Response to Comments

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Solid Waste Management
Fifth Floor, L & C Tower
401 Church Street
Nashville, Tennessee 37243 – 1535

April 7, 2011

Mr. Robert Ragan
Commander's Representative
Holston Army Ammunition Plant
4509 West Stone Drive
Kingsport, TN 37660-1048

RE: Response to Comments
Holston Army Ammunition Plant
Kingsport, Tennessee
Unit: Burn Pan Unit
EPA ID No: TN5210020421
Permit Number: TNHW-148

Dear Mr. Ragan

Attached is a copy of the Response to Comments for the hazardous waste Open Burn Treatment Permit, TNHW-148, issued to Holston Army Ammunition Plant, in Kingsport, Tennessee on March 31, 2011.

If you have any questions, please contact Mr. Malek Faradji of my staff at (615) 532-0822.

Sincerely,

Mike Apple
Director

cc: Mr. Bob Winstead, BAE, Ordnance System, Inc.
Mr. Jon Johnston, Chief, RCRA Branch, EPA, Region 4
Mr. Fred Willingham, Johnson City Field Office, DSWM
Mr. William Krispin, Manager, Permitting Sections, DSWM
Ms. Jamie Burroughs, Manager, TSD Section, DSWM
Mr. Charles Burroughs, Manager, Corrective Action Section, DSWM
Mr. Al Frakes, Corrective Action Section, DSWM
Mr. Malek Faradji, Corrective Action Section, DSWM

RESPONSE TO COMMENTS
Holston Army Ammunition Plant
Kingsport, Tennessee

This document has been prepared in accordance with Tennessee Rule 1200-01-11-07(7)(j) It has resulted from the Tennessee Division of Solid Waste Management's issuance of a draft permit to the U S Army Holston Army Ammunition Plant (HSAAP) located at 4509 West Stone Drive Kingsport, Tennessee 37660-1048, EPA Identification Number TN5210020421 The permit conditions allow the facility to treat hazardous waste in Burn Pans

A Public Involvement Opportunities

A public notice of the issuance of the draft permit was published in the September 20, 2010 edition of The Kingsport Time-News in Hawkins County, Kingsport, Tennessee, and September 22, 2010 edition of The Rogersville Review in City of Rogersville Sullivan County, Tennessee Several 30-second announcements of the action, referencing the notice published in the newspaper, were also provided over a local radio station (WRZK)-FM, Kingsport and Church Hill, Tennessee) The public notice advised the public that copies of the permit application, the draft permit, air dispersion modeling protocol and risk assessment, corrective action order, fact sheet and public notice were available for public inspection at the Church Hill Branch Library, 412 East Main Blvd , Church Hill, Tennessee (423-357-4591), and Kingsport Public Library, 400 Broad Street, Kingsport, Tennessee 37600 (423-229-9489) These materials were also available for public inspection, at the TDEC Johnson City Field Office Division of Solid Waste Management located at 2305 Silverdale Road, Johnson City, Tennessee, and at the TDEC Division of Solid Waste Management's Central Office, 5th Floor, L&C Tower, 401 Church Street Nashville, TN 37242-1535

B Public Comment/Response Summary

There were no written comments received from the public during the 45-day comment period No members of the general public requested a public hearing HSAAP submitted comments during the established 45-day comment period These comments are addressed below Tennessee's Division of Solid Waste Management (DSWM) made changes to the final permit These changes are also addressed below

HOLSTON ARMY AMMUNITION PLANT

Response To Comments on Draft Open Burn Permit

Facility Comments.

COMMENT #1 Section I-F 8 and II E 3 require inspection records to be maintained for 5 years, however OSI currently maintains the records for 3 years Attachment 4 (page 4-1) and the current Interim Permit indicate that records should be maintained for 3 years OSI requests that Section I-F 8 and II E 3 be modified to 3 years

RESPONSE. Tennessee Rule 1200-01-11- 06(5)(d)2(v) requires the owner or operator of the facility to keep the records of inspections for (5) years Attachment 4 Page 4-2 has been changed from 3 years to 5 years

COMMENT # 2 Sections II P to II R are not applicable, can they be removed?

RESPONSE. These are standard conditions for all RCRA Permits in Tennessee, even though they may not be applicable at this time for this unit, they will not be removed

COMMENT # 3 Section III E 3 does not allow the placement of hazardous waste on the burn pan units if any of the monitoring equipment fails to operate properly Request adding, "in the event of a malfunction of monitoring equipment, weather conditions will be obtained from the National Oceanic and Atmospheric Administration (NOAA) "

RESPONSE The change has been made on Page III-3 E-3 as requested

COMMENT # 4 Section III E 4 is missing a word in the following phrase, "until such time that the? Is certified " Also, " certified in closed accordance with this permit," is not clear Recommend changing to "certified as closed in accordance with this permit "

RESPONSE. The changes have been made on Page III-3 Section III E 4

COMMENT. # 5 Section III F 1 does not allow open burning two hours before or after the listed meteorological conditions Weather conditions are very unpredictable OSI requests removing the text that states "within two (2) hours before or after the treatment schedule" and replace with "before and during treatment " Per E 1 weather parameters will be checked prior to each thermal treatment to ensure that meteorological conditions are favorable to commence and continue thermal treatment

RESPONSE. Section III F 1 has been changed to "Open burning shall not occur whenever any of the following meteorological conditions are present or reasonably expected to occur during thermal treatment "

COMMENT. # 6 Section III F 4 requires checking meteorological conditions prior to placement of waste on burn pans This is a change from current operations Request removing "prior to transporting the waste to the burn pan(s)" As explained in Attachment 8, depending on moisture content the material may require several days to dry on the pan before it can be thermally treated

RESPONSE: In Section III F 4 "prior to transporting the waste to the burn pan(s)" has been removed

COMMENT. # 7 Section III F 4 (b) mentions concrete pads Please change "concrete pads" to "burn pan area "

RESPONSE: In Section III F 4 (b) "concrete pads" has been changed to "burn pan area "

COMMENT # 8 Section III F 5 (c) and (d) should be removed The permittee does not have scheduled thermal treatment dates Explosives must contain moisture to be handled safely, so the permittee does not thermally treat them until they have sufficiently dried Thermal treatment is rarely conducted on the same day that waste is placed on the burn pan units Burn pan units are only left uncovered during favorable meteorological conditions and during daylight hours When meteorological conditions are met and the waste is sufficiently dried, thermal treatment takes place

RESPONSE. In Section III 5 (c) the word "daily" has been added to the sentence, and Section III 5 (d) has been removed

COMMENT. # 9 Section III F 6 should state, "The permittee shall complete removal of spilled or leaked waste from the burn pan and surrounding soils on the same day of thermal treatment " In addition, there is never any accumulated precipitation on the burn pans because they are always covered during unfavorable meteorological conditions

RESPONSE. Section III F 6 has been changed to read "The permittee shall remove spilled or leaked waste from the burn pan(s) and surrounding soils immediately after placement of material on the burn pan(s) in accordance with Attachment 8 of this permit

COMMENT # 10 Section III F 11 should change concrete "pads" to concrete "bumpers "

RESPONSE In Section III F 11 concrete "pads" has been changed to concrete "bumpers "

COMMENT # 11 Section III K 1 (c) should change "treated **should** be 3 inches" to "treated **must** be no more than 3 inches "

RESPONSE. Section III K 1 (c) has been changed to "The depth of energetic waste to be treated must be 3 inches, or less to avoid the potential for detonation and facilitate effective treatment "

COMMENT # 12 Section III K 1 (i) requires that the containment devices should be cleaned of any residue and managed as hazardous waste until determined otherwise Currently, the "residues are cleaned periodically from the burn pans and are treated as hazardous waste until samples are collected and analytical results prove otherwise "

RESPONSE The State disagrees Facilities that treat hazardous waste by open burn open detonation must sample the residues The paragraph has been changed to "Prior to removing any treated residues from the burn pans any residue is managed as hazardous waste until determined otherwise based on waste analyses"

COMMENT. # 13 Section VI, Item #1 requires a risk assessment to be conducted on a new waste to be treated in the burn pans Rather than a full-scale risk assessment each time a product is added, OSI recommends providing a waste analysis of the new waste as described in Section III G 2

RESPONSE. In addition to the waste analysis as described in Section III G 2, an evaluation of the new wastes's effect on the ecological and human risk must be undertaken

COMMENT # 14 Section VI, Item #2 requires soil sampling twice a year OSI requests that Item #2 be waived It is OSI's understanding that this is normally only required upon closure of a RCRA Unit and not of a permitted active RCRA unit

RESPONSE Section E-3-1 **Burn Pan Unit Sampling Rationale** of the permit application states "Open burning is a vigorous exothermic reaction The potential exists for explosive materials to be ejected from the burn unit and to land on the ground surface surrounding the burn pans " The State agrees, therefore, biannual soil sampling around the burn units is required to provide an "early warning" of potential contamination of the soil, which could infiltrate into the groundwater

After a period of biannual sampling, HSAAP may evaluated the results and request a permit modification for an alternate sampling frequency

COMMENT. # 15 Section VI requires a reapplication every 5 years for any waivers granted under this permit Section V waives the requirement to conduct point of compliance groundwater monitoring Will a reapplication be necessary for this waiver?

RESPONSE. Yes, the permittee must reapply every 5 years for continuation of this waiver

COMMENT # 16 Attachment 1, Figure 1 1-1 needs to be updated A new Figure will be provided by November 30, 2010

RESPONSE Figure 1 1-1 has been updated

COMMENT # 17 Attachment 1, Figure 1 1-2 needs to be updated A new Figure will be provided by November 30, 2010

RESPONSE. Figure 1 1-2 has been updated

COMMENT. # 18 Attachment 1, Figure 1 1-3 needs to be updated A new Figure will be provided by November 30, 2010

RESPONSE. Figure 1 1-3 has been updated

COMMENT. # 19 Attachment 2, paragraph 3, "Manufacturing Area Materials Chemical and Physical Information " Please remove "and trinitrotoluene (TNT) " TNT is not manufactured onsite but is purchased offsite as a raw material Please add "NTO," "DNAN," and TATB to products manufactured onsite

RESPONSE The change has been made as requested

COMMENT # 20 Attachment 2, Tables 2-1, 2-2, and 2-3 needs to be updated An updated list will be provided by November 30, 2010

RESPONSE Tables 2-1, 2-2, and 2-3 have been updated

COMMENT # 21 Attachment 2, Table 2-1, page 2-4 has a typo DNA needs an "N" so it is DNAN (2,4, Dinitroanisole)

RESPONSE The change has been made

COMMENT # 22 Attachment 2, Figure 2-2 needs to be updated A new Figure will be provided by November 30, 2010

RESPONSE. In Attachment 2, Figure 2-2 has been updated

COMMENT # 23 Attachment 2, page 2-14, "Treatment Residues" paragraph requires annual testing of each burn pan Why is the treatment residue required to be tested for TCLP metals when on page 2-1 of Attachment 2 it is acknowledged that RCRA metals are not utilized in the manufacturing of explosives? Metals would actually sensitize explosives A great deal of care is taken into not allowing metals into any of the products as metal to metal contact creates unsafe work conditions and is a possible source of detonation

RESPONSE After further discussions the permittee elected to withdraw this comment

COMMENT. # 24 Attachment 3, under the "24-Hour Surveillance System" paragraph, the phrase "a 24-hour intrusion detection system, including" should be deleted

RESPONSE The change has been made

COMMENT # 25 Attachment 3, the typo in the title of the "Control Access" paragraph needs to be corrected

RESPONSE The change has been made

COMMENT. # 26 Attachment 3, under the "Control Access" paragraph should delete the phrase "an intrusion alarm system, as well as "

RESPONSE The change has been made

COMMENT # 27 Attachment 3, Figure 3-1 needs to be updated A new Figure will be provided by November 30, 2010

RESPONSE. In Attachment 3, Figure 3-1 has been updated

COMMENT # 28 Attachment 4, Paragraph "Equipment Requirements" on page 4-2, second paragraph needs to change building #6 to HSAAP Security Dispatch

RESPONSE. Building #6 has been changed to HSAAP Security Dispatch

COMMENT # 29 Attachment 4, in the Section of "Testing and Maintenance of Equipment" on page 4-3, need to remove "and intrusion detection systems" from the paragraph beginning with "The security camera "

RESPONSE The change has been made

COMMENT. # 30 Attachment 4, Figure 4-2, #4 needs to be removed Fire blankets are no longer available

RESPONSE The State agrees The change has been made

COMMENT # 31 Attachment 4, Figure 4-2, need to change the load limit on #8 to 500 pounds instead of 750 pounds

RESPONSE. The load limit has been changed to 500 pounds instead of 750 pounds

COMMENT # 32 Attachment 5, under the Operating Procedures in the General Information section on page 5 1-3, the paragraph needs to change the location of the video monitor The video monitor is located at Building 20, not behind wood barricade and in the Burning Ground trailer

RESPONSE The change has been made

COMMENT # 33 Attachment 5, under the Emergency Equipment Section, "First-Aid Equipment" paragraph please remove "(Bldg No 7)" on page 5 1-11

RESPONSE. The change has been made

COMMENT # 34 Attachment 5, under the Emergency Equipment Section, need to add the "Plant-wide emergency warning system" to the list of equipment in the "Emergency Communications and Alarm System" paragraph on page 5 1-12

RESPONSE The change has been made

COMMENT # 35 Attachment 5, under the Preventive Procedures, Structures, and Equipment Section, need to remove "include fire retardant outer clothing," and "The barricade serves as protection against any explosions" in the "Personnel Protective Equipment," paragraph on 5 1-15

RESPONSE The change has been made

COMMENT. # 36 Attachment 5, Figure 5 1-1 needs to be updated A new Figure will be provided by November 30, 2010

RESPONSE. In Attachment 5, Figure 5 1-1 has been updated

COMMENT # 37 Attachment 5, Figure 5 1-2 needs to be updated A new Figure will be provided by November 30, 2010

RESPONSE. Figure 5 1-2 has been updated

COMMENT. # 38 Attachment 5 2 – Coordination Agreements The most current agreements will be provided by November 30, 2010

RESPONSE Attachment 5 2 – Coordination Agreements has been updated

COMMENT # 39 Attachment 6, Figure 6 1-1 needs to be updated A new Figure will be provided by November 30, 2010

RESPONSE. Figure 6 1-1 has been updated

COMMENT # 40 Attachment 6, Figure 6 1-2 needs to be updated A new Figure will be provided by November 30, 2010

RESPONSE Figure 6 1-2 has been updated

COMMENT # 41 Attachment 8, under the "Burn Pan Unit" paragraph on page 8-1, please add, "waterproof plastic sheet" to the list

RESPONSE In Attachment 8, under the "Burn Pan Unit" paragraph on page 8-1, "waterproof plastic sheet" has been added to the list

COMMENT # 42 Attachment 8, under the "Operating Procedures" Section, "Personnel Safety" paragraph on page 8-4, "flame retardant" should be removed and replaced with white "cotton" coveralls

RESPONSE In Attachment 8, under the "Operating Procedures" Section, "Personnel Safety" paragraph on page 8-4, "flame retardant" has been removed and replaced with white "cotton" coveralls

COMMENT. # 43 Attachment 8, paragraph "Waste Ignition" on page 8-5, please remove all 8 sentences starting with "Both people, one a Safety " and ending with " shows that the burn has been completed " Please replace these sentences with the following

"Both people, one a Safety Department Representative, move to the remote ignition area which is currently located inside Building 20 on the west wall The controls to the remote ignition system are in two locked metal boxes spaced approximately 15 feet apart The Safety Department Representative has the only key To activate the ignition system, one person at each box has to depress and hold a manual switch in order to

complete the ignition circuit Ignition normally takes approximately three minutes The burn pan is monitored by closed circuit TV and when ignition takes place, the manual switches are released and the metal boxes are returned to the locked position No person shall enter the burn field until at least 30 minutes after there is no visible flame observed on the closed circuit TV "

RESPONSE The change has been made

COMMENT # 44 Attachment 8, Figure 8 1 needs to be updated A new Figure will be provided by November 30, 2010

RESPONSE In Attachment 8, Figure 8 1 has been updated

COMMENT. # 45 Attachment 8, Figure 8 2 needs to be updated A new Figure will be provided by November 30, 2010

RESPONSE In Attachment 8, Figure 8 2 has been updated

COMMENT: # 46 Attachment 8, Section "Maintenance Procedures," paragraph #3 on page 8-6, please remove "and intrusion detection systems" and "Security Department" and replace "Security Department" with "OSI Instrument Technicians "

RESPONSE The change has been made

COMMENT # 47 Any reference to "wooden barricade" at the burning ground area should be changed to refer to Building 20 Building 20 is where the remote operations currently take place Building 20 is located at the east end of the burning ground

RESPONSE References to "wooden barricade" at the burning ground area have been changed to refer to Building 20

COMMENT # 48 Any reference to "a 24-hour intrusion detection system" should be removed A closed-circuit television security system serves to detect intruders and to monitor burning activities

RESPONSE. References to "a 24-hour intrusion detection system" have been removed

DIVISION CHANGES TO HOLSTON ARMY AMMUNITION PLANT DRAFT PERMIT

For final permit issuance, listed below are the changes the Division of Solid Waste Management made to Holston Army Ammunition Plant's Draft Permit Additions are noted by bold italicized text

1 In Attachment 2 Table 2-4 on page 2-8 was for 2001 The table was considered obsolete and has been removed

2 The following paragraphs have been added to Attachment 2, page 2-21, to provide additional requirements to waste received from offsite

A complete waste characterization provided by the off-site generator will be reviewed by HSAAP before HSAAP agrees to accept the waste. For each new waste stream that is a candidate for management by the facility, the generator will provide the facility with any required Land Disposal Restriction Notification/Certification Information and/or Data [TN Rule 1200-01-11-.10(1)(g)1]; and other supporting documentation, including information such as Material Safety Data Sheets, product ingredients, analytical data, etc.

Waste Profile Re-evaluation

In accordance with TN Rule 1200-01-11-.06(2)(d), a waste profile re-evaluation will be conducted when one of the following occurs:

- ***A generator notifies the facility that the process generating the waste has changed;***
- ***The results of inspection or analysis indicate that the waste received at the facility does not match the identity of the waste designated on the accompanying manifest (or shipping paper) or pre-acceptance documentation; or***
- ***Every two years. A biennial waste profile re-evaluation along with a vigilant incoming load-screening program is sufficient to ensure that wastes continue to be properly managed at the facility.***
- ***For bullets one and three above, this re-evaluation process may consist of a review of the paperwork to ascertain that the analytical data is accurate and current and that it is sufficient to properly manage the waste as intended. The procedure typically involves comparing the current waste profile to the available results of routine inspection, sampling, and analysis obtained upon receipt of an incoming load of the waste stream. To augment this review, if existing analytical is not sufficient, the generator may be asked to review the current waste profile, to supply a new profile, and/or to***

submit a sample for analysis, or the facility may obtain a sample from a load of the waste

3 All references to the Federal Regulations (CFR) in Attachment 2 have been changed to the equivalent Tennessee State Regulations (Rules)

4 The process description on page 2-21 & 2-22 states that the wastes are D003, **D0030 (TYPO, should be D030)** & K044 and does not address solvents used in the recrystallization of crude explosives as underlying hazardous constituents

The following paragraphs have been added to address this in the final permit

Attachment 2 page 2-2 paragraph 3-4-5 and 6 has been changed as follows

3 The crudely washed explosive, in water slurry, is pumped to Building G (Recrystallization Building) The explosive is partially dissolved in a solvent, simmered, and recrystallized by boiling off the solvent. The solvent vapor is condensed and collected in a tank for re-use. The remaining explosive and water slurry is pumped to Building H (Dewatering Building), where it is discharged to nutsches The excess water is removed by vacuum and the weight adjusted.

A representative list of solvents includes

- ***Toluene,***
- ***MEK,***
- ***Acetone,***
- ***Cyclohexanone,***
- ***n-octane, and***
- ***Ethyl acetate***

4. The explosive is then sent to one of the Incorporation Buildings or returned to Building G, where it is combined with supplied raw materials to produce the specified final formulation.

5. The final products are then sent to Building N for packaging.

6. From Building N, the products go either directly to the loading docks for shipment or to a storage magazine for storage.

Attachment 2, page 2-13, the second paragraph has been changed as follows

The composition of any new formulation will be reviewed by HSAAP to determine whether any underlying hazardous constituents are present

If any underlying hazardous constituents are present, the Burn Pan Unit treatment residue will be analyzed to determine whether the treatment standard has been met

5 In Section III K (k), Page III-9, D003 has been removed

6 On page 8-5 of Attachment 8, under Waste Drying Section the wind speed from 30 miles per hour has been changed to 15 miles per hour

MAF 3/06/11

Permit Cover Letter

State of Tennessee
Department of Environment
and Conservation
Division of Solid Waste Management

Hazardous Waste Management Program
5th Floor, L & C Tower
401 Church Street
Nashville, Tennessee 37243-1535

HAZARDOUS WASTE MANAGEMENT PERMIT

Permittee Holston Army Ammunition Plant
Facility. Holston Army Ammunition Plant
Owner/Operator United States Army
Co-Operator BAE Systems Ordnance Systems
Location 4509 West Stone Drive, Kingsport Tennessee 37660-9982
Type Subpart X Open Burn Miscellaneous Treatment
Units Burn Pan Units
EPA Identification Number. TN5 21 002 0421
Permit Number TNHW-148

Pursuant to the Tennessee Hazardous Waste Management Act, as amended (Tennessee Code Annotated (TCA) 68-212-101 et seq) and regulations (Chapter 1200-01-11) promulgated there under by the Tennessee Solid Waste Disposal Control Board, a permit is issued to Holston Army Ammunition Plant (hereinafter called the permittee), to operate hazardous waste treatment units, located in Kingsport, Tennessee, Hawkins county at latitude 36° 31' 058" North and longitude 82° 37' 058" West The permittee shall be allowed to treat hazardous waste by open burning in burn pans in accordance with the terms of this permit This permit does not allow the permittee to operate this facility in a manner defined by TCA 68-212-104(2) as a "commercial facility"

This permit is issued under the authority of T C A §68-212-108 The permit also requires the permittee to comply with all land disposal restrictions and air emission standards applicable to this facility and to certify annually that on-site generation of hazardous waste is minimized to the extent practicable

The permittee must comply with all terms and conditions of this permit This permit consists of the conditions contained herein (including those in any Attachments) and the applicable regulations contained in Chapter 1200-01-11, or 1200-01-12- 14, as specified in the permit Applicable regulations are those from Tennessee Rule (Rule) 1200-01-11- 06, or from Rule 1200-01-14- 04 which are in effect on the date of issuance of the permit, for all other rules in Chapter 1200-01-11, applicable regulations are those in effect on the date of the issuance of this permit and any subsequent modifications to those rules as they become effective

Continuation, Transfer, Modification, Revocation and Reissuance, and Termination of this permit shall comply with and conform to Rule 1200-01-11- 07(9)

This permit is based on the premise that the information and reports submitted by the permittee prior to issuance of this permit or prior to any subsequent modification to this permit are accurate

EPA Identification Number: TN5 21 002 0421
Permit Number: TNHW-148

Any inaccuracies found in this information or information submitted as required by this permit may be grounds for termination or modification of this permit and enforcement action. The Commissioner may modify this permit if information is received which was not available at the time of permit issuance and which would have justified the application of different permit conditions at the time of issuance. The permittee must notify the Commissioner of any deviation from or changes in the information in the application, which would affect the permittee's ability to comply with the applicable regulations or permit conditions.

This permit is effective as of March 31, 2011 and shall remain in effect until March 31, 2021, unless revoked and reissued, or terminated, or continued.

Mike Apple Director	4-11-11 Date

EPA Identification Number TN5 21 002 0421
Permit Number. TNHW-148

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Facility. Holston Army Ammunition Plant

EPA Identification Number TN5 21 002 0421
Permit Number TNHW-148

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Permittee Holston Army Ammunition Plant
Facility Holston Army Ammunition Plant
Owner/Operator United States Army
Co-Operator. BAE Systems Ordnance Systems
Location. 4509 West Stone Drive, Kingsport Tennessee 37660-9982
Type. Subpart X Open Burning Treatment
Units Burn Pan Units
EPA Identification Number TN5 21 002 0421
Permit Number TNHW-148

I STANDARD CONDITIONS

A EFFECT OF PERMIT

The permittee is allowed to treat hazardous waste in accordance with the conditions of this permit Any receipt or handling of hazardous waste not authorized in this permit is prohibited, unless such management is not subject to a permit as set forth at Tennessee Rule 1200-01-11- 07(1)(b), is operating under interim status as set forth in Tennessee Rule 1200-01-11- 07(3)(a), or is subject to a separate hazardous waste management permit issued by the Tennessee Division of Environment and Conservation, Compliance with this permit during its term constitutes compliance, for the purposes of enforcement, with the Tennessee Hazardous Waste Management Act of 1977, as amended, as it applies to the permitted activities, except for those requirements not included in the permit which (1) become effective by statute, or (2) are promulgated under Tennessee Rule 1200-01-11- 10 restricting the placement of hazardous waste in or on the land However, this permit may be modified, revoked and reissued, or terminated during its term for cause as set forth in this permit and paragraph (9) of Tennessee Rule 1200-01-11- 07 Issuance of this permit does not authorize any injury to persons or property, any invasion of other private rights, or any infringement of other State or local laws or regulations This permit does not convey any property rights of any sort or any exclusive privilege Compliance with the terms of this permit does not constitute a defense to any order issued or any action brought under Section 3013 or Section 7003 of the Resource Conservation and Recovery Act of 1976 as amended (42 U S C 6901 et seq , commonly referred to as RCRA), Sections 104, 106(a) and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U S C 9601 et seq , commonly known as CERCLA), Sections 68-212-206(a), 207, and 215(c) of the Tennessee Hazardous Waste Management Act of 1983, as amended, or any other law providing for protection of public health or the environment

B SEVERABILITY

The provisions of this permit are severable, and if any provisions of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby

C DEFINITIONS

For the purpose of this permit, terms used herein shall have the same meaning as those in Rules 1200-01-11- 01, 02, 06, 07, and 10, unless this permit specifically provides otherwise Where terms are not defined in the regulations, the permit, or U S Environmental Protection Agency (EPA) guidelines or publications, the meaning associated with such terms shall be as defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term

1 "Area of concern" (AOC) includes any area having a probable release of a hazardous waste or hazardous constituent that is not from a solid waste management unit and is determined by the Commissioner to pose a current or potential threat to human health or the environment Such areas of concern may require investigations and remedial action as required by this permit and Rule 1200-01-11- 07(8)(b)2(ii) in order to ensure adequate protection of human health and the environment

2 "Contamination" refers to the presence of any hazardous constituent in a concentration, which exceeds the naturally occurring concentration of that constituent in the immediate vicinity of the unit (i e , having higher concentrations of a constituent as compared to nearby areas that have not been affected by the unit)

3 "Corrective action management unit" (CAMU) includes any area within a facility that is designated by the Commissioner under Rule 1200-01-11- 06(22) for the purpose of implementing corrective action requirements under Rule 1200-01-11- 06(6)(l) A CAMU shall only be used for the management of remediation wastes pursuant to implementing such corrective action requirements at the facility

4 "Corrective measures" include all corrective action necessary to protect human health and the environment for all releases of hazardous waste or hazardous constituents from any solid waste management unit at the facility, regardless of the time at which waste was placed in the unit, as required under Rule 1200-01-11- 06(6)(l) Corrective measures may address releases to air, soil, surface water or groundwater

5 "Extent of contamination" is defined as the horizontal and vertical area in which the concentrations of hazardous constituents in the environmental media being investigated are above detection limits or background concentrations indicative of the region, whichever is appropriate as determined by the Commissioner

6 "Facility" includes all contiguous land and structures, other appurtenances, and improvements on the land used for treating, storing, or disposing of hazardous waste A facility may consist of several treatment, storage, or disposal operational units (e g , one or more landfills, surface impoundments, or combinations of them) For the purposes of implementing corrective action under Rule 1200-01-11- 06(6)(l), a facility includes all contiguous property under the control of the owner or operator seeking a permit under the Tennessee Hazardous Waste Management Act

7 "Hazardous constituent(s)" or "hazardous waste constituent(s)" are those substances listed in Rule 1200-01-11- 02(5), Appendix VIII, including hazardous constituents released from any waste and hazardous constituents that are reaction by-products

8 "Interim measures" are actions necessary to minimize or prevent the further migration of contaminants and limit actual or potential human and environmental exposure to contaminants while long-term corrective action remedies are evaluated and, if necessary, implemented

9 "Land disposal" means placement in or on the land, except for a "corrective action management unit," and includes, but is not limited to, placement in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, underground mine or cave, or concrete vault or bunker intended for disposal purposes

10 "Landfill" includes any disposal facility or part of a facility where hazardous waste is placed in or on the land and which is not a pile, a land treatment facility, a surface impoundment, an underground injection well, a salt dome formation, a salt bed formation, an underground mine, a cave, or a corrective action management unit

11 "Military munitions" means all ammunition products and components produced or used by or for the U S Department of Defense or the U S Armed Services for national defense and security, including military munitions under the control of the Department of Defense, the U S Coast Guard, the U S Department of Energy (DOE), and National Guard personnel The term military munitions includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries used by DOD components, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof Military munitions do not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components thereof However, the term does include non-nuclear components of nuclear devices, managed under DOE's nuclear weapons program after all required sanitization operations under the Atomic Energy Act of 1954, as amended, have been completed

12 "Miscellaneous unit" means a hazardous waste management unit where hazardous waste is treated, stored, or disposed of and that is not a container, tank, surface impoundment, pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, underground injection well with appropriate technical standards under 40 CFR Part 146, containment building, corrective action management unit eligible for a research, development and demonstration permit under Rule 1200-01-11- 07(6)(g), or staging pile

13 "Open burning" means the combustion of any material without the control of combustion air maintain adequate temperature for efficient combustion, containment of the combustion-reaction in an enclosed device to provide

sufficient residence time and mixing for complete combustion, and control of emission of the gaseous combustion products

14 "Open detonation" means the explosion in which chemical transformation passes through the material faster than the speed of sound (0 33 kilometers/second at sea level) and which produces the uncontrolled emission of the gaseous detonation products

15 "Point of compliance" refers to the vertical surface located at the hydraulically downgradient limit of the waste management area that extends down into the uppermost aquifer underlying the regulated unit

16 "Registered engineer" or "registered professional engineer" shall mean a person authorized to perform engineering in Tennessee pursuant to Tennessee Code Annotated, Title 62, Chapter 2

17 "Release" includes any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of any hazardous waste or hazardous constituents

18 "Remediation waste" includes all solid and hazardous wastes, all media (including groundwater, surface water, soil, and sediment), and all debris which contain listed hazardous waste or which themselves exhibit a hazardous waste characteristic, that are managed for the purpose of implementing the corrective action requirements of Rule 1200-01-11- 06(6)(l) For a given facility, remediation wastes may originate only from within the facility boundary but may include waste managed for releases beyond the facility boundary

19 "Screening levels" are health-based concentrations of hazardous constituents determined to be indicators for the protection of human health and/or the environment

20 "Solid waste" means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, or agricultural operations, or from community activities, but does not include solid or dissolved materials in domestic sewage or solid or dissolved materials in irrigation return flows or industrial discharges that are point sources subject to permits under Section 402 of the Federal Water Pollution Control Act, as amended (86 Stat 880), or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (68 Stat 923)

21 "Solid waste management unit" (SWMU) includes any unit that has been used for the treatment, storage, or disposal of solid waste at any time, irrespective of whether the unit is or ever was intended for the management of solid waste Permitted or interim status hazardous waste management units are also solid waste management units Solid waste management units include areas that have been contaminated by routine and systematic releases of hazardous waste or hazardous constituents, excluding one-time accidental spills that are

immediately remediated and cannot be linked to solid waste management activities (e g , product or process spills)

22 "Temporary unit" (TU) includes any temporary tanks and/or container storage areas used solely for treatment or storage of hazardous remediation wastes during specific remediation activities Designated by the Commissioner, such units must conform to specific standards and may only be in operation for a period of time as specified in this permit

23 "Thermal treatment" means the treatment of hazardous waste in a device which uses elevated temperatures as the primary means to change the chemical, physical, or biological character or composition of the hazardous waste Examples of thermal treatment processes are incineration, molten salt, pyrolysis, calcination, wet air oxidation, microwave discharge, open burning, and open detonation

24 "Unit" includes, but is not limited to, any Open Burn unit, Open Detonation unit, landfill, surface impoundment, waste pile, land treatment unit, incinerator, injection well, tank, container storage area, septic tank, drain field, wastewater treatment unit, elementary neutralization unit, transfer station, or recycling unit

D GENERAL DUTIES AND REQUIREMENTS

1 Duty to Comply The permittee shall comply with all conditions of this permit, except that the permittee need not comply with the conditions of the permit to the extent and for the duration that such noncompliance is authorized in an emergency permit Any permit noncompliance, except under the terms of an emergency permit, constitutes a violation of the Act and is grounds for enforcement action, for permit termination, revocation and reissuance, or modification, or for denial of a permit renewal application

2 Duty to Reapply If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit The permittee must submit a new application at least 180 days before the expiration date of the effective permit, unless permission for a later date has been granted by the Commissioner The Commissioner shall not grant permission for applications to be submitted later than the expiration date of the existing permit

3 Need to Halt or Reduce Activity Not a Defense It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit

4 Duty to Mitigate In the event of noncompliance with the permit, the permittee shall take all reasonable steps to minimize releases to the environment, and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment

5 Proper Operation and Maintenance The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and

related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit

6 Permit Actions This permit may be modified, revoked and reissued, or terminated for cause as specified in Rule 1200-01-11- 07(9)(c) The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes under Subparagraph I D 11(a) or anticipated noncompliance under Subparagraph I D 11(b) does not stay any existing permit condition

7 Duty to Provide Information The permittee shall furnish to the Commissioner, within a reasonable time, any relevant information which the Commissioner may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit The permittee shall also furnish to the Commissioner, upon request, copies of records required to be kept by this permit

8 Inspection and Entry The permittee shall allow the Commissioner, or any authorized representative, upon presentation of credentials and other documents as may be required by law, to

(a) Enter, at reasonable times, upon the permittee's premises where a regulated unit(s) or activity is located or conducted, or where records must be kept under the conditions of this permit,

(b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit,

(c) Inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit,

(d) Sample or monitor, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location, and

(e) Make photographs for the purpose of documenting items of compliance or noncompliance at waste management units or, where appropriate to protect legitimate proprietary interests, make such photographs for him or her

"At reasonable times" shall mean, for the purposes of this permit condition, at least but not limited to, any time the facility is in operation

9 Monitoring and Records

(a) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity The permittee shall perform all monitoring in accordance with the methods described in this permit, including the Attachments If not specified in this permit, the method used to obtain a representative waste sample to be analyzed must be the appropriate method from Appendix I of Rule 1200-01-11- 02(5), the most recent version of the USEPA, Region 4, Science and Ecosystem Support Division's (SESD) Field Branches Quality System and Technical Procedures, or an equivalent method approved by the Commissioner If not specified in this permit, procedures for sampling media must be those identified in the latest edition of the Field Branches Quality System and Technical Procedures or an equivalent method approved by the Commissioner Laboratory methods must be those specified in the most recent edition of Test Methods for Evaluating Solid Waste Physical/Chemical Methods, SW-846, or an equivalent method approved by the Commissioner

(b) The permittee shall retain at the facility, as provided for under Rule 1200-01-11- 06, or other location approved by the Commissioner, records of all monitoring information required under the terms of this permit, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, records of all data used to prepare documents required by this permit, copies of all reports and records required by this permit, the certification required by Subparagraph II K 1(i), and records of all data used to complete the application for this permit, for a period of at least (5) years from the date of the sample, measurement, report, certification, or application, or until corrective action is completed, whichever date is later As a generator of hazardous waste, the permittee shall retain a copy of all notices, certifications, demonstrations, waste analysis data, and other documentation produced pursuant to Rule 1200-01-11- 10 for at least (5) years from the date that the waste which is the subject of such documentation was last sent to on-site or off-site treatment, storage or disposal, or until corrective action is completed, whichever date is later The permittee shall maintain records from all groundwater monitoring wells and associated groundwater surface elevations, for the active life of the facility, and, for disposal facilities, for the post-closure care period as well These periods may be extended by request of the Commissioner at any time and are automatically extended during the course of any unresolved enforcement action regarding this facility

(c) Records of monitoring information shall include

(i) The date, exact place, and time of sampling or measurements,

(ii) The individual(s) who performed the sampling or measurements,

(iii) The date(s) analyses were performed,

(iv) The name of the laboratory that performed the analyses,

(v) The analytical techniques or methods used, and

(vi) The results of such analyses

10 Signatory Requirement All applications, reports, or information submitted to the Commissioner shall be signed and certified All signatures and certifications shall satisfy the requirements of Rule 1200-01-11- 07(2)(a)

11 Reporting Requirements

(a) Planned changes The permittee shall give written notice to the Commissioner as soon as possible of any planned physical alterations or additions to the permitted facility, including permittee-intiated Interim Measures under Subparagraph V F 1(b), or other activities that impact known or suspected contamination at or from SWMUs or AOCs, including the areas off-site from the facility The notice shall include, at a minimum, a summary of the planned change, the reason for the planned change, a discussion of the impacts(s) the planned change will have on the ability to investigate contamination at or from the SWMU or AOC, and a discussion of the impact(s) the planned change will have on the known or suspected contamination

(b) Anticipated noncompliance The permittee shall give advance notice to the Commissioner as soon as possible of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements For a new facility, the permittee may not commence treatment, storage, or disposal of hazardous waste, and for a facility being modified, the permittee may not treat, store, or dispose of hazardous waste in the modified portion of the facility except as provided in Rule 1200-01-11- 07(9)(c)5, until

(i) The permittee has submitted to the Commissioner by certified mail or hand delivery a letter signed by the permittee and a registered professional engineer stating that the facility has been constructed or modified in compliance with the permit, and

(ii) (I) The Commissioner has inspected the modified or newly constructed facility and finds it is in compliance with the conditions of the permit, or

(II) Within 15 days of the date of submission of the letter in Part I D 11(b)(i) above, the permittee has not received notice from the Commissioner of his or her intent to inspect, prior inspection is waived and the permittee may commence treatment, storage, or disposal of hazardous waste

(iii) It is recognized that minor deviations from exact design specifications may occur during construction These must be

noted in the engineer's statement accompanied with an evaluation of the impact of the deviation on facility performance The Commissioner may modify the permit accordingly, without following the procedures of Rules 1200-01-11- 07(7) and (9), if he determines that the deviations are indeed minor and will not adversely impact the permittee's ability to comply with the regulatory requirements

(c) Transfers This permit is not transferable to any person except after notice to the Commissioner The Commissioner may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Act (See Rule 1200-01-11- 07(9)(b), in some cases, modification or revocation and reissuance is mandatory)

(d) Monitoring reports Monitoring results shall be reported at the intervals specified elsewhere in this permit

(e) Compliance schedules Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date Submittal of a required item according to the schedule constitutes notification of compliance

(f) Twenty-four hour reporting

(i) The permittee shall report any noncompliance or any imminent or existing hazard from a release of hazardous waste or hazardous constituent that may endanger health or the environment orally within 24 hours from the time the permittee becomes aware of the circumstances, including but not limited to

(I) Information concerning release of any hazardous waste or hazardous constituent that may cause an endangerment to public drinking water supplies

(II) Any information of a release or discharge of hazardous waste or hazardous constituent, or of a fire or explosion from the hazardous waste management facility, which could threaten the environment or human health outside the facility

(ii) The description of the occurrence and the cause shall include

(I) Name, address, and telephone number of the owner or operator,

(II) Name, address, and telephone number of the facility,

(III) Date, time, and type of incident,

(IV) Name and quantity of material(s) involved,

(V) The extent of injuries, if any,

(VI) An assessment of actual or potential hazards to the environment and human health outside the facility, and

(VII) Estimated quantity and disposition of recovered material that resulted from the incident

(iii) A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue, and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance The Commissioner may waive the five-day written notice requirement in favor of a written report within 15 days

(g) Manifest discrepancy report If a significant discrepancy in a manifest is discovered, the permittee must attempt to reconcile the discrepancy If not resolved within 15 days, the permittee must submit a letter report, including a copy of the manifest, to the Commissioner (See Paragraph II J 5)

(h) Unmanifested waste report Such report must be submitted to the Commissioner within 15 days of receipt of unmanifested waste (See Paragraph II K 3)

(i) Annual report An annual report must be submitted covering facility activities during the previous calendar year as outlined in Paragraph II K 4

(j) Other noncompliance The permittee shall report all instances of noncompliance not reported under Subparagraph I D 11(d), (e), or (f) above, at the time monitoring reports are submitted The reports shall contain the information listed in Subparagraph I D 11(f) as appropriate

(k) Other information Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any document to the Commissioner, it shall promptly submit such facts or information In addition, upon request, the permittee shall furnish to the Commissioner any information related to compliance with this permit

12 Continuation of Expiring Permit When the permittee has made timely and sufficient application for a new permit, the existing permit does not expire until the application has been finally determined by the Commissioner and, in case the application is denied, or the terms of the new permit limited, until the last day for

seeking review of the Commissioner's order or a later date fixed by order of the reviewing court

13 Obligation for Corrective Action Pursuant to the requirements of Section IV, "Specific Conditions for Corrective Action," the permittee is required to select and implement corrective actions as necessary to protect human health and the environment for all releases of hazardous waste or constituents from any solid waste management unit at the facility, regardless of the time at which waste was placed in such unit The permittee is required to continue this permit for any period necessary to comply with the corrective action requirements of this permit If corrective action is expected to continue beyond the expiration date of this permit, the permittee is required to meet the reapplication requirement under Paragraph I D 2

E. CONFIDENTIAL INFORMATION

In accordance with Rules 1200-01-11- 01(7) and 07(1)(h), the permittee may claim for confidential handling any proprietary information required to be submitted by this permit

F DOCUMENTS TO BE MAINTAINED AT THE FACILITY

The permittee shall maintain at the facility, until closure is completed and certified by an independent registered professional engineer, the following documents and amendments, revisions and modifications to these documents

1 A copy of this permit,

2 Waste analysis plan(s) required by this permit,

3 Personnel training documents and records required by this permit, except that training records on former employees are not required to be kept for more than three years from the date the employee last worked at the facility Personnel training records may accompany personnel transferred within the same company,

4 Contingency plan required by this permit,

5 Closure plan(s) required by this permit,

6 All corrective action work plans, reports and other documents as specified by the Commissioner and Section IV, "Specific Conditions for Corrective Action "

7 Operating and other applicable administrative records as required by this permit and Chapter 1200-01-11, and

8 Monitoring information and inspection records in accordance with Subparagraph I D 9(b) and Paragraph II E 3, except that inspection records need only be kept for five (5) years after the date of the inspection

G ANNUAL MAINTENANCE FEES

The permittee shall submit to the Commissioner annual maintenance fees as required by Rule 1200-01-11- 08

H. REQUIRED NOTICES

1 If the permittee has arranged to receive hazardous waste from a foreign source, he must notify the Commissioner in writing at least four weeks in advance of the date the waste is expected to arrive at the facility Notice of subsequent shipments of the same waste from the same foreign source is not required

2 If the permittee receives hazardous waste from an off-site source (except where the permittee is also the generator), he must inform the generator in writing that he has the appropriate permit(s) for, and will accept, the waste the generator is shipping The permittee must keep a copy of this written notice as part of the operating record

3 Before transferring ownership or operation of a facility during its operating life, or of a disposal facility during the post-closure care period, the permittee must notify the new owner or operator in writing of the requirements of this permit and Rule 1200-01-11- 07 However, the permittee's failure to notify the new owner or operator of the requirements of this permit condition in no way relieves the new owner or operator of his obligation to comply with all applicable requirements

I ORDER OF PRECEDENCE

In the event of any inconsistency between the permit conditions and the material contained in any Attachment to this permit, the permit conditions shall take precedence

J PERMIT STRUCTURE

This permit is organized, numbered, and referenced according to the following outline form

I Section

A Subsection

1 Paragraph

(a) Subparagraph

(i) Part

(I) Subpart

(A) Item

II GENERAL FACILITY CONDITIONS

A **HAZARDOUS WASTES TO BE MANAGED.** The hazardous wastes to be managed in the unit(s) authorized by this permit are identified in section III, and Attachment 1 The permittee shall not manage any other hazardous wastes identified by Rule 1200-01-11-02 in the unit(s) authorized by this permit, until this permit has been appropriately modified

B **MAINTENANCE OF THE FACILITY.** The permittee shall construct or maintain the facility to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment

C **SAMPLING, ANALYSIS, AND MONITORING**

1 General Waste Analysis Before the permittee treat, any hazardous waste, he shall obtain a detailed chemical and physical analysis of a representative sample of the waste At a minimum, this analysis shall contain all the information which must be known to manage the waste in accordance with this permit and Rule 1200-01-11- 10

2 Waste Analysis Plan

(a) The permittee shall follow the procedures described in the Waste Analysis Plan found in Attachment 2 However, use of the exact forms included in Attachment 2 is not mandatory The permittee may change the format and content of those forms as deemed necessary to provide the information he needs to properly manage the facility Any deletion of information from such forms, however, must be approved in advance in writing by the Commissioner as a modification to this permit

(b) The permittee shall ensure that the Waste Analysis Plan, required by Subparagraph II C 2(a) above, at a minimum, specifies

(i) The parameters for which each hazardous waste will be analyzed and the rationale for the selection of these parameters,

(ii) The test methods which will be used to test for these parameters,

(iii) The sampling method which will be used to obtain a representative sample of the waste to be analyzed,

(iv) The frequency with which the initial analysis of the waste will be reviewed or repeated to ensure that the analysis is accurate and up to date,

(v) For off-site facilities, the waste analysis the hazardous waste generators have agreed to supply, and,

(vi) Where applicable, the methods that will be used to meet the additional waste analysis requirements for specific waste management methods as specified in Paragraph II G 3 and Subsections II O, II P, II Q, and II R

(c) For off-site facilities, the permittee shall also ensure that the Waste Analysis Plan, required by Subparagraph II C 2(a) above, at a minimum, specifies the procedures to be used to inspect and, if necessary, analyze each movement of hazardous waste received at the facility to ensure that it matches the identity of the waste designated on the accompanying manifest or shipping paper At a minimum, the plan shall describe

(i) The procedures which will be used to determine the identity of each movement of waste managed at the facility, and

(ii) The sampling method which will be used to obtain a representative sample of the waste to be identified, if the identification method includes sampling

3 Frequency of Analysis The analysis shall be repeated as necessary to ensure that it is accurate and up-to-date At a minimum, the analysis shall be repeated no less frequently than the frequency specified in the Waste Analysis Plan (Attachment 2) and shall be repeated

(a) When the permittee is notified or has reason to believe that the process or operation generating the hazardous waste has changed, and

(b) For off-site facilities, when the results of the inspection required in Subparagraph II C 4(a) below indicate that the hazardous waste received at the facility does not match the waste designated on the accompanying manifest or shipping paper

4 Additional Analysis

(a) The permittee shall inspect and, if necessary, analyze each hazardous waste shipment received from off-site at the facility to determine whether it matches the identity of the waste specified on the accompanying manifest or shipping paper The procedure which shall be followed is described in the Waste Analysis Plan, Attachment 2

(b) The permittee shall inspect and, if necessary, analyze all standing liquid in the secondary containment system(s) prior to its release from the facility Sampling and analysis shall be performed as necessary to determine whether the liquid is a hazardous waste and how to properly manage it

5 Sampling and Monitoring Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity The method used to obtain a representative sample of the waste to be analyzed must be the appropriate method from Rule 1200-01-11- 02(5), Appendix I, the most recent

version of the EPA Region 4 Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), or an equivalent method Laboratory methods must be those specified in the most recent edition of Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846) or Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020), or the methods as specified in the attached Waste Analysis Plan, Attachment 2

D SECURITY

1 The permittee shall prevent the unknowing entry, and minimize the possibility for the unauthorized entry, of persons or livestock onto the active portion of the facility The permittee shall maintain security for the facility in the manner described in Attachment 3

2 The permittee shall post a sign with the legend, "Danger - Unauthorized Personnel Keep Out," at each entrance to any active portion of the facility, and at other locations, in sufficient numbers to be seen from any approach to the active portion The legend must be written in English and in any other language predominant in the area surrounding the facility, and must be legible from a distance of at least 25 feet

E GENERAL INSPECTION REQUIREMENTS

1 Inspections The permittee shall inspect the facility for malfunctions and deterioration, operator errors, and discharges which may be causing or may lead to (1) a release of hazardous waste or hazardous constituents to the environment or (2) a threat to human health The permittee shall inspect each listed item on the inspection form(s) in Attachment 4 The inspection type and frequency shall be in accordance with Attachment 4

2 Remedies The permittee shall remedy any deterioration or malfunction of equipment or structures which the inspection reveals on a schedule which ensures that the problem does not lead to an environmental or human health hazard Where a hazard is imminent or has already occurred, remedial action shall be taken immediately

3 Inspection Records The permittee shall record inspections in an inspection log or summary The permittee shall keep these records for at least five (5) years from the date of inspection At a minimum, these records shall include the date and time of the inspection, the name of the inspector, a notation of the observations made, and the date and nature of any repairs or other remedial actions The permittee may change the format and content of the inspection form(s) in Attachment 4 as deemed necessary to provide the information he needs to properly manage the facility Any deletion of information from such form(s), however, must be approved in advance, in writing, by the Commissioner as a modification to this permit

F PERSONNEL TRAINING

The permittee shall ensure that facility personnel successfully complete a program of classroom instruction and/or on-the-job training that teaches them to perform their duties in a way that ensures the permittee's compliance with this permit and the Tennessee Hazardous Waste Management Regulations The permittee shall ensure that the training program is directed by a person(s) trained in hazardous waste management procedures and shall include instruction which teaches facility personnel hazardous waste management procedures (including contingency plan implementation) relevant to the positions in which they are employed

1 Training Program The training program shall at least conform to the personnel training included in this subsection and Attachment 7 The permittee shall ensure that the training program is, at a minimum, designed to ensure that facility personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment, and emergency systems, including where applicable

(a) Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment,

(b) Key parameters for automatic waste feed cut-off systems,

(c) Communications or alarm systems,

(d) Response to fires or explosions,

(e) Response to groundwater contamination incidents, and

(f) Shutdown of operations

2 Timing Facility personnel shall successfully complete the program within six months after the date of their employment or assignment to the facility, or to a new position at the facility, whichever is later Untrained personnel shall not work in unsupervised positions until they have completed the training requirements of this permit

3 Annual Review Facility personnel shall take part in an annual review of the initial training required by this permit

4 Training Documents and Records The permittee shall maintain the following documents and records at the facility

(a) The job title for each position at the facility related to hazardous waste management, and the name of the employee(s) filling each job,

(b) A written description for each position listed in Subparagraph II F 4(a) above This description may be consistent in its degree of specificity with descriptions for other similar positions in the same company location or bargaining unit, but must include the requisite skill, education, or other qualifications, and duties of employees assigned to each position,

(c) A written description of the type and amount of both introductory and continuing training that will be given to each person filling a position listed under Subparagraph II F 4(a) above, and,

(d) Records that document that the training or job experience required under Paragraphs II F 1, 2 and 3 above has been given to, and completed by, facility personnel

5 Retention of Training Records Training records on current personnel shall be kept until closure of the facility, training records on former employees shall be kept for at least five (3) years from the date the employee last worked at the facility Personnel training records may accompany personnel transferred within the same company

G GENERAL REQUIREMENTS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTE

1 The permittee shall take precautions to prevent accidental ignition or reaction of ignitable or reactive waste This waste shall be separated and protected from sources of ignition or reaction including but not limited to open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, or mechanical), spontaneous ignition (e g , from heat producing chemical reactions), and radiant heat While ignitable or reactive waste is handled, the permittee shall confine smoking and open flames to specially designated locations "No smoking" signs shall be conspicuously placed wherever there is a hazard from ignitable or reactive waste

2 Where specifically required by this permit, the permittee that treats, stores or disposes of ignitable or reactive waste, or mixes incompatible waste or incompatible wastes and other materials, shall take precautions to prevent reactions which

(a) Generate extreme heat or pressure, fire or explosions, or violent reactions,

(b) Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment,

(c) Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions,

(d) Damage the structural integrity of the device or facility, or

(e) Through other like means threaten human health or the environment

3 When required to comply with Paragraph II G 1 or 2 above, the permittee shall document that compliance This documentation may be based on references to published scientific or engineering literature, data from trial tests (e g , bench scale or pilot scale tests), waste analyses, or the results of the treatment of similar wastes by similar treatment processes and under similar operating conditions

H PREPAREDNESS AND PREVENTION

1 Operation/Maintenance of the Facility The facility shall be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous constituents to air, soil, or surface water which could threaten human health or the environment

2 Required Equipment At a minimum, the permittee shall equip the facility with the equipment listed in the Contingency Plan, Attachment 5, and with the following

(a) An internal communications or alarm system capable of providing immediate emergency instruction (voice or signal) to facility personnel,

(b) A device, such as a telephone (immediately available at the scene of operations) or a hand-held two-way radio, capable of summoning emergency assistance from local police departments, fire departments, or State or local emergency response teams,

(c) Portable fire extinguishers, fire control equipment (including special extinguishing equipment, such as that using foam, inert gas, or dry chemicals), spill control equipment, and decontamination equipment, and

(d) Water at adequate volume and pressure to supply water hose streams, or foam producing equipment, or automatic sprinklers, or water spray systems

3 Testing and Maintenance of Equipment The permittee shall test and maintain all facility communications or alarm systems, fire protection equipment, spill control equipment, and decontamination equipment, as necessary to assure its proper operation in time of emergency

4 Access to Communications or Alarm Systems The permittee shall ensure that

(a) Whenever hazardous waste is being poured, mixed, spread, or otherwise handled, all personnel involved in the operation shall have immediate access to an internal alarm or emergency communication device, either directly or through visual or voice contact with another employee

(b) If there is ever just one employee on the premises while the facility is operating, he shall have immediate access to a device, such as a telephone (immediately available at the scene of operation) or a hand-held two-way radio, capable of summoning external emergency assistance

5 Required Aisle Space The permittee shall maintain aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of the facility operation in an emergency

6 Arrangements with Local Authorities

(a) The permittee shall attempt to make the following arrangements, as appropriate for the type of waste authorized to be managed by this permit and the potential need for the services of these organizations

(i) Arrangements to familiarize police, fire departments, and emergency response teams with the layout of the facility, properties of hazardous waste handled at the facility and associated hazards, places where facility personnel would normally be working, entrances to and roads inside the facility, and possible evacuation routes,

(ii) Where more than one police or fire department might respond to an emergency, agreements designating primary emergency authority to a specific police and a specific fire department, and agreements with any others to provide support to the primary emergency authority,

(iii) Arrangements with State emergency response teams, emergency response contractors, and equipment suppliers, and

(iv) Arrangements to familiarize local hospitals with the properties of hazardous wastes handled at the facility and the types of injuries or illnesses which could result from fires, explosions, or releases at the facility

(b) If State or local authorities decline to enter into such arrangements, the permittee shall document this refusal in the operating record

7 Unloading Operations Prevention of hazards at the container unloading (storage) area shall be accomplished by several means

(a) Hazardous waste received from off site at the facility shall be routed, within 24-hours, to the container unloading area, where the waste is to be unloaded by trained operations personnel

(b) Containers of hazardous waste shall be checked for proper closure, labeling, and proper placement prior to unloading

(c) Operational equipment (fork-lift trucks, straps, etc) shall be properly maintained to prevent the occurrence of a spill or release of hazardous waste due to equipment malfunctions

(d) The unloading area shall be checked prior to use for potential hazards due to aisle space obstructions, for improper container management practices, and for cleanliness

(e) The container unloading operations shall take place within the container storage area, which is a covered area and is well lit

I **CONTINGENCY PLAN** The permittee shall have a Contingency Plan for the facility

1 Purpose of the Contingency Plan The Contingency Plan, contained in this permit as Attachment 5, shall, at all times, be designed to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water

2 Implementation of Plan(s) The permittee shall immediately carry out the provisions of the Contingency Plan, Attachment 5, whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which threatens or could threaten human health or the environment

3 Content of the Contingency Plan

(a) The Contingency Plan, Attachment 5, shall accurately describe the actions facility personnel must take to comply with Paragraphs II I 1 and 2 above and Paragraph II I 7 below in response to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents which could threaten human health or the environment

(b) The Contingency Plan, Attachment 5, shall accurately describe arrangements agreed to by local police departments, fire departments, hospitals, contractors, and State and local emergency response teams to coordinate emergency services, pursuant to Paragraph II H 6

(c) The Contingency Plan, Attachment 5, shall list names, addresses, and phone numbers (office and home) of all persons qualified to act as emergency coordinator (see Paragraph II I 6), and this list must be kept up to date Where more than one person is listed, one must be named as primary emergency coordinator and others must be listed in the order in which they will assume responsibility as alternates For new facilities, this information must be supplied to the Commissioner at the time of certification

(d) The Contingency Plan, Attachment 5, shall include a list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems (internal and external), and decontamination equipment), where this equipment is required This list must be kept up to date In addition, the Contingency Plan, Attachment5, shall include the location and a physical description of each item on the list, and a brief outline of its capabilities

