Susan
Ramona
27422

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

MAY 1 9 1993

Mr. Jeffrey Pratt
Kentucky Natural Resources and
Environmental Protection Cabinet
Frankfort Office Park
18 Reilly Road
Frankfort, Kentucky 40601

RE: Jefferson Forest Drum Site, Kentucky

Dear Mr. Pratt:

On April 27, 1993, the U.S. Environmental Protection Agency's Emergency Response and Removal Branch (ERRB) conducted a site investigation for potential removal action eligibility under the National Contingency Plan (NCP) at the above mentioned site. Results from the investigation were evaluated using criteria from Section 300.415 of the NCP and current ERRB program guidance.

Although the above referenced site meets ERRB's criteria for a low prioirity removal action, current information indicates the site would be better addressed under the authority of the Commonwealth of Kentucky rather than EPA's. Should site conditions change or additional information become available, ERRB will re-evaluate this site as necessary. Enclosed please find a copy of the site investigation report prepared by ERRB.

Should you have any questions concerning ERRB's determination, please contact Mr. Shane Hitchcock, Chief of Removal Operations Section, at (404) 347-3931.

Sincerely,

Myron D. Laif, Chief
Emergency Response and Removal Branch

Enclosure

CC: Narindar Kumar, Site Assessment Section, EPA

Printed on Recycled Paper

WESTON 1575 Northside Dr., N.W., Suite 325, Bldg. 300, Atlanta, GA 30318 404-352-4147

TECHNICAL ASSISTANCE TEAM FOR EMERGENCY RESPONSE REMOVAL AND PREVENTION
EPA CONTRACT 68-WO-0036

MEMORANDUM

TO: Charlie Stevens
OSC, Region IV

FROM: Matthew Manka
TAT, Region IV

THRU: Donnissa L. Duvic
TATL, Region IV

SUBJECT: Jefferson Forest Drum Site
Brooks, Bullitt County, Kentucky
TDD# 04-9212-0012-4186
0012A-4288
TAT# 04-F-00958

DATE: 31 March 1993

SITUATION

This report has been prepared in accordance with the requirements of Technical Direction Document (TDD) #04-9212-0012, issued to the Roy F. Weston, Inc., Technical Assistance Team (TAT) Louisville, Kentucky Satellite Office, by Region IV of the U.S. Environmental Protection Agency (EPA).

On 10 February 1993, On-Scene Coordinator (OSC) Charlie Stevens mobilized TAT members Manka and Maybriar to an area of the Jefferson County Memorial Forest near Brooks, Bullitt County, Kentucky (Figure 1 & 2 - Regional and Site Location Maps). This action was in response to a request from the Kentucky Department of Waste Management to investigate a number of drums abandoned in the forest. Some of the drums appeared to have leaked their contents onto the ground. The purpose of the investigation was to determine if additional drums were buried in conjunction with the exposed drums. The site in question lies in close proximity to the A. L. Taylor Drum Site.

SUMMARY

OSC Stevens tasked the TAT to subcontract exploratory excavation services. Six contractors were solicited and the job was awarded to Heritage Remediation/Engineers, Inc. (Heritage), which submitted the lowest bid for the requested services. TAT members Manka and Maybriar met Heritage personnel at the site on the morning of 10 February 1993 (Attachment A - Table of Witnesses). Heritage moved their equipment to the site and set up the hot zone and decontamination area. The area of concern was a small hillside that had several exposed and partially exposed drums along its slope. A couple of the drums had leaked what appeared to be paint waste. Most of the drums were very weathered and many were either rusted through or had bullet holes in them. There was a small amount of household trash throughout the area.

OSC Gail Scogin arrived at 0945 and toured the site. A work scope and safety meeting was held (Attachment B - Safety Plan). The Heritage crew then dressed out in level B and began work. Manka also dressed out in level B to perform air monitoring. Heritage started at the western end of the drum pile and excavated back into the hillside in order to determine the extent and size of the drum pile (Attachment D - Photographs). Excavation terminated at each point when native soil was uncovered and no further debris was found. The excavator worked its way eastward along the hillside. At 1015 hours, representatives from the Kentucky Department for Environmental Protection arrived onsite, met with the OSC and walked the hillside to check for previously undiscovered areas of drums. Maybriar and the OSC then switched out with Manka and continued air monitoring. During the excavation activities, three drums were discovered which contained liquids (Attachment E - Drum Logs). These drums were staged together within the work zone. Air monitoring within the drums revealed elevated readings in two of the three drums. The rest of the drums unearthed were empty. At approximately 1200 hours, OSC Dora Ann Johnson arrived and was briefed.

After the length of the hillside had been excavated, the OSC directed Heritage to dig a trench approximately four feet deep along the top of the hill as a secondary check of how far into the hill the drums extended. No drums were discovered and the trench revealed only native soil and some surface debris at the east end. The trench was then backfilled with the excavated soils. The OSC then had Heritage dig an additional trench approximately 100 yards east-northeast of the hill in an area where state representatives registered high magnetometer readings. No abnormalities were discovered and the trench was backfilled.

Following the trenching activities, Heritage segregated the metal debris into piles and crushed the empty drums with the bucket of the excavator. Manka and Maybriar dressed out in level B to collect samples of the liquids inside the drums. The drums were sampled and logged (Attachment E). The first drum contained approximately seven gallons of a gray substance which registered 45

parts per million (ppm) on the photoionization detector. The second drum contained about 10 gallons of a bright green liquid and the last drum contained 15-20 gallons of what appeared to be old oil. Neither of the last two drums emitted vapors in detectable amounts. Two sediment samples were collected from the bed of an intermittent steam located south of the hillside which could possibly receive runoff from the hill. One sample was from an upgradient location and the other from a downgradient location. One final sample, which consisted of an unidentifiable white powder, was collected from some of the debris uncovered during the excavation. The samples were labeled JCF-01 through JCF-06. The sampled drums were then covered with plastic sheeting and wrapped with caution tape. Sampling and excavation equipment was thoroughly deconned and the decon water was returned to the work zone. At 1730 hours, all parties demobed from the site.

On 11 February 1993, the samples were packaged and shipped to the Roy F. Weston, Inc. Laboratory in Stockton, California. The sediment samples (JCF-01 and -02), the powdered substance (JFC-03) and the liquid samples (JFC-04 and -05) were analyzed for extractable organics, TAL metals, and volatile organic compounds. The liquid sample numbered JFC-05 underwent a phase separation before it was analyzed and, at the OSC's request, the analyses were run on both phases. The remaining liquid sample (JFC-06) was analyzed for PCBs, in addition to the above parameters.

CONCLUSIONS

Laboratory analysis of the samples collected during the investigation did not reveal any significant environmental impact on the area. Compounds in the soil samples were within background levels. The powdered substance had an elevated level of lead. The liquid samples contained compounds typical of petroleum distillates. PCBs were not discovered in sample JFC-06 (See Attachment F for complete analytical results and tables). Any further action at the site will be determined by the OSC following a review of the analytical data.

ATTACHMENT

Figures 1-3 Maps & Sketches
Attachment A - Photographs
B - Log Notes
C - Table of Witnesses
D - Site Safety Plan
E - Drum Log
F - Analytical Analysis

