000	18,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE LLSL														
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)												0	11,000	7,000
Contingency	32.5%	R = 0.325 * (P+Q)												0	13,000	8,000
		Subtotal (S)												1,000	24,000	15,000
TOTAL O&M COSTS (T = I+T+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														2,000	34,116,000	31,675,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															36,800,000	34,200,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-5 Cost Estimate - No Future Use, Significant Contamination History
Alternative 9: Vacuum Dusting, Dismantling, Salvage, On-Post Hazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
Vacuum Dusting	LS	3	--	0.03	/SF	149,224	SF	1.000	1.000	1.000			5,000	4,000
On-post Hazardous Waste Landfill	LS	3	--	8.26	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		357,000	337,000
On-post Hazardous Waste Landfill Closure	LS	4	--	4.92	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		213,000	195,000
					Subtotal (A)								574,000	536,000
INDIRECT CAPITAL COSTS					COST CODE LMSS									
Mob/Demob	3.9%				B = 0.039 * (A)								22,000	21,000
Indirects, Overhead & Profit	39.0%				C = 0.390 * (A+B)								233,000	217,000
Engineering Design	4.5%				D = 0.045 * (A+B+C)								37,000	35,000
Resident Engineering	1.5%				E = 0.015 * (A+B+C)								12,000	12,000
Contingency	30.0%				F = 0.300 * (A+B+C+D+E)								264,000	246,000
					Subtotal (G =B+C+D+E+F)								568,000	530,000
TOTAL CAPITAL COSTS (H = A+G)													1,143,000	1,066,000

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Table C-5 Cost Estimate - No Future Use, Significant Contamination History
Alternative 9: Vacuum Dusting, Dismantling, Salvage, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	224,548	CY	1.000	1.000	1.000			872,000	810,000
Vacuum Dusting			A	3	4	0.78	/SF	149,224	SF	1.000	1.000	1.000			120,000	111,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	224,548	CY	1.000	1.000	1.000			5,733,000	5,325,000
Loading Hazardous Debris			A	3	4	1.56	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		109,000	101,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	26,311	CY	2.500	4.500	1.000	Expansion, Miles, (Note 1)		337,000	313,000
On-post Hazardous Waste Landfill			A	3	4	5.78	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		250,000	232,000
		Subtotal (I)													7,421,000	6,893,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	5,987	TON	1.000	1.000	1.000			(154,000)	(143,000)
		Subtotal (I')													(154,000)	(143,000)
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	MMLMST													
Mob/Demob	2.0%	J = 0.020 * (I)													148,000	138,000
Indirects, Overhead & Profit	37.8%	K = 0.378 * (I+J)													2,857,000	2,654,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	2.0%	M = 0.020 * (I+J+K)													209,000	194,000
Contingency	31.3%	N = 0.313 * (I+J+K+L+M)													3,323,000	3,087,000
		Subtotal (O = J+K+L+M+N)													6,538,000	6,073,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
On-post Hazardous Waste Landfill Closure			A	4	30	0.02	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)	1,000	28,000	18,000
		Subtotal (P)												1,000	28,000	18,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE	LLSL													
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)												0	11,000	7,000
Contingency	32.5%	R = 0.325 * (P+Q)												0	13,000	8,000
		Subtotal (S)												1,000	24,000	15,000
TOTAL O&M COSTS (T = I+I'+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														2,000	13,856,000	12,856,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															15,000,000	13,900,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-6 Cost Estimate - No Future Use, Significant Contamination History
Alternative 9a: Steam Cleaning, Dismantling, Salvage, On-Post Hazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
Steam Cleaning	LS	3	--	0.29	/SF	127,625	SF	1.000	1.000	1.000			38,000	36,000
On-post Hazardous Waste Landfill	LS	3	--	8.26	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		357,000	337,000
On-post Hazardous Waste Landfill Closure	LS	4	--	4.92	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		213,000	195,000
Subtotal (A)													608,000	567,000
INDIRECT CAPITAL COSTS		COST CODE	LMSS											
Mob/Demob	3.9%	B = 0.039 * (A)											24,000	22,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)											246,000	230,000
Engineering Design	4.5%	D = 0.045 * (A+B+C)											39,000	37,000
Resident Engineering	1.5%	E = 0.015 * (A+B+C)											13,000	12,000
Contingency	30.0%	F = 0.300 * (A+B+C+D+E)											279,000	260,000
		Subtotal (G =B+C+D+E+F)											602,000	561,000
TOTAL CAPITAL COSTS (H = A+G)													1,209,000	1,128,000

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Table C-6 Cost Estimate - No Future Use, Significant Contamination History
Alternative 9a: Steam Cleaning, Dismantling, Salvage, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	224,548	CY	1.000	1.000	1.000			872,000	810,000
Steam Cleaning			A	3	4	2.57	/SF	127,625	SF	1.000	1.000	1.000			337,000	313,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	224,548	CY	1.000	1.000	1.000			5,733,000	5,325,000
Loading Hazardous Debris			A	3	4	1.56	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		109,000	101,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	26,311	CY	2.500	4.500	1.000	Expansion, Miles, (Note 1)		337,000	313,000
On-post Hazardous Waste Landfill			A	3	4	5.78	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		250,000	232,000
		Subtotal (I)													7,638,000	7,095,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	5,987	TON	1.000	1.000	1.000			(154,000)	(143,000)
		Subtotal (I')													(154,000)	(143,000)
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	MMLMST													
Mob/Demob	2.0%	J = 0.020 * (I)													153,000	142,000
Indirects, Overhead & Profit	37.8%	K = 0.378 * (I+J)													2,941,000	2,732,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	2.0%	M = 0.020 * (I+J+K)													215,000	199,000
Contingency	31.3%	N = 0.313 * (I+J+K+L+M)													3,421,000	3,177,000
		Subtotal (O = J+K+L+M+N)													6,729,000	6,250,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
On-post Hazardous Waste Landfill Closure			A	4	30	0.02	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)	1,000	28,000	18,000
		Subtotal (P)												1,000	28,000	18,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE	LLSL													
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)												0	11,000	7,000
Contingency	32.5%	R = 0.325 * (P+Q)												0	13,000	8,000
		Subtotal (S)												1,000	24,000	15,000
TOTAL O&M COSTS (T = I+I'+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														2,000	14,265,000	13,235,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															15,500,000	14,400,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-7 Cost Estimate - No Future Use, Significant Contamination History
Alternative 10: Sand Blasting, Dismantling, Salvage, On-Post Hazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
Sand Blasting	LS	3	--	0.42	/SF	149,224	SF	1.000	1.000	1.000			64,000	61,000
On-post Hazardous Waste Landfill	LS	3	--	8.26	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		357,000	337,000
On-post Hazardous Waste Landfill Closure	LS	4	--	4.92	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		213,000	195,000
Subtotal (A)													634,000	592,000
INDIRECT CAPITAL COSTS		COST CODE	LMSS											
Mob/Demob	3.9%	B = 0.039 * (A)											25,000	23,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)											257,000	240,000
Engineering Design	4.5%	D = 0.045 * (A+B+C)											41,000	38,000
Resident Engineering	1.5%	E = 0.015 * (A+B+C)											14,000	13,000
Contingency	30.0%	F = 0.300 * (A+B+C+D+E)											291,000	272,000
		Subtotal (G =B+C+D+E+F)											628,000	586,000
TOTAL CAPITAL COSTS (H = A+G)													1,262,000	1,178,000

Table C-7 Cost Estimate - No Future Use, Significant Contamination History
Alternative 10: Sand Blasting, Dismantling, Salvage, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)															
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	224,548	CY	1.000	1.000	1.000		872,000	810,000
Sand Blasting			A	3	4	3.61	/SF	149,224	SF	1.000	1.000	1.000		553,000	514,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	224,548	CY	1.000	1.000	1.000		5,733,000	5,325,000
Loading Hazardous Debris			A	3	4	1.56	/CY	27,216	CY	2.500	1.000	1.000 Expansion, (Note 1)		109,000	101,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	26,311	CY	2.500	4.500	1.000 Expansion, Miles, (Note 1)		337,000	313,000
On-post Hazardous Waste Landfill			A	3	4	5.78	/CY	26,311	CY	1.600	1.000	1.000 Expansion, (Note 2)		250,000	232,000
		Subtotal (I)												7,854,000	7,296,000
DIRECT O&M REVENUES (OPERATIONS)															
Salvage of Metal			A	3	4	(25.00)	/TON	5,987	TON	1.000	1.000	1.000		(154,000)	(143,000)
		Subtotal (I')												(154,000)	(143,000)
INDIRECT O&M COSTS (OPERATIONS)		COST CODE MMLMST													
Mob/Demob	2.0%	J = 0.020 * (I)												157,000	146,000
Indirects, Overhead & Profit	37.8%	K = 0.378 * (I+J)												3,024,000	2,809,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)												0	0
Resident Engineering	2.0%	M = 0.020 * (I+J+K)												221,000	205,000
Contingency	31.3%	N = 0.313 * (I+J+K+L+M)												3,518,000	3,267,000
		Subtotal (O = J+K+L+M+N)												6,920,000	6,427,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)															
On-post Hazardous Waste Landfill Closure			A	4	30	0.02	/CY	26,311	CY	1.600	1.000	1.000 Expansion, (Note 2)	1,000	28,000	18,000
		Subtotal (P)											1,000	28,000	18,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE LLSL													
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)											0	11,000	7,000
Contingency	32.5%	R = 0.325 * (P+Q)											0	13,000	8,000
		Subtotal (S)											1,000	24,000	15,000
TOTAL O&M COSTS (T = I+I'+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]													2,000	14,672,000	13,613,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)														15,900,000	14,800,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2.- A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-8 Cost Estimate - No Future Use, Significant Contamination History
Alternative 12: Dismantling, Salvage, Off-Post Rotary Kiln Incineration, Off-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
Shredding Structure Debris			LS	3	--	0.32	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		22,000	21,000
Transfer Station			LS	3	--	0.24	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		10,000	10,000
		Subtotal (A)													33,000	31,000
INDIRECT CAPITAL COSTS		COST CODE MMLS														
Mob/Demob	4.5%	B = 0.045 * (A)													1,000	1,000
Indirects, Overhead & Profit	37.8%	C = 0.378 * (A+B)													13,000	12,000
Engineering Design	4.5%	D = 0.045 * (A+B+C)													2,000	2,000
Resident Engineering	1.8%	E = 0.018 * (A+B+C)													1,000	1,000
Contingency	31.3%	F = 0.313 * (A+B+C+D+E)													15,000	15,000
		Subtotal (G =B+C+D+E+F)													33,000	31,000
DIRECT SUBCONTRACT CAPITAL COSTS																
		Subtotal (A1)													0	0
INDIRECT SUBCONTRACT CAPITAL COSTS		COST CODE Z														
Mob/Demob	0.0%	B1 = 0.000 * (A1)													0	0
Contractor Markup	0.0%	C1 = 0.000 * (A1+B1)													0	0
Engineering Design	0.0%	D1 = 0.000 * (A1+B1+C1)													0	0
Resident Engineering	0.0%	E1 = 0.000 * (A1+B1+C1)													0	0
Contingency	0.0%	F1 = 0.000 * (A1+B1+C1+D1+E1)													0	0
		Subtotal (G1 = B1+C1+D1+E1+F1)													0	0
TOTAL CAPITAL COSTS (H = A+G)															65,000	62,000

Table C-8 Cost Estimate - No Future Use, Significant Contamination History
Alternative 12: Dismantling, Salvage, Off-Post Rotary Kiln Incineration, Off-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	224,548	CY	1.000	1.000	1.000			872,000	810,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	224,548	CY	1.000	1.000	1.000			5,733,000	5,325,000
Loading Hazardous Debris			A	3	4	1.56	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		109,000	101,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	27,216	CY	2.500	1.500	1.000	Expansion, Miles, (Note 1)		116,000	108,000
Shredding Structure Debris			A	3	4	13.75	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		961,000	892,000
Loading Hazardous Debris			A	3	4	1.56	/CY	27,216	CY	1.600	1.000	1.000	Expansion, (Note 2)		70,000	65,000
Transfer Station			A	3	4	1.10	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		48,000	44,000
		Subtotal (I)													7,908,000	7,346,000
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	MMLSST													
Mob/Demob	2.0%	J = 0.020 * (I)													158,000	147,000
Indirects, Overhead & Profit	37.8%	K = 0.378 * (I+J)													3,045,000	2,828,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	1.8%	M = 0.018 * (I+J+K)													194,000	181,000
Contingency	27.5%	N = 0.275 * (I+J+K+L+M)													3,056,000	2,838,000
		Subtotal (O = J+K+L+M+N)													6,453,000	5,994,000
DIRECT SUBCONTRACT O&M COSTS (OPERATIONS)																
Off-post Rotary Kiln Incineration			A	3	4	3,404.00	/CY	26,311	CY	2.500	1.000	1.000	Expansion, (Note 1)		229,952,000	213,595,000
		Subtotal (I')													229,952,000	213,595,000
INDIRECT SUBCONTR. O&M COSTS (OPERATIO		COST CODE:	A													
Mob/Demob	0.0%	J' = 0.000 * (I')													0	0
Contractor Markup	6.0%	K' = 0.060 * (I'+J')													13,797,000	12,816,000
Engineering Design	0.0%	L' = 0.000 * (I'+J'+K')													0	0
Resident Engineering	0.1%	M' = 0.001 * (I'+J'+K')													244,000	226,000
Contingency	30.0%	N' = 0.300 * (I'+J'+K'+L'+M')													73,198,000	67,991,000
		Subtotal (O' = J'+K'+L'+M'+N')													87,239,000	81,033,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	5,987	TON	1.000	1.000	1.000			(154,000)	(143,000)
		Subtotal (V)													(154,000)	(143,000)
TOTAL O&M COSTS (OPERATIONS) (P = I+I'+O+O'+V)															331,399,000	307,826,000

Table C-8 Cost Estimate - No Future Use, Significant Contamination History
Alternative 12: Dismantling, Salvage, Off-Post Rotary Kiln Incineration, Off-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
INDIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
														0	0	0
		Subtotal (Q)												0	0	0
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE	LLSL													
Indirects, Overhead & Profit	39.0%	R = 0.390 * (Q)												0	0	0
Contingency	32.5%	S = 0.325 * (Q+R)												0	0	0
		Subtotal (T)												0	0	0
TOTAL O&M COSTS (LONG-TERM ACTIVITIES) (U = Q+T)														0	0	0
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+P+U)															331,000,000	308,000,000

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Notes. 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume after shredding.