(e) The Contingency Plan, Attachment 5, shall include an evacuation plan for facility personnel where there is a possibility that evacuation could be necessary This evacuation plan shall describe signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes (in cases where the primary routes could be blocked by releases of hazardous waste or fires)

4 Copies of Plan The permittee shall maintain at the facility a copy of the Contingency Plan, Attachment 5, and its subsequent revisions In addition, the Contingency Plan and all revisions to the plan shall be submitted to all local police departments, fire departments, hospitals, and State and local emergency response teams that may be called upon to provide emergency services

5 Amendments to Plan(s) The permittee shall review and immediately amend the Contingency Plan(s) whenever one or more of the following occur

(a) This permit is revised,

(b) The Contingency Plan fails in an emergency,

(c) The facility changes - in its design, construction, operation, maintenance, or other circumstances - in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous constituents, or changes the response necessary in an emergency,

(d) The list of emergency coordinators changes, or

(e) The list of emergency equipment changes

6 Emergency Coordinator There shall be, at all times, at least one employee either on the facility premises or on call (i e , available to respond to an emergency by reaching the facility within a short period of time) with the responsibility for coordinating all emergency response measures This emergency coordinator shall be thoroughly familiar with all aspects of the facility's Contingency Plan, all operations and activities at the facility, the location and characteristics of waste(s) handled, the location of all records within the facility, and the facility layout In addition, this person must have the authority to commit the resources needed to carry out the Contingency Plan

7 Emergency Procedures

(a) Whenever there is an imminent or actual emergency situation, the emergency coordinator (or his designee when the emergency coordinator is on call) must immediately

(i) Activate internal facility alarms or communication systems, where applicable, to notify all facility personnel, and

(ii) Notify appropriate State or local agencies with designated response roles if their help is needed

(b) Whenever there is a release, fire, or explosion, the emergency coordinator must immediately identify the character, exact source, amount, and areal extent of any released materials He may do this by observation or review of facility records or manifests, and, if necessary, by chemical analysis

(c) Concurrently, the emergency coordinator must assess possible hazards to human health or the environment that may result from the release, fire, or explosion This assessment must consider both direct and indirect effects of the release, fire, or explosion (e g , the effects of any toxic, irritating, or asphyxiating gases that are generated, or the effects of any hazardous surface water run-off from water or chemical agents used to control fire and heat-induced explosions)

(d) If the emergency coordinator determines that the facility has had a release, fire, or explosion which could threaten human health, or the environment, outside the facility, he must report his findings as follows

(i) If his assessment indicates that evacuation of local areas may be advisable, he must immediately notify appropriate local authorities He must be available to help appropriate officials decide whether local areas should be evacuated, and

(ii) He must immediately notify the Tennessee Emergency Management Agency (using their 24-hour toll free number 800/262-3300) and/or the National Response Center (using their 24-hour toll free number 800/424-8802) The report must include

(I) Name and telephone number of reporter,

(II) Name and address of facility,

(III) Time and type of incident (e g , release, fire),

(IV) Name and quantity of material(s) involved, to the extent known,

(V) The extent of injuries, if any, and

(VI) The possible hazards to human health, or the environment, outside the facility

(e) During an emergency, the emergency coordinator must take all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other hazardous waste at the facility These measures must include, where applicable, stopping processes and operations, collecting and containing release waste, and removing or isolating containers

(f) If the facility stops operations in response to a fire, explosion, or release, the emergency coordinator must monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, wherever this is appropriate

(g) Immediately after an emergency, the emergency coordinator must provide for treating, storing, or disposing of recovered waste,

contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the facility

(h) The emergency coordinator must ensure that, in the affected area(s) of the facility

(i) No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed, and

(ii) All emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use before operations are resumed

(i) The permittee shall note in the operating record the time, date, and details of any incident that requires implementing the Contingency Plan Within 15 days after the incident, he shall submit a written report on the incident to the Commissioner The report must include

(i) Name, address, and telephone number of the owner or operator,

(ii) Name, address, and telephone number of the facility,

(iii) Date, time, and type of incident (e g , fire, explosion),

(iv) Name and quantity of material(s) involved,

(v) The extent of injuries, if any,

(vi) An assessment of actual or potential hazards to human health or the environment, where this is applicable, and

(vii) Estimated quantity and disposition of recovered material that resulted from the incident

J MANIFEST SYSTEM

1 Use of the Manifest System

(a) If a facility receives hazardous waste accompanied by a manifest, the permittee or his agent must sign and date the manifest as indicated in Subparagraph II J 1(b) to certify that the hazardous waste covered by the manifest was received, that the hazardous waste was received except as noted in the discrepancy space of the manifest, or that the hazardous waste was rejected as noted in the manifest discrepancy space

(b) If a facility receives a hazardous waste shipment accompanied by a manifest, the permittee or his agent must

(i) Sign and date, by hand, each copy of the manifest,

(ii) Note any discrepancies (as defined in Subparagraph II J 5(a)) on each copy of the manifest,

(iii) Immediately give the transporter at least one copy of the manifest,

(iv) Within 30 days of delivery, send a copy of the manifest to the generator, and

(v) Retain at the facility a copy of each manifest for at least five (5) years from the date of delivery

(c) If a facility receives hazardous waste imported from a foreign source, the receiving facility must mail a copy of the manifest to the following address within 30 days of delivery International Compliance Assurance Division, OFA/OECA (2254A), U S Environmental Protection Agency, Ariel Rios Building, 1200 Pennsylvania Avenue, NW, Washington, DC 20460

2 Bulk Shipments If a facility receives, from a rail or water (bulk shipment) transporter, hazardous waste which is accompanied by a shipping paper containing all the information required on the manifest (excluding the installation identification numbers, generator's certification, and signatures), the permittee, or his agent, shall

(a) Sign and date each copy of the manifest or shipping paper (if the manifest has not been received) to certify that the hazardous waste covered by the manifest or shipping paper was received,

(b) Note any significant discrepancies (as defined in Subparagraph II J 5(a) below) on each copy of the manifest or shipping paper,
(Note The Department does not intend that the permittee whose procedures under Subparagraph II C 2(c) include waste analysis must perform that analysis before signing the shipping paper and giving it to the transporter Subparagraph II J 5(b) below, however, requires reporting an unreconciled discrepancy discovered during later analysis)

(c) Immediately give the rail or water (bulk shipment) transporter at least one copy of the manifest or shipping paper (if the manifest has not been received),

(d) Within 30 days after the delivery, send a copy of the signed and dated manifest or a signed and dated copy of the shipping paper (if the manifest has not been received within 30 days after delivery) to the generator, and

(e) Retain at the facility a copy of the manifest and shipping paper (if signed in lieu of the manifest at the time of delivery) for at least five (5) years from the date of delivery

3 Initiating a Shipment Whenever a shipment of hazardous waste is initiated from a facility, the permittee shall comply with the manifesting requirements of Rule 1200-01-11- 03, except for Rule 1200-01-11- 03(4)(e), applicable to the on-site accumulation of hazardous waste by generators The provisions of Rule 1200-

01-11- 03(4)(e) only apply to owners or operators who are shipping hazardous waste which they generated at that facility

4 A facility must determine whether the consignment state for a shipment regulates any additional wastes (beyond those regulated Federally) as hazardous wastes under its state hazardous waste program Facilities must also determine whether the consignment state or generator state requires the facility to submit any copies of the manifest to these states

5 Manifest Discrepancies

(a) Manifest discrepancies are

(i) Significant differences (as defined by Subparagraph II J 5 (b)) between the quantity or type of hazardous waste designated on the manifest or shipping paper, and the quantity and type of hazardous waste a facility actually receives,

(ii) Rejected wastes, which may be a full or partial shipment of hazardous waste that the TSDF cannot accept, or

(iii) Container residues, which are residues that exceed the quantity limits for "empty" containers set forth in Rule 1200-01-11-02(1)(g)2

(b) Significant differences in quantity are for bulk waste, variations greater than 10 percent in weight, and for batch waste, any variation in piece count, such as a discrepancy of one drum in a truckload Significant differences in type are obvious differences which can be discovered by inspection or waste analysis, such as waste solvent substituted for waste acid, or toxic constituents not reported on the manifest or shipping paper

(c) Upon discovering a significant difference in quantity or type, the permittee must attempt to reconcile the discrepancy with the waste generator or transporter (e g , with telephone conversations) If the discrepancy is not resolved within 15 days after receiving the waste, the permittee must immediately submit to the Commissioner a letter describing the discrepancy and attempts to reconcile it, and a copy of the manifest or shipping paper at issue

(d) (i) Upon rejecting waste or identifying a container residue that exceeds the quantity limits for "empty" containers set forth in Rule 1200-01-11- 02(1)(g)2, the permittee must consult with the generator prior to forwarding the waste to another facility that can manage the waste If it is impossible to locate an alternative facility that can receive the waste, the permittee may return the rejected waste or residue to the generator The permittee must send the waste to the alternative facility or to the generator within 60 days of the rejection of the container residue identification

(ii) While the permittee is making arrangements for forwarding rejected wastes or residues to another facility, the permittee must ensure that either the delivering transporter retains custody of the waste, or the permittee must provide for secure, temporary custody of the waste, pending delivery of the waste to the first transporter designated on the manifest prepared under Rule 1200-01-11- 06(5)(c)5 or 6

(iii) If a facility rejects a waste or identifies a container residue that exceeds the quantity limits for "empty" containers set forth in Rule 1200-01-11- 02(1)(g)2 after it has been signed, dated, and returned a copy of the manifest to the delivering transporter or to the generator, the permittee must follow Rule 1200-01-11- 06(5)(c)7

K RECORDKEEPING AND REPORTING

The permittee shall keep a written operating record at the facility

1 Operating Record The following information shall be recorded by the permittee, as it becomes available, and maintained in the operating record for five (5) years unless noted as follows

(a) A description and the quantity of each hazardous waste received and the method(s) and date(s) of its treatment, storage, or disposal at the facility as required by Rule 1200-01-11- 06(57), Appendix I This information must be maintained in the operating record until closure of the facility,

(b) The location of each hazardous waste within the facility and the quantity at each location This information shall include cross-references to specific manifest document numbers if the waste was accompanied by a manifest This information must be maintained in the operating record until closure of the facility,

(c) Records and results of waste analysis and waste determinations performed as specified in Subsections II C, II G, II O, II P, II Q, and II R,

(d) Summary reports and details of all incidents that require implementing the Contingency Plan as required by Subparagraph II I 7(i),

(e) Records and results of inspections required by Paragraph II E 3,

(f) Monitoring, testing or analytical data, and corrective action where required by Sections III, IV, V, and subsection II P, II Q, and II R Maintain in the operating record for five (5) years, except for records and results pertaining to groundwater monitoring and cleanup, which must be maintained in the operating record until closure of the facility,

(g) For off-site facilities, notices to generators as required by Paragraph I H 2,

(h) All closure cost estimates as required by Subsection II N This information must be maintained in the operating record until closure of the facility,

(i) A certification by the permittee no less often than annually, that the permittee has a program in place to reduce the volume and toxicity of hazardous waste that he generates to the degree determined by the permittee to be economically practicable, and the proposed method of treatment, storage or disposal is that practicable method currently available to the permittee which minimizes the present and future threat to human health and the environment

(j) For an off-site treatment facility, a copy of the notice, and the certification and demonstration, if applicable, required by the generator or the owner or operator under Rule 1200-01-11- 10(1)(g) or (h),

(k) For an on-site treatment facility, the information contained in the notice (except the manifest number), and the certification and demonstration if applicable, required by the generator or the owner or operator under Rule 1200-01-11- 10(1)(g) or (h),

(l) For an off-site storage facility, a copy of the notice, and the certification and demonstration if applicable, required by the generator or the owner or operator under Rule 1200-01-11- 10(1)(g) or (h),

(m) For an on-site storage facility, the information contained in the notice (except the manifest number), and the certification and demonstration if applicable, required by the generator or the owner or operator under Rule 1200-01-11- 10(1)(g) or (h),

(n) Any records required under Rule 1200-01-11- 06(1)(b)9(xiii), and,

(o) Certifications as required by Rule 1200-01-11- 06(10)(g)6, if applicable, must be maintained in the operating record until closure of the facility

2 Availability, Retention, and Disposition of Records

(a) All records, including plans, required by this permit shall be furnished upon request, and made available at all reasonable times for inspection, by any officer, employee, or representative of the Department who is duly designated by the Commissioner

(b) The retention period for all records required under this permit is extended automatically during the course of any unresolved enforcement action regarding the facility or as requested by the Commissioner

3 Unmanifested Waste Report

If a facility accepts for treatment, storage, or disposal any hazardous waste from an off-site source without an accompanying manifest, or without an accompanying shipping paper (bulk shipments) as described in Rule 1200-01-11-04(3)(a)5(ii), and if the waste is not excluded from the manifest requirement by

Rule 1200-01-11- 02(1)(e) (conditionally exempt small quantity generators), then the permittee shall prepare and submit a single copy of a letter to the Commissioner within 15 days after receiving the waste The unmanifested waste report must be submitted on EPA Form 8700-13B Such report shall be designated "Unmanifested Waste Report" and include the following information

(a) The EPA identification number, name, and address of the facility,

(b) The date the facility received the waste,

(c) The EPA identification number, name, and address of the generator and the transporter, if available,

(d) A description and the quantity of each unmanifested hazardous waste the facility received,

(e) The method of treatment, storage, or disposal for each hazardous waste,

(f) The certification signed by the permittee or his authorized representative, and

(g) A brief explanation of why the waste was unmanifested, if known

4 Annual Report

(a) The permittee shall prepare and submit a single copy of an annual report to the Commissioner by March 1 of each year

(b) Annual reports shall be submitted on forms provided by the Department and in accordance with the instructions accompanying the form

(c) The annual report shall cover facility activities during the previous calendar year and shall include the following information

(i) The EPA identification number, name, and address of the facility,

(ii) The calendar year covered by the report,

(iii) For off-site facilities, the EPA identification number of each hazardous waste generator from which the facility received a hazardous waste during the year, for imported shipments, the report shall give the name and address of the foreign generator,

(iv) A description and the quantity of each hazardous waste the facility received during the year For off-site facilities, this information shall be listed by EPA identification number of each generator,

(v) The method of treatment, storage or disposal for each hazardous waste,

(vi) The most recent closure cost estimate as required by Paragraphs II N 2 and 3,

(vii) For generators who treat, store, or dispose of hazardous waste on-site, a description of the efforts undertaken during the year to reduce the volume and toxicity of waste generated,

(viii) For generators who treat, store, or dispose of hazardous waste on-site, a description of the changes in volume and toxicity of waste actually achieved during the year in comparison to previous years to the extent such information is available for the years prior to 1984, and

(ix) The certification signed by the permittee or his authorized representative

5 Additional Reports In addition to submitting unmanifested waste reports and the annual report required by Paragraphs II K 3 and 4, the permittee shall also report to the Commissioner

(a) Releases, fires, and explosions as specified by Subparagraph II I 7(j), and Attachment 5

(b) Facility closures as required by Paragraph II L 7, and

(c) As otherwise required by groundwater monitoring and Subsections II P, II Q, and II R

L CLOSURE

1 Performance Standard

(a) The permittee shall close the facility in a manner that

(i) Minimizes the need for further maintenance, and

(ii) Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere

(b) The permittee shall close the facility in accordance with the Closure Plan, Attachment 6

2 Amendment to Closure Plan(s) The permittee shall submit a written notification of or request for a permit modification to authorize a change in operating plans, facility design, or the approved Closure Plan in accordance with the procedures in Rule 1200-01-11- 07(9) The written notification or request shall include a copy of the amended Closure Plan for review or approval by the Commissioner

(a) The permittee may submit a written notification or request to the Commissioner for a permit modification to amend the Closure Plan(s) at any time prior to the notification of partial or final closure of the facility

(b) The permittee shall submit a written notification of or request for a permit modification to authorize a change in the approved Closure Plan whenever

(i) Changes in operating plans or facility design affect the Closure Plan, or

(ii) There is a change in the expected year of closure, if applicable, or

(iii) In conducting partial or final closure activities, unexpected events require a modification of the approved Closure Plan

(c) The permittee shall submit a written request for a permit modification including a copy of the amended Closure Plan for approval at least 60 days prior to the proposed change in facility design or operation, or no later than 60 days after an unexpected event has occurred which has affected the Closure Plan If an unexpected event occurs during the partial or final closure period, the permittee shall request a permit modification no later than 30 days after the unexpected event The Commissioner will approve, disapprove, or modify this amended plan in accordance with the procedures in Rule 1200-01-11- 07(9) The modified Closure Plan, when approved, will become a condition of this permit

(d) The Commissioner may request modification to the plan under the conditions described in Subparagraph II L 2(b) The permittee shall submit the modified plan within 60 days of the Commissioner's request, or within 30 days if the change in facility conditions occurs during partial or final closure Any modifications requested by the Commissioner will be approved in accordance with the procedures in Rule 1200-01-11- 07(9)

3 <u>Notification of Partial and Final Closure</u>

(a) The permittee shall notify the Commissioner in writing at least 45 days prior to the date on which he expects to begin final closure of the facility

(b) The date when he "expects to begin closure" must be no later than 30 days after the date on which any hazardous waste management unit receives the known final volume of hazardous waste or, if there is a reasonable possibility that the hazardous waste management unit will receive additional hazardous waste, no later than one year after the date on which the unit received the most recent volume of hazardous waste If the permittee can demonstrate to the Commissioner that the hazardous waste management unit or facility has the capacity to receive additional hazardous wastes and he has taken all steps to prevent threats to human health and the environment, including compliance with all applicable permit requirements, the Commissioner may approve an extension to this one-year limit

(c) Notification of closure is not required, if the permit is terminated or the facility is otherwise ordered, by judicial decree or final order under the Act, to cease receiving hazardous wastes or to close However, the permittee shall close the facility in accordance with the deadlines established in Paragraph II L 5 below

4 Removal of Wastes and Decontamination or Dismantling of Equipment Nothing in this subsection (II L) of the permit shall preclude the permittee from removing hazardous wastes and decontaminating or dismantling equipment in accordance with the approved partial or final Closure Plan at any time before or after notification of partial or final closure

5 Time Allowed For Closure

(a) Within 90 days after receiving the final volume of hazardous wastes at a hazardous waste management unit or facility, the permittee shall treat, remove from the unit or facility, or dispose of on-site, all hazardous waste in accordance with the approved Closure Plan, Attachment 6 The Commissioner may approve a longer period if the permittee complies with all applicable requirements for requesting a modification to the permit and demonstrates that

(i) (I) The activities required to comply with Subparagraph II L 5(a) above will, of necessity, take longer than 90 days to complete, or

(II) (A) The hazardous waste management unit or facility has the capacity to receive additional hazardous wastes,

(B) There is a reasonable likelihood that he or another person will recommence operation of the hazardous waste management unit or the facility within one year, and

(C) Closure of the hazardous waste management unit or facility would be incompatible with continued operation of the site, and

(ii) He has taken and will continue to take all steps to prevent threats to human health and the environment, including compliance with all applicable permit requirements

(b) The permittee shall complete partial and final closure activities in accordance with the approved Closure Plan, Attachment 6, and within 180 days after receiving the final volume of hazardous wastes at the hazardous waste management unit or facility The Commissioner may approve an extension to the closure period if the permittee complies with all applicable requirements for requesting a modification to the permit and demonstrates that

(i) (I) The partial or final closure activities will, of necessity, take longer than 180 days to complete, or

(II) (A) The hazardous waste management unit or facility has the capacity to receive additional hazardous wastes,

(B) There is a reasonable likelihood that he or another person will recommence operation of the hazardous waste management unit or the facility within one year, and

(C) Closure of the hazardous waste management unit or facility would be incompatible with continued operation of the site, and

(ii) He has taken and will continue to take all steps to prevent threats to human health and the environment from the unclosed but not operating hazardous waste management unit or facility, including compliance with all applicable permit requirements

(c) The demonstrations referred to in Subparagraphs II L 5(a) and (b) above shall be made as follows

(i) The demonstration in Subparagraph II L 5(a) above shall be made at least 30 days prior to the expiration of the 90-day period in Subparagraph II L 5(a), and

(ii) The demonstration in Subparagraph II L 5(b) above shall be made at least 30 days prior to the expiration of the 180-day period in Subparagraph II L 5(b)

6 Disposal or Decontamination of Equipment, Structures, and Soils During the partial and final closure periods, all contaminated equipment, structures and soils shall be properly disposed of or decontaminated, unless otherwise specified in the approved Closure Plan, Attachment 6 By removing any hazardous wastes or hazardous constituents during partial or final closure, the permittee may become a generator of hazardous waste and, if so, must handle that hazardous waste in accordance with all applicable requirements of Rule 1200-01-11- 03

7 Certification of Closure Within 60 days of completion of final closure, the permittee shall submit to the Commissioner, by registered mail, at least 4 copies of a certification that the hazardous waste management unit or facility, as applicable, has been closed in accordance with the specifications in the approved Closure Plan Attachment 6 The certification shall be signed by the permittee and by a Qualified Professional Engineer Documentation supporting the Qualified Professional Engineer certification shall be furnished to the Commissioner upon request until he releases the permittee from the financial assurance requirements for closure as required by Subparagraph II N 6(d)

M **CO-MANAGEMENT OF OTHER MATERIALS.** The permittee shall not treat, store, or dispose of other wastes or other materials along with hazardous waste in any hazardous waste management unit or facility covered by this permit unless

1 The other waste or other material is labeled, marked, or otherwise clearly identifiable as to what it is,

2 The permittee is able to demonstrate that the other waste or other material is not a hazardous waste, and

3 The other waste or other material is managed in a manner that does not adversely impact compliance with the conditions of this permit

N **FINANCIAL REQUIREMENTS.** State and federal government are exempt from the requirements of subsection II N

O **LAND DISPOSAL RESTRICTIONS**

1 Tennessee Rule 1200-01-11- 10 identifies hazardous wastes that are prohibited from land disposal and defines those limited circumstances under which an otherwise prohibited waste may continue to be placed in a land treatment, storage or disposal unit The permittee shall comply with all applicable requirements of Rule 1200-01-11- 10 Where the permittee has applied for an extension, waiver or variance under Rule 1200-01-11- 10, the permittee shall comply with all applicable restrictions of Rule 1200-01-11- 10 pending final approval of such application

2 A restricted waste identified in Rule 1200-01-11- 10(2) may not be placed in a land disposal unit without further treatment unless the requirements of Rule 1200-01-11- 10(2) and/or Rule 1200-01-11- 10(3) are met

3 The storage of hazardous waste restricted from land disposal under Rule 1200-01-11- 10 is prohibited unless the requirements of Rule 1200-01-11- 10(4) are met

P **AIR EMISSION STANDARDS FOR PROCESS VENTS**

1 The permittee shall comply with the requirements of Rule 1200-01-11- 06(30) for all process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations that manage hazardous waste with organic concentrations of at least 10 ppmw, if these operations are conducted in hazardous waste management units subject to this permit and in any on-site hazardous waste recycling unit

2 To show that a process vent associated with a hazardous waste distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operation is not subject to the requirements of Paragraph II P 1, the permittee shall make an initial determination that the time-weighted, annual average total organic concentration of the waste managed by the hazardous waste management unit is less than 10 ppmw using one of the following two methods

(a) Direct measurement of the organic concentration of the waste using the following procedures

(i) The permittee shall take a minimum of four grab samples of waste for each waste stream managed in the affected unit under process conditions expected to cause the maximum waste organic concentration

(ii) For waste generated on-site, the grab samples shall be collected at a point before the waste is exposed to the atmosphere such as in an enclosed pipe or other closed system that is used to transfer the waste after generation to the first affected distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operation For waste generated off-site, the grab samples shall be collected at the inlet to the first waste management unit that receives the waste provided the waste has been transferred to the facility in a closed system such as a tank truck and the waste is not diluted or mixed with other waste

(iii) Each sample shall be analyzed and the total organic concentration of the sample shall be computed using Method 9060 of SW-846 (Rule 1200-01-11- 01(2)(b))

(iv) The arithmetic mean of the results of the analyses of the four samples shall apply for each waste stream managed in the unit in determining the time-weighted, annual average total organic concentration of the waste The time-weighted average is to be calculated using the annual quantity of each waste stream processed and the mean organic concentration of each waste stream managed in the unit

(b) Using knowledge of the waste to determine that its total organic concentration is less than 10 ppmw Documentation of the waste determination is required Examples of documentation that shall be used to support a determination under this provision include production process information documenting that no organic compounds are used, information that the waste is generated by a process that is identical to a process at the same or another facility that has previously been demonstrated by direct measurement to generate a waste stream having a total organic content less than 10 ppmw, or prior speciation analysis results on the same waste stream where it can also be documented that no process changes have occurred since that analysis that could affect the waste total organic concentration

3 The determination that distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations manage hazardous wastes with time-weighted, annual average total organic concentrations less than 10 ppmw shall be made as follows

(a) By the effective date that the facility becomes subject to the provisions of Subsection II P or by the date when the waste is first managed in a waste management unit, whichever is later, and

(b) For continuously generated waste, annually, or

(c) Whenever there is a change in the waste being managed or a change in the process that generates or treats the waste

4 When the permittee and the Commissioner do not agree on whether a distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operation manages a hazardous waste with organic concentrations of at least 10 ppmw based on knowledge of the waste, the procedures in Method 8260 of SW-846 (Rule 1200-01-11- 01(2)(b)) may be used to resolve the dispute

Q. AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

The permittee shall comply with the requirements of Rule 1200-01-11- 06(31) for all equipment that contains or contacts hazardous waste with organic concentrations of at least 10 percent by weight that are managed in units that are subject to this permit or in any on-site hazardous waste recycling unit

R ORGANIC AIR EMISSION STANDARDS

1 Applicability

(a) Rule 1200-01-11- 06(32) applies to all tanks, containers, and miscellaneous units identified in this permit, except as provided for in Rule 1200-01-11- 06(1)(b) and Rule 1200-01-11- 06(32)(a)2

(b) The conditions of this subsection apply to hazardous waste management units identified in this permit for which required control equipment has been installed and is operational

2 Emission Control Technology The permittee shall install and maintain all regulated units and associated emission control technology in accordance with the detailed plans, schedules, information and reports as contained in Attachments 2 and 8

3 General Standards The permittee shall comply with the applicable requirements of Rule 1200-01-11- 06(32) If the organic air emission control equipment is not installed and operational by December 6, 1996, the permittee is required to submit a Schedule for Implementation in accordance with Rule 1200-01-11- 05(29)(c) The Schedule for Implementation shall indicate that the organic air emission control equipment be installed and operational as soon as possible, but no later than December 8, 1997 for units subject to Rule 1200-01-11- 06(32), except controls on tanks used for stabilization, and June 8, 1998 for tanks used for stabilization that are subject to Rule 1200-01-11- 06(32) The permittee shall comply with Rule 1200-01-11- 05(29) until such time the organic air emission control equipment is installed and operational Upon approval of the final organic

air emissions control option, this permit will be modified in accordance with Rule 1200-01-11- 07(9)(c)5

4 Reporting Requirements

(a) For each tank, container or miscellaneous unit which manages hazardous waste that is exempted from using air emission controls, a written report shall be submitted to the Division Director within fifteen (15) days of each occurrence when hazardous waste is placed in the waste management unit in noncompliance with the conditions of Rule 1200-01-11- 06(32)(c)3(i) or (ii), as applicable The written report shall contain the EPA identification number, facility name and address, a description of the noncompliance event and the cause, the dates of the noncompliance, and the actions taken to correct the noncompliance and prevent reoccurrence of the noncompliance

(b) For tanks listed in Subparagraph II R 1(b), which use air emission controls in accordance with the requirements of Rule 1200-01-11- 06(32)(e)3, a written report shall be submitted to the Division Director within 15 days of each occurrence when hazardous waste is managed in the tank in noncompliance with the conditions specified in Rules 1200-01-11- 06(32)(e)3(i) through (iv) The written report shall contain the EPA identification number, facility name and address, a description of the noncompliance event and the cause, the dates of the noncompliance, and the actions taken to correct the noncompliance and prevent reoccurrence of the noncompliance

(c) For control devices used in accordance with the requirements of Rule 1200-01-11- 06(32)(h), a semiannual written report shall be submitted to the Division Director except as provided for in Subparagraph II R 4(d) The report shall describe each occurrence during the previous 6-month period when a control device is operated continuously for 24 hours or longer in noncompliance with the applicable operating values defined in Rule 1200-01-11- 06(30)(f)3(iv) or when a flare is operated with visible emissions for 5 minutes or longer in a two-hour period, as defined in Rule 1200-01-11- 06(30)(d)4 The written report shall include the EPA identification number, facility name and address, and an explanation why the control device could not be returned to compliance within 24 hours, and actions taken to correct the noncompliance

(d) A report to the Division Director in accordance with the requirements of Subparagraph II R 4(c) is not required for a 6-month period during which all control devices subject to Rule 1200-01-11- 06(32) are operated by the permittee such that during no period of 24 hours or longer did a control device operate continuously in noncompliance with the applicable operating values defined in Rule 1200-01-11- 06(30)(f)3(iv) or a flare operate with visible emissions for 5 minutes or longer in a two-hour period, as defined in Rule 1200-01-11- 06(30)(d)4

(e) All reports shall be signed and dated by an authorized representative of the permittee as per Rule 1200-01-11- 07(2)(a)8

5 Notification of New Units Prior to installing any tank, container, surface impoundment, or miscellaneous unit subject to Rule 1200-01-11- 06(32) or modifying an existing process handling waste in tanks or containers, such that the unit(s) will become subject to Rule 1200-01-11- 06(32), the permittee shall apply for a permit modification under Rule 1200-01-11- 07(9)(c)5, and provide specific Part B application information required under Rules 1200-01-11- 07(5)(a) through 07(5)(b)3 and Rule 1200-01-11- 07(5)(b)13, as applicable, with the modification request

S RESTRICTION ON OWNERSHIP OF THE FACILITY

No person who has been convicted of any felony or has been convicted of a misdemeanor for the unlawful storage, treatment, or disposal of hazardous waste may, at any time, be the legal or beneficial owner of ten percent (10%) or more of the stock of the facility

EPA Identification Number TN5 21 002 0421
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III SPECIFIC CONDITIONS FOR TREATMENT OF ENERGETIC WASTES IN BURN PANS

A APPLICABILITY

The permittee shall comply with this permit including Section I, Standard Conditions, Section II, General Facility Conditions and this Section III, Specific Conditions for Treatment by Open Burning in the burn pan units for Treating hazardous wastes

B WASTE IDENTIFICATION

1 Only hazardous wastes that have explosive characteristics of reactivity (EPA Hazardous Waste Code DOO3, DO30, and KO44) are allowable for open burn (OB) treatment Specifically, these explosive reactivity definitions are specified in Tennessee Rule 1200-01-11- 02(3)(d) as follows

(a) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement

(b) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure

(c) It is forbidden explosive as defined in Tennessee Rule 1200-01-11-02(3)(d), or a Class A explosive as defined in 49CFR 173 53 or a Class B explosive as defined in 49 CFR 173 88

2 Wastes generated off-site from material manufactured by the permittee, generated only at a site or sites owned or operated by the permittee, or subsidiaries of permittee, or product distribution sites under contact to the permittee, provided that the volume of hazardous waste received from such sites to be treated at the burn pans does not exceed ten percent (10%) of the permitted volume, and burn capacity at the facility, and provided that during no annual period may more than ten (10%) of the total hazardous waste treated or disposed at the facility be from such sites

C. UNIT DESIGN

1 The permittee may treat the following hazardous wastes by open burning in the burn pan units only, subject to the terms of this permit and as described below

Number Of Units	Type of Units	Description Of Unit	Description of Hazardous Waste	Authorized Hazardous Waste Codes	Maximum* Allowed Daily Quantity
4	Burn Pan with Cover	¼-inch-thick, seam-welded steel pan 4 feet 10 inches wide by 20 feet long by 1 foot deep	Explosive and reactive	D003 D030 K044	1500 lbs NEW each pan per day
*Total Maximum quantity allowed for the 4 burn pans is 5000 lb NEW per day					

[NEW – Net Explosive Weight]

2 The permittee is limited to treat no more than 5,000 pounds net explosive weight (NEW) per day The permittee is limited to treat a maximum of 1,500 pounds of net explosive weight of hazardous waste in any one (1) pan (The total not to exceed the 5,000 pounds daily limit with a maximum of one (1) burn per day)

3 Based on a treatment schedule of 5 days per week, 50 weeks per year, the permittee is allowed to treat a maximum of 1,250,000 pounds net explosive weight of hazardous waste annually

D. PROHIBITED

1 The permittee is prohibited from treating hazardous waste that is not identified in this permit

2 The permittee is prohibited from treating wholly inert items and improvised explosive devices (e g homemade bombs which are non-military), chemical and nuclear weapons, their devices and components and military munitions, propellant or residues that contain free liquids

3 The permittee is not allowed to act as a commercial facility as defined by Tennessee Rule 1200-01-14

4 Open burning of hazardous waste is prohibited except for the open burning of waste explosives Waste explosives include waste, which has the potential to detonate and bulk military propellants, which cannot safely be disposed of through other modes of treatment Owner or operators choosing to open burn waste explosive must do so in a manner that does not threaten human health or the environment

5 The permittee is prohibited from treating hazardous waste within 530 meters (1,730 feet) from the property of others

E MONITORING REQUIREMENT

1 The permittee must conduct at a minimum, the following monitoring to verify that the operating requirements in the permit do achieve the performance standards temperatures, wind direction, speed, relative humidity, barometric pressure, sky condition, etc The permittee shall inspect any such related equipment visually prior to burns to verify operability

2 The permittee shall maintain, calibrate, and operate process monitoring, control, and recording equipment as specified in Attachment 8 of this permit, while treating hazardous waste

3 Hazardous waste shall not be placed in the miscellaneous units if any of the monitoring instruments fail to operate properly In the event of a malfunction of monitoring equipment, weather conditions will be obtained from the National Oceanic and Atmospheric Administration (NOAA) "

4 The permittee shall keep on file at the facility the written assessments of each hazardous waste miscellaneous units integrity and suitability for handling hazardous waste, until such time that the permited unit(s) are certified and closed in accordance with this permit

5 The permittee shall maintain at the facility record of the results of leak tests and integrity tests conducted

6 In the event that a hazardous waste miscellaneous unit exceeds the maximum allowable capacity designated for that unit this permit, the permittee shall document in the operating record, and notify the commissioner as required by this permit, the following information

(a) The date and time of occurrence,

(b) Identification of the unit,

(c) Identification of the person causing the incident, why it happened, and what action is taken to stop it from happening in the future?

F OPERATING REQUIREMENT

The permittee shall comply with the following requirements prior to thermal treatment

1 Open burning shall not occur whenever any of the following meteorological conditions are present or reasonably expected to occur during thermal treatment

(a) Precipitations, rain, thunderstorms, or lightning

(b) Additional meteorological conditions (air pollution episodes, inversions overcast sky)

(c) Restricted visibility (dense fog, blowing snow, or dust

(d) Low, overcast sky

(e) Air pollution stagnation advisories

(f) Ozone advisory alert

(g) The Wind speeds not greater than 15 miles per hour (mph)

2 Open burning treatment shall take place during daylight hours after 1200 hours and before 1600 hours, local times, Monday through Friday

3 All of the hazardous waste destined for thermal treatment shall be collected, transported, placed on the burn pan(s) and treated in accordance with the instructions listed in Attachment 8 of the permit

4 On the day of each scheduled thermal treatment event the permittee shall

(a) Verify and record the meteorological conditions on the forms

(b) Inspect the burn pan area for hot spots or cracks

(c) Inspect burn pans and covers for any rusted spot or hole (before and after each operation)

(d) Remove all unauthorized personnel and vehicles within 1250 feet radius of the perimeter of the burn pans

(e) Maintain written records of all of the information observed per the requirements of this specific condition and keep them as part of the operating records

(f) Vegetation such as dry grass, leaves and combustible materials and glass or other objects must be removed within a radius of 200 feet from the burn pans prior to initiation of an OB event

5 If unexpected meteorological conditions arise or if technical difficulties (such as a hang fire) develop, the permittee may allow the material to remain on the pan under the following conditions

a The pan is covered as soon as safety conditions allow

(b) The waste is treated, in compliance with Attachment 8, and paragraph 1 of this section, as soon as the conditions become safe

(c) If the permittee determines that meteorological conditions or technical difficulties will prevent the treatment on the same day The cause for the postponement shall be recorded daily in the operating record

(d) No additional waste is placed on the pan,

6 The permittee shall remove spilled or leaked waste from the burn pan(s) and surrounding soils immediately after placement of material on the burn pan(s) in accordance with Attachment 8 of this permit

7 The permittee shall manage ash and other residues, removed from the burn pan(s), in accordance with the procedures described in Attachments 8 of this permit

8 Thermal treatment of the hazardous waste shall be conducted by qualified personnel, experienced in handling explosive hazardous waste material

9 The permittee shall provide adequate fire protection to ensure confinement and control of any fire resulting from the operation, as specified in the Attachment 5 The permittee shall notify the local fire department of the on-going nature of on-site thermal treatment of explosive waste, and shall allow local fire officials (State Department of Forestry or the Sullivan County Fire Marshal) to observe and provide additional fire protection

10 All the burn pans that are determined by the permittee to be no longer usable for the thermal treatment shall be decontaminated and disposed of, within 30 days of such determination, in accordance with the decontamination and disposal procedures for the clean debris as described in the Closure Plan of the Permit Application A report describing all the decontamination activities must be submitted to the Division, within 15 days of completion of decontamination

11 The permittee shall conduct inspections of the miscellaneous unit including the covers, on each day of the thermal treatment and weekly when the unit is not in operation, in accordance with inspection check list in Attachment 4 of this permit, to detect precipitation, stains, residues from incomplete combustion, accumulation of storm water and integrity of burn pans and concrete bumpers including berms If a significant deterioration of the concrete pads or joint sealant material is noted during inspections, the permittee shall re-evaluate the need for repairing the facility and the need for a protective coating on the burn pad All the inspection reports including corrective actions must be recorded and kept as part of the operating records

12 The permittee shall implement appropriate remedial actions for the problems discovered during the inspections conducted pursuant to the paragraph 13 of this subsection For problems that cannot be remediated within 48 hours, the permittee shall notify the Division within three (3) working days and follow up with a written report within fourteen (14) days of discovering such problems The report must include descriptions of the remedial actions taken The permittee shall cease operation of the burn pan(s) until completion of the necessary repairs

13 The permittee shall submit an annual report describing the activities at the burn pans, to the Division by March 1st for the previous year The report shall include the following information

(a) Description and quantity of each hazardous waste received and treated at the unit

(b) Dates of its treatment

(c) Location of each hazardous waste within the accumulation areas and quantity at each location at the end of the reporting period

(d) Summary reports and details of all incidents that require implementation of the Contingency Plan at the units

(e) List of personnel present at each event

(f) Weather conditions to include humidity, weather forecast, wind speed and wind direction at each event

(g) Copies of manifests showing disposition of burn residues and/or the quantity of burn residues onsite at the end of the reporting period

(h) Details of any significant problems discovered during inspections conducted pursuant the paragraph 13 of this part and details of remedial actions taken

14 The permittee shall maintain compliance with the environmental performance standards listed in Tennessee Rule 1200-01-11- 6(27) at all times

15 Any new/replacement of unit before operating must obtain and submit to the commissioner a written assessment, renewal and certify by a qualified professional engineer attesting that the OB unit has structural integrity and is acceptable for the storing and treating hazardous waste

16 The permittee must operate and maintain the design, construction, operation, and engineering of the earthen berm surrounding the entire unit as described in Attachment 1 and Attachment 8 of this permit, to prevent washout of any hazardous waste by 100-year flood

G RISK ASSESSMENTS

1 As part of environmental assessment, permittee shall conduct a risk assessment to demonstrate that releases from the Subpart X units will not pose unacceptable risks The risk assessment shall include, but not limited to evaluations of risks to human health (that is, a human health risk assessment), to plants and other animals (that is an ecological risk assessment) The primary goal of risk assessments for OB unit is to provide a means to communicate the risk caused by the operation of the unit during the permit life of the unit

The risk assessment must be included but not limited to the following

(a) Information on the physical and chemical characteristic of hazardous waste constituents released from the unit

(b) Identification and location of potential human and environmental receptors

(c) An estimate of the concentrations of hazardous waste constituents at receptor locations

(d) An estimate of the rate of uptake of each hazardous waste constituent by each Human and environmental receptor

(e) An estimate of the rate uptake of each hazardous waste constituent by each receptor

2 The permittee must sufficiently analyze any waste, which has not previously treated in this thermal process to enable him to establish steady state (normal) or other appropriate (for a non-continuous process) operating conditions (including waste and auxiliary fuel feed) and to determine the type of the pollutants which might be emitted At a minimum, the analysis must determine

/

a Heating value of the waste

b Halogen content and sulfur content in the waste, and

c Concentrations in the waste of lead and mercury, unless the permittee has written, documented data show that the element is not present

Comment As required by subparagraph (5)(d) of Rule 1200-01-11- 05, the permittee must place the results from each waste analysis, or the documented information, in the operating record of the facility

H MISCELLANEOUS UNITS

The requirements in this section apply to owners and operators of facility that treat, or dispose of hazardous waste in miscellaneous units

A miscellaneous unit must be located, designed, constructed, operated, maintained, and closed in a manner that will insure protection of human health and the environment Permits for miscellaneous units are to contain such terms and provisions including, but not limited to, as appropriate, design and operating requirements, detection and monitoring requirements, and requirements for responses to releases of hazardous waste or hazardous constituents from the units Protection of human health and the environment includes, but is not limited to

1 Prevention of any releases that may have adverse effects on human health or environment due to migration of waste constituents in the ground water or subsurface environment, considering

(a) The volume and physical and chemical characteristics of the waste in the unit, including its potential for migration through soil, liners, or other containing structures,

(b) The hydrologic and geologic characteristics of the units and surrounding area,

(c) The existing quality of ground water, including other sources of contamination and their cumulative impact on the ground water,

(d) The quantity and direction of ground water flow,

(e) The proximity to and withdrawal rates of current and potential ground-water users,

(f) The patterns of land use in the region,

(g) The potential for deposition or migration of waste constituents into subsurface physical structures, and into the root zone of food-chain crops and other vegetation,

(h) The potential for health risks caused by human exposure to waste constituents, and

(i) The potential for damage to domestic animals, wildlife, corps, vegetation, and physical structures caused by exposure to waste constituents

2 Prevention of any releases that may have adverse effects on human health or the environment due to the migration of waste constituents in surface water, or wetlands or on the soil surface considering,

(a) The volume and physical and chemical characteristics of the waste in the unit,

(b) The effectiveness and reliability of containing, confining, and collecting systems and structures in preventing migration,

(c) The hydrologic characteristics of the unit and surrounding area, including the topography of the unit,

(d) The patterns of precipitation in the region,

(e) The quantity, quality, and direction of ground-water flow

I CLOSURE OF THE UNIT

In accordance with Tennessee Rule 1200-01-11- 06(9)(i), the permittee must remove all hazardous waste and hazardous waste residues from the unit Remaining burn pans, and soil containing or contaminated with hazardous waste or hazardous waste residues must be decontaminated or removed

The permitte shall complete the closure operation in accordance with the closure plan in Attachment 6 of the Permit

J SPECIAL REQUIREMENTS FOR INCOMPATIBLE WASTES

1 In accordance with Tennessee Rule 1200-01-11- 06(9)(h) the permittee must ensure that

(a) Incompatible wastes, or incompatible wastes and materials, are not placed into the same burn pan

(b) Hazardous wastes are not placed in a damaged or rusted burn pan that is not safe to hold hazardous waste nor incompatible waste or material

K. OPEN BURNING BEST MANAGEMENT PRACTICES

1 The permittee shall comply with the following requirements for best management practices of OB treatments

(a) Burn pans (or the other containment devices) must used to avoid contact with the soil surface

(b) Pans must be made of material sufficient to withstand the burning process and be sufficient size and depth to contain residues

(c) The depth of energetic waste to be treated must be 3 inches, or less (to avoid the potential for detonation and facilitate effective treatment)

(d) The pans must be elevated to enhance cooling and to facilitate routine inspections

(e) The pans must be covered when not in use to prevent entry of precipitation

(f) Collected precipitation should not be discharged onto the ground unless the pan was decontaminated after its last use, or unless determined not to contain hazardous constituents based on sampling and analysis

(g) Metal screening or cages may be helpful to minimize the ejection of residue from the pans/device

(h) A 24 hours wait time is observed between OB events for pan reuse to allow the burn pans surface to cool off

(i) Prior to removing any treated residues from the burn pans any residue is managed as hazardous waste until determined otherwise based on waste analyses

(j) The permittee must analyze the ash generated from OB treatment for LDR compliance before disposal

(k) Explosive and reactive hazardous waste residue and ash must be verified through sampling and analyses prior to classification as non-hazardous The permittee must sample for all analyses listed in Tennessee Rule 1200-01-11- 10(3) unless otherwise proven that constituents are not waste being burned as specified in Tennessee Rule 1200-01-11- 10(3)(i) Universal Treatment Standards

(l) Emissions from any hazardous waste facility shall not violate the Tennessee Air Pollution regulations

(m) Water Discharges from any hazardous facility shall not violate the Tennessee Water Quality Control Act regulations

Additional OB best management practices may be appropriate on a case-by-case basis in the future

IV SPECIFIC CONDITIONS FOR CORRECTIVE ACTION

A APPLICABILITY

The conditions for continued corrective action of solid waste management units (SWMUs) and areas of concern (AOCs) at the facility are addressed in Order NO 03HCA002 which was issued for Holston Army Ammunition Plant on April 16, 2003 The Corrective Action Order details the procedures and schedule that Holston must follow for reporting the discovery of newly identified SWMUs and AOCs and newly discovered release from existing SWMUs or AOCs Further corrective action for newly identified SWMUs, AOCs or releases shall follow the procedures as described in the Order

V SPECIFIC CONDITIONS FOR GROUNDWATER MONITORING

A GROUNDWATER MONITORING

Rule 1200-01-11- 06(27)(b)1 and Paragraph III H 1 require the permittee to prevent any release that may have adverse effects on human health or environment due to migration of waste constituents in the ground water or subsurface environment Rule 1200-01-11-06(1)(d) "Waivers" states "Any standard under this Rule may be waived by the Commissioner if the owner or operator can demonstrate to the satisfaction of the Commissioner that the standard is inapplicable, inappropriate, or unnecessary to his facility, or that it is equaled in effect by other procedures or mechanisms utilized at the facility " In accordance with that Rule, the Commissioner waives the need for Point of Compliance groundwater monitoring at the open burning treatment unit However, site-wide and other corrective action groundwater monitoring requirements are provided in Permit Attachment 9, Groundwater Monitoring

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VI SCHEDULE OF COMPLIANCE

1 The permittee must conduct a risk assessment within one (1) year of issuance of this permit and before adding a new waste to be treated in the burn pan The risk assessment must be submitted to the commissioner for review and approval

2 Within 60 days of the effective date of this Permit, the permittee must submit a work plan to sample soil from the burn pan treatment area (Area B) to insure the facility is not creating a new waste unit as an unintentional result of the burn operations Upon TDEC approval of the sampling work plan, the pemittee must sample twice a year (semi annually) and send the resulting sampling report to the Commissioner

3 In the event that for any waiver(s) granted per Tennessee Rule 1200-01-11- 06(1)(d) including the waiver standard or other procedures have changed or no longer apply, the permitee must notify the Division and request a modification to the permit The permittee must submit descriptions necessary to meet the above rule(s) waived

4 Any waiver(s) granted per Tennessee Rule 1200-01-11- 06(1)(d) in this permit including the waiver standard(s) or other equivalent procedure(s) or mechanism(s) utilized are effective for a period of five years from the effective date of this permit To renew the waiver(s) the permittee must reapply for the waiver under the above rule providing documentation that the condition for the waiver granted still apply or request a new waiver and permit modification, if applicable Once the request for a new waiver is submitted in a timely manner with sufficient documentation, the existing waiver does not expire until the new waiver is issued

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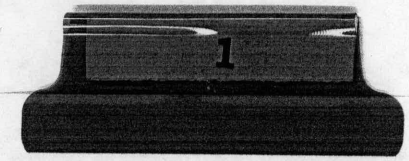
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Facility Holston Army Ammunition Plant
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ATTACHMENT 1 FACILITY DESCRIPTION

Attachment 1 1 includes the following sections

- Attachment 1 1 Facility Description
- Attachment 1 2 Structural Calculation And Stability Of Flood Event
- Attachment 1 3 Flood Profiles And Backwater Curve

ATTACHMENT 1 1 FACILITY DESCRIPTION

DESCRIPTION OF PANS AND BERMED AREA

The Burn Pan Unit has a berm that surrounds the entire unit to protect against floods Run-on and run-off are also prevented The berm features sides that slope inward toward the burn pan area so as to direct precipitation to the stormwater drainage system The entire berm has been topped with a 12-inch layer of rock material (riprap) that is designed to prevent erosion of the berm in the event of a flood Further information regarding the design and construction of the berms and burn pans is provided in Attachment 8

Environmental Monitoring of Burn Pan Unit Area

HSAAP will implement a soil monitoring program at the Burn Pan Unit for detecting any contamination in the compacted-clay liner during the active life of the unit This program will feature the biennial collection of samples from the upper compacted-clay liner, if contamination is detected, samples will be collected from the deeper layer of the compacted clay and underlying native soil All samples will be analyzed for key explosive constituents

General Requirements

Figure 1 1-3 shows a topographic map of the Burn Pan Unit and the immediate surrounding area out to a distance of approximately 250 feet The scale of the map is 1 inch = 200 feet Details of Figure 1 1-3 include elevation contours at 2-foot intervals Also shown in Figure 1 1-3 are the locations of shallow and deep groundwater monitoring wells and the horizontal direction of groundwater flow The topography within and immediately surrounding the Burn Pan Unit is generally flat and has a base elevation of 1,165 feet (msl) The Burn Pan Unit is situated in the extreme southern portion of Area B adjacent to the Holston River

Surrounding Land Use

Area A is located within the City of Kingsport The City of Kingsport features a combination of industrial, commercial, and residential land use Most of the industrial activity is located adjacent to the Holston River which passes through the southern portion of the city Commercial businesses are located primarily along the major roadways (Highway 11W and Center Street) that pass through the city limits Residential areas are located to the north and east of Kingsport Area B is encompassed by U S Highway 11W to the north and on all other sides by the Holston River Land use across Highway 11W is predominantly commercial or residential To the east, primarily single-family residential land lies across the river A small, multi-family residential area is adjacent to the western boundary of Area B The area west of Kingsport is primarily a rural residential area

Wind Rose

Figure 1 1-5 shows a wind rose of the frequency distribution of wind speed and wind direction for the local area The wind rose data were collected at the Tri-Cities Regional Airport, which is

located approximately 15 miles southeast of the HSAAP in Sullivan County, Tennessee This is the closest National Weather Service (NWS) reporting station to the HSAAP The wind rose shown in 1 1-5 represents a 30-year climatological record for the period 1948 through 1978

Sewers

The Burn Pan Unit has a sewer drainage system that collects stormwater and any liquid spills that might occur within the Burn Pan Unit The Burn Pan Unit drainage system is shown in Figure 1 1-2 The drainage system features nine catch basins, which all flow to a single drain that flows to the wastewater treatment plant located in Area B The wastewater treatment plant is designed to treat explosives in wastewaters at a capacity of 6,000,000 gallons per day and discharges the treated effluent to the Holston River per National Pollutant Discharge Elimination System (NPDES) permit Three backflow prevention valves for the stormwater drainage system are located immediately north of the Burn Pan Unit as shown in Figure 1 1-2 The Safety Department Representative (Burning Ground operator) is responsible for closing the valves in response to the threat of flooding In the event of a flood, HSAAP would receive advance warning When an advanced warning is received, the valves on the stormwater drainage lines will be closed to prevent any backflow of floodwaters into the Burn Pan Unit

100-YEAR FLOODPLAIN AREA

The Burn Pan Unit is adjacent to the Holston River and lies within the 100-year floodplain area The 100 year floodplain in the vicinity of the Burn Pan Unit is 1,167 6 feet The Burn Pan Unit is protected by an earthen berm of clay and riprap that has a top elevation which exceeds the 100-year flood elevation by more than 3 4 feet and is designed to withstand and exclude floodwaters from the burn pan unit in the event of a flood The earthen berm has a top elevation of 1,172 feet Further information regarding the earthen berm is provided in Attachment 8 of this permit

Floodplain Standard

The location of the 100-year floodplain in the vicinity of HSAAP Area B is shown in Figure 1 1-4 The Burn Pan Unit is located within the 100-year floodplain area but is surrounded by a berm designed to exclude floodwaters The floodplain information was taken from flood insurance rate maps developed by the Tennessee Valley Authority (TVA) for Sullivan County and the City of Kingsport, Tennessee TVA defines the 100-year floodplain boundary as the plant railroad embankment north of the Open Burning Grounds The elevation of the 100-year flood at the Burn Pan Unit is 1,167 6 feet (msl) In the event of a flood, advance warning would be received from the Nation Weather Service This warning would be received at least twelve to twenty-four hours before a flood event If possible, the wastes would be treated If it is not possible to treat the wastes before a flood event, the wastes will be removed to one of the existing product storage igloos These igloos are above the floodplain and meet the requirements for conditional exemption from RCRA storage requirements for Military Munitions Storage facilities in Tennessee Rule 1200-01-11- 09(13)(f) (40 CFR 266 205)

Facility Flood Protection Design

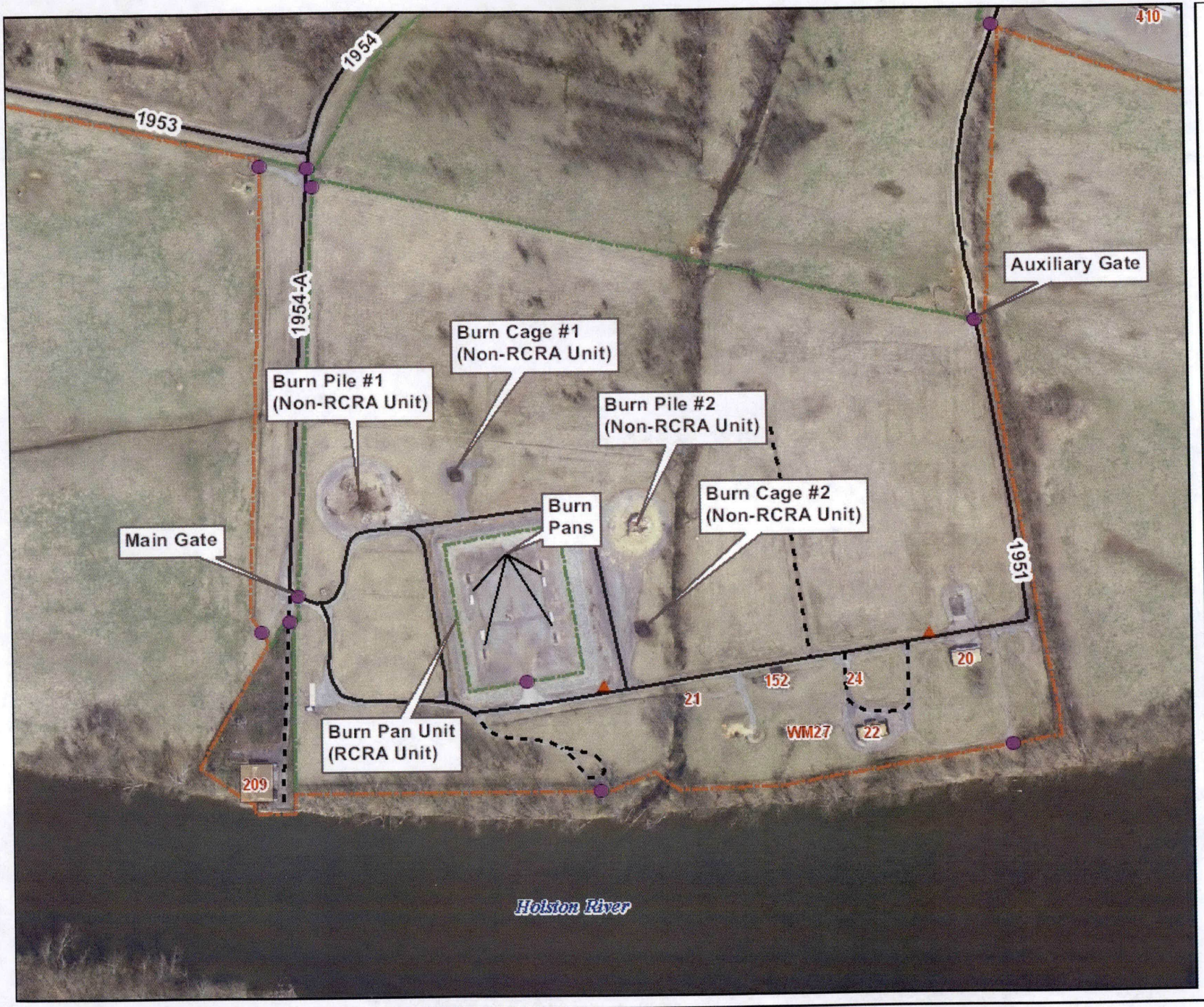
Although the Burn Pan Unit is located within the 100-year floodplain, it is important to note that the Burn Pan Unit is protected from flooding by an earthen berm that completely surrounds the unit and has a top elevation that exceeds the 100-year floodplain elevation The elevation of the Burn Pan Unit is approximately 1,165 feet (msl), whereas the top elevation of the earthen berm is