FIGURE 1

General Site Map

Figure 1

Weston T.A.T. Activity Location

TDD #04-9212-0012-4186

Jefferson Forest Drum Site

Brooks, Bullitt County, Kentucky

EPA

FIGURE 2

Area Location Map

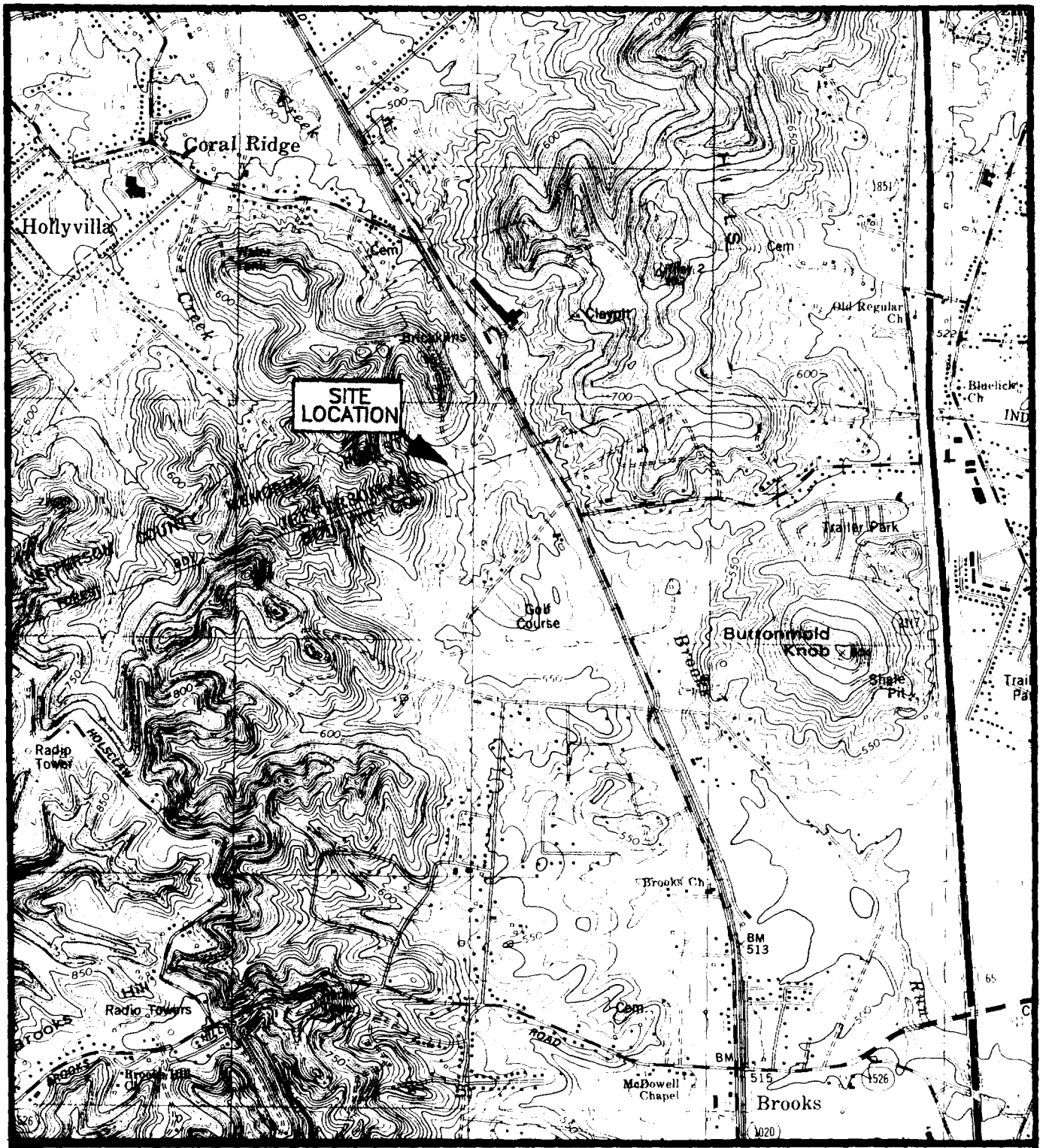


Figure 2

U.S.G.S. Quadrangle Map: Brooks

TDD #04-9212-0012-4186

Jefferson Forest Drum Site

Brook, Bullitt County, Kentucky

EPA

FIGURE 3

Site Diagram

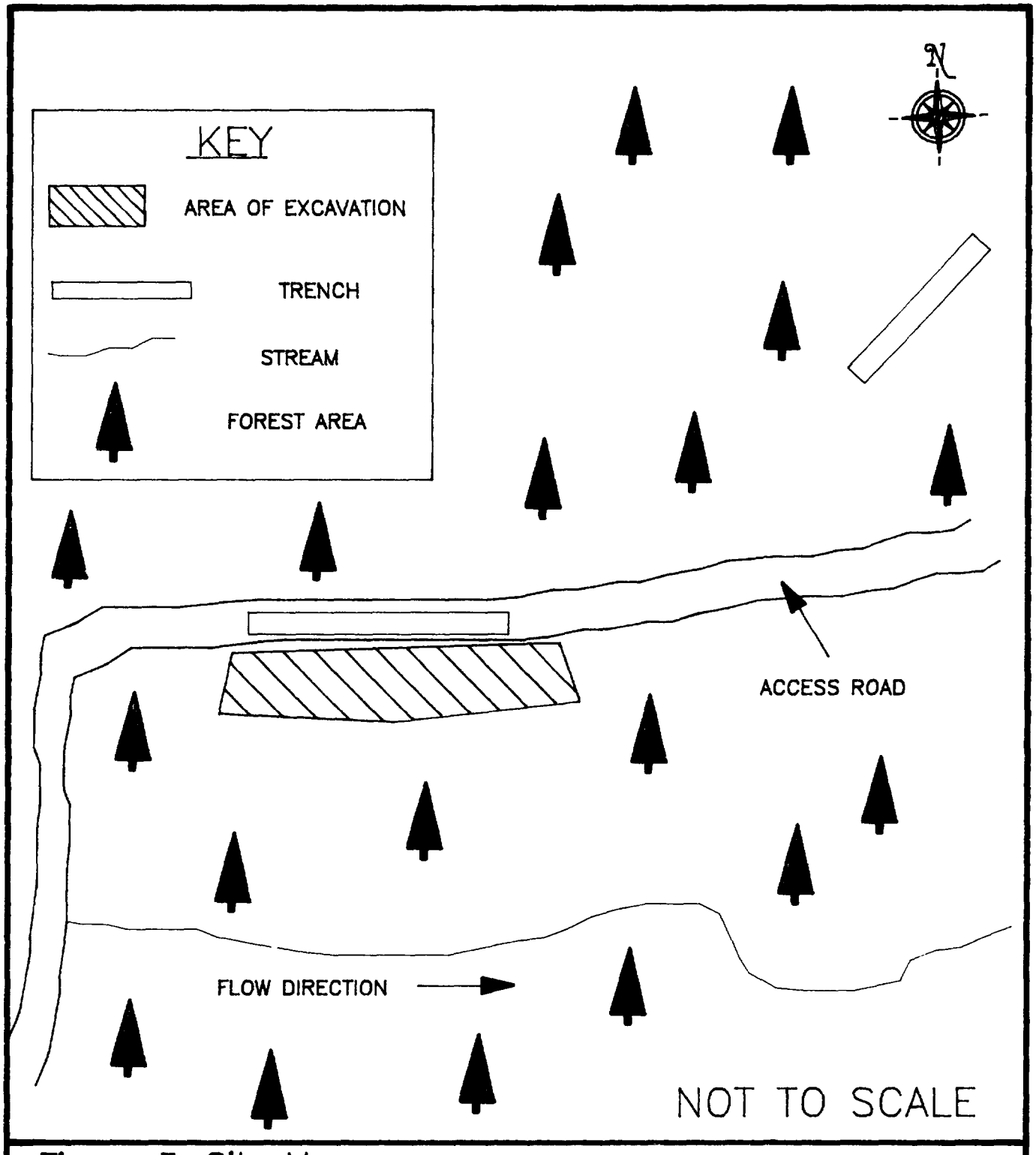


Figure 3: Site Map

TDD #04-9212-0012-4186
Jefferson Forest Drum Site
Brooks, Bullitt County, Kentucky

EPA

ATTACHMENT A

Photographs

UNSCANNABLE

MEDIA

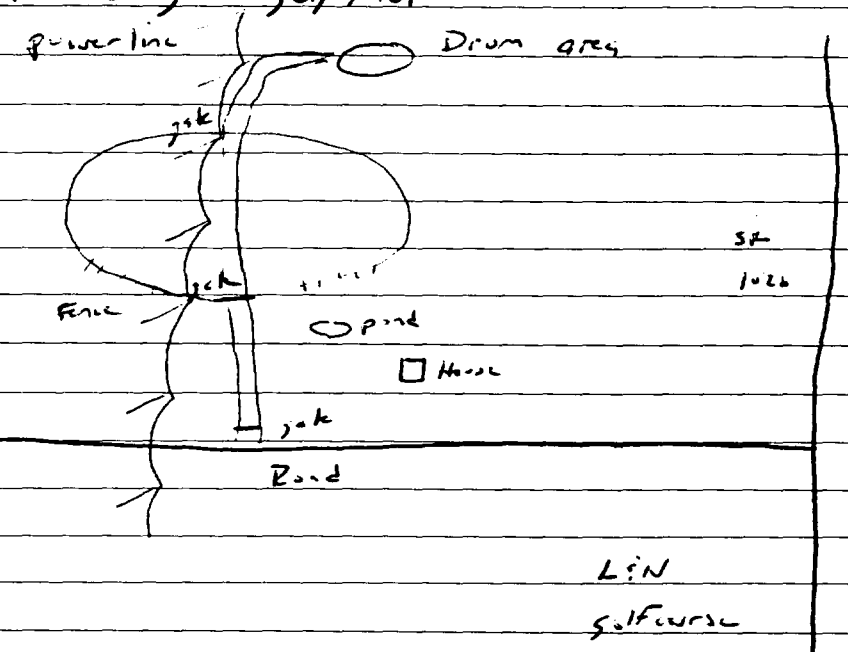
(PHOTOGRAPHS)

ATTACHMENT B

Log Notes

Jefferson County #4 Forest
Drum Site

0800 TAT arrives onsite and Heritage awaiting. Unlock the front gate and travel to rear of site to stage equipment



0815 TAT Maybrier given a tour of the site by TAT Marks. Observe numerous weathered drums partially buried in the hillside. Drums are rusted w/ bullet holes in them.

0835 Begin to clear brush with Komatsu PC200LC trackhoe rented from Resco and brought to the site yesterday. Trees and brush

are removed and piled in east and west end of excavation area.

0915 Heritage crew sets up decon area and hot zone.

0945 OSC Gayle Scogan arrives onsite and meets Ron Moore w/ Heritage.

0955 Conduct safety meeting w/ Heritage

1005 Crew begins to don level B w/ egress lines. TAT Manke begins to dress out in Level B for air monitoring

1015 KDWM / Lajuanda Maybrier and Eric arrive onsite and meet OSC Scogan
Travel hillside and observe extent of visual drums

1105 TAT Maybrier and OSC dress out in Level B to air monitor and document ~~remaining~~ act excavation activities
Air monitoring in several drums reveal 1 unit on HNu, Ø units and 45 units, Ø 25% LEL and 20.8% O^2.
Background HNu 0 units, O_2 20.8 LEL 0%

1210 Stop exploratory excavation
All parties depart the site for lunch and will return at 1310 hrs OSC Dora Ann

Johnson arrives onsite at 1210 hrs

1300 All parties return to the site and Heritage continues with excavation.

1330 Two additional drums are unearthed containing lq. Staged on top of hill above excavation area

1405 Stop digging after completing initial exploratory excavation. Unearthed 3 drums (55 gallon) with some liquid and 20-25 empty drums (55 gallon).

15 Begin to dig an exploratory trench parallel to the hillside to a depth of 3-5 feet or until native soil is unearthed.

1435 No additional drums are found and trenches backfills with excavated soil

1450 Travel to open, barren area in field and continue exploratory digging in attempt to identify high magnetometer readings. A trench 4-5 feet deep is dug 30 feet long. No debris or waste is found. Backfill with excavated soil

1510 TAT prepares to collect six samples 1 sediment upgradient, 1 sediment downgradient, 1 waste(s), 3 waste (lq).

1520 JCF-01 upgradient sediment
1530 JCF-02 downgradient sediment
1545 JCF-03 white powder material
1555 JCF-04 Gray lg
1610 JCF-05 Bright green lg
1620 JCF-06 motor oil (?) lg
Note KDwm personnel departed at 1455
~~Do~~ TAT donned level B to collect the above mentioned samples. The samples will be shipped to:
Roy F. Weston, Inc Lab
212 Frank West Circle
Suite A
Stockton, CA 95206
Lori Cullen
209/983-1340

1630 Heritage segregates the empty drums and metal debris and crushes the material. The crushed material is placed on top of the hill in a pile. Additionally, any waste material is stored on top of hill in a pile.
1705 Heritage packs all PPE in garbage bag and will dispose of property
1715 The three drums are covered with visqueen and wrapped with caution tape

1730 All remaining parties depart the site

Jon May

ATTACHMENT C

Table of Witnesses

TABLE OF WITNESSES

Gail Scogin, OSC
Dora Ann Johnson, OSC
U.S. Environmental Protection Agency
345 Courtland Street N.E.
Atlanta, Georgia 30365
(404)347-3431

Lajuanda Haight-Maybriar
Eric Liebenauer
Environmental Inspectors
Kentucky Department for Environmental Protection
Division of Waste Management
18 Reilly Road
Frankfort, Kentucky 40601
(502)564-6716

Ron Moore
Dennis Beavets
James Pollard
David Reynolds
Heritage Remediation/Engineering, Inc.
4925 Heller Avenue
Louisville, Kentucky 40218
(502)473-0638

Jon Maybriar
Matt Manka
Roy F. Weston, Inc.
Technical Assistance Team
10121 Production Court
Louisville, Kentucky, 40299
(502)491-0872

ATTACHMENT D

Safety Plan

WESTON MAJOR PROGRAMS DIVISION
HEALTH AND SAFETY PLAN
EMERGENCY RESPONSE / SITE INVESTIGATION

TDD No. 04-9212-0012-4186 **Site Name:** Jefferson Forest Drums

Site Address: Street No. _____

City Brooks

County/State Bullitt County, Kentucky

Site Contact / Phone No.: Lajuanda Haight-Maybriar (502)564-6716

Directions to Site: (Att.Map) From Louisville, I-65 south to Brooks Road Exit (SR1526). Follow SR1526 west to intersection of SR1020. Turn right on SR1020. Follow approximately 2 miles past the L3N Golf Course on left. Turn left on gravel road past golf course. Enter site through security gate on the right.

Historical/Current Site Information:

The Kentucky Department for Environmental Protection discovered 40 drums partially buried on the outskirts of the A.L. Taylor NPL site.

Incident Type:
- ( ) Air Release - _____
- ( ) Spill - _____
- ( ) Fire - _____
- (✓) HW Site - _____

Location Class : ( ) Industrial ( ) Commercial (✓) Urban/Residential ( ) Rural

USEPA Contact: Charlie Stevens **Date of Initial Site Activities:** 1/11/93

Original HASP: Yes ✓ **Modification Number:** _____

Lead TAT: Manka **Site Health & Safety Coordinator:** Manka

Response Activities/Duration (fill in as applicable)

Emergency Response:
- ( ) Perimeter Recon. _____
- ( ) Site Entry _____
- ( ) Visual Documentation: _____
- ( ) Multi-media Sampling: _____
- ( ) Decontamination: _____

Assessment:
- (✓) Perimeter Recon. 2 days
- (✓) Site Entry
- (✓) Visual Documentation:
- (✓) Multi-media Sampling:
- (✓) Decontamination:

Physical Safety Hazards to Personnel

( ) Heat (✓) Cold (✓) Precipitation ( ) Confined Space ( ) Terrain
(✓) Walking/Working Surfaces ( ) Fire & Explosion ( ) Oxygen Deficiency
( ) Underground Utilities ( ) Overhead Utilities ( ) Heavy Equipment
(✓) Unknowns in Drums, Tanks, Containers ( ) Ponds, Lagoons, Impoundments
( ) Rivers, Streams ( ) Pressurized Containers, Systems ( ) Noise
( ) Illumination ( ) Nonionizing Radiation ( ) Ionizing Radiation

Biological Hazards to Personnel

( ) Infectious/Medical/Hospital Waste ( ) Non-domesticated Animals ( ) Insects
(✓) Poisonous Plants/Vegetation ( ) Raw Sewage

Training Requirements

(✓) 40 Hour General Site Worker Course with three days supervised experience.
( ) 24 Hour Course for limited, specific tasks with one day supervised experience.
( ) 24 Hour Course for Level D Site with one day supervised experience.
(✓) 8 Hour Annual Refresher Health and Safety Training.
(✓) 8 Hour Management/Supervisor Training in addition to basic training course.
( ) Site Specific Health and Safety Training.
( ) Pre-entry training for emergency response skilled support personnel.