Table C-9 Cost Estimate - No Future Use, Significant Contamination History
Alternative 13: Dismantling, Salvage, On-Post Rotary Kiln Incineration, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
Shredding Structure Debris			LS	3	--	0.32	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		22,000	21,000
On-post Hazardous Waste Landfill			LS	5	--	8.26	/CY	30,941	CY	1.000	1.000	1.000	(Note 3)		262,000	233,000
On-post Hazardous Waste Landfill Closure			LS	6	--	4.92	/CY	30,941	CY	1.000	1.000	1.000	(Note 3)		156,000	135,000
		Subtotal (A)													441,000	389,000
INDIRECT CAPITAL COSTS		COST CODE LLMS														
Mob/Demob	3.3%	B = 0.033 * (A)													14,000	13,000
Indirects, Overhead & Profit	37.8%	C = 0.378 * (A+B)													172,000	152,000
Engineering Design	3.0%	D = 0.030 * (A+B+C)													19,000	17,000
Resident Engineering	1.3%	E = 0.013 * (A+B+C)													8,000	7,000
Contingency	28.8%	F = 0.288 * (A+B+C+D+E)													186,000	164,000
		Subtotal (G =B+C+D+E+F)													399,000	352,000
DIRECT SUBCONTRACT CAPITAL COSTS																
On-post Rotary Kiln Incineration			LS	5	--	76.00	/CY	30,941	CY	1.500	1.000	1.000	Expansion, (Note 2)		3,864,000	3,433,000
		Subtotal (A1)													3,864,000	3,433,000
INDIRECT SUBCONTRACT CAPITAL COSTS		COST CODE: C														
Mob/Demob	2.0%	B1 = 0.020 * (A1)													77,000	69,000
Contractor Markup	10.0%	C1 = 0.100 * (A1+B1)													394,000	350,000
Engineering Design	9.0%	D1 = 0.090 * (A1+B1+C1)													390,000	347,000
Resident Engineering	3.0%	E1 = 0.030 * (A1+B1+C1)													130,000	116,000
Contingency	30.0%	F1 = 0.300 * (A1+B1+C1+D1+E1)													1,457,000	1,294,000
		Subtotal (G1 = B1+C1+D1+E1+F1)													2,448,000	2,175,000
TOTAL CAPITAL COSTS (H = A+G)															7,153,000	6,350,000

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34,978

Table C-9 Cost Estimate - No Future Use, Significant Contamination History
Alternative 13: Dismantling, Salvage, On-Post Rotary Kiln Incineration, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	224,548	CY	1.000	1.000	1.000			872,000	810,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	224,548	CY	1.000	1.000	1.000			5,733,000	5,325,000
Loading Hazardous Debris			A	3	4	1.56	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		109,000	101,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	27,216	CY	2.500	1.500	1.000	Expansion, Miles, (Note 1)		116,000	108,000
Shredding Structure Debris			A	3	4	13.75	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		961,000	892,000
Loading Hazardous Debris			A	3	4	1.56	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		67,000	63,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	26,311	CY	1.600	1.500	1.000	Expansion, (Note 2)		72,000	67,000
Stockpiling of Structure Demolition Materials			A	3	6	21.4	/CY	30,941	CY	1.600	1.000	1.000	Expansion, (Note 2)		1,088,000	982,000
Transportation of Hazardous Waste On-post			A	5	6	1.11	/CY	30,941	CY	1.600	1.500	1.000	Expansion, (Note 2)		85,000	74,000
Loading Hazardous Debris			A	5	6	1.56	/CY	30,941	CY	1.000	1.000	1.000	(Note 3)		50,000	43,000
Transportation of Hazardous Waste On-post			A	5	6	1.11	/CY	30,941	CY	1.000	3.000	1.000	Miles, (Note 3)		106,000	93,000
On-post Hazardous Waste Landfill			A	5	6	5.78	/CY	30,941	CY	1.000	1.000	1.000	(Note 3)		184,000	161,000
		Subtotal (I)													9,442,000	8,719,000
INDIRECT O&M COSTS (OPERATIONS)		COST CODE MMLSST														
Mob/Demob	2.0%	J = 0.020 * (I)													189,000	174,000
Indirects, Overhead & Profit	37.8%	K = 0.378 * (I+J)													3,636,000	3,357,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	1.8%	M = 0.018 * (I+J+K)													232,000	214,000
Contingency	27.5%	N = 0.275 * (I+J+K+L+M)													3,648,000	3,369,000
		Subtotal (O = J+K+L+M+N)													7,705,000	7,115,000
DIRECT SUBCONTRACT O&M COSTS (OPERATIONS)																
On-post Rotary Kiln Incineration			A	5	6	172.50	/CY	30,941	CY	1.600	1.000	1.000	Expansion, (Note 2)		8,770,000	7,679,000
		Subtotal (I')													8,770,000	7,679,000
INDIRECT SUBCONTR. O&M COSTS (OPERATIO		COST CODE: D														
Mob/Demob	0.0%	J' = 0.000 * (I')													0	0
Contractor Markup	10.0%	K' = 0.100 * (I'+J')													877,000	768,000
Engineering Design	0.0%	L' = 0.000 * (I'+J'+K')													0	0
Resident Engineering	2.0%	M' = 0.020 * (I'+J'+K')													193,000	169,000
Contingency	40.0%	N' = 0.400 * (I'+J'+K'+L'+M')													3,936,000	3,446,000
		Subtotal (O' = J'+K'+L'+M'+N')													5,006,000	4,383,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	-25.00	/TON	5,987	TON	1.000	1.000	1.000			(153,705)	(142,772)
		Subtotal (V)													(154,000)	(143,000)
TOTAL O&M COSTS (OPERATIONS) (P = I+I'+O+O'+V)															30,770,000	27,753,000

Table C-9 Cost Estimate - No Future Use, Significant Contamination History
Alternative 13: Dismantling, Salvage, On-Post Rotary Kiln Incineration, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
INDIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
On-post Hazardous Waste Landfill Closure			A	6	30	0.02	/CY	30,941	CY	1.000	1.000	1.000	(Note 3)	1,000	19,000	12,000
		Subtotal (Q)												1,000	19,000	12,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE	LLSL													
Indirects, Overhead & Profit	39.0%	R = 0.390 * (Q)												0	7,000	5,000
Contingency	32.5%	S = 0.325 *(Q+R)												0	9,000	5,000
		Subtotal (T)												1,000	16,000	10,000
TOTAL O&M COSTS (LONG-TERM ACTIVITIES) (U = Q+T)														1,000	35,000	22,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+P+U)															38,000,000	34,100,000

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STRUCTURES DAA

Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume following shredding
3 - A factor of 1.0 is applied to the bank cubic yard volume of structural material to account for the volume following incineration.

Table C-10 Cost Estimate - No Future Use, Significant Contamination History
Alternative 19: Dismantling, Salvage, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
On-post Hazardous Waste Landfill			LS	3	--	8.26	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		357,000	337,000
On-post Hazardous Waste Landfill Closure			LS	4	--	4.92	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		213,000	195,000
		Subtotal (A)													570,000	531,000
INDIRECT CAPITAL COSTS		COST CODE LLMS														
Mob/Demob	3.3%	B = 0.033 * (A)													19,000	17,000
Indirects, Overhead & Profit	37.8%	C = 0.378 * (A+B)													222,000	207,000
Engineering Design	3.0%	D = 0.030 * (A+B+C)													24,000	23,000
Resident Engineering	1.3%	E = 0.013 * (A+B+C)													10,000	9,000
Contingency	28.8%	F = 0.288 * (A+B+C+D+E)													243,000	226,000
		Subtotal (G =B+C+D+E+F)													518,000	483,000
TOTAL CAPITAL COSTS (H = A+G)															1,088,000	1,014,000

Table C-10 Cost Estimate - No Future Use, Significant Contamination History
Alternative 19: Dismantling, Salvage, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Exp/Re Factor	Mileage Factor	Other Factor	Factor Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	224,548	CY	1.000	1.000	1.000			872,000	810,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	224,548	CY	1.000	1.000	1.000			5,733,000	5,325,000
Loading Hazardous Debris			A	3	4	1.56	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		109,000	101,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	26,311	CY	2.500	4.500	1.000	Expansion, Miles, (Note 1)		337,000	313,000
On-post Hazardous Waste Landfill			A	3	4	5.78	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		250,000	232,000
		Subtotal (I)													7,301,000	6,782,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	5,987	TON	1.000	1.000	1.000			(154,000)	(143,000)
		Subtotal (I')													(154,000)	(143,000)
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	MMLSST													
Mob/Demob	2.0%	J = 0.020 * (I)													146,000	136,000
Indirects, Overhead & Profit	37.8%	K = 0.378 * (I+J)													2,811,000	2,611,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	1.8%	M = 0.018 * (I+J+K)													180,000	167,000
Contingency	27.5%	N = 0.275 * (I+J+K+L+M)													2,870,000	2,666,000
		Subtotal (O = J+K+L+M+N)													6,007,000	5,580,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
On-post Hazardous Waste Landfill Closure			A	4	30	0.02	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)	1,000	28,000	18,000
		Subtotal (P)												1,000	28,000	18,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE	LLSL													
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)												0	11,000	7,000
Contingency	32.5%	R = 0.325 * (P+Q)												0	13,000	8,000
		Subtotal (S)												1,000	24,000	15,000
TOTAL O&M COSTS (T = I+I'+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														2,000	13,206,000	12,252,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															14,300,000	13,300,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-11 Cost Estimate - No Future Use, Significant Contamination History
Alternative 20: Dismantling, Salvage, Off-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
Transfer Station			LS	3	--	0.24	/CY	26,311	CY	2.500	1.000	1.000	Expansion., (Note 1)		16,000	15,000
		Subtotal (A)													16,000	15,000
INDIRECT CAPITAL COSTS		COST CODE LLSS														
Mob/Demob	3.3%	B = 0.033 * (A)													1,000	0
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)													7,000	6,000
Engineering Design	3.0%	D = 0.030 * (A+B+C)													1,000	1,000
Resident Engineering	1.3%	E = 0.013 * (A+B+C)													0	0
Contingency	27.5%	F = 0.275 * (A+B+C+D+E)													7,000	6,000
		Subtotal (G =B+C+D+E+F)													15,000	14,000
DIRECT SUBCONTRACT CAPITAL COSTS															0	0
		Subtotal (A1)													0	0
INDIRECT SUBCONTRACT CAPITAL COSTS		COST CODE: Z														
Mob/Demob	0.0%	B1 = 0.000 * (A1)													0	0
Contractor Markup	0.0%	C1 = 0.000 * (A1+B1)													0	0
Engineering Design	0.0%	D1 = 0.000 * (A1+B1+C1)													0	0
Resident Engineering	0.0%	E1 = 0.000 * (A1+B1+C1)													0	0
Contingency	0.0%	F1 = 0.000 * (A1+B1+C1+D1+E1)													0	0
		Subtotal (G1 = B1+C1+D1+E1+F1)													0	0
TOTAL CAPITAL COSTS (H = A+G)															31,000	29,000

Table C-11 Cost Estimate - No Future Use, Significant Contamination History
Alternative 20: Dismantling, Salvage, Off-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	224,548	CY	1.000	1.000	1.000			872,000	810,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	224,548	CY	1.000	1.000	1.000			5,733,000	5,325,000
Debris Sampling Every 100 CY			A	3	4	28.85	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		2,016,000	1,873,000
Loading Hazardous Debris			A	3	4	1.56	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		109,000	101,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	27,216	CY	2.500	1.500	1.000	Expansion, Miles, (Note 1)		116,000	108,000
Transfer Station			A	3	4	1.10	/CY	26,311	CY	2.500	1.000	1.000	Expansion, (Note 1)		74,000	69,000
Transportation of Hazardous Waste Off-post			A	3	4	0.56	/CY	26,311	CY	2.500	70.000	1.000	Expansion, Miles, (Note 1)		2,648,000	2,460,000
		Subtotal (I)													11,568,000	10,746,000
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	MMLSST													
Mob/Demob	2.0%	J = 0.020 * (I)													231,000	215,000
Indirects, Overhead & Profit	37.8%	K = 0.378 * (I+J)													4,454,000	4,138,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	1.8%	M = 0.018 * (I+J+K)													284,000	264,000
Contingency	27.5%	N = 0.275 * (I+J+K+L+M)													4,470,000	4,152,000
		Subtotal (O = J+K+L+M+N)													9,440,000	8,769,000
DIRECT SUBCONTRACT O&M COSTS (OPERATIONS)																
Off-post Hazardous Waste Landfill			A	3	4	165.25	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		7,144,000	6,636,000
		Subtotal (I')													7,144,000	6,636,000
INDIRECT SUBCONTR. O&M COSTS (OPERATIO		COST CODE:	B													
Mob/Demob	0.0%	J' = 0.000 * (I')													0	0
Contractor Markup	8.0%	K' = 0.060 * (I'+J')													429,000	398,000
Engineering Design	0.0%	L' = 0.000 * (I'+J'+K')													0	0
Resident Engineering	0.0%	M' = 0.000 * (I'+J'+K')													0	0
Contingency	25.0%	N' = 0.250 * (I'+J'+K'+L'+M')													1,893,000	1,759,000
		Subtotal (O' = J'+K'+L'+M'+N')													2,322,000	2,157,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	5,987	TON	1.000	1.000	1.000			(153,705)	(142,772)
		Subtotal (V)													(154,000)	(143,000)
TOTAL O&M COSTS (OPERATIONS) (P = I+I'+O+O'+V)															30,321,000	28,164,000

Table C-11 Cost Estimate - No Future Use, Significant Contamination History
Alternative 20: Dismantling, Salvage, Off-Post Hazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
INDIRECT O&M COSTS (LONG-TERM ACTIVITIES)														
												0	0	0
Subtotal (Q)												0	0	0
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE	COST CODE	Z												
Indirects, Overhead & Profit 0.0%	R = 0.000 * (Q)											0	0	0
Contingency 0.0%	S = 0.000 * (Q+R)											0	0	0
Subtotal (T)												0	0	0
TOTAL O&M COSTS (LONG-TERM ACTIVITIES) (U = Q+T)												0	0	0
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+P+U)													30,400,000	28,200,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-12 Cost Estimate - No Future Use, Significant Contamination History
Alternative 21: Dismantling, Salvage, Clay Cap

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
Groundwater Monitoring Well Installation			LS	3	--	36,670.99	LS	1	EA	1.000	1.000	1.000			38,000	35,000
		Subtotal (A)													38,000	35,000
INDIRECT CAPITAL COSTS		COST CODE LLSS														
Mob/Demob	3.3%	B = 0.033 * (A)													1,000	1,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)													15,000	14,000
Engineering Design	3.0%	D = 0.030 * (A+B+C)													2,000	2,000
Resident Engineering	1.3%	E = 0.013 * (A+B+C)													1,000	1,000
Contingency	27.5%	F = 0.275 * (A+B+C+D+E)													15,000	15,000
		Subtotal (G =B+C+D+E+F)													34,000	32,000
TOTAL CAPITAL COSTS (H = A+G)															72,000	68,000

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Table C-12 Cost Estimate - No Future Use, Significant Contamination History
Alternative 21: Dismantling, Salvage, Clay Cap