1,172 feet (msl) Based on information obtained from the TVA, the elevation of the 100-year floodplain in the area of the Burn Pan Unit is 1,167 6 feet (msl) Therefore, the earthen berm allows 3 4 feet of protection from a 100-year flood level Structural calculations showing stability of the berm during a 200-year flood event with an assumed water elevation of 1,169 6 feet and a duration of 6 days are presented in Attachment 1 2 Attachment 8 has details on design of the berms A graph showing the marked and computed flood profiles and backwater curves for the Holston River is presented in Attachment 1 3 The location of the Burn Pan Unit on this graph is at mile marker 139 The 100-year flood level is represented by the 75,000 cubic feet per second profile and confirms the flood elevation to be 1,167 6 feet The 200-year flood level is represented by the 100,000 cubic feet per second profile and indicates that the flood level at the Burn Pan Unit is 1,169 6 feet Also included in Attachment 1 3 is a letter from the Tennessee Valley Authority to HSAAP confirming the flow rates for the 100-year and 200-year flood events and the relative difference (approximately 2 feet) in flood elevation for each event

Flood Procedures

The Burn Pan Unit is surrounded and protected by an earthen berm with a top elevation that exceeds the 100-year floodplain elevation and is designed to exclude floodwaters from the unit during a flood event In the event of a flood, HSAAP would receive advance warning This advanced warning would be received 12 to 24 hours before a flood event from the National Weather Service When an advanced warning is received, no additional wastes will be sent to the Burn Pan Unit for treatment Any wastes in the pans awaiting treatment will be treated if conditions allow If the material cannot be treated, it will be taken to and stored in existing product storage igloos located at the Explosive Storage Magazine Area All of the storage igloos at the Explosive Storage Magazine Area are located above the 100-year floodplain level, as well as the bridge crossing the Holston River, which connects the Explosive Storage Magazine Area to Area B where the Burn Pan Unit is located These product storage igloos meet the requirements of Tennessee Rule 1200-01-11- 09(13)(f) [40 CFR 266 205] for conditional exemption from RCRA storage requirements for permitted facilities These facilities meet the requirements of the Department of Defense Explosives Safety Board (DDESB) The backflow prevention valves on the stormwater drainage lines will be closed to prevent any backflow of floodwaters into the Burn Pan Unit through the drainage lines The location of the backflow prevention valves are shown in Figure 1 1-2 The Safety Department Representative, the operator of the Burn Pan Unit, is responsible for closing the back flow prevention valves Mobile covers will be placed on the pans, and the gate will be locked

Treatment of reactive hazardous wastes in the Burn Pan Unit will not resume until floodwaters have receded and the bermed Burn Pan Unit is once again accessible



Buildings

Gates
- Vehicle barrier

Fences
- Interior
- Perimeter

Fire Hydrants

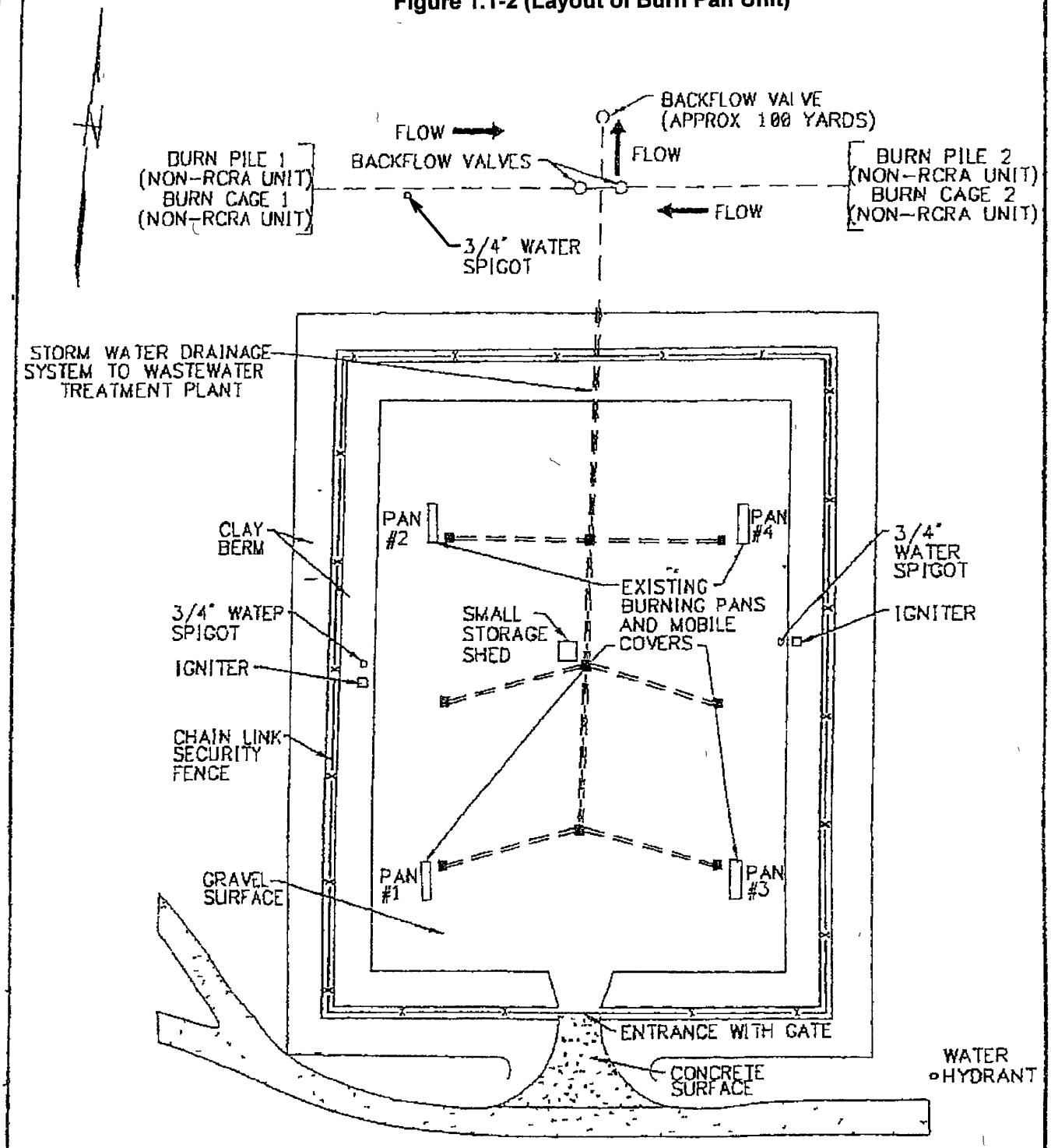
Road Centerline
- Primary
- Secondary

Holston Army Ammunition Plant, Kingsport, TN
Burning Ground

Figure 1.1-1

Feet
0 300

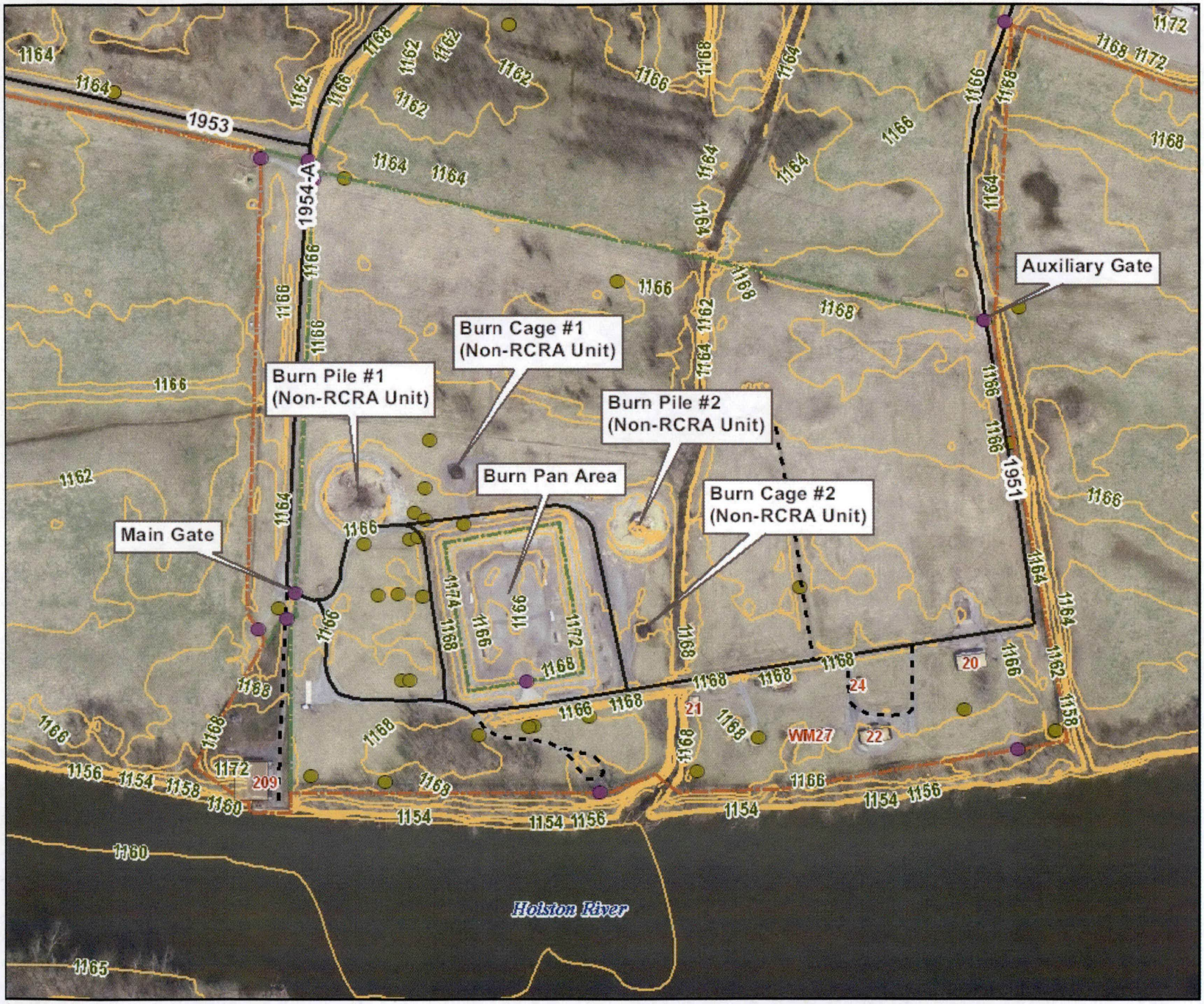
Figure 1.1-2 (Layout of Burn Pan Unit)



SOURCE
DRAWING ADAPTED FROM SIRRINE ENVIRONMENTAL CONSULTANTS, GREENVILLE, S C
RCRA OPERATING PERMIT APPLICATION
HOLSTON ARMY AMMUNITION PLANT

0 80 160
SCALE IN FEET

DRAWN BY HJP DATE 4/24/00	Tetra Tech NUS, Inc.	CONTRACT NO JF95	OWNER NO ———
CHECKED BY DATE	BURN PAN UNIT HOLSTON ARMY AMMUNITION PLANT KINGSPORT, TN	APPROVED BY	DATE
COST/SCHED-AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO FIGURE 1-1-2	



Buildings

Gates
- Vehicle barrier

Fences
- Interior
- Perimeter

Road Centerline
- Primary
- Secondary

Ground Water Mon Well

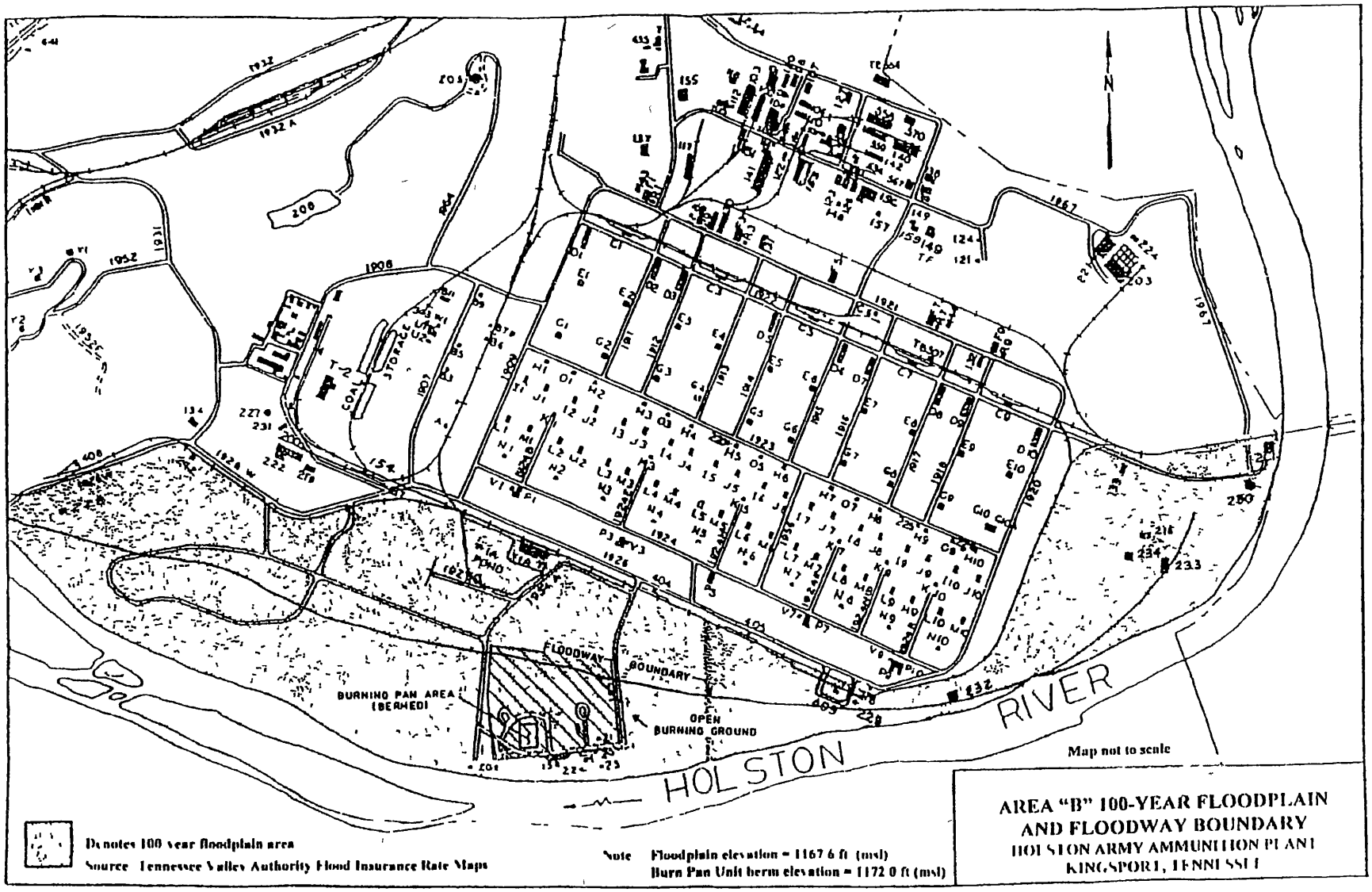
Topography (feet)

Holston Army Ammunition Plant, Kingsport, TN
Ground Water Monitoring Wells

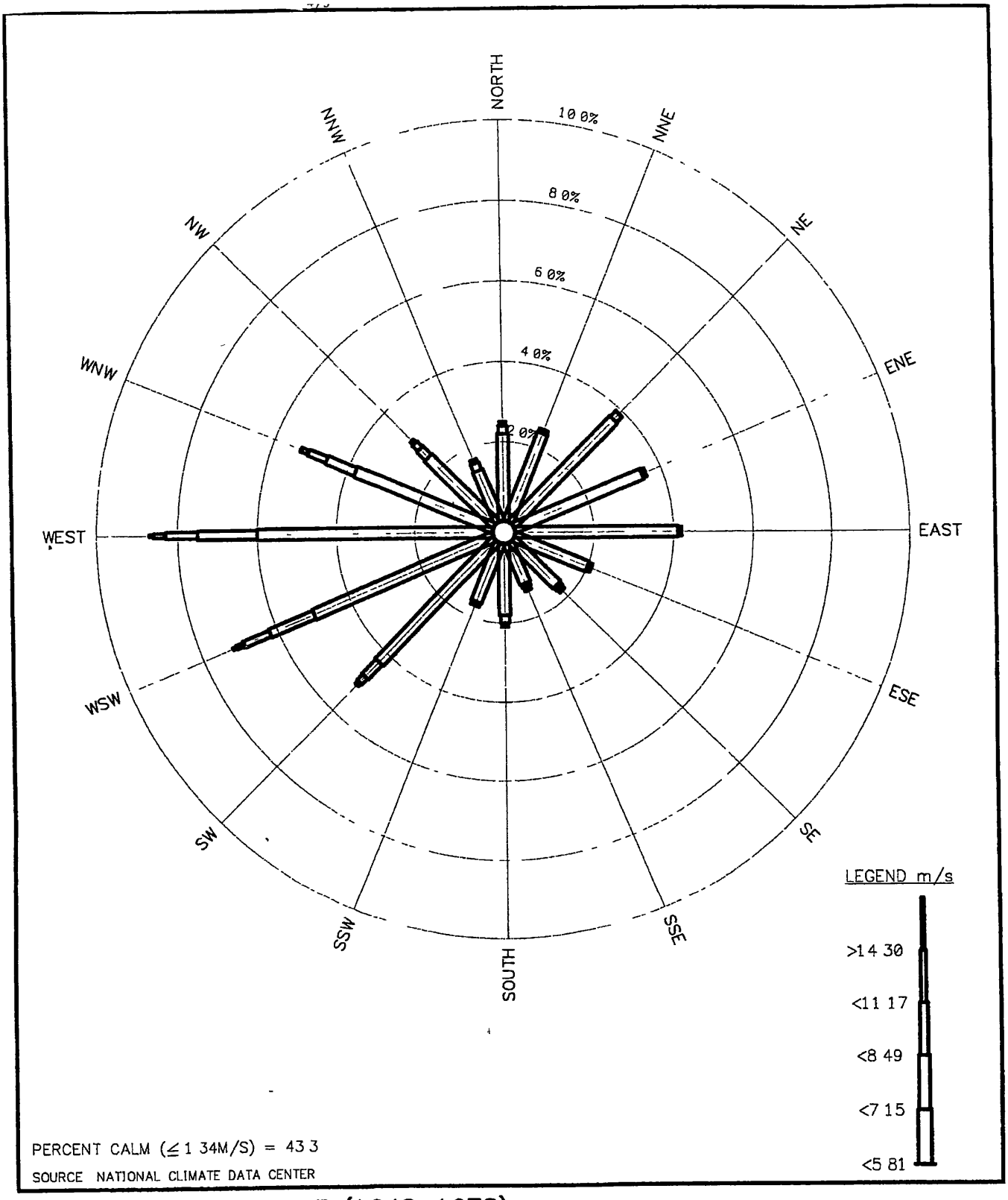
Figure 1-1-3

Feet
0 300

FIGURE 1 1-4
AREA "B" 100- YEAR FLOODPLAN
AND FLOODWAY BONDARY



DRAWING ADAPTED FROM SIRRINE ENVIRONMENTAL CONSULTANTS GREENVILLE, SC
RCRA OPERATING PERMIT APPLICATION
HOLSTON ARMY AMMUNITION PLANT - SECTION F



30 YEAR WIND ROSE (1948–1978)
NATIONAL WEATHER SERVICE
TRI–CITIES REGIONAL AIRPORT
SULLIVAN COUNTY, TN

FIGURE 1 1-5
WIND ROSE
HOLSTON ARMY AMMUNITION PLANT

Facility HOLSTON ARMY AMMUNTION PLANT
EPA Identification Number TN5 21 002 0421
Permit Number TNHW-148

ATTACHMENT 1 2 STRUCTURAL CALCULATION AND STABILITY OF FLOOD EVENT

Attachment 1 2 is a copy of permittee's Flood profiles and a copy of Tennessee Valley Authority 100-and 200-year flood elevations for Holston River

(This Attachment is a copy of Appendix B-2 of permittee's Application dated January 2002)

MAF03/03/11

^EC DONOHUE

CALCULATION SHEET

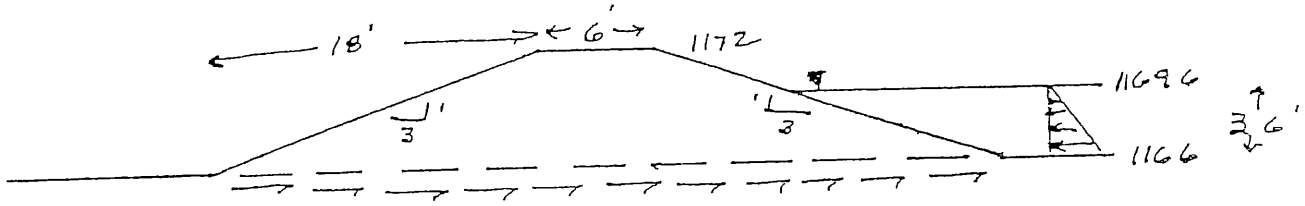
CLIENT Holston LOCATION _____ JOB NO G3841 00

SUBJECT Static Stability Calcs, Burn Pan Berm

BY PJ Flood DATE 9-21-92 CHECKED BY PJ Wells DATE 9-21-92

OVERTURNING: KINEMATICALLY UNLIKELY, NO NEED TO EVALUATE

SLIDING KINEMATICALLY POSSIBLE, BUT HIGH FACTORS OF SAFETY CLEARLY EXIST. PERFORM SIMPLIFIED CALCULATION TO ESTIMATE FS



$$FS = \frac{\text{RESISTING FORCES}}{\text{DRIVING FORCES}}$$

SHORT-TERM (UNDRAINED) CONDITIONS ARE ASSUMED TO EXIST MOST LIKELY FAILURE PLANE EXISTS AT BASE OF BERM ASSUME BERM EXISTS OF RELATIVELY HOMOGENEOUS COHESIVE MATERIALS, GRAVEL LAYER MENTIONED IN TEXT ASSUMED NOT TO EXTEND THROUGH BERM NO SHEAR STRENGTH DATA AVAILABLE, ASSUME $S_u \simeq 250$ PSF (V SOFT - SOFT CLAY)

RESISTING FORCE $[(18)(2)+6](250 \text{ PSF}) = (42 \text{ FT})(250 \text{ PSF}) = 10{,}500$ #

DRIVING FORCE $\frac{36(624)}{2} \times 36 = 404$ #/L.FT

$FS = \frac{10\,500}{404} = 26$ VERY SAFE IN SLIDING

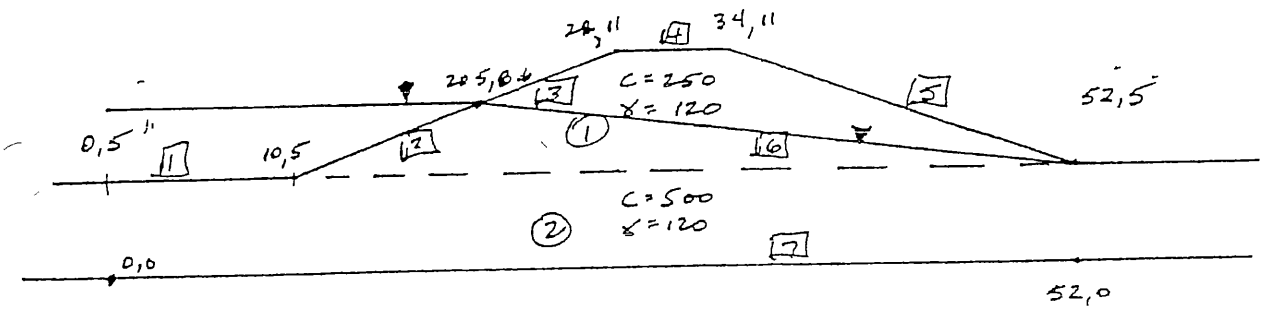
SEC DONOHUE CALCULATION SHEET

CLIENT _____ LOCATION _____ JOB NO _____

SUBJECT _____

BY _____ DATE _____ CHECKED BY _____ DATE _____

SLOPE STABILITY THIS IS EXPECTED TO BE MOST CRITICAL. SINCE THE OCCURANCE OF A DESIGN EARTHQUAKE AND 100 YEAR FLOOD TOGETHER IS EXTREMELY UNLIKELY, ONLY EXAMINE STATIC CASE EXAMINE STABILITY USING PCSTABL5 COMPUTER RUN ATTACHED



STEADY STATE SEEPAGE HAS BEEN ASSUMED ALTHOUGH THE LOW PERMEABILITY MATERIAL AND RELATIVELY SHORT TIME DURATION WOULD PROBABLY PRECLUDE THIS FOR FROM DEVELOPING THE ANALYSIS IS, THEREFORE, SOMEWHAT CONSERVATIVE IN THIS REGARD, ALTHOUGH IN THIS INSTANCE, THE MODEL IS PROBABLY NOT VERY SENSETIVE TO SELECTION OF PHREATIC ~~SUR~~ SURFACE

$$\boxed{FS. \approx 5.0}$$

VERY HIGH FACTOR OF SAFETY SAFETY FACTORS FOR STRUCTURE ARE HIGHER THAN RECOMMENDED MINIMUMS

FS = 4.2 IF PIEZOMETRIC SURFACE IGNORED

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date.	9-21-92
Time of Run:	4 02 PM
Run By	P J FLOOD
Input Data Filename	A HOSTONS DAT
Output Filename	A HOSTONS OUT

PROBLEM DESCRIPTION SLOPE STABILITY ANALYSIS FOR BURN PAN BE
RM, STATIC ANALYSIS, STEADY STATE

BOUNDARY COORDINATES

5 Top Boundaries
6 Total Boundaries

Boundary No	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	00	5 00	10 00	5 00	2
2	10 00	5 00	20 50	8.60	1
3	20 50	8 60	28.00	11 00	1
4	28 00	11 00	34 00	11.00	1
5	34.00	11.00	52 00	5 00	1
6	10 00	5 00	52 00	5 00	2

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No	Total Unit Wt (pcf)	Saturated Unit Wt (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param	Pressure Constant (psf)	Piez. Surface No.
1	110.0	120 0	250.0	0	00	.0	1
2	110.0	120 0	500 0	0	.00	0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62 40

Piezometric Surface No 1 Specified by 3 Coordinate Points

Point No	X-Water (ft)	Y-Water (ft)
1	00	8 60
2	20.50	8.60
3	52 00	5 00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

100 Trial Surfaces Have Been Generated

10 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = 00 ft
and X = 20 00 ft

Each Surface Terminates Between X = 29 00 ft
and X = 36 00 ft

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 00 ft

3 00 ft Line Segments Define Each Trial Failure Surface

Restrictions Have Been Imposed Upon The Angle Of Initiation The Angle Has Been Restricted Between The Angles Of -45.0 And 13 0 deg

1

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined They Are Ordered - Most Critical First

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 9 Coordinate Points

Point No	X-Surf (ft)	Y-Surf (ft)
1	13 33	6.14
2	16 27	5.52
3	19 26	5.24
4	22 25	5 33
5	25 22	5 76
6	28 12	6 54
7	30 90	7 66
8	33 54	9 10
9	35 50	10 50

Circle Center At X = 20 1 , Y = 30.6 and Radius, 25 4

*** 5 050 ***

Individual data on the 12 slices

Slice No	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	2 9	287.1	378 2	518.4	0	0	.0	.0	.0
2	3 0	817 3	185 0	602.5	0	.0	0	.0	0
3	1 2	466.7	17 5	259.4	0	0	0	.0	.0
4	1 8	746 5	0	348.0	0	.0	0	.0	.0
5	3 0	1416 1	.0	499 9	0	0	0	0	.0
6	2 8	1399 5	0	315 2	0	0	0	0	.0
7	1	60.1	0	9 3	.0	0	0	0	0
8	2 3	1025.9	.0	91 4	0	0	.0	0	0
9	5	181.9	.0	0	0	0	0	0	.0
10	2.6	759 0	.0	.0	.0	0	.0	.0	.0
11	5	88.7	.0	0	0	0	0	.0	.0
12	1 5	129 9	0	0	0	.0	0	.0	.0

Failure Surface Specified By 9 Coordinate Points

Point No	X-Surf (ft)	Y-Surf (ft)
1	13 33	6 14
2	16 21	5 29
3	19 19	4 91
4	22.19	5 01
5	25 13	5 59
6	27.95	6 62
7	30.56	8 09
8	32.91	9 96
9	33.85	11 00

Circle Center At X = 20.1 , Y = 23 7 and Radius, 18 8

*** 5.354 ***

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	15 56	6 90
2	18 46	6.15
3	21 44	5 82
4	24 44	5 93
5	27 39	6 48
6	30 23	7 44
7	32 90	8 81
8	35 35	10 55
9	35 35	10 55

Circle Center At X = 22 2 ; Y = 26 5 and Radius, 20 6

*** 5 435 ***

Failure Surface Specified By 6 Coordinate Points

Point No	X-Surf (ft)	Y-Surf (ft)
1	17.78	7 67
2	20.43	6.26
3	23.42	5 97
4	26.29	6 82
5	28.64	8.69
6	29.94	11 00

Circle Center At X = 22 7 , Y = 13 7 and Radius, 7 7

*** 5 691 ***

1

Failure Surface Specified By 10 Coordinate Points

Point No	X-Surf (ft)	Y-Surf (ft)
1	11.11	5 38
2	14 11	5 24

3	17 11	5 29
4	20 10	5 54
5	23 06	5 99
6	25 99	6 63
7	28 88	7 46
8	31 70	8.48
9	34 44	9.69
10	35 81	10 40

Circle Center At X = 14 8 ; Y = 50 5 and Radius, 45 2

*** 5.784 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	17 78	7.67
2	20 52	6 44
3	23 51	6.33
4	26 34	7.34
5	28 58	9.33
6	29 41	11 00

Circle Center At X = 22 3 , Y = 14 0 and Radius, 7 7

*** 5 933 ***

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	15 56	6 90
2	18.30	5 68
3	21 21	4 98
4	24 21	4 81
5	27 18	5 19
6	30.04	6 11
7	32 68	7 53
8	35 02	9 40
9	35 87	10 38

Circle Center At X = 23 6 ; Y = [illegible] 3 and Radius, 16.5

*** 5 952 ***

Circle Center At X = 19.6 , Y = 21 2 and Radius, 14 9

*** 6.114 ***

1

```
              Y            A     X     I     S           F     T

                00       6 50     13 00     19.50     26 00     32.50

X          .00 +-------*-+--W------+---------+---------+---------+
                -
                -     .
                -     .
                -
                -   . .
           6 50 +    .
                -.   .
                - .  .
                -.   .. *
                . .   . 5
                -.   .
A         13 00 . .  .   1
                ..... . 5
                . . ..  .  3
                .  .  . 1
                  .. .  5   4
                         39
X         19 50 .  .  . 1
                -        54  *
                -       239
                -       15.. .
                -   . .7 46 .
                -        1 9..
I         26 00 +      .  46.
                -     . 7 3  9
                -        1 .46  *
                -         5    96
                -       7.32 ...4
                -        . 15....
S         32 50 +          7 32 .
                -        .   1 .*
                -            75..
                -             . 1
                -
                -
           39 00 +
                -
                -
                -
                -
                -
F         45 50 +
                -
                -
```

```
                -
                -
                -
T      52 00 +        *
```

```
PROFIL
SLOPE STABILITY ANALYSIS FOR BURN PAN BERM, STATIC ANALYSIS, STEADY STATE
6 5
0.0 5.0 10.0 5.0 2
10.0 5.0 20.5 8.6 1
20.5 8.6 28.0 11.0 1
28.0 11.0 34.0 11.0 1
34.0 11.0 52.0 5.0 1
10.0 5.0 52.0 5.0 2
SOIL
2
110.0 120.0 250.0 0.0 0.0 0.0 1
110.0 120.0 500.0 0.0 0.0 0.0 1
WATER
1 0.0
3
0.0 8.6
20.5 8.6
52.0 5.0
CIRCL2
10 10
0.0 20.0 29.0 36.0
0.0 3.0 13.0 -45.0
```

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date.	9-21-92
Time of Run:	4 41 PM
Run By·	P J FLOOD
Input Data Filename	A HNOPIEZ DAT
Output Filename.	A HNOPIEZ OUT

PROBLEM DESCRIPTION SLOPE STABILITY ANALYSIS FOR BURN PAN BERM, STATIC ANALYSIS, NO PIEZ SURF.

BOUNDARY COORDINATES

5 Top Boundaries
6 Total Boundaries

Boundary No	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	00	5 00	10 00	5 00	2
2	10 00	5.00	20.50	8.60	1
3	20 50	8 60	28 00	11 00	1
4	28 00	11 00	34 00	11.00	1
5	34 00	11 00	52.00	5.00	1
6	10 00	5 00	52 00	5.00	2

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No.	Total Unit Wt (pcf)	Saturated Unit Wt (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	110 0	120 0	250 0	0	00	0	1
2	110.0	120 0	500 0	0	00	0	1

A Critical Failure Surface Searching Method, Using A Random

Technique For Generating Circular Surfaces, Has Been Specified.

100 Trial Surfaces Have Been Generated

10 Surfaces Initiate From Each Of 10 Points Equally Spaced
Along The Ground Surface Between X = 00 ft
and X = 20 00 ft.

Each Surface Terminates Between X = 29 00 ft.
and X = 36 00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 00 ft.

3 00 ft. Line Segments Define Each Trial Failure Surface

Restrictions Have Been Imposed Upon The Angle Of Initiation.
The Angle Has Been Restricted Between The Angles Of -45 0
And 13 0 deg

1

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 9 Coordinate Points

Point No	X-Surf (ft)	Y-Surf (ft)
1	13.33	6 14
2	16 27	5 52
3	19.26	5 24
4	22 25	5.33
5	25 22	5 76
6	28.12	6 54
7	30 90	7 66
8	33 54	9 10
9	35 50	10 50

Circle Center At X = 20 1 ; Y = 30 6 and Radius, 25.4

*** 4 171 ***

Individual data on the 11 slices

Slice No	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	2 9	263 2	0	0	.0	0	.0	0	.0
2	3 0	749.2	.0	0	.0	.0	.0	0	0
3	1 2	427.8	.0	.0	.0	0	.0	0	.0
4	1.8	690 7	.0	0	.0	0	.0	0	.0
5	3.0	1336.8	0	.0	.0	0	.0	.0	.0
6	2.8	1350.7	0	.0	.0	0	.0	.0	.0
7	.1	58 7	0	0	0	0	.0	.0	.0
8	2 8	1194 2	0	0	.0	0	.0	0	.0
9	2.6	759 0	0	.0	0	0	.0	.0	.0
10	5	88.7	0	0	0	0	.0	.0	.0
11	1 5	129 9	0	0	.0	0	0	.0	.0

Failure Surface Specified By 9 Coordinate Points

Point No	X-Surf (ft)	Y-Surf (ft)
1	13 33	6 14
2	16 21	5 29
3	19 19	4 91
4	22 19	5 01
5	25 13	5 59
6	27 95	6 62
7	30 56	8 09
8	32 91	9 96
9	33 85	11 00

Circle Center At X = 20 1 , Y = 23 7 and Radius, 18.8

*** 4.386 ***

1

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	6 67	5 00
2	8 98	3 09
3	11 61	1 64
4	14 46	70
5	17 43	30
6	20 43	46
7	23.34	1 17
8	26 08	2 41

9	28 54	4 12
10	30 64	6 26
11	32 31	8 76
12	33.27	11 00

Circle Center At X = 18 1 , Y = 16 4 and Radius, 16.1

*** 4 479 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	8 89	5 00
2	11.24	3.13
3	13.90	1 75
4	16.78	.90
5	19 76	.63
6	22.75	93
7	25.62	1.79
8	28 27	3.20
9	30.61	5 08
10	32.54	7 38
11	33.99	10 00
12	34.28	10.91

Circle Center At X = 19.7 ; Y = 16.1 and Radius, 15 5

*** 4.526 ***

1

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	11 11	5.38
2	14 11	5.24
3	17 11	5 29
4	20 10	5.54
5	23.06	5 99
6	25.99	6 63
7	28.88	7 46
8	31.70	8 48
9	34 44	9 69
10	35.81	10.40

Circle Center At X = 14.8 ; Y = 50 5 and Radius, 45 2

*** 4 591 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	8.89	5 00
2	11.08	2 95
3	13.66	1 42
4	16 51	50
5	19.50	.22
6	22.48	61
7	25 29	1 64
8	27 82	3.26
9	29.92	5 40
10	31 51	7 94
11	32.50	10 77
12	32.53	11.00

Circle Center At X = 19 2 , Y = 13 8 and Radius, 13 6

*** 4 630 ***

1

Failure Surface Specified By 12 Coordinate Points

Point No	X-Surf (ft)	Y-Surf (ft)
1	6 67	5 00
2	9 32	3 60
3	12.15	2.60
4	15 09	2 00
5	18 08	1 84
6	21.07	2 11
7	23 99	2 80
8	26 78	3 90
9	29.39	5 38
10	31 75	7 23
11	33.83	9.40
12	34.79	10 74

Circle Center At X = 17 7 , Y = 22 7 and Radius, 20 8

*** 4 666 ***

Failure Surface Specified By 11 Coordinate Points

Point No	X-Surf (ft)	Y-Surf (ft)
1	8 89	5 00
2	11 47	3 47
3	14 30	2 46
4	17 26	2 02
5	20.26	2.16
6	23 17	2 87
7	25 89	4.14
8	28 32	5 90
9	30 36	8 10
10	31 94	10 65
11	32 08	11 00

Circle Center At X = 18 0 ; Y = 17 5 and Radius, 15 5

*** 4 670 ***

Failure Surface Specified By 12 Coordinate Points

Point No	X-Surf (ft)	Y-Surf (ft)
1	4 44	5 00
2	6 74	3 07
3	9 36	1.60
4	12 20	.64
5	15 17	.23
6	18 17	37
7	21.09	1.07
8	23 82	2.30
9	26 28	4.01
10	28.38	6.16
11	30.05	8.65
12	31.05	11 00

Circle Center At X = 15 9 ; Y = 16 3 and Radius, 16 1

*** 4 720 ***

Failure Surface Specified By 11 Coordinate Points

Point No	X-Surf (ft)	Y-Surf (ft)

1	8 89	5 00
2	11 02	2 88
3	13 57	1 32
4	16.43	39
5	19 42	14
6	22 38	.60
7	25 16	1 73
8	27 60	3.47
9	29 57	5.73
10	30.97	8.39
11	31 63	11 00

Circle Center At X = 19 0 , Y = 13 0 and Radius, 12 9

*** 4 722 ***

1

```
                Y            A     X     I     S            F     T

                .00       6.50     13.00     19 50     26.00     32.50

  X          00 +-------*-+---------+---------+---------+---------+
                -
                -    .
                -     .
                -    .  9
                -    .  .
           6 50 +    9  3
                - .  ..
                - .  3 .4
                -.9  .7.*
                  . 04. 5
                -9.378  .
  A       13.00 . .  . . 1
                 3648.. 5
                9  7.. .
                 4  ... 1
                3  8 .  5
                 9 7..   .
  X       19 50 64. ... 1.
                -397..   5   *
                - . ... 2.
                -4  8 . 15   .
                - 3 7 .  .  ..
                -  6.  . 1
  I       26 00 +  43 8  .5  ..
                -   .07      .
                -   .43. 81 .    *
                -       70 5 .  .
                -       4 3 29  .
                -         .715..89
  S       32 50 +         .4 3.2 6
                -         .  .14 *
                -             5 4
```

```
PROFIL
SLOPE STABILITY ANALYSIS FOR BURN PAN   BERM, STATIC ANALYSIS, NO PIEZ. SURF.
6 5
0.0 5.0 10.0 5.0 2
10.0 5.0 20.5 8.6 1
20.5 8.6 28.0 11.0 1
28.0 11.0 34.0 11.0 1
34.0 11.0 52.0 5.0 1
10.0 5.0 52.0 5.0 2
SOIL
2
110.0 120.0 250.0 0.0 0.0 0.0 1
110.0 120.0 500.0 0.0 0.0 0.0 1
CIRCL2
10 10
0.0 20.0 29.0 36.0
0.0 3.0 13.0 -45.0
```

HYDRODYNAMIC FORCE CALCULATIONS

Revision 01
October 1992

SEC DONOHUE
Environment & Infrastructure

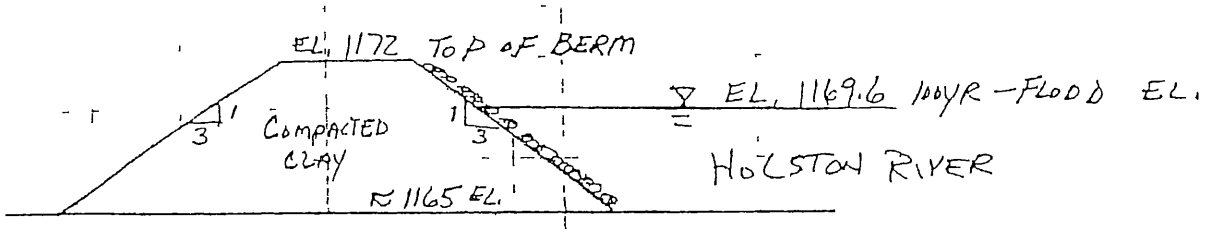
CALCULATION SHEET

PROJECT NO _____

CLIENT HOLSTON SUBJECT _____ Prepared By TMD Date 9/22/92

PROJECT PAN AREA CONTAINMENT BERM EVALUATION Reviewed By BLK Date 9/22/92

Approved By _____ Date _____



OBTAINED FLOW AND VELOCITY DATA FROM TVA - JIM CRAYFORD
615 632 6850

100 YR FLOOD - 79,000 CFS
VELOCITY AT RIVER MILE 139.08 = 5.2 FPS (MEAN)

- SIZE RIP-RAP PROTECTION TO PROTECT CONTAINMENT AREA FROM EROSION.

USING CORPS OF ENGINEER HYDRAULIC DESIGN CRITERIA

$$V = C\left[2g\left(\frac{\gamma_s - \gamma_w}{\gamma_w}\right)\right]^{1/2}(D)^{1/2}$$

V = velocity fps
C = 0.86
g = gravity 32.2 ft/s²
γ_s = specific weight stone use 135 lb/ft³
γ_w = specific weight water 62.4 lb/ft³
D = stone diameter (ft)

USING V = 5.2 fps

$$5.2 = .86\left[2(32.2)\left(\frac{135-62.4}{62.4}\right)\right]^{1/2}(D)^{1/2}$$

$$5.2 = 7.4(D)^{1/2}$$

$$(D)^{1/2} = \frac{5.2}{7.4}$$

$$D = \left(\frac{5.2}{7.4}\right)^2$$

D = 0.49 FT = 6 INCHES USE FOR D_{50} STONE SIZE

SEC DONOHUE
Environment & Infrastructure

CALCULATION SHEET

PROJECT NO. _____

LIENT _____ SUBJECT _____ Prepared By _____ Date _____

PROJECT _____ Reviewed By _____ Date _____

Approved By _____ Date _____

- DIKE CURRENTLY HAS 1.5 INCH DIAMETER COBBLES WHICH VARY FROM 2 to 3 INCHES IN DEPTH

DETERMINE for which erosion protection is adequate

$$V = C\left[2(32.2)\left(\frac{165-62.4}{62.4}\right)\right]^{1/2}(D)^{1/2}$$

$$V = 0.86\left[64.4\left(\frac{165-62.4}{62.4}\right)\right]^{1/2}\left(\frac{1.5}{12}\right)^{1/2}$$

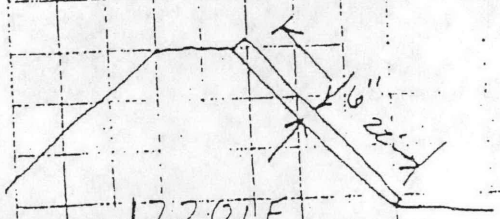
$$V = 3.1 \text{ fps}$$

Recommend placing additional larger riprap on side slopes of containment berm to prevent erosion. The riprap should have a D_{50} size of 6 inches with a minimum specific weight of 135 lb/ft³. The layer should be placed on the slopes with a thickness of approximately 12 inches. The berm should also be periodically inspected and repairs implemented as necessary, particularly after a major flood event. SINCE the berm already has 2 inches of stone placing 10 inches will be sufficient.

ESTIMATED QUANTITY 22 FT x (10/12)' x 1220 LF = 22366 CF

USING 135 lb/FT³ = 1509 TONS

USE 1525 TONS



COST FROM [redacted]

HYDRAULIC DESIGN CRITERIA

SHEET 712-1

STONE STABILITY

VELOCITY VS STONE DIAMETER

1 Purpose Hydraulic Design Chart 712-1 can be used as a guide for the selection of rock sizes for riprap for channel bottom and side slopes downstream from stilling basins and for rock sizes for river closures Recommended stone gradation for stilling basin riprap is given in paragraph 6

2 Background In 1885 Wilfred Airy[1] showed that the capacity of a stream to move material along its bed by sliding is a function of the sixth power of the velocity of the water [1] Henry Law applied this concept to the overturning of a cube,[2] and in 1896 Hooker[2] illustrated its application to spheres In 1932 and 1936 Isbash published coefficients for the stability of rounded stones dropped in flowing water.[3,4] The design curves given in Chart 712-1 have been computed using Airy's law and the experimental coefficients for rounded stones published by Isbash.

3. Theory. According to Isbash the basic equation for the movement of stone in flowing water can be written as:

$$V = C \left[2g \left(\frac{\gamma_s - \gamma_w}{\gamma_w} \right) \right]^{1/2} (D)^{1/2} \qquad (1)$$

where

V = velocity, fps

C = a coefficient

g = acceleration of gravity, ft/sec^2

γ_s = specific weight of stone, lb/ft^3

γ_w = specific weight of water, lb/ft^3

D = stone diameter, ft

The diameter of a spherical stone in terms of its weight W is

$$D = \left(\frac{6W}{\pi \gamma_s} \right)^{1/3} \qquad (2)$$

Substituting for D in equation 1 results in

712-1
Revised 9-70

$$V = C\left[2g\left(\frac{\gamma_s - \gamma_w}{\gamma_w}\right)\right]^{1/2}\left(\frac{6W}{\pi\gamma_s}\right)^{1/6}$$

which describes Airy's law stated in paragraph 2

4 Experimental Results. Experimental data on stone movement in flowing water from the early (1786) work of DuBuat[5] to the more recent Bonneville Hydraulic Laboratory tests[6] have been shown to confirm Airy's law and Isbash's stability coefficients.[7] The published experimental data are generally defined in terms of bottom velocities. However, some are in terms of average flow velocities and some are not specified. The Isbash coefficients are from tests with essentially no boundary layer development and the average flow velocities are representative of the velocity against stone When the stone movement resulted by sliding, a coefficient of 0 86 was obtained When movement was effected by rolling or overturning, a coefficient of 1.20 resulted. Extensive U. S Army Engineer Waterways Experiment Station laboratory testing for the design of riprap below stilling basins indicates that the coefficient of 0.86 should be used with the average flow velocity over the end sill for sizing stilling basin riprap because of the excessively high turbulence level in the flow. For impact-type stilling basins, the Bureau of Reclamation[8] has adopted a riprap design curve based on field and laboratory experience and on a study by Mavis and Laushey [9] The Bureau curve specifies rock weighing 165 lb/ft^3 and is very close to the Isbash curve for similar rock using a stability coefficient of 0.86.

5. Application The curves given in Chart 712-1 are applicable to specific stone weights of 135 to 205 lb/ft^3. The use of the average flow velocity is desirable for conservative design The solid-line curves are recommended for stilling basin riprap design and other high-level turbulence conditions The dashed line curves are recommended for river closures and similar low-level turbulence conditions. Riprap bank and bed protection in natural and artificial flood-control channels should be designed in accordance with reference 10.

6. Stilling Basin Riprap.

a. Size The W_{50} stone weight and the D_{50} stone diameter for establishing riprap size for stilling basins can be obtained using Chart 712-1 in the manner indicated by the heavy arrows thereon The effect of specific weight of the rock on the required size is indicated by the vertical spread of the solid line curves.

b. Gradation The following size criteria should serve as guidelines for stilling basin riprap gradation.

(1) The lower limit of W_{50} stone should not be less than the weight of stone determined using the appropriate "Stilling Basins" curve in Chart 712-1.

(2) The upper limit of W_{50} stone should not exceed the weight that can be obtained economically from the quarry or the size that will satisfy layer thickness requirements as specified in paragraph 6c.

(3) The lower limit of W_{100} stone should not be less than two times the lower limit of W_{50} stone.

(4) The upper limit of W_{100} stone should not be more than five times the lower limit of W_{50} stone, nor exceed the size that can be obtained economically from the quarry, nor exceed the size that will satisfy layer thickness requirements as specified in paragraph 6c

(5) The lower limit of W_{15} stone should not be less than one-sixteenth the upper limit of W_{100} stone.

(6) The upper limit of W_{15} stone should be less than the upper limit of W_{50} stone as required to satisfy criteria for graded stone filters specified in EM 1110-2-1901

(7) The bulk volume of stone lighter than the W_{15} stone should not exceed the volume of voids in the revetment without this lighter stone.

(8) W_0 to W_{25} stone may be used instead of W_{15} stone in criteria (5), (6), and (7) if desirable to better utilize available stone sizes.

c Thickness. The thickness of the riprap protection should be $2D_{50\ max}$ or $1.5D_{100\ max}$, whichever results in the greater thickness.

d Extent Riprap protection should extend downstream to where nonerosive channel velocities are established and should be placed sufficiently high on the adjacent bank to provide protection from wave wash during maximum discharge. The required riprap thickness is determined by substituting values for these relations in equation 2.

7. References.

(1) Shelford, W., "On rivers flowing into tideless seas, illustrated by the river Tiber." Proceedings, Institute of Civil Engineers, vol 82 (1885).

(2) Hooker, E H., "The suspension of solids in flowing water." Transactions, American Society of Civil Engineers, vol 36 (1896), pp 239-340.

(3) Isbash, S. V., Construction of Dams by Dumping Stones in Flowing

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Water, Leningrad, 1932 Translated by A Dorijikov, U. S. Army Engineer District, Eastport, CE, Maine, 1935.

(4) _____, "Construction of dams by depositing rock in running water." Transactions, Second Congress on Large Dams, vol 5 (1936), pp 123-136.

(5) DuBuat, P. L. G., Traite d'Hydraulique Paris, France, 1786.

(6) U. S. Army Engineer District, Portland, CE, McNary Dam - Second Step Cofferdam Closure Bonneville Hydraulic Laboratory Report No 51-1, 1956.

(7) U S. Army Engineer Waterways Experiment Station, CE, Velocity Forces on Submerged Rocks. Miscellaneous Paper No. 2-265, Vicksburg, Miss., April 1958.

(8) U. S. Bureau of Reclamation, Stilling Basin Performance; An Aid in Determining Riprap Sizes, by A. J. Peterka. Hydraulic Laboratory Report No. HYD-409, Denver, Colo., 1956

(9) Mavis, F. T. and Laushey, L. M , "A reappraisal of the beginning of bed movement - competent velocity." Second Meeting, International Association for Hydraulic Structure Research, Stockholm, Sweden, 1948. See also Civil Engineering, vol 19 (January 1949), pp 38, 39, and 72.

(10) U. S. Army, Office, Chief of Engineers, Engineering and Design; Hydraulic Design of Flood Control Channels. EM 1110-2-1601, Washington, D. C , 1 July 1970.

712-1
Revised 9-70

FAX COVER

Send To:

Name: TERRY DARRAGH

Company: SEC DONOHUE

Address: GREENVILLE, SC

Fax Number: 803-234-3069 Number of Pages: 4

Verification Number: 803-234-3054

Subject: HOLSTON RIVER M 139.08 INFO

From: Tennessee Valley Authority

Name: JIM GRAYFORD

Organization: FLOOD PROTECTION

Address: KNOXVILLE, TN

Fax Number: 615-632-2032

Telephone Number: 615-632-6850

Special Instructions:

Important! If you do not receive all pages, Call us back immediately.