Medical Surveillance Requirements

(✓) Baseline initial physical examination with physician certification.
(✓) Annual medical examination with physician certification.
( ) Site Specific medical monitoring protocol (Radiation, Pesticide, PCB, Metals).
( ) Asbestos Worker medical protocol.
( ) Exempt from medical surveillance:_____.
(✓) Examination required in event of chemical exposure or trauma.

Chemical Hazards To Personnel

Chemical Contaminant	Unknown

PEL		ppm or mg/m3
TLV		ppm or mg/m3
IDLH		ppm or mg/m3
Carcinogen		Yes
		No
Physical Form		Solid
		Liquid
		Gas
Color		
Odor		
Flashpoint		Degrees F or C
Flammable Limits		% UEL
		% LEL
Route of Exposure		Inhalation
		Skin Absorption
		Eye / Skin Contact
		Ingestion

Vapor Pressure	mm/Hg
Vapor Density	(Air = 1)
Specific Gravity	(Water = 1)
Solubility	
Incompatible Materials	
Ion Potential	eV

Instruments for Detection		
		PID w/ Probe
		FID
		CGI
		Rad meter
		pH meter
		Detector Tube
		RAM / Mini-RAM
		Other:

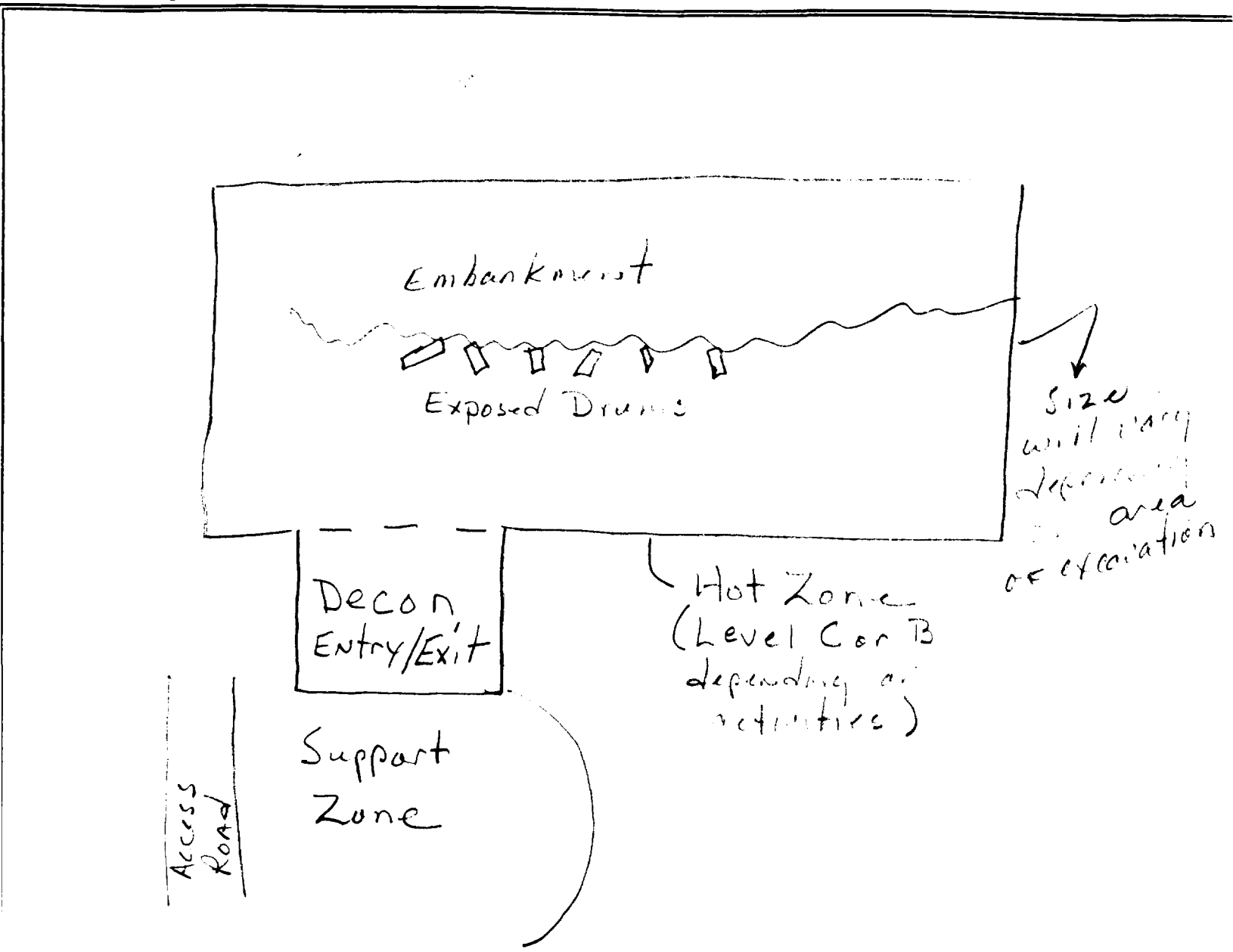
Symptoms of Acute Exposure		
		Confusion
		Convulsions
		Dizziness
		Drowsiness
		Giddiness
		Headache
		Irritation to eyes, nose or throat
		Lightheadedness
		Nausea
		Respiratory Problems
		Seizure
		Sweating (excessive)
		Vision Disturbance
		Weakness
		Other

First Aid Treatment		
		Irrigate Eyes w/ Water for 15 minutes
		Flush Skin w/ Water for 15 minutes
		Remove Contaminated Clothing
		Get Medical Attention
		Move to Fresh Air
		Provide Respiratory Support
		Other

Data Source		
		CHRIS
		NIOSH
		Sax
		HSDB
		Other:

Site Control Measures

Site Map with work zones:



Decontamination Procedures

(✓) Wet Decontamination - using: alconox & water
( ) Dry Decontamination

Description of Site Specific Decontamination Plan: All sampling equipment will be cleaned with soap & water, rinsed with deionized water and a final rinse with pesticide grade alcohol. All PPE will be contained in proper receptacles with storage on-site until disposal has been arranged.

Adequacy of decontamination determined by: Site Health & Safety Officer

Personal Protective Equipment

TAS TO BE PERFORMED/AIR MONITORING REQUIRED	ANTICIPATED LEVEL OF PROTECTION	TYPE OF CHEMICAL PROTECTIVE COVERALL	INNER GLOVE OUTER GLOVE BOOT COVER	TYPE OF APR CARTRIDGE OR CANISTER
Drum excavation and removal*	B	Saranex	nitrile gloves latex gloves PVC boots	SCBA
Perimeter monitoring during excavation	B	Saranex	latex gloves nitrile gloves PVC boots	SCBA
Drum Sampling	B	Saranex	latex nitrile PVC	SCBA
* See attached	regulations for	excavations.		

Frequency and Types of Air Monitoring: (✓) Continuous ( ) Routine -_____ ( ) Periodic - _____

DIRECT READING INSTRUMENTS	COMBUSTIBLE GAS/OXYGEN METER (1)	RADIATION SURVEY METER/PROBE (2)	PHOTOIONIZATION DETECTOR/PROBE (3)	FLAME IONIZATION DETECTOR (4)	CHEM. DETECTOR TUBE (5)
ID NUMBER	637959	668842	637960 637961	668827	686682
CAL. DATE	2/9/93 * ~~12/29/92~~	2/9/93 ~~12/29/92~~	2/9/93 ~~12/23/92~~	2/9/93 ~~12/29/92~~	2/9/93 ~~12/29/92~~
TAT MEMBER	Manka	Manka	Keyes	Manka	Manka
ACT. N LEVEL	≥ 20%LEL - ≤19.5%, ≥23% O_2 - LEAVE	3X BACKGRND - CAUTION; 1 MR/HR-LEAVE	UNKNOWNS 0-5 UNITS:"C" 5-500:"B"	UNKNOWNS 0-5 UNITS:"C" 5-500:"B"	PEL/TLV COMPARE W/PF

* original trip cancelled due to weather. New dates and numbers reflect recalibration for field activities (renewed)

Emergency Phone Numbers

Emergency Contact	Location	Phone Number	Notified
Hospital	Humana Hospital Southwest 9820 3rd Street Road	502/933-8100	
Ambulance	Bullitt County Ambulance Zoneton	502/955-7580	
Police	Bullitt County Sheriff Zoneton	502/955-7804	
Fire Dept.	Zoneton	502/955-8076	

Chemical Trauma Capability? (✓) Yes ( ) No If no, closest backup:_____ Phone:_____

Directions to Hospital (attach map) - Route verified by: NHS Date: 12/30/92

From site, SR 1020 south to SR 1526 east. Follow SR 1526 to I-65. Follow I-65 north to Hwy 841 (Gene Snyder Freeway). Follow Hwy 841 to the Stonestreet exit. Turn right on Stonestreet. Follow to T, make right on 3rd Street Road, then immediately left onto Hospital Drive.