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Exp/Red Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	224,548	CY	1.000	1.000	1.000			872,000	810,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	224,548	CY	1.000	1.000	1.000			5,733,000	5,325,000
Loading Hazardous Debris			A	3	4	1.56	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		109,000	101,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	26,311	CY	2.500	4.500	1.000	Expansion, Miles, (Note 1)		337,000	313,000
Consolidation of Structural Material			A	3	4	5.04	/CY	26,311	CY	1.600	1.000	1.000	(Note 2)		218,000	202,000
Clay Cap			A	3	4	0.70	/SF	34,061	SF	1.000	1.000	1.000			24,000	23,000
Vegetative Cover for Cap			A	3	4	0.03	/SF	34,061	SF	1.000	1.000	1.000			1,000	1,000
		Subtotal (I)													7,295,000	6,776,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	5,987	TON	1.000	1.000	1.000			(154,000)	(143,000)
		Subtotal (T)													(154,000)	(143,000)
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	MMMSST													
Mob/Demob	2.0%	J = 0.020 * (I)													146,000	136,000
Indirects, Overhead & Profit	39.0%	K = 0.390 * (I+J)													2,902,000	2,695,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	1.8%	M = 0.018 * (I+J+K)													181,000	168,000
Contingency	28.8%	N = 0.288 * (I+J+K+L+M)													3,025,000	2,810,000
		Subtotal (O = J+K+L+M+N)													6,254,000	5,809,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
Clay Cap			A	4	30	0.01	/SF	34,061	SF	1.000	1.000	1.000		0	9,000	6,000
Groundwater Monitoring			A	4	30	14,603.63	/YEAR	1	YR	1.000	1.000	1.000		15,000	405,000	259,000
5-Year Site Review			A	4	30	2,700.00	/YEAR	1	YR	1.000	1.000	1.000		3,000	75,000	48,000
		Subtotal (P)												18,000	489,000	313,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIES		COST CODE	LLSL													
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)												7,000	191,000	122,000
Contingency	32.5%	R = 0.325 * (P+Q)												8,000	221,000	141,000
		Subtotal (S)												15,000	412,000	263,000
TOTAL O&M COSTS (T = I+T+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														33,000	14,296,000	13,019,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															14,400,000	13,100,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-13 Cost Estimate - No Future Use, Significant Contamination History
Alternative 21a: Dismantling, Salvage, Consolidation

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
					Subtotal (A)								0	0
INDIRECT CAPITAL COSTS					COST CODE LLSS									
Mob/Demob	3 3%				B = 0 033 * (A)								0	0
Indirects, Overhead & Profit	39.0%				C = 0 390 * (A+B)								0	0
Engineering Design	3 0%				D = 0 030 * (A+B+C)								0	0
Resident Engineering	1 3%				E = 0 013 * (A+B+C)								0	0
Contingency	27 5%				F = 0 275 * (A+B+C+D+E)								0	0
					Subtotal (G =B+C+D+E+F)								0	0
TOTAL CAPITAL COSTS (H = A+G)													0	0

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Table C-13 Cost Estimate - No Future Use, Significant Contamination History
Alternative 21a: Dismantling, Salvage, Consolidation

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	224,548	CY	1.000	1.000	1.000			872,000	810,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	224,548	CY	1.000	1.000	1.000			5,733,000	5,325,000
Loading Hazardous Debris			A	3	4	1.56	/CY	27,216	CY	2.500	1.000	1.000	Expansion, (Note 1)		109,000	101,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	26,311	CY	2.500	3.000	1.000	Expansion, Miles, (Note 1)		225,000	209,000
Consolidation of Structural Material			A	3	4	5.04	/CY	26,311	CY	1.600	1.000	1.000	Expansion, (Note 2)		218,000	202,000
		Subtotal (I)													7,157,000	6,648,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	5,987	TON	1.000	1.000	1.000			(154,000)	(143,000)
		Subtotal (I')													(154,000)	(143,000)
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	MMMSST													
Mob/Demob	2.0%	J = 0.020 * (I)													143,000	133,000
Indirects, Overhead & Profit	39.0%	K = 0.390 * (I+J)													2,847,000	2,644,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	1.8%	M = 0.018 * (I+J+K)													178,000	165,000
Contingency	28.8%	N = 0.288 * (I+J+K+L+M)													2,968,000	2,757,000
		Subtotal (O = J+K+L+M+N)													6,136,000	5,699,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
		Subtotal (P)												0	0	0
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE	Z													
Indirects, Overhead & Profit	0.0%	Q = 0.000 * (P)												0	0	0
Contingency	0.0%	R = 0.000 * (P+Q)												0	0	0
		Subtotal (S)												0	0	0
TOTAL O&M COSTS (T = I+I'+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														0	13,139,000	12,204,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															13,100,000	12,200,000

Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-14 Cost Estimate - No Future Use, Other Contamination History
Alternative 1: No Action

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
No Action	LS	3	--	0.00	/EA	1	EA	1.000	1.000	1.000			0	0
Subtotal (A)													0	0
INDIRECT CAPITAL COSTS		COST CODE	LLSS											
Mob/Demob	3.3%	B = 0.033 * (A)											0	0
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)											0	0
Engineering Design	3.0%	D = 0.030 * (A+B+C)											0	0
Resident Engineering	1.3%	E = 0.013 * (A+B+C)											0	0
Contingency	27.5%	F = 0.275 * (A+B+C+D+E)											0	0
		Subtotal (G =B+C+D+E+F)											0	0
TOTAL CAPITAL COSTS (H = A+G)													0	0

Table C-14 Cost Estimate - No Future Use, Other Contamination History
Alternative 1: No Action

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
No Action			LS	3	--	0.00	/EA	1	EA	1.000	1.000	1.000			0	0
		Subtotal (I)													0	0
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	LLSS													
Mob/Demob	3.3%	J = 0.033 * (I)													0	0
Indirects, Overhead & Profit	39.0%	K = 0.390 * (I+J)													0	0
Engineering Design	3.0%	L = 0.030 * (I+J+K)													0	0
Resident Engineering	1.3%	M = 0.013 * (I+J+K)													0	0
Contingency	27.5%	N = 0.275 * (I+J+K+L+M)													0	0
		Subtotal (O = J+K+L+M+N)													0	0
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
No Action			LS	3	--	0.00	/EA	1	EA	1.000	1.000	1.000		0	0	0
		Subtotal (P)												0	0	0
INDIRECT O&M COSTS (LONG-TERM ACTIVITI		COST CODE	LLSS													
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)												0	0	0
Contingency	27.5%	R = 0.275 * (P+Q)												0	0	0
		Subtotal (S)												0	0	0
TOTAL O&M COSTS (T = I+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														0	0	0
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															0	0

Table C-15 Cost Estimate - No Future Use, Other Contamination History
Alternative 2: Pipe Plugs, Locks/Boards/Fences/Signs

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
Locks & Boards	LS	3	--	1.88	/SF	471,032	SF	1.000	1.000	1.000			909,000	857,000
Fences & Signs	LS	3	--	16.27	/LF	79,304	LF	1.000	1.000	1.000			1,325,000	1,249,000
			Subtotal (A)										2,235,000	2,106,000
INDIRECT CAPITAL COSTS		COST CODE	LLSS											
Mob/Demob	3.3%	B = 0.033 * (A)											73,000	68,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)											900,000	848,000
Engineering Design	3.0%	D = 0.030 * (A+B+C)											96,000	91,000
Resident Engineering	1.3%	E = 0.013 * (A+B+C)											40,000	38,000
Contingency	27.5%	F = 0.275 * (A+B+C+D+E)											919,000	867,000
		Subtotal (G =B+C+D+E+F)											2,028,000	1,912,000
TOTAL CAPITAL COSTS (H = A+G)													4,263,000	4,018,000

Table C-15 Cost Estimate - No Future Use, Other Contamination History
Alternative 2: Pipe Plugs, Locks/Boards/Fences/Signs

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)														
Dust & Safety Samp of Manuf Structures	A	3	4	3.78	/CY	627,346	CY	1.000	1.000	1.000			2,435,000	2,262,000
Pipe Plugging - ID <= 2 in.	A	3	4	10,049.64	/CY	1,361	CY	1.000	1.000	1.000			14,048,000	13,049,000
Pipe Plugging - 2 in. < ID <= 6 in.	A	3	4	2,138.07	/CY	14,973	CY	1.000	1.000	1.000			32,877,000	30,538,000
Pipe Plugging - ID > 6 in.	A	3	4	681.08	/CY	10,889	CY	1.000	1.000	1.000			7,617,000	7,075,000
			Subtotal (I)										56,977,000	52,925,000
INDIRECT O&M COSTS (OPERATIONS)			COST CODE Z											
Mob/Demob	0.0%		J = 0.000 * (I)										0	0
Indirects, Overhead & Profit	0.0%		K = 0.000 * (I+J)										0	0
Engineering Design	0.0%		L = 0.000 * (I+J+K)										0	0
Resident Engineering	0.0%		M = 0.000 * (I+J+K)										0	0
Contingency	0.0%		N = 0.000 * (I+J+K+L+M)										0	0
			Subtotal (O = J+K+L+M+N)										0	0
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)														
Locks & Boards		A	4	30	0.19	/SF	471,032	SF	1.000	1.000	1.000	92,000	2,482,000	1,588,000
Fences & Signs		A	4	30	1.62	/LF	79,304	LF	1.000	1.000	1.000	132,000	3,562,000	2,279,000
			Subtotal (P)									224,000	6,044,000	3,867,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITI			COST CODE LLSL											
Indirects, Overhead & Profit	39.0%		Q = 0.390 * (P)									87,000	2,357,000	1,508,000
Contingency	32.5%		R = 0.325 * (P+Q)									101,000	2,730,000	1,747,000
			Subtotal (S)									188,000	5,088,000	3,255,000
TOTAL O&M COSTS (T = I+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]												412,000	68,109,000	60,047,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)													72,400,000	64,100,000

Table C-16 Cost Estimate - No Future Use, Other Contamination History
Alternative 9: Vacuum Dusting, Dismantling, Salvage, On-Post Nonhazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
Vacuum Dusting	LS	3	--	0.03	/SF	581,771	SF	1.000	1.000	1.000			18,000	17,000
On-post Nonhazardous Waste Landfill	LS	3	--	8.26	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		1,351,000	1,273,000
On-post Nonhazardous Waste Landfill Closure	LS	4	--	4.92	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		805,000	736,000
Subtotal (A)													2,174,000	2,027,000
INDIRECT CAPITAL COSTS		COST CODE	LMSS											
Mob/Demob	3.9%	B = 0.039 * (A)											84,000	79,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)											881,000	821,000
Engineering Design	4.5%	D = 0.045 * (A+B+C)											141,000	132,000
Resident Engineering	1.5%	E = 0.015 * (A+B+C)											47,000	44,000
Contingency	30.0%	F = 0.300 * (A+B+C+D+E)											998,000	931,000
		Subtotal (G =B+C+D+E+F)											2,151,000	2,006,000
TOTAL CAPITAL COSTS (H = A+G)													4,325,000	4,032,000

Table C-16 Cost Estimate - No Future Use, Other Contamination History
Alternative 9: Vacuum Dusting, Dismantling, Salvage, On-Post Nonhazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	627,346	CY	1.000	1.000	1.000			2,435,000	2,262,000
Vacuum Dusting			A	3	4	0.78	/SF	581,771	SF	1.000	1.000	1.000			466,000	433,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	627,346	CY	1.000	1.000	1.000			16,017,000	14,878,000
Loading Nonhazardous Debris			A	3	4	1.29	/CY	108,700	CY	2.500	1.000	1.000	Expansion, (Note 1)		360,000	334,000
Transportation of Nonhazardous Waste On-post			A	3	4	0.90	/CY	99,535	CY	2.500	4.500	1.000	Expansion, Miles, (Note 1)		1,035,000	961,000
On-post Nonhazardous Waste Landfill			A	3	4	5.78	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		945,000	878,000
		Subtotal (I)													21,259,000	19,747,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	60,626	TON	1.000	1.000	1.000			(1,557,000)	(1,446,000)
		Subtotal (T)													(1,557,000)	(1,446,000)
INDIRECT O&M COSTS (OPERATIONS)		COST CODE MMLMST														
Mob/Demob	2.0%	J = 0.020 * (I)													425,000	395,000
Indirects, Overhead & Profit	37.8%	K = 0.378 * (I+J)													8,186,000	7,603,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	2.0%	M = 0.020 * (I+J+K)													597,000	555,000
Contingency	31.3%	N = 0.313 * (I+J+K+L+M)													9,521,000	8,844,000
		Subtotal (O = J+K+L+M+N)													18,729,000	17,397,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
On-post Nonhazardous Waste Landfill Closure			A	4	30	0.02	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)	4,000	106,000	68,000
		Subtotal (P)												4,000	106,000	68,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE LLSL														
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)												2,000	41,000	26,000
Contingency	32.5%	R = 0.325 * (P+Q)												2,000	48,000	31,000
		Subtotal (S)												3,000	89,000	57,000
TOTAL O&M COSTS (T = I+T+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														7,000	38,626,000	35,823,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															43,000,000	39,900,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-17 Cost Estimate - No Future Use, Other Contamination History
Alternative 9a: Steam Cleaning, Dismantling, Salvage, On-Post Nonhazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
Steam Cleaning	LS	3	--	0.29	/SF	409,731	SF	1.000	1.000	1.000			122,000	115,000
On-post Nonhazardous Waste Landfill	LS	3	--	8.26	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		1,351,000	1,273,000
On-post Nonhazardous Waste Landfill Closure	LS	4	--	4.92	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		805,000	736,000
Subtotal (A)													2,278,000	2,125,000
INDIRECT CAPITAL COSTS		COST CODE	LMSS											
Mob/Demob	3.9%	B = 0.039 * (A)											88,000	82,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)											923,000	861,000
Engineering Design	4.5%	D = 0.045 * (A+B+C)											148,000	138,000
Resident Engineering	1.5%	E = 0.015 * (A+B+C)											49,000	46,000
Contingency	30.0%	F = 0.300 * (A+B+C+D+E)											1,046,000	976,000
		Subtotal (G =B+C+D+E+F)											2,254,000	2,103,000
TOTAL CAPITAL COSTS (H = A+G)													4,532,000	4,228,000