TVA 15536 (IS-CRM 6/91)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
HOLSTON RIVER								
A	0	650	11,883	6.6	1141.8	1141.8	1142.7	0.9
B	1390	770	13,707	5.8	1142.8	1142.8	1143.7	0.9
C	5650	1100	14,867	5.3	1144.6	1144.6	1145.3	0.7
D	10,025	980	13,998	5.6	1146.2	1146.2	1147.2	1.0
E	14,075	820	12,322	6.4	1148.1	1148.1	1149.1	1.0
F	19,375	450[2]	9407	8.4	1152.1	1152.1	1152.7	0.6
G	24,545	490	9933	8.0	1155.7	1155.7	1156.6	0.9
H	27,330	440	9858	8.0	1157.5	1157.5	1158.4	0.9
I	30,080	360	8744	9.0	1158.9	1158.9	1159.8	0.9
J	33,095	460	9435	8.4	1160.9	1160.9	1161.9	1.0
K	35,390	1000	20,390	3.9	1163.1	1163.1	1164.1	1.0
L	36,235	1400	16,129	4.9	1164.0	1164.0	1164.9	0.9
M	38,664	1450	15,945	5.0	1166.0	1166.0	1166.8	0.8
N	42,466	1550	15,279	5.2	1167.7	1167.7	1168.7	1.0
O	45,634	850	13,139	6.0	1168.8	1168.8	1169.8	1.0
P	48,432	470	9999	7.9	1170.0	1170.0	1170.9	0.9
Q	52,022	540[3]	9857	8.0	1172.0	1172.0	1172.7	0.7
R	53,184	540[3]	10,685	7.4	1173.5	1173.5	1174.2	0.7

[1]FEET ABOVE RIVER MILE 131.21
[2]WIDTH PERPENDICULAR TO FLOW
[3]THIS WIDTH EXTENDS BEYOND COUNTY BOUNDARY

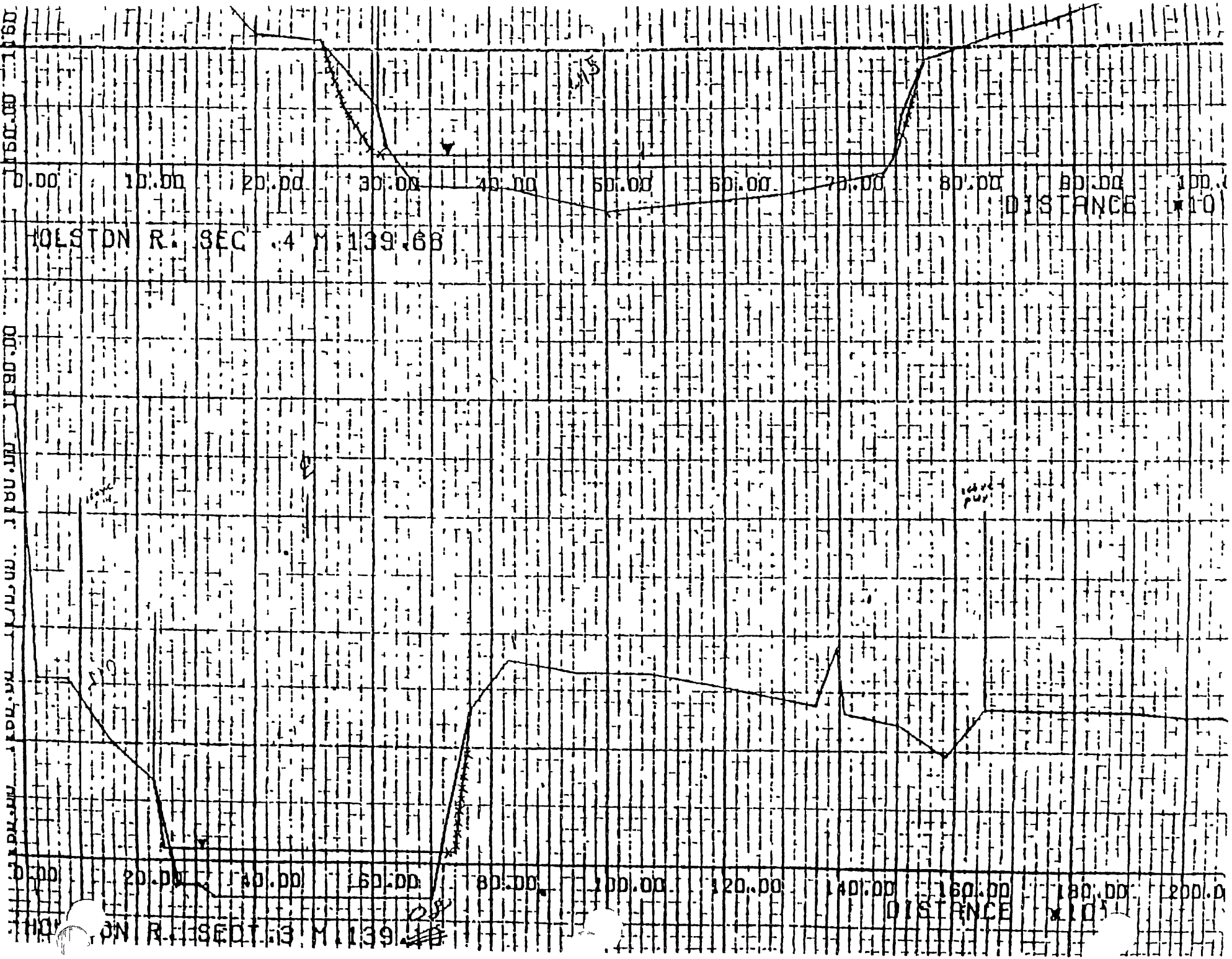
TABLE

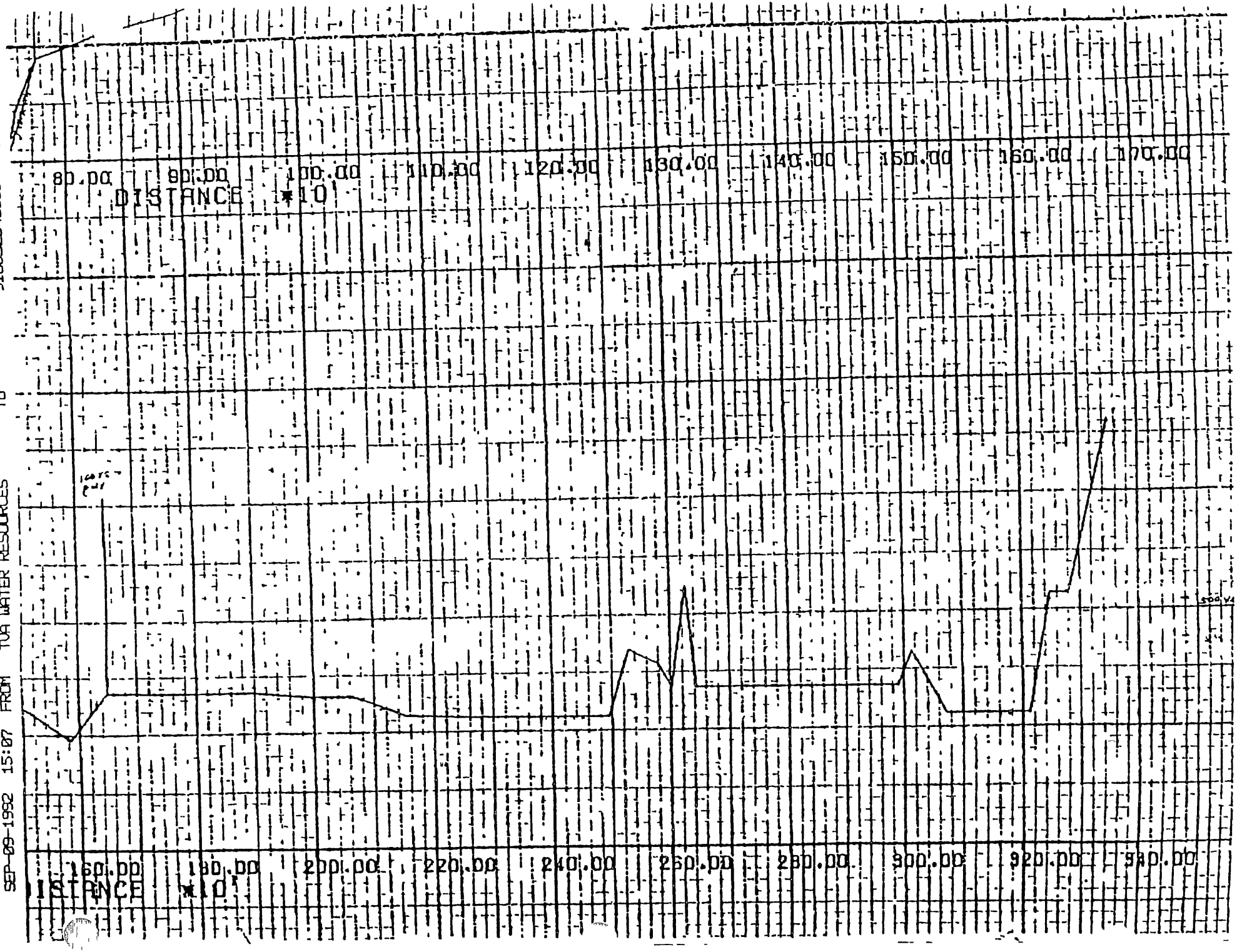
FEDERAL EMERGENCY MANAGEMENT AGENCY

HAWKINS COUNTY, TN
(UNINCORPORATED AREAS)

FLOODWAY DATA

HOLSTON RIVER


1160.00
1150.00
1140.00
1130.00
1120.00
1110.00
1100.00
1090.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.0
DISTANCE X10
HOLSTON R. SEC 4 M 139.68
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
180.00
200.0
DISTANCE X10
HOLSTON R. SECT 3 M 139.48


80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
160.00
170.00
DISTANCE *10
160.00
180.00
200.00
220.00
240.00
260.00
280.00
300.00
320.00
340.00
DISTANCE *10

ATTACHMENT 1 3 FLOOD PROFILES AND BACKWATER CURVE

Attachment 1 3 is a copy of permittee's flood profiles and backwater curves for Holston River, and a copy of Tennessee Valley Authorities 100-and 200- year flood elevations

TENNESSEE VALLEY AUTHORITY
KNOXVILLE TENNESSEE 37902

October 10, 1975

Mr. David Stinson
Post Office Box 749
Kingsport, Tennessee 37662

Dear Mr. Stinson

This is in reply to your oral request to John Rozek for the 100- and 200-year flood elevations along Holston River from miles 137 to 142 and along South Fork Holston River from miles 0 to 8. The requested information is given on the two enclosed profile drawings.

The 200-year flood on Holston River from mile 137 to the mouth of the South Fork at mile 142.2 approximates the 100,000 cubic feet per second natural profile marked in red on the Holston River drawing. The 100-year flood for this reach would be approximately 2 feet below the 200-year flood profile. The August 14, 1940, flood profile on the South Fork Holston River drawing is approximately equal to the 200-year flood from about mile 1.3 to mile 8.18 along South Fork Holston River. The maximum known flood (1901), regulated, approximates the 100-year flood for this same reach.

Please note that the backwater effect from the Holston River floods extends up the South Fork approximately 1.3 miles and should be considered the controlling elevation up to that point All of the above defined profiles assume existing upstream regulation This profile information is based on available data which were developed for conditions prior to 1960.

If we can be of further service please let us know.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

Edward H. Lesesne

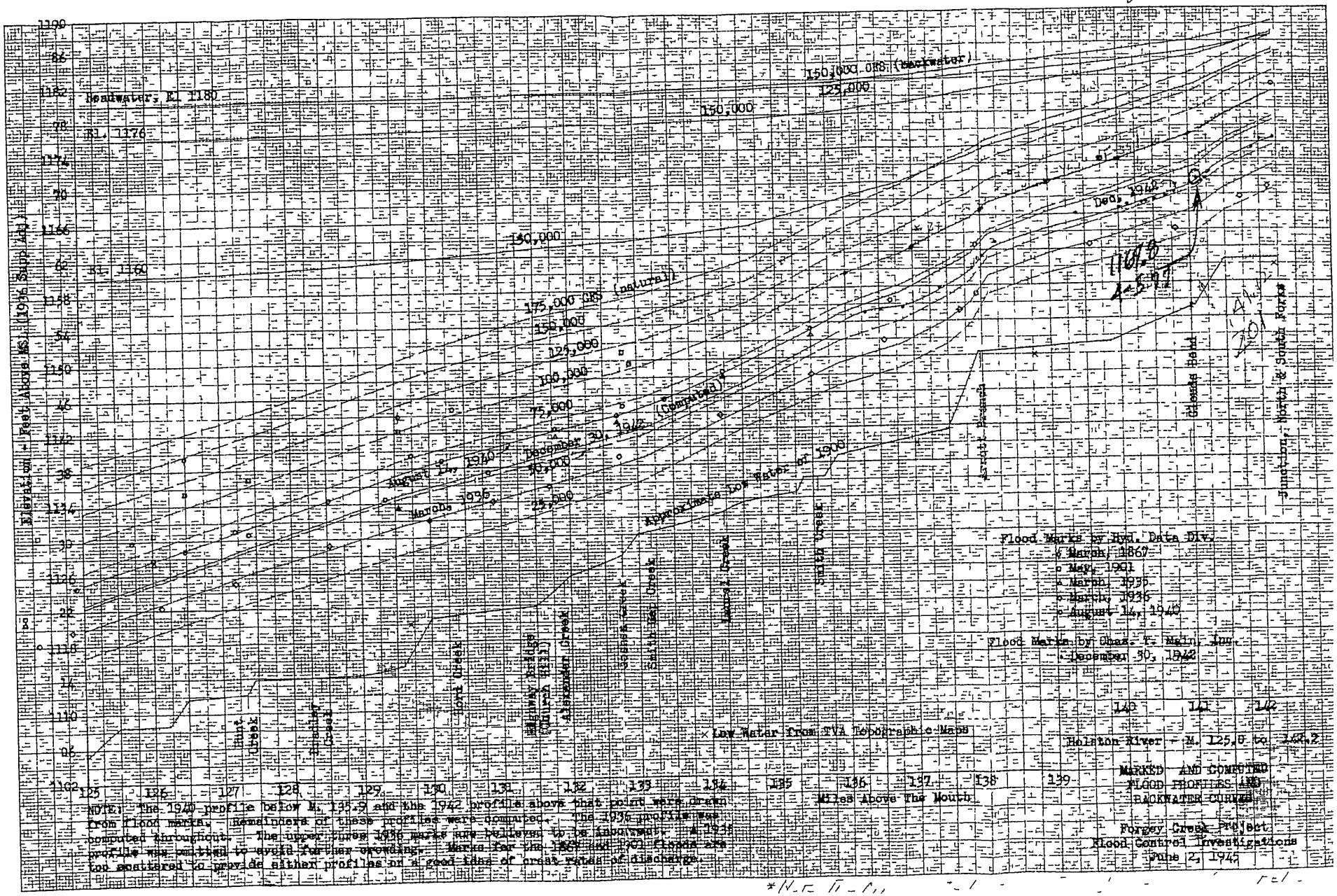
Edward H. Lesesne,
Director of Water Management

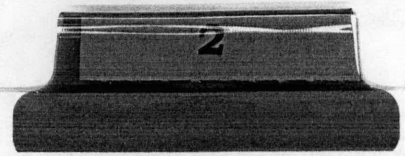
Enclosures

An Equal Opportunity Employer

FU 133-61.02
ajc

Drawing #1


Headwater, El. 1180
El. 1176
El. 1160
Elevation - Feet Above MSL (1936 Datum)
150,000 CFS (backwater)
125,000
150,000
175,000 CFS (natural)
150,000
125,000
100,000
75,000
50,000
25,000
(Computed)
December 30, 1942
August 14, 1940
March 1936
Approximate Low Water of 1900
Dec. 1942
Flood Marks by Hyd. Data Div.
6 March, 1867
May, 1901
March, 1936
March, 1936
August 14, 1940
Flood Marks by Chas. T. Main, Inc.
December 30, 1942
Low Water from TVA Topographic Maps
Holston River - M. 125.0 to 142.2
Miles Above The Mouth
Junction, North & South Forks
Glade Bend
Forgey Branch
South Creek
Alexander Creek
Fort Creek
Weather Creek
Hunt Creek
Highway Bridge
Railroad Bridge
NOTE: The 1940 profile below M. 135.9 and the 1942 profile above that point were drawn from flood marks. Remainders of these profiles were computed. The 1936 profile was computed throughout. The upper three 1936 marks are believed to be inaccurate. A 1936 profile was omitted to avoid further crowding. Marks for the 1867 and 1901 floods are too scattered to provide either profiles or a good idea of great rates of discharge.
MARKED AND COMPUTED FLOOD PROFILES AND BACKWATER CURVES
Forgey Creek Project
Flood Control Investigations
June 2, 1945


2

Facility: Holston Army Ammunition Plant
EPA Identification Number: TN5 21 002 0421
Permit Number: TNHW-148

ATTACHMENT 2 WASTE ANALYSIS PLAN

The chemical and physical characteristics of the hazardous wastes treated by open burning at the Burn Pan Unit at HSAAP are described in this Attachment. Information is presented on the chemical composition of the range of explosive waste materials that may be treated by open burning in the Burn Pan Unit. A Waste Analysis Plan for both the wastes treated and treatment residues is included. Quality assurance, treatment emissions, and land disposal restrictions are also addressed.

CHEMICAL AND PHYSICAL ANALYSES

Wastes Treated at Miscellaneous Units

The Burn Pan Unit, which is used to treat reactive hazardous waste, is classified as a miscellaneous unit. The Burn Pan Unit is used to treat reactive hazardous wastes received from the manufacturing area, the product storage area, and the laboratory. The chemical and physical information for reactive hazardous wastes generated at the manufacturing area, the product storage area, and the laboratory is provided in following three sections respectively.

Manufacturing Area Materials Chemical and Physical Information

HSAAP manufactures explosives and explosive formulations. The principal explosives manufactured at HSAAP are cyclotrimethylene trinitramine (RDX) cyclotetramethylene tetranitramine (HMX), NTO (3-nitro –1,2,4 triazol-5-one), and DNAN (2,4-dinitroanisole). TNT, Triamino-trinitrobenzene (TATB), and nitrocellulose (NC) are examples of explosives brought from off-site which are used to produce other explosive compounds. Table 2-1 includes a listing of the representative range of explosives compounds that HSAAP manufactures or incorporates into products along with the chemical formulas of these compounds. This table also includes materials such as propellants (e.g., nitrocellulose [NC]), which are not manufactured by HSAAP but are part of product formulations that may be treated in the burn pans. These energetics (explosives/propellants) are manufactured as either final products or as an intermediate phase to the final product. The final products are packaged and shipped off-site or stored temporarily in the storage magazines.

The end-products manufactured and formulated at HSAAP may contain nonexplosive additives such as waxes and lecithin. Table 2-2 provides a listing of such additives and their chemical formulas. Table 2-3 provides a representative listing of the items manufactured and potentially treated at the Burn Pan Unit by HSAAP along with their explosive and nonexplosive constituents.. HSAAP does not utilize any RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) in the manufacturing of the explosives. These metals are not present in the primary raw ingredients (e.g., acetic acid, nitric acid, hexamine) or in the various additives (e.g., wax, lecithin) that are added as binders for many products.

Process Description

HSAAP operates 10 identical process lines for the manufacturing of explosives Figure 2-1 is a schematic of the building layout in the manufacturing area of HSAAP The following is a general description of the process used to manufacture explosives at HSAAP

1 Raw materials (acetic acid, nitric acid, ammonium nitrate, acetic anhydride, and hexamine) are pumped from Building C to Building D see Figure 2-1 Building D, known as the Nitration Building, is where nitrification takes place The nitrification of the raw products produces an acid slurry of explosives

2 The acid slurry of explosives is pumped to Building E for washing Here the spent acid is removed by washing A small amount of the dilute acid is returned to Building D to be used as dilution liquor The remaining dilute acid is piped to the primary distillation line (B line), where any remaining explosives are recovered and returned to Building E The recovered acid, free of explosives, is pumped to Area A for reprocessing into glacial acetic acid or acetic anhydride, both of which are returned to Area B as raw materials to be used in production

3 The crudely washed explosive, in water slurry, is pumped to Building G (Recrystallization Building) The explosive is partially dissolved in a solvent, simmered, and recrystallized by boiling off the solvent The solvent vapor is condensed and collected in a tank for re-use The remaining explosive and water slurry is pumped to Building H (Dewatering Building), where it is discharged to nutsches The excess water is removed by vacuum and the weight adjusted

   A representative list of solvents includes

   - Toluene,
   - MEK,
   - Acetone,
   - Cyclohexanone,
   - n-octane, and
   - Ethyl acetate

4 The explosive is then sent to one of the Incorporation Buildings or returned to Building G, where it is combined with supplied raw materials to produce the specified final formulation

5 The final products are then sent to Building N for packaging

6 From Building N, the products go either directly to the loading docks for shipment or to a storage magazine for storage

Off-Specification Materials

Military explosives must behave in very predictable patterns when used Therefore, military explosives must meet very exacting specifications Small deviations in composition and/or physical properties can result in the material being classified as off-specification Deviations in granularity, color, and sensitivity all can result in a product's being classified as off-specification Most off-specification materials are classified as such as the result of foreign matter Foreign matter often causes an increase in sensitivity Sensitivity to initiation is a measure of how much

initiating force is required for the material to explode Small amounts of foreign matter, such as glass or rust, will increase the sensitivity of a product Another source of sensitized material is the formation of polymorphic forms of nitramines during hydration These deviations in physical properties and the presence of foreign matter would not affect the burning characteristics of material or the treatment residuals and emissions, but would potentially affect the performance of the explosives in the field

TABLE 2-1

REPRESENTATIVE RANGE OF EXPLOSIVES IN FORMULATIONS MANUFACTURED AT HOLSTON ARMY AMMUNITION PLANT KINGSPORT, TN

Name	Chemical Formula
(BTN) 1,2,4-Butanetriol Trinitrate	$C_4H_7N_3O_9$
(DEGN) Diethyleneglycol Dinitrate	$C_4H_8N_2O_7$
(EDDN) Ethylenediamine Dinitrate	$C_2H_{10}N_4O_6$
(Haleite) Ethylenedinitramine	$C_2H_6N_4O_4$
(HMX) Cyclotetramethylene Tetranitramine	$C_4H_8N_8O_8$
(NC) Nitrocellulose	$(C_6H_7N_{2.25}O_{9.5})_n$
(NG) Nitroglycerine	$C_3H_5N_3O_9$
(NQ) Nitroguanidine	$CH_4N_4O_2$
(NS) Nitrostarch	$C_6H_7(OH)_x(ONO_2)_y$ where x - y = 3
(PETN) Pentaerythritol Tetranitrate	$C_5H_8N_4O_{12}$
(RDX) Cyclotrimethylene Trinitramine	$C_3H_6N_6O_6$
(TEGDN) Triethylene Glycol Dinitrate	$C_6H_{12}N_2O_8$
(Tetryl) 2,4,6-Trinitrophenyl-methylnitramine	$C_7H_5N_5O_8$
(TMETN) 1,1,1-Trimethylolethane Trinitrate	$C_5H_9N_3O_9$
(DATB) 1,3-Diamino-2,4,6-trinitrobenzene	$C_6H_4N_5O_6$
(Explosive D) Ammonium Picrate	$C_6H_3N_3O_7 \times H_3N$
(HNAB) 2,2',4,4',6,6'-Hexanitroazobenzene	$C_{12}H_4N_8O_{12}$
(HNS) Hexanitrostilbene	$C_{14}H_6N_6O_{12}$
(TATB) 1,3,5-Triamino-2,4,6-trinitrobenzene	$C_6H_6N_6O_6$
(TNT) 2,4,6-Trinitrotoluene	$C_7H_5N_3O_6$
(TNAZ) 1,3,3-Trinitroazetidine	$C_3H_4N_4O_6$
FEFO	$C_5H_6N_4O_{10}F_2$
CL-20	$C_6H_6N_{12}O_{12}$
Ammonium Nitrate	NH_4NO_3
AP (Ammonium Perchlorate)	NH_4ClO_4
NTO (3-nitro –1,2,4 triazol-5-one)	$C_2H_2N_4O_3$
TO (1,2,4 triazol-5-one)	$C_2H_3N_3O$
DNAN (2,4-dinitroanisole)	$C_7H_6N_2O_5$
NONA (nonanitroterphenyl)	$C_{18}H_5N_9O_{18}$
DNGU (1,4-dinitro-tetrahydro-imidazo[4,5-d]imidazole-2,5-dione)	$C_4H_4N_6O_6$
Research and Development Energetics	(very limited quantities)

TABLE 2-2

CHEMICAL COMPOSITION OF ADDITIVES IN EXPLOSIVE FORMULATIONS
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TN

Name	Chemical Formula
Stearic Acid	$C_{18}H_{36}O_2$
Wax	Hydrocarbon Mixture
Calcium Silicate	$Ca_3(Si_3O_9)$
Polyisobutylene	$[C_4H_8]_n$
Calcium Stearate	$C_{36}H_{70}CaO_4$
Dioctyl Adipate	$C_{22}H_{42}O_4$
Process Oil	Hydrocarbon Mixture
DMDNB	$C_6H_{12}N_2O_4$
Graphite	Carbon
Lecithin	$C_{10}H_{18}NO_8PR$
Lauryl Methacrylate	$C_{16}H_{30}O_2$
Dioctyl Maleate	$C_{20}H_{22}O_2$
NP	$C_8H_{14}N_4O_{10}/C_7H_{12}N_4O_{10}$
PDNPA	$C_6H_8N_2O_6$
FEFO	$C_5H_6N_4O_{10}F_2$
Tri-beta-chloroethyl Phosphate	$C_6H_{12}Cl_3O_4P$
Diphenylamine	$C_{12}H_{11}N$
Estane (Polyurethane Elastomer)	$(C_{5\ 14}H_{7\ 5}N_{0\ 19}O_{1\ 76})_n$
Irganox	$C_{73}H_{108}O_{12}$
Kel-F (Fluoroelastomer)	$(C_8H_2Cl_3F_{11})_n$
Nylon	$(C_6H_{11}NO)_n$
Viton-A (Fluoroelastomer)	Copolymer-Vinylidene Fluoride/ Hexafluoropropylene $(C_5H_{3\ 5}F_{6\ 5})$
Teflon	$(CF_2)_n$
Dioctyl Sabecate	$C_{26}H_{50}O_4$
Polyacrylic Elastomer	$(C_7H_{12}O_2)_n$
DNAN (2, 4, Dinitroanisole)	$C_7H_6N_2O_5$
CAB (Cellulose Acetate Butyrate)	Cellulosic Polymer
OXY-461 (vinyl chloride-chlorofluoroethylene copolymer)	$(C_2H_3Cl - C_2ClF_3)n$
Carbazole Violet 23	$C_{34}H_{22}Cl_2N_4O_2$
Polyethylene	$(C_2H_4)n$
Alipal co-433 Surfactant	$C_{23}H_{39}C_8SNa$
n-Methyl 4-nitroaniline	$C_6H_8N_2O_3$
isodecyl pelargonate	Synthetic Lubricant (C_nH_n)
Aluminum Powder	Al
Copper Powder	Cu
Phthalic Acid	$C_8H_6O_4$
Fumaric Acid	$C_4H_4O_4$

TABLE 2-3

REPRESENTATIVE CHEMICAL COMPOSITION OF ENERGETICS IN ITEMS TREATED BY OPEN BURNING HOLSTON ARMY AMMUNITION PLANT KINGSPORT, TN

Item Number	Item	Formulation Constituents	Weight Percent
1	CL-20	Hexanitroisowurtzitane	100
2	Composition A-3	RDX	90
		WAX	10
3	Composition A-3, Type II	RDX	90
		Polyethylene Emulsion	10
4	Composition A-4	RDX	96 5
		Wax	3 5
5	Composition A-5	RDX	98 5
		Stearic Acid	1 5
6	Composition B	RDX	59 5
		TNT	39 5
		Wax	1
7	Composition B-3	RDX	59 5
		TNT	40 5
8	Composition B-4	RDX	60
		TNT	39 5
		Calcium Silicate	0 5
9	Composition C-4	RDX	90 5
		Polyisobutylene	2 4
		Dioctyl Adipate	5 6
		Process Oil	1 5
		DMDNB	1 25
10	Composition CH-6	RDX	97 5
		Polyisobutylene	0 5
		Calcium Stearate	1 5
		Graphite	0 5
11	Composition D-2	Nitrocellulose	14
		Wax	84
		lecithin	2
12	CXM-9	HMX	97 5
		Lecithin	0 15
		Lauryl Methacrylate	2 35
13	CXM-3	RDX	96 5
		Dioctyl Maleate	3 5
14	CXM-6	RDX	95
		NP	5 0
15	CXM-7	RDX	95 3
		Dioctyl Adipate	4 7

TABLE 2-3

REPRESENTATIVE CHEMICAL COMPOSITION OF ENERGETICS IN ITEMS TREATED BY OPEN BURNING HOLSTON ARMY AMMUNITION PLANT KINGSPORT, TN

Item Number	Item	Formulation Constituents	Weight Percent
16	Cyclotol 70/30	RDX	70
		TNT	30
17	Cyclotol 75/25	RDX	75
		TNT	25
18	HDX-106	RDX	88 2
		Polyisobutylene	8 2
		Teflon	1 4
		Dioctyl Sebecate	2 2
19	HMX	Cyclotetramethylene Tetranitramine	100
20	LX-04	HMX	85
		Fluoroelastomer (Viton-A)	15
21	LX-07	HMX	90
		Fluoroelastomer (Viton-A)	10
22	LX-09	HMX	93 3
		2,2-Dinitropropylacrylate Polymer (PDNPA)	4 4
		Bis/2,2-dinitro-2-fluoroethyl/Formal (FEFO)	2 3
23	LX-10-2	HMX	94 6
		Fluoroelastomer (Viton-A)	5 4
24	LX-14-1	HMX	94 6
		Polyurethane Elastomer (Estane)	4 5
25	LX-17	Triamino-trinitrobenzene (TATB)	92 5
		Fluoroelastomer (Kel-F)	7 5
26	Octol 70/30	HMX	70
		TNT	30
27	Octol 75/25	HMX	75
		TNT	25
28	PBX-0280	RDX	95
		Polyurethane Elastomer (Estane)	5
29	PBX-9404	HMX	94
		Nitrocellulose	2 9
		Tris-beta-chloroethyl Phosphate	2 98
		Diphenylamine	0 10
30	PBX-9407	RDX	94
		Plastic Resin	6
31	PBX-9501	HMX	94 9
		Polyurethane Elastomer (Estane)	2 5
		Irganox	0 1
		NP	2 5
32	PBX-9502	TATB	95
		Fluoroelastomer (Kel-F)	5

TABLE 2-3

REPRESENTATIVE CHEMICAL COMPOSITION OF ENERGETICS IN ITEMS TREATED BY OPEN BURNING HOLSTON ARMY AMMUNITION PLANT KINGSPORT, TN

Item Number	Item	Formulation Constituents	Weight Percent
33	PBXN-7	TATB	60
		RDX	35
		Fluoroelastomer (Viton-A)	5
34	PBXN-3	HMX	86
		Nylon	14
35	PBXN-5	HMX	95
		Fluoroelastomer (Viton-A)	5
36	PBXN-6	RDX	95
		Fluoroelastomer (Viton-A)	5
37	PBXN-9	HMX	92
		Dioctyl Adipate	6
		Polyacrylic Elastomer	2
38	PETN	Pentaerythritol Tetranitrate	100
39	RDX	Cyclotrimethylene-Trinitramine	100
40	TATB	Triaminotrinitrobenzene	100
41	1,3,3-Trinitroazetidine (TNAZ)	Trinitroazetidine	100
42	TNT	Trinitrotoluene	100
43	CXM-8	RDX	95
		Isodecyl Petargonate	5
44	CXM-10	HMX	96
		Isodecyl Petargonate	4
45	CXM-11	HMX	96
		Isodecyl Petargonate	4
47	CXM-39	RDX	97 5
		Lecithin	0 15
		Methacrylate	2 35
48	CXM-AF-1	RDX	95
		Dioctyl Adipate	5
49	CXM-AF-5	RDX	95
		Dioctyl Adipate	5
50	CXM-AF-6	RDX	95
		Dioctyl Adipate	5
51	CXM-AF-7	RDX	95
		Dioctyl Adipate	5
52	PAX-21	DNAN	34
		RDX	35 75
		AP	30
		MNA	0 25
53	PAX-41	DNAN	34 75
		RDX	65
		MNA	0 25

TABLE 2-3

REPRESENTATIVE CHEMICAL COMPOSITION OF ENERGETICS IN ITEMS TREATED BY OPEN BURNING HOLSTON ARMY AMMUNITION PLANT KINGSPORT, TN

Item Number	Item	Formulation Constituents	Weight Percent
54	PAX-46	RDX	91
		Wax	9
55	PAX-48	DNAN	35
		HMX	12
		NTO	53
56	IMX-101	DNAN	Nominal 40
		NTO	Nominal 20
		NQ	Nominal 40
57	IMX-102	TNT	Nominal 35
		NTO	Nominal 50
		Wax	Nominal 15
58	IMX-104	DNAN	Nominal 32
		RDX	Nominal 15
		NTO	Nominal 53
59	PBXN-10	RDX	94
		Dioctyl Adipate	4 5
		Polyacrylic Elastomer	1 5
60	PBXN-11	HMX	96
		Dioctyl Adipate	3
		Polyacrylic Elastomer	1
61	PBXW-14	HMX	50
		TATB	45
		Fluoroelastomer (Viton-A)	5
62	PBXIH-18	HMX	64 4
		Aluminum	30
		Dioctyl Adipate	4 2
		Polyacrylic Elastomer	1 4
63	PAX-2A	HMX	85
		BDNPA/F	9
		Cellulose Acetate Butyrate (CAB)	6
		Graphite	0 02
64	PAX-3	HMX	64
		Aluminum	20
		BDNPA/F	9 5
		Cellulose Acetate Butyrate (CAB)	6 5
65	PAX-3 with R8002 Plasticizer	HMX	65
		Aluminum	20
		R8002	9 5
		Cellulose Acetate Butyrate	6 5

TABLE 2-3

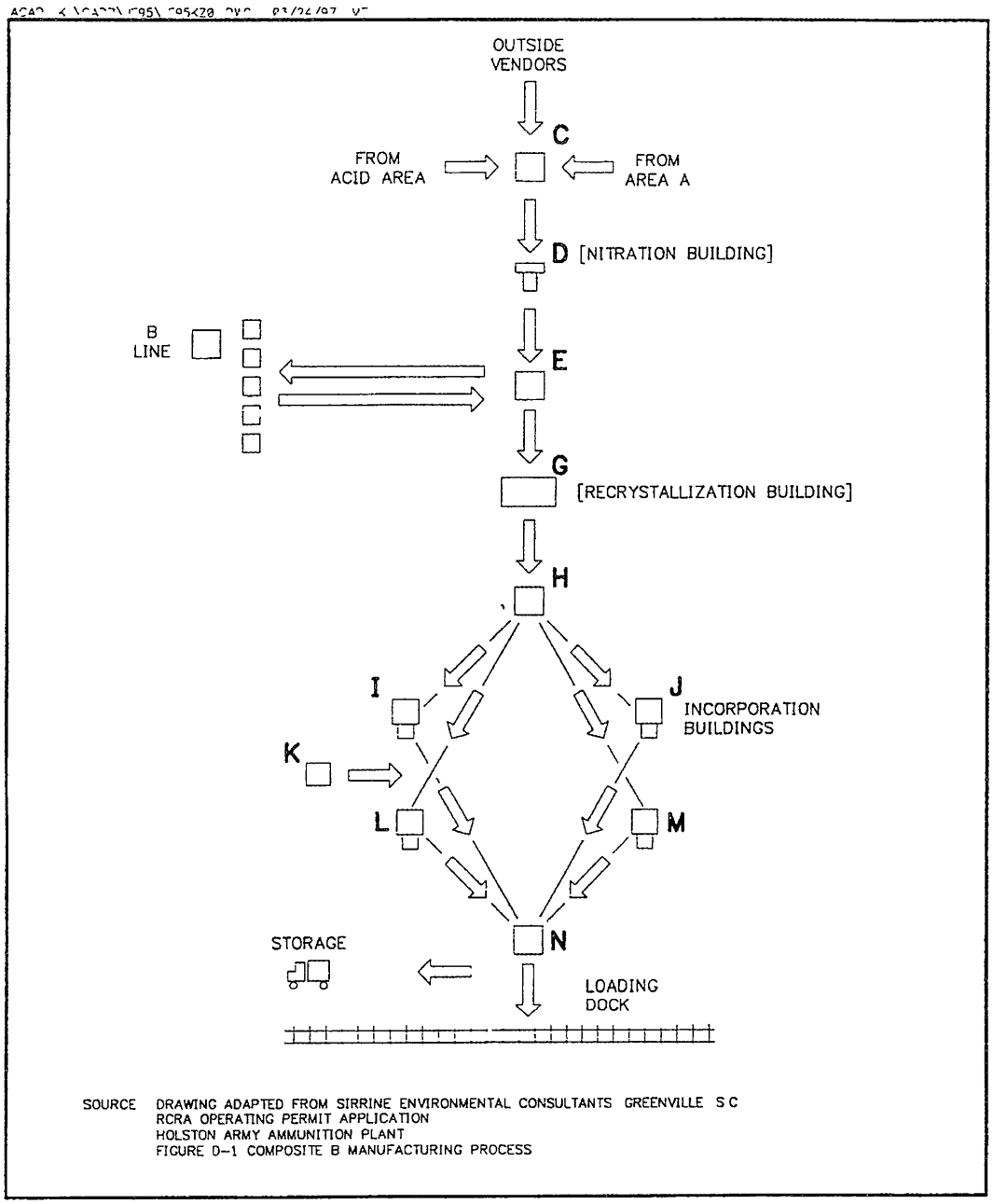
REPRESENTATIVE CHEMICAL COMPOSITION OF ENERGETICS IN ITEMS TREATED BY OPEN BURNING HOLSTON ARMY AMMUNITION PLANT KINGSPORT, TN

Item Number	Item	Formulation Constituents	Weight Percent
66	ROWANEX 4400	RDX	72 27
		Polyisobutylene	10 69
		Aluminum	14 85
		Wax	1 13
		DMDNB	1
67	OSX-12	DNAN	30 5
		Aluminum	20
		NTO	29 5
		RDX	20
68	HMX Main (Grade C and H300)	HMX	98
		Wax	1 25
		Graphite	0 75
69	HMX Main (H310)	HMX	98 5
		Wax	1
		Graphite	0 5

Note Weights and percentages of energetics are estimates in some cases Where percentages vary for a constituent, midpoints were chosen Total percentage may not equal 100 percent

Updated 12/06/2010

FIGURE 2-1



SCHEMATIC OF MANFACTURING AREA
BUILDING LAYOUT
HOLSTON ARMY AMMUNITION DEPOT
KINGSPORT, TN

FIGURE C-1

Brown & Root Environmental

039713/P

Catch Basin Residues

During the manufacturing process, waters containing explosives are generated at different stages in the production process of explosives Explosives are generally insoluble in water and form heavy solids, which settle out rapidly Within each process building where explosives may be present, catch basins are used to remove the explosive solids Catch basins are units in which quiescent conditions allow explosives to settle Water from the catch basin is sent to the wastewater treatment system The catch basins are periodically cleaned out and the solids removed The solids are sent to the Burn Pan Unit for treatment The catch basin constituents vary depending on the particular products that have been manufactured during the period between cleanings and the process that occurs at a particular building Each process building has a defined set of production processes that include input and output materials and residuals Information from the location where the catch basin materials originate is used to characterize the materials

Product Storage Area Materials Chemical and Physical Information

The existing ammunition storage facilities consist of earth-covered, concrete magazines used to store explosives in the form of finished explosive products Occasionally, the manufactured explosives that are no longer needed are classified as wastes because they cannot be reworked or recycled, or no buyer can be found In these cases, the manufactured explosives will be treated by open burning at the Burn Pan Unit In all cases the chemical and physical characteristics of the stored explosive formulations are known

Laboratory Wastes Chemical and Physical Information

HSAAP operates a laboratory that conducts quality control testing and research for new formulations The laboratory generates explosive material from several sources These sources include quality control samples on file, catch basin residues, and explosive contaminated research samples The composition of these materials is known based upon process knowledge

Burn Pan Unit Treatment Residues Chemical and Physical Properties

Open burning of explosives in the burn pans at the Burn Pan Unit generates very small amounts of ash (treatment residue) The treatment residue can be generated only as the result of combustion of the explosive materials The physical form of the treatment residue is distinctly different from the unburned explosive The treatment residue is a dark, coarse-grained material consisting primarily of dirt, glass, and inert material that was entrained in the waste explosives, whereas the explosives are light colored and have a physical form such as powder, granules or paste depending on the waste being treated The primary hazard associated with the treatment residue after thermal treatment is the possibility of trace amounts of reactive materials that failed to combust

The composition of any new formulation will be reviewed by HSAAP to determine whether any underlying hazardous constituents are present If any underlying hazardous constituents are present, the Burn Pan Unit treatment residue will be analyzed to determine whether the treatment standard has been met

Waste Characterization Procedures

Prior to treatment, process knowledge and product specifications are used to obtain chemical and physical information on the waste materials to be burned in the burn pans All wastes treated at the Burn Pan Unit are products manufactured at HSAAP or residues of the manufacturing process Material Safety Data Sheets (MSDSs) are the main source of information containing chemical and physical information for each product manufactured at HSAAP A new MSDS is prepared anytime a new product is manufactured Table 2-3 is a representative list of the products manufactured by HSAAP along with their formulation constituents and their percent compositions In the future, HSAAP may manufacture additional products When new products are manufactured at HSAAP, the MSDS for the new product is added to production specifications database These products will be composed of the same types of explosive materials (RDX, HMX, TATB, etc) and non-explosive additives (waxes, lecithin, etc) but in differing proportions and physical characteristics (grain size, density, etc) From time to time, new explosive formulations may be manufactured at HSAAP Any new explosive is expected to consist of the same elements (carbon, hydrogen oxygen, nitrogen), but in a different chemical structure In all cases the physical and chemical properties of these new explosives are expected to be similar to those listed in Table 2-3

The composition of any new formulation will be reviewed by HSAAP to determine whether any underlying hazardous constituents are present If any underlying hazardous constituents are present, the Burn Pan Unit treatment residue will be analyzed to determine whether the treatment standard has been met

Waste Receipt Verification Procedures

All of the wastes accepted for thermal treatment at the Burn Pan Unit are considered reactive hazardous wastes subsequent to being unloaded from the transport vehicle No other wastes, other than reactive hazardous wastes, are accepted into the Burn Pan Unit Any nonreactive wastes that are inadvertently brought to the unit will be returned to the originator The following procedures are used to verify that the waste received at the Burn Pan Unit is the waste meant for treatment

1) The transporting vehicle is inspected for fire symbol placards This is the initial verification that the waste being brought into the Burning Ground Area is actually an explosive waste

2) The Explosives Disposition Records (Figures 2-2 and 2-3) is inspected The Explosives Disposition Record is used to track explosive wastes from the point of generation to receipt at the Burn Pan Unit

   The Explosives Disposition Record consists of two parts One part consists of the Explosives Removal Request This part of the form contains information on the name of the waste material, its location, quantity, and the reason that the waste material must be removed A space for approval by the Environmental Coordinator is included Spaces for completion of information on the final treatment/disposition of the waste material are provided

   The second part of the form is the Explosives Waste Disposition Record The Building Operator provides information on the type of material (catch basin, scrubber, etc), the building number, the number of bags, the gross weight, and net explosive weight (NEW) The material handler (truck driver) verifies that the number of bags described by the operator is the number of bags collected The Burning Ground Attendant (Safety

Department Representative) verifies that the waste material described by the building operator was received at the Burning Ground (Burn Pan Unit) The Burning Ground Attendant (Safety Department Representative) also provides the time and date that the waste explosives were treated

WASTE LOCATION INFORMATION

Waste will be treated on a daily basis when the unit is active Based on these considerations, it is necessary to record location information

WASTE ANALYSIS RECORDS

Records and results of waste analysis will be kept The list of wastes will contain information on the energetic compositions of explosive items Waste composition information obtained in the process of evaluation of additional items for treatment at the Burn Pan Unit will be maintained Copies of the Explosives Disposition Records are retained for until closure Analytical results for the treatment residue will be maintained at the facility

WASTE MINIMIZATION CERTIFICATION

An annual certification will be prepared indicating that a program is in place at HSAAP to reduce the volume and toxicity of hazardous waste generated to the degree determined to be practicable from the standpoint of economics and safety The certification will also include a statement that the treatment by open burning is the only practicable method currently available to minimize present and future threats to human health and the environment

FIGURE 2-2

ORDNANCE SYSTEMS INC.
EXPLOSIVES REMOVAL REQUEST/EXPLOSIVES DISPOSITION RECORD

***This form is not for building or catch basin waste: use form 3158A**

Instructions: This form is to be completed for products or material that has been determined to be a waste, and is no longer marketable or usable product.

EXPLOSIVES REMOVAL REQUEST

MATERIAL DESCRIPTION

Material Name: _____ ☐ Solid ☐ Liquid

Location of Material _____ Quantity _____ Est. Value _____

Lot Number(s) _____ Batch Number(s) _____

Reason for Removal Request _____

☐ Material rejected by QA QA Investigation No.: _____

Note: If rejected by QA, Quality Manager's signature is required below.

HSAAP AND BAE INVENTORY AND ENVIRONMENTAL DISPOSAL APPROVAL

The material described above is declared: ☐ to be hazardous waste and must be disposed of **within 90 days** from the date below

Date declared a waste: _____

Hazardous waste code(s): ☐ D003 (reactive)

☐ D030 (2,4-Dinitrotoluene)

☐ not to be hazardous waste.

Recommended treatment/disposal: ☐ Onsite treatment in open burning facility (X01)

☐ Other: _____

BAE QUALITY MANAGER (if applicable) _____ Date _____ Time _____

HSAAP EXPL. INVENTORY CONTROL REP. _____ Date _____ Time _____

BAE EXPL. INVENTORY CONTROL REP. _____ Date _____ Time _____

BAE DIRECTOR OF MANUFACTURING _____ Date _____ Time _____

HSAAP ENVIRONMENTAL COORDINATOR _____ Date _____ Time _____

BAE ENVIRONMENTAL COORDINATOR _____ Date _____ Time _____

BAE DIRECTOR OF FINANCE _____ Date _____ Time _____

Cost code for INVA Transaction: _____

FINAL TREATMENT/DISPOSITION

The material described above was treated/disposed of in the following manner: ☐ Onsite treatment in open burning facility (X01)

Other: _____

Delivered to: _____ by _____ Date _____ Time _____

Received at _____ by _____ Date _____ Time _____

The material described above was treated/disposed of by _____

_____ Date _____ Time _____

HH-3158-B (07/08) Distribution: White-Explosives Records, Canary-Environmental (B-559), Pink-Explosives Mfg.or QA Goldenrod - Finance

FIGURE 2-3

ORDNANCE SYSTEMS INC.
EXPLOSIVES DISPOSITION RECORD

Instructions: This form is to be completed for building and catch basin waste (K044 & D003)

EXPLOSIVES WASTE DISPOSITION RECORD

TYPE OF MATERIAL (Catch Basin, Scrubber, Settling Tank, etc.)	Building No.	No. of Bags	Waste Material (Gross lbs.)	Waste Explosives* (Net lbs.)
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

_____ Building Operator _____ Date _____ Time AM/PM

*** Compensate for moisture and/or insolubles. The percentage of explosives equals 65% of the total weight.**

I verify that the number of bags stated above agrees with the number I have collected.

Explosives Division Truck Driver _____ Date _____ Time _____

I verify that the waste explosives described above were received at the Burning Ground.

Burning Ground Attendant _____ Date _____ Time _____

FINAL TREATMENT/DISPOSITION

The material described above was treated/disposed of in the following manner: _____

_____

The material described above was treated/disposed of by _____ Date _____ Time _____

HH-3158-A (12/06) Distribution: White-Explosives Records, Yellow-Environmental, Pink-Explosives Manufacturing

WASTE ANALYSIS PLAN

The waste analysis plan describes the methodologies for conducting the analysis required to (1) determine the RCRA hazard classification of wastes and (2) obtain the chemical and physical data necessary to properly treat hazardous wastes in the Burn Pan Unit The following information is discussed

- Parameters and Rationale
- Test Methods
- Sampling Methods
- Frequency of Analysis
- Additional Requirements for Wastes Generated Off-Site
- Additional Requirements for Ignitable, Reactive, or Incompatible Wastes

Parameters and Rationale

Wastes Treated

Process knowledge and product specifications are used to obtain the necessary chemical and physical data for the treatment of explosive materials in the burn pans It would be extremely rare for situations to occur where process knowledge is unavailable to adequately characterize explosive materials Each process building has a defined set of documented production processes, which include input and output materials, as well as residuals HSAAP is able to use documented information from the location where the waste is generated to characterize the materials coming directly from manufacturing processes, off-specification products, laboratory wastes, or stored explosive materials wastes There have not been any instances at HSAAP where unknown explosive wastes were generated

Treatment Residues

The only hazardous wastes treated at the Burn Pan Unit are D003, D030, and K044 The burn pan treatment residue is sampled and analyzed for reactivity prior to being removed for disposal In addition, although not expected to be present, the burn pan treatment residue is sampled and analyzed annually for the toxicity characteristic (TC) metals by using the toxicity characteristic leaching procedure (TCLP) Table 2-4 lists the parameters analyzed and the rationale for the analysis

Test Methods

Wastes Treated

Reactive hazardous wastes are not tested prior to treatment at the Burn Pan Unit The physical and chemical characteristics of the reactive hazardous wastes have already been determined prior to treatment

TABLE 2-4

RATIONALE FOR PARAMETERS ANALYZED
BURN PAN UNIT TREATMENT RESIDUE
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TN

Wastes	Parameters	Rationale
Burn Pan Treatment Residue	TC Leaching Procedure	Generate leachate
Burn Pan Treatment Residue	TC Arsenic	Determine if treatment residue exceeds TC level for arsenic
Burn Pan Treatment Residue	TC Barium	Determine if treatment residue exceeds TC level for barium
Burn Pan Treatment Residue	TC Cadmium	Determine if treatment residue exceeds TC level for cadmium
Burn Pan Treatment Residue	TC Chromium	Determine if treatment residue exceeds TC level for chromium
Burn Pan Treatment Residue	TC Lead	Determine if treatment residue exceeds TC level for lead
Burn Pan Treatment Residue	TC Mercury	Determine if treatment residue exceeds TC level for mercury
Burn Pan Treatment Residue	TC Selenium	Determine if treatment residue exceeds TC level for selenium
Burn Pan Treatment Residue	TC Silver	Determine if treatment residue exceeds TC level for silver
Burn Pan Treatment Residue	TC 2,4-Dinitrotoluene	Determine if treatment residue exceeds TC level for 2,4-dinitrotoluene
Burn Pan Treatment Residue	Reactivity	Determine if explosive has been treated

Treatment Residues

Analytical methods for analyzing the treatment residue in burn pans are shown in Table 2-5 Analytical procedures are from SW-846, 3rd Edition (or latest edition) The procedure for the Impact Sensitivity Test will be the latest approved method

The laboratory analyzing the burn pan residue will operate in conformance with a QA/QC plan that meets the requirements described in Chapter 1 of SW-846 or the latest Division approved method

Sampling Methods

Wastes Treated

The waste material is not being analyzed Therefore, no sampling procedures are necessary

Treatment Residues

Treatment residue is sampled only after the burn pan has cooled to ambient temperature The pan is divided into six to eight equally distanced sampling grids along the length of the pan From within each grid, approximately equal grab samples are obtained using a non-sparking scoop The scoop will have been cleaned using a laboratory-grade soap The grab samples are placed into a non-sparking bowl and homogenized by mixing with the scoop The homogenized sample is then placed into a sample bottle obtained from the laboratory The sample bottle is sent to the onsite HSAAP laboratory for reactivity analyses Annually, a second sample bottle is filled and sent to an off-site laboratory for TC characterization Labels and chain-of-custody forms are obtained from the laboratory Duplicate samples are collected at a frequency of one to every ten samples and serve as quality control to ensure the representativeness of the treatment residue wastes Each duplicate will be tested for the same parameters

Once the treatment residue in a burn pan is sampled for reactivity, the burn pan is not used for treatment again until test results are available and the treatment residue is removed If treatment were to take place before the treatment residue had been removed, the reactivity tests would be repeated

Frequency of Analysis

Wastes Treated

Process knowledge is used to determine the chemical and physical characteristics of wastes prior to every treatment The sampling and analyses of reactive hazardous wastes is not performed

Treatment Residues

Samples of treatment residue are analyzed for reactivity prior to removal of treatment residue from the burn pans The treatment residue is analyzed annually for the TC metals and 2,4-dinitrotoluene (if present in materials treated) Samples will be collected more frequently for the Toxicity Characteristic if the potential exists for a change in the toxicity characteristic of the

TABLE 2-5

PARAMETER TEST SUMMARY FOR BURN PAN UNIT TREATMENT RESIDUES
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TN

Parameter	Analytical Method	Method Number(1)
Toxicity characteristic	TCLP	40 CFR 268 Appendix I, SW-846 Method 1311
Reactivity	Impact Sensitivity Test	Holston ASM P-4
TCLP Arsenic	GFAA	SW-846 Method 7060A
TCLP Barium	ICPAA	SW-846 Method 3050B/6010B
TCLP Cadmium	ICPAA	SW-846 Method 3050B/6010B
TCLP Chromium	ICPAA	SW-846 Method 3050B/6010B
TCLP Lead	GFAA	SW-846 Method 3050B/6010B
TCLP Mercury	Cold Vapor AA	SW-846 Method 7471A
TCLP Selenium	GFAA	SW-846 Method 7740
TCLP Silver	ICPAA	SW-846 Method 3050B/6010B
TCLP 2,4-DNT	GC (ECD)	SW-846 Method 8270C

AA Atomic Absorption
ASM Analytical Standard Method
GC/MS Gas chromatograph/Mass Spectrometry
GFAA Graphite Furnace Atomic Absorption
ICPAA Inductively Coupled Plasma Atomic Absorption
TCLP Toxicity characteristic leaching procedure
1 Where SW-846 methods are referenced, the latest update will be used

treatment residues as a result of a change in the composition of the waste treated Such changes could occur if new explosive formulations with new constituents are treated Residue from any initial burn off for a new explosive formulation will be tested

Additional Requirements for Wastes Generated Off-Site

Currently, HSAAP handles only wastes that are generated on-site, however, the facility may accept similar explosive wastes generated off-site at some time in the future A maximum of 10 percent of the wastes treated in any annual period may be received from off-site facilities This is below the level for classification as a commercial facility as defined in Tennessee Rule 1200-01- 14- 01(2)(a) In no annual period will off-site wastes treated at the Burn Pan Unit exceed more than 10 percent of the total hazardous waste treated or disposed at the Burn Pan Unit For any reactive hazardous wastes received from off-site and treated at the Burn Pan Unit of HSAAP, information necessary to comply with the requirements of this Attachment, and the environmental performance standards will be obtained prior to treatment

HSAAP would only accept off-site generated wastes for treatment in the Burn Pan Unit that originate from processes which manufacture the same types of explosives as manufactured by HSAAP and which use similar manufacturing processes Off-site wastes will be accepted only from processes that have well documented input and output materials and residuals Generators will be required to use process knowledge and product specifications to obtain the necessary chemical and physical data Waste characterization of the off-site generated waste will be the responsibility of the generator A complete waste characterization provided by the off-site generator will be reviewed by HSAAP before HSAAP agrees to accept the waste For each new waste stream that is a candidate for management by the facility, the generator will provide the facility with any required Land Disposal Restriction Notification/Certification Information and/or Data [TN Rule 1200-01-11- 10(1)(g)1], and other supporting documentation, including information such as Material Safety Data Sheets, product ingredients, analytical data, etc

Waste Profile Re-evaluation

In accordance with TN Rule 1200-01-11- 06(2)(d), a waste profile re-evaluation will be conducted when one of the following occurs

- A generator notifies the facility that the process generating the waste has changed,
- The results of inspection or analysis indicate that the waste received at the facility does not match the identity of the waste designated on the accompanying manifest (or shipping paper) or pre-acceptance documentation, or
- Every two years A biennial waste profile re-evaluation along with a vigilant incoming load-screening program is sufficient to ensure that wastes continue to be properly managed at the facility
- For bullets one and three above, this re-evaluation process may consist of a review of the paperwork to ascertain that the analytical data is accurate and current and that it is sufficient to properly manage the waste as intended The procedure typically involves comparing the current waste profile to the available results of routine inspection, sampling, and analysis obtained upon receipt of an incoming load of the waste stream To augment this review, if existing analytical is not sufficient, the generator may be asked to review the

current waste profile, to supply a new profile, and/or to submit a sample for analysis, or the facility may obtain a sample from a load of the waste

Each shipment of off-site generated wastes received for treatment will be visually examined by the Safety Department Representative to assure that items listed on the manifest are the items that are received The wastes are identifiable by size, weight, shape, color, and markings stamped or stenciled on the shipping container The waste received will be verified against the hazardous waste manifest, or the DOD shipping paper and the waste characterization information received from the generator

Shipments received damaged, and/or with a quantity discrepancy will be separated from other lots in storage and placarded with a tag/label The lot will remain placarded until the discrepancy is resolved Shipments received without documentation will be rejected or held until the information is obtained

However in the event it were necessary to store wastes such storage would take place in conditionally exempt product storage igloos These igloos meet the requirements including Department of Defense Explosives Safety Board (DDESB) requirements listed in Tennessee Rule 1200-01-11- 09(13)(f) for exemption from RCRA requirements Storage of any rejected wastes would also take place in these conditionally exempt product storage igloos If it is necessary to store wastes, HSAAP will notify the Commissioner as required in Tennessee Rule 1200-01-11- 09(13)(f)(IV) and meet the other requirements listed in Tennessee Rule 1200-01-11- 09(13)(f) for maintenance of the conditional exemption for storage

The specific procedures used by HSAAP to track off-site hazardous waste is described below

1 Initiation of Process

a) Contact made between HSAAP and Generating Facility

b Type of Material identified

c Arrangements for Shipping are made

2 Receipt of Waste at HSAAP

a Truck Arrives at Gate

b Safety and Security personnel inspect vehicle, contents, and shipping paper manifests

c Truck is held in Suspect Yard until any discrepancies are resolved

d Truck is escorted to designated offloading point or explosives magazine storage point

i Waste may be offloaded into storage area temporarily and then loaded into in-plant truck for transport to burn pan unit,

ii Or, shipment truck is offloaded directly into in-plant truck for transport to burn pan unit at a designated explosives loading dock area where appropriate spill controls are available,

iii Or, if shipment truck is suitable, it may be offloaded directly onto burn pans at the burn pan unit

e Truck is taken to decon pad and is decontaminated if necessary

f Safety and Security personnel perform an inspection of the truck in order to release it

g Truck is escorted to plant gate and released

3 Treatment of Off-Site Waste at HSAAP

a) Records are reviewed to ensure that no more than 10 % of the total waste has originated from off-site,

b) A few days are allowed as necessary for water to evaporate from energetic material on the burn pans in order to facilitate an open burn,

c) Off-site wastes would then be treated by open burning per the same procedure as listed for on-site wastes

4 Generator notified of completion of treatment

a) Return copies of shipping papers, manifests, sent

b) Certification of Treatment sent to Generator

c) Other Paperwork completed as necessary

These igloos meet the requirements including Department of Defense Explosives Safety Board (DDESB) requirements listed in Tennessee Rule 1200-01-11- 09(13)(f) for exemption from RCRA requirements Storage of any rejected wastes would also take place in these conditionally exempt product storage igloos If it is necessary to store wastes, HSAAP will notify the Commissioner as required in Tennessee Rule 1200-01-11- 09(13)(f)(IV) and meet the other requirements listed in Tennessee Rule 1200-01-11- 09(13)(f) for maintenance of the conditional exemption for storage

Additional Requirements for Ignitable, Reactive, or Incompatible Wastes

All wastes treated at the Burn Pan Unit are reactive The sampling and analysis procedures described in the HSAAP Burn Pan Unit Waste Analysis Plan were developed with requirements based on reactivity characteristics Strong oxidizers would be the only incompatible waste Strong oxidizers are not accepted at the Burn Pan Unit No ignitability or corrosivity characteristic wastes are managed at the Burn Pan Unit The reactivity characteristics of the reactive hazardous waste and the treatment residue have already been discussed in the Waste Analysis Plan

QUALITY ASSURANCE (QA)

QA procedures for laboratory analysis of wastes will be followed according to the 3rd Edition (or latest edition) of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA, SW-846, 1986 The laboratory will use strict chain-of-custody procedures that conform to the EPA requirements contained in SW-846

EMISSIONS FROM OPEN BURNING IN PANS

The emissions from the open burning of explosives at HSAAP have not been tested Tests have not been conducted because of the need for specialized test facilities and test equipment required for the sampling and measuring of open burning treatment emissions plumes However, the Army has conducted an extensive testing program to determine the contents of emissions from the open burning and open detonation of military munitions The tests were conducted in a specially designed test chamber located at the Dugway Proving Grounds in Utah U S EPA assisted in the design of the experimental program and in oversight of the conduct of the test program

The test chamber, known as the "bang box," is designed to contain the open burn and open detonation treatment emissions The bang box consists of an inflated structure with the test pit in the center and sampling and analysis equipment After a burn or detonation, the emissions are trapped within the test chamber The bang box atmosphere is then sampled and analyzed and the concentrations of emission constituents determined The volume of the test chamber is known This allows the total mass of constituents emitted to be calculated The total mass of emission constituents is then used to calculate emission factors for each emission constituent The emission factors are stated in terms of pounds of emission constituent per pound of explosive material burned or detonated

To date, tests have been conducted on more than 20 military munitions items Several of the munitions tested are bulk explosives and explosive formulations, which were similar to, or the same as, explosives and explosive formulations manufactured by HSAAP and treated in the Burn Pan Unit These include the following