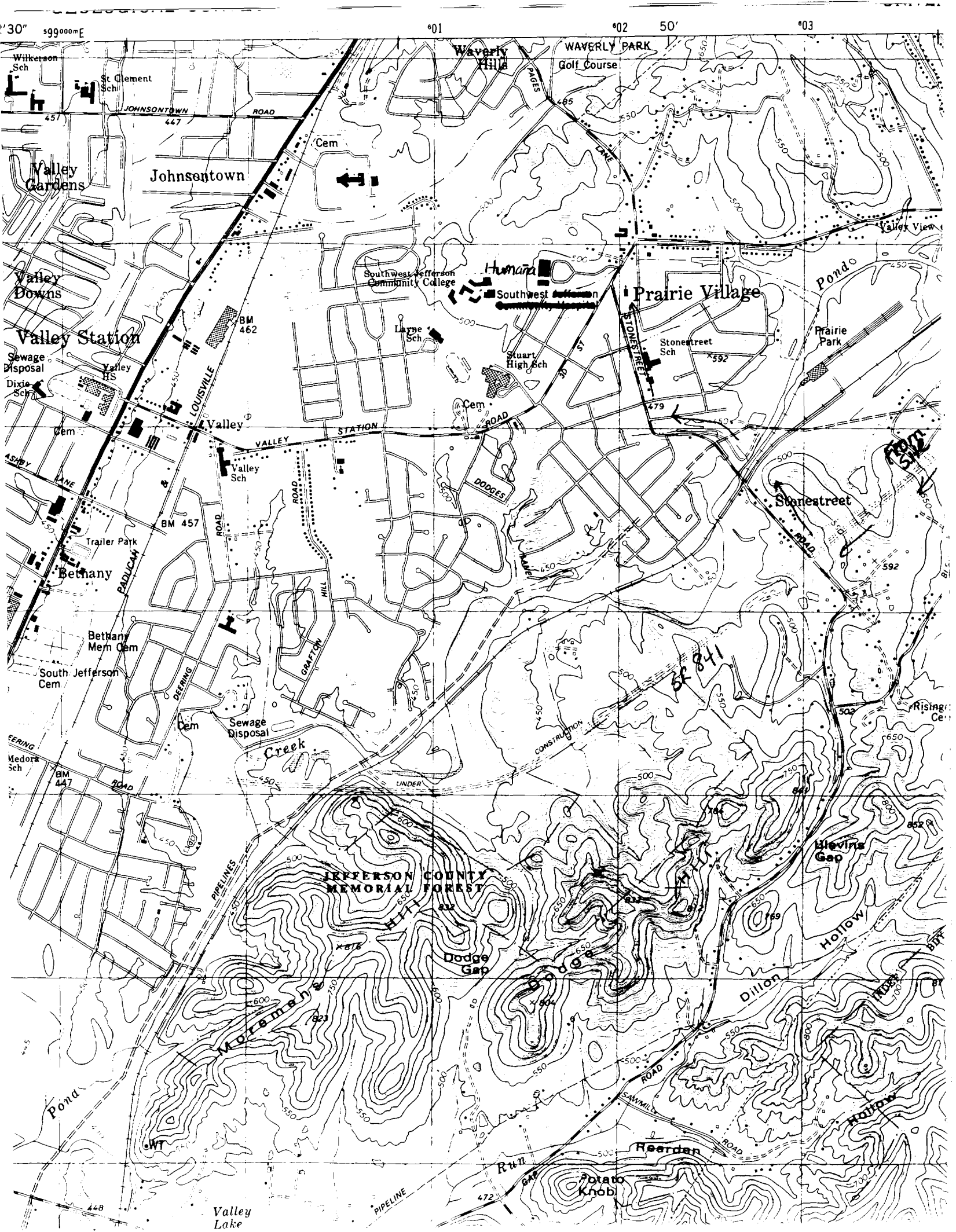
Additional Emergency Phone Contacts

Contact	Phone Number
WESTON 24 hr. Hotline	215-524-1925 215-524-1926
WESTON Medical Emergency Service	513-421-3063
Chemtrec	800-424-9300
ATSDR	404-639-0615
ATF (explosives information)	800-424-9555
National Response Center	800-424-8802
National Poison Control Center	800-942-5969

HASP prepared by: Leonna Smith Date: 12/10/92

Pre-Response/Entry Approval by: Ray Doyle (by phone) Date: 12/10/92

Verbal Approval/Modification to Original HASP by:_____ Date: __/__/__



Wilkerson Sch
St Clement Sch
JOHNSONTOWN ROAD
Waverly Hills
WAVERLY PARK
Golf Course
PAGES LANE
Cem
Valley Gardens
Johnsontown
Valley View
Valley Downs
Southwest Jefferson Community College
Humana
Southwest Jefferson Community Hospital
Prairie Village
Pond
Valley Station
BM 462
Layne Sch
Stuart High Sch
Stonestreet Sch
Prairie Park
Sewage Disposal
Valley HS
Dixie Sch
LOUISVILLE
Cem
Valley
VALLEY STATION ROAD
Valley Sch
DODGES
Stonestreet
BM 457
Trailer Park
Bethany
PADUCAH
Bethany Mem Cem
South Jefferson Cem
DEERING
GRAFTON
HILL
Cem
Sewage Disposal
Creek
Medora Sch
BM 447
ROAD
CONSTRUCTION
UNDER
SR 841
Rising Cem
Blevins Gap
JEFFERSON COUNTY MEMORIAL FOREST
PIPELINES
Dodge Gap
Dodge
Moreman
Hill
Dillon
Hollow
Pond
SAWMILL ROAD
Reardan
Run
Potato Knob
PIPELINE
Valley Lake

Physical Description of Site and Response Activities

Size of Site: .25 Acre Terrain hill (Forest) Weather Sunny 65°
Distance to Nearest: Residence >1 m School >1 m Hospital >1 m
Public Building .5 m Other _____
Evacuation: ( ) Yes (✓) No By Whom: _____
Nearest Waterway: Unnamed intermittent Stream Distance from Site: 30 yds

Condition	Observed	Potential	None	Comments/Observations
Surface Water Contamination		✓		Stream sediment sampled
Ground Water Contamination			✓	
Drinking Water Contamination			✓	
Air Release			✓	
Soil Contamination		✓		leaky drums discovered
Stressed Vegetation			✓	
Dead Animal Species			✓	

Actions Taken On-Site:

Perimeter Monitoring: (✓) Yes ( ) No
Site Entry by TAT: (✓) Yes ( ) No

Tasks Conducted	Level of Protection/Specific PPE Used
Air Monitoring	Level B / nitrile, latex gloves, PVC boots SCBA, Saranex
Drum Sampling	" / "

Air Monitoring Summary Log

Date: 2/10/93

Data Collected by: Marks

Data be summarized by a "Range of readings,i.e.,- Low to High" and/or "Average" by location.

Station/Location	CGI/O_2 Meter	Radiation Meter	PID/Probe	FID/OVA	Detector Tube
Background Calibration	0%/20%	.01 SD/2 mR/h	Ø	Not used	Not used
1100 Work Zone	Bkrd " (Average)	Bkrd " (Average)	Bkrd " (Average)		
1300 Work Zone	Bkrd Average	Bkrd Average	Bkrd Average		
1500 Work Zone	Bkrd "	Bkrd "	Bkrd "		

Summary/Comments:

Hazardous Waste Site and Environmental Sampling Activities

Off Site: ( ) Yes (✓) No
On Site: (✓) Yes ( ) No

Describe types of samples and methods used to obtain samples: Product samples were collected out of the drums. Since product quantity was low, the drums were tipped and the product allowed to pour into sample container through bung hole or other opening. Work done in level B.

Was Laboratory notified of Potential Hazard Level Of Samples? (✓) Yes ( ) No

Note: The nature of the work assignment may require the use of the following procedures/programs which will be included as Attachments to this HASP as applicable: Emergency Response Plan, Confined Space Entry Procedures, Spill Containment Program.

Disclaimer: This Health and Safety Plan (HASP) was prepared for work to be conducted under the Technical Assistance Team (TAT) Contract 68-WO-0036 for Zone I. Use of this HASP by WESTON and its subcontractors is intended to fulfill the OSHA requirements found in 29 CFR 1910.120. Items not specifically covered in this HASP are included by reference to 29 CFR 1910 and 1926.

The signatures below indicate that the individuals have read and understood this Health and Safety Plan.

PRINTED NAME	SIGNATURE	AFFILIATION	DATE
David Reynolds	David Reynolds	HR-E Operator	2-10-93
Dennis Beauets	Dennis Beauets	HR/E Driver	2-10-93
James Pollard	James Pollard	HR/E Rec. Tech	2-10-93
Ron Moore	[illegible]	HR/E Supervisor	2-10-93
Gail Scogin	Gail Scogin	U.S. EPA OSC	2/10/93

Final Submission of HASP by:	[illegible]	Date
Post Response Review by:		
Post Response Approval by:	[illegible]	3/23/93
TAT HSO Review by:		

COMMENTS/FOLLOWUP

JOB SAFETY & HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Requirements of the Act include the following:

Employers

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discrimination.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory penalties against employers of up to $1,000 for each serious violation and for optional penalties of up to $1,000 for each nonserious violation. Penalties of up to $1,000 per day may be proposed for failure to correct violations within the proposed time period. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to $10,000 for each such violation.

Criminal penalties are also provided for in the Act. Any willful violation resulting in death of an employee, upon conviction, is punishable by a fine of not more than $10,000, or by imprisonment for not more than six months, or by both. Conviction of an employer after a first conviction doubles these maximum penalties.

Voluntary Activity

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

Such voluntary action should initially focus on the identification and elimination of hazards that could cause death, injury, or illness to employees and supervisors. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help such as training.

Consultation

Free consultative assistance, without citation or penalty, is available to employers, on request, through OSHA supported programs in most State departments of labor or health.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta, Georgia
Boston, Massachusetts
Chicago, Illinois
Dallas, Texas
Denver, Colorado
Kansas City, Missouri
New York, New York
Philadelphia, Pennsylvania
San Francisco, California
Seattle, Washington

Telephone numbers for these offices, and additional area office locations, are listed in the telephone directory under the United States Department of Labor in the United States Government listing.

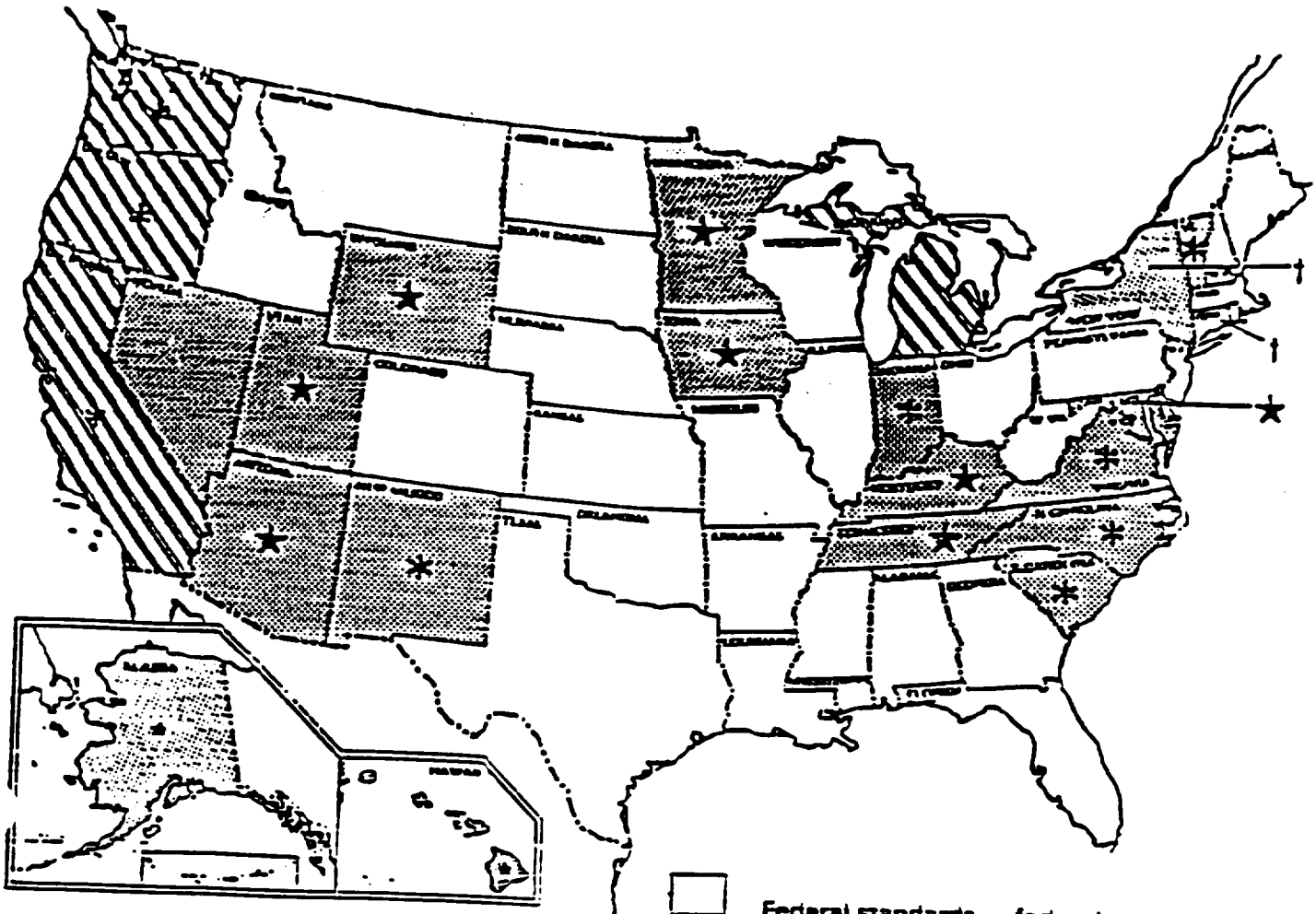
Washington, D.C.
1985
OSHA 2203

William E. Brock, Secretary of Labor

U.S. Department of Labor

Occupational Safety and Health Administration

STATE PLANS



PUERTO RICO*
SAMOA
GUAM
VIRGIN ISLANDS★

Federal standards — federal enforcement
State plan — state enforced federal standards
State plan — state enforced state standards
*State plan certified
★State plan has final approval
On-site consultation now available in all jurisdictions

FEDERAL OSHA AND STATE PLANS JURISDICTIONS

The above map represents the current status of jurisdictional areas for applicable OSHA or state regulations, inspections, and enforcement. At present, only four states (Washington, Oregon, California, and Michigan) have approved plans which differ significantly from federal standards.