Table C-17 Cost Estimate - No Future Use, Other Contamination History
Alternative 9a: Steam Cleaning, Dismantling, Salvage, On-Post Nonhazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	627,346	CY	1.000	1.000	1.000			2,435,000	2,262,000
Steam Cleaning			A	3	4	2.57	/SF	409,731	SF	1.000	1.000	1.000			1,081,000	1,005,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	627,346	CY	1.000	1.000	1.000			16,017,000	14,878,000
Loading Nonhazardous Debris			A	3	4	1.29	/CY	108,700	CY	2.500	1.000	1.000	Expansion, (Note 1)		360,000	334,000
Transportation of Nonhazardous Waste On-post			A	3	4	0.90	/CY	99,535	CY	2.500	4.500	1.000	Expansion, Miles, (Note 1)		1,035,000	961,000
On-post Nonhazardous Waste Landfill			A	3	4	5.78	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		945,000	878,000
		Subtotal (I)													21,874,000	20,318,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	60,626	TON	1.000	1.000	1.000			(1,557,000)	(1,446,000)
		Subtotal (Γ)													(1,557,000)	(1,446,000)
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	MMLMST													
Mob/Demob	2.0%	J = 0.020 * (I)													437,000	406,000
Indirects, Overhead & Profit	37.8%	K = 0.378 * (I+J)													8,423,000	7,824,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	2.0%	M = 0.020 * (I+J+K)													615,000	571,000
Contingency	31.3%	N = 0.313 * (I+J+K+L+M)													9,797,000	9,100,000
		Subtotal (O = J+K+L+M+N)													19,271,000	17,901,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
On-post Nonhazardous Waste Landfill Closure			A	4	30	0.02	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)	4,000	106,000	68,000
		Subtotal (P)												4,000	106,000	68,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE	LLSL													
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)												2,000	41,000	26,000
Contingency	32.5%	R = 0.325 * (P+Q)												2,000	48,000	31,000
		Subtotal (S)												3,000	89,000	57,000
TOTAL O&M COSTS (T = I+Γ+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														7,000	39,784,000	36,898,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															44,300,000	41,100,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-18 Cost Estimate - No Future Use, Other Contamination History
Alternative 10: Sand Blasting, Dismantling, Salvage, On-Post Nonhazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
Sand Blasting	LS	3	--	0.42	/SF	581,771	SF	1.000	1.000	1.000			251,000	237,000
On-post Nonhazardous Waste Landfill	LS	3	--	8.26	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		1,351,000	1,273,000
On-post Nonhazardous Waste Landfill Closure	LS	4	--	4.92	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		805,000	736,000
			Subtotal (A)										2,407,000	2,246,000
INDIRECT CAPITAL COSTS		COST CODE	LMSS											
Mob/Demob	3.9%	B = 0.039 * (A)											93,000	87,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)											975,000	910,000
Engineering Design	4.5%	D = 0.045 * (A+B+C)											156,000	146,000
Resident Engineering	1.5%	E = 0.015 * (A+B+C)											52,000	49,000
Contingency	30.0%	F = 0.300 * (A+B+C+D+E)											1,105,000	1,031,000
		Subtotal (G =B+C+D+E+F)											2,382,000	2,223,000
TOTAL CAPITAL COSTS (H = A+G)													4,788,000	4,469,000

Table C-18 Cost Estimate - No Future Use, Other Contamination History
Alternative 10: Sand Blasting, Dismantling, Salvage, On-Post Nonhazardous Waste Landfill

Cost Item		Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)															
Dust & Safety Samp of Manuf Structures		A	3	4	3.78	/CY	627,346	CY	1.000	1.000	1.000			2,435,000	2,262,000
Sand Blasting		A	3	4	3.61	/SF	581,771	SF	1.000	1.000	1.000			2,157,000	2,003,000
Demolition of Nonagent Structures		A	3	4	24.86	/CY	627,346	CY	1.000	1.000	1.000			16,017,000	14,878,000
Loading Nonhazardous Debris		A	3	4	1.29	/CY	108,700	CY	2.500	1.000	1.000	Expansion, (Note 1)		360,000	334,000
Transportation of Nonhazardous Waste On-post		A	3	4	0.90	/CY	99,535	CY	2.500	4.500	1.000	Expansion, Miles, (Note 1)		1,035,000	961,000
On-post Nonhazardous Waste Landfill		A	3	4	5.78	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		945,000	878,000
	Subtotal (I)													22,950,000	21,317,000
DIRECT O&M REVENUES (OPERATIONS)															
Salvage of Metal		A	3	4	(25.00)	/TON	60,626	TON	1.000	1.000	1.000			(1,557,000)	(1,446,000)
	Subtotal (T)													(1,557,000)	(1,446,000)
INDIRECT O&M COSTS (OPERATIONS)	COST CODE MMLMST														
Mob/Demob 2.0%	J = 0.020 * (I)													459,000	426,000
Indirects, Overhead & Profit 37.8%	K = 0.378 * (I+J)													8,837,000	8,208,000
Engineering Design 0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering 2.0%	M = 0.020 * (I+J+K)													645,000	599,000
Contingency 31.3%	N = 0.313 * (I+J+K+L+M)													10,278,000	9,547,000
	Subtotal (O = J+K+L+M+N)													20,219,000	18,781,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)															
On-post Nonhazardous Waste Landfill Closure		A	4	30	0.02	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)	4,000	106,000	68,000
	Subtotal (P)												4,000	106,000	68,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE	COST CODE LLSL														
Indirects, Overhead & Profit 39.0%	Q = 0.390 * (P)												2,000	41,000	26,000
Contingency 32.5%	R = 0.325 * (P+Q)												2,000	48,000	31,000
	Subtotal (S)												3,000	89,000	57,000
TOTAL O&M COSTS (T = I+T+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]													7,000	41,807,000	38,777,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)														46,600,000	43,200,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-19 Cost Estimate - No Future Use, Other Contamination History
Alternative 19: Dismantling, Salvage, On-Post Hazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
On-post Hazardous Waste Landfill	LS	3	--	8.26	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		1,351,000	1,273,000
On-post Hazardous Waste Landfill Closure	LS	4	--	4.92	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		805,000	736,000
			Subtotal (A)										2,156,000	2,010,000
INDIRECT CAPITAL COSTS			COST CODE LLSS											
Mob/Demob	3.3%		B = 0.033 * (A)										70,000	65,000
Indirects, Overhead & Profit	39.0%		C = 0.390 * (A+B)										868,000	809,000
Engineering Design	3.0%		D = 0.030 * (A+B+C)										93,000	87,000
Resident Engineering	1.3%		E = 0.013 * (A+B+C)										39,000	36,000
Contingency	27.5%		F = 0.275 * (A+B+C+D+E)										887,000	827,000
			Subtotal (G =B+C+D+E+F)										1,957,000	1,824,000
TOTAL CAPITAL COSTS (H = A+G)													4,112,000	3,834,000

Table C-19 Cost Estimate - No Future Use, Other Contamination History
Alternative 19: Dismantling, Salvage, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	627,346	CY	1.000	1.000	1.000			2,435,000	2,262,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	627,346	CY	1.000	1.000	1.000			16,017,000	14,878,000
Loading Hazardous Debris			A	3	4	1.56	/CY	108,700	CY	2.500	1.000	1.000	Expansion, (Note 1)		435,000	404,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	99,535	CY	2.500	4.500	1.000	Expansion, Miles, (Note 1)		1,277,000	1,186,000
On-post Hazardous Waste Landfill			A	3	4	5.78	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		945,000	878,000
		Subtotal (I)													21,110,000	19,608,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	60,626	TON	1.000	1.000	1.000			(1,557,000)	(1,446,000)
		Subtotal (I')													(1,557,000)	(1,446,000)
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	MMMSST													
Mob/Demob	2.0%	J = 0.020 * (I)													422,000	392,000
Indirects, Overhead & Profit	39.0%	K = 0.390 * (I+J)													8,397,000	7,800,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	1.8%	M = 0.018 * (I+J+K)													524,000	487,000
Contingency	28.8%	N = 0.288 * (I+J+K+L+M)													8,755,000	8,132,000
		Subtotal (O = J+K+L+M+N)													18,099,000	16,811,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
On-post Hazardous Waste Landfill Closure			A	4	30	0.02	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)	4,000	106,000	68,000
		Subtotal (P)												4,000	106,000	68,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE	LLSL													
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)												2,000	41,000	26,000
Contingency	32.5%	R = 0.325 * (P+Q)												2,000	48,000	31,000
		Subtotal (S)												3,000	89,000	57,000
TOTAL O&M COSTS (T = I+I'+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														7,000	37,847,000	35,098,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															42,000,000	38,900,000

Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-20 Cost Estimate - No Future Use, Other Contamination History
Alternative 20: Dismantling, Salvage, Off-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
Transfer Station			LS	3	--	0.24	/CY	99,535	CY	2.500	1.000	1.000	Expansion, (Note 1)		61,000	58,000
		Subtotal (A)													61,000	58,000
INDIRECT CAPITAL COSTS		COST CODE LLSS														
Mob/Demob	3.3%	B = 0.033 * (A)													2,000	2,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)													25,000	23,000
Engineering Design	3.0%	D = 0.030 * (A+B+C)													3,000	2,000
Resident Engineering	1.3%	E = 0.013 * (A+B+C)													1,000	1,000
Contingency	27.5%	F = 0.275 * (A+B+C+D+E)													25,000	24,000
		Subtotal (G =B+C+D+E+F)													55,000	52,000
DIRECT SUBCONTRACT CAPITAL COSTS															0	0
		Subtotal (A1)													0	0
INDIRECT SUBCONTRACT CAPITAL COSTS		COST CODE: Z														
Mob/Demob	0.0%	B1 = 0.000 * (A1)													0	0
Contractor Markup	0.0%	C1 = 0.000 * (A1+B1)													0	0
Engineering Design	0.0%	D1 = 0.000 * (A1+B1+C1)													0	0
Resident Engineering	0.0%	E1 = 0.000 * (A1+B1+C1)													0	0
Contingency	0.0%	F1 = 0.000 * (A1+B1+C1+D1+E1)													0	0
		Subtotal (G1 = B1+C1+D1+E1+F1)													0	0
TOTAL CAPITAL COSTS (H = A+G)															117,000	110,000

Table C-20 Cost Estimate - No Future Use, Other Contamination History
Alternative 20: Dismantling, Salvage, Off-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	627,346	CY	1.000	1.000	1.000			2,435,000	2,262,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	627,346	CY	1.000	1.000	1.000			16,017,000	14,878,000
Debris Sampling Every 100 CY			A	3	4	28.85	/CY	108,700	CY	2.500	1.000	1.000	Expansion, (Note 1)		8,052,000	7,479,000
Loading Hazardous Debris			A	3	4	1.56	/CY	108,700	CY	2.500	1.000	1.000	Expansion, (Note 1)		435,000	404,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	108,700	CY	2.500	1.500	1.000	Expansion, Miles, (Note 1)		465,000	432,000
Transfer Station			A	3	4	1.10	/CY	99,535	CY	2.500	1.000	1.000	Expansion, (Note 1)		281,000	261,000
Transportation of Hazardous Waste Off-post			A	3	4	0.56	/CY	99,535	CY	2.500	70.000	1.000	Expansion, Miles, (Note 1)		10,018,000	9,305,000
		Subtotal (I)													37,703,000	35,021,000
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	MMLSST													
Mob/Demob	2.0%	J = 0.020 * (I)													754,000	700,000
Indirects, Overhead & Profit	37.8%	K = 0.378 * (I+J)													14,518,000	13,485,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	1.8%	M = 0.018 * (I+J+K)													927,000	861,000
Contingency	27.5%	N = 0.275 * (I+J+K+L+M)													14,568,000	13,532,000
		Subtotal (O = J+K+L+M+N)													30,767,000	28,578,000
DIRECT SUBCONTRACT O&M COSTS (OPERATIONS)																
Off-post Hazardous Waste Landfill			A	3	4	165.25	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		27,028,000	25,105,000
		Subtotal (I')													27,028,000	25,105,000
INDIRECT SUBCONTR. O&M COSTS (OPERATIO		COST CODE:	B													
Mob/Demob	0.0%	J' = 0.000 * (I')													0	0
Contractor Markup	6.0%	K' = 0.060 * (I'+J')													1,622,000	1,506,000
Engineering Design	0.0%	L' = 0.000 * (I'+J'+K')													0	0
Resident Engineering	0.0%	M' = 0.000 * (I'+J'+K')													0	0
Contingency	25.0%	N' = 0.250 * (I'+J'+K'+L'+M')													7,162,000	6,653,000
		Subtotal (O' = J'+K'+L'+M'+N')													8,784,000	8,159,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	60,626	TON	1.000	1.000	1.000			(1,556,585)	(1,445,863)
		Subtotal (V)													(1,557,000)	(1,446,000)
TOTAL O&M COSTS (OPERATIONS) (P = I+I'+O+O'+V)															102,725,000	95,418,000

Table C-20 Cost Estimate - No Future Use, Other Contamination History
Alternative 20: Dismantling, Salvage, Off-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
INDIRECT O&M COSTS (LONG-TERM ACTIVITIES)														0	0	0
		Subtotal (Q)												0	0	0
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE	Z													
Indirects, Overhead & Profit	0.0%	R = 0.000 * (Q)												0	0	0
Contingency	0.0%	S = 0.000 * (Q+R)												0	0	0
		Subtotal (T)												0	0	0
TOTAL O&M COSTS (LONG-TERM ACTIVITIES) (U = Q+T)														0	0	0
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+P+U)															103,000,000	95,500,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-21 Cost Estimate - No Future Use, Other Contamination History
Alternative 21: Dismantling, Salvage, Clay Cap

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
Groundwater Monitoring Well Installation			LS	3	--	36,670.99	LS	1	EA	1.000	1.000	1.000			38,000	35,000
		Subtotal (A)													38,000	35,000
INDIRECT CAPITAL COSTS		COST CODE LLSS														
Mob/Demob	3.3%	B = 0.033 * (A)													1,000	1,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)													15,000	14,000
Engineering Design	3.0%	D = 0.030 * (A+B+C)													2,000	2,000
Resident Engineering	1.3%	E = 0.013 * (A+B+C)													1,000	1,000
Contingency	27.5%	F = 0.275 * (A+B+C+D+E)													15,000	15,000
		Subtotal (G =B+C+D+E+F)													34,000	32,000
TOTAL CAPITAL COSTS (H = A+G)															72,000	68,000

Table C-21 Cost Estimate - No Future Use, Other Contamination History
Alternative 21: Dismantling, Salvage, Clay Cap

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Exp/Red Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	627,346	CY	1.000	1.000	1.000			2,435,000	2,262,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	627,346	CY	1.000	1.000	1.000			16,017,000	14,878,000
Loading Hazardous Debris			A	3	4	1.56	/CY	108,700	CY	2.500	1.000	1.000	Expansion, (Note 1)		435,000	404,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	99,535	CY	2.500	4.500	1.000	Expansion, Miles, (Note 1)		1,277,000	1,186,000
Consolidation of Structural Material			A	3	4	5.04	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		824,000	766,000
Clay Cap			A	3	4	0.70	/SF	219,338	SF	1.000	1.000	1.000			158,000	146,000
Vegetative Cover for Cap			A	3	4	0.03	/SF	219,338	SF	1.000	1.000	1.000			7,000	6,000
		Subtotal (I)													21,153,000	19,648,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	60,626	TON	1.000	1.000	1.000			(1,557,000)	(1,446,000)
		Subtotal (I')													(1,557,000)	(1,446,000)
INDIRECT O&M COSTS (OPERATIONS)		COST CODE MMMSST														
Mob/Demob	2.0%	J = 0.020 * (I)													423,000	393,000
Indirects, Overhead & Profit	39.0%	K = 0.390 * (I+J)													8,415,000	7,816,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	1.8%	M = 0.018 * (I+J+K)													525,000	488,000
Contingency	28.8%	N = 0.288 * (I+J+K+L+M)													8,773,000	8,149,000
		Subtotal (O = J+K+L+M+N)													18,136,000	16,846,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
Clay Cap			A	4	30	0.01	/SF	219,338	SF	1.000	1.000	1.000		2,000	61,000	39,000
Groundwater Monitoring			A	4	30	14,603.63	/YEAR	1	YR	1.000	1.000	1.000		15,000	405,000	259,000
5-Year Site Review			A	4	30	2,700.00	/YEAR	1	YR	1.000	1.000	1.000		3,000	75,000	48,000
		Subtotal (P)												20,000	541,000	346,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE LLSL														
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)												8,000	211,000	135,000
Contingency	32.5%	R = 0.325 * (P+Q)												9,000	244,000	156,000
		Subtotal (S)												17,000	455,000	291,000
TOTAL O&M COSTS (T = I+I'+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														37,000	38,728,000	35,685,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															38,800,000	35,800,000