- Amatol (50% TNT, 50% Ammonium Nitrate)
- Composition B (RDX/TNT/wax)
- Double Base
- HBX (RDX/TNT/Al/wax)
- M1 (85% NC)
- M6 (85% NC)
- RDX
- TNT
- Triple Base

Table 2-7 contains a summary of the organic emission constituents and emission factors for each organic emission constituent as determined in the Dugway test program These emission factors are stated as pounds (lbs) of emission constituent per pound of explosive material stated as Net Explosive Weight (NEW) Data are included for products of complete combustion, such as carbon dioxide, and products of incomplete combustion (PICs), such as carbon monoxide and benzene

The data for Amatol, Composition B, HBX, RDX, and TNT were obtained from the detonation of these materials The data for Double Base, M1, M6, and Triple Base were obtained from the open burning of these materials A review of the carbon monoxide test data indicates that open burning is a more efficient process than open detonation The carbon monoxide values for the open burning ranged from 2 5E-5 or 2 5 x 10^{-5} lbs/lb-NEW to 7 0E-4 or 7 0 x 10^{-4} lbs/lb-NEW (0 000025 lbs/lb-NEW to 0 0007 lbs/lb-NEW) The carbon monoxide emission factors for open detonation ranged from 4 17 E-3 lbs/lb-NEW to 3 1E-2 lbs/lb-NEW (0 00417 lbs/lb-NEW to 0 031 lbs/lb-NEW) A review of the information presented in Table 2-6 shows that detonations of explosive materials resulted in a greater number of PICs and higher emission factors for these PICs However for PICs, in all cases, the emission factors are low, ranging from 1E-4 lbs/lb-NEW to 1E-9 lbs/lb-NEW (0 0001 to 0 000000001 lbs/lb-NEW)

The explosive Composition B, RDX, and TNT tested at Dugway are similar to Composition B, RDX, and TNT manufactured at HSAAP The detonation emission factors from these three compounds were used to estimate Burn Pan Unit emissions at HSAAP The open detonation emission factors were used, since no data are available for the emissions resulting from the open burning of explosive compounds (HMX, RDX, and TNT) Use of detonation emission factors as surrogates for emission constituents and emission quantities for Burn Pan Unit treatments is conservative, since open detonation appears to result in higher emissions

LAND DISPOSAL RESTRICTIONS

The explosive wastes treated at the Burn Pan Unit are D003, D030 and/or K044 The Land Disposal Restrictions (LDR) treatment requirement listed in Tennessee Rule 1200-01-11- 10(3)(a) for the explosives subcategory D030 and K044 wastes is deactivation and attainment of the treatment standards listed in Tennessee Rule 1200-01-11- 10(3)(i) Underlying hazardous constituents that may be present in the wastes treated are listed in Tennessee Rule 1200-01-11- 10(3)(i) Open burning achieves the LDR treatment standard of deactivation

A review of the waste composition information (see Tables 2-1 and 2-2) did not show the presence of any of the underlying hazardous constituents listed in Tennessee Rule 1200-01-11- 10(3)(a) The treatment residue generated from open burning at HSAAP Burn Pan Unit meets the RCRA LDR for explosive wastes In the future, new explosive formulations may be manufactured by HSAAP The composition of any new formulation will be reviewed by HSAAP to determine whether any underlying hazardous constituents are present If any underlying hazardous constituents are present, the Burn Pan Unit treatment residue will be analyzed to determine whether the treatment standard listed in Tennessee Rule 1200-01-11- 10(3)(a) has been met

The treatment residue generated in the burn pans is disposed into a non hazardous Subtitle D facility Currently, the onsite solid waste disposal facility at HSAAP is used to dispose of the wastes In accordance with Tennessee Rule 1200-01-11- 10(3)(i)(4), the following notification is provided to Tennessee Department of Environment and Conservation (TDEC) and retained in the HSAAP file

Notification

HSAAP disposes ash residue from the treatment of reactive explosive wastes into the onsite solid waste disposal facility located at HSAAP The explosive wastes, as initially generated, have the RCRA codes of D030 and K044 The treatability group as defined in Tennessee Rule 01-11-10(3)(a) is the explosives subcategory There are no underlying hazardous constituents present in the explosive wastes

Certification

The following certification will be made by HSAAP for any explosive wastes which contain underlying hazardous constituents, provided that any underlying hazardous constituents are treated by open burning

> *I certify under penalty of law that the waste has been treated in accordance with the requirements of* Tennessee Rule 1200-01-11- 10(3)(a) *to remove the hazardous characteristic, and that underlying hazardous constituents, as defined in* Tennessee Rule 1200-01-11- 10(1)(b), *have been treated onsite to meet the* Tennessee Rule 1200-01-11- 10(3)(i) *Universal Treatment Standards I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment*

FATE AND TRANSPORT PROPERTIES OF WASTE AND TREATMENT EMISSION CONSTITUENTS

Table 2-7 contains a summary of the fate and transport mobility parameters for constituents of concern at HSAAP

MAF/02/24/2011

TABLE 2-6
DUGWAY TEST PROGRAM EMISSION FACTOR DATABASE
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TN
Page 1 0f 2

Compound	Amatol (50% TNT, 50% Ammonium Nitrate)	Composition B (56/68/6 RDX-TNT-WAX)	Double Base (50% nitrocellulose)	HBX (48/31/17/4 RDX-TNT-Al-WAX)	M1 (85% Nitrocellulose)	M6 (87 7% Nitrocellulose)	RDX (cyclotrimethylene-trinitramine)	TNT (2,4,6-Trinitrotoluene)	Triple Base (M30-28% Nitrocellulose)
1,2,4-Trimethylbenzene	6 21E-07	9 79E-07		4 93E-07					
1,3 - Butadiene								5 34E-07	
1 3 5-Trimethylbenzene	2 48E 07	3 66E-07		3 65E-07					
1 3 5-Trinitrobenzene		1 72E-05		1 23E-05				2 88E-05	
1,3-Dinitrobenzene		2 83E-07							
2 4 6-Trinitrotoluene								3 45E-05	
2,4-Dinitrotoluene	4 05E-07	2 33E-07		2 74E-07	1 20E-09	1 00E-09		7 55E-06	
2,6-Dinitrotoluene						1 00E-10			
2-Methylnapthalene	6 93E-10	9 81E-08						1 78E-06	
3,4-Methylphenol (m- & p-cresol)								5 30E-08	
4-Aminobiphenyl				2 19E-07					
4-Nitrophenol	3 28E-07			5 29E-07					
Acenaphthylene								1 66E-07	
Acetophenone	1 23E-09	1 67E 07		3 80E-07				5 18E-06	
Alkanes (Paraffins)	1 58E 05	1 14E-05		1 44E-05				3 29E-06	
Alkenes (Olefins)	1 38E-04	3 36E-05		9 35E 05				4 14E-05	
Anthracene								1 49E-07	
Aromatics	4 27E-05	2 35E-05		1 38E-05				2 93E-06	
Arsenic								6 54E-06	
Benz(a)anthracene	1 18E-07							7 18E-07	
Benzene	1 99E-05	5 16E-06	1 60E-05	7 05E 06	4 80E-06	1 70E-06	6 90E-05	6 28E-06	
Benzo(a)pyrene	5 20E-08							4 64E-07	
Benzo(b)fluoranthene	9 93E-08							8 28E-07	
Benzo(g h i)perylene								1 52E-07	
Benzo(k)fluoranthene	9 93E-08							6 07E-07	
Benzyl alcohol	5 88E-09	1 92E-07		3 33E-07				4 42E-08	
Biphenyl								3 44E-07	
bis(2-Ethylhexyl)phthalate	4 84E-07	1 63E-06		3 70E-06				8 81E-07	
Butylbenzyl phthalate	4 36E-07	4 83E-07		1 61E-06				2 91E-06	
Carbon dioxide	8 03E 01	1 25E+00	1 00E+00	1 14E+00	1 10E+00	1 06E+00	5 70E-01	1 42E+00	6 60E-01
Carbon monoxide	9 71E-03	4 17E-03	7 00E-04	5 18E-03	2 50E-04	9 50E-05	3 10E-02	7 23E 03	2 50E-05
Carbon tetrachloride	3 74E-07	3 64E-07		2 60E-07					
Chloroform				3 82E-07					
Chromium	1 42E-06	1 48E-06		5 33E-06				3 68E-05	
Chrysene	9 46E-08								
Di-n-butyl phthalate	1 69E-07	2 08E-07		1 38E-06				2 51E-06	
Di n-octyl phthalate	1 20E-06	2 30E 06		8 51E-06				8 70E 07	
Dibenzofuran								6 86E 08	
Dichloromethane	1 50E-04	2 83E-04		2 72E-04					
Diethyl phthalate	3 57E 08	1 85E-07		2 45E-06				1 93E-06	
Dimethyl phthalate		2 86E-07		5 89E-07					
Diphenylamine					1 10E-10	2 60E-10			
Ethylbenzene	1 24E 06	1 96E-06		2 05E-06					
Fluoranthene								4 88E 06	
Fluorene								3 86E-08	

TABLE 2-6
DUGWAY TEST PROGRAM EMISSION FACTOR DATABASE
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TN
Page 2 0f 2

Compound	Amatol (50% TNT, 50% Ammonium Nitrate)	Composition B (56/68/6 RDX-TNT-WAX)	Double Base (50% nitrocellulose)	HBX (48/31/17/4 RDX-TNT-Al-WAX)	M1 (85% Nitrocellulose)	M6 (87 7% Nitrocellulose)	RDX (cyclotrimethylene-trinitramine)	TNT (2,4,6-Trinitrotoluene)	Triple Base (M30-28% Nitrocellulose)
Freon 11	3 35E-06	1 46E-06		2 58E-07					
Freon 113	3 73E-07	3 64E-07							
Freon 12	4 46E-06	3 71E-07		3 71E-07				1 39E-06	
Freon 14	3 72E 07								
HMX								2 36E-06	
Indeno(1,2,3-cd)pyrene								1 69E-07	
m- & p-Xylene	3 60E-06	6 74E-06		5 77E-06					
Methane			7 50E-04		8 00E-03	4 60E-05	2 00E-04	1 83E-05	
Methyl chloride	7 47E 07	7 38E-07		6 29E 07				4 94E-07	
Methyl chloroform	2 49E-07			3 82E-07					
N-Nitronaphthalene						1 40E-10			
n-Nitrosodiphenylamine								8 70E-08	
Naphthalene	1 75E-09	9 81E 08		3 81E-09	1 90E-08	7 50E-08		3 58E-06	
Nitrogen dioxide (peroxide)		1 92E-04	1 50E-04	4 41E-05	4 70E-04	5 20E-03	6 00E-04	6 59E-05	2 10E-03
Nitrogen oxide	1 77E-02	9 28E-03	2 60E-03	9 85E-03	1 20E-03	2 40E 03	9 00E-04	9 20E-03	5 20E 03
o-Xylene	1 49E-06	2 70E 06		2 57E-06					
p-Ethyltoluene	1 25E 07	7 36E-07		3 69E-07				4 47E-07	
Perylene	5 20E-08								
Phenanthrene	1 28E-07	7 57E-08		4 44E 07				6 07E-07	
Phenol	4 39E-09	2 15E-09		1 06E-08	3 43E-09	1 50E-09		1 52E-06	
Potassium	5 51E-05	5 54E-05		2 01E-04				2 75E-03	
Pyrene	1 37E 07	6 34E-08		2 10E-07				5 32E-06	
RDX								9 59E-06	
Styrene				1 85E-06				1 46E-06	
Tetrachloroethylene	2 49E-07	1 80E-05							
TO - 12 (NMOC)								8 42E-05	
Toluene	7 09E-06	3 92E-06		1 64E-06				1 46E-06	
Total Non-methane Hydrocarbons	4 51E-04	1 14E-04	5 60E-04	1 81E-04	4 60E-04	1 30E-05	1 30E-03	3 92E-05	1 50E-05
Total Non-methane Organic Compounds	5 76E-04	2 90E 04		4 30E-04					
Total Unidentified Hydrocarbons	2 54E-04	4 54E-05		5 23E-05					

TABLE 2-7

MOBILITY PARAMETERS FOR CHEMICALS OF POTENTIAL CONCERN
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TN
PAGE 1 OF 2

Chemical	CAS Number	Molecular Weight[1]	Density[1] (g/ml)	Vapor Pressure[4] (mm Hg) (25°C)	Water Solubility[4] (mg/L) (25°C)	log K_{ow}[4] Octanol/Water Partition Coefficient	K_{oc} (ml/g) Organic Carbon Partition Coefficient	Henry's Law Constant[4] (atm-m^3/mole)	Bioaccumulation Factor[2] (L/kg)	Half-life[11] soil (hours)	Half-life[11] ground water (hours)	Aquatic Photolysis Half-life[11] (hours)	Aqueous Biodegradation[11] (hours) Aerobic (A) or	Anaerobic (AN)
Explosives														
(BTN) 1 2 4-Butanetriol Trinitrate	6659-60-5	241 11	1 52[5]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(DEGN) Diethyleneglycol Dinitrate	693-21-0	196 12	1 38[5]	4 8x10^{-3}[5]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(EDDN) Ethylenediamine Dinitrate	NA	186 1[5]	1 58[5]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(Haleite) Ethylenedinitramine	505-70 5	150 09	1 71[5]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(HMX) Cyclotetramethylene Tetranitramine	2691-41-0	296 16	1 86[5][6]	NA	NA	0 54[2]	3 80[2]	NA	NA	NA	NA	NA	NA	NA
(NC) Nitrocellulose	9004-70-0	252 14	1 67[5]	NA	NA	NA	NA	NA	1 7	NA	NA	NA	NA	NA
(NG) Nitroglycerine	55-63-0	227 09	1 59[5]	0 04	1380	1 62	NA	9 87x10^{-8}	NA	48-168	96-336	928-2784	192-672	AN
(NQ) Nitroguanidine	556-88-7	104 07	1 71[5]	1X10^{-9}	4400	-0 89	0 1334[2]	4 49x10^{-12}	0 12	NA	NA	NA	NA	NA
(NS) Nitrostarch	NA	NA	1 6[5]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(PETN) Pentaerythritol Tetranitrate	78-11-5	316 14	1 76[5]	NA	<1 g/100ml @22°C[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA
(RDX) Cyclotrimethylene Trinitramine	121-82-4	222 12	1 82[5]	4 1x10^{-9}	59 7	0 87	7 17[2]	6 32x10^{-8}	190	NA	NA	NA	NA	NA
(TEGDN) Triethylene Glycol Dinitrate	111-22-8	241 17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(Tetryl) 2 4 6-Trinitrophenyl-methylnitramine	479-45-8	287 15	1 73[5]	NA	0 02 g/100ml[1]	2[2]	92 53[2]	NA	19	NA	NA	NA	NA	NA
(TMETN) 1 1 1-Trimethylolethane Trinitrate	3032-55 1	255 14	1 47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(DATB) 1 3-Diamino-2 4 6-trinitrobenzene	28930-29-2	243 14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(Explosive D) Ammonium Picrate	131-74-8	246 14	1 72[5]	NA	1 g/100ml[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA
(HNAB) 2 2 4 4' 6 6'-Hexanitroazobenzene	19159-68-3	452 21	1 6[5]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(HNS) Hexanitrostilbene	20062-22-0	450 23	1 74[5]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(TATB) 1 3 5-Triamino-2 4 6-trinitrobenzene	3058-38-6	258 15	1 93[5]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(TNT) 2 4 6-Trinitrotoluene	118-96-7	227 13	1 65	8 2x10^{-6}	130	1 6	1 0[2]	4 57x10^{-7}	33	672-4320	672-8640	3 7-11 3	672-4320	A AN
(TNAZ) 1,3 3-Trinitroazetidine	NA	192 09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FEFO	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(CL-20) Hexanitroisowurtzitane	NA	438 19[13]	2 04[13]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatiles, Semivolatiles and Inorganics														
1 2 4-Trimethylbenzene	95-63-6	120 19	0 876	2 1	57	3 63	472[12]	6 16x10^{-3}	439 (estimated)[12]	168-672	336-1344	NA	672-2688	AN
1 3-Butadiene	106 99-0	54 09	NA	2 11x10^{-1}	735	1 99	120[7]	7 36x10^{-2}	19	168-672	336-1344	380	672-2688	AN
1 3 5-Trimethylbenzene	108-67-8	120 19	0 865	2 48	48 2	3 42	NA	8 77x10^{-3}	NA	NA	NA	NA	NA	NA
1 3 5-Trinitrobenzene	99-35-4	213 11	1 76[8]	6 422x10^{-6}	278	1 18	14 5[2]	3 31x10^{-10}	4 8	NA	NA	NA	NA	NA
1 3-Dinitrobenzene	99-65-0	168 11	1 37	9 0x10^{-1}	533	1 49	150[7]	4 9x10^{-8}	9 7	672-4320	554-720	554-720	672-4320	A
2 4-Dinitrotoluene	121-14-2	182 14	1 52	1 47x10^{-4} @ 22°C	270 @ 22°C	1 98	45[7]	5 4x10^{-8}	19	672-4320	48-8640	23-72	672-4320	A
2-Methylnaphthalene	91-57-6	142 20	1	5 5x10^{-2}	24 6	3 86	224[2]	5 18x10^{-4}	540	NA	NA	NA	NA	NA
3 4-Methylphenol (m- & p-cresol)	1319-77-3	324 42	1 04	1 7x10^{-1}	9066	1 95	500[7]	6 19x10^{-7}	9[10]	1-696	2-1176	NA	240-1176	AN
Acenaphthylene	208-96-8	152 20	0 899	9 12x10^{-4}	16 1	3 94	2500[7]	1 14x10^{-4}	38	1020-1440	2040-2880	NA	4080-5760	AN
Acetophenone	98-86-2	120 15	1 03	3 97x10^{-1}	6130	1 58	23 38[2]	1 04x10^{-5}	120	NA	NA	NA	NA	NA
Anthracene	120-12-7	178 23	1 28	2 67x10^{-6}	0 0434	4 45	14000[7]	5 56x10^{-5}	1300	120-11040	2400-22080	0 58-1 7	4800-44160	AN
Benzo(a)anthracene	56-55 3	228 29	NA	1 9x10^{-6}	0 0094	5 76	1380000[7]	1 2x10^{-4}	13000	2448-16320	4896-32640	1-3	9792-65280	AN
Benzene	71-43-2	78 11	0 879	9 48x10	1790	2 13	83[7]	5 55x10^{-3}	23	120-384	240-17280	2808-16152	2688-17280	AN
Benzo(a)pyrene	50-32-8	252 31	1 35	5 49x10^{-9}	0 00162	6 13	5500000[7]	4 57x10^{-7}	25000	1368-12720	2736-25440	0 37-1 1	5472-50880	AN
Benzo(b)fluoranthene	205-99-2	252 31	NA	5x10^{-7}	0 0015	5 78	550000[7]	6 57x10^{-7}	25000	8640-14640	172780-29280	8 7-720	34560 58560	AN
Benzo(g h i)perylene	191-24-2	276 34	NA	1x10^{-10}	0 00026	6 63	1600000[7]	3 31x10^{-7}	61000	14160-15600	28320 31200	NA	56640-62400	AN
Benzo(k)fluoranthene	207-08-9	252 31	NA	9 65x10^{-10}	0 0008	6 11	550000[7]	5 84x10^{-7}	87000	21840-51360	42680-102720	3 8-499	87360-205440	AN
Benzyl alcohol	100-51-6	108 14	1 05	9 4x10^{-2}	42900	1 1	44 44[2]	3 37x10^{-7}	4	NA	NA	NA	NA	NA
Biphenyl	92-52-4	154 21	0 992	8 93x10^{-1}	6 94	3 98	15632[2]	3 08x10^{-4}	770	36-168	72-336	NA	144-672	AN
bis (2-Ethylhexyl)phthalate	117-81-7	390 56	0 973	1 42x10^{-7}	0 27	7 6	111000[9]	2 70x10^{-7}	3100	120-550	240-9336	3500-4800	980-9336	AN
Butylbenzyl phthalate	85-68-7	312 36	1 1	8 25x10^{-6}	2 69	4 73	13700[9]	1 26x10^{-5}	3100	24-168	48-4320	100 years	672-4320	AN
Carbon Dioxide	124-38-9	44 01	NA	4 83x10^{-3}	1475	0 83	NA	1 52x10^{-2}	NA	NA	NA	NA	NA	NA
Carbon Monoxide	630-08-0	28 01	NA	1 55x10^{5}	004 g/100ml @ 20°C[1]	1 78	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	56-23-5	153 82	1 59	1 15x10^{-2}	793	2 83	110[7]	2 76x10^{-2}	79	4320-8640	168-8640	NA	4032-8640	A
Di-n-butyl phthalate	84-74-2	278 35	1 04	1x10^{-5}[7]	0013 g/100ml[1]	5 60[7]	170000[7]	2 82x10^{-7}[7]	3100	48-552	48 552	3466	48 552	AN
Di-n-octyl phthalate	117-84-0	390 56	0 978	1x10	0 02	8 1	83200000[9]	2 57x10^{-5}	5800000	168-672	336-8760	NA	4320-8760	AN
Dibenzofuran	132-64-9	168 19	NA	2 48x10^{-1}	3 1	4 12	NA	2 13x10^{-4}	NA	168-672	205-835	NA	672-2688	AN
Dichloromethane	75-09-2	84 94	1 33	4 35x10^{-1}	13000	1 25	11 74[2]	3 25x10	5 7	168-672	336-1344	NA	672-2688	AN

TABLE 2-7

MOBILITY PARAMETERS FOR CHEMICALS OF POTENTIAL CONCERN
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TN
PAGE 2 OF 2

Chemical	CAS Number	Molecular Weight[1]	Density[1] (g/ml)	Vapor Pressure[4] (mm Hg) (25°C)	Water Solubility[4] (mg/L) (25°C)	log K_{ow}[4] Octanol/Water Partition Coefficient	K_{oc} (ml/g) Organic Carbon Partition Coefficient	Henry's Law Constant[4] (atm-m^3/mole)	Bioaccumulation Factor [2] (L/kg)	Half-life[11] soil (hours)	Half-life[11] ground water (hours)	Aquatic Photolysis Half-life[11] (hours)	Aqueous Biodegradation[11] (hours) Aerobic (A) or Anaerobic (AN)	
Dichloromethane	75-09-2	84 94	1 33	$4\ 35\times10^{2}$	13000	1 25	11 74[2]	$3\ 25\times10^{-3}$	5 7	168-672	336-1344	NA	672-2688	AN
Diethyl phthalate	84-66-2	222 24	1 12	$2\ 1\times10^{-3}$	1080	2 42	142[7]	$6\ 10\times10^{-7}$	47	72-1344	144-2688	NA	672-5376	AN
Dimethyl phthalate	131-11-3	194 19	1 19	$3\ 08\times10^{-3}$	4000	1 6	82 2[9]	$1\ 97\times10^{-7}$	9 7	24-168	48-336	NA	96-672	AN
Ethylbenzene	100-41-4	106 17	0 867	9 6	169	3 15	1100[7]	$7\ 88\times10^{-3}$	130	72-240	72-240	NA	4224-5472	AN
Fluoranthene	206-44-0	202 26	NA	$9\ 22\times10^{-6}$	0 26	5 16	38000[7]	$8\ 86\times10^{-6}$	3100	3360-10560	6720-21120	63-21	13440-42240	AN
Fluorene	86-73-7	166 22	1 2	$8\ 42\times10^{-3}$	1 89	4 18	7300[7]	$9\ 62\times10^{-5}$	1300	768-1440	1536-2880	NA	3072-5760	AN
Freon 11	75-69-4	137 37	1 49	803×10^{2}	1100	2 53	159[7]	$9\ 7\times10^{-2}$	47	4230-8640	8640-17280	NA	16128-34560	AN
Freon 113	76-13-1	187 38	1 58	$3\ 63\times10^{3}$	170	3 16	389[2]	$5\ 3\times10^{-1}$	56	4320-8460	1440-17280	NA	17280-34560	AN
Freon 12	75-71-8	120 91	1 33	$4\ 85\times10^{2}$	280	2 16	58[7]	$3\ 43\times10^{-1}$	28	672-4320	1344-8640	NA	2688-4032	AN
Hydrogen Chloride	7647-01-0	36 46	0 909	NA	62 g/100ml[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hydrogen Fluoride	7664-39-3	20 01	0 993	$9\ 17\times10^{2}$	922	0 23	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1 2 3-cd) pyrene	193-39-5	276 34	NA	$1\ 25\times10^{-10}$	0 00019	6 7	1600000[7]	$3\ 48\times10^{-7}$	61000	14400-17520	28800-35040	3000-6000	57600-70080	AN
m- & p-Xylene[3]	1330-20-7	318 50	0 862	7 99	106	3 16	240[7]	$6\ 63\times10^{-3}$	190	168-672	336-8640	NA	4320-8640	AN
Methane	74-82-8	16 04	0 466	$4\ 658\times10^{5}$	22	1 09	NA	$6\ 576\times10^{-1}$	NA	NA	NA	NA	NA	NA
Methyl chloride	74-87-3	50 49	0 991	$4\ 3\times10^{3}$	5320	0 91	35[7]	$8\ 82\times10^{-3}$	5 7	168-672	336-1344	NA	672-2688	AN
n-Nitrosodiphenylamine	86-30-6	198 22	1 23	0 1	35	3 13	1290[2]	$1\ 21\times10^{-6}$	130	240-816	480-1632	NA	960-3264	AN
Naphthalene	91-20-3	128 17	0 997	$8\ 5\times10^{-2}$	31	3 3	119[9]	$4\ 4\times10^{-4}$	19	398-1152	24-6192	1704-13200	600-6192	AN
Nitrogen Dioxide (peroxide)	10102-44-0	46 01	NA	$9\ 0\times10^{2}$	170900	-0 58	NA	$2\ 45\times10^{-2}$	NA	NA	NA	NA	NA	NA
Nitrogen Oxide	10024-97-2	44 01	NA	$4\ 289\times10^{4}$	8738	0 36	NA	$1\ 56\times10^{-9}$	NA	NA	NA	NA	NA	NA
o-Xylene	95-47-6	106 17	0 897	6 61	178	3 12	241[9]	$5\ 18\times10^{-3}$	160	168-672	336-8640	NA	4320-8640	AN
p-Ethyltoluene	622-96-8	120 19	0 861	3	94 9	3 63	NA	$5\ 01\times10^{-3}$	NA	NA	NA	NA	NA	NA
Phenanthrene	85-01-8	178 23	1 06	$1\ 2\times10^{-4}$	1 15	4 46	14000[7]	$4\ 23\times10^{-5}$	1800	384-4800	768-9600	3-25	1536-19200	AN
Phenol	108-95-2	94 11	1 07	$3\ 5\times10^{-1}$	104	1 46	14 2[7]	$3\ 33\times10^{-7}$	8 1	24-240	12-168	46-173	192-672	AN
Pyrene	129-00-0	202 26	1 27	$4\ 5\times10^{-6}$	0 135	4 88	38000[7]	$1\ 9\times10^{-5}$	3100	5040-45600	10080-91200	0 68-2 04	20160-182400	AN
Styrene	100-42-5	104 15	0 905	6 4	310	2 95	776[2]	$2\ 75\times10^{-3}$	94	336-672	672-5040	NA	1344-2688	AN
Tetrachloroethylene	127-18-4	165 85	1 62	$1\ 85\times10^{1}$	200	3 4	155[2]	$1\ 77\times10^{-2}$	56	4320-8460	8640-17280	NA	2352-39672	AN
Toluene	108-88-3	92 13	0 867	$2\ 84\times10^{1}$	5 26	2 73	182[2]	$6\ 64\times10^{-3}$	66	96-528	168-672	NA	1344-5040	AN

(1) http /chemfinder camsoft com/results asp (Chemfinder Database and Internet Searching, Homepage)
(2) http /risk lsd ornl gov/cgi-bin/tox/TOX_9801 (Risk Assessment Information System, Chemical-Specific Factors page)
(3) No data available, data for mixed xylenes presented
(4) http /esc syrres com/interkow/physdemo htm (Interactive PhysProp Database Demo page)
(5) Rudolph Meyer, Explosives Third, revised and extended edition, 1987
(6) The value presented for HMX is based on the alpha modification of the compound
(7) USEAP, Superfind Public Health Evaluation Manual, (OSWER Directive 9285 4-1)
(8) Appendix IX to 740CFR Part 264, Handbook of RCRA Ground-Water Monitoring constituents Chemical and Physical Properties, September 1992
(9) USEPA, Soil Screening Guidance Technical Background Document, May 1996
(10) USEPA, Health Effects Assessment for Cresols, September 1984
(11) Howard et al , Environmental Degradation Rates, 1991 Values presented are given as a range from low to high half-life values
(12) http /www epa gov/opptintr/chemfact (USEPA Chemicals in the Environment OPPT Chemicial Facts Sheets page)
(13) Holston Defense Corporation - Development information sheet on CL-20

NA Not available in the references reviewed

3

Facility Holston Army Ammunition Plant
EPA Identification Number TN5 21 002 0421
Permit Number. TNHW-148

ATTACHMENT 3 SECURITY

SECURITY

The entire Holston Army Ammunition Plant (HSAAP) is a secured, limited-access facility Specific security measures for the Burn Pan Unit are provided in the subsections that follow

Security Procedures and Equipment

24-Hour Surveillance System

Area B is surrounded by a 6-foot, chain-link fence with top guard (3 strands of barbed wire) Area B may be accessed only by pass-through gates that are manned by security guards on a 24-hour basis In addition, the Burn Pan Unit is protected with a closed-circuit television security system to detect intruders and to monitor burning activities This camera system is also used for monitoring burns from a safe vantage point Roving recurring guards also check the gates several times a day

Barrier and Means to Control Entry

Barrier

The Burning Ground, where the Burn Pan Unit is located, is surrounded by a 6-foot chain-link fence with top guard Gates providing access to the Burning Ground are locked except when in use The burning pans in which explosive wastes are burned are surrounded by a chain-link fence

The Burning Ground is located within Area B, which is a fenced area within the HSAAP facility Public access from the river is restricted Thus, the Burn Pan Unit is double-fenced with a third fence and restricted river access to prevent entry Figure 3-1 shows the fencing and gates around the Burning Ground and around the Burn Pan Unit

Means to Control Entry

Entry to the Burn Pan Unit is controlled by locked gates Keys for the gate locks are controlled by a sign-in/out procedure The keys to the Burning Ground gate are maintained by the Safety Department Representative

CONTROL ACCESS

An 8-foot-high, chain-link fence runs along the pinnacle of the berm that surrounds the unit There is one 15-foot-wide gate in the fence on the southern side of the unit used to control access to the unit A paved, 45-foot ramp follows the contour of the berm up to the fence and then down into the unit

The entire HSAAP is a secured, limited-access facility Entrances are staffed 24-7 by HSAAP security personnel The Burning Ground where the Burn Pan Unit is located is protected from unauthorized access by a 7-foot, chain-link fence that completely encompasses the area An entrance gate is situated along the western side of the Burning Ground The Burn Pan Unit area is also completely enclosed by a chain-link fence The entrance to the Burning Ground is kept locked except when people are working in the Burning Ground The Burn Pan Unit gate is kept locked unless the Safety Department Representative is present Keys for the gate locks are controlled by a sign-in/sign-out procedure The Burn Pan Unit is also protected by a closed-circuit television security system that can detect intruders and monitor burning activities, Attachments 1, 3 and 8 of this permit contain additional information relative to the security

Warning Signs

Signs are posted on the entrance gate to the Burn Pan Unit where open burning treatment in burn pans takes place This is the only gate entrance into the Burn Pan Unit These signs are legible from a distance of 25 feet and read

DANGER
UNAUTHORIZED PERSONNEL
KEEP OUT

MAF/ 02/28/2011

Buildings

Gates
- Vehicle barrier

Fences
- Interior
- Perimeter

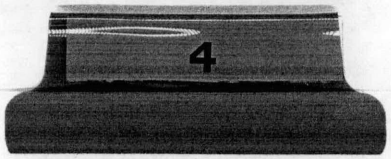
Fire Hydrants

Road Centerline
- Primary
- Secondary

Holston Army Ammunition Plant, Kingsport, TN
Burning Ground and Burn Pan Unit

Figure 3-1

Feet
0 300


4

Facility Holston Army Ammunition Plant
EPA Identification Number TN5 21 002 0421
Permit Number· TNHW-148

ATTACHMENT 4 INSPECTION

INSPECTION SCHEDULE

Inspections are performed at HSAAP for Burn Pan Unit treatment operations Figure 4-1 shows the inspection schedule Inspection schedules and records for the Burn Pan Unit, which is the subject of this permit application, are maintained at the Burning Ground office

General Inspection Requirements

Burn Pan Unit inspections are performed to maintain equipment, facilities, and procedures in accordance with safety and environmentally protective standards The inspection schedule is shown in Figure 4-1 Inspections at the Burn Pan Unit are conducted as required by the schedule indicated and documented on the inspection log The inspection log is maintained at the Burning Ground office All of the information shown on the form, including items inspected, the types of problems to look for, the required frequency, status, observations, and corrective actions, is required to be filled in as applicable The inspector is required to indicate whether any condition is satisfactory or unsatisfactory, and to follow up on unsatisfactory notations with the date and nature of corrective actions All inspection logs are maintained for at least 5 years following the date of the inspection

In the event that a deficiency is discovered during an inspection that presents significant environmental/safety hazards which cannot be immediately repaired/corrected, treatment will be postponed until that deficiency is corrected

Types of Problems Checked

The types of problems and equipment checked are described on the Inspection Checklists contained in Figure 4-1 and 4-2

Frequency of Inspections

The frequency of inspection by item is listed in Figure 4-1 Due to the frequency of routine inspections and required inspections before use non-routine inspections are not planned However in the event that a catastrophic event occurs (tornado) the inspection items listed in Figure 4-1 would be conducted The inspection schedule shown in Figure 4-1 does list the critical inspection items that are checked before each use

Miscellaneous Unit Inspection

The HSAAP Burn Pan Unit is classified as a miscellaneous treatment unit Figure 4-1 lists the particular items to be inspected, the types of problems to look for, the frequency required for each inspection item, the status (satisfactory or unsatisfactory), any notable observations, and finally, the date and nature of corrective actions recommended

These inspections will be performed by the HSAAP Safety Department Representative and will be signed, dated, and the time noted All inspection records will be maintained at the Burning Ground office for at least 5 years from the date of inspection

Remedial Action Schedules

Any deterioration or malfunction of equipment or structures noted during an inspection will be remedied The Safety Department Representative is authorized to initiate corrective action of unacceptable conditions discovered during an inspection The Safety Department Representative will also be responsible for ensuring proper action (emergency or otherwise) is taken within an identified time period which he/she will establish

Specific methods of how deterioration or malfunction of equipment will be remedied depend on the nature of the problem Repairs on any deteriorated or malfunctioning equipment or structures will be initiated immediately or as soon as practical, depending on the nature of the problems Repairs or replacement of equipment will be scheduled accordingly

Equipment Requirements

Internal Communications and Alarms

All personnel working at the Burn Pan Unit have a hand-held, two-way radio with them at all times A land-line telephone is available in the office

An emergency response dispatcher (security officer) is on duty 24-hours a day at the central dispatch HSAAP Security Dispach The security dispatcher would receive alarms Security would investigate any alarms of intruders

External Communications

Only HSAAP emergency personnel are allowed onto the Burning Ground to deal with emergency events Outside emergency personnel will serve as backup to HSAAP personnel If communication with external agencies is required, these communications will be initiated by telephone

Emergency Equipment

Emergency equipment located at the Burning Ground where the Burn Pan Unit is located includes portable fire extinguishers, shovels, and brooms This equipment is inspected in accordance with the schedule shown in Figure 4-1 and is available for any emergencies occurring in the Burning Ground area The equipment is located in the Burning Ground office, which is shown in Figure 3-1

The HSAAP Fire Department has additional emergency response equipment (on trucks and at the Fire Department) available in the event of emergencies (Attachment 5 include information on the types of emergency equipment maintained by the HSAAP Fire Department Figure 5 1-1 of the contingency plan shows the location of the Fire Department in Area B The Fire Department will respond to any Burn Pan Unit emergency Figure 5 1-1 of contingency plan in Attachment 5 shows the locations where emergency equipment is maintained

Water for Fire Control

The Burn Pan Unit is kept free of vegetation and combustible material The only fire that could occur would be a result of explosive waste materials being treated These fires would be allowed to burn until the fire has run its course

Fires could occur outside the Burn Pan Unit These fires would be fought if the Fire Chief and the Emergency Coordinator determined that it was safe to do so

Water for fire control at the Burn Pan Unit is available from water hydrants at the Burning Ground (see Figure 3-1) and the Holston River, which is located approximately 250 to 300 feet away

Testing and Maintenance of Equipment

Maintenance activities are described below for various categories of equipment at HSAAP Each of these systems/equipment is tested and maintained by responsible organizations A brief description of how maintenance is provided is included

Communication systems will be tested before any use of the Burn Pan Unit Maintenance activities will generally consist of the repair of damaged parts and complete replacement, depending on the extent of malfunction HSAAP performs most maintenance functions in-house and uses contract maintenance as backup

Burn pans and associated equipment will be checked before each use by the Safety Department Representative Maintenance activities will generally consist of repair or replacement of damaged parts and/or the clay liner in the pan Complete replacement of pans is highly unlikely

Engineered structures (berms, clay liners, and cleanup of treatment residue) will be checked weekly Maintenance activities will generally consist of repair of damaged sections and, only under extremely unusual situations, complete replacement, depending on the extent of damage

The drainage system and vegetation control will be checked weekly Maintenance activities will generally consist of repair of damage, removal of unwanted vegetation, and only under extremely unusual situations, replacement of drainage components, depending on the extent of damage

Fences and gates will be checked weekly Maintenance activities will generally consist of repair of damaged sections and complete replacement, depending on the extent of damage

Fire control systems will be tested by the Fire Department Volume and pressure testing of spigots and hydrants, and repair or replacement of damaged parts will be conducted by the Fire Department Maintenance activities (repair and replacement of damaged parts) will be conducted as needed

The security camera will be tested by the Security Department Maintenance activities will generally consist of contract maintenance services (when required), repair of damaged parts, and complete replacement, depending on the extent of malfunction

Spill control maintenance activities are not envisioned Contingency Plan, spill control equipments contains a discussion of type of spill equipment located at the Burn Pan Unit Inspections are conducted to ensure that shovels and scoops are available at the Burn Pan Unit to pick up spilled materials and are in good condition Any problem detected would most likely result in replacement of the tool, rather than any maintenance

MAF 12/08/10

FIGURE 4-1

INSPECTION CHECKLIST
HOLSTON ARMY AMMUNITION PLANT
PAGE 1 OF 4

Inspection Item	Type(s) of Problems	Frequency	Status		Observations	Date and Nature of Recommended Corrective Action
			S	U		
Security Devices and Bermed Area						
Fences	Integrity	W				
Gates	Operating	D				
Lock	Operating	D				
Sign	Present and legible	W				
Communication Devices						
TV Camera	Operating	BU				
2-Way Radio	Operating	BU				
Telephone	Operating	BU				
Observation Mirrors	Clear, unbroken	BU				
Burn Pan Unit						
Berms	Conditions, sign of erosion, riprap in place	W				
Compacted-Clay Liner	Condition, signs of erosion, gravel in place	W				
Collection Drains	Presence of Obstructions	W				
Vegetation on Berms	Presence	W				

FIGURE 4-1

INSPECTION CHECKLIST
HOLSTON ARMY AMMUNITION PLANT
PAGE 2 OF 4

Inspection Item	Type(s) of Problems	Frequency	Status		Observations	Date and Nature of Recommended Corrective Action
			S	U		
Vegetation on Compacted-Clay Liner	Presence	W				
Standing Water	Presence	W				
Spills	Presence	AU				
Storage Shed	Integrity	W				
Resistance Heater Ignitor Assembly	Operating	BU				
Drop Inlets for Storm Waters	Presence of Obstructions	W				
Stormwater Drainage System	Pooling of water and or Observations with Drainage System	W				
Gravel Surface	Condition, gravel in place	W				
Firing Station	Operating	W				
Extension Cord to Firing Unit	Operating	BU				
Monitoring Equipment	Operating	W				

FIGURE 4-1

INSPECTION CHECKLIST
HOLSTON ARMY AMMUNITION PLANT
PAGE 3 OF 4

Inspection Item	Type(s) of Problems	Frequency	Status		Observations	Date and Nature of Recommended Corrective Action
			S	U		
Burn Pans						
Integrity	Breaks, holes excessive warpage	BU				
Freeboard	Less than 6 inches	BU				
Untreated Explosives	Presence	AU				
Ejected Waste Material	Presence	AU				
Unloading Spills	Presence	BU				
Pan Covers	Integrity	W				
Hot-spots	Presence of embers, signs of heat	BU & AU				
Emergency Equipment						
Fire Extinguishers(3)	Present, in-date, 3 available	W				
Water Spigots	Operational	W				
Shovels(2)	Present	W				

FIGURE 4-1

INSPECTION CHECKLIST
HOLSTON ARMY AMMUNITION PLANT
PAGE 4 OF 4

Inspection Item	Type(s) of Problems	Frequency	Status		Observations	Date and Nature of Recommended Corrective Action
			S	U		
Scoops	Present	W				
Brooms	Present	W				
Miscellaneous						
Wind Speed Indicator (monitoring equipment)	Operating/ Recording	BU				
Barometer Thermometer Humidistat	Operating Recording Calibrated	BU				
Flood Valves	Movement Corrosion	3 yrs				
Vehicles						
Placarding	Appropriate and present	BU				
Containers	Damage	BU				
Documentation	Appropriate and present	BU				

W = Weekly
BU = Before use
AU = After use
M = Monthly
D = Daily

Inspector _____ Date _____

FIGURE 4-2

Burn No _____ **Year**_____

BURNING GROUND SURVEILLANCE INSPECTION LIST
BURNING OF EXPLOSIVE WASTE

1 Tennessee Air Pollution Control Board permit present? _____
2 "Open Burning of Explosive Waste" permit present? _____
3 SOP 1930-9600 present? _____
4 5,000 pound explosive load limit posted at Burning Ground? _____
5 Fire Symbol 1 posted at Burning Ground? _____
6 Pan Numbers 1, 2, and 4 load limits are 1,500 pounds? _____
7 Pan Number 3 load limit is 500 pounds? _____
8 Leaks in the burning pans? _____
9 Empty Pans Covered? _____
10 Parallel pans of explosives separated by not less than 150 feet? _____
11 Vehicles transporting explosives have fire symbols on each side of vehicle? _____
12 No more than 2 personnel in the cab of a vehicle? _____
13 No personnel riding in the bed of vehicles transporting explosives? _____
14 Documentation to ensure authorization for burning? _____
15 Explosive material contained in vehicle bed? _____
16 Explosive material in closed containers? _____
17 No explosive material changed from one container to another inside truck? _____
18 No explosive material loaded or unloaded while vehicle motor is running, or within 25 feet of any spark or flame-producing device? _____
19 Explosive containers not to be handled roughly, thrown, tumbled, rolled, or "walked over" the ground, floors, or other dragged or pushed along the ground or floor or dropped from the vehicle _____
20 No containers to be opened until all vehicles have been removed form Field No 4 _____
21 Waterproof plastic sheet placed in the burning pan? _____
22 Explosives to be spread in the burning pan no deeper than 3 inches _____
23 Matches locked in metal box _____
24 Wind speed no more than 10 MPH average, no precipitation, no electrical storms, no dense fog, blowing snow or dirt, no low or overcast sky, no inversions, no potential increase of water in the river capable of overflowing its banks during the burn? _____
25 Number of pounds burned? _____
26 Temperature _____
27 Wind direction and speed _____
28 Relative humidity _____
29 Barometric Pressure _____
30 Sky condition
31 Minimum of 2 personnel present for a burn, personnel to remain behind barricade at the burning ground office _____
32 Field No 4 locked? _____
33 Burning grounds closed to all traffic during the burn?
34 30-minute waiting period when an ignition failure occurs?
35 Burning pans to have a 24-hour cooling period before reuse _____
3 6Ash analyzed? _____
37 "Contaminated Explosive Waste" log book completed? _____
38 Burning ground attendant training records on file? _____
39 Annual report to State Hazardous Waste Department on file? _____
40 HH Form 3561 completed and filed? _____

Remarks

_____ Burning Ground Attendant Date

_____ Surveillance Inspector Date

5

Facility Holston Army Ammunition Plant
EPA Identification Number: TN5 21 002 0421
Permit Number: TNHW-148

ATTACHMENT 5 CONTINGENCY PLAN

Attachment 5 consists of two separate sections as follows

- Attachment 5 1 Contingency Plan
- Attachment 5 2 Coordination Agreements

ATTACHMENT 5 1 CONTINGENCY PLAN

CONTINGENCY PLAN

This contingency plan for the Holston Army Ammunition Plant (HSAAP) Burn Pan Unit is designed to minimize hazards to human health and the environment from fires, explosions, or unplanned releases of hazardous waste constituents to air, soil, and water Provisions of this contingency plan are carried out immediately whenever there is an unplanned fire, explosion, or other releases that could threaten human health and the environment The emergency scenarios that are addressed in this contingency plan are based on evaluation of the probable emergency events that could take place at the Burn Pan Unit

GENERAL INFORMATION

Holston Army Ammunition Plant (HSAAP) Background

HSAAP is located in Hawkins and Sullivan Counties in northeastern Tennessee HSAAP's mission is the production of defense-related explosive compounds and mixtures HSAAP manufactures explosive intermediates for use in the formulation of final products classified as explosives HSAAP receives orders from the Operations Support Command (OSC) of the U S Army to manufacture various explosive materials for use in the assembly of a diversity of military munitions Manufacturing Area A is composed of nonexplosive acetic acid and acetic anhydride manufacturing operations and is located within Sullivan County, Tennessee, at the intersection of State Routes 93 and 93A Area B, where explosives are manufactured, processed, and formulated, consists of production and blending and is located 5 miles west of Area A in Hawkins County, Tennessee, on U S Route 11W The Burn Pan Unit, which is the subject of this, is located in Area B All manufacturing and process wastes treated in the Burn Pan Unit originate in Area B

Burn Pan Unit Description

Hazardous waste explosive materials from production operations are transported to the Burn Pan Unit in a moist condition Waste generated from the onsite laboratory, nonsaleable excess explosives from storage, or off-specification product is transported in a dry condition Open burning of waste explosive materials is conducted at the Burn Pan Unit The Burn Pan Unit area is shown in (Figure 5 1-2) The Burn Pan Unit contains four burn pans that are positioned in the northeast, southeast, southwest, and northwest quadrants Each burn pan has a mobile cover that covers the entire pan area These pan covers are used to prevent precipitation from infiltrating into the pans, which may contain untreated waste materials or residues The Burn Pan Unit measures approximately 250 feet by 325 feet Within this area is a stormwater drainage system, a small storage shed, a resistance heater ignitor assembly, and two, 3/4-inch water spigots The entire Burn Pan Unit is surrounded by a clay berm designed to protect against floods, and the area within the berm has a 6- to 8-inch surface layer of compacted-clay liner The Burn Pan Unit is surrounded by a chain-link security fence and A closed-circuit television security system serves to detect intruders and to monitor burning activities

Operating Procedures

No more than 5,000 pounds net explosive weight (NEW) of explosive material can be present at the Burn Pan Unit Each pan can be loaded to a maximum of 1,500 pounds NEW as long as the 5,000-pound limit is maintained Explosive waste materials are spread in the burn pans to a maximum depth of 3 inches If the waste materials are moist, they may remain in the burn pan uncovered for several hours to several days to dry If the materials have not dried sufficiently by the end of the day, mobile covers are placed on the pans The pan covers are then removed the next work day, weather permitting, to complete the drying process Waste explosives are electrically ignited from the firing station using a resistance heater element and excelsior strips The Safety Department Representative responsible for Burn Pan Unit operations observes the burn using video monitors The video monitor is located at Building 20 The area surrounding the burn pans is inspected after each use for the presence of ejected material Any ejected material is collected by use of scoops and shovels The ejected material would be placed back into the burn pan for treatment in the next burn When the burn has been completed, the treatment residue remaining in the pans is assessed If any remaining material appears not to have been totally treated, it remains in the burn pan for treatment at the next scheduled event Periodically, the treatment residue is removed after a sample is collected and tested for reactivity by the Impact Sensitivity Test If the test results show that the treatment residue is not reactive, it is disposed of as a nonhazardous waste at the onsite landfill If the treatment residue sample would fail the reactivity test, the treatment residue would be treated again at the next event

Hazards Evaluation

The Burn Pan Unit location, types of wastes treated, facility design, and operating practices were evaluated for potential hazards to determine emergency events that should be addressed in this contingency plan This section describes the hazards evaluation and presents the results

Floods

The Burn Pan Unit is located within the 100-year floodplain However, floods would not constitute an emergency event requiring implementation of the Contingency Plan Floods do not occur suddenly because advance warning is available before flood events In the event of an impending flood, wastes would not be taken to the burn pans for treatment If possible, any waste already on the burn pans awaiting treatment would be treated If it is not possible to treat the wastes they would be removed to one of the existing product storage igloos These igloos meet the requirements for conditional exemtion from RCRA storage requirements for military munitions storage facilities in Tennessee Rule 12-1-11- 09(13)(f) The area where the burn pans are located is within the area protected from the 100-year flood by berms The stormwater drainage system within the bermed area has backflow prevention valves in the lines which are closed during floods to prevent backflow of flood water into the bermed areas Any untreated waste materials or treatment residues would not be washed away by floods In the event of a flood, the Burn Pan Operator would be responsible for closing the valves Attachments 1, 8, and 4 of this permit contain additional information relative to floods

Spills

Spills would not constitute an emergency event requiring implementation of the contingency plan The waste materials treated that originate in the storage units are all dry Wastes coming

from the manufacturing area are moist and typically do not contain free liquids The solid portion of any spill occurring within the Burn Pan Unit would be easily cleaned up by shovels and scoops and placed into a burn pan If any free liquids are present, they would flow over the compacted-clay liner to the drainage system and be conveyed to the HSAAP National Pollutant Discharge Elimination System (NPDES) permitted wastewater treatment plant, which is designed to treat explosives in water Therefore, any spills would exit the Burn Pan Unit only under controlled circumstances

Power Interruption

Power interruption would not result in implementation of the contingency plan Power interruption would result in prevention of ignition if occurring before initiation of treatment Any power interruption occurring when treatment had begun would only affect the ability to visually observe the burning via the video camera There would be no impacts on the treatment processes, once burning had been initiated, because the burn is self-sustaining Physical security devices, such as fences and gates, would not be affected If the power interruption occurred before treatment was initiated, and the interruption was for an extended period of time, the gate to the Burn Pan Unit would be locked after the covers were placed over the pans, and treatment would take place once power was available during permissible treatment period (12 00 p m to 4 00 p m)

Offsite Impacts of Fires (Unplanned) and Explosions

The maximum quantity of explosives that are present at any one time is 5,000 pounds, and the most present in any one burn pan is 1,500 pounds The Burn Pan Unit is located approximately 4,500 feet from the nearest boundary For a quantity of 5000 pounds, Army quantity-distance requirements contained in Army Material Command Regulation (AMCR) 385-100 require explosives of this quantity to be located at least 1,250 feet from the boundary of the facility EPA interim status regulations contain a requirement in 40 CFR 265 382 for explosives, weighing in total 1,001 to 10,001 pounds, to be located at least 1,730 feet from the property of others Both of these quantity-distance relationships were designed to prevent offsite impacts due to explosions The Burn Pan Unit is approximately 4,500 feet from the nearest boundary and, therefore, meets both of these quantity-distance relationships Therefore, offsite impacts from an accidental explosion are not probable Fires may occur outside the bermed Burn Pan Unit as a result of a fire or explosion within the bermed area However, it is not expected that these fires would spread beyond the HSAAP boundary The Burn Pan Unit is close to the Holston River, which is located to the south of the Burning Ground Any fires in this direction would be stopped by the river Additionally, HSAAP owns the property across the river In all other directions, the shortest distance to the boundary of HSAAP is 4,500 feet This area with trees only present at the boundary is cleared of trees and vegetation other than grass It is not likely, even in a worst-case scenario, that fire would spread off site Although fires within the Burn Pan Unit would not be fought, any fires spreading beyond these areas into the Burning Ground would be fought if determined safe by the Fire Chief

Fires

An unplanned fire could occur within the burn pans and is a probable emergency event Fires outside the burn pans, but within the Burn Pan Unit area, are extremely unlikely to occur because the area is kept clear of any vegetation Therefore, there is no fuel for a fire Potential fires outside the Burn Pan Unit area could start as the result of an explosion ejecting burning material outside the Burn Pan Unit into the Burning Ground

Explosions

Explosions are a probable emergency event The waste materials treated are explosives

Personnel Injury

Serious personnel injury is a probable emergency event Such injuries could result from unplanned fires and explosions Based on the above discussion, unplanned fires in the burn pans, explosions, and personnel injury are the only emergency events addressed in this contingency plan These scenarios would result in implementation of the contingency plan Offsite impacts are not addressed because such impacts are not expected to occur

EMERGENCY COORDINATORS

Names, Addresses, and Telephone Numbers

The Emergency Coordinator (EC) is responsible for coordination of all control and cleanup activities associated with emergencies at the Burn Pan Unit The EC has full authority to mobilize personnel and equipment to deal with emergency events The EC is the prime point of contact for incidents resulting in implementation of the Contingency Plan The EC is thoroughly familiar with the Burn Pan Unit contingency plan, all operations and activities conducted, the location and characteristics of the explosive wastes treated in the burn pans, and the layout of the bermed area where open burn treatment takes place The EC has the authority to activate the alarms and coordinate the communication system to ensure that an incident at the Burn Pan Unit area is properly handled HSAAP has 24-hour 365-day per year on-site presence of a qualified Emergency Coordinator and emergency personnel The Emergency Coordinator will be either the Safety Department Representative or Fire Captain/Fire Chief Table 5-1 lists emergency contact information In addition to 24/7 on-site presence of qualified emergency personnel, HSAAP Security Dispatch maintains an on-call list of personnel with home and mobile phone numbers updated weekly HSAAP uses an internal 911 system All internal 911 calls are answered by an on-site security dispatcher The security dispatcher will contact the EC by telephone, or plant radio The Safety Department Representative working at the Burn Pan Unit will always have a plant radio The plant radios can also be used to contact security dispatch or the EC

TABLE 5-1

EMERGENCY CONTACT INFORMATION
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TENNESSEE

CONTACT	PHONE NUMBER
HSAAP SECURITY DISPATCH (24-7) (The Dispatcher serves as primary initial contact and maintains direct contact with both on-site and on-call personnel)	From Off-site (423) 578-6000 or (423) 578-6318 or (423) 245-9119 (emergencies only) From On-site 911 (Dispatch is staffed 24-7)
Safety Department Representative	(423) 578-6042
HSAAP Fire Department (Captain/Chief)	(423) 578-6310

Duties of Emergency Coordinator

General

An EC is always on duty at HSAAP The EC has the responsibility for coordinating all emergency incidents at the Burn Pan Unit The EC is familiar with this contingency plan, with operation of the facility, and with the location and characteristics of hazardous wastes and hazardous waste operations at the facility

Regulatory Requirements

Federal and Tennessee hazardous waste regulations have very specific requirements defining the duties of an EC The EC must

- Notify facility personnel and request necessary assistance
- Identify the quantity and type of wastes involved
- Assess hazards associated with emergency
- Report the incident to the involved regulatory agencies if areas outside the facility are affected, and assist in evacuation if necessary
- Attempt to keep the emergency situation from spreading
- Monitor treatment systems if the situation has interrupted operations
- Arrange for disposal of wastes after the emergency is over
- Make sure that operations
  - Do not result in danger because of incompatible wastes reacting
  - Do not resume until all emergency equipment is replenished
- Submit a written report to the required regulatory agencies within 15 days of emergencies resulting in activation of the contingency plan

Resource Commitment

The EC has the authority to commit resources HSAAP resources that are available in an emergency include the following

- HSAAP Fire Department
  - Fire Truck
  - Water Supply Truck
  - Personal Protective Equipment
- First Aid and Medical Supplies available at the fire hall
- Fire Extinguishers
- Clean-up Equipment

IMPLEMENTATION

The contingency plan will be implemented in the event of an unplanned fire in the burn pans, any fire within the bermed area, an explosion, or for personnel injuries requiring evacuation or emergency medical services The following personnel are required to perform emergency response in accordance with the Contingency Plan

1 The EC will have the primary responsibility for directing emergency response

2 The Security Dispatcher (Security Department) will be responsible for establishing and maintaining communications

3 The Fire Chief (Fire Department) will be responsible for firefighting and paramedic services Emergency medical services, including ambulance services, will be provided or arranged for by the Emergency Medical Technician (EMT) on duty

4 Material Handlers will have the responsibility for removing and isolating other waste materials from the area in the event of an emergency incident

The implementation of all emergency activities at the Burn Pan Unit will be conducted by HSAAP personnel Outside emergency management agencies will not directly participate in emergency activities at the Burn Pan Unit The only involvement of outside emergency agencies would be pickup of injured personnel from the Burn Pan Unit while under escort by HSAAP

EMERGENCY RESPONSE PROCEDURES

The hazards evaluation described in this Attachment identified emergency events that would result in the necessity to implement the contingency plan The emergency events that were identified were unplanned fires in the burn pans, any fire outside the burn pans but inside the bermed area, explosion, and personnel injuries requiring medical evaluation The emergency response procedures described in this section address the above emergency events