All of the states are monitored by OSHA to determine state plan qualification. State plans must be judged "at least as effective as" the federal program in order to be approved. A state plan may receive OSHA approval by demonstrating it will meet all requirements within three years. After completing these steps and operating its program at a fully effective level for at least one year, federal enforcement will end in the areas covered by the state plan. OSHA then continues its monitoring to determine when the plan should be certified and when it hould receive final approval.

†Connecticut and New York — state plan covers employees of state only: all other employees are under federal OSHA jurisdiction.

SECTION 23

EXCAVATIONS

23.A. GENERAL

23.A.01. The sides of all excavations in which employees are exposed to danger from moving ground shall be guarded by a shoring system, sloping of the ground, or other equivalent means. The minimum slope in any soil, with the exception of solid rock, shall be no less than 1/4 horizontal to 1 vertical.

23.A.02. The determination of angle of repose and design of supporting system shall be based on careful evaluation of pertinent factors such as: depth of cut, possible variation in water content of the material while the excavation is open; anticipated changes in materials from exposure to air, sun, water, or freezing; loading imposed by structures, equipment, overlaying material, or stored material; and vibration from equipment, blasting, or traffic.

23.A.03. Where a weak stratum is overlain by strata with a greater angle of repose, the angle of repose for the overlying strata shall be taken as no more than that of the supporting stratum.

23.A.04. Design of supporting system, i.e., piling, cribbing, shoring, etc., shall be based on calculation of forces and their direction with adequate consideration for surcharges, angle of internal friction of materials in the face, and other pertinent properties of the material to be retained in place. When tight sheeting or sheet piling is used, full loading due to ground water table shall be assumed unless prevented by weep holes, drains, or other means. Additional stringers, ties, and bracing shall be provided to allow for any necessary temporary removal of individual supports.

23.A.05. Except in hard rock, excavations below the level of the base of footing of any foundation or retaining wall shall not be permitted unless the wall is underpinned and all other precautions taken to insure the stability of the adjacent walls for the protection of the employees involved in excavation work or in the vicinity thereof. If the stability of adjoining buildings or walls is

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endangered by excavations, shoring, bracing, or underpinning designed by a qualified person shall be provided. Such shoring, bracing, or underpinning shall be inspected daily or more often, as conditions warrant, by the qualified person and the protection effectively maintained.

23.A.06. Diversion ditches, dikes, or other means shall be used to prevent surface water entering an excavation and to provide good drainage of the area adjacent to the excavation.

23.A.07. Excavated material shall be stored and retained at least 2 feet from the edge of the excavation and at a distance to prevent excessive loading on the face of the excavation.

23.A.08. Boulders, stumps, or other materials that may slide or roll into the excavation shall be removed or made safe.

23.A.09. Guardrails, fences, or barricades and warning lights or other illumination maintained from sunset to sunup, shall be placed at all excavations which are adjacent to paths, walkways, sidewalks, driveways, and other pedestrian or vehicle thoroughfares. Adequate physical protection shall be provided at all remotely located excavations. All wells, calyx holes, pits, shafts, etc., shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, calyx holes, pits, shafts, etc., shall be backfilled immediately.

23.A.10. Walkways or bridges with guardrails shall be provided where people or equipment are required or permitted to cross over excavations.

23.A.11. Materials used for sheeting, sheet piling, cribbing, bracing, shoring, and underpinning shall be in good serviceable condition and of adequate dimensions. Timbers shall be sound and free of large or loose knots.

23.A.12. Side slopes and faces of all excavations shall be maintained in safe condition by scaling, ice removal, benching, barricading, rock bolting, wire mesh, or other means. Special attention shall be given to slopes which may be adversely affected by weather, moisture content, or vibration.

23.A.13. Precautions shall be taken in sloping or

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shoring the sides of excavations adjacent to a previously backfilled excavation or a fill, particularly when the separation is less than the depth of the excavation. Attention shall also be paid to joints and seams of material comprising a face and the slope of such seams and joints.

23.A.14. Support systems shall be planned and designed by a qualified person when an excavation is in excess of 20 feet in depth, adjacent to structures or improvements, or subject to vibration or ground water.

23.A.15. Prior to opening an excavation, underground installations (i.e., sewer, water, fuel, electric lines, etc.) shall be located and protected from damage or displacement. Utility companies shall be contacted to have them locate and mark actual locations.

23.A.16. Where unexploded munitions/military ordnance or hazardous materials may possibly be uncovered during excavation, job planning will require contact with local safety/health expertise.(See Appendix V).

23.A.17. Where personnel are required to enter excavations over 4 feet in depth, sufficient stairs, ladders, or ramps shall be provided to require no more than 25 feet of lateral travel. When access to excavations in excess of 20 feet in depth is required, ramps, stairs, or mechanical personnel hoists shall be provided.

23.A.18. Where it is necessary to undercut the side of an excavation, overhanging material shall be safely supported.

23.A.19. Bracing, shoring, cribbing, and other supports shall be inspected daily and after every rainstorm or other hazard-increasing occurence by a competent person. Protection against slides and cave-ins shall be increased if necessary. If evidence of possible cave-ins or slides is apparent, all work in the excavation shall cease until the necessary precautions have been taken to safeguard the employees.

23.A.20. When tie rods are used to restrain the top of sheeting or other retaining system, the rods shall be anchored well back of the angle of repose.

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23.A.21. In locations where oxygen deficiency or gaseous conditions are known or suspected, air in the excavation shall be tested prior to the start of each shift or more often if directed by the designated authority. A log of all test results shall be maintained at the work site. Controls shall be in accordance with Sections 7 and 8.

23.A.22. Emergency rescue equipment such as breathing apparatus, safety harness and line, and basket stretcher shall be readily available where adverse atmospheric conditions are suspected or may develop in an excavation.

23.A.23. Where ramps are used, a minimum width of 4 feet for personnel and 12 feet for equipment shall be provided. Guardrails shall be provided on all personnel ramps. Curbs not less than 8 x 8-inch timbers or equivalent protection shall be provided on equipment ramps. Such ramps shall be designed and constructed in accordance with accepted engineering practice and 22.D.

23.A.24. When mobile equipment is utilized or allowed adjacent to excavations, substantial stop logs or barricades shall be installed.

23.A.25. Excavating or hoisting equipment shall not be allowed to raise, lower, or swing loads over personnel in the excavation without substantial overhead protection.

23.A.26. At least two means of exit shall be provided for personnel working in excavations. Where the width of the excavation exceeds 100 feet, two or more means of exit shall be provided on each side of the excavation.

23.A.27. Ground water shall be controlled. Freezing, pumping, drainage, and similar control measures shall be planned and directed by a competent engineer. Consideration shall be given to the existing moisture balances in surrounding soils and the effects on foundations and structures if it is disturbed. When continous operation of ground water control equipment is necessary, an emergency power source shall be provided.

23.B. TRENCH EXCAVATION

23.B.01. Banks more than 5 feet high shall be

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shored, laid back to a stable slope, or provided with other equivalent protection where employees may be exposed to moving ground or cave-ins. Trenches less than 5 feet in depth also shall be protected when examination of the ground indicates hazardous ground movement may be expected. The safe angle of repose for soil conditions and bracing systems shall be determined by a qualified person.

23.B.02. Bracing or shoring of trenches shall be carried along with the excavation.

23.B.03. Cross braces or trench jacks shall be in true horizontal position, secured to prevent sliding, falling, or kick-outs.

23.B.04. Portable trench boxes, sliding trench boxes, or shields shall be designed, constructed, and maintained in a manner to provide protection equal to or greater than the sheathing and shoring required for the situation.

23.B.05. Ladders used as accessways shall extend from the bottom of the trench to not less than 3 feet above the surface. Lateral travel to an exit ladder shall not exceed 25 feet.

23.B.06. Backfilling and removal of trench supports should progress together from the bottom of the trench. Jacks or braces shall be released slowly and, in unstable soil, ropes shall be used to pull out the jacks or braces from above after personnel have cleared the trench.

23.B.07. Minimum size and spacing of timbers for shoring of trenches shall be in accordance with APPENDIX J.

23.B.08. Braces and diagonal shores in a wood shoring system shall not be subjected to compressive stress in excess of values given by the following formula:

$$S=1300-\frac{20L}{D}$$

Maximum ratio $\frac{L}{D}=50$

Where:

L = Length, unsupported, in inches.

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D = Least side of the timber in inches.
S = Maximum allowable stress in pounds per square inch of cross section.

23.B.09. Aluminum hydraluic shoring shall be installed in accordance with the manufacturer's recommendations and requirements of 23.A.04.

23.C. EXCAVATION OF SMALL DIAMETER SHAFTS

23.C.01. Calyx holes, caisson footings, and other small diameter shafts, which persons are required to enter, shall be provided with a steel casing of sufficient strength to withstand shifting of the surrounding earth. Casing shall be provided the full depth of the overburden and shall extend at least 5 feet into solid rock, where such conditions exist.

23.C.02. The steel casing shall extend at least 1 foot above ground level and be equipped with a cover that can be locked. This cover shall be in place whenever no work is being performed in the excavation and until the excavation is backfilled to ground level.

23.C.03. Prior to working in a shaft, air at the bottom of the shaft shall be tested for oxygen deficiency and harmful contaminants. No work shall be done in the shaft until the air is safe for breathing.

23.C.04. Mechanical ventilation shall be used to change the air in shafts. Compressed air from an untested source shall not be used.

23.C.05. Hoisting of persons shall be done only with equipment meeting applicable requirements contained in section 22.G.

23.C.06. An inclosed covered metal cage shall be used to raise and lower persons in the shaft. The cage shall be designed with a safety factor of 4 and shall be load tested prior to use. The exterior of the cage shall be free of projections or sharp corners. Only closed shackles shall be used in the cage rigging.

23.C.07. If the cage is equipped with a door, a positive locking device shall be installed to prevent the door from opening accidentally while the cage is being lowered or raised.

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23.C.08. The rigging and cage shall be checked at the start of each shift by lowering the empty cage to the bottom of the shaft and hoisting it to the surface.

23.C.09 If the work or an emergency prohibits the use of a cage, persons may be raised and lowered in the shaft in the muck bucket or a boatswain's chair. Persons hoisted in this manner shall wear a parachute-type harness with an independent safety line attached. "Riding the Hook" shall not be permitted.

23.C.10. A tender shall be stationed at the shaft entrance whenever personnel are in the shaft. He/she will be assigned no other duties.

23.C.11. A communication or signal system shall be provided and used.

23.C.12. Procedures for rescuing personnel who might be injured or incapacitated while in the shaft shall be written and posted at the job site. These procedures shall include hoisting procedures to be used in the event the cage and the cage hoisting device is inoperative.

23.C.13. No employee shall be permitted to enter an unsupported auger-type excavation in unstable material for any purpose. Necessary clean-out in such cases shall be accomplished without entry.

23.C.14. All wells or shafts over 5 feet in depth shall be retained with lagging, piling or casing.

23.C.15. In shafts, the employer shall inspect the walls, ladders, timbers, blocking, and wedges of the last set to determine if they have loosened following blasting operations. Where found unsafe, corrections shall be made before shift operations are started.

23.C.16. Safety belts shall be worn or skips and platforms used in shafts by crews when the skip or cage does not occlude the opening to within 1 foot of the sides of the shaft, unless guardrails or cages are provided.