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Note 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-22 Cost Estimate - No Future Use, Other Contamination History
Alternative 21a: Dismantling, Salvage, Consolidation

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
		Subtotal (A)													0	0
INDIRECT CAPITAL COSTS		COST CODE LLSS														
Mob/Demob	3.3%	B = 0.033 * (A)													0	0
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)													0	0
Engineering Design	3.0%	D = 0.030 * (A+B+C)													0	0
Resident Engineering	1.3%	E = 0.013 * (A+B+C)													0	0
Contingency	27.5%	F = 0.275 * (A+B+C+D+E)													0	0
		Subtotal (G =B+C+D+E+F)													0	0
TOTAL CAPITAL COSTS (H = A+G)															0	0

Table C-22 Cost Estimate - No Future Use, Other Contamination History
Alternative 21a: Dismantling, Salvage, Consolidation

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Dust & Safety Samp of Manuf Structures			A	3	4	3.78	/CY	627,346	CY	1.000	1.000	1.000			2,435,000	2,262,000
Demolition of Nonagent Structures			A	3	4	24.86	/CY	627,346	CY	1.000	1.000	1.000			16,017,000	14,878,000
Loading Hazardous Debris			A	3	4	1.56	/CY	108,700	CY	2.500	1.000	1.000	Expansion, (Note 1)		435,000	404,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	99,535	CY	2.500	3.000	1.000	Expansion, Miles, (Note 1)		851,000	790,000
Consolidation of Structural Material			A	3	4	5.04	/CY	99,535	CY	1.600	1.000	1.000	Expansion, (Note 2)		824,000	766,000
		Subtotal (I)													20,563,000	19,100,000
DIRECT O&M REVENUES (OPERATIONS)																
Salvage of Metal			A	3	4	(25.00)	/TON	60,626	TON	1.000	1.000	1.000			(1,557,000)	(1,446,000)
		Subtotal (I')													(1,557,000)	(1,446,000)
INDIRECT O&M COSTS (OPERATIONS)		COST CODE MMMSST														
Mob/Demob	2.0%	J = 0.020 * (I)													411,000	382,000
Indirects, Overhead & Profit	39.0%	K = 0.390 * (I+J)													8,180,000	7,598,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	1.8%	M = 0.018 * (I+J+K)													510,000	474,000
Contingency	28.8%	N = 0.288 * (I+J+K+L+M)													8,529,000	7,922,000
		Subtotal (O = J+K+L+M+N)													17,630,000	16,376,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
		Subtotal (P)												0	0	0
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE Z														
Indirects, Overhead & Profit	0.0%	Q = 0.000 * (P)												0	0	0
Contingency	0.0%	R = 0.000 * (P+Q)												0	0	0
		Subtotal (S)												0	0	0
TOTAL O&M COSTS (T = I+I'+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]														0	36,636,000	34,030,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)															36,600,000	34,000,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-23 Cost Estimate - No Future Use, Agent History
Alternative 1: No Action

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
No Action			LS	3	--	0.00	/EA	1	EA	1.000	1.000	1.000			0	0
		Subtotal (A)													0	0
INDIRECT CAPITAL COSTS		COST CODE Z														
Mob/Demob	0.0%	B = 0.000 * (A)													0	0
Indirects, Overhead & Profit	0.0%	C = 0.000 * (A+B)													0	0
Engineering Design	0.0%	D = 0.000 * (A+B+C)													0	0
Resident Engineering	0.0%	E = 0.000 * (A+B+C)													0	0
Contingency	0.0%	F = 0.000 * (A+B+C+D+E)													0	0
		Subtotal (G =B+C+D+E+F)													0	0
TOTAL CAPITAL COSTS (H = A+G)															0	0

Table C-23 Cost Estimate - No Future Use, Agent History
Alternative 1: No Action

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)														
No Action	LS	3	--	0.00	/EA	1	EA	1.000	1.000	1.000			0	0
Subtotal (I)													0	0
INDIRECT O&M COSTS (OPERATIONS)	COST CODE	Z												
Mob/Demob	0.0%	J = 0.000 * (I)											0	0
Indirects, Overhead & Profit	0.0%	K = 0.000 * (I+J)											0	0
Engineering Design	0.0%	L = 0.000 * (I+J+K)											0	0
Resident Engineering	0.0%	M = 0.000 * (I+J+K)											0	0
Contingency	0.0%	N = 0.000 * (I+J+K+L+M)											0	0
Subtotal (O = J+K+L+M+N)													0	0
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)														
No Action	LS	3	--	0.00	/EA	1	EA	1.000	1.000	1.000		0	0	0
Subtotal (P)												0	0	0
INDIRECT O&M COSTS (LONG-TERM ACTIVITI	COST CODE	Z												
Indirects, Overhead & Profit	0.0%	Q = 0.000 * (P)										0	0	0
Contingency	0.0%	R = 0.000 * (P+Q)										0	0	0
Subtotal (S)												0	0	0
TOTAL O&M COSTS (T = I+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]												0	0	0
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)													0	0

Table C-24 Cost Estimate - No Future Use, Agent History
Alternative 4: Hot Gas, Dismantling, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
Hot Gas for Agent Structures			LS	3	--	0.82	/SF	1,849,194	SF	1.000	1.000	1.000			1,557,000	1,468,000
Agent Monitoring			LS	3	--	0.82	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		158,000	149,000
On-post Hazardous Waste Landfill			LS	3	--	8.26	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		1,018,000	959,000
On-post Hazardous Waste Landfill Closure			LS	4	--	4.92	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		606,000	555,000
		Subtotal (A)													3,339,000	3,131,000
INDIRECT CAPITAL COSTS		COST CODE LHSS														
Mob/Demob	4.5%	B = 0.045 * (A)													150,000	141,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)													1,361,000	1,276,000
Engineering Design	6.5%	D = 0.065 * (A+B+C)													315,000	296,000
Resident Engineering	1.8%	E = 0.018 * (A+B+C)													85,000	80,000
Contingency	32.5%	F = 0.325 * (A+B+C+D+E)													1,706,000	1,600,000
		Subtotal (G =B+C+D+E+F)													3,617,000	3,392,000
TOTAL CAPITAL COSTS (H = A+G)															6,956,000	6,522,000

Table C-24 Cost Estimate - No Future Use, Agent History
Alternative 4: Hot Gas, Dismantling, On-Post Hazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)														
Air Sampling	A	3	3	270,000.00	/YR	2	YR	1.000	1.000	1.000			555,000	515,000
Hot Gas for Agent Structures	A	3	4	16.10	/SF	1,849,194	SF	1.000	1.000	1.000			30,576,000	28,401,000
Demolition of Agent Structures	A	3	4	34.94	/CY	600,064	CY	1.000	1.000	1.000			21,532,000	20,001,000
Loading Hazardous Debris	A	3	4	1.56	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		300,000	279,000
Transportation of Hazardous Waste On-post	A	3	4	1.11	/CY	74,972	CY	2.500	1.500	1.000	Expansion, Miles (Note 1)		320,000	298,000
Agent Monitoring	A	3	4	8.55	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		1,646,000	1,529,000
Transportation of Hazardous Waste On-post	A	3	4	1.11	/CY	74,972	CY	2.500	3.000	1.000	Expansion, Miles (Note 1)		641,000	595,000
On-post Hazardous Waste Landfill	A	3	4	5.78	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		712,000	661,000
Backfill of Structure Excavation	A	3	4	8.12	/CY	20,056	CY	1.000	1.000	1.000	Expansion		167,000	155,000
Subtotal (I)													56,450,000	52,434,000
INDIRECT O&M COSTS (OPERATIONS)	COST CODE	HMLMST												
Mob/Demob 2.0%	J = 0.020 * (I)												1,129,000	1,049,000
Indirects, Overhead & Profit 39.0%	K = 0.390 * (I+J)												22,456,000	20,858,000
Engineering Design 0.0%	L = 0.000 * (I+J+K)												0	0
Resident Engineering 2.3%	M = 0.023 * (I+J+K)												1,801,000	1,673,000
Contingency 32.5%	N = 0.325 * (I+J+K+L+M)												26,596,000	24,705,000
Subtotal (O = J+K+L+M+N)													51,982,000	48,284,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)														
On-post Hazardous Waste Landfill Closure	A	4	30	0.02	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)	3,000	80,000	51,000
Subtotal (P)												3,000	80,000	51,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE	COST CODE	LLSL												
Indirects, Overhead & Profit 39.0%	Q = 0.390 * (P)											1,000	31,000	20,000
Contingency 32.5%	R = 0.325 * (P+Q)											1,000	36,000	23,000
Subtotal (S)												2,000	67,000	43,000
TOTAL O&M COSTS (T = I+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]												5,000	108,579,000	100,813,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)													116,000,000	107,000,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-25 Cost Estimate - No Future Use, Agent History
Alternative 6: Hot Gas, Dismantling, On-Post Rotary Kiln Incineration, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Other Factor Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
Hot Gas for Agent Structures			LS	3	--	0.82	/SF	1,849,194	SF	1.000	1.000	1.000			1,557,000	1,468,000
Agent Monitoring			LS	5	--	0.82	/CY	88,672	CY	2.500	1.000	1.000	Expansion, (Note 1)		187,000	166,000
On-post Hazardous Waste Landfill			LS	5	--	8.26	/CY	88,672	CY	1.000	1.000	1.000	(Note 2)		752,000	668,000
On-post Hazardous Waste Landfill Closure			LS	6	--	4.92	/CY	88,672	CY	1.000	1.000	1.000	(Note 2)		448,000	386,000
		Subtotal (A)													2,944,000	2,689,000
INDIRECT CAPITAL COSTS		COST CODE LHMS														
Mob/Demob	4.5%	B = 0.045 * (A)													132,000	121,000
Indirects, Overhead & Profit	37.8%	C = 0.378 * (A+B)													1,161,000	1,061,000
Engineering Design	6.5%	D = 0.065 * (A+B+C)													275,000	252,000
Resident Engineering	1.8%	E = 0.018 * (A+B+C)													79,000	72,000
Contingency	32.5%	F = 0.325 * (A+B+C+D+E)													1,467,000	1,340,000
		Subtotal (G =B+C+D+E+F)													3,115,000	2,845,000
DIRECT SUBCONTRACT CAPITAL COSTS																
On-post Rotary Kiln Incineration			LS	5	--	76.00	/CY	88,672	CY	2.500	1.000	1.000	Expansion, (Note 1)		17,303,000	15,373,000
		Subtotal (A1)													17,303,000	15,373,000
INDIRECT SUBCONTRACT CAPITAL COSTS		COST CODE: C														
Mob/Demob	2.0%	B1 = 0.020 * (A1)													346,000	307,000
Contractor Markup	10.0%	C1 = 0.100 * (A1+B1)													1,765,000	1,568,000
Engineering Design	9.0%	D1 = 0.090 * (A1+B1+C1)													1,747,000	1,552,000
Resident Engineering	3.0%	E1 = 0.030 * (A1+B1+C1)													582,000	517,000
Contingency	30.0%	F1 = 0.300 * (A1+B1+C1+D1+E1)													6,523,000	5,796,000
		Subtotal (G1 = B1+C1+D1+E1+F1)													10,963,000	9,741,000
TOTAL CAPITAL COSTS (H = A+G)															34,326,000	30,647,000

Table C-25 Cost Estimate - No Future Use, Agent History

Alternative 6: Hot Gas, Dismantling, On-Post Rotary Kiln Incineration, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Air Sampling			A	3	4	270,000.00	/YR	2	YR	1.000	1.000	1.000			555,000	515,000
Hot Gas for Agent Structures			A	3	4	16.10	/SF	1,849,194	SF	1.000	1.000	1.000			30,576,000	28,401,000
Demolition of Agent Structures			A	3	4	34.94	/CY	600,064	CY	1.000	1.000	1.000			21,532,000	20,001,000
Loading Hazardous Debris			A	3	4	1.56	/CY	74,972	CY	2.500	1.000	1.000	Expansion, (Note 1)		300,000	279,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	74,972	CY	2.500	1.500	1.000	Expansion, Miles, (Note 1)		320,000	298,000
Stockpiling of Structure Demolition Materials			A	3	6	21.40	/CY	88,672	CY	2.500	1.000	1.000	Expansion, (Note 1)		4,872,000	4,525,000
Loading Hazardous Debris			A	5	6	1.56	/CY	88,672	CY	2.500	1.000	1.000	Expansion, (Note 1)		355,000	311,000
Transportation of Hazardous Waste On-post			A	5	6	1.11	/CY	88,672	CY	2.500	1.500	1.000	Expansion, Miles, (Note 1)		379,000	332,000
Agent Monitoring			A	5	6	8.55	/CY	88,672	CY	2.500	1.000	1.000	Expansion, (Note 1)		1,947,000	1,704,000
Loading Hazardous Debris			A	5	6	1.56	/CY	88,672	CY	2.500	1.000	1.000	Expansion, (Note 1)		355,000	311,000
Transportation of Hazardous Waste On-post			A	5	6	1.11	/CY	88,672	CY	2.500	1.500	1.000	Expansion, Miles, (Note 1)		379,000	332,000
Loading Hazardous Debris			A	5	6	1.56	/CY	88,672	CY	1.000	1.000	1.000	(Note 2)		142,000	124,000
Transportation of Hazardous Waste On-post			A	5	6	1.11	/CY	88,672	CY	1.000	3.000	1.000	Miles (Note 2)		303,000	266,000
On-post Hazardous Waste Landfill			A	5	6	5.78	/CY	88,672	CY	1.000	1.000	1.000	(Note 2)		526,000	461,000
Backfill of Structure Excavation			A	3	4	8.12	/CY	20,056	CY	1.000	1.000	1.000	(Note 2)		167,000	155,000
		Subtotal (I)													62,709,000	58,015,000
INDIRECT O&M COSTS (OPERATIONS)		COST CODE HMLMST														
Mob/Demob	2.0%	J = 0.020 * (I)													1,254,000	1,160,000
Indirects, Overhead & Profit	39.0%	K = 0.390 * (I+J)													24,946,000	23,078,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	2.3%	M = 0.023 * (I+J+K)													2,000,000	1,851,000
Contingency	32.5%	N = 0.325 * (I+J+K+L+M)													28,896,000	26,732,000
		Subtotal (O = J+K+L+M+N)													57,096,000	52,822,000
DIRECT SUBCONTRACT O&M COSTS (OPERATIONS)																
On-post Rotary Kiln Incineration			A	5	6	172.50	/CY	88,672	CY	2.500	1.000	1.000	Expansion, (Note 1)		39,272,000	34,385,000
		Subtotal (I')													39,272,000	34,385,000
INDIRECT SUBCONTR. O&M COSTS (OPERATIO		COST CODE: D														
Mob/Demob	0.0%	J' = 0.000 * (I')													0	0
Contractor Markup	10.0%	K' = 0.100 * (I'+J')													3,927,000	3,438,000
Engineering Design	0.0%	L' = 0.000 * (I'+J'+K')													0	0
Resident Engineering	2.0%	M' = 0.020 * (I'+J'+K')													864,000	756,000
Contingency	40.0%	N' = 0.400 * (I'+J'+K'+L'+M')													17,625,000	15,432,000
		Subtotal (O' = J'+K'+L'+M'+N')													22,417,000	19,627,000
DIRECT O&M REVENUES (OPERATIONS)																
		Subtotal (V)													0	0
TOTAL O&M COSTS (OPERATIONS) (P = I+I'+O+O'+V)															181,494,000	164,848,000