Notification

The individual discovering the emergency will call 911 on the telephone If the telephone system is out, the individual will either go to the nearest radio-equipped location or stop a passing vehicle if it is radio-equipped and report the emergency If the report is being made from a non-plant telephone, the individual will call (423) 245-9119 If notification of the emergency is received by other means, it will be immediately relayed to the Security Dispatcher The notifier will supply information on the location of the emergency (burn pan, berms, etc), the nature of the emergency (fire, explosion, injury), and the types of waste materials present Security dispatch will receive the call and will notify the EC, Security, and the Fire Department Additional personnel notifications will be as determined necessary by the EC As soon as practical after notifying the EC, the Security Dispatcher will communicate to general plant personnel that an emergency exists in the plant When an emergency is reported, the Security Dispatcher will make an announcement on the radio network that all transmissions on the Security and Maintenance Networks stop and state that an emergency exists and the nature of the emergency If an emergency occurs after normal work hours, the Security Dispatcher will

complete the necessary notification by contacting the on-call person by telephone or by activating the mobile messaging system

Identification of Hazardous Materials

The only hazardous materials that could be present at the Burn Pan Unit would be explosive waste materials The EC will determine the types and quantities of explosive waste materials present by reviewing the Explosives Disposition Record at the Burning Ground office Alternatively, the EC may be informed by the emergency notifier of the types and quantities of waste materials that are present at the Burn Pan Unit If there has been an explosion, the EC will use visual observation to determine the nature and location of any ejected materials, both inside and outside the Burn Pan Unit

Hazard Assessment

The EC will assess the hazard based on the following information

- Type of waste present at the Burn Pan Unit (manufacturing process waste, off-specification product, laboratory file sample, etc)
- Explosive constituent/explosive formulation (RDX, HMX, Comp B, TNAZ, etc)
- Quantity of explosive material present Net Explosive Weight (NEW)
- Location of the truck(s) transporting explosives to the Burn Pan Unit
- Stage of treatment process (unloading, drying, excelsior strip attached/unattached, etc)
- Nature of emergency (fire, explosion, personnel injury)
- Location of emergency within Burn Pan Unit (burn pan, outside burn pan, adjacent to gate, etc)
- Weather conditions (wind speed, precipitation, thunder/lightning storms)
- Number of personnel present
- Action/no action alternatives based on nature of emergency (e g , fight/not fight fires)
- Need to evacuate personnel in the Burning Ground

Notification of Offsite Impacts

The hazard evaluation described in this Attachment determined that offsite impacts would not occur as the result of any probable emergency at the Burn Pan Unit Therefore, this contingency plan for the Burn Pan Unit does not address offsite impacts

Control Procedure

Fires

Any unplanned fire involving explosive material at the Burn Pan Unit would not be fought Personnel would withdraw and observe the progress of the fire The withdrawal distance would be the barricade at the Burning Ground office The Senior Fire Department Representative and the EC would jointly make any decisions regarding firefighting for fires outside the Burn Pan Unit No additional explosive materials would be brought to the Burn Pan Unit until the fire is out and it is determined by the EC that it is safe to resume the normal treatment program Any fires involving explosive materials would generally be anticipated to consume the explosive materials If the fire occurred outside a burn pan (e g , a fire of explosive material on the ground), any treatment residue would be picked up (shovel, scoop, etc) and placed into a burn pan

Explosions

In the event of an explosion, the primary concern would be injured personnel see "the personal injury" below, and the potential for the presence of ejected explosive material in the Burn Pan Unit and surrounding area of the Burning Ground Initially, a search would be conducted for injured personnel After any explosion, security would prevent any personnel (other than emergency personnel) from entering the Burning Ground area All shipments of explosive materials to the burn pans would stop When determined safe by the EC, the Burn Pan Unit and the area surrounding the Burn Pan Unit would be searched for any ejected explosive material Any ejected explosive material found would be picked up by means including shovels, rakes, scoops, etc , placed into a container (bucket or drum), and taken back to a burn pan for future treatment If the EC determined that the explosive material was unsafe to move, it would be burned in-place by attaching an excelsior strip to the explosive material and igniting the strip

Personnel Injury

The condition of injured personnel would be evaluated initially by the EMT The EMT would provide initial first aid and arrange for transportation to a medical facility, if necessary Any waste treatment activities would stop until the injured personnel were evacuated If the injury of personnel were due to fire or explosion, all further waste treatment activities would stop until the control procedures described in the "Fire" and "Explorers" sections above had been completed

Assessment of Possible Hazards to Human Health and the Environment From an Explosion, Fire or Release

In the event of a release, fire or explosion, the EC will assess the possible hazards to human health and the environment The EC's assessment will consider both direct and indirect effects of the emergency The EC will order the evacuation of the Burn Pan Unit if there are any unplanned fires involving explosives or if a lightning storm was impending or occurring

Procedures to Prevent Fires, Explosion or Release

In the event of an emergency incident at the Burn Pan Unit, procedures will be implemented to prevent fires, explosions or releases from spreading to other areas of the facility Further shipments of waste materials to the Burn Pan Unit for treatment will be suspended until the emergency incident is rectified In case of a fire, fire watches are maintained after the fire is

extinguished to ensure the fire is completely out All ejected materials resulting from the incident will be collected using non-sparking tools and placed in the burn pan Any explosives already placed in burn pans would not be removed

Storage, Treatment, and Disposal of Released Material

In the event of a release, fire or explosion at the Burn Pan Unit, the EC will arrange for treatment, storage, or disposal of recovered waste, contaminated soil, or any other contaminated material Any released material will be picked up, and placed in an approved container or the Burn Pan Unit for treatment at the next treatment event Explosive material would not be removed from the Burn Pan Unit It would be placed into a Burn Pan for treatment If a pan was not available and the material was safe to transport, the contained material will be transported to an appropriate storage magazine until such time that thermal treatment can be conducted Storage magazines would meet the requirements of TR 1200-01-11- 09(13)(f) Non-hazardous residues would be picked up, placed into containers, and taken to the onsite Tennessee Class II landfill Following area decontamination activities, the inspection procedure described in Attachment 4 will be followed prior to the resumption of treatment operations

Post-Emergency Equipment Maintenance

Burn Pan Unit operations resume only when emergency and other facility equipment (fire extinguishers, containers, tools) are replaced, repaired, or decontaminated, and have been inspected by the Safety Department Representative

Emergency equipment would be used to fight fires and rescue/treat injured personnel Such equipment would not become contaminated during the course of this use All of the wastes treated are solids and would not adhere to the equipment If equipment (i e , shovels) is necessary to pick up spilled material, it is easily cleaned by brushing The EC will be responsible for checking that emergency equipment used during fires and injuries is decontaminated The Safety Department Representative will be responsible for performing decontamination operations for equipment located at the Burn Pan Unit

Burn Pan Unit (Miscellaneous Unit) Spills and Leakage

The only spills possible in the Burn Pan Unit area would be dry or damp This material would simply be scooped or shoveled up and placed back into one of the pans to await treatment during the next burn

EMERGENCY EQUIPMENT

Chemical Protective Clothing

Personal protective equipment (PPE) is available for responding to emergencies if the contingency plan is implemented Each department (Fire Department, Safety Department) is responsible for maintaining personal protective gear for its personnel The following protective gear is maintained and available

- Fire Department
  - Firefighter helmet with face shield
  - Rubber boots with steel toes
  - Firefighter gloves
  - Turn-out gear (fire-resistant coats and pants)
  - Self-contained breathing apparatus
  - Hard hats with face shield
  - Water supply truck
  - Clean-up equipment

- Safety Department
  - Gloves
  - Safety shoes
  - Safety goggles
  - Hard hats with face shield
  - Decontamination equipment

First-Aid Equipment

Emergency first-aid equipment and medical supplies are is available at the Fire Hall EMTs are on duty 24-hours per day at the Fire Hall

Communications Equipment

Hand-held, battery powered, two-way radios, mobile telephones, and landline telephones are used for Burn Pan Unit emergencies The radios are inspected and maintained by a trained/certified radio repair technician in the Instrument and Electric Shop (Bldg No 102)

Spill Control Equipment

Brooms (2), shovels (2), and scoops (2) are available at the Burn Pan Unit shed No other spill control equipment is needed in this area Spills would not result in implementation of the contingency plan Decontamination equipment is kept at the Safety Department

Emergency Response Protection Equipment

Personnel protective equipment is transported to the scene of the incident by emergency responders The EC determines the safety procedures and protective clothing to be used The EC is also responsible for coordinating the inspection and supply of safety equipment Based on the emergency scenarios described, fire turn-out gear is the emergency response protective equipment anticipated

Emergency Decontamination Equipment

Decontamination (if necessary) is handled by the Safety Department Tools that are used during emergency procedures usually will not become contaminated Material being disposed of is solid and can be physically picked up from the soil by hand or by a shovel Tools are decontaminated with brushes, if necessary

Water for Fire Control

The HSAAP Fire Department has a 1000-gallon-per-minute (gpm) pumper carrying 750 gallons of water and a 1200-gallon tank truck maintained on standby duty at the Fire Hall to respond as needed to the Open Burning area Response time from the Fire Hall to the Burn Pan Unit is less than 5 minutes Water for fire control is available from water hydrants at the Burning Ground and from the Holston River, which is located approximately 250 to 300 feet away

Emergency Communications and Alarm System

Two-way radios, mobile telephones, plant-wide emergency warning system, and landline telephones are available for emergency communication Figure 5 1-1 shows the location of the emergency equipment

COORDINATION AGREEMENT REQUIREMENTS

Outside emergency management agencies would not directly participate in any emergency actions at the Burn Pan Unit due to the potential presence of explosive material Therefore, outside emergency management agencies are not supplied with copies of this contingency plan The Church Hill Emergency Medical Service would provide emergency ambulance services This would consist of pickup of injured personnel for transport to offsite medical facilities If it were necessary to pickup injured personnel at the Burn Pan Unit, the Church Hill Emergency Medical Service staff would be escorted by HSAAP staff The City of Kingsport Fire Department would provide fire fighting services at HSAAP except where explosive materials are involved Therefore, the City of Kingsport Fire Department would not provide fire fighting services at the Burn Pan Unit Holston Valley Medical Center and Hospital would provide off-site treatment of medical emergencies Attachment 5-2 of the permit contains a copy of the coordination agreements with Church Hill Emergency Medical Service and the City of Kingsport Fire Department There is no coordination agreement with Holston Valley Medical Center and Hospital

EVACUATION PLAN

The EC may choose to evacuate the Burn Pan Unit whenever conditions are present that may endanger personnel These conditions include unplanned fires or impending lightning storms The evacuation signal(s) will be given verbally with the assistance of bullhorns, if available, or by two-way radio If required, other plant personnel will be notified by two-way radio or by telephone Figure 5 1-2 shows the evacuation routes from the Burn Pan Unit

REQUIRED REPORTS

The following notification and report must be provided to federal and state agencies after the incident

Operational Readiness Notification

In the event that it is necessary to implement the contingency plan for the Burn Pan Unit, the EC will implement notification of the Regional Administrator, as well as appropriate state and local authorities, before operations are resumed

The operational readiness notification will include information stating

- Control procedures used and completeness
- Emergency equipment is cleaned and ready for use
- Cleanup procedures have been completed for released materials that may be incompatible with waste materials treated, stored, or disposed of
- All emergency equipment listed in the contingency plan is cleaned and fit for its intended use before operations are resumed

Incident Report

The EC will note in the operating record the time, date, and details of any incident that requires implementing the contingency plan for the Burn Pan Unit Within 15 days after the incident, the EC will implement submission of a written report on the incident to the Tennessee Department of Environment and Conservation (TDEC) The report will include

- Name, address, and telephone number of the owner or operator
- Name, address, and telephone number of the facility
- Date, time, and type of incident (e g , fire, explosion)
- Name and quantity of material(s) involved
- The extent of injuries, if any
- An assessment of actual or potential hazards to human health or the environment, where this is applicable
- Estimated quantity and disposition of recovered material that resulted from the incident

AMENDMENT OF CONTINGENCY PLAN

The contingency plan for the Burn Pan Unit will be reviewed and immediately amended, if necessary, whenever any of the following occurs

- The facility permit is revised
- The plan fails in an emergency
- The facility changes in its design, construction, operation, maintenance, or other circumstances in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency
- The list of emergency equipment changes

A change in the contingency plan regarding the lists of facility EC or equipment constitutes a minor modification to the facility permit to which the plan is a condition Revisions will be forwarded to all parties holding a copy of the plan, including federal and state agencies

PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT

The operation of the Burn Pan Unit is detailed in Attachment 8 The following sections describe preventive measures pertinent to Burn Pan Unit operations

Unloading Operations

All vehicles transporting explosive waste to the Burn Pan Unit are inspected by the Safety Department Representative to ensure that the vehicles are properly placarded and that all waste is contained in the vehicle bed Material Handlers, assigned to the Burn Pan Unit, are required to operate the transporting vehicles A maximum of two persons are allowed in a vehicle transporting explosives No one is allowed on the vehicle other than in the cab No explosive material may be loaded or unloaded while the motor of the vehicle is running Contents of containers (usually plastic bags) of explosives are carefully placed in the burn pans They may not be thrown, rolled, dragged, or pushed Only Material Handlers are permitted to handle hazardous waste materials at the Bun Pan Unit Containers (usually plastic bags) of waste explosives are collected from various generation points, and loaded directly (by hand) into a pickup truck and transferred to the Burn Pan Unit and unloaded at the specified burn pan according to the schedule for treatment that day Explosive materials are unloaded by hand by the Material Handlers Waste explosives are placed directly in the burn pan(s) for open burn treatment There are no engineering unloading ramps, docks, or structures associated with the Burn Pan Unit, with the exception of the burning trays, and compacted-clay-lined berms and compacted-clay liners

Flooding and Run-off

The Burn Pan Unit is located in the floodplain of the Holston River The Burn Pan Unit has been designed and constructed to prevent flooding of the unit The burn pans are all contained in an area totally surrounded by a clay berm The entire area within the berms is underlain by a compacted-clay liner All precipitation falling onto the Burn Pan Unit is contained within the unit Precipitation is collected by the drainage collection system and conveyed to the HSAAP wastewater treatment system No run-off exits the Burn Pan Unit, and there is no run-on because of the berm around the burn pan unit These berms protect the burn pan unit from flooding Backflow through the stormwater drainage system during flood events is prevented by the closing of valves in the drainage system All treatment in the Burn Pan Unit takes place in pans These pans are protected by mobile covers, when not in use, to prevent the accumulation of precipitation in the pans In the unlikely event that any liquids would accumulate in the pans, the liquid would either be allowed to evaporate, because it would not contain volatile hazardous constituents, or it would be allowed to vaporize in the next burn The integrity of the pans is inspected periodically (before each use), as shown in Figure 4-1 of Attachment 4 If a pan is found to have lost its structural integrity, it is taken out of service Because open burn treatment takes place in pans, there is no potential for contaminated runoff to occur from the pans The potential for contaminated runoff to occur as the result of precipitation contacting untreated materials ejected from the pans is controlled by inspections of the area surrounding the burn pans after each treatment Any ejected material is collected and placed back into the burn pan and treated in the next burn

Water Supplies

Water supplies are protected by four levels of control mechanisms which prevent contamination of surface and groundwaters at the Burn Pan Unit First, all burning takes place within burn pans that are designed to be able to hold liquids Within each pan there is a clay layer The primary purpose of the clay liner is to serve as a thermal insulator However, the clay layer also helps prevent liquids from leaving the pan The second level of control mechanisms is the construction of the compacted-clay lined berms of clay and underlying of the Burn Pan Unit with a compacted-clay liner The clay minimizes any potential infiltration of surface waters into the groundwater The third level of control is the stormwater collection system All precipitation falling into the Burn Pan Unit flows over the clay liner and then into drains The stormwater is then drained to the National Pollution Discharge Elimination System (NPDES) wastewater treatment system The latter two controls would also prevent any contaminated waters from the pans from entering ground or surface waters The fourth level is the mobile covers, which prevent precipitation from entering the burn pans in the first place

Equipment and Power Failures

Electric power is used only for the initiation of the burns in the pans and for the cameras monitoring the progress of the burns If a power outage occurred prior to the initiation of the burn, the materials would be kept in the burn pans until power was restored and treatment could take place If the power failure were to take place before the truck was unloaded, unloading would be completed and treatment would take place once the material had dried sufficiently in accordance with normal procedures and power was restored Power failures affecting security monitoring devices would not affect the physical barriers, which are the primary security devices to prevent access to the hazardous waste treatment area by intruders The portion of the Holston River adjacent to the burning grounds is restricted both upstream and downstream from public access The land surrounding the Burning Ground area is owned by HSAAP This land is surrounded by fences, and all gates are either locked and/or manned by guards

Personnel Protective Equipment

Personnel engaged in the handling of waste explosives for any reason must do so in a manner that minimizes contact with the waste At a minimum, protective clothing, when handling exposed explosives include, work gloves, safety glasses with side shields, and non-sparking safety shoes In addition to personal protective equipment (PPE) requirements during ignition of explosives, all personnel inside the Burning Ground perimeter fence must be outside the Burn Pan Unit and behind the barricade at the office The gate to the Burn Pan Unit is then locked Observations of the burn take place using the closed-circuit TV system The firing station control remains locked when not in use, and the Safety Department Representative carries the only key when in the Burn Pan Unit Personnel will not reenter the Burn Pan Unit for 30 minutes after any misfires of the ignition train Personnel will not reenter the Burn Pan Unit after a burn unless the closed circuit TV system shows that the burn has been completed

Releases to the Atmosphere

The only releases to the atmosphere, other than the release of water vapor, that are associated with open burning take place during the actual treatment process There are no releases to the atmosphere prior to treatment because the wastes do not contain any volatile substances (other than water) Materials are placed in pans and are always covered except during treatment, or during drying prior to treatment Following the cool-down period, no releases take place

because there are no volatiles present and any remaining treatment residue remains in the pan (covered) until the next treatment

PREVENTION OF REACTION OF IGNITABLE, REACTIVE OR INCOMPATIBLE WASTES

Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Wastes

All wastes treated by open burning in the burn pans exhibit the RCRA reactivity characteristic Therefore, all of the procedures used in the burn pan treatment of explosive wastes are designed to avoid unplanned ignition or reaction of the explosive waste materials

General safety precautions to be followed for preventing ignition or reaction of the wastes treated include the following

- No smoking, matches, lighters, or other unauthorized ignition sources are permitted in the Burn Pan Unit
- No cutting, welding, activities involving hot surfaces, frictional heat, radiant heat, or other heat-producing activities are permitted in the Burn Pan Unit when explosive wastes are present
- Spark-producing equipment and tools are prohibited from use near explosive materials unless specifically authorized
- Incompatible materials are not accepted at the Burn Pan Unit (e g , oxidizers)
- A 24-hour waiting period is observed between burns to allow cooling In the pans, thorough wetting down of the pan will take place if this 24-hour waiting period cannot be observed
- Safety Department Representatives who work in the Burn Pan Unit are trained in handling wastes treated by open burning
- The area surrounding the burn pans within the Burn Pan Unit is kept clear of vegetation

General Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste

The safety of personnel involved in open burning operations at the Burn Pan Unit is of primary importance In addition to the precautions outlined in Attachment, the following safety precautions are observed by the Material Handlers when handling reactive wastes These guidelines include, but are not limited to, the following

- Inspections are performed on hand tools and mechanical devices to ensure that they have not become unsafe for use by the operator
- Motor vehicles used to transport explosive wastes or other materials to the Burn Pan Unit must meet safety requirements for the transportation of explosives
- Prior to placement or spreading of waste material for burning, the burn pans are carefully inspected to ensure against the presence of heat retained in embers, sparks, or burning material from previously treated materials

- Containers of reactive wastes are handled carefully at all times They are not thrown, pushed, or dumped from the truck to the ground If a truck is not equipped with an elevator-type tailgate, the individual containers are lifted and placed in the burn pan by hand, one at a time

- All nearby explosives, whether in a vehicle or not, are placed at a safe distance from the Burn Pan Unit operations and are protected from flying embers, fragments, or sparks

- The structural integrity of the burn pans is maintained by the use of a 6-inch, insulating clay liner in the burn pans

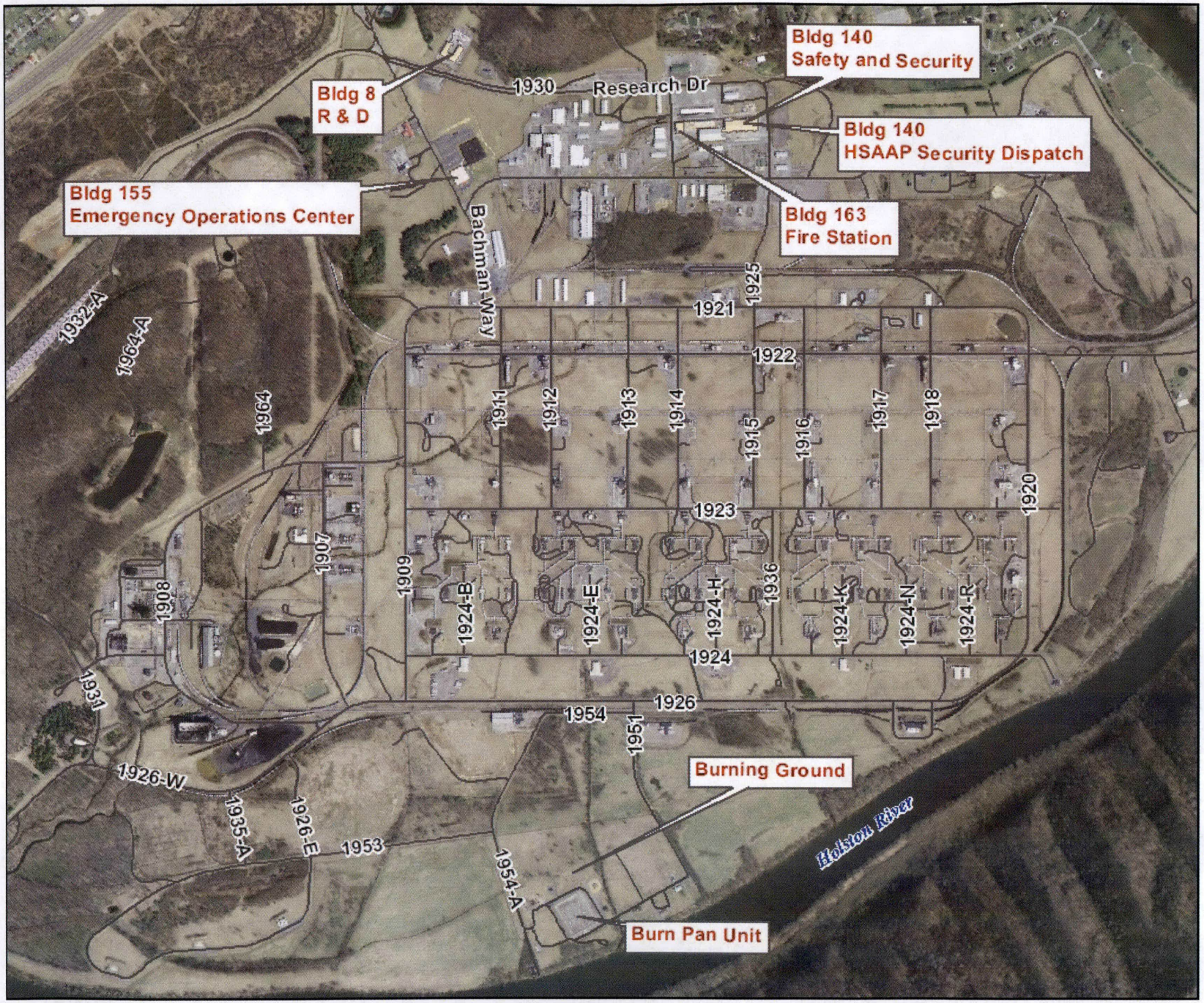
- Only authorized tools are allowed to be used within 15 feet of exposed hazardous materials Tools are not allowed to become heated by remaining near burning explosives

- The area within the Burn Pan Unit is kept clear of vegetation

- Burn Pan Unit treatment operations will occur during the following meteorological conditions

  - No precipitation
  - Wind speed of less than 30 mph and at average of 20 mph
  - No observable threat of electrical storms
  - No restricted visibility (dense fog, blowing snow or dust)
  - No low, overcast sky
  - No air pollution episodes

MAF 03/02/2011



Buildings

Road Centerline

Holston Army Ammunition Plant, Kingsport, TN

Emergency Equipment Building Locations

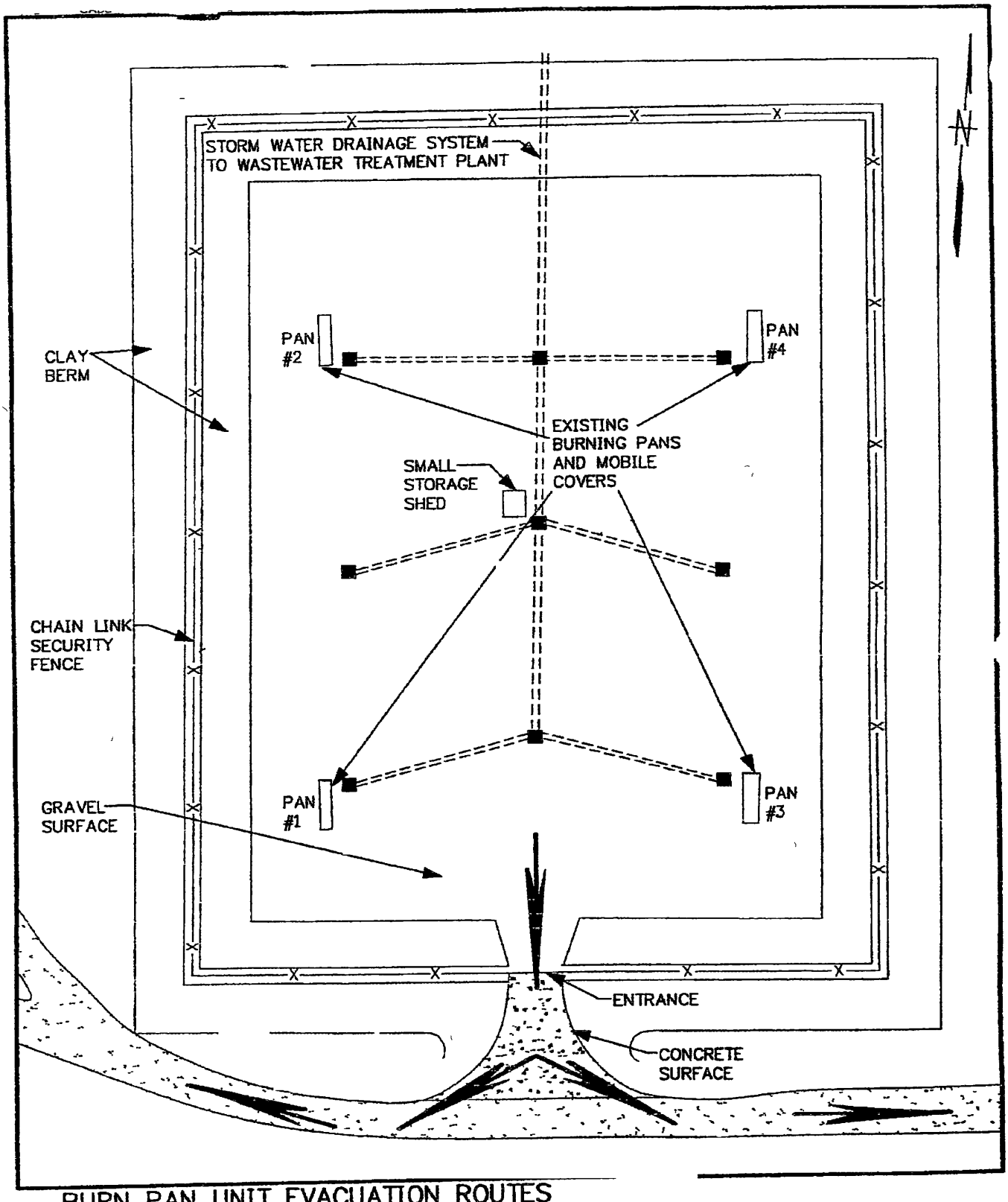
Figure 5.1-1

Feet

0 1,300

Figure 5.1-2

BURN PAN UNIT EVACUTION ROUTES



BURN PAN UNIT EVACUATION ROUTES
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TN

Figure 5.1-2

0 50 100
APPROXIMATE SCALE IN FEET

Brown & Root Environmental

SOURCE DRAWING ADAPTED FROM SIRRINE ENVIRONMENTAL CONSULTANTS, GREENVILLE, S C
RCRA OPERATING PERMIT APPLICATION
HOLSTON ARMY AMMUNITION PLANT

039713/P
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Facility. HOLSTON ARMY AMMUNTION PLANT
EPA Identification Number: TN5 21 002 0421
Permit Number· TNHW-148

ATTACHMENT 5.2 COORDINATION AGREEMENTS

Attachment 5 2 is a copy of the permittee's Emergency Medical Service agreement with Church Hill Emergency Medical Service, and City of Kingsport' Fire Department updated 11/30/2010

CONTRACT BETWEEN

BAE SYSTEMS, Ordnance Systems Inc.

AND

CHURCH HILL EMERGENCY MEDICAL SERVICE

SUBCONTRACT NO.

FOR

EMERGENCY AMBULANCE SERVICES

Contract No. DAAA09·98·E-0006

(Reference DAAA09-97 -R-0214)

November 01, 2004

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I. DESCRIPTION OF SERVICE

II. TERM AND TERMINATION OF SUBCONTRACT
III. PRICE IV PAYMENT

V. ORDERING AUTHORIZATION VI GENERAL CONDITIONS

VII. CONTRACT DEFINED

VIII. SIGNATURES SUBCONTRACT

AGREEMENT FOR EMERGENCY AMBULANCE SERVICE

THIS AGREEMENT dated the 26TH day of April, 1999 is made between **Church Hill Emergency Medical Service** (hereinafter referred to as "Subcontractor") and, **BAE SYSTEMS, Ordnance Systems** Inc , F K A "ROYAL ORDNANCE NORTH AMERICA, INC ", 4509 West Stone Drive , Kingsport, Tennessee 376609982 (hereinafter referred to as "Corporation")

Subcontractor agrees to provide Emergency Ambulance Service at Area B, **HOLSTON ARMY AMMUNITION PLANT** (hereinafter referred to as "HSAAP") and Corporation agrees to pay for said service in accordance with the terms and conditions set forth below

Said service is procured by the corporation under its Prime Contract No DAAA09-98-E-0006 with the **DEPARTMENT OF THE ARMY, U S. ARMY JOINT MUNITIONS COMMAND** (hereinafter referred to as "Government")

I. DESCRIPTION OF SERVICE

Subcontractor shall provide on Call Emergency and Non-Emergency Ambulance Services to Corporation at the Holston Army Ammunition Plant Subcontractor shall operate in compliance with State of Tennessee Department of Health, Division of Emergency Medical Services, rules and regulation and provide services as described below

1 Response to emergency call by Corporation's authorized dispatcher will result in having qualified personnel on the scene of incident within five (5) minutes maximum The vast majority of cases should fall within a 2-3 minute range

2 Subcontractor will respond to all calls with full staff and equipment to provide Advanced Life Support (ALS)

3 WSI-EMS staff will accompany Subcontractor personnel on the ambulance when transport to off site care facility is required and when such assistance is requested by Subcontractor

4 Subcontractor shall provide on site stand-by service when required by Corporation This service shall be billed on an hourly basis as defined in Section

5 Subcontractor agrees to support and participate in Corporation's mutual readiness exercises and planning activities

6 Corporation's WSI-EMS staff will act as First Responders and will operate under the Subcontractor's medical director's license

7 Subcontractor shall be met at the gate and escorted to the incident by Corporation's WSI Security personnel

8 Service must include compliance with OSHA 29 CFR 1910 1030, Occupational Exposure to Bloodborne Pathogens, Final Rule

II TERM AND TERMINATION OF SUBCONTRACT

The Service to be provided under this Subcontract shall commence on April 26, 1999 and extend through December 31, 2007 The Agreement may be extended for four (4) additional 12-month periods by written authorization from the Corporation

This Subcontract may be terminated by either party provided written notification is made at least thirty (30) days prior to the date of termination

Without limiting any other right which Corporation may have in the event of default by Subcontractor, if after award, Subcontractor breaches Subcontract by failure to perform in accordance with the terms and conditions of this Subcontract, then Corporation may send Subcontractor a written notice of default and upon failure to cure such default within fifteen (15) days after such notice, Subcontractor shall lose all right, title and interest which it might otherwise have acquired in and to such Services where a default has occurred Subcontractor agrees that in the event it fails to perform in accordance with the terms and conditions of this Subcontract, Corporation may exercise such rights and may pursue such remedies as are provided by law or under this Subcontract

If Subcontractor should be adjudged bankrupt, or should make a general assignment for the benefit of Subcontractor's creditors, or if a receiver should be appointed for Subcontractor's actual or claimed insolvency, or if Subcontractor should be temporarily or permanently enjoined from prosecuting Services, or if Subcontractor should persistently or repeatedly refuse or should fail, except in cases for which extension of time is granted, to supply the necessary skilled workmen or proper materials, or persistently disregard laws, ordinances, regulations or the instructions of Corporation, or otherwise be guilty of a substantial violation of any provision of this Subcontract, then Corporation, upon certification of the Subcontract Administrator that sufficient cause exists to justify such action, may without prejudice to any other right or remedy, terminate this Subcontract

III PRICE

Corporation shall pay Subcontractor for Services performed under this Agreement as defined below

Advanced Life Support (emergency)	$376 00 per call Advanced Life
Support (non-emergency)	$372 00 per call Basic Life
Support (emergency)	$247 00 per call Basic Life
Support (non-emergency)	$243 00 per call Stand-By
Assistance	$ 50 00 per hour

Charges shall include transportation to designated continuous care facility if required and all supplies

Note Subcontractor shall respond with Advanced Life Support Team on every call Advance Life Support (ALS) charges shall apply only to those cases where ALS is actually required If call is aborted prior to Subcontractor's arrival at the emergency scene, there shall be no charges

IV. PAYMENT

Corporation shall pay Subcontractor for Services performed under this Subcontract within thirty (30) days after acceptance of work and receipt of invoice

V AUTHORIZATION

Authorization shall be by call from the Corporation's WSI Security Dispatcher

VI GENERAL CONDITIONS

A <u>Communications</u>

Written notice shall have been duly served if delivered in person to an employee of the Subcontractor for whom it was intended or, if

delivered at or sent by mail to the Subcontractor's last known business address

All communications between the Corporation and the Subcontractor must show the Contract number assigned to this Contract by the Corporation

B Prevailing Terms and Conditions

The terms and conditions contained herein, and any general conditions attached hereto, are essential terms of this Contract In the event of any inconsistency with your quotation, such terms and conditions shall prevail

C Insurance and Indemnity Provisions

In performing the service covered by this Subcontract, the Subcontractor agrees to take such measures as will *effectually* prevent any accident to persons or property during or in connection with the Service, and to indemnify and save harmless Corporation from all loss, costs, damages, expense and liability for property damage and for bodily injuries to, or death of, any and all persons, including without limitation, as to both property damage and bodily injury, Subcontractor and Corporation and their respective agents and employees caused solely by the acts or omissions of the Subcontractor, or the Subcontractor's agents, employees or lowertier subcontractors, their agents or employees, during or in connection with said Service, excepting only property damage, bodily injury or death caused by the negligence of the Corporation, its agents or employees The Subcontractor shall maintain such insurance as will protect it from claims under Workers Compensation Acts and from claims for bodily injuries, including death, either to its employees or others, and from claims on account of property damage, which may arise in connections with said service

Such insurance shall be in at least the following amounts

1 Workers compensation Limits -Statutory

2 Comprehensive General Liability
Bodily Injury -Property Damage
$300,000 Single Limit

3 Comprehensive Automobile

(including trucks) Liability

Bodily Injury -Property Damage

$300,000 Single Limit

Subcontractor must show to the Corporation evidence of the above coverage

D Drug Policy

If during the course of the service, Subcontractor's activities require Subcontractor personnel to visit HSAAP facilities, the Subcontractor acknowledges and agrees to advise its employees, agents and lower-tier subcontractors that it is the policy of the Corporation

(1) to prohibit the use, possession, sale and distribution of alcohol, illegal drugs, or other controlled substances on its premises, and

(2) to prohibit the presence on HSAAP property of employees of the Subcontractor, lower-tier subcontractor or agent who has such substances in his/her body for non-medical reasons Entry onto HSAAP property constitutes consent to an inspection of the employees of the Subcontractor, lower-tier subcontractor or agent, including vehicles and personal effects when entering, while on, or upon leaving HSAAP property Any Subcontractor employee, lower-tier subcontractor or agent who is found in violation of this policy will be removed and barred from HSAAP property

Subcontractor further agrees that when one of its employees, agents or an employee of a lower-tier subcontractor, while on HSAAP property, has a performance deviation, abnormal incident, or unusual behavior which is suspected to be the result of drug or alcohol abuse, this employee will be asked to leave the premises upon the arrival of his/her immediate supervisor who will accompany the employee from HSAAP property

An employee or agent of the Subcontractor or lower-tier subcontractor suspected to be under the influence of alcohol or drugs will not be readmitted to HSAAP site until a negative blood alcohol and urinalysis for drug screen for that employee is certified by an approved laboratory, at Subcontractor's expense, and transmitted to Corporation Subcontractor employees, lower-tier subcontractors and agents who test positive for alcohol or other drugs in a test administered by a Corporation approved laboratory, on samples taken immediately after leaving HSAAP will not be permitted reentry to HSAAP property Subcontractor agrees that any disciplinary actions or other employment decisions affecting Subcontractor's employees, lower-tier subcontractors, agents and

applicants that arise in any way out of matters related to this Drug Policy are the sole responsibility of the Subcontractor Corporation agrees to maintain the confidentiality of test results and to use said results solely in connection with its decisions as to whether to permit a Subcontractor employee, lower-tier subcontractor or agent to enter or remain on HSAAP property Subcontractor agrees to maintain the confidentiality of any information gained or exchanged from or during the implementation of this policy

Where applicable, Subcontractor agrees to meet all drug-testing regulations including but not limited to the requirements of DOD and DOT

VII CONTRACT DEFINED

The entire document consists of this Subcontract, Section 11-General Conditions, and the Purchase Order

This Subcontract and the performance thereunder shall be governed by and construed in accordance with the laws of the State of Tennessee

VIII. SIGNATURES

Accepted for Corporation	*Accepted for Subcontractor*
ROYAL ORDNANCE NORTH **AMERICA**	**CHURCH HILL EMERGENCY MEDICAL SERVICES**
BY	BY
TITLE PurchasirlCl Mana~er	TITLE
DATE	DATE

SUBCONTRACT 9901-00026 AMENDMENT A

EMERGENCY AMBULANCE SERVICE

Corporation exercises its option to extend Subcontract 9901-00026 through April 25, 2004

All other terms and conditions shall remain the same *Accepted for Corporation* ROYAL ORDNANCE NORTH **AMERICA**	*Acce2ted for Subcontractor* **CHURCH HILL EMERGENCY MEDICAL SERVICES**
BY	BY
TITLE Purchasinq Manaqer	TITLE
DATE	DATE

AMENDMENT 'B'

(Dated 01 November 2004) to
SUBCONTRACT No GWT -110104-01
(Previously Numbered 9901-00026)
for
EMERGENCY AMBULANCE SERVICE

This Subcontract originally dated the 26th of April, 1999, and Amendment 'A', is hereby revised to (a) extend the term through October 31,2005, (b) change the name of the Corporation, (c) change the number of this agreement, and d) change itemized rate schedule to reflect increases, as follows

The term of this agreement is hereby extended to October 31st, 2005, as stated in first paragraph of part II, page 4 of 10, herein,

The name of "Corporation", and any and all references thereto as defined in first paragraph on page 3 of 10, is changed from "ROYAL ORDNANCE NORTH AMERICA, INC " to **"BAE SYSTEMS, Ordnance Systems Inc "**

The number of this agreement is hereby changed

From "9901-00026"

to **"GWT -110104-01"**

- The rates for services applicable are hereby changed to Advanced Life Support (emergency) $376 00 per call Advanced Life Support (non-emergency) $372 00 per call Basic Life Support (emergency) $247 00 per call Basic Life Support (non-emergency) $243 00 per call Stand-By Assistance $ 50 00 per hour

All other terms and conditions shall remain the same

Accepted for: Accepted for.

BAE SYSTEMS, ***Ordnance Systems Inc.***
BY
GARY W TAYLOR, C P M , CPIM
Purchasing Manager

_____

CHURCH HILL EMS

BY

Title _____

AMENDMENT 'D'

(Dated 24 January 2008)
to
SUBCONTRACT No. GWT-110104-01
(Previously Numbered 9901-00026)
for
EMERGENCY AMBULANCE SERVICE

This Subcontract originally dated the 26th of April, 1999, Amendments 'A' , 'B', and 'C', is hereby revised to extend the term through December 31, 2011 as follows

The term of this agreement is hereby extended to December 31st, 2011, as stated in first paragraph of part II, page 4 of 10, herein

All other terms and conditions shall remain the same

Accepted for:

BAE SYSTEMS, ***Ordnance Systems Inc.***
By
GARY W TAYLOR, C P M , CPIM
Procurement Manager

Accepted for:

CHURCH HILL EMS
By Stanley Hines

Title Director

Stanley Hines

6

Facility: Holston Amy Ammunition Plant
EPA Identification Number: TN5 21 002 0421
Permit Number: TNHW-148

ATTACHMENT 6. CLOSURE AND POST-CLOSURE PLANS

Attachment 6 consists of three separate sections as follows

- Attachment 6 1 Closure and Post-Closure Plans
- Attachment 6 2 Partial and Final Closure Plans
- Attachment 6 3 Soil Sampling During Closure Activities

ATTACHMENT 6.1 CLOSURE AND POST-CLOSURE PLANS

CLOSURE AND POST-CLOSURE PLANS

This Attachment contains the closure plan describing the steps necessary to permanently close the Burn Pan Unit at Holston Army Ammunition Plant (HSAAP) HSAAP would anticipate clean closure at the unit, however, contingent closure and post-closure plan is also provided herein in the event that contamination has occurred and it is not possible to achieve clean closure standards The information provided in this Attachment includes closure plan, post-closure plan, notice in deed and certification, cost estimates, financial assurance mechanisms, and closure plan amendment

CLOSURE PLAN

HSAAP Description

HSAAP is a government-owned, contractor-operated facility used for the manufacturing of explosive compounds and explosive formulations HSAAP is located in Hawkins and Sullivan Counties in northeastern Tennessee The plant is composed of two distinct manufacturing areas as well as explosive material storage magazines, industrial landfills, a wastewater treatment plant, and several office buildings that provide administrative, environmental, health and safety, and security support services Area A manufacturing operations consist of refining and concentrating acetic acid and the production of acetic anhydride These materials are then sent to Area B for use in manufacturing explosives Area B manufacturing operations consist of the production of concentrated nitric acid for the manufacturing of explosive compounds, the blending of explosive compounds, and the recovery of acetic acid Explosive wastes are generated only in Area B There are a total of 10 identical explosives production lines in Area B Open burning of waste explosive material is conducted in Area B at the Burn Pan Unit

Burn Pan Unit Description

HSAAP conducts open burning of explosive wastes at the Burn Pan Unit located within the Burning Ground in Area B Figure 6 1-1 shows the details of the Burn Pan Unit, which is the subject of this closure and post-closure plan The Burn Pan Unit is surrounded by a berm The entire area within the berms has a 6- to 8-inch compacted-clay liner Security is provided by a chain-link fence, which surrounds the unit The Burn Pan Unit contains four burn pans that are evenly spaced and positioned in the northeast, southeast, southwest, and northwest corners of the area Within the Burn Pan Unit is a stormwater drainage system, a small storage shed, two resistance heating igniter assemblies, and two 3/4-inch water spigots

Closure Performance Standards

Clean closure standards for hazardous constituents in soil (compacted clay and native soil) within the Burn Pan Unit include background levels, soil screening levels, or site-specific risk-based concentrations for explosives The explosives that will be considered will be the target analytes in U S EPA Method 8330 for the analyses of explosives Target explosive analytes include

cyclotrimethylene trinitramine (RDX), cyclotetramethylene tetranitramine (HMX), 2,4,6-trinitrotoluene (TNT), o-nitrotoluene (2NT), m-nitrotoluene (3NT), p-nitrotoluene (4NT), trinitro-2,4,6-phenylamine (tetryl), nitrobenzene (NB), dinitrobenzene all isomers (DNB), 1,3,5-trinitrobenzene (TNB), and dinitrotoluene all isomers (DNT) Analytical results will be compared to the U S EPA Regional, Soil Screening Levels (RSL's) for chemical contaminants at superfund sits or current approved levels

Partial Closure Activities

The entire Burn Pan Unit is expected to remain in service throughout the active life of the facility However, from time to time, one or more of the burn pans may be taken out of service for repair or replacement The remaining pans within the unit would remain active If a burn pan is taken out of service, the procedures described in this Attachment will be implemented for the burn pan Replacement of burn pans is a normal part of operations during the active life of the facility Replaced burn pans must undergo Equivalent partial closure The Burn Pan Unit would not be closed

Maximum Waste Inventory

Explosive materials are neither stored nor accumulated at the Burn Pan Unit Also, HSAAP does not store wastes As waste materials are collected, they are transported to the Burn Pan Unit for treatment The maximum inventory of explosives ever present in the Burn Pan Unit is the explosive load limit or 5000 pounds net explosive weight (NEW) These quantities would be the maximum waste inventory ever present at the Burn Pan Unit at one time Any explosive wastes present at the Burn Pan Unit would be treated in the burn pans before closure begins When closure activities begin, no inventory of explosive wastes will remain at the Burn Pan Unit

Inventory Removal, Disposal, and Decontamination of Equipment, Structures, and Soils

Closure of Miscellaneous Units

HSAAP operates a hazardous waste Burn Pan Unit The Burn Pan Unit is classified as a miscellaneous unit Methods for determining the presence of contamination, performing decontamination, and evaluating the effectiveness of decontamination during closure of the Burn Pan Unit are described in this Attachment

Inventory Removal and Disposal for Wastes and Burn Pans

Wastes Treated

The maximum amount of waste materials present at the Burn Pan Unit at any one time would be 5000 pounds NEW of material The quantity can be treated in one treatment event using all four burn pans Prior to closure of the Burn Pan Unit, remaining material would be treated Therefore, no untreated material would be within the Burn Pan Unit when closure activities begin

Treatment Residue and Burn Pan Clay Liner

After treatment of the final volume of wastes, the burn pans will contain treatment residuals and clay liner These materials will be managed as follows

1) The treatment residue in each burn pan will be sampled and analyzed for the reactivity characteristic using the Impact Sensitivity Test

2) If the treatment residue fails the reactivity characteristic test, it will be reburned Step 1 will be repeated until the treatment residue passes the reactivity characteristic test

3) If the treatment residue passes the RSL'S reactivity test, the treatment residue will be analyzed for the toxicity characteristic (TC) The TC constituents include arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, 2,4-dinitrotoluene, and nitrobenzene

4) If the treatment residue results exceed the regulatory TC levels, the treatment residue will be removed from the pan(s), placed into containers, and disposed of at an offsite hazardous waste TSDF landfill

5) If the treatment residue results are below the regulatory TC levels, the treatment residue will be removed from the pans and placed into containers The material will be placed in a solid waste landfill

6) Once the treatment residue is removed, the clay liner will be sampled and analyzed for the reactivity characteristic using the Impact Sensitivity Test

7) If the clay liner fails the reactivity characteristic test, it will be reburned Steps 6 and 7 will be repeated until the clay layer passes the reactivity characteristic test

8) If the clay liner passes the reactivity test, the clay liner will be tested for the TC The TC constituents tested will be arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, 2,4-dinitrotoluene, and nitrobenzene

9) If the clay results exceed the TC levels, the clay will be removed from the pans, placed into appropriate containers, and disposed of at an offsite Hazardous Waste TSDF landfill

10) If the clay results are below the TC levels, the clay will be removed from the pans and placed into appropriate containers, and placed in a solid waste landfill

Burn Pans

After all of the treatment residue and clay have been removed from the burn pans, the burn pans will be inspected, certified as explosive-free, and sold for recycle as metallic scrap The aluminum lids will be certified as explosive-free and also sold as metallic scrap The concrete rail pan supports will be disposed of as a solid waste after certification as explosive-free

Assessment of Contamination

Following is a discussion of the sampling program that will be conducted at closure to determine whether the compacted clay/native soil at the Burn Pan Unit meets clean-closure standards

Sampling of the environmental media (compacted clay and native soil) within the Burn Pan Unit will be conducted in phases The phased approach will allow HSAAP to determine the vertical and horizontal extent of any contamination within the Burn Pan Unit The first and second phases will be focused on the compacted-clay-liner that lines the entire Burn Pan Unit The third and forth phases, if necessary, depending upon the results of the first phase of sampling, will focus on the native soils underlying the compacted-clay liner

Compacted-Clay Liner Sampling and Analysis (Phases I and II)

The initial samples taken in Phase I will consist of four composite samples of the surface compacted-clay liner taken around each burn pan, each composite consisting of four grab samples, and one grab sample taken at the upgradient side of each of the nine drop inlets One-half of each grab sample from around the burn pans will be used to form the composite and one-half will be retained If analysis of a composite sample shows the presence of explosives, then each of the grab samples comprising the composite will be analyzed for the detected explosives Subsequent sampling in Phases II, III, and IV will be based on the results of the Phase I sampling Figure 6 I-2 shows the location of the Phase I sampling points Surface (0-2 inch) samples will be collected from the compacted-clay liner in Phase I These samples will be analyzed for the Method 8330 (or Division approved method) explosives (2NT, 3NT, 4NT, tetryl, NB, DNB, TNB, DNT, RDX, HMX, and TNT) If analysis indicates that explosives are not present above clean closure levels, then no additional sampling will be conducted However, if the results from the surface samples indicate the presence of explosives above clean closure levels, then Phase II subsurface (4-6 inch) sampling of the compacted-clay layer will be conducted and analyzed for the Method 8330 explosives found to be present in Phase I

Native Soil Sampling and Analysis (Phases III and IV)

If analysis of the subsurface compacted-clay liner indicates that explosives are not present above clean closure levels, then no further sampling will be conducted The underlying native soils will be sampled and analyzed only if results from the subsurface compacted-clay layer is contaminated (Phase III sampling) Initially, a surface native soil sample (0-2 inch) will be collected and analyzed for the Method 8330 or (Division approve method) explosives detected during Phase II If this layer shows contamination, then subsurface native soil sampling will be conducted in Phase IV for analytes found in Phase III The subsurface native soil will initially be collected from 0-2 inches, 1 foot, and then in increments of 1 foot until contamination is no longer indicated or the groundwater table is reached, whichever comes first Native soil samples will be tested for explosives by the current EPA Method QA/QC will be conducted in accordance with methods described in SW-846 (or Division approved method) Upon completion of the sampling and analysis of native soil, the extent of any vertical and/or horizontal contamination, and an estimate of the size of the area affected, will be determined Based upon this data, a determination will be made as to whether further investigation is warranted and to what extent

Additional Sampling and Analysis

If explosives are detected at concentrations that exceed clean-closure standards (soil screening or site-specific risk-based levels), additional samples will be collected to more completely characterize the nature and extent of the contamination Samples will be taken at a greater

depth than the initial sampling locations to define the vertical extent of contamination Samples will also be taken at a greater distance from the units to determine the horizontal extent of contamination If the analysis indicates that the concentrations of all explosive constituents are equal to or less than soil screening levels or site-specific risk-based levels, no further sampling or soil removal or remediation will be necessary

Procedures/Methods to Perform Decontamination

Any contaminated soil at the Burn Pan Unit exceeding clean-closure levels will be excavated Soils will be removed in layers up to 2 feet in thickness using backhoes, bulldozers, or other excavation equipment After a layer of contaminated soil (compacted clay or native soil) is removed, sampling and analysis will be conducted to determine whether cleanup goals have been attained If goals are not attained, additional layers of compacted clay/native soil will be removed until closure goals are attained or the unit is closed as a landfill If in-situ treatment is considered to be an appropriate alternative to excavation, the closure plan will be revised and submitted to the Tennessee Department of Environmental Conservation (TDEC) in accordance with (Closure Plan Amendment) Contaminated compacted clay/native soils will be removed from the unit and brought to a temporary staging area located within or adjacent to the Burn Pan Unit At the staging area, the contaminated compacted clay/native soils will be placed in U S Department of Transportation (DOT) approved drums, roll-off boxes, or other suitable containers for offsite transport The staging area will consist of a graded, compacted, earthen foundation surrounded by earthen berms or temporary concrete berms The foundation and berms will be overlain by a 30-mm thickness (minimum) liner of sufficient durability to withstand sorting activities Plywood or a similar material will be laid on top of the liner to prevent tearing The staging area will be covered in a manner that prevents accumulation of precipitation while allowing work to continue Full drums of contaminated material will be temporarily stored at the staging area and away from sorting activities to prevent contamination by loose material In addition, the outside of all containers will be decontaminated prior to leaving the area if they come into contact with contaminated materials The disposition of any excavated material (compacted clay or native soil) will depend on whether it is a TC hazardous waste Representative composite samples of the excavated compacted clay or native soil will be obtained and tested for the TC The TC parameters that will be tested will be explosive TC constituents 2,4-dinitrotoluene, and nitrobenzene Excavated soils failing the TC test will be managed as hazardous waste and disposed of at an offsite hazardous waste landfill Excavated (compacted clay or native) soils that are not TC will be managed as solid waste and placed in a solid waste landfill All decontamination liquids will be consolidated into appropriate leakproof shipping containers A representative sample will be collected and analyzed for the same TC constituents as soil If determined to be hazardous, all containers will be labeled and moved to a temporary storage area If determined to be nonhazardous, the decontamination liquids will be discharged to the HSAAP wastewater treatment system

Equipment Decontamination

Decontamination Pad

A decontamination pad will be constructed The decontamination pad will be constructed on a graded and compacted earthen foundation It will be surrounded by berms The berms and the pad will be overlain by a liner (at least 30 millimeters [mm] thick) so that decontamination fluids are retained The liner will be protected from tearing by material such as sand or plywood Ramps will be positioned at the entrance and exit of the pad to allow vehicles to pass over the

berms The pad will be sloped so that decontamination fluid will flow to a low point and be collected After decontamination activities are finished, the decontamination pad liner will be steam cleaned and the rinsate collected and containerized The liner will then be disposed of as a solid waste

Personnel Protective Equipment (PPE)

Any contamination on PPE is expected to consist of solids All disposable PPE, such as clothing, gloves, and expendable protective gear, will be cleaned on the decontamination pad to remove any solid material adhering to the PPE The PPE will then be placed into a container and disposed of as a nonhazardous solid waste into HSAAP's onsite solid waste landfill

Small Excavation Equipment Decontamination

Small excavation equipment, such as shovels and rakes, will be decontaminated by removal of solids by use of a brush followed by steam cleaning with a high-pressure washer

Large Excavation Equipment Decontamination

Vehicles and heavy equipment, such as trucks, backhoes, and bulldozers, will be decontaminated by steam cleaning with a high-pressure washer on the decontamination pad All heavy equipment will be decontaminated before leaving the site

Sampling Equipment Decontamination

Sampling equipment will be decontaminated as follows

- A detergent scrub with brushes using Alconox or trisodium phosphate
- Clean water rinse
- Two isopropanol (nanograde) rinses
- Air dry
- Analyte-free water rinse

Management of Decontamination Wastes

All decontamination wastes, both liquids and solids, will be collected Liquids will be collected at a low point on the decontamination pad Both liquid and solid waste will be placed into containers meeting DOT requirements The containerized decontamination wastes will be tested for the TC Any decontamination wastes failing the TC will be handled as hazardous waste Decontamination wastes passing the TC will be handled as nonhazardous wastes

<u>Additional Closure Activities</u>

The ignition system at the Burn Pan Unit will be made inoperative and above-ground portions removed The drainage system will be flushed to remove any solids to the HSAAP wastewater treatment system Dust may be generated during excavation and material-handling activities Therefore, dust control procedures, such as wetting the material to be excavated, will be implemented if this is a problem