23.D. EXCAVATION WITH COFFERDAMS

23.D.01. If overtopping of the cofferdams by high water is possible, design shall include provisions

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for controlled flooding of the work area.

23.D.02. Where personnel or equipment are required or permitted on cofferdams, walkways, bridges, or ramps, standard railings or equilvalent protection shall be provided.

23.D.03. At least two ladders, walkways, ramps, roads or other means of rapid exit shall be provided for personnel and equipment working on cofferdams.

23.D.04. A plan including warning signal for excavation of personnel and equipment in case of emergency and for controlled flooding shall be developed and posted.

23.D.05. Cofferdams located close to navigable shipping channels shall be protected from vessels in transit, where possible.

23.E. CAISSONS

23.E.01. Whenever, in caisson work in which compressed air is used, and the working chamber is less than 11 feet in length, and when such caissons are at any time suspended or hung while work is in progress so that the bottom of the excavation is more than 9 feet below the deck of the working chamber, a shield shall be erected therein for the protection of the employees.

23.E.02. Shafts shall be subjected to a hydrostatic test, at which pressure they shall be tight. The shaft shall be stamped on the outside shell about 12 inches from each flange to show the safe working pressure.

23.E.03. Whenever a shaft is used, it shall be provided, where space permits, with a safe, proper, and suitable staircase for its entire length, including landing platforms (not more than 20 feet apart). Where this is impractical, ladders not more than 20 feet high shall be installed with each section offset from adjacent sections and a guarded landing provided at each offset.

23.E.04. All caissons having a diameter or side greater than 10 feet shall be provided with a man lock and shaft for the exclusive use of employees.

23.E.05. In addition to the gauge in the locks,

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an accurate gauge shall be maintained on the outer and inner side of each bulkhead. These gauges shall be accessible at all times and kept in accurate working order.

23.E.06. See 05.C. for employee physical qualifications.

23.E.07. See 24.F. for compressed air requirements.

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WESTON 1575 Northside Dr., N.W., Suite 325, Bldg. 300, Atlanta, GA 30318 404-352-4147

TECHNICAL ASSISTANCE TEAM FOR EMERGENCY RESPONSE REMOVAL AND PREVENTION
EPA CONTRACT 68-WO-0036

MEMORANDUM

TO: FILE

FROM: Paula C. MacLaren
Analytical Coordinator

THRU: Donnissa L. Duvic
TATL, Region IV

SUBJECT: Jefferson Forest Drums Site Analytical Data
TDD# 04-9302-L003-0704

DATE: 17 March 1993

Roy F. Weston, Inc. laboratory performed volatile, semivolatile and target analyte list metal analyses on one soil, two sediment and three liquid waste samples collected from the Jefferson Forest Drums site on 10 February 1993. Due to limited sample volume, the laboratory was only able to perform duplicate analyses for soil volatile compounds. In addition, prior to the semivolatile analysis, liquid waste sample JCF-05 separated into two phases; one oil and one water. Both phases were analyzed for semivolatile compounds. The sample data package was required within a two week time period.

The analytical report was received seven days late incurring a 10% penalty fee on the total invoice cost.

The laboratory blank revealed methylene chloride contamination during the organic analyses. The effect on reported sample values was evaluated and presented in the attached data summary.

All extraction and analyses hold times were met (hold times have not been established for drum waste samples.)

Volatile analysis showed some matrix interferences for soil and oil samples with 5 out of 12 surrogate percent recoveries slightly exceeding method QC limits. The blank matrix spike percent recoveries, however, were all within limits; verifying the analytical process. Semivolatile analysis showed no matrix interferences with all surrogate spike percent recoveries within

analytical process. Semivolatile analysis showed no matrix interferences with all surrogate spike percent recoveries within method QC limits.

Metal soil matrix spike/matrix spike duplicates showed several percent recoveries exceeding the QA/QC 80%-120% guideline. Showing lower percent recoveries due to matrix interferences were arsenic, antimony, cadmium, chromium and selenium. Arsenic, antimony and chromium also showed wide variances in reproducible data with relative percent differences (RPD) exceeding the 20% guideline. Due to elevated sample concentrations, spike percent recoveries for aluminum, calcium, copper, iron, magnesium, manganese, nickel, lead and zinc were not applicable. All metal laboratory control samples were within limits to verify the analytical process.

Metal liquid waste matrix spikes only showed thallium to experience a matrix interference with a percent recovery below the recommended 80%. Due to elevated sample concentrations, spike percent recoveries for iron, lead and zinc were not applicable. All other matrix spike percent recoveries were within limits. All metal laboratory control samples were within limits to verify the analytical process.

Some samples were diluted due to matrix interferences. Note the elevated reporting limits for volatile analysis on samples JCF-04, JCF-06 and semivolatile analysis on samples JCF-05 (oil) and JCF-06.

A summary of the data can be found on the following pages.

cc: Gail Scoggins
Matt Manka

JEFFERSON FOREST DRUMS SITE
ANALYTICAL DATA

Sediment and Soil Samples

ORGANIC COMPOUNDS (ug/kg)

SAMPLE ID	JCF-01	JCF-02	JCF-03	JCF-03
MATRIX	SEDIMENT	SEDIMENT	SOIL	DUPLICATE
Methylene Chloride	5 J	3 J		U
Phenanthrene			100 J	-
Fluoranthene			110 J	-
Pyrene			110 J	-
bis(2-Ethylhexyl) phthalate			280 J	-
Benzo(g,h,i)perylene			51 J	-

NOTES: J - ESTIMATED VALUE; COMPOUND CONCENTRATION IS BELOW THE REPORTING LIMIT

U - UNDETECTED; COMPOUND PRESENT IN LABORATORY BLANK

"-" - NOT ANALYZED

JEFFERSON FOREST DRUMS SITE
ANALYTICAL DATA

Sediment and Soil Samples

METALS (mg/kg)

SAMPLE ID	JCF-01	JCF-02	JCF-03
MATRIX	SEDIMENT	SEDIMENT	SOIL
Aluminum	11000	8670	17700
Antimony			15.4
Arsenic	20.5	23.1	7.1
Barium	51.6	39.5	230
Beryllium	0.95	0.74	
Cadmium			2.9
Calcium	834	753	8440
Chromium, Total	21.0	14.0	48.2
obalt	29.8	26.4	10.8
Copper	28.1	17.3	157
Cyanide, Total			0.91
Iron	62200	40700	41400
Lead	29.3	27.1	1730
Magnesium	3010	2650	3400
Manganese	760	658	480
Mercury	0.04	0.04	0.39
Nickel	57.2	46.8	38.9
Potassium	1630	1330	1720
Sodium			1440
Vanadium	35.9	24.9	27.3
Zinc	152	103	1220

JEFFERSON FOREST DRUMS SITE
ANALYTICAL DATA

Waste Samples

ORGANIC COMPOUNDS (ug/kg)

SAMPLE ID	JCF-04	JCF-05	JCF-05	JCF-06
MATRIX	OIL	OIL	WATER	OIL
Methylene Chloride	U		-	U
Toluene	56 J		-	
Ethylbenzene	3300		-	
Xylene, Total	14000		-	
Phenol			270 J	
Naphthalene	350 J			
2-Methylnapthalene	350 J			
Benzoic Acid			2600	
Phenanthrene	200 J			
bis(2-Ethylhexyl) phthalate	310 J			

NOTES:

U - UNDETECTED; COMPOUND WAS PRESENT IN LABORATORY BLANK

J - ESTIMATED VALUE; COMPOUND CONCENTRATION IS BELOW THE REPORTING LIMIT

"-" - NOT ANALYZED

JEFFERSON FOREST DRUMS SITE
ANALYTICAL DATA

Waste Samples

METALS(mg/kg)

SAMPLE ID	JCF-04	JCF-05	JCF-06
MATRIX	OIL	OIL	OIL
Aluminum	92.4	20.3	
Arsenic	1.5	99.2	
Barium	25.3	25.9	134
Cadmium	0.71		
Chromium, Total	3.5	1.3	
Cyanide, Total	1.4		
Iron	1300	95.3	48.0
Lead	48.6	1.4	12.6
Manganese	7.9	1.9	
Mercury	0.04		
Potassium		4550	
Sodium	3020		
Zinc	30.1	131	223

U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4 TAT

93 02 S 099

RECEIVED FEB 19 1993

CHAIN OF CUSTODY RECORD

ENVIRONMENTAL SERVICES DIVISION
COLLEGE STATION ROAD
ATHENS, GEORGIA 30613

8270 TAL metals Cyanide 8010 Cyanide 8010 TAL metals Cyanide

PROJ NO

PROJECT NAME: Jefferson Forest Drum Si

SAMPLERS (Signature): Jon May

Water/Wastewater | Soil/Sed/Sog | Waste | Misc

Circle/add Parameters Desired ( ) - Indicates Separate Containers

LAB ID	STA NO	DATE	TIME	COMP	GRAB	STATION LOCATION	NO OF CONTAINERS	(Gal G (ext org. Pest) (EP) (herb)	40 ml Vial (VOA)	250 ml G (TOX)	P (Bod, TSS, Cl, R, Sol, etc)	1LG (phenol) (OAG) (pest)	1LP (met, hard) (Tot. COD, H, P, etc)	0.5-1LP (ST)	½ gal or 1LP (CN)	16 oz G (ext org) pest, herb ((met) (EP)	4 oz G (VOA)	P or G (TOX, S², N, P, COD, etc)	12 oz G (ext org) pest, herb	32 oz G (ext org) pest, herb, (VOA)	32 oz G (TOX, S², FP) (FP, BTU)	REMARKS/TAG NUMBERS
001	JCF-01	2/10/93	1520	✓			3									2	1					T4-07306, 07, 08
002	JCF-02	2/10/93	1530	✓			3									2	1					T4-04638, 07305, 07448
003	JCF-03	2/10/93	1545	✓			2											1	1			T4-07309, 10 Oil
004	JCF-04	2/10/93	1555		✓		2											1	1			T4-07311, 12
005	JCF-05	2/10/93	1610		✓		2											1	1			T4-07313, 14
006	JCF-06	2/10/93	1620		✓		2											1	1			T4-07315, 16 Oil

Custody Seal Intact
T=4°C

Relinquished by (Signature)	Date/Time	Received by: (Signature)	Relinquished by (Signature)	Date/Time	Received by: (Signature)
Jon M	2/11/93 1600	Federal Express	A-bill #	2/12/93 0830	M. [illegible]
Relinquished by (Signature)	Date/Time	Received by: (Signature)	Relinquished by (Signature)	Date/Time	Received by (Signature)

Remarks
Roy F. Weston, Inc. Lab
212 Frank West Circle
Suite A
Stockton, CA 95206

* Analyze for TAL metals
* Sample JCF-06 should also be analyzed for PCBs.

DISTRIBUTION Original and Pink copies accompany sample shipment to laboratory. Pink copy retained by laboratory. Yellow copy retained by samplers. Blue copy extra copy as needed

Airbill # 6137 68 7113
Haz. Airbill # 9823518541

T4-0351 * No p[illegible]

212 FRANK WEST CIRCLE
SUITE A
STOCKTON, CA 95206
PHONE: (209) 983-1340
FAX: 209-983-0304

4 March 1993

Ms. Paula Maclaren
Roy F. Weston, Inc.
Building 300, Suite 325
Atlanta Technology Center
1575 Northside Drive, NW
Atlanta, GA 30318-4208

RECEIVED
MAR 1 1993

Work Order No.00000-000-000-0

TDD#04-9302-0003-0704

RE: Jefferson Forest/Analytical Results
RFW Batch: 9302S099

Dear Ms. Maclaren:

Enclosed are the laboratory results for samples submitted to Weston Analytics Division.

Non-hazardous samples will be disposed of by the laboratory 30 days after the final report is issued at no charge. Hazardous samples which are inconsistent with laboratory waste streams will be returned to you.