Table C-25 Cost Estimate - No Future Use, Agent History
Alternative 6: Hot Gas, Dismantling, On-Post Rotary Kiln Incineration, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
INDIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
On-post Hazardous Waste Landfill Closure			A	6	30	0.02	/CY	88,672	CY	1.000	1.000	1.000	(Note 2)	2,000	55,000	34,000
		Subtotal (Q)												2,000	55,000	34,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE	LLSL													
Indirects, Overhead & Profit	39.0%	R = 0.390 * (Q)												1,000	21,000	13,000
Contingency	32.5%	S = 0.325 * (Q+R)												1,000	25,000	15,000
		Subtotal (T)												2,000	46,000	28,000
TOTAL O&M COSTS (LONG-TERM ACTIVITIES) (U = Q+T)														4,000	101,000	62,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+P+U)															216,000,000	196,000,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.0 is applied to the bank cubic yard volume of structural material to account for the volume following incineration.

Table C-26 Cost Estimate - No Future Use, Agent History
Alternative 14: Dismantling, On-Post Hazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
Agent Monitoring	LS	3	--	0.82	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		158,000	149,000
On-post Hazardous Waste Landfill	LS	3	--	8.26	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		1,018,000	959,000
On-post Hazardous Waste Landfill Closure	LS	4	--	4.92	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		606,000	555,000
			Subtotal (A)										1,782,000	1,663,000
INDIRECT CAPITAL COSTS		COST CODE	LLSS											
Mob/Demob	3.3%	B = 0.033 * (A)											58,000	54,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)											717,000	669,000
Engineering Design	3.0%	D = 0.030 * (A+B+C)											77,000	72,000
Resident Engineering	1.3%	E = 0.013 * (A+B+C)											32,000	30,000
Contingency	27.5%	F = 0.275 * (A+B+C+D+E)											733,000	684,000
		Subtotal (G =B+C+D+E+F)											1,617,000	1,509,000
TOTAL CAPITAL COSTS (H = A+G)													3,398,000	3,172,000

Table C-26 Cost Estimate - No Future Use, Agent History
Alternative 14: Dismantling, On-Post Hazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)													
Air Sampling	A	3	4	270,000.00	/YR	2	YR	1.000	1.000	1.000		555,000	515,000
Demolition of Agent Structures	A	3	4	34.94	/CY	600,064	CY	1.000	1.000	1.000		21,532,000	20,001,000
Loading Hazardous Debris	A	3	4	1.56	/CY	74,972	CY	2.500	1.000	1.000 Expansion (Note 1)		300,000	279,000
Transportation of Hazardous Waste On-post	A	3	4	1.11	/CY	74,972	CY	2.500	1.500	1.000 Expansion, Miles (Note 1)		320,000	298,000
Agent Monitoring	A	3	4	8.55	/CY	74,972	CY	2.500	1.000	1.000 Expansion (Note 1)		1,646,000	1,529,000
Transportation of Hazardous Waste On-post	A	3	4	1.11	/CY	74,972	CY	2.500	3.000	1.000 Expansion, Miles (Note 1)		641,000	595,000
On-post Hazardous Waste Landfill	A	3	4	5.78	/CY	74,972	CY	1.600	1.000	1.000 Expansion (Note 2)		712,000	661,000
Backfill of Structure Excavation	A	3	4	8.12	/CY	20,056	CY	1.000	1.000	1.000		167,000	155,000
Subtotal (I)												25,874,000	24,033,000
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	HMLSST										
Mob/Demob	2.0%	J = 0.020 * (I)										517,000	481,000
Indirects, Overhead & Profit	39.0%	K = 0.390 * (I+J)										10,293,000	9,560,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)										0	0
Resident Engineering	2.0%	M = 0.020 * (I+J+K)										734,000	681,000
Contingency	31.3%	N = 0.313 * (I+J+K+L+M)										11,693,000	10,861,000
		Subtotal (O = J+K+L+M+N)										23,237,000	21,584,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)													
On-post Hazardous Waste Landfill Closure		A	4	30	0.02	/CY	74,972	CY	1.600	1.000	1.000 Expansion (Note 2)	3,000	80,000	51,000
		Subtotal (P)										3,000	80,000	51,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE	LLSL											
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)										1,000	31,000	20,000
Contingency	32.5%	R = 0.325 * (P+Q)										1,000	36,000	23,000
		Subtotal (S)										2,000	67,000	43,000
TOTAL O&M COSTS (T = I+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]												5,000	49,258,000	45,711,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)													52,700,000	48,900,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-27 Cost Estimate - No Future Use, Agent History
Alternative 15: Dismantling, On-Post Rotary Kiln Incineration, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
Agent Monitoring			LS	5	--	0.82	/CY	88,672	CY	2.500	1.000	1.000	Expansion (Note 1)		187,000	166,000
On-post Hazardous Waste Landfill			LS	5	--	8.26	/CY	88,672	CY	1.000	1.000	1.000	(Note 2)		752,000	668,000
On-post Hazardous Waste Landfill Closure			LS	6	--	4.92	/CY	88,672	CY	1.000	1.000	1.000	(Note 2)		448,000	386,000
		Subtotal (A)													1,387,000	1,221,000
INDIRECT CAPITAL COSTS		COST CODE LLSS														
Mob/Demob	3.3%	B = 0.033 * (A)													45,000	40,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)													558,000	492,000
Engineering Design	3.0%	D = 0.030 * (A+B+C)													60,000	53,000
Resident Engineering	1.3%	E = 0.013 * (A+B+C)													26,000	23,000
Contingency	27.5%	F = 0.275 * (A+B+C+D+E)													564,000	496,000
		Subtotal (G =B+C+D+E+F)													1,253,000	1,103,000
DIRECT SUBCONTRACT CAPITAL COSTS																
On-post Rotary Kiln Incineration			LS	5	--	76.00	/CY	88,672	CY	2.500	1.000	1.000	Expansion (Note 1)		17,303,000	15,373,000
		Subtotal (A1)													17,303,000	15,373,000
INDIRECT SUBCONTRACT CAPITAL COSTS		COST CODE C														
Mob/Demob	2.0%	B1 = 0.020 * (A1)													346,000	307,000
Contractor Markup	10.0%	C1 = 0.100 * (A1+B1)													1,765,000	1,568,000
Engineering Design	4.6%	D1 = 0.046 * (A1+B1+C1)													885,000	787,000
Resident Engineering	3.0%	E1 = 0.030 * (A1+B1+C1)													582,000	517,000
Contingency	1.1%	F1 = 0.011 * (A1+B1+C1+D1+E1)													230,000	204,000
		Subtotal (G1 = B1+C1+D1+E1+F1)													3,808,000	3,384,000
TOTAL CAPITAL COSTS (H = A+G)															23,750,000	21,080,000

Table C-27 Cost Estimate - No Future Use, Agent History
Alternative 15: Dismantling, On-Post Rotary Kiln Incineration, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)																
Air Sampling			A	3	4	270,000.00	/YR	2	YR	1.000	1.000	1.000			555,000	515,000
Demolition of Agent Structures			A	3	4	34.94	/CY	600,064	CY	1.000	1.000	1.000			21,532,000	20,001,000
Loading Hazardous Debris			A	3	4	1.56	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		300,000	279,000
Transportation of Hazardous Waste On-post			A	3	4	1.11	/CY	74,972	CY	2.500	1.500	1.000	Expansion, Miles (Note 1)		320,000	298,000
Stockpiling of Structure Demolition Materials			A	3	6	21.40	/CY	88,672	CY	2.500	1.000	1.000	Expansion, (Note 1)		4,872,000	4,396,000
Loading Hazardous Debris			A	5	6	1.56	/CY	88,672	CY	2.500	1.000	1.000	Expansion (Note 1)		355,000	311,000
Transportation of Hazardous Waste On-post			A	5	6	1.11	/CY	88,672	CY	2.500	1.500	1.000	Expansion, Miles (Note 1)		379,000	332,000
Agent Monitoring			A	5	6	8.55	/CY	88,672	CY	2.500	1.000	1.000	Expansion (Note 1)		1,947,000	1,704,000
Loading Hazardous Debris			A	5	6	1.56	/CY	88,672	CY	2.500	1.000	1.000	Expansion (Note 1)		355,000	311,000
Transportation of Hazardous Waste On-post			A	5	6	1.11	/CY	88,672	CY	2.500	1.500	1.000	Expansion, Miles (Note 1)		379,000	332,000
Loading Hazardous Debris			A	5	6	1.56	/CY	88,672	CY	1.000	1.000	1.000	(Note 2)		142,000	124,000
Transportation of Hazardous Waste On-post			A	5	6	1.11	/CY	88,672	CY	1.000	3.000	1.000	Miles (Note 2)		303,000	266,000
On-post Hazardous Waste Landfill			A	5	6	5.78	/CY	88,672	CY	1.000	1.000	1.000	(Note 2)		526,000	461,000
Backfill of Structure Excavation			A	3	4	8.12	/CY	20,056	CY	1.000	1.000	1.000			167,000	155,000
		Subtotal (I)													32,134,000	29,484,000
INDIRECT O&M COSTS (OPERATIONS)		COST CODE HMMMST														
Mob/Demob	2.0%	J = 0.020 * (I)													643,000	590,000
Indirects, Overhead & Profit	40.3%	K = 0.403 * (I+J)													13,192,000	12,105,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)													0	0
Resident Engineering	2.3%	M = 0.023 * (I+J+K)													1,034,000	949,000
Contingency	32.5%	N = 0.325 * (I+J+K+L+M)													14,940,000	13,708,000
		Subtotal (O = J+K+L+M+N)													29,809,000	27,351,000
DIRECT SUBCONTRACT O&M COSTS (OPERATIONS)																
On-post Rotary Kiln Incineration			A	5	6	172.50	/CY	88,672	CY	2.500	1.000	1.000	Expansion (Note 1)		39,272,000	34,385,000
		Subtotal (I')													39,272,000	34,385,000
INDIRECT SUBCONTR. O&M COSTS (OPERATIO		COST CODE: D														
Mob/Demob	0.0%	J' = 0.000 * (I')													0	0
Contractor Markup	10.0%	K' = 0.100 * (I'+J')													3,927,000	3,438,000
Engineering Design	0.0%	L' = 0.000 * (I'+J'+K')													0	0
Resident Engineering	2.0%	M' = 0.020 * (I'+J'+K')													864,000	756,000
Contingency	40.0%	N' = 0.400 * (I'+J'+K'+L'+M')													17,625,000	15,432,000
		Subtotal (O' = J'+K'+L'+M'+N')													22,417,000	19,627,000
DIRECT O&M REVENUES (OPERATIONS)																
		Subtotal (V)													0	0
TOTAL O&M COSTS (OPERATIONS) (P = I+I'+O+O'+V)															123,632,000	110,847,000

Table C-27 Cost Estimate - No Future Use, Agent History
Alternative 15: Dismantling, On-Post Rotary Kiln Incineration, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Factor Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
INDIRECT O&M COSTS (LONG-TERM ACTIVITIES)																
On-post Hazardous Waste Landfill Closure			A	6	30	0.02	/CY	88,672	CY	1.000	1.000	1.000	(Note 2)	2,000	55,000	34,000
		Subtotal (Q)												2,000	55,000	34,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE	LLSL													
Indirects, Overhead & Profit	39.0%	R = 0.390 * (Q)												1,000	21,000	13,000
Contingency	32.5%	S = 0.325 * (Q+R)												1,000	25,000	15,000
		Subtotal (T)												2,000	46,000	28,000
TOTAL O&M COSTS (LONG-TERM ACTIVITIES) (U = Q+T)														4,000	101,000	62,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+P+U)															147,000,000	132,000,000

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Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.0 is applied to the bank cubic yard volume of structural material to account for the volume following incineration.