Procedures to Evaluate Effectiveness of Decontamination

The effectiveness of the decontamination procedures for the surrounding area will be determined by collecting soil samples, both vertically and laterally at the edges of the excavation area Each distinct excavated area will be sampled Composite samples will be taken from the middle of the excavation pit and from the four walls One duplicate composite will be obtained The composite samples will consist of four grab samples Each grab sample will be split in half with one half being retained and the other half used to form the composite sample The composite samples will be analyzed for whatever constituent(s) necessitated the initial excavation The laboratory will be requested to analyze the samples on a quick-turnaround basis If each of the composite samples has concentrations of the constituents below clean-closure levels for an excavated area, then clean closure will be considered attained for that area The horizontal extent of contamination will not have been identified if one or more of the composite samples taken at the edge of the excavation walls are above clean closure levels Each of the grab samples comprising the composite sample exceeding clean-closure levels will then be analyzed, for the contaminants necessitating the excavation, to better delineate the horizontal extent of contamination The results of the analysis of the grab samples will be used to determine the locations for additional sampling beyond the edge of the original excavation Samples will be taken of 5- and 10-foot distances from the edges of the excavation area where clean-closure levels were still exceeded The vertical extent of contamination will not have been identified if the composite sample of the bottom of the excavation is above clean-closure levels for the contaminant necessitating the excavation If the vertical extent of contamination is not identified, then as much as 2 feet of soil will be removed and another composite sample taken The above process will be repeated until sampling results show that clean-closure has been obtained in both the horizontal and vertical directions for the area If a determination is made that clean-closure cannot be attained, the contingent closure and post-closure plan will be implemented for the portion of the Burn Pan Unit that cannot be clean-closed After all decontamination steps have been completed, the site will be regraded consistent with the natural topography The topsoil will be re-seeded with native grasses

Analysis Procedures

Analytical procedures for analyzing the compacted clay/native soil at the Burn Pan Unit during closure are shown on Table 6 1-1 These analytical procedures are from SW-846, 3rd Edition (or latest edition) Background samples are normally collected only for metals Explosives are not naturally occurring Metals are not identified as hazardous constituents in the materials treated in the Burn Pan Unit and will not be analyzed during closure activities Therefore, background samples will not be collected

Schedule for Closure

Year of Closure

The expected year of closure is 2035

Closure Schedule

The Burn Pan Unit will be closed in accordance with the schedule in Table 6 1-2, once the decision for closure has been made and funding has been provided

Extensions of Closure Time

If unforeseen problems are encountered during closure of any of the storage facilities, an extension of the required closure time (180 days) may be necessary to allow sufficient time to conduct sampling events and to receive and interpret sampling data Demonstrations required for an extension of closure time will be made in accordance with the requirements of and within the time required in TN Rule 1200-01-11- 06(7)

MAF/12/10/2010

TABLE 6 1-1

ANALYTICAL METHODS* FOR BURN PAN UNIT CLOSURE
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TENNESSEE

Constituent	Analytical Method	Method Number
DNT Mixture	GC/MS	SW-846 Method 8270
1,2-Dinitrobenzene	GC/MS	SW-846 Method 8270
1,3-Dinitrobenzene	HPLC	SW-846 Method 8330
1,4-Dinitrobenzene	GC/MS	SW-846 Method 8270
2,4-DNT	HPLC	SW-846 Method 8330
2,6-DNT	HPLC	SW-846 Method 8330
Diphenylamine	GC/MS	SW-846 Method 8270
Nitrobenzene	HPLC	SW-846 Method 8330
Nitroglycerine	HPLC	SW-846 Method 8332
m-Nitrotoluene	HPLC	SW-846 Method 8330
o-Nitrotoluene	HPLC	SW-846 Method 8330
p-Nitrotoluene	HPLC	SW-846 Method 8330
1,3,5-Trinitrobenzene	HPLC	SW-846 Method 8330
2,4,6-Trinitrotoluene	HPLC	SW-846 Method 8330

* SW-846, 3rd Edition (or latest edition)
GC/MS Gas chromatograph/Mass Spectrometry
HPLC High Performance Liquid Chromatography

TABLE 6 1-2

CLOSURE SCHEDULE FOR BURN PAN UNIT
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TN

Step	Description	Cumulative Time (Days)
1	Receipt of final volume of waste	-60
2	Start of closure	0
3	Site investigation (complete sampling and testing of all samples, data interpretation)	60
4	Site remediation	120
5	Complete closure activities	180
6	U S Army certification that closure is completed in accordance with plan	210*
7	Certification by independent, registered professional engineer that closure has been completed in accordance with plan	210*

* Longer if large quantities of contaminated soil are encountered during closure

Statement of Certification of Closure

Within 60 days of completion of closure of the Burn Pan Unit, HSAAP will submit to the State of Tennessee, by registered mail, a certification that the unit has been closed in accordance with the approved closure plan The certification will be signed by the Installation Commanding Officer and qualified Tennessee-registered professional engineer Documentation supporting the qualified professional engineer's certification will be furnished to the State of Tennessee upon request

POST-CLOSURE PLAN

If the Burn Pan Unit, or any portion thereof, cannot be fully decontaminated to constituent concentrations below closure performance standards by means of closure activities, any such portion will be closed as a land disposal unit Any disposal unit will be fully covered with soil material or other low-permeability material having a permeability less than or equal to the permeability of the natural subsoils present beneath the unit to minimize the migration of liquids through the closed unit The cover will be vegetated and contoured to promote drainage and to prevent erosion The cover material will be of sufficient thickness and elasticity to accommodate settling and subsidence If post-closure activities are necessary, HSAAP will submit a detailed post-closure plan to TDEC Any portion closed as a land disposal unit will also have a run-on control system installed to minimize flow onto the closed unit and a run-off management system These systems will be designed to prevent run-on and run-off from damaging the final cover Groundwater monitoring will be conducted on a periodic basis throughout the post-closure period

Inspection Plan

Inspections will be conducted during the post-closure care period whenever groundwater sampling events occur, as a minimum, or semiannually The various inspection findings and actions will be documented on inspection forms The items to be checked during the inspections are described on the Post-Closure Inspection Checklist shown in Table 6 1-3

Post-Closure Monitoring Plan

Groundwater monitoring in accordance with a groundwater monitoring program will continue as necessary throughout the post-closure care period for the Burn Pan Unit HSAAP will submit a groundwater monitoring program to TDEC as a part of the detailed Post-Closure Plan The plan will meet the requirement listed in Tennessee Rule 1200-01-11- 06 It will consist of a sufficient number of monitoring wells, installed at appropriate depths and locations, to yield water samples that

TABLE 6 1-3

POST-CLOSURE INSPECTION CHECKLIST
HOLSTON ARMY AMMUNITION PLANT

Inspection Item	Type(s) of Problems	Frequency	Observations	Date and Nature of Recommended Corrective Action
Disposal Unit Cover (Cap)				
Erosion Damage	Washouts	M		
Settlement	Ponding, cracks subsidence, or displacement	M		
Vegetative Cover				
Condition	Coverage	M		
Run-on/Run-off Controls				
Drainage Channels	Integrity	M		
	Presence of Obstructions	M		
Monitoring Wells				
Well Casings	Condition	M		
Well Caps	Condition	M		
Well Locks	Condition	M		
ID/ MARKING or TAGS	Condition	M		
Site Security	**Damage**	**Deterioration**	**Missing**	
Fence				
Gats				
Locks				
Signs				
Benchmark				

Time
Date
Inspector
Comments

M = Monthly

- Represent the background conditions of the site (groundwater not contaminated by the Burn Plan Unit)
- Represent the quality of groundwater passing the point of compliance
- Detect any contamination of the uppermost aquifer at the point of compliance

Groundwater monitoring wells will be constructed in a manner to maintain the integrity of the monitoring well bore hole The casing will be screened and packed with gravel or sand, where necessary to enable collection of groundwater samples The annular space above the sampling depth will be sealed to prevent contamination of samples and the groundwater

The program will include procedures and techniques for

- Sample collection
- Sample preservation and requirements
- Analytical procedures
- Chain-of-custody control

The sampling and analytical procedures will be appropriate for groundwater sampling and that accurately measure hazardous constituents in the groundwater

Groundwater elevations will be measured each time groundwater is sampled

A statistical evaluation program will for evaluation of results will be included

Post-Closure Maintenance Plan

Deficiencies noted during inspections will be corrected to maintain the integrity of the closed unit Telephone numbers for emergency notification and maintenance will be posted at the closure unit Records of inspections and maintenance activities will be maintained by the HSAAP Environmental Coordinator A discussion of the preventive and corrective procedures, as well as equipment required for the post-closure maintenance program, follows

- Security - Signs will be replaced as they become illegible Ground at the base of the fence will be regraded, as needed, to maintain a maximum gap of 12 inches The fence will be replaced, as needed, to maintain adequate site security

- Erosion - Washouts will be repaired as they are detected If the cap integrity is in question, repair activities will be made as soon as practical Restoration of vegetative cover will be performed as needed

- Cover Settlement - Settlement will be repaired by placing additional cover materials on top of the existing cover and by replacing vegetation

- Vegetative Cover - Maintenance of the vegetative cover, if part of the cover system, will include seeding, watering, and fertilizing, as needed Tree or bush growth will be prevented Mowing will be performed as necessary to control the growth of vegetative cover and to maintain it at a reasonable height above the cover

- Run-on and Run-off Control - Drains and ditches will be cleaned and maintained to allow free drainage so that retention of stormwater does not occur High-rate run-off areas will be protected by placing coarse stone, if needed, to ensure that erosion is minimal

- Monitoring Wells - Any damage to monitoring wells will be repaired If necessary, a damaged well will be replaced

A copy of the Post-Closure Plan will be maintained by the HSAAP Environmental Coordinator The Environmental Coordinator will be responsible for updating the plan, as necessary

Closure of the Burn Pan Unit as a Disposal Unit

If the Burn Pan Unit, or any portion thereof, cannot be fully decontaminated to constituent concentrations below clean-closure standards by means of closure activities, any such portion will be closed as a land disposal unit Any disposal unit will be covered with soil material or a synthetic membrane having a permeability less than or equal to the permeability of the natural subsoils present beneath the unit to minimize the migration of liquids through the closed unit The cover will be vegetated and contoured to promote drainage and to prevent erosion The cover material will be of sufficient thickness and elasticity to accommodate settling and subsidence The post-closure plan described in this Attachment will then be implemented

Run-on/Run-off Control

Any portion of the Burn Pan Unit closed as a land disposal unit will also have a run-on control system installed to minimize flow onto the closed unit and a run-off management system These systems will be designed to prevent run-on and runoff from damaging the final cover The run-on and run-off controls will consist of drainage channels that will surround the land disposal unit to collect storm water run-off and divert storm water from running on to the closed portion of the Burn Pan Unit The drainage channels will be designed to accumulate run-on and run-off from a 24-hour, 25 year storm event The Drainage channels will be cleaned and maintained to allow free drainage so retention of storm water does not occur Inspection of drainage channels will be included in the post-closure inspection plan

Groundwater Monitoring

If clean closure standards cannot be achieved for part or all of the Burn Pan Unit, groundwater monitoring may be required In this event, a detailed groundwater monitoring program will be submitted with the post-closure application

NOTICE IN DEED AND CERTIFICATION

Closure Certification

A closure certification stating that the unit has been closed in accordance with the approved closure plan will be submitted This certification will be signed by an authorized representative of HSAAP and a qualified Tennessee-registered professional engineer

Post-Closure Certification

In the event that the unit cannot be clean-closed, post-closure notices will be submitted to the State of Tennessee and to any other local zoning authority or authority with jurisdiction over land use according to the schedule specified in these regulations, as described below Post-closure use of property where wastes remain following closure will not be allowed to disturb the integrity of the final cover or the function of the groundwater monitoring system At closure, HSAAP will prepare a record of the type, location, and quantity of hazardous wastes remaining following closure Within 60 days after certification of closure, HSAAP will submit this record to the State of Tennessee and to any local zoning authority or authority with jurisdiction over local land use Within 60 days after certification of closure as a disposal unit, HSAAP will record a notation on the deed to the facility property (or on some other instrument that is normally examined during title search) that will in perpetuity notify any potential purchaser of the property that (1) the land has been used to manage hazardous wastes, (2) the land use is restricted, and (3) the survey plat and record of the type, location, and quantity of hazardous wastes remaining after closure have been filed with the State of Tennessee and with any local zoning authority or authority with jurisdiction over local land use Within 60 days after certification of post-closure, HSAAP will submit a signed certification to the State of Tennessee that the required notation to the deed has been recorded, along with a copy of the document in which the notation has been placed

CLOSURE COST ESTIMATE

Federal facilities are exempted from financial requirements, including a closure cost estimate HSAAP is a federal facility

FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

Federal facilities are excluded from financial requirements, including financial assurance mechanisms HSAAP is a federal facility

POST-CLOSURE COST ESTIMATE

Federal facilities are excluded from financial requirements, including post-closure cost estimates HSAAP is a federal facility

FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE CARE

Federal facilities are excluded from financial requirements, including financial assurance mechanisms for post-closure cost HSAAP is a federal facility

LIABILITY REQUIREMENTS

Federal facilities are excluded from financial requirements, including liability requirements HSAAP is a federal facility

STATE MECHANISMS

The State of Tennessee has adopted in TN Rule 1200-01-11- 06(8) the federal financial requirements for hazardous waste facilities contained in 40 CFR 264 Subpart H TN Rule 1200-01-11 06((8)(3) exempts the state and federal government from financial requirements TN

Rule 1200-01-11- 06(8) does not have any exceptions Therefore, there are no state financial mechanisms applicable to HSAAP

CLOSURE PLAN AMENDMENT

HSAAP will maintain this closure plan to ensure that it is current and accounts for anticipated closure activities This closure plan will be amended when the following events or contingencies occur

- The expected reasons that warrant closure of the Burn Pan Unit change
- Changes in operating plans or facility design affect this closure plan This will include, but not be limited to, the need to add new pans to the Burn Pan Unit, to expand the treatment capacity, or to treat different types of materials
- New information is obtained that significantly changes the underlying assumptions or procedures outlined in this closure plan
- Unexpected events occur during closure that require significant modifications of this closure plan

Certain events and contingencies are anticipated in this closure plan which do not warrant formal amendments of this plan For example, the need to remove minor additional quantities of soil than is currently anticipated, or the need to extend the anticipated schedule of some closure activities a few days (provided the overall time scheduled for closure is not exceeded) Such events and contingencies will be brought to the attention of the State of Tennessee However, a formal amendment of the closure plan will not be requested Whenever events or contingencies requiring formal amendment of this closure plan occur, a written request for permit modification will be submitted to the State of Tennessee Such request will be submitted by the Environmental Coordinator and sent by certified mail Any request for amendment will describe in detail the necessary closure plan changes A copy of the closure plan and list of holders of the closure plan will be maintained by the HSAAP Environmental Coordinator The HSAAP Environmental Coordinator will be responsible for transmission of amendments to the closure plan to all holders of the plan The transmittal letter will list each of the pages, figures, tables, etc which have been changed and provide instructions for removal of the old pages, figures, tables, etc and replacement with the new pages, figures, tables, etc

POST-CLOSURE PLAN AMENDMENT

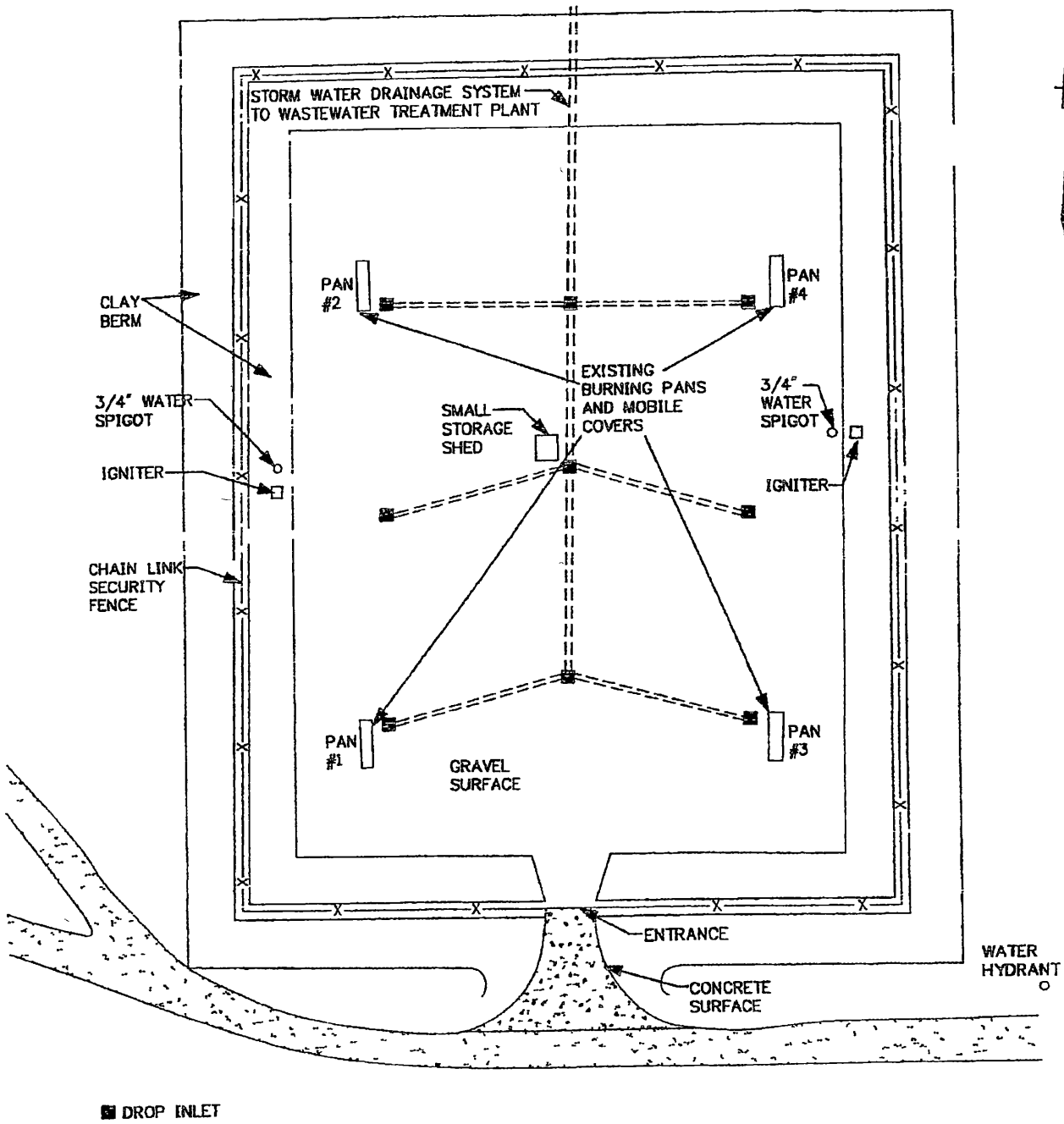
HSAAP will maintain the post-closure plan to ensure that it is current and accounts for anticipated post-closure activities The post-closure plan will be amended when the following events or contingencies occur

- Events occur during the active life of the facility, include partial and final closures, affect the approved post-closure plan
- New information is obtained that significantly changes the underlying assumption or procedures outlined in this closure plan

- Unexpected event(s) occur during closure that require significant modifications of the post-closure plan

Whenever events or contingencies requiring formal amendment of the post-closure plan occur, a written request for permit modification will be submitted to the State of Tennessee Such request will be submitted by the HSAAP Facility Commander and will be sent by certified mail Any request for amendment will describe in detail the necessary post-closure plan changes A copy of the approved post-closure plan and list of holders of the post-closure plan will be maintained by the HSAAP Environmental Coordinator The RONA Environmental Manager will be responsible for distribution of amendments to the post-closure plan to all holders of the plan The transmittal letter will list each of the pages, figures, tables, etc which have been changed and provide instruction for removal of the old pages, figures, tables, etc , and replacement with the new pages, figures, tables, etc

MAF 03/03/2011



SOURCE DRAWING ADAPTED FROM SIRRINE ENVIRONMENTAL CONSULTANTS GREENVILLE, S C
RCRA OPERATING PERMIT APPLICATION
HOLSTON ARMY AMMUNITION PLANT
FIGURE D-2 BURNING PAN LOCATION WITH BURNING GROUND AREA

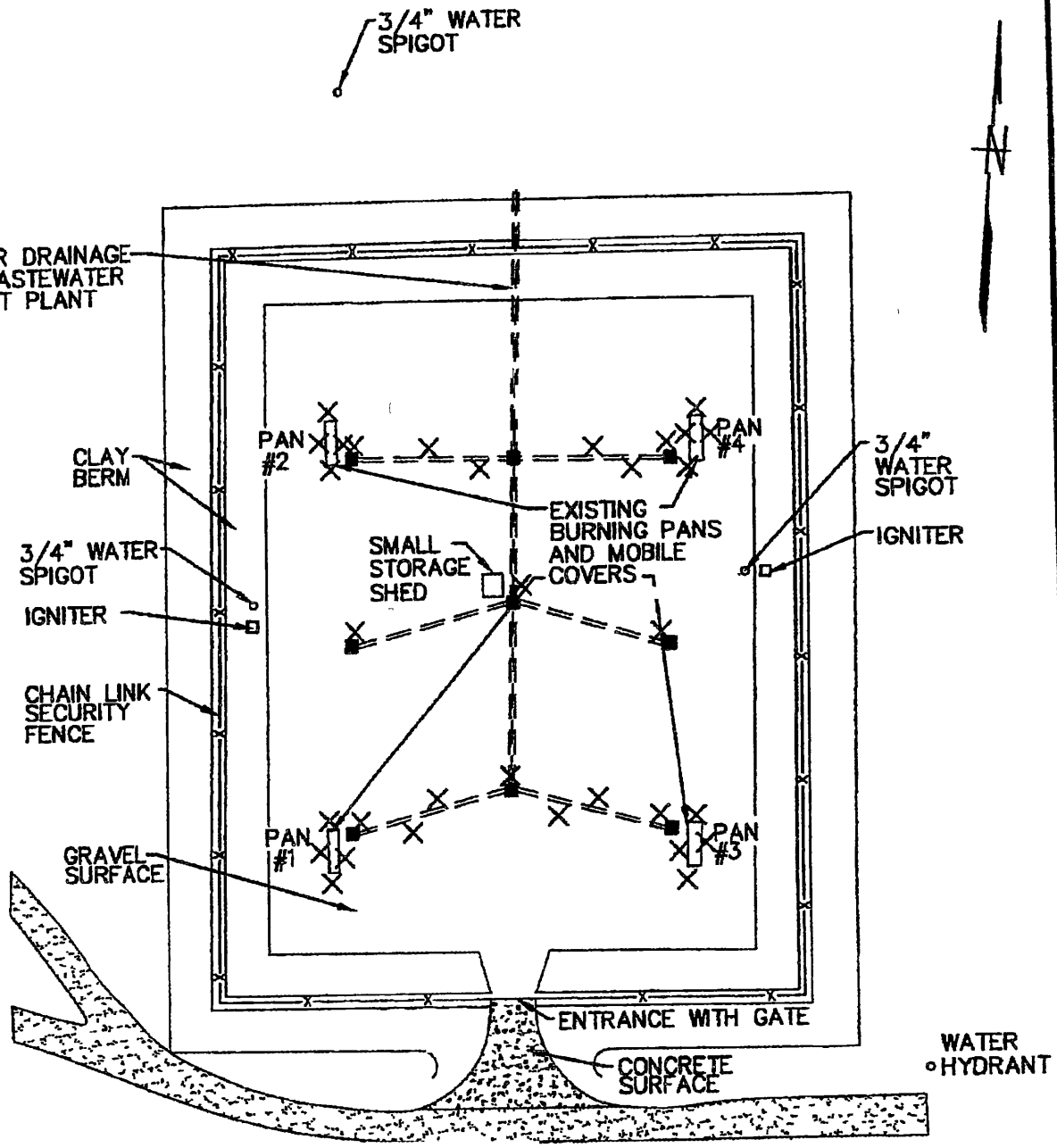
BURN PAN UNIT
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TN

FIGURE 6-1-1

60
0 APPROXIMATE SCALE IN FEET 120

Brown & Root Environmental

\Fig 6-1-1 dgn 11/24/2010 1 02 36 PM



LEGEND

X GRAB SAMPLE

■ DROP INLET

0 80 160

APPROXIMATE SCALE IN FEET

SOURCE
DRAWING ADAPTED FROM SIRRINE ENVIRONMENTAL CONSULTANTS, GREENVILLE, S.C.
RCRA OPERATING PERMIT APPLICATION
HOLSTON ARMY AMMUNITION PLANT

DRAWN BY HJP DATE 6/2/00	Tetra Tech NUS, Inc.	CONTRACT NO JF95	OWNER NO
CHECKED BY DATE	BURN PAN UNIT PHASE I SOIL SAMPLE LOCATIONS HOLSTON ARMY AMMUNITION PLANT KINGSPORT, TN	APPROVED BY	DATE
COST/SCHED-AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO FIGURE 6.1-2	REV 0

Facility. Holston Amy Ammunition Plant
EPA Identification Number TN5 21 002 0421
Permit Number TNHW-148

ATTACHMENT 6 2 PARTIAL AND FINAL CLOSURE PLAN

CLOSURE PLAN

Partial and Final Closure Activities

HSAAP expects to perform partial closure before making modifications to the existing drainage systems at the waste explosive burning area Intended procedures for partial closure of the area including cleanup plan and disposal of contaminated soil are described in this attachment The procedure for the final closure of the area including cleanup, disposal of contaminated soil and decontamination activities are described in following section Any modification to existing facility equipment, structures, instruments or procedures related to the management of the facility will result in HSAAP updating the partial closure plan, and revising the final closure plan accordingly

Inventory Of Wastes

At present no waste will be in the burning pan area and the ashes from the burns will be removed

Partial Closure Procedures

The area under the existing burning pans is to be removed and decontaminated with waste in an open pile area There are a total of two pan areas Each are 8 feet wide and 110 feet long Half of the site will be cleaned up so not to interrupt the operation of the facility After completion of phase I site clean up and contaminated soil disposed, modifications to the phase I area will begin After modification have been completed on phase I, the phase II area will be cleaned up and tested for soil contamination Contaminated soil in the phase II area will be removed and disposed of in the open burning area

Partial Closure Procedures for each phase are as follows

1 The pads will be stripped to a depth of 18 inches and 10 feet wide and 5 feet beyond the ends of the pad

2 This stripped dirt will be placed in the open burning area and decontaminated when the pile is burned Ash and non-combustible material will then be removed from the open burning area and buried in a landfill located on plan grounds

3 The soil of the depression and the surrounding area will then be sampled The sampling pattern is shown on Figure 6 2-1 The soil samples will be taken with a tubular thief stick to a depth of 3 inches The samples will be tested for reactivity The reactivity test is an impact test, to determine if the material will detonate This test is performed on the Holston Impact Machine Non-reactive is no detonation at 100 cm Normal HMX and RDX detonate in the 30 to 33 cm range

4 If the soil is contaminated, the next 6 inches of the depression (sides and bottom) will be removed and placed in the open pile area and be decontaminated (open burned) when the pile is burned The soil of the depression and the surrounding area will be resampled as in Item 3 above

5 When the soil tests show the depression to be non-reactive, the depression will be backfield with compacted clay from HSAAP's earth borrow area

6 All equipment used to remove and move the soil will be decontaminated by washing with water at the washdown station at the Burning Ground This station drains to the Industrial Wastewater Treatment Plant The work will be supervised using qualified HSAAP personnel All personnel will be equipped with the powder clothing, head protection, safety shoes and eye protection

Final Closure Procedures

The procedures of the final closure will include all the procedures detailed in the Partial Closure Section plus the following additions

1 All waste material and sediment collected and accumulated in the catch basins, manholes, and valve boxes will be sampled and tested for reactivity If the material is contaminated, it will be removed and burned in the explosive burning pans

2 Soil tests will be made over the entire burning pan area which includes all soil within the fenced area of the waste explosive burning pan grounds Tests will be made at 20-foot grid spacings to the limits of contamination All contaminated soil will be removed and burned in the open burning area Borrow soil material will be backfilled in depressions to original grade

3 Soil inside the burning pans will be tested for reactivity If the soil is non-reactive, then it will be removed and buried at the landfill located plant grounds A burning pan will be designated to burn any reactive soil If the designated pan's soil is reactive after disposal of possible reactive soil from other pans, then soil will be transported and disposed at a licensed hazardous waste disposal facility

4 The burning pans will be removed and burned in the open burning areas Ash and non-combustible material will than be buried in a landfill located on plant grounds

Schedule for Closure

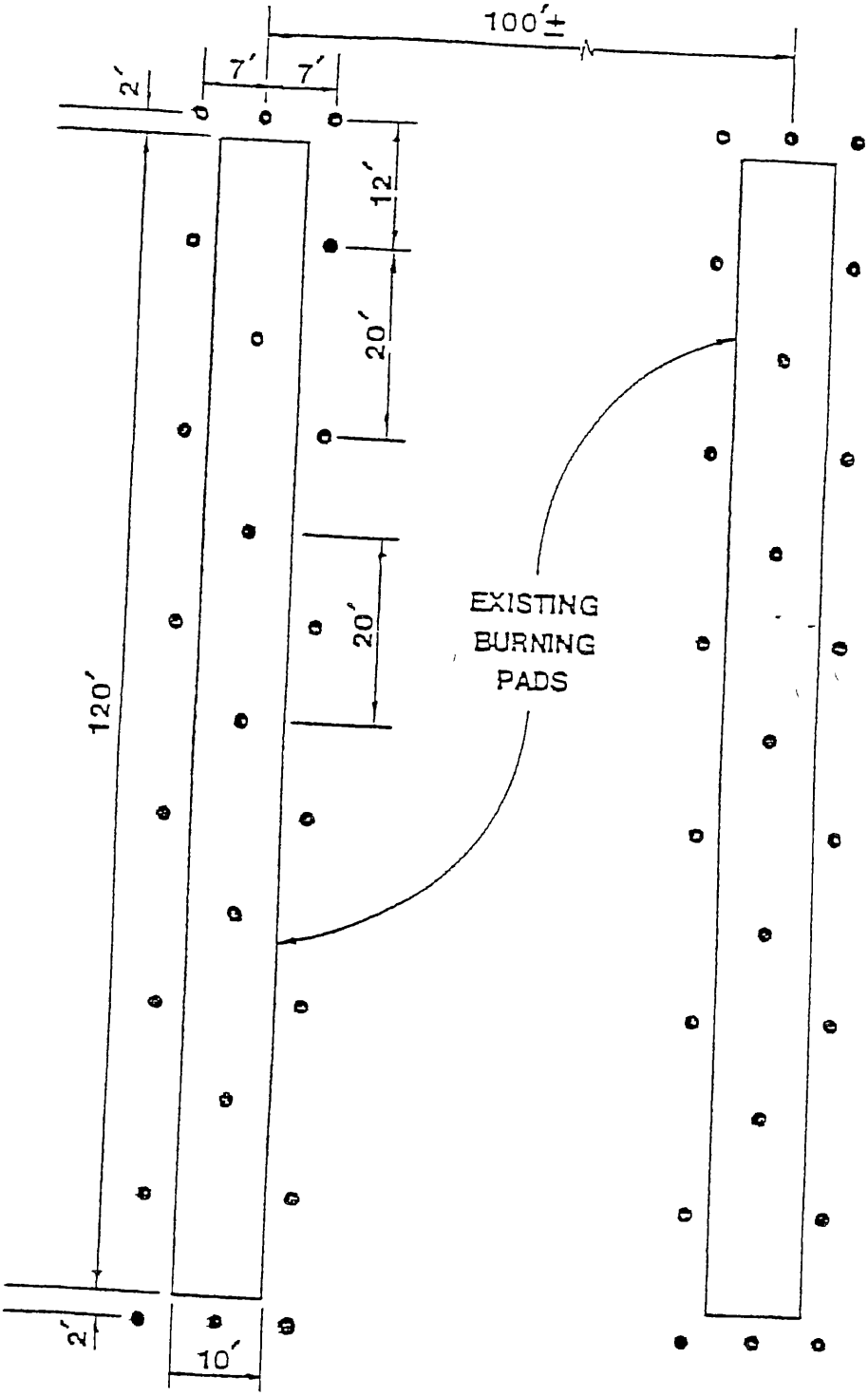
Within 90 days after receipt of the final volume of the explosive waste, final closure activities will be initiated Completion of closure will within 180 days of this occurrence The Regional Administrator and Tennessee Commissioner will be notified by HSAAP 180 days before beginning final closure The proposed schedule for final closure is shown in Table 6 2-1 Final closure will be supervised and certified by a qualified professional engineer, in addition to HSAAP certification

Extensions for Closure Time

Holston Army Ammunition Plan will not require an extension for closure time

FIGURE 6 2-1

SOIL SAMPLING GRID
WASTE EXPLOSIVE BURNING PADS
PARTAL CLOSURE PLAN



• – Sampling Point

Facility: Holston Amy Ammunition Plant
EPA Identification Number: TN5 21 002 0421
Permit Number: TNHW-148

ATTACHMENT 6.3 SOIL SAMPLING DURING CLOSURE ACTIVITIES

SOIL SAMPLING TECHNIQUES

This Attachment contains details on the sampling techniques to be used during closure activities at the Holston Army Ammunition Plant Burn Pan Unit to ensure that the unit meets clean closure standards

Surface Compacted-Clay Liner

Surface compacted-clay liner samples will be collected using decontaminated, stainless-steel spoons and bowls according to the following procedure

1 Place plastic sheeting on the ground around the sampling location to prevent cross-contamination

2 Brush aside the gravel and any organic material that is covering the compacted-clay liner

3 Remove 0-2 inches of the compacted-clay liner with a precleaned or decontaminated spade

4 Transfer the sample to a stainless-steel bowl for homogenizing

5 Adequately mix the sample by chopping, then stirring, the material in a circular fashion and occasionally turning the material over Remove material such as stones and organic matter, if present Once mixing is complete, divide the sample in half and fill the sample containers by scooping sample material alternately from each half

6 Transfer the homogenized sample into an appropriate sample bottle with a stainless-steel lab spoon or equivalent

7 Assemble the sample containers that contain the grab samples which will make up a specific composite sample

8 Remove an equal aliquot of sample from each sample container and place it into a clean, stainless-steel mixing bowl Each aliquot amount is to be as identical as possible to facilitate representativeness

9 Repeat the homogenization technique in Step 4

10 Remove sample amounts from the homogenized composite sample and place them into the proper containers for shipment to the laboratory

11 Secure the cap tightly

12 Label the sample bottle with the appropriate sample label Be sure to label the bottle carefully and clearly, addressing all the categories or parameters

13 Place filled sample containers on ice immediately Samples for explosives analysis will be preserved by cooling to 4°C All sample bottles will be obtained from the laboratory

14 Complete all chain-of-custody documents and record information in the field logbook Prepare samples for shipment

15 Replace the clay from the sample location with clean clay

Subsurface Compacted-Clay Liner

Subsurface samples for chemical analysis will be collected at the same locations as the surface samples They will be collected using decontaminated, stainless-steel hand augers by the following procedure

1 Place plastic sheeting on the ground around the sampling location to prevent cross-contamination

2 Clear the area to be sampled of any surface debris (gravel, twigs, rocks, litter)

3 Begin hand augering to desired depth, periodically removing accumulated materials This prevents accidentally brushing loose material into the borehole when removing the auger

4 After reaching desired depth, slowly and carefully remove auger from boring

5 Transfer the sample to a stainless-steel bowl for homogenizing

6 Adequately mix the sample by chopping or stirring the material in a circular fashion and occasionally turning the material over Remove material such as stones and organic matter, if present Once mixing is complete, divide the sample in half and fill the sample containers by scooping sample material alternately from each half

7 Transfer the homogenized sample into an appropriate sample bottle with a stainless-steel lab spoon or equivalent

8 Assemble the sample containers that contain the grab samples which will make up a specific composite sample

9 Remove an aliquot of sample from each sample container and place it into a clean, stainless-steel mixing bowl Each aliquot amount is to be as identical as possible to facilitate representativeness Avoid generating excess contaminated sample when possible

10 Repeat the homogenization technique in Step 6

11 Remove sample amounts from the homogenized composite sample and place them into the proper containers for shipment to the laboratory

12 Secure the cap tightly

13 Label the sample bottle with the appropriate sample label Be sure to label the bottle carefully and clearly, addressing all the categories or parameters

14 Place filled sample containers on ice immediately Samples for explosives analysis will be preserved by cooling to 4°C All sample bottles will be obtained from the laboratory

15 Complete all chain-of-custody (COC) documents and record information in field logbook Prepare samples for shipment

16 Replace the clay from the sample location with clean clay

FIELD DOCUMENTATION

All pertinent information regarding the site and sampling procedures will be documented in the field logbook The following five steps detail procedure for maintaining the field logbooks

1 Bound logbooks with numbered and water-resistant pages will be used for the maintenance of all field records

2 Logbooks will be kept on site at the Environmental Office

3 Information will be entered into the field notebook legibly with indelible ink A new page will be used at the beginning of each day's activities

4 The following information will be recorded at a minimum

   a Name and exact location of site of investigation
   b Date and time of arrival and departure
   c Name of person keeping log
   d Names of all persons on site
   e Purpose of sampling
   f Location of sampling point (including justification, number of samples taken, volume of samples taken)
   g Preservation method
   h Method of sample collection and any factors that may affect sample quality
   I Date and time of sample collection and any factors that may affect sample quality
   j Name of collector
   k All sample identification numbers
   l Description of samples
   m Weather conditions on the day of sampling
   n Sketch of grab sample location in relation to pan

5 Logbooks are controlled documents and are to be maintained as part of the project file The documents are not to be destroyed or thrown away, even if they are illegible or contain inaccuracies

SAMPLE PACKAGING AND SHIPPING

Samples will be packaged and shipped according to the following procedures Steps 1-5 will be followed if the onsite HSAAP laboratory conducts the analysis Steps 1-8 will be followed if an offsite commercial lab is used

1 Complete all sample labels and place samples into Ziploc polyethylene bags

2 Place samples into a strong outside container, such as a metal picnic cooler lined with a polyethylene garbage bag

3 Place absorbent cushioning material (vermiculite) in and around samples

4 Place several pillows of ice in the coolers on top of the sample containers

5 Place a copy of the chain-of-custody in a Ziploc bag and tape it to the inside lid of the cooler

6 Apply strapping tape around the outside of the cooler Apply chain-of-custody labels on cooler and go once over with the tape

7 Properly mark the outside of the shipping container with proper shipping name, category of hazardous materials, United Nations (UN) or North America (NA) number, proper label (e g , "Laboratory Samples," "This End Up" with upward pointing arrows on all four sides), addressee, and addresser

8 Complete shipping document and place it on the top of the cooler for delivery to the shipper

CHAIN-OF-CUSTODY

Custody of samples will be maintained and documented at all times COC is initiated at the laboratory and remains with the sample at all times The COC bears the name of the person assuming responsibility for the samples This person is tasked with ensuring secure and appropriate handling of the bottles and samples A sample is in custody if

- It is in the field investigator's or the transferee's actual possession
- It is in the field investigator's or the transferee's view, after being in his/her physical possession
- It was in the field investigator's or the transferee's physical possession and then he/she secured it to prevent tampering
- It is placed in a designated secure area

A COC record form will be used to record the custody of all samples collected and maintained by personnel The COC will also serve as a sample logging mechanism for the laboratory The COC form will be completed and kept with the samples at all times inside the cooler in a plastic bag Figure 6 3-1 shows an example of the chain-of-custody form

The sampler will maintain custody from the time of sampling until the coolers are prepared for transport and shipped via overnight air freight, or until the samples are delivered by the sampler to the laboratory

QUALITY ASSURANCE/QUALITY CONTROL

Quality Assurance/Quality Control (QA/QC) samples include duplicates and equipment blanks One field duplicate will be obtained Field duplicates are two samples collected independently at a sampling location Duplicates will be obtained during a single act of sampling and are used to assess the overall precision of the sampling and analysis program A minimum of 1 for every 20 samples (5 percent) for each media shall be field duplicates Duplicates will be analyzed for the same parameters in the laboratory A field duplicate will be obtained at one burn pan At each of the four grab sample locations for the pan, a second grab sample will be obtained and used to prepare a second composite sample

Field blanks are samples of analyte-free water which are rinsed over decontaminated sampling equipment and used to assess cross-contamination from sampling equipment or sample containers Equipment blanks will be obtained at a frequency of 1 per day

12/10/10

HOLSTON DEFENSE CORPORATION
4509 WEST STONE DRIVE
KINGSPORT, TN 37660-9982
(423) 247-9111

CHAIN OF CUSTODY RECORD

PROJECT NO	PROJECT NAME
SAMPLERS *(Signature)*	

STATION #	DATE	TIME	COMP	GRAB	STATION LOCATION	NO OF CONT-AINERS							REMARKS

Relinquished by *(Signature)*	Date	Time	Received by *(Signature)*	Relinquished by *(Signature)*	Date	Time	Received by *(Signature)*
Relinquished by *(Signature)*	Date	Time	Received by *(Signature)*	Relinquished by *(Signature)*	Date	Time	Received by *(Signature)*
Relinquished by *(Signature)*	Date	Time	Received for Laboratory by: *(Signature)*	Date	Time	Remarks	

Distribution Original Accompanies Shipment; Copy to Coordinator Files

FIGURE 6 3-1 CHAIN-OF-CUSTODY FORM

7

Facility. Holston Amy Ammunition Plant
EPA Identification Number. TN5 21 002 0421
Permit Number TNHW-148

ATTACHMENT 7 PERSONNEL TRAINING

PERSONNEL TRAINING

This Attachment describes the training program for Holston Army Ammunition Plant (HSAAP) personnel involved in operation of the Burn Pan Unit Job functions are described Information is provided on how the contents of the training program are designed to meet actual job tasks The management of training records is described

OUTLINE OF TRAINING PROGRAM

HSAAP has developed a training program for all employees involved in hazardous waste management activities at the Burn Pan Unit This personnel training program is designed to ensure that all Burn Pan Unit operations are conducted safely and in compliance with the RCRA Part B permit conditions The training program teaches personnel to perform their job functions safely, and in compliance with environmental regulations and the Part B permit conditions This personnel training plan is designed to address the four job positions that are involved in the operations at the HSAAP Burn Pan Unit

The first job position is the Material Handler The Material Handler is the truck driver who is responsible for the transportation of the waste from the point of generation to the Burn Pan Unit The Material Handler initially receives the OSHA 24-hour training course on Hazardous Health and Safety Training This is followed by annual OSHA 8-hour Refresher course training New Burn Pan Unit employees are continually undergoing on-the-job training by accompanying trained employees In addition, initial and annual RCRA training is received

The second job position is the Emergency Coordinator (EC) The EC is responsible for emergency activities when the contingency plan is implemented The initial training for the EC includes the 40-hour training course on Hazardous Waste Health and Safety Training and the OSHA 8-hour supervisory course Annually, the EC is required to complete 8-hour OSHA and Refresher training In addition, initial and annual RCRA training is received

The third job position is the Safety Department Representative This job position is responsible for all operations at the Burn Pan Unit The initial training for the Safety Department Representative includes the OSHA 40-hour training course on Hazardous Waste Health and Safety Training Annually, the Safety Department Representative is required to complete 8-hour OSHA Refresher training In addition, initial and annual RCRA training is received

The fourth job position is the Environmental Affairs Department Representative This job position is responsible for maintaining compliance with the RCRA Part B permit conditions, submission of required reports to the Tennessee Department of Environment and Conservation (TDEC), maintenance of the closure plan and directs RCRA training This person will be a degreed professional (environmental engineer or scientist or related field) with knowledge in hazardous waste management The Environmental Affairs Department Representative does not handle hazardous waste at the Burn Pan Unit The personnel training program is designed so that the training required of each job position is appropriate for the individual's various responsibilities and

ensures that the individual filling each position is adequately trained to carry out his or her responsibilities

The training records for each employee are maintained for 3 years after the employee leaves HSAAP or until closure of the Burn Pan Unit

Figure 7-1 presents a matrix illustrating the general training topics required of each job position with Burn Pan Unit operational responsibilities The training program consists of both on-the-job and classroom training Each position has introductory training requirements (to be completed within an individual's first 6 months of employment) and continuing annual training requirements No individuals are allowed to work unsupervised until they have completed their introductory training requirements

FIGURE 7-1

GENERAL TRAINING TOPICS REQUIRED FOR JOB POSITIONS HAVING BURN PAN UNIT RESPONSIBILITIES HOLSTON ARMY AMMUNITION PLANT KINGSPORT, TN

Job Title		RCRA Hazardous Waste Management	OSHA (40CFR 1910 120)
Material Handler	Explosives Operator	X	X
Emergency Coordinator	Safety Assistant	X	X
Safety Department Representative	Safety Assistant	X	X
Environmental Affairs Department Representative	Environmental Affairs Specialist	X*	

* Responsible for directing training

Job Title/Job Description

The positions within each functional group discussed in the previous section, as well as the Burn Pan Unit operational responsibilities associated with each position, are shown below

Job titles and descriptions for each position related to hazardous waste management are as follows

1) Material Handler

   a) Qualifications
   Valid State of Tennessee truck driver's license and the ability to demonstrate proficiency through experience
   High school education or GED

   b) Job Responsibilities
   Pick up wastes at point of generation, report any spills occurring during transportation, and transport explosive wastes by truck to the Burn Pan Unit

c) Initial Training
- OSHA 24-hour Emergency Response Training

d) Annual Training
- OSHA 8-hour Refresher
RCRA Refresher

2) Emergency Coordinator

a) Qualifications
High school education or graduate equivalency degree (GED)

b) Job Responsibilities
Notify onsite and offsite emergency management staff/agencies of emergencies, assess hazards resulting from emergencies, coordinate responses to emergencies, and implement preparation of reports to TDEC when the contingency plan is implemented

c) Initial Training
- OSHA 40-hour Emergency Response Training
- 8-hour OSHA Supervisor
RCRA Unit-Specific Training

d) Annual Training
- OSHA 8-hour Refresher
- RCRA Refresher

3) Safety Department Representative

a) Qualifications
High school diploma or GED

b) Job Responsibilities
Receipt and placement of explosives in the burn pans, preparation of explosives for burning, preparation of ignition train, ignition of burn, periodic removal of burn pan treatment residues, inspections of burn pans and Burn Pan Unit, preparation of records of treatment, and cleanup of spills of explosive material within the Burn Pan Unit

c) Initial Training
- OSHA 40-hour Emergency Response Training
- 8-hour Supervisory Training
RCRA Unit-Specific Training

d) Annual Training
- 8-hour OSHA Refresher
- RCRA Refresher

4) Environmental Affairs Department Representative

a) Qualifications
B S degree in environmental engineering, or environmental scientist or related field

b) Job Responsibilities
Maintain compliance with RCRA Part B permit conditions, submit required RCRA reports to TDEC, and maintain closure plan

c) Initial Training
- RCRA Hazardous Material Management

d) Annual Training
- RCRA Refresher

Copies of the job descriptions are maintain in operating record

Training Content, Frequency, and Techniques

Training for all personnel having Burn Pan Unit operational responsibilities consists of on-the-job training, which is conducted by the individual's immediate supervisor, and classroom training, which is described below Individuals are required to complete the introductory on-the-job and classroom training within their first 6 months No individual is allowed to work unsupervised during the transportation of wastes to the Burn Pan Unit or in operations at the Burn Pan Unit until he or she has completed all classroom training and until the individual's supervisor has determined that he or she has completed the on-the-job training required for the position

Training Coordinator

Training will be under the direction of the Environmental Affairs Department Representative, who will serve as the Training Coordinator

Relevance of Training to Job Position

Figure 7-1 demonstrates that the training program has been designed to tailor course requirements to the level of detail appropriate for each job position With this information, a determination was made regarding the level of detail, in each subject area, that is required knowledge for each position

The RCRA training is specific to operation of the Burn Pan Unit The classroom training will be delivered by the Environmental Affairs Department Representative Training is provided in a worker setting by an experienced operator

RCRA Training, Introductory and Annual RCRA Training Course Content

The RCRA training is modular Training in individual modules is conducted throughout the year The introductory RCRA training course covers the following subjects

- Waste Receipt/Verification Procedures
- Hazardous Characteristics of the Wastes Treated in the Burn Pans
  - Hazardous Waste Identification for explosives/reactivity

- Spill Cleanup Procedures
- Allowable Meteorological Conditions for Treatment
- Inspection Requirements
  - Inspection Log
  - Inspection Checklist
  - Procedures for Inspecting, Repairing, and Replacing Facility Emergency Response Equipment
- Emergency Procedures
  - Emergency Response Procedures/Contingency Plan
  - Response to Fires
  - Response to Explosion
  - Shutdown of Operations
- Exit Route from Burn Pan Unit
- Permit Conditions Relative to Operation of the Burn Pan Unit
- Permit Conditions for Recordkeeping for the Burn Pan Unit
  - Recordkeeping and Reporting Requirements
  - Inspection Log
  - Inspection Checklist
  - Corrective Action Reports
- Safety Requirements
  - Standard Operating Procedures (SOPs)
  - Safety Equipment

The Emergency Procedures module listed above instructs facility personnel on the proper procedures for implementing the HSAAP Contingency Plan, relevant to the positions in which they are employed

This course is designed to provide each worker at the Burn Pan Unit with an understanding of the hazardous waste requirements applicable to the open burning of hazardous waste explosives in the burn pans and to their job functions This course will be reviewed periodically and updated, as required, based on permit conditions, changes in hazardous waste regulations, and applicable operating practices

The annual refresher will briefly review each of the topics covered in the introductory training with expanded emphasis on changes that have occurred

On-The-Job Training (OJT)

For each job responsibility the trainee will accompany a trained employee and conduct the job functions under the direct supervision of the trained employee Each job function will be completed The amount of time for OJT will vary depending on the previous experience of the employee being trained and the job function

Specific activities (as applicable) to be included in OJT are as follows

- Transport of explosives to Burn Pan Unit
- Receiving Explosives
- Placement of Explosives in Pan
- Preparation of Explosives for Burning
- Preparation for Ignition

- Ignition
- Inspections

IMPLEMENTATION OF THE TRAINING PROGRAM

Records documenting that each individual has completed required training are maintained by the individual department to which the worker belongs Individual training records are maintained as part of an individual's employment history Training records are maintained for 3 years after an individual leaves HSAAP or until closure of the Burn Pan Unit

MAF/03/02/2011

Facility. Holston Army Ammunition Plant
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ATTACHMENT 8 PROCESS DESCRIPTION

PROCESS INFORMATION

Attachment 8 provides information on the design and operation of the Holston Army Ammunition Plant (HSAAP) Burn Pan Unit Descriptions and design drawings are provided for the burn pans, burn pan mobile covers, berms surrounding the burn pans, and the underlying compacted-clay layer between the berms This Attachment includes a summary of operating conditions, allowable meteorological conditions during which time treatment can be conducted

MISCELLANEOUS UNITS. OPEN BURNING

HSAAP operates a Burn Pan Unit for the thermal treatment of reactive hazardous wastes The Burn Pan Unit is classified as a miscellaneous unit

LAYOUT OF BURN PAN UNIT

A general description of the Burning Ground where the Burn Pan Unit is located and historical summary of the Burn Pan Units are provided in Attachment 1

BURN PAN UNIT

The Burn Pan Unit and ancillary structures consist of the following

Compacted-Clay-lined Berms and Compacted-Clay Liner
Drop Inlets for Stormwaters
Open Burning Pans
Equipment Storage Shed
Water Spigots
Igniters
Ancillary Structures
Burning Ground Office
Building 20
Water Proof Plastic Sheet

Building 20 is where the remote operations currently take place Building 20 is located at the east end of the burning ground Figure 8-1 is a schematic of the Burn Pan Unit that includes the Burning Ground office and Building 20 Figure 8-2 is a detailed drawing of the Burn Pan Unit The Burn Pan Unit proper is approximately 250 feet wide by 325 feet long The entire unit is contained within a bermed area

CONTROL ACCESS

An 8-foot-high, chain-link fence runs along the pinnacle of the berm that surrounds the unit There is one 15-foot-wide gate in the fence on the southern side of the unit used to control access to the unit A paved, 45-foot ramp follows the contour of the berm up to the fence and then down into the unit Also within the unit is a stormwater collection system This system is described in detail in this Attachment Within the unit are four Burn pans The details of the pans are described in this Attachment The pans are placed near the four corners of the unit positioned facing lengthwise north to south The pans are placed 150 feet away from each other in all directions At the center of the unit is a storage shed approximately 6 feet deep by 6 feet wide by 8 feet high There are two 3/4-inch water spigots within the unit They are located approximately half-way between each of the pans on either side of the unit Within proximity to each of the water spigots (approximately 10 feet) is an igniter The Burning Ground office and Building 20 are located west of the Burn Pan Unit Behind the barricade is the firing station Monitoring of the open burn takes place from behind the barricade until flames are seen and from inside the office

Berms and Liner

Berm

The Burn Pan Unit is located within the 100-year floodplain To protect against 100-year floods, a berm was constructed The berm is covered with compacted clay The clay was compacted to a design permeability of 1 0E-7 cm/sec or less The berm is also covered with rip-rap to protect against erosion Figure 8-3 presents a cross Section of the berm

Liner

Underlying the complete area within the berms is a compacted-clay liner The clay is a minimum of 6 inches thick and has a design permeability of no greater than 1 0E-7 cm/sec The actual permeabilities were measured as 3 7E-8 to 5 6E-8 cm/sec The compacted-clay liner is protected by gravel placed on top The gravel protects the compacted-clay liner against physical damage from truck and foot traffic It also helps to shield the clay from the heat released during open burning The compacted-clay liner slopes toward the drop inlets

Stormwater Collection System

In 1986, HSAAP installed a storm sewer system within the Burn Pan Unit Figure 8-2 shows the storm sewer system layout within the Burn Pan Unit This system is composed of nine drop inlets and associated steel grates, which are distributed uniformly over the area There are a total of nine drop inlets within the Burn Pan Unit, as shown on Figure 8-2 This stormwater system is designed to remove precipitation that falls within the Burn Pan Unit The clay layer is gently sloped toward the drop inlet, and the gravel layer acts as a drainage layer The drop inlets are also located downgradient of the burning pans All precipitation run-off, leaks, or spills are routed to the onsite wastewater treatment plant through standard stormwater piping In the event of a flood, HSAAP would receive advance warning When an advanced warning is received, the backflow prevention valves on the stormwater drainage lines will be closed to prevent any backflow of floodwaters into the Burn Pan Unit The stormwater drainage system is designed to prevent backflow of floodwater through the drainage system into the Burn Pan Unit Backflow

prevention valves associated with the stormwater drainage system are shown in Figure 1-5 of Attachment 1 The stormwater drainage pipes have a valve box, which would be closed during a flood to prevent backflow into the Burn Pan Unit Figure 8-4, Burning Ground Miscellaneous Details, includes information on the stormwater collection system, including typical valves and boxes, drop inlets, and the tie-in to a manhole

Burn Pan Design

Burn Pans

The thermal treatment of hazardous waste explosives is performed in four burn pans Each burn pan is constructed of 1/4-inch-thick, seam-welded steel Each of the four pans is 4 feet 10 inches wide by 20 feet long by 1 foot deep All four burn pans are identical in construction with the exception of Bun Pans #1 and #2 which have steel lips at each end of the burn pan Figures 8-5 and 8-6 show the engineering design details of Burn Pans #1 and #2, and #3 and #4, respectively

Burn Pan Liner

Each burn pan is lined to prevent structural damage during the burning event as well as to minimize the chance of water leakage or spills from the devices at any time As shown in Figures 8-5 and 8-6, each burn pan is lined with 4 to 6 inches of compacted clay The primary function of the clay is to reflect and dissipate heat generated during each burn This minimizes structural damage to the burning pans The clay also serves as a containment layer

Support Devices

Each burn pan is supported on 6-inch-wide by 4-inch-high rectangular structural tubing conforming to American Society for Testing and Materials (ASTM) A500, Grade B specifications Figures 8-5 and 8-6 show the design of the support tubing This tubing is designed to elevate the bottom of each pan a few inches above the gravel surface The pans are placed on top of concrete parking bumpers This allows a visual inspection of each pan for leakage or structural integrity by the Safety Department Representative, responsible for Burn Pan Unit operations, prior to treatment of reactive hazardous wastes

Burn Pan Cover

HSAAP utilizes a mobile cover to protect each pan Figures 8-5 and 8-6 illustrate the burn pan covers The cover is used to prevent rainfall from collecting in the burn pan and wind dispersion of treatment residue The burn pan cover is composed of an aluminum super-structure The roof of the structure has a 2-2/3-inch pitch from side to side to shed water The overall structure is mounted on four wheels This cover can be moved by one person over or away from the burn pans A mobile cover is placed over each burn pan each evening and in times of inclement weather To prevent the mobile covers from being blown around, the covers can be secured to the burn pans

Leak Detection Provisions

All burn pans are supported by rectangular structural tubing welded to the pans on the long side The structural tubing rests on top of concrete parking rails This allows a visual inspection of all sides and the bottom of the pans This inspection occurs on a daily basis when the pans are in

use for drying or prior to open burning Part of the inspection is to determine whether any leaks or spills of explosive waste or treatment residues from the burning pans have occurred Furthermore, a visual check of the structural integrity of the containment devices is also performed The detailed Inspection Checklist for the Burn Pan Unit is contained in Figure 4-2

METEOROLOGICAL MONITIORING SYSTEM

Open burning treatment of explosive materials in burn pans at HSAAP can take place only during a limited set of meteorological conditions Treatment is not allowed to take place during meteorological conditions that would inhibit burning (e g , precipitation), present a safety hazard from premature ignition (lightning), or prevent efficient dispersal of combustion products Open burning is not conducted during the following conditions

- During electrical storms or thunderstorms
- When the wind speed is more than 15 miles per hour (mph)
- When visibility is less than one mile
- Before 1200 hours and after 1600 hours
- Additional meteorological conditions (air pollution episodes, inversions, overcast sky) may also limit treatment ability

Operating Procedures

Following are the general operating procedures for treating explosive wastes at the Burn Pan Unit