If you have any questions, please call me at (209) 983-1340.

Very truly yours,

ROY F. WESTON, INC.

Laurie J. Cullen
Project Manager

LJC/paj

Enclosure

Approved by:

Irving M. Kipnis, Ph.D., C.I.H.
Laboratory Manager

WESTON

STANDARD - GLOSSARY OF DATA QUALIFIERS AND ABBREVIATIONS

RECEIVED
MAR 0 9 1993

Inorganic Data Qualifiers

U Analyte was not detected at or above the reporting limit

X Result obtained indirectly through calculation based on results from other analyses

Organic Data Qualifiers

B Compound was found in the blank and the sample

D Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis

E Concentration exceeds the instrument calibration range and was subsequently diluted

I Appears on the "results spreadsheet" to indicate an interference

J Result is an estimated value below the reporting limit or a tenatively identified compound (TIC)

T Compound was found in the TCLP extraction blank and the sample

U Compound was not detected at or above the reporting limit

Abbreviations

BS Blank Spike: spike analysis was conducted on reagent grade water or a matrix free from the analyte(s) of interest.

BSD Blank Spike Duplicate

BRL Below Reporting Limit

CD Calculation Factor used by the laboratory's Information Management System (LIMS)

DF Dilution Factor

DL Appears in the sample ID to indicate a secondary dilution was performed

LCS or (LC) denotes Laboratory Control Standard

MB Method Blank or (PB) preparation blank

MS Matrix Spike

MSD Matrix Spike Duplicate

NA Not Applicable

NR Not Required

NS Not Spiked

RE Appears in the sample ID to indicate a Re-analysis

REP Replicate analysis

REPREP Sample was reprepared and then reanalyzed

RFW# Equivalent to the laboratory sample identification (LAB ID)

RPD Relative Percent Difference of duplicate analyses

RRF Relative Response Factor

RT Retention Time

RTW Retention Time Window

NOTES:

- One or a combination of these data qualifiers and abbreviations may appear in the analytical report.
- Soil, sediment and sludge results are reported on a dry weight basis except when analyzed for landfill disposal or incineration parameters. All other results on a solid matrix are reported on an "as received" basis unless noted differently.
- Reporting limits are adjusted for preparation sample size, sample dilutions and sample moisture content if analyzed on a dry weight basis.

Revised 12/02/92

ROY F. WESTON, INC.
STOCKTON ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

MAR 0 9 1993

Client: JEFFERSON FOREST DRUM ST
RFW #: 9302S099

Test: GC/MS Volatiles

1. This narrative covers the analysis of 1 soil, 2 sediment and 3 oil samples for volatiles in accordance with EPA SW-846 Method 8240.

2. All required hold times were met.

3. The method blanks associated with these samples were free from target analyte interferences at or above the reporting limits.

4. The tuning and standard calibrations were within QC guidelines.

5. The internal standard areas and retention times were all within QC guidelines with the exception of the initial analysis of sample JCF-03 and JCF-03RE which had one low internal standard area. Matrix effects are indicated.

6. The surrogate recoveries were within laboratory limits with the exception of the reanalysis of sample JCF-03 and both initial and reanalysis of sample JCF-04.

7. The blank spike recoveries were within laboratory limits.

8. Methylene chloride reported in spikes was a lab contaminant.

9. Sample JCF-05 could not be run more concentrated due to high amounts of non-target compounds.

Walt McCurdy
W.C. McCurdy
Unit Leader

2-28-93
Date

Roy F. Weston, Inc. - Stockton Laboratory
VOA ANALYTICAL DATA PACKAGE FOR
JEFFERSON FOREST DRUM ST

DATE RECEIVED: 02/12/93 RFW LOT # :9302S099

CLIENT ID	RFW #		MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS	LIST
JCF-01	001		SE	93SMA044	02/10/93	02/19/93	02/19/93	0624HA
JCF-02	002		SE	93SMA044	02/10/93	02/19/93	02/19/93	0624HA
JCF-03	003		S	93SMA044	02/10/93	02/19/93	02/19/93	0624HA
JCF-03	003	R1	S	93SMA046	02/10/93	02/22/93	02/22/93	0624HA
JCF-04	004	M1	OI	93SMA050	02/10/93	02/24/93	02/24/93	0624HA
JCF-04	004	M2	OI	93SMA050	02/10/93	02/24/93	02/24/93	0624HA
JCF-05	005		OI	93SMA49A	02/10/93	02/24/93	02/24/93	0624HA
JCF-06	006	M1	OI	93SMA050	02/10/93	02/24/93	02/24/93	0624HA

LAB QC:

VBLKA044	MB1		S	93SMA044	02/19/93	02/19/93	02/19/93	0624HA
VBLKA044	MB1	BS	S	93SMA044	02/19/93	02/19/93	02/19/93	0624HA
VBLKA046	MB1		S	93SMA046	02/22/93	02/22/93	02/22/93	0624HA
VBLKA046	MB1	BS	S	93SMA046	02/22/93	02/22/93	02/22/93	0624HA
VBLKA050	MB1		S	93SMA050	02/24/93	02/24/93	02/24/93	0624HA
VBLK49A	MB1		S	93SMA49A	02/24/93	02/24/93	02/24/93	0624HA
VBLK49A	MB1	BS	S	93SMA49A	02/24/93	02/24/93	02/24/93	0624HA

Roy F. Weston, Inc. Stockton Laboratory
Volatiles by GC/MS, HSL List
Report Date: 02/26/93 15:59

RFW Batch Number: 9302S099 Client: JEFFERSON FOREST DRUM ST Work Order: 00000-000-000-0 Page: 1a

RECEIVED MAR 09 1993

Sample Information	Cust ID:	JCF-01	JCF-02	JCF-03	JCF-03	JCF-04	JCF-04
	RFW#:	001	099-002	099-003	099-003	099-004	099-004 DL
	Matrix:	SEDIMENT	SEDIMENT	SOIL	SOIL	OIL	OIL
	D.F.:	1.00	1.00	1.00	1.00	1.25	1.25
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	Level:	LOW	LOW	LOW	LOW REPREP	MED	MED
Surrogate Recovery	Toluene-d8	97 %	99 %	100 %	123 * %	70 * %	76 * %
	Bromofluorobenzene	83 %	97 %	75 %	86 %	76 %	80 %
	1,2-Dichloroethane-d4	108 %	119 %	107 %	116 %	69 * %	69 * %
Chloromethane		15 U	15 U	14 U	14 U	1200 U	NA
Bromomethane		15 U	15 U	14 U	14 U	1200 U	NA
Vinyl Chloride		15 U	15 U	14 U	14 U	1200 U	NA
Chloroethane		15 U	15 U	14 U	14 U	1200 U	NA
Methylene Chloride		5 J	3 J	7 U	2 JB	130 JB	300 JB
Acetone		15 U	15 U	14 U	14 U	1200 U	NA
Carbon Disulfide		8 U	8 U	7 U	7 U	620 U	NA
1,1-Dichloroethene		8 U	8 U	7 U	7 U	620 U	NA
1,1-Dichloroethane		8 U	8 U	7 U	7 U	620 U	NA
1,2-Dichloroethene (total)		8 U	8 U	7 U	7 U	620 U	NA
Chloroform		8 U	8 U	7 U	7 U	620 U	NA
1,2-Dichloroethane		8 U	8 U	7 U	7 U	620 U	NA
2-Butanone		15 U	15 U	14 U	14 U	1200 U	NA
1,1,1-Trichloroethane		8 U	8 U	7 U	7 U	620 U	NA
Carbon Tetrachloride		8 U	8 U	7 U	7 U	620 U	NA
Vinyl Acetate		15 U	15 U	14 U	14 U	1200 U	NA
Bromodichloromethane		8 U	8 U	7 U	7 U	620 U	NA
1,2-Dichloropropane		8 U	8 U	7 U	7 U	620 U	NA
cis-1,3-Dichloropropene		8 U	8 U	7 U	7 U	620 U	NA
Trichloroethene		8 U	8 U	7 U	7 U	620 U	NA
Dibromochloromethane		8 U	8 U	7 U	7 U	620 U	NA
1,1,2-Trichloroethane		8 U	8 U	7 U	7 U	620 U	NA
Benzene		8 U	8 U	7 U	7 U	620 U	NA
trans-1,3-Dichloropropene		8 U	8 U	7 U	7 U	620 U	NA
Bromoform		8 U	8 U	7 U	7 U	620 U	NA
4-Methyl-2-pentanone		15 U	15 U	14 U	14 U	1200 U	NA
2-Hexanone		15 U	15 U	14 U	14 U	1200 U	NA
Tetrachloroethene		8 U	8 U	7 U	7 U	620 U	NA
1,1,2,2-Tetrachloroethane		8 U	8 U	7 U	7 U	620 U	NA

*= Outside of Advisory limits.

RFW Bat Number: 9302S099 Client: JEFFERSON FORE DRUM ST Work Order: 00000-000-000-0 Pa : 1b

Cust ID:	JCF-01	JCF-02	JCF-03	JCF-03	JCF-04	JCF-04
RFW#:	001	099-002	099-003	099-003	099-004	099-004 DL
Level:	LOW	LOW	LOW	LOW REPREP	MED	MED
Toluene	8 U	8 U	7 U	7 U	56 J	NA
Chlorobenzene	8 U	8 U	7 U	7 U	620 U	NA
Ethylbenzene	8 U	8 U	7 U	7 U	3100	3300
Styrene	8 U	8 U	7 U	7 U	620 U	NA
Xylene (total)	8 U	8 U	7 U	7 U	14000	14000

*= Outside of Advisory limits.

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Roy F. Weston, Inc. **Stockton Laboratory**

Volatiles by GC/MS, HSL List

RFW Batch Number: 9302S099 Client: JEFFERSON FOREST DRUM ST Work Order: 00000-000-000-0

Report Date: 02/26/93 15:59

Sample Information						
Cust ID:	JCF-05	JCF-06	VBLKA044	VBLKA044 BS	VBLKA046	VBLKA046 BS
RFW#:	099-005	099-006	93SMA044-MB1	93SMA044-MB1	93SMA046-MB1	93SMA046-MB1
Matrix:	OIL	OIL	SOIL	SOIL	SOIL	SOIL
D.F.:	20.0	1.25	1.00	1.00	1.00	1.00
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Level:	LOW	MED	LOW	LOW	LOW	LOW

Surrogate Recovery						
Toluene-d8	100 %	88 %	99 %	107 %	104 %	107 %
Bromofluorobenzene	108 %	94 %	89 %	105 %	89 %	117 %
1,2-Dichloroethane-d4	104 %	95 %	102 %	108 %	111 %	113 %

Chloromethane	200 U	1200 U	10 U	10 U	10 U	10 U
Bromomethane	200 U	1200 U	10 U	10 U	10 U	10 U
Vinyl Chloride	200 U	1200 U	10 U	10 U	10 U	10 U
Chloroethane	200 U	1200 U	10 U	10 U	10 U	10 U
Methylene Chloride	100 U	660 B	5 U	40	4 J	46 B
Acetone	200 U	1200 U	10 U	10 U	10 U	10 U
Carbon Disulfide	100 U	620 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	100 U	620 U	5 U	122 %	5 U	124 %
1,1-Dichloroethane	100 U	620 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	100 U	620 U	5 U	5 U	5 U	5 U
Chloroform	100 U	620 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	100 U	620 U	5 U	5 U	5 U	5 U
2-Butanone	200 U	1200 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	100 U	620 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	100 U	620 U	5 U	5 U	5 U	5 U
Vinyl Acetate	200 U	1200 U	10 U	10 U	10 U	10 U
Bromodichloromethane	100 U	620 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	100 U	620 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	100 U	620 U	5 U	5 U	5 U	5 U
Trichloroethene	100 U	620 U	5 U	102 %	5 U	114 %
Dibromochloromethane	100 U	620 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	100 U	620 U	5 U	5 U	5 U	5 U
Benzene	100 U	620 U	5 U	106 %	5 U	107 %
trans-1,3-Dichloropropene	100 U	620 U	5 U	5 U	5 U	5 U
Bromoform	100 U	620 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	200 U	1200 U	10 U	10 U	10 U	10 U
2-Hexanone	200 U	1200 U	10 U	10 U	10 U	10 U
Tetrachloroethene	100 U	620 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	100 U	620 U	5 U	5 U	5 U	5 U

*= Outside of Advisory limits.