Table C-28 Cost Estimate - No Future Use, Agent History
Alternative 17: Dismantling, Hot Gas, On-Post Hazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
Agent Monitoring	LS	3	--	0.82	/CY	74,972	CY	1.000	1.000	1.000			63,000	60,000
Hot Gas for Agent Structures	LS	3	--	0.82	/SF	2,751,691	SF	1.000	1.000	0.050	Expansion, Agent Treatment (Note 3)		116,000	109,000
Agent Monitoring	LS	3	--	0.82	/CY	74,972	CY	2.500	1.000	0.050	Expansion, Agent Treatment (Notes 1 & 3)		8,000	7,000
On-post Hazardous Waste Landfill	LS	3	--	8.26	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		1,018,000	959,000
On-post Hazardous Waste Landfill Closure	LS	4	--	4.92	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		606,000	555,000
Subtotal (A)													1,811,000	1,690,000
INDIRECT CAPITAL COSTS		COST CODE	LHSS											
Mob/Demob	4.5%	B = 0.045 * (A)											81,000	76,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)											738,000	689,000
Engineering Design	6.5%	D = 0.065 * (A+B+C)											171,000	160,000
Resident Engineering	1.8%	E = 0.018 * (A+B+C)											46,000	43,000
Contingency	32.5%	F = 0.325 * (A+B+C+D+E)											925,000	864,000
Subtotal (G =B+C+D+E+F)													1,962,000	1,831,000
TOTAL CAPITAL COSTS (H = A+G)													3,772,000	3,521,000

Table C-28 Cost Estimate - No Future Use, Agent History
Alternative 17. Dismantling, Hot Gas, On-Post Hazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)														
Air Sampling	A	3	4	270,000.00	/YR	2	YR	1.000	1.000	1.000			555,000	515,000
Demolition of Agent Structures	A	3	4	34.94	/CY	600,064	CY	1.000	1.000	1.000			21,532,000	20,001,000
Loading Hazardous Debris	A	3	4	1.56	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		300,000	279,000
Transportation of Hazardous Waste On-post	A	3	4	1.11	/CY	74,972	CY	2.500	1.500	1.000	Expansion, Miles (Note 1)		320,000	298,000
Agent Monitoring	A	3	4	8.55	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		1,646,000	1,529,000
Hot Gas for Agent Structures	A	3	4	16.10	/SF	2,751,691	SF	2.500	1.000	0.050	Expansion, Agent Treatment (Notes 1 & 3)		5,687,000	5,283,000
Agent Monitoring	A	3	4	8.55	/CY	74,972	CY	2.500	1.000	0.050	Expansion, Agent Treatment (Notes 1 & 3)		82,000	76,000
Loading Hazardous Debris	A	3	4	1.56	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		300,000	279,000
Transportation of Hazardous Waste On-post	A	3	4	1.11	/CY	74,972	CY	2.500	3.000	1.000	Expansion, Miles (Note 1)		641,000	595,000
On-post Hazardous Waste Landfill	A	3	4	5.78	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		712,000	661,000
Backfill of Structure Excavation	A	3	4	8.12	/CY	20,056	CY	1.000	1.000	1.000	Expansion		167,000	155,000
Subtotal (I)													31,944,000	29,671,000
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	HMLSST											
Mob/Demob	2.0%	J = 0.020 * (I)											639,000	593,000
Indirects, Overhead & Profit	39.0%	K = 0.390 * (I+J)											12,707,000	11,803,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)											0	0
Resident Engineering	2.0%	M = 0.020 * (I+J+K)											906,000	841,000
Contingency	31.3%	N = 0.313 * (I+J+K+L+M)											14,436,000	13,409,000
Subtotal (O = J+K+L+M+N)													28,688,000	26,647,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)														
On-post Hazardous Waste Landfill Closure		A	4	30	0.02	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)	3,000	80,000	51,000
Subtotal (P)													3,000	80,000	51,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIES		COST CODE	LLSL											
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)											1,000	31,000	20,000
Contingency	32.5%	R = 0.325 * (P+Q)											1,000	36,000	23,000
Subtotal (S)													2,000	67,000	43,000
TOTAL O&M COSTS (T = I+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]													5,000	60,779,000	56,413,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)														64,600,000	59,900,000

Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.
3 - It is assumed that 5% of the structure volume will require agent treatment and remonitoring.

Table C-29 Cost Estimate - No Future Use, Agent History
Alternative 18: Dismantling, Caustic Treatment, On-Post Hazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Factor Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS														
Agent Monitoring	LS	3	--	0.82	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		158,000	149,000
Caustic Treatment	LS	3	--	121.54	/CY	3,749	CY	2.500	1.000	1.000	Expansion (Note 1)		1,170,000	1,103,000
Agent Monitoring	LS	3	--	0.82	/CY	3,749	CY	2.500	1.000	1.000	Expansion (Note 1)		8,000	7,000
On-post Hazardous Waste Landfill	LS	3	--	8.26	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		1,018,000	959,000
On-post Hazardous Waste Landfill Closure	LS	4	--	4.92	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		606,000	555,000
			Subtotal (A)										2,959,000	2,773,000
INDIRECT CAPITAL COSTS		COST CODE	LMSS											
Mob/Demob	3.9%	B = 0.039 * (A)											115,000	107,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)											1,199,000	1,123,000
Engineering Design	4.5%	D = 0.045 * (A+B+C)											192,000	180,000
Resident Engineering	1.5%	E = 0.015 * (A+B+C)											64,000	60,000
Contingency	30.0%	F = 0.300 * (A+B+C+D+E)											1,359,000	1,273,000
		Subtotal (G =B+C+D+E+F)											2,929,000	2,744,000
TOTAL CAPITAL COSTS (H = A+G)													5,888,000	5,517,000

Table C-29 Cost Estimate - No Future Use, Agent History
Alternative 18: Dismantling, Caustic Treatment, On-Post Hazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)														
Air Sampling	A	3	4	270,000.00	/YR	2	YR	1.000	1.000	1.000			555,000	515,000
Demolition of Agent Structures	A	3	4	34.94	/CY	600,064	CY	1.000	1.000	1.000			21,532,000	20,001,000
Loading Hazardous Debris	A	3	4	1.56	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		300,000	279,000
Transportation of Hazardous Waste On-post	A	3	4	1.11	/CY	74,972	CY	2.500	1.500	1.000	Expansion, Miles (Note 1)		320,000	298,000
Agent Monitoring	A	3	4	8.55	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		1,646,000	1,529,000
Caustic Treatment	A	3	4	323.48	/CY	3,749	CY	2.500	1.000	1.000	Expansion (Note 1)		3,113,000	2,892,000
Agent Monitoring	A	3	4	8.55	/CY	3,749	CY	2.500	1.000	1.000	Expansion (Note 1)		82,000	76,000
Transportation of Hazardous Waste On-post	A	3	4	1.11	/CY	74,972	CY	2.500	3.000	1.000	Expansion, Miles (Note 1)		641,000	595,000
On-post Hazardous Waste Landfill	A	3	4	5.78	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		712,000	661,000
Backfill of Structure Excavation	A	3	4	8.12	/CY	20,056	CY	1.000	1.000	1.000	Expansion		167,000	155,000
Subtotal (I)													29,069,000	27,002,000
INDIRECT O&M COSTS (OPERATIONS)		COST CODE	HMLSST											
Mob/Demob	2.0%	J = 0.020 * (I)											581,000	540,000
Indirects, Overhead & Profit	39.0%	K = 0.390 * (I+J)											11,564,000	10,741,000
Engineering Design	0.0%	L = 0.000 * (I+J+K)											0	0
Resident Engineering	2.0%	M = 0.020 * (I+J+K)											824,000	766,000
Contingency	31.3%	N = 0.313 * (I+J+K+L+M)											13,137,000	12,203,000
Subtotal (O = J+K+L+M+N)													26,107,000	24,250,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)														
On-post Hazardous Waste Landfill Closure		A	4	30	0.02	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 1)	3,000	80,000	51,000
Subtotal (P)													3,000	80,000	51,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE		COST CODE	LLSL												
Indirects, Overhead & Profit	39.0%	Q = 0.390 * (P)											1,000	31,000	20,000
Contingency	32.5%	R = 0.325 * (P+Q)											1,000	36,000	23,000
Subtotal (S)													2,000	67,000	43,000
TOTAL O&M COSTS (T = I+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]													5,000	55,323,000	51,345,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)														61,200,000	56,900,000

A-18.WB2
STRUCTURES DAA

06-Oct-95

Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.

Table C-30 Cost Estimate - No Future Use, Agent History
Alternative 18a: Sand Blasting, Dismantling, Caustic Treatment, On-Post Hazardous Waste Landfill

Cost Item			Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT CAPITAL COSTS																
Sand Blasting			LS	3	--	0.42	/SF	391,970	SF	1.000	1.000	1.000			169,000	159,000
Agent Monitoring			LS	3	--	0.82	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		158,000	149,000
Caustic Treatment			LS	3	--	121.54	/CY	3,749	CY	2.500	1.000	1.000	Expansion (Note 1)		1,170,000	1,103,000
Agent Monitoring			LS	3	--	0.82	/CY	3,749	CY	2.500	1.000	1.000	Expansion (Note 1)		8,000	7,000
On-post Hazardous Waste Landfill			LS	3	--	8.26	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		1,018,000	959,000
On-post Hazardous Waste Landfill Closure			LS	4	--	4.92	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		606,000	555,000
		Subtotal (A)													3,128,000	2,932,000
INDIRECT CAPITAL COSTS		COST CODE LMSS														
Mob/Demob	3.9%	B = 0.039 * (A)													121,000	114,000
Indirects, Overhead & Profit	39.0%	C = 0.390 * (A+B)													1,267,000	1,188,000
Engineering Design	4.5%	D = 0.045 * (A+B+C)													203,000	191,000
Resident Engineering	1.5%	E = 0.015 * (A+B+C)													68,000	64,000
Contingency	30.0%	F = 0.300 * (A+B+C+D+E)													1,436,000	1,346,000
		Subtotal (G =B+C+D+E+F)													3,096,000	2,902,000
TOTAL CAPITAL COSTS (H = A+G)															6,224,000	5,834,000

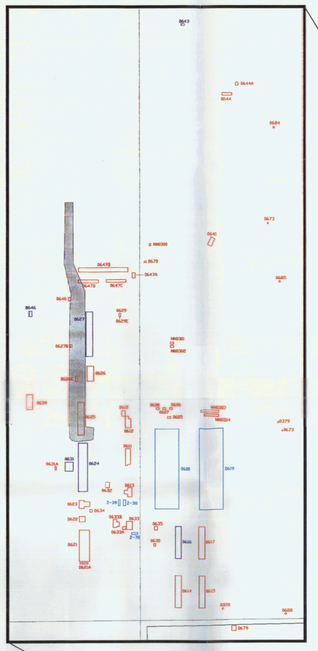
Table C-30 Cost Estimate - No Future Use, Agent History
Alternative 18a: Sand Blasting, Dismantling, Caustic Treatment, On-Post Hazardous Waste Landfill

Cost Item	Cost Type	Start Year	End Year	1994 ($) Unit Cost	Units	Quantity	Units	Volume Factor	Mileage Factor	Other Factor	Description	1995 ($) Annual Cost	1995 ($) Total Cost	1995 ($) PW Cost
DIRECT O&M COSTS (OPERATIONS)														
Air Sampling	A	3	4	270,000.00	/YR	2	YR	1.000	1.000	1.000			555,000	515,000
Sand Blasting	A	3	4	3.61	/SF	391,970	SF	1.000	1.000	1.000			1,453,000	1,350,000
Demolition of Agent Structures	A	3	4	34.94	/CY	600,064	CY	1.000	1.000	1.000			21,532,000	20,001,000
Loading Hazardous Debris	A	3	4	1.56	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		300,000	279,000
Transportation of Hazardous Waste On-post	A	3	4	1.11	/CY	74,972	CY	2.500	1.500	1.000	Expansion, Miles (Note 1)		320,000	298,000
Agent Monitoring	A	3	4	8.55	/CY	74,972	CY	2.500	1.000	1.000	Expansion (Note 1)		1,646,000	1,529,000
Caustic Treatment	A	3	4	323.48	/CY	3,749	CY	2.500	1.000	1.000	Expansion (Note 1)		3,113,000	2,892,000
Agent Monitoring	A	3	4	8.55	/CY	3,749	CY	2.500	1.000	1.000	Expansion (Note 1)		82,000	76,000
Transportation of Hazardous Waste On-post	A	3	4	1.11	/CY	74,972	CY	2.500	3.000	1.000	Expansion, Miles (Note 1)		641,000	595,000
On-post Hazardous Waste Landfill	A	3	4	5.78	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)		712,000	661,000
Backfill of Structure Excavation	A	3	4	8.12	/CY	74,972	CY	1.000	1.000	1.000	Expansion		625,000	581,000
Subtotal (I)													30,981,000	28,777,000
INDIRECT O&M COSTS (OPERATIONS)	COST CODE	HMLSST												
Mob/Demob 2.0%	J = 0.020 * (I)												620,000	576,000
Indirects, Overhead & Profit 39.0%	K = 0.390 * (I+J)												12,324,000	11,447,000
Engineering Design 0.0%	L = 0.000 * (I+J+K)												0	0
Resident Engineering 2.0%	M = 0.020 * (I+J+K)												878,000	816,000
Contingency 31.3%	N = 0.313 * (I+J+K+L+M)												14,001,000	13,005,000
Subtotal (O = J+K+L+M+N)													27,823,000	25,844,000
DIRECT O&M COSTS (LONG-TERM ACTIVITIES)														
On-post Hazardous Waste Landfill Closure	A	4	30	0.02	/CY	74,972	CY	1.600	1.000	1.000	Expansion (Note 2)	3,000	80,000	51,000
Subtotal (P)												3,000	80,000	51,000
INDIRECT O&M COSTS (LONG-TERM ACTIVITIE	COST CODE	LLSL												
Indirects, Overhead & Profit 39.0%	Q = 0.390 * (P)											1,000	31,000	20,000
Contingency 32.5%	R = 0.325 * (P+Q)											1,000	36,000	23,000
Subtotal (S)												2,000	67,000	43,000
TOTAL O&M COSTS (T = I+O+P+S) [Note: Total O&M Annual Cost Only Includes Long-Term Activities]												5,000	58,951,000	54,715,000
TOTAL CAPITAL COSTS AND TOTAL O&M COSTS (U = H+T)													65,200,000	60,500,000

A-18A.WB2
STRUCTURES DAA

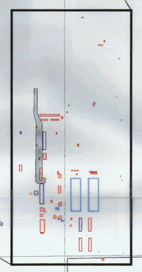
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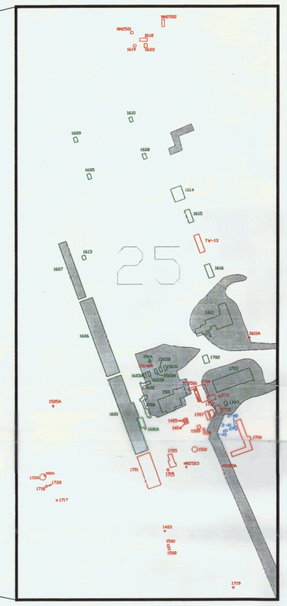
Notes: 1 - A factor of 2.5 is applied to the bank cubic yard volume of structural material to account for post-demolition volume expansion.
2 - A factor of 1.6 is applied to the bank cubic yard volume of structural material to account for the volume in the landfill.



RAIL CLASSIFICATION/
MAINTENANCE YARD

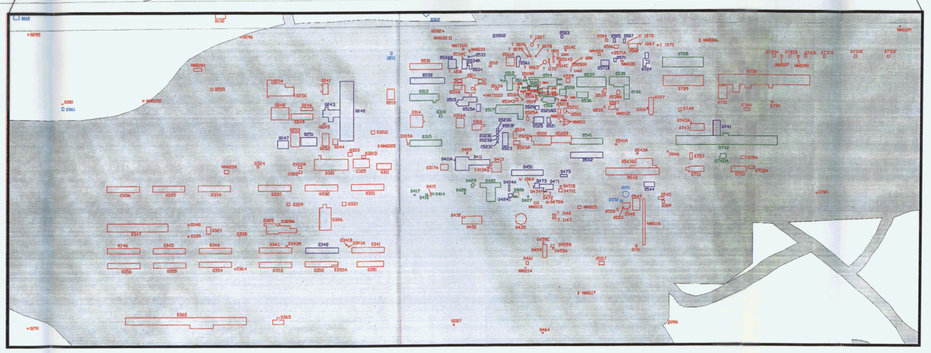
SCALE OF INSERTS:
0 400 800
Scale in Feet





NORTH PLANTS

SCALE OF INSERTS:
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Scale in Feet



SOUTH PLANTS

SCALE OF INSERTS:
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Scale in Feet

EXPLANATION

- Buildings with Future Use, No Potential Exposure
- Buildings with No Future Use, Significant Contamination History
- Buildings with No Future Use, Agent History
- Buildings with No Future Use, Other Contamination History

Pipe runs are not shown on map
Substations are not shown on map
Not all tanks are shown on map

Shaded areas indicate sites where contaminated soil may require structure removal; does not represent all areas of soil contamination.