Personnel Safety

All personnel engaged in explosives treatment operations will wear white cotton coveralls, gloves, safety glasses, and non-sparking safety shoes This includes treatment operations of handling, unloading, spreading, and igniting the explosive waste

Inspections

Prior to treatment, the Burn Pan Unit will be inspected to ensure that the unit is free of combustible material In addition, the metal pans will be inspected for leaks Detailed inspection procedures are described in Attachment 4

Waste Receipt

The composition of wastes received is known prior to treatment This information is summarized on an Explosive Disposition Record, which contains information of the identity, weight, and number of containers of waste explosives This information is reviewed by the Safety Department Representative before the incoming waste shipment is accepted Attachment 2 provides details for receiving wastes at the Burn Pan Unit Only reactive hazardous wastes will be accepted at the Burn Pan Unit for treatment No oxidizers will be accepted into the Burn Pan Unit

Waste Unloading

All wastes received at the Burn Pan Unit are explosive wastes and, therefore, will be handled with care Bagged explosives are handled gently and are not handled roughly, thrown, tumbled, rolled, or "walked over" They are not dragged or pushed along the ground or floor, dropped from a vehicle, or in any way handled so that shock or friction may cause a fire or explosion
The first step in the unloading process is to place a waterproof plastic sheet into the burn pan prior to placing the explosive waste into the pan This waterproof plastic sheet prevents any liquid present in the wastes from getting onto the clay liner of the burn pan The plastic bags of explosives will then be placed into the burn pan on top of the waterproof plastic sheet Next, the plastic bags will be slashed using a hawksbill blade knife The material will be spread out in a continuous train to a maximum depth of 3 inches inside the burn pan The wetter reactive hazardous waste will be placed on the bottom, and the drier explosives will be placed on the top This placement aids in igniting the explosives and will create a better burn All plastic bags will be removed from the Burn Pan Unit The smaller plastic bags will be placed into one large bag and removed from the Burn Pan Unit Waste will not be placed in a burn pan that has been used within the preceding 24-hour period unless the pan has been thoroughly wet down and inspected to ensure that it has cooled sufficiently Any wastes that have been inadvertently dropped onto the ground during unloading operations will be put back into the burn pan for treatment All vehicles will be removed from the Burn Pan Unit prior to opening the plastic bags containing explosive wastes

Waste Drying

Manufacturing process explosive wastes received at the Burn Pan Unit typically contain moisture In some cases the waste may be too wet to burn In these cases, the roll-away mobile cover(s) will be left off during the day when it is not raining and if the wind speed is less than 15 miles per hour This will allow the excess moisture to evaporate Depending on the moisture content and weather conditions the material may require several days to dry Pans will be covered at dusk

Waste Ignition

Prior to igniting the waste, the mobile covers are rolled at least 20 feet away from the pan(s) This prevents damage to the cover from heat The Safety Department Representative checks to ensure that there are no personnel in the Burn Pan Unit before continuing with ignition procedures An excelsior streamer is placed into the reactive hazardous waste The free end of the excelsior stream extends toward the igniter The ignition device uses a heating element consisting of an electrical resistance charcoal heater that ignites the excelsior streamer The gate to the Burn Pan Unit is locked The Burning Ground Area is cleared of personnel and traffic The gate to the Burning Ground Area is closed and locked Two people must be present for the burn ignition Both people, one a Safety Department Representative, move to the remote ignition area which is currently located inside Building 20 on the west wall The controls to the remote ignition system are in two locked metal boxes spaced approximately 15 feet apart The Safety Department Representative has the only key To activate the ignition system, one person at each box has to depress and hold a manual switch in order to complete the ignition circuit Ignition normally takes approximately three minutes The burn pan is monitored by closed circuit TV and when ignition takes place, the manual switches are released and the metal boxes are returned to the locked position No person shall enter the burn field until at least 30 minutes after there is no visible flame observed on the closed circuit TV

Ignition Failures

If ignition is not successful, personnel wait 30 minutes prior to entering the Burn Pan Unit to examine the cause of an ignition failure Extreme caution will be taken when investigating an ignition failure The investigation will be performed by only one person The second person will observe from a safe distance (300 feet minimum) for safety purposes

Post-Treatment Entry

After an appropriate time has elapsed after burning is completed (a minimum of 30 minutes), the mobile covers will be moved over the burn pans Burn pans normally remain covered, especially during inclement weather, to prevent rainwater from accumulating in the burn pans

Post-Treatment Inspection

After each treatment event, the area surrounding the burn pans will be inspected for the presence of ejected material All ejected material will be collected by using non-sparking scoops and shovels and placed back into the burn pan for treatment in the next burn

Recordkeeping

When waste is received at the Burn Pan Unit, the following information is recorded in the Explosives Waste logbook date waste received, location waste generated, number of pounds of waste, number of containers of waste, and pan number into which waste is placed Following each treatment, the following additional information is recorded in the Explosives Waste logbook date burned, total number of pounds burned, time burned (military, based on 24-hour clock), length of burning time, weather before and after burn, temperature, wind-direction and speed, relative humidity, barometric pressure, hazard code, treatment code, and operator

MAINTENANCE PROCEDURES

Maintenance activities are described below for various categories of equipment Each of these systems/equipment is maintained by responsible organizations as identified

1 The drainage system and vegetation control are maintained by the Engineering Services Department Maintenance activities generally consist of damage repair, removal of unwanted vegetation, and only under extremely unusual situations, replacement of drainage components

2 Fences and gates are maintained by the Engineering Services Department Maintenance activities generally consist of damage repair and complete replacement, if necessary

3 The security camera is maintained by OSI Instrument Technicians Maintenance activities will generally consist of contract maintenance services (when required), repair of damaged parts, and complete replacement, depending on the extent of malfunction

Fire control systems are maintained by the Fire Department Maintenance activities generally consist of contract maintenance services (when required), volume and pressure testing of spigots and hydrants, and repair or replacement of damaged parts and equipment, depending on the

extent of damage or malfunction The communication and alarm systems are maintained by the Engineering Services Department Maintenance activities generally consist of onsite or contract maintenance, repair of damaged parts, and, depending on the extent of malfunction, complete replacement Burn pans and associated equipment are maintained by the Safety Department Maintenance activities generally consist of repair or replacement of damaged parts and/or the clay liner in the pan Complete replacement of pans is highly unlikely Engineered structures (berms, compacted-clay liners) and cleanup of treatment residue are maintained by the Safety Department Maintenance activities generally consist of repair of damaged sections, and only under extremely unusual situations, complete replacement

TREATMENT RESIDUE MANAGEMENT

The initial evaluation of treatment effectiveness is based on visual inspection Successful treatment of explosives is demonstrated by destruction of the physical form of the material If the physical form has not been changed, the treatment is considered to be ineffective and the material will be retreated in the next burn Treatment residue is removed periodically, depending on the level of treatment activity The following procedure will be used for the removal of treatment residue

1 After letting the burning pan cool for 24 hours (minimum), a composite sample of treatment residue will be collected and tested for reactivity using the impact sensitivity test No additional reactive hazardous waste will be treated in the pan between the time the samples are taken and the treatment residue removed unless tests indicate the samples are positive, then the treatment residue must be reburned and retested until negative results are obtained Treatment residue is removed periodically, depending on the amount of treatment taking place

2 If the impact sensitivity test results show that the treatment residue passes the reactivity characteristic test, the treatment residue will be considered non hazardous

3 The treatment residue will be removed from the pans using a shovel, and placed into containers The treatment residue is taken to the onsite Class II landfill

Attachment 2-1 has details on treatment residue sampling and analysis

DOCUMENTATION OF COMPLIANCE WITH MANIFEST SYSTEM, RECORDKEEPING, AND REPORTING REQUIREMENTS

MAINIFEST SYSTEM

This section provides procedures for handling manifests of hazardous wastes received at HSAAP The following procedures would be followed for any offsite hazardous wastes received for treatment in burn pans at HSAAP

1 When hazardous wastes are received at HSAAP, the designated HSAAP representative will

a Sign and date each copy of the manifest to certify that the hazardous waste covered by the manifest was received

b Note any significant discrepancies in the manifest on each copy of the manifest

C Immediately give the transporter at least one copy of the signed manifest

d Within 30 days after the delivery, send a copy of the manifest to the generator

e Retain at the facility a copy of each manifest for at least 5 years from the date of delivery

2 If the wastes are received by rail, accompanied by a shipping paper containing all the information required by the manifest (excluding EPA ID numbers, generator certification, and signatures), and the manifest has not been received by the time action is required, the procedures in 1(a) through 1(d) above will be followed using the shipping paper in lieu of the manifest Both the shipping paper and the manifest will be retained for at least 5 years if the shipping paper was signed in lieu of the manifest at the time of delivery

3 If significant discrepancies are not resolved within 15 days, a letter indicating the discrepancies and the attempts to resolve them, together with a copy of the manifest or shipping document, will be sent to the regulatory agencies involved

4 If a shipment is accepted without an accompanying manifest or shipping paper, and HSAAP has not received certification from the generator that the waste is excluded from the regulations, HSAAP will submit a single copy of an "Unmanifested Waste Report," EPA Form 8700-13B, to the Tennessee Regional Administrator within 15 days of receiving the waste The report will include the following information

a The identification number, name, and address of the facility

b The date the facility received the waste

c The identification number, name, and address of the generator and the transporter, if available

d A description and the quantity of each unmanifested hazardous waste and receiving facility

e The method of transfer, treatment, storage, or disposal for each hazardous waste

f The certification signed by the owner or operator of the facility or his authorized representative

g A brief explanation of why the waste was unmanifested, if known

OPERATING RECORD

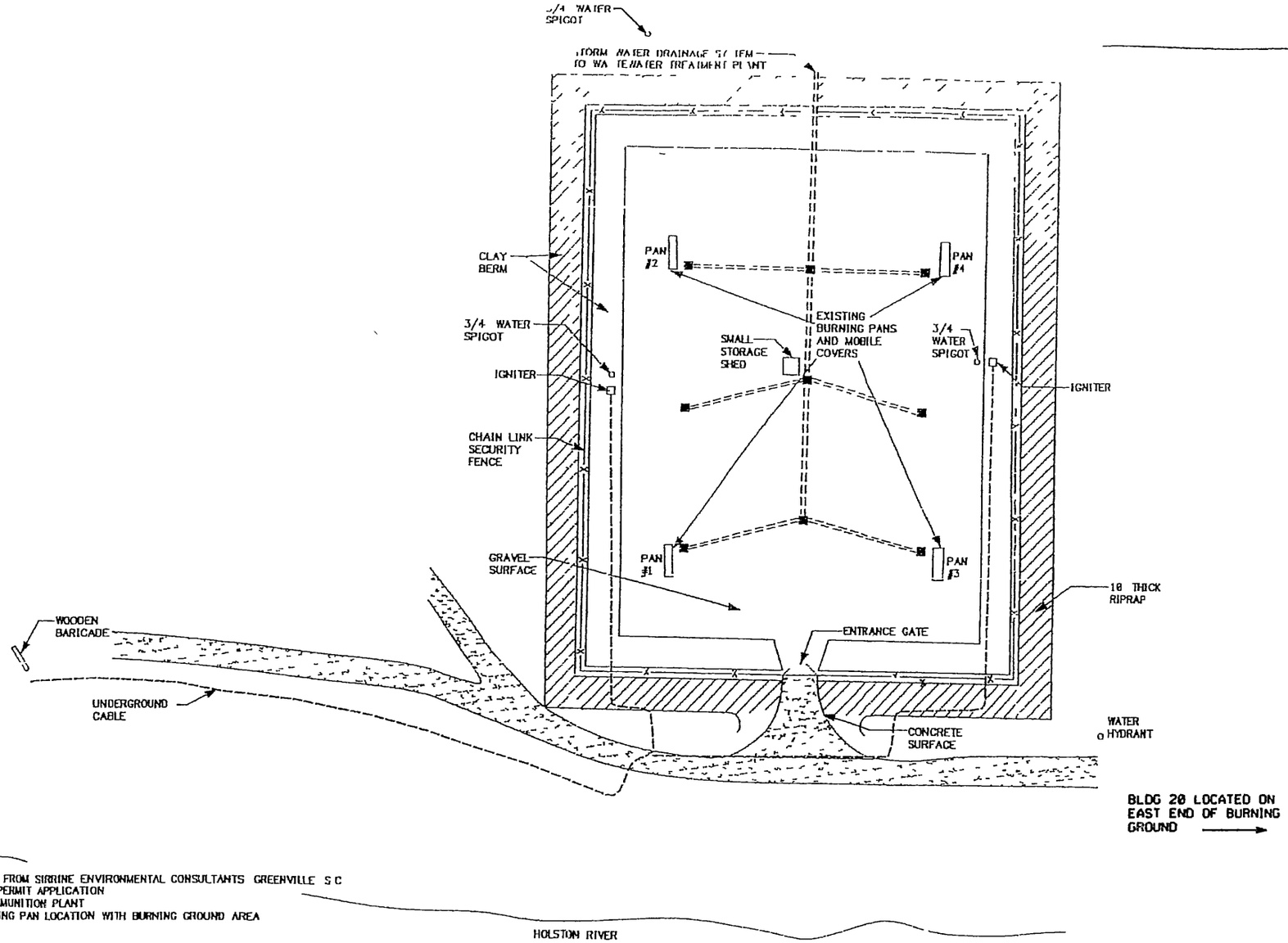
A written operating record will be kept for the hazardous waste treatment activities In addition to the recordkeeping and reports requirements in part II K of this permit, the following information is compiled and maintained as a part of the operating record

WASTE DESCRIPTION/QUANTITIES/TREATMENT

Manifest records on each hazardous waste received for treatment with a description of the waste, its quantity, and the date and method of treatment No hazardous wastes are disposed of at HSAAP (Also see Attachment 2 for documentation of wastes treated and temporarily stored at the facility)

MONITORING TESTING AND ANALYTICAL DATA

A record of any monitoring and analytical results obtained will be maintained Records also will be kept of meteorological condition observations, waste composition information, and Burn Pan Unit treatment residue analysis



SOURCE DRAWING ADAPTED FROM SIRRINE ENVIRONMENTAL CONSULTANTS GREENVILLE S C
RCRA OPERATING PERMIT APPLICATION
HOLSTON ARMY AMMUNITION PLANT
FIGURE D-2 BURNING PAN LOCATION WITH BURNING GROUND AREA

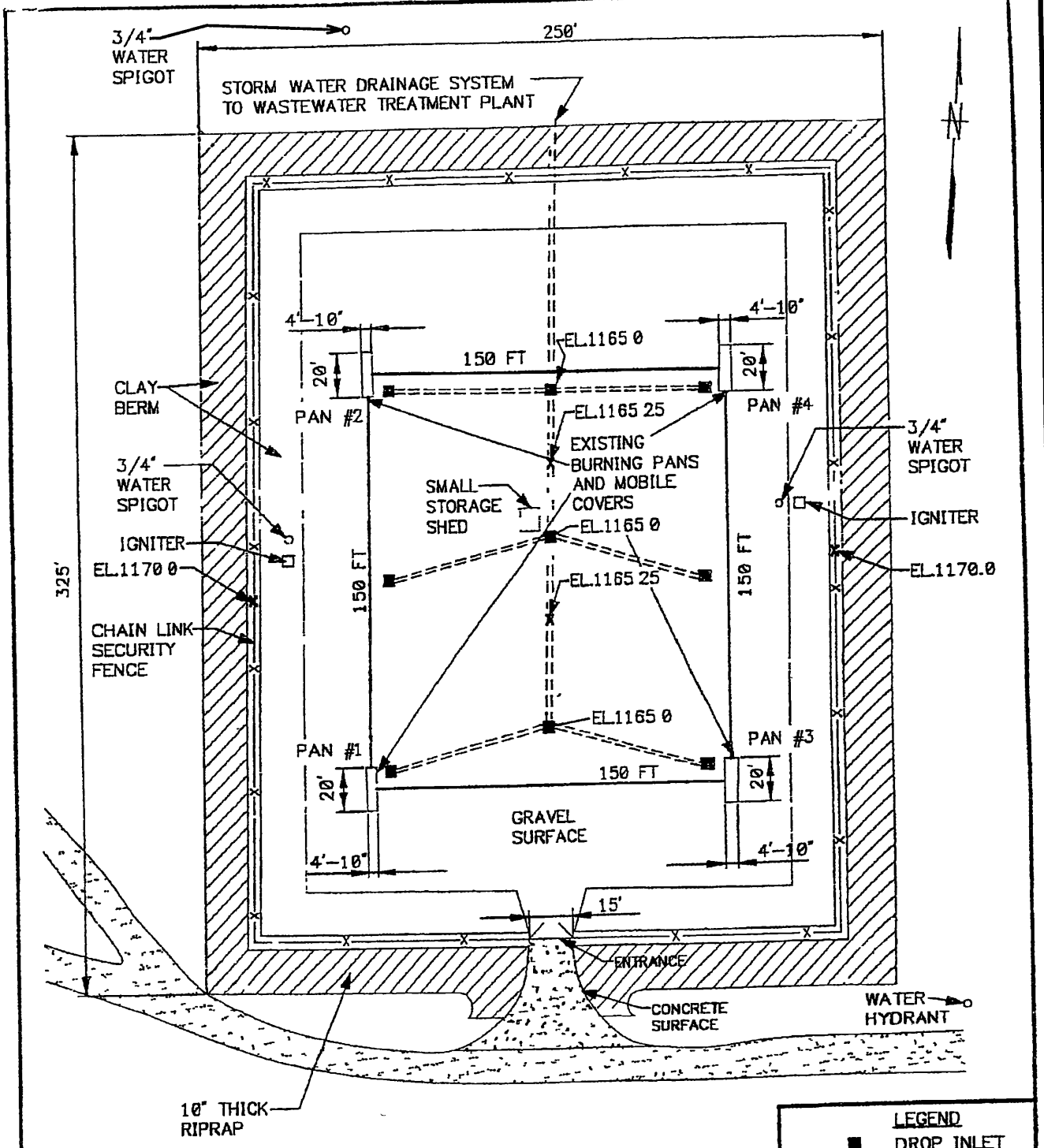
FIGURE 8-1

BURN PAN UNIT SCHEMATIC
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TN

60 20
SCALE IN FEET

Brown & Root Environmental

\Fig 8-1 dgn 11/24/2010 1 21 09 PM



SOURCE. DRAWING ADAPTED FROM SIRRINE ENVIRONMENTAL CONSULTANTS, GREENVILLE S C.
RCRA OPERATING PERMIT APPLICATION
HOLSTON ARMY AMMUNITION PLANT
FIGURE D-2 BURNING PAN LOCATION WITH BURNING GROUND AREA

BURN PAN UNIT DETAILS
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TN

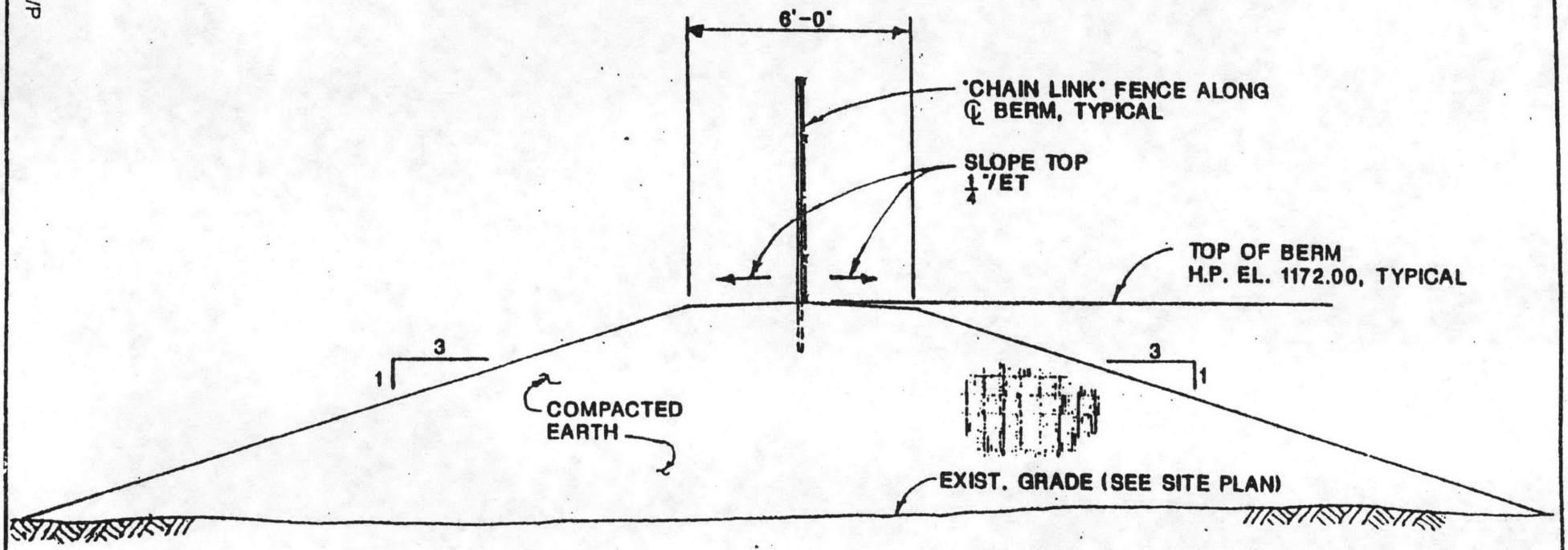
0 60 120
APPROXIMATE SCALE IN FEET

FIGURE 8-2

Brown & Root Environmental

\Fig 8-2 dgn 11/24/2010 1 13 53 PM

039713/P

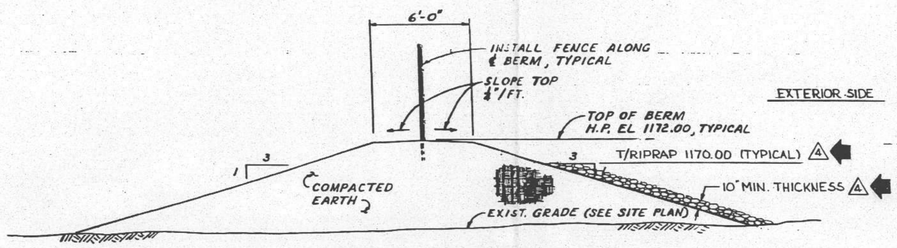


N.T.S.

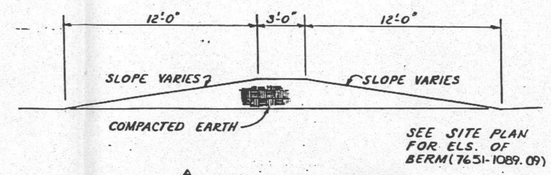
SIRRINE
ENVIRONMENTAL
CONSULTANTS
Greenville, South Carolina

FIGURE 8.-3
CROSS SECTION OF THE BERM

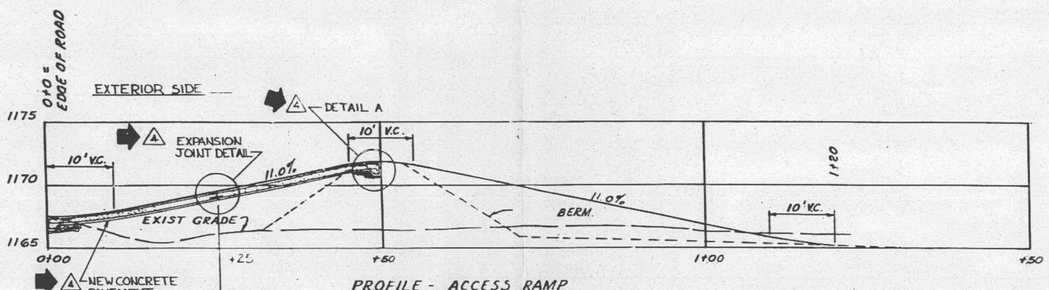
88



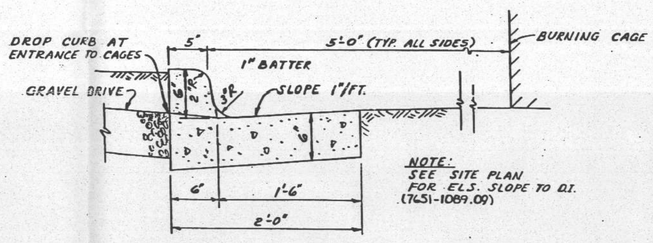
TYPICAL BERM SECTION AT BURNING PAN AREA
N.T.S.



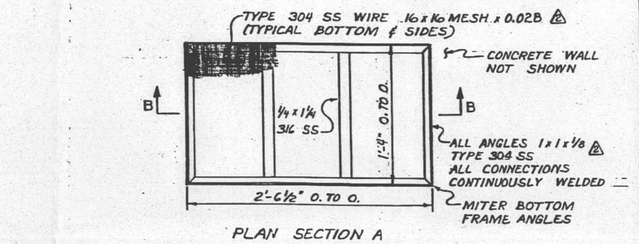
4 TYPICAL BERM SECTION AT OPEN BURNING AREAS
N.T.S.



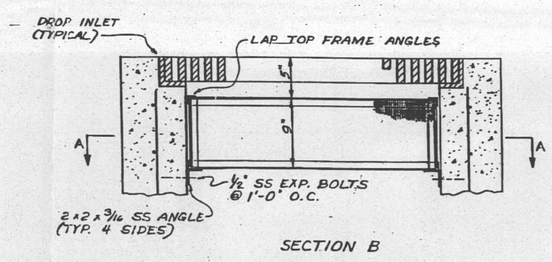
PROFILE - ACCESS RAMP AT BURNING PAN AREA
SCALE HORIZ. 1"=10' VERT 1"=5'



4 TYPICAL CURB & GUTTER SECTION AT BURNING CAGES
1½" = 1'-0"

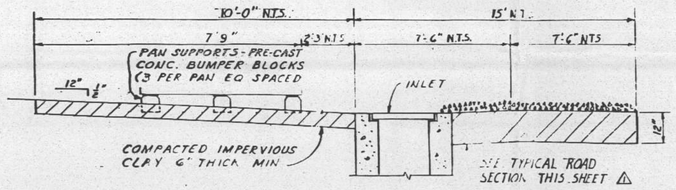


PLAN SECTION A

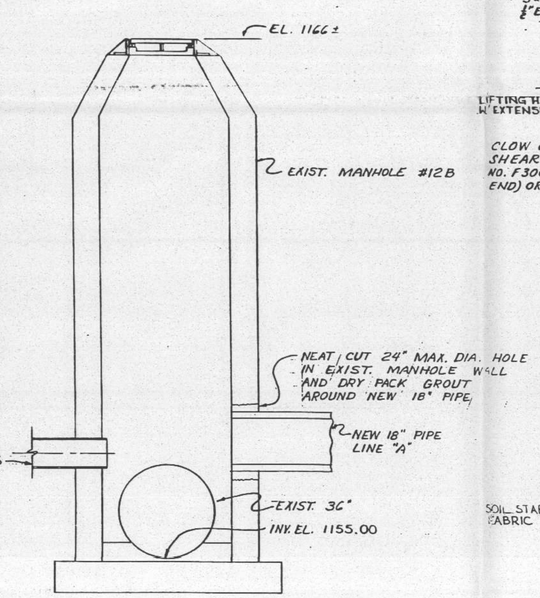


SECTION B

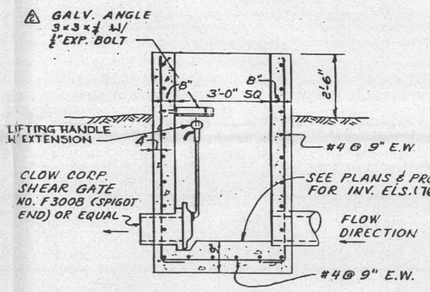
4 DROP INLET DEBRIS BASKET
1½" = 1'-0"
15 REQ'D.



TYPICAL SECTION AT BURNING PANS
½" = 1'-0"



TIE-IN AT EXISTING MANHOLE NO. 1
½" = 1'-0"



4 TYPICAL VALVE AND BOX
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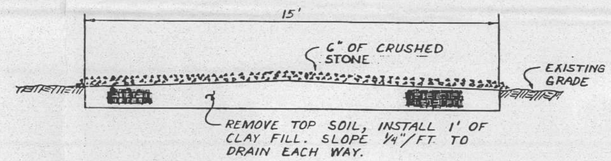

4 TYPICAL ROAD SECTION
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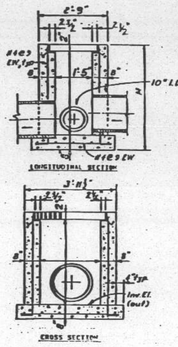
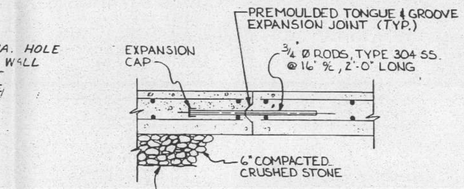
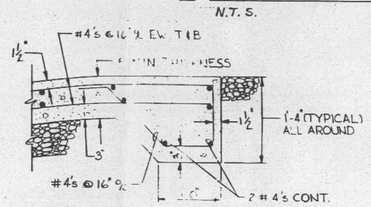


4 TYPICAL DROP INLET
N.T.S.



4 EXPANSION JOINT DETAIL
SCALE 1"=1'-0"



4 DETAIL A
SCALE 1"=1'-0"

NOTE:
4 THIS SHACOH DRAWING SUPERCEDES ORIGINAL TRACING DRAWING NO. 7651-1089.10

4 APPROVAL					Initial & Date PJM 2-24-93		
COR.	3/AC1	4/1/93	PRESIDENT			BIOMEDICAL ENG.	
CHIEF ENGR.	3/AAL	4/1/93	DIR. OF OPER.			DEPT. OPS. SERV.	3/RCG 3/30/93
SAFETY DIR.	3/AAL	4/1/93	PLANT ENGR.	3/JWH	4/1/93	DEPT. ENGR.	3/DM 4-19-93
			LINE DEPT.			SECT. LEADER	RAC 4/1/93
			DEPT. DEPT.	3/THK	4/1/93	GROUP LEADER	
			DEPT. HEAD			JOB CAPT.	AWC 4-8-93
DEPT. S & H	3/RHB	3/31/93	ACCIDENT PREV.	3/LW	3/31/93	JOB ENGR.	AWC 4.8.93

DAAA09-83-C-4515

BOX No. 83-3860

4 APPROVAL					Initial & Date PJM 1-3-91		
COR.	3/JET	3/1/91	PRESIDENT			BIOMEDICAL ENG.	
CHIEF ENGR.	3/MAN	3/1/91	DIR. OF OPER.			DEPT. OPS. SERV.	3/RCG 3/1/91
SAFETY DIR.	3/AAL	3/1/91	PLANT ENGR.	3/JWH	3/1/91	DEPT. ENGR.	3/DM 3/1/91
			LINE DEPT.	3/DMK	3/1/91	SECT. LEADER	
			DEPT. DEPT.	3/JEE	3/1/91	GROUP LEADER	RAC 2/91
			DEPT. HEAD			JOB CAPT.	RAC 2/91
DEPT. S & H	3/RHB	3/1/91	ACCIDENT PREV.	3/JEE	3/1/91	JOB ENGR.	

DAAA09-83-C-4515

BOX No. 82-1421

REFERENCE DRAWINGS 7651-	
1089.09	SITE PLAN
1089.11	PLAN AND PROFILES

NO.	JOB	BLDG	ZONE	BY	REVISION	DATE	ENGR.	OPER.	SAFETY
1	85-0326			E.D.H.	ADDED ROAD SECTION AT PANS	11/11/86	CJT		
2	85-0326			GMB	MADE AS-BUILT REVISIONS 02-16-87	7/2/87	CJT		
3	82-1421			PJM	DETAILS FOR BURNING AREA NO. 1	1-3-91	RAC		
4	83-3860			PJM	ADDED RIPRAP/CONCRETE PAVEMENT	3-24-93	RAC		

U.S. GOVERNMENT APPROVAL		DATE
CORP.		8-9-85
CHIEF ENGR.		10/2/85
SAFETY DIR.		10/2/85

HDC APPROVAL		DATE
PRESIDENT		
DIR. OF OPER.		
PLANT ENGR.	MB Fowler	9/23/85
LINE-DEPT.		9/27/85
DEPT. DEPT.		
DEPT. HEAD		
BIOMEDICAL ENG.		
DEPT. S & H	S/RC. GILLENWATER	9/26/85

HDC APPROVAL		DATE
PLANT PROTECTION		9/26/85
DEPT. OPS. SERV.		9/26/85
CHIEF ENGR.		9/26/85
SECT. LEADER		9/26/85
GROUP LEADER		9/26/85
JOB CAPT.		9-9-85
JOB ENGR.		
DRAWN BY	R.R.H.	JUNE '85

Hayden | Wegman
Consulting Engineers
ATLANTA, GEORGIA

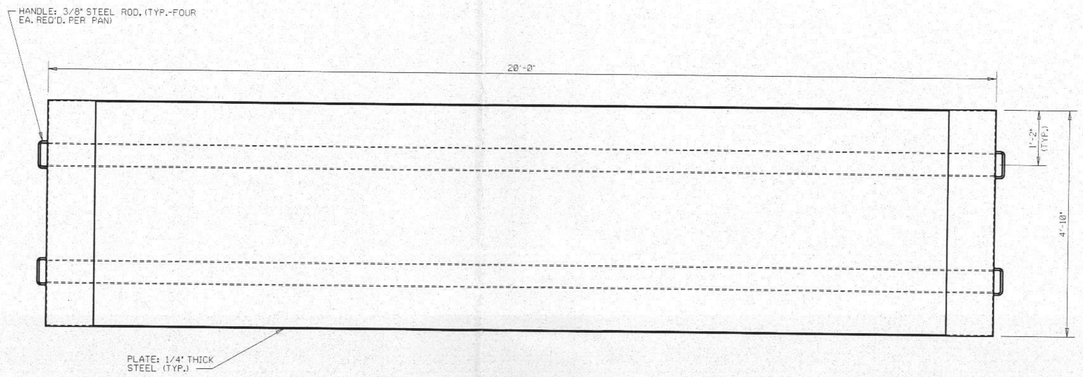
THIS DRAWING IS THE PROPERTY OF HOLSTON DEFENSE CORPORATION AND/OR UNITED STATES GOVERNMENT UNDER CONTRACT DAAA09-83-C-4515 TO BE USED IN CONNECTION WITH HOLSTON ARMY AMMUNITION PLANT. ITS TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED SOURCE IS PROHIBITED BY LAW. THIS DRAWING IS ISSUED ONLY ON A SIGNED RECEIPT AND ITS RETURN IS DEMANDED UNLESS SPECIFICALLY WAIVED IN WRITING.

HOLSTON ARMY AMMUNITION PLANT
HOLSTON DEFENSE CORPORATION
KINGSPORT, TENNESSEE

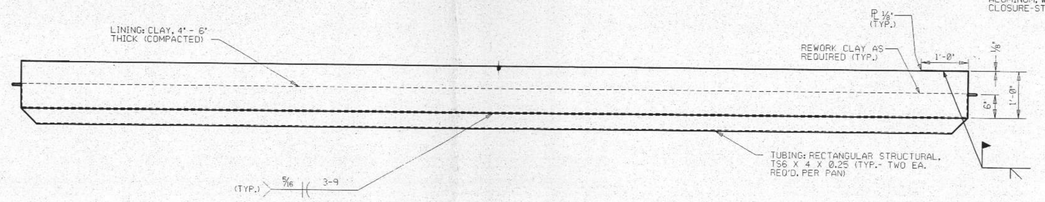
BURNING GROUND
MISCELLANEOUS DETAILS

BLDG.	JOB	SCALE	DRAWING NUMBER
	85-0326	AS SHOWN	FIGURE D-4 4

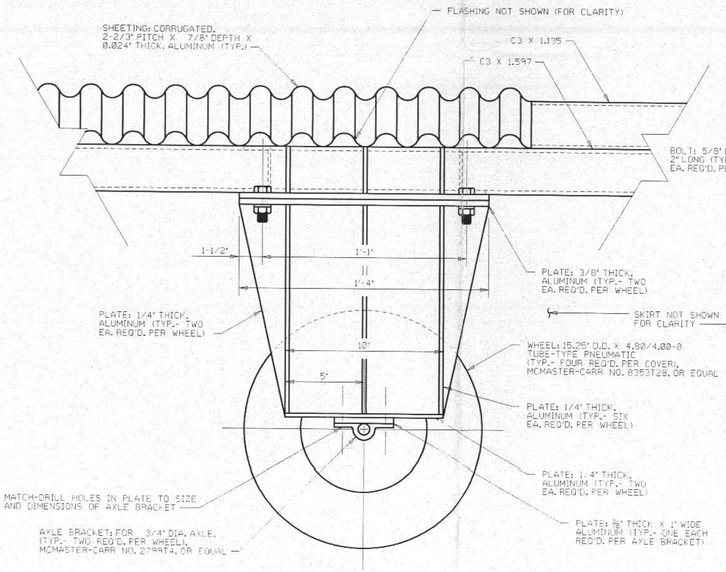
GC 4 IS



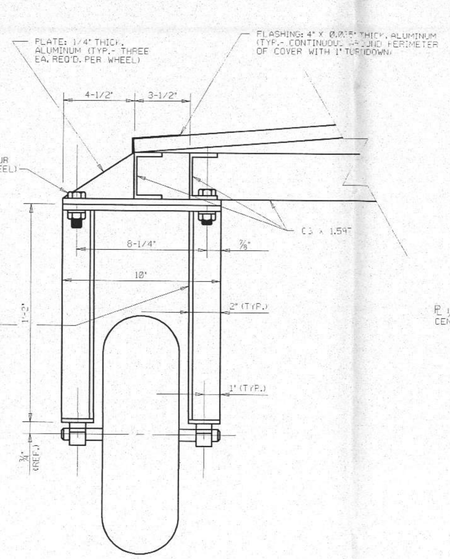
BURNING PAN (PLAN VIEW)
SCALE: 3/4" = 1'-0"



BURNING PAN (SIDE VIEW)
SCALE: 3/4" = 1'-0"

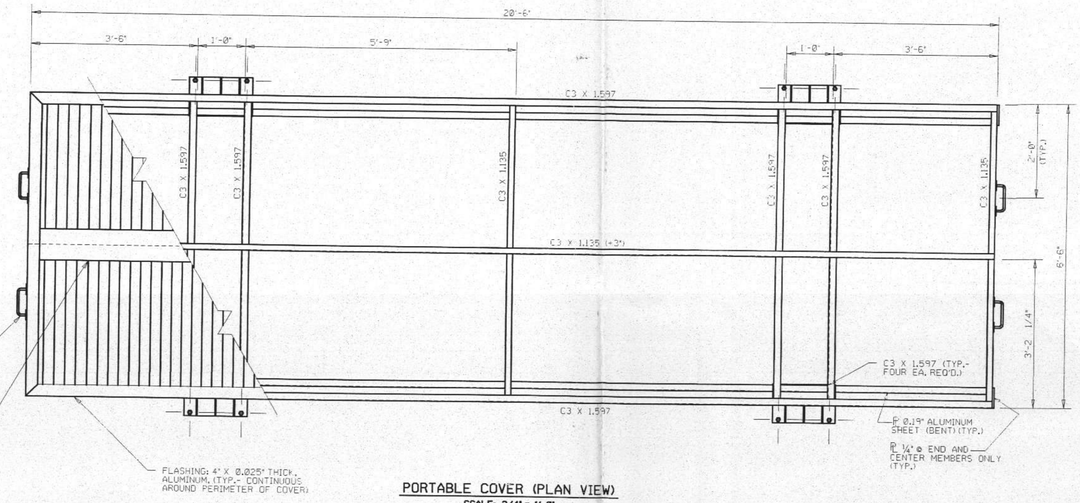


(SIDE VIEW)

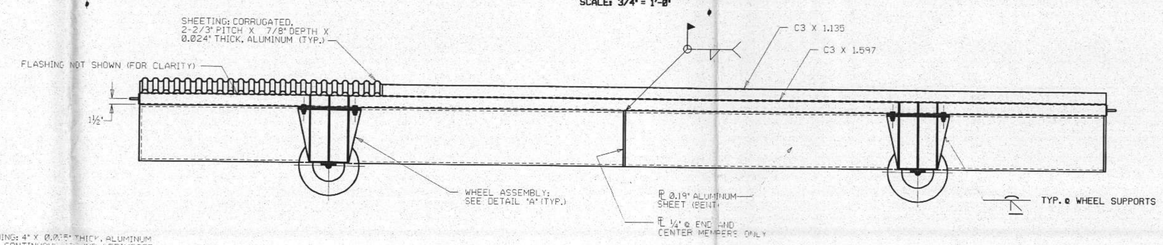


(END VIEW)

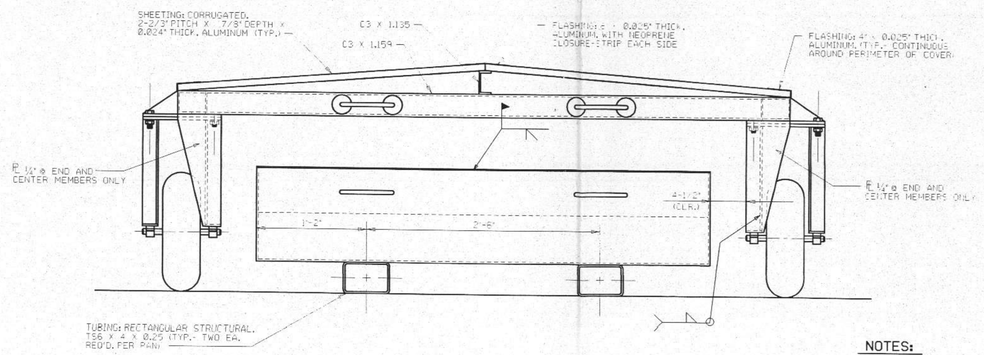
DETAIL 'A'
SCALE: 1/4" = 0'-1"



PORTABLE COVER (PLAN VIEW)
SCALE: 3/4" = 1'-0"



PORTABLE COVER (SIDE VIEW)
SCALE: 3/4" = 1'-0"



BURNING PAN AND COVER (ASSEMBLED VIEW)
SCALE: 1-1/2" = 1'-0"

NOTES:

1. ALL ALUMINUM SHAPES AND PLATEWORK SHALL BE ALLOY 6061-T6, UNLESS OTHERWISE SPECIFIED. THE SHAPES SHALL CONFORM TO ASTM B209, AND THE PLATEWORK SHALL CONFORM TO ASTM B209.
2. PORTABLE COVER SHALL BE ALL-WELDED CONSTRUCTION, UNLESS OTHERWISE SPECIFIED. ALUMINUM FILLER ALLOY FOR WELDING SHALL BE 4043. ALL WELDS SHALL BE 3/16" FILLET WELDS ALL-AROUND, UNLESS OTHERWISE SPECIFIED.
3. ALL BOLTS FOR WHEEL ASSEMBLY SHALL BE TYPE 304, STAINLESS STEEL.
4. CARBON STEEL PLATE FOR BURNING PAN SHALL CONFORM TO ASTM A36.
5. ALL STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE "B".
6. BURNING PAN SHALL BE ALL-WELDED CONSTRUCTION. ALL WELDS SHALL BE 1/4" FILLET WELDS, UNLESS OTHERWISE SPECIFIED. WELDING ELECTRODES SHALL BE E-8018.
7. ALL HOLES SHALL BE 11/16" DIA., UNLESS OTHERWISE SPECIFIED.

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REFERENCE DRAWINGS (7651-)		REV	JOB	DESCRIPTION	DATE APPROVED
		4	N/A	AS-BUILT.	06/09/00
		3	N/A	AS-BUILT.	04/13/00
		2		AS-BUILT TO SHOW PLATE ADDITIONS.	02/16/96
		1	81-1414	REVISED WHEEL TYPE, MOUNTING, AS-BUILT.	04/30/90
1089.0017	BURNING PAN No. 3 & No.4	0		ORIGINAL CADD DRAWING ISSUE.	08/17/88

HSAAP ACO:		OPER DIR:	
HSAAP ENGR:		OPER MGR:	
HSAAP SAFETY:		PROJ DIR:	
		PROJ. ENGR.:	D.M. GOTHARD 06/09/00
		DESIGN:	
ROAA SAFETY:		DRAWN:	J.M. DETWEILER 06/09/00
APPROVED	DATE	APPROVED	DATE

AS-BUILT

4 CURRENT REVISION

0 ORIGINAL ISSUE

NOTICE

APPROVAL SIGNATURES ARE FILED IN ENGINEERING PROJECTS VAULT

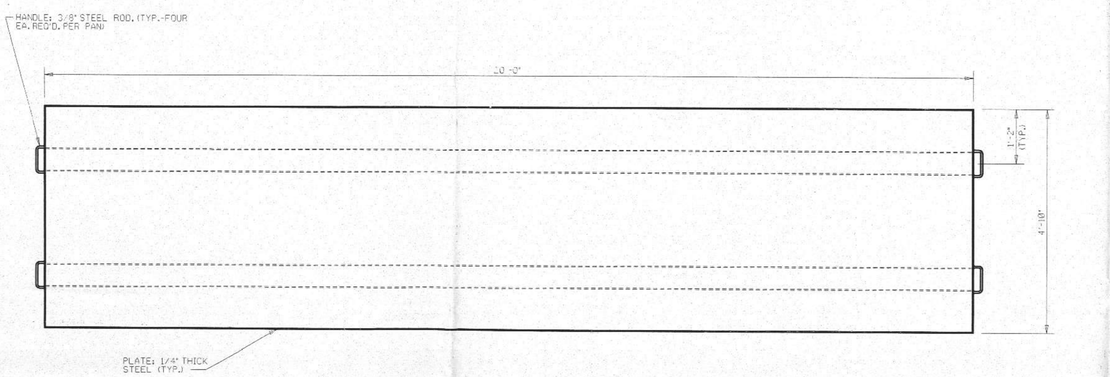
BAE SYSTEMS

ROYAL ORDNANCE NORTH AMERICA
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TENNESSEE

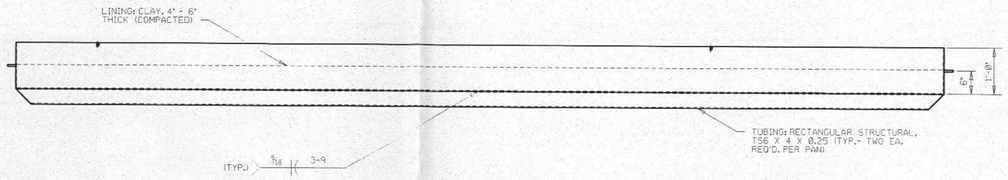
BURNING PAN No. 1 & No. 2
COVER ASSEMBLY
AND DETAILS

BLDG. NO.: PLANT	SCALE: AS NOTED	DRAWING NUMBER	REV.
AREA: B	FRACTIONAL TOL.:	FIGURE D-5	4
CLASS: SE	DECIMAL TOL.:		
DO NOT SCALE	REVISE ON CADD ONLY		

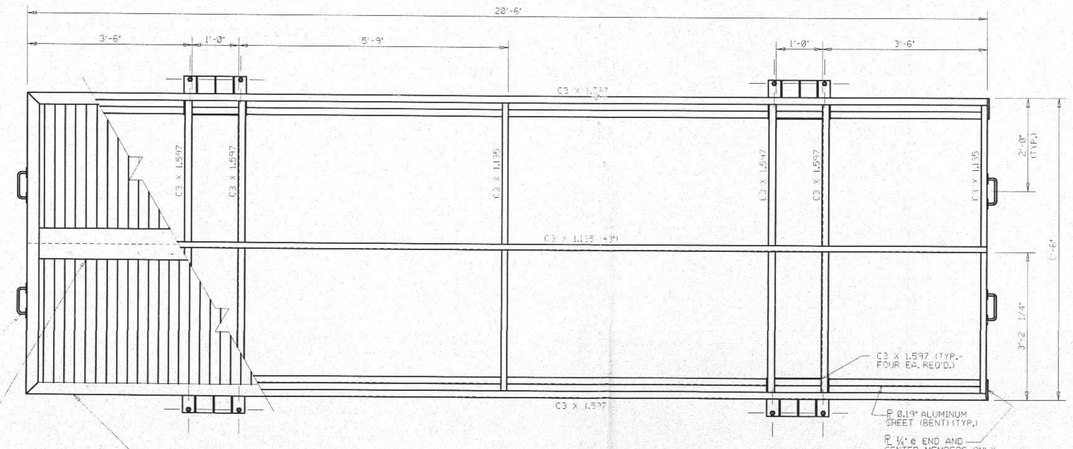
M:\7651\1089\0013-04.dgn Jun. 09, 2000 10:45:15



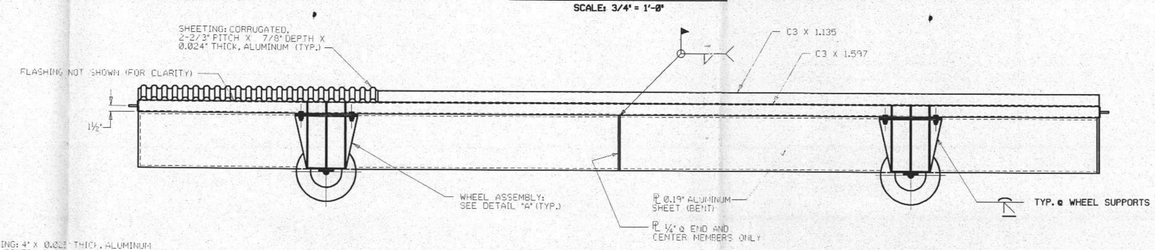
BURNING PAN (PLAN VIEW)
SCALE: 3/4" = 1'-0"



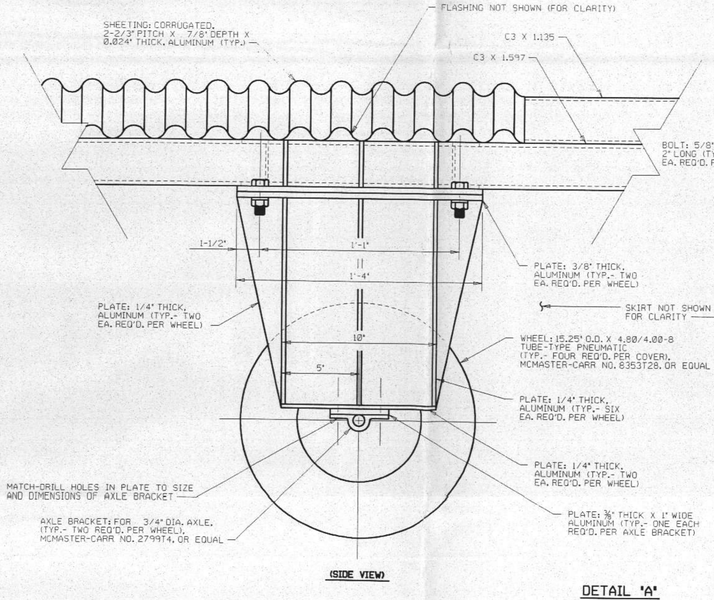
BURNING PAN (SIDE VIEW)
SCALE: 3/4" = 1'-0"



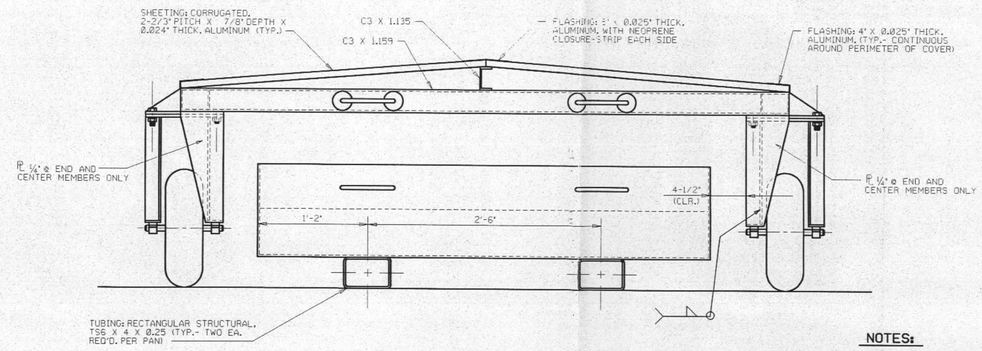
PORTABLE COVER (PLAN VIEW)
SCALE: 3/4" = 1'-0"



PORTABLE COVER (SIDE VIEW)
SCALE: 3/4" = 1'-0"



DETAIL "A"
SCALE: 1/4" = 0'-1"



BURNING PAN AND COVER (ASSEMBLED VIEW)
SCALE: 1-1/2" = 1'-0"

NOTES:

1. ALL ALUMINUM SHAPES AND PLATEWORK SHALL BE ALLOY 6061-T6, UNLESS OTHERWISE SPECIFIED. ALL SHAPES SHALL CONFORM TO ASTM B308 AND ALL PLATEWORK SHALL CONFORM TO ASTM B209.
2. PORTABLE COVER SHALL BE ALL-WELDED CONSTRUCTION, UNLESS OTHERWISE NOTED. ALUMINUM FILLER ALLOY FOR WELDING SHALL BE 4043. ALL WELDS SHALL BE 3/16" FILLET WELDS (ALL-AROUND), UNLESS OTHERWISE SPECIFIED.
3. ALL BOLTS FOR WHEEL ASSEMBLY SHALL BE TYPE 304. STAINLESS STEEL.
4. CARBON STEEL PLATE FOR BURNING PAN SHALL CONFORM TO ASTM A36.
5. ALL STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B.
6. BURNING PAN SHALL BE ALL-WELDED CONSTRUCTION. ALL WELDS SHALL BE 1/4" FILLET WELDS, UNLESS OTHERWISE SPECIFIED. WELDING ELECTRODES SHALL BE E70-XX.
7. ALL HOLES SHALL BE 11/16" DIA., UNLESS OTHERWISE SPECIFIED.

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REFERENCE DRAWINGS (7651-)		REV	JOB	DESCRIPTION	DATE APPROVED
		1	N/A	AS-BUILT REVISION.	06/09/00
1089.0013	BURNING PAN No. 1 & No. 2	0	N/A	ORIGINAL DRAWING ISSUE AS-BUILT.	04/13/00

1 CURRENT REVISION					
HSAAP ACO:		OPER DIR:			
HSAAP ENGR:		OPER MGR:	AS-BUILT		
HSAAP SAFETY:	AS-BUILT	PROJ DIR:			
		PROJ. ENGR.:	D. M. GOTHARD	06/09/00	
		DESIGN:			
RONA SAFETY:		DRAWN:	J. M. DETWEILER	06/09/00	
APPROVED	DATE	APPROVED		DATE	

0 ORIGINAL ISSUE					
HSAAP ACO:		OPER DIR:			
HSAAP ENGR:		OPER MGR:	AS-BUILT		
HSAAP SAFETY:	AS-BUILT	PROJ DIR:			
		PROJ. ENGR.:	D. M. GOTHARD	04/13/00	
		DESIGN:			
RONA SAFETY:		DRAWN:	J. M. DETWEILER	04/12/00	
APPROVED	DATE	APPROVED		DATE	

BAE SYSTEMS

ROYAL ORDNANCE NORTH AMERICA
HOLSTON ARMY AMMUNITION PLANT
KINGSPORT, TENNESSEE

BURNING PAN No. 3 & No. 4 COVER ASSEMBLY AND DETAILS

BLDG. NO.: PLANT	SCALE: AS NOTED	DRAWING NUMBER	REV.
AREA: B	FRACTIONAL TOL.:	FIGURE D-6	1
CLASS: SE	DECIMAL TOL.:		
DO NOT SCALE	REVISE ON CADD ONLY		

9

Facility Holston Army Ammunition Plant
EPA Identification Number. TN5 21 002 0421
Permit Number TNHW-148

ATTACHMENT 9 GROUNDWATER MONITORING

A GROUNDWATER MONITORING

Rule 1200-01-11- 06(27)(b)1 and Paragraph III H 1 require the permittee to prevent any release that may have adverse effects on human health or environment due to migration of waste constituents in the ground water or subsurface environment Rule 1200-01-11- 06(1)(d) "Waivers" states "Any standard under this Rule may be waived by the Commissioner if the owner or operator can demonstrate to the satisfaction of the Commissioner that the standard is inapplicable, inappropriate, or unnecessary to his facility, or that it is equaled in effect by other procedures or mechanisms utilized at the facility "

A two year groundwater study by the facility determined that there had been no previous impact on the groundwater by the unit being permitted from previous operations Based on the construction of the new unit, the mode of treatment as described in pans off the ground and the immediate collection of any spillage from the pan during the burn it was determined that if the unit prior to the improved upgrades had not impacted the groundwater that it was highly unlikely that the operation would impact the groundwater with the improvements Consideration was also given to the close proximity to the Holston River, the thickness of the residuum to the groundwater, and the tight clays, that would impede the vertical movement of any contaminated groundwater As a safety measure a Corrective Action site wide groundwater monitoring well was placed between the unit and the Holston River to monitor groundwater in the area, including groundwater moving under the unit under the Corrective Action Program In addition, Soil sampling around the unit will be required to ensure that no future impacts will be made

In accordance with the above Rule, the Commissioner waives the need for Point of Compliance groundwater monitoring at the open burning treatment unit Site-wide and other corrective action groundwater monitoring requirements are provided in Permit Attachment 9, Groundwater Monitoring