N

SCALE OF BASE MAP:
0 1000 2000
Scale in Feet

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Prepared for:
U.S. Army Program Manager
for Rocky Mountain Arsenal

Prepared October 1995

PLATE 1.2–1 Structures Medium Groups

Rocky Mountain Arsenal
Prepared by: Foster Wheeler Environmental Corporation


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NORTH PLANTS
SCALE OF INSERTS:
0 400 800
Scale in Feet
SOUTH PLANTS
SCALE OF INSERTS:
0 400 800
Scale in Feet
EXPLANATION
Declared Perimeter for Chemical Agent Treaties
Buildings with No Future Use, Other Contamination History
Buildings with No Future Use, Agent History
Pipe runs are not shown on map
Substations are not shown on map
Not all tanks are shown on map
N
SCALE OF BASE MAP:
0 1000 2000
Scale in Feet
Prepared for:
U.S. Army Program Manager
for Rocky Mountain Arsenal
Prepared October 1995
PLATE 3.3-1 Agent History and Treaty Structures
Rocky Mountain Arsenal
Prepared by: Foster Wheeler Environmental Corporation

TASK 24 DATA

SQ_FT = Total Square Feet of Structure Floor Space (ft^2)

STORIES = Number of Stories in the Structure

C_BLDGVOL = Collapsed and Neatly Stacked Volume of Structure Materials (yd^3)

C_EQUIPVOL = Collapsed and Neatly Stacked Volume of Process Equipment (yd^3)

S_BLDGVOL = Standing Structure Volume (yd^3)

FDN_AB_GRD = Volume of Foundation Materials Above Ground (yd^3)

FDN_BL_GRD = Volume of Foundation Materials Below Ground (yd^3)

FOUND_TYPE = Type of Foundation Material

- C = Concrete
- W = Wood
- N = None

ROOF_TYPE = Type of Roofing Materials

- C = Concrete
- W = Wood
- CM = Corrugated Metal
- CA = Corrugated Asbestos
- A = Asphalt Shingle
- B = Built-Up/Hot Tar
- M = Sheet Metal
- WA = Wood and Asphalt
- F = Fiberglass
- N = None

WALL_TYPE = Type of Wall Materials

- C = Concrete
- W = Wood
- CM = Corrugated Metal
- CA = Corrugated Asbestos
- T = Tile
- B = Brick
- M = Masonry/Cinder Block
- M = Metal for Tanks Only
- A = Asbestos Board
- FG = Fiberglass
- N = None

See Plate B1.0-2 For Quantity Algorithms

STRUCTURES FS DERIVED QUANTITIES

TSF = Total Structure Footprint (ft^2)

CYDROOF = Cubic Yards of Roof Material (yd^3)

CYDWALL = Cubic Yards of Wall and Floor Material (yd^3)

Total Collapsed Volume of (yd^3)

- Concrete
- Wood
- Tile
- Brick
- Masonry/Cinder Block
- Tank Metal
- Corrugated Metal
- Corrugated Asbestos
- Asbestos Board
- Fiberglass
- Asphalt Shingle
- Built Up/Hot Tar
- Sheet Metal
- Wood and Asphalt

Scrap Metal Volume = Volume of Scrap Metal for Recycling (yd^3)

Aggregate Volume = Volume of Recycled Concrete, Tile, Brick, and Masonry/Cinder Block (yd^3)

Capping Area = Area for Clay Cap (ft^2)

Perimeter = Perimeter of Structure (ft)

Perimeter w/10 ft Buffer = Perimeter of Structure w/10 ft Buffer on all sides (ft)

Tank Standing Volume (yd^3)

Tank Treatable Surface (ft^2)

Treatable Surface Area for Sand Blasting and Vacuum Dusting (ft^2)

Treatable Surface Area for Steam Cleaning (ft^2)

Interior Surface Area (ft^2)

Interior and Exterior Surface Area (ft^2)

See Plate B1.0-3 For Quantity Algorithms

QUANTITY TABLE

1	Unity for Lump Sum
2	Standing Building Volume (yd^3)
3	Collapsed Building Volume (yd^3)
4	Building Footprint Area (ft^2)
5	Open Piping Volume (yd^3)
6	Collapsed Process Equipment Volume (yd^3)
7	Not Used
8	Not Used
9	Collapsed Scrap Metal Salvage Volume (yd^3)
10	Not Used
11	Not Used
12	Not Used
13	Treatable Surface Area for Sand Blasting and Vacuum Dusting (ft^2)
14	Total Collapsed Volume = Building + Piping + Equipment (yd^3)
15	2 Years Annual Cost
16	Collapsed Metal Weight (Tons)
17	3 Years Annual Cost
18	Not Used
19	Small Pipe Open Volume (yd^3)
20	Medium Pipe Open Volume (yd^3)
21	Large Pipe Open Volume (yd^3)
22	Treatable Surface Area for Steam Cleaning (ft^2)
23	Not Used
24	Building Perimeter with 10 ft Buffer (ft)
25	Total Collapsed Volume - Metal Salvage Volume (yd^3)
26	Not Used
27	Interior Surface Area for Hot Gas (ft^2)
28	Interior and Exterior Surface for Hot Gas of Debris (ft^2)
29	Agent Treatment Volume (yd^3)
30	Volume for Structure Hole Fill (yd^3)
31	15% of Interior Surface (ft^2)
32	Unity for Annual Costs
33	Not Used
34	Not Used
35	Cap in Place Collapsed Total Volume (yd^3)
36	Cap in Place Metal Salvage Volume (yd^3)
37	Central Processing Area Total Collapsed Volume (yd^3)
38	Central Processing Area Metal Salvage Volume (yd^3)
39	Not Used
40	Cap in Place Disposal Volume (yd^3)
41	Cap in Place Consolidation Area (ft^2)

NOTE: Task 24 is the Structures Survey Report (EBASCO 1988c)

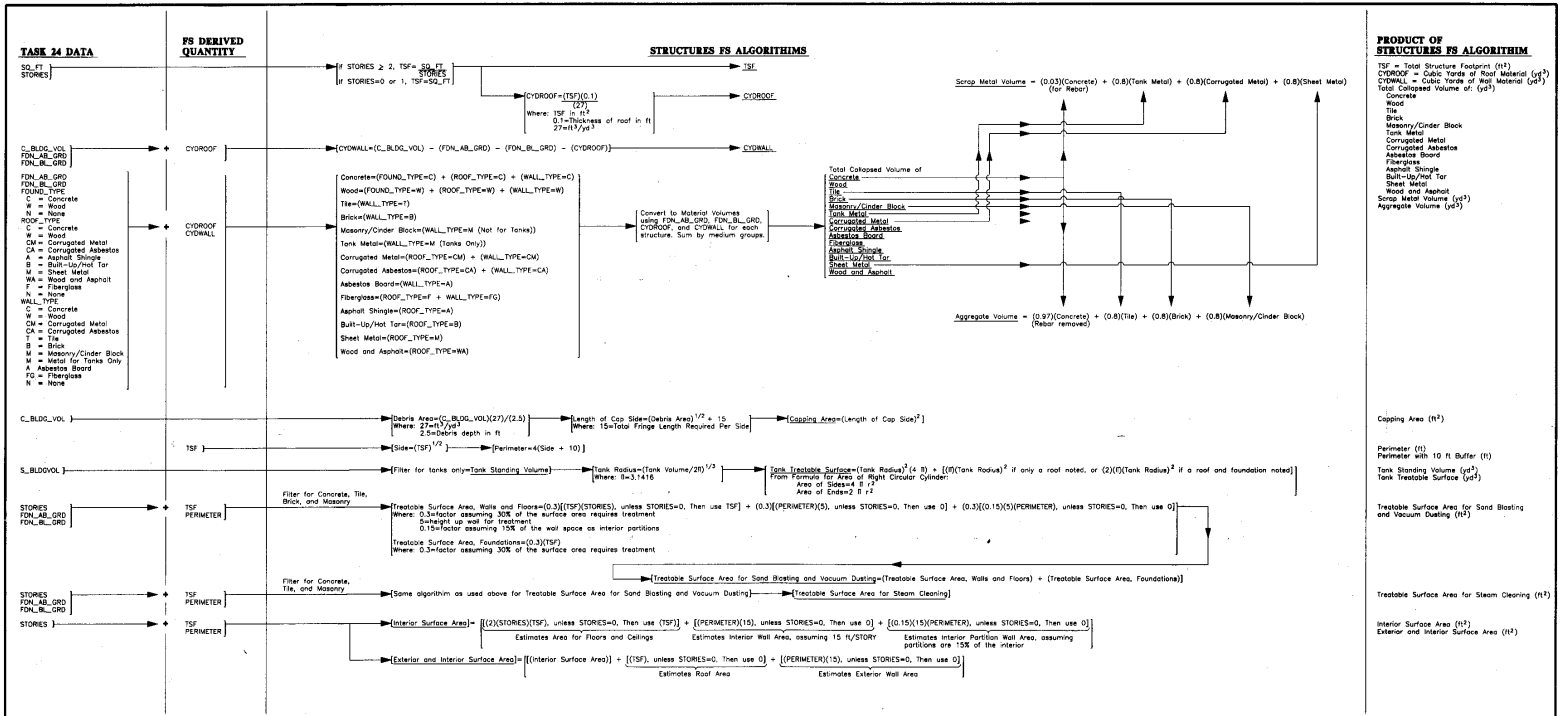
ft = feet
ft2 = square feet
ft3 = cubic feet
yd3 = cubic yard

Prepared for:
U.S. Army Program Manager
for Rocky Mountain Arsenal
Prepared October, 1995

Plate B1.0-1

Structures FS Material Quantity Derivation Overview

Rocky Mountain Arsenal
Prepared by: Foster Wheeler Environmental Corporation



NOTE: Task 24 is The Structures Survey Report (EBASCO 1988c)

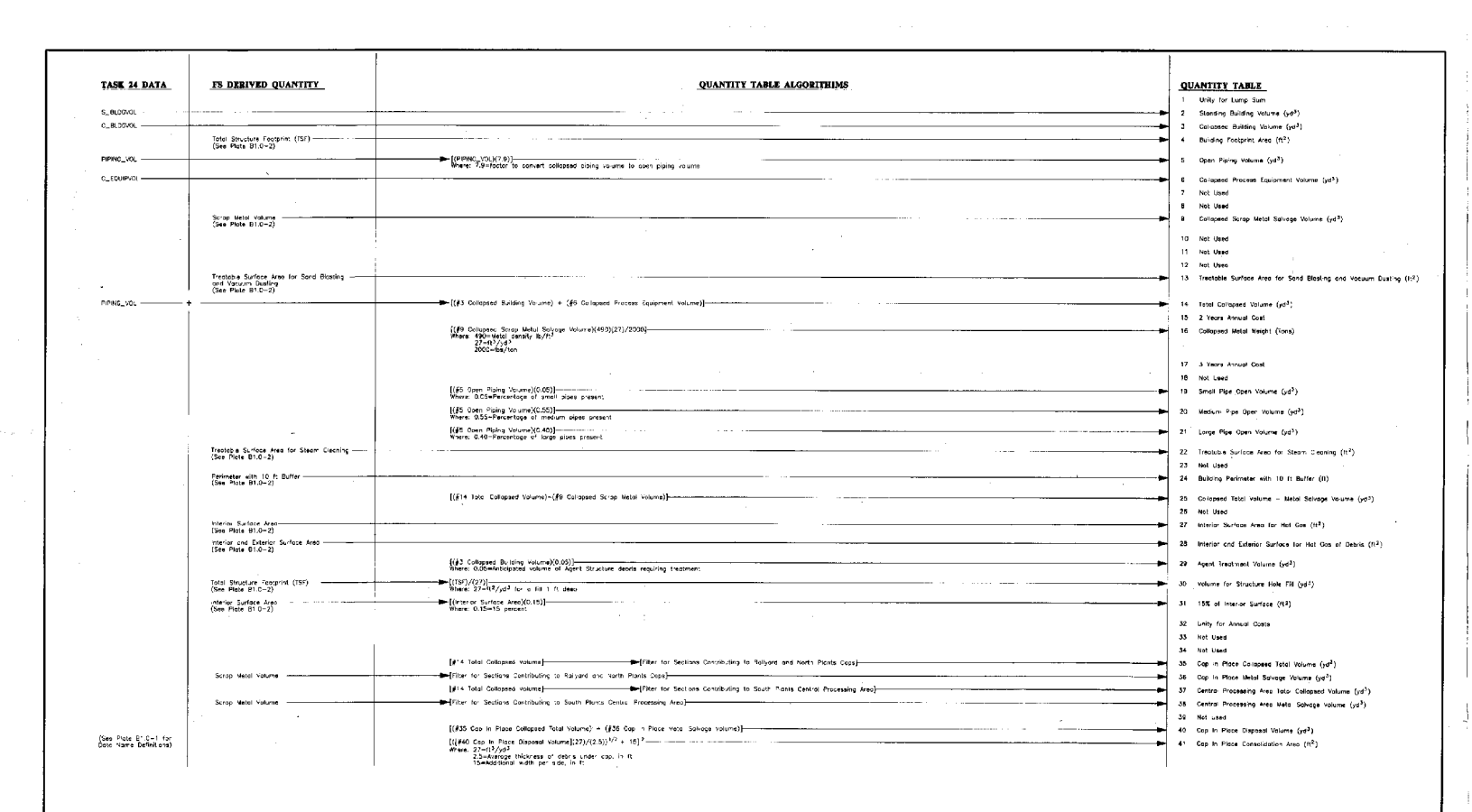
ft. = feet
ft.² = square feet
ft.³ = cubic feet
yd.³ = cubic yard

Prepared for:
U.S. Army Program Manager for Rocky Mountain Arsenal
Prepared October, 1995

Plate B1.0-2

Structures FS Material Quantity Algorithims

Rocky Mountain Arsenal
Prepared by: Foster Wheeler Environmental Corporation



NOTE: Task 24 is The Structures Survey Report (EBASCO 1988c)

ft = feet
ft2 = square feet
ft3 = cubic feet
yd3 = cubic yard

Prepared for:
U.S. Army Program Manager
for Rocky Mountain Arsenal
Prepared October, 1985

Plate B1.0-3

Quantity Table Material Quantity Algorithims

Rocky Mountain Arsenal
Prepared by: Foster Wheeler Environmental Corporation