RFW Bat Number: 9302S099 Client: JEFFERSON FORE DRUM ST Work Order: 00000-000-000-0 Page: 2b

Cust ID:	JCF-05		JCF-06		VBLKA044		VBLKA044 BS		VBLKA046		VBLKA046 BS	
RFW#:	099-005		099-006		93SMA044-MB1		93SMA044-MB1		93SMA046-MB1		93SMA046-MB1	
Level:	LOW		MED		LOW		LOW		LOW		LOW	
Toluene	100	U	620	U	5	U	105	%	5	U	110	%
Chlorobenzene	100	U	620	U	5	U	102	%	5	U	111	%
Ethylbenzene	100	U	620	U	5	U	5	U	5	U	5	U
Styrene	100	U	620	U	5	U	5	U	5	U	5	U
Xylene (total)	100	U	620	U	5	U	5	U	5	U	5	U

*= Outside of Advisory limits.

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Roy F. Weston, Inc. Stockton Laboratory
Volatiles by GC/MS, HSL List
Report Date: 02/26/93 15:59

RFW Batch Number: 9302S099 Client: JEFFERSON FOREST DRUM ST Work Order: 00000-000-000-0 Page: 3a

MAR 0 9 1993

Sample Information

Cust ID:	VBLK49A	VBLK49A BS	VBLKA050
RFW#:	93SMA49A-MB1	93SMA49A-MB1	93SMA050-MB1
Matrix:	SOIL	SOIL	SOIL
D.F.:	1.00	1.00	1.25
Units:	ug/Kg	ug/Kg	ug/Kg
Level:	LOW	LOW	MED

Surrogate Recovery	Toluene-d8	109	%	106	%	106	%
	Bromofluorobenzene	113	%	104	%	108	%
	1,2-Dichloroethane-d4	101	%	100	%	92	%
Chloromethane		10	U	10	U	1200	U
Bromomethane		10	U	10	U	1200	U
Vinyl Chloride		10	U	10	U	1200	U
Chloroethane		10	U	10	U	1200	U
Methylene Chloride		3	J	5	U	790	
Acetone		10	U	10	U	1200	U
Carbon Disulfide		5	U	5	U	620	U
1,1-Dichloroethene		5	U	97	%	620	U
1,1-Dichloroethane		5	U	5	U	620	U
1,2-Dichloroethene (total)		5	U	5	U	620	U
Chloroform		5	U	5	U	620	U
1,2-Dichloroethane		5	U	5	U	620	U
2-Butanone		10	U	10	U	1200	U
1,1,1-Trichloroethane		5	U	5	U	620	U
Carbon Tetrachloride		5	U	5	U	620	U
Vinyl Acetate		10	U	10	U	1200	U
Bromodichloromethane		5	U	5	U	620	U
1,2-Dichloropropane		5	U	5	U	620	U
cis-1,3-Dichloropropene		5	U	5	U	620	U
Trichloroethene		5	U	93	%	620	U
Dibromochloromethane		5	U	5	U	620	U
1,1,2-Trichloroethane		5	U	5	U	620	U
Benzene		5	U	96	%	620	U
trans-1,3-Dichloropropene		5	U	5	U	620	U
Bromoform		5	U	5	U	620	U
4-Methyl-2-pentanone		10	U	10	U	1200	U
2-Hexanone		10	U	10	U	1200	U
Tetrachloroethene		5	U	5	U	620	U
1,1,2,2-Tetrachloroethane		5	U	5	U	620	U

*= Outside of Advisory limits.

RFW Bat Number: 9302S099 Client: JEFFERSON FORE: DRUM ST Work Order: 00000-000-000-0 Pa . 3b

Cust ID:	VBLK49A		VBLK49A BS		VBLKA050	
RFW#:	93SMA49A-MB1		93SMA49A-MB1		93SMA050-MB1	
Level:	LOW		LOW		MED	
Toluene	5	U	104	%	620	U
Chlorobenzene	5	U	99	%	620	U
Ethylbenzene	5	U	5	U	620	U
Styrene	5	U	5	U	620	U
Xylene (total)	5	U	5	U	620	U

*= Outside of Advisory limits.

MAR 0 9 1993

ROY F. WESTON, INC.
STOCKTON ANALYTICAL LABORATORY
ANALYTICAL CASE NARRATIVE

Client: JEFFERSON FOREST DRUM ST
RFW #: 9302S099

Test: GC/MS SEMIVOLATILES

1. This narrative covers the analysis of 2 sediment and 4 oil samples for semivolatiles in accordance with EPA SW-846 Method 8270. Sample JCF-05 had both oil and water phases, and both phases were analyzed separately.

2. All required analytical hold times were met.

3. The method blanks associated with these samples were free from target analyte interferences at or above the reporting limits.

4. The tuning and standard calibrations were within QC guidelines.

5. The internal standard areas and retention times were all within QC guidelines, with the exceptions of JCF-05 (water and oil phases) and JCF-06, which each had one or more low standard recoveries. All were analyzed at two dilutions, and matrix effects were shown. JCF-04 also had a low standard, but no target compounds were affected, so a reanalysis was not performed.

6. The surrogate recoveries were within laboratory limits, although 4 surrogates were diluted out in sample JCF-05DL. Surrogates were not used in samples JCF-06 and JCF-05 (soil phase only).

7. The blank spike recoveries and RPD values were within laboratory limits.

Walter McCurdy
W.C. McCurdy
Unit Leader

3-4-93
Date

Roy F. Weston, Inc. - Stockton Laboratory
BNA ANALYTICAL DATA PACKAGE FOR
JEFFERSON FOREST DRUM ST

DATE RECEIVED: 02/12/93 RFW LOT # :9302S099

CLIENT ID	RFW #		MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS	LIST
JCF-01	001		SE	93SE1810	02/10/93	02/18/93	02/23/93	0625HA
JCF-02	002		SE	93SE1810	02/10/93	02/18/93	02/24/93	0625HA
JCF-03	003		S	93SE1829	02/10/93	02/23/93	03/02/93	0625HA
JCF-04	004		W	93SE1849	02/10/93	03/01/93	03/02/93	0625HA
JCF-05	005		W	93SE1849	02/10/93	03/01/93	03/02/93	0625HA
JCF-05	005	01	W	93SE1849	02/10/93	03/01/93	03/02/93	0625HA
JCF-06	006		OI	93SE1850	02/10/93	03/01/93	03/03/93	0625HD
JCF-06	006	01	OI	93SE1850	02/10/93	03/01/93	03/02/93	0625HD
JCF-05/OIL	007		OI	93SE1850	02/10/93	03/01/93	03/03/93	0625HD
JCF-05/OIL	007	01	OI	93SE1850	02/10/93	03/01/93	03/02/93	0625HD

LAB QC:

SBLK1810	MB1		S	93SE1810	02/18/93	02/18/93	02/23/93	0625HA
SBLK1810	MB1	BS	S	93SE1810	02/18/93	02/18/93	02/23/93	0625HA
SBLK1829	MB1		S	93SE1829	02/23/93	02/23/93	03/02/93	0625HA
SBLK1829	MB1	BS	S	93SE1829	02/23/93	02/23/93	03/02/93	0625HA
SBLK1849	MB1		W	93SE1849	03/01/93	03/01/93	03/02/93	0625HA
SBLK1849	MB1	BS	W	93SE1849	03/01/93	03/01/93	03/02/93	0625HA
SBLK1850	MB1		S	93SE1850	03/01/93	03/01/93	03/02/93	0625HD

Roy F. Weston, Inc. Stockton Laboratory

Semivolatiles by GC/MS, HSL List

RFW Batch Number: 93SE1810 Client: LAB Work Order: NONE

Report Date: 03/04/93 14:11

Page: 1a

MAR 09 1993

	Cust ID:	SBLK1810		SBLK1829		SBLK1849		SBLK1810 BS		SBLK1829 BS		SBLK1849 BS	
Sample Information	RFW#:	MB1		93SE1829-MB1		93SE1849-MB1		93SE1810-MB1		93SE1829-MB1		93SE1849-MB1	
	Matrix:	SOIL		SOIL		WATER		SOIL		SOIL		WATER	
	D.F.:	2.00		1.00		1.00		1.00		1.00		1.00	
	Units:	ug/Kg		ug/Kg		ug/L		ug/Kg		ug/Kg		ug/L	
Surrogate Recovery	Nitrobenzene-d5	90	%	84	%	78	%	81	%	79	%	90	%
	2-Fluorobiphenyl	102	%	86	%	66	%	87	%	81	%	68	%
	Terphenyl-d14	113	%	80	%	70	%	107	%	77	%	76	%
	Phenol-d5	104	%	80	%	37	%	82	%	71	%	36	%
	2-Fluorophenol	77	%	72	%	39	%	72	%	69	%	47	%
	2,4,6-Tribromophenol	89	%	73	%	68	%	86	%	74	%	66	%
Phenol		670	U	330	U	10	U	76	%	67	%	31	%
bis(2-Chloroethyl)ether		670	U	330	U	10	U	330	U	330	U	10	U
2-Chlorophenol		670	U	330	U	10	U	78	%	65	%	66	%
1,3-Dichlorobenzene		670	U	330	U	10	U	330	U	330	U	10	U
1,4-Dichlorobenzene		670	U	330	U	10	U	75	%	74	%	70	%
Benzyl alcohol		670	U	330	U	10	U	330	U	330	U	10	U
1,2-Dichlorobenzene		670	U	330	U	10	U	330	U	330	U	10	U
2-Methylphenol		670	U	330	U	10	U	330	U	330	U	10	U
bis(2-Chloroisopropyl)ether		670	U	330	U	10	U	330	U	330	U	10	U
4-Methylphenol		670	U	330	U	10	U	330	U	330	U	10	U
N-Nitroso-di-n-propylamine		670	U	330	U	10	U	79	%	82	%	83	%
Hexachloroethane		670	U	330	U	10	U	330	U	330	U	10	U
Nitrobenzene		670	U	330	U	10	U	330	U	330	U	10	U
Isophorone		670	U	330	U	10	U	330	U	330	U	10	U
2-Nitrophenol		670	U	330	U	10	U	330	U	330	U	10	U
2,4-Dimethylphenol		670	U	330	U	10	U	330	U	330	U	10	U
Benzoic acid		3300	U	1700	U	50	U	1700	U	1700	U	50	U
bis(2-Chloroethoxy)methane		670	U	330	U	10	U	330	U	330	U	10	U
2,4-Dichlorophenol		670	U	330	U	10	U	330	U	330	U	10	U
1,2,4-Trichlorobenzene		670	U	330	U	10	U	83	%	69	%	66	%
Naphthalene		670	U	330	U	10	U	330	U	330	U	10	U
4-Chloroaniline		670	U	330	U	10	U	330	U	330	U	10	U
Hexachlorobutadiene		670	U	330	U	10	U	330	U	330	U	10	U
4-Chloro-3-methylphenol		670	U	330	U	10	U	79	%	61	%	71	%
2-Methylnaphthalene		670	U	330	U	10	U	330	U	330	U	10	U
Hexachlorocyclopentadiene		670	U	330	U	10	U	330	U	330	U	10	U

*= Outside of Advisory limits.

RFW Bat Number: 93SE1810 Client: LAB Work Order: NONE P. : 1b

Cust ID:	SBLK1810		SBLK1829		SBLK1849		SBLK1810 BS		SBLK1829 BS		SBLK1849 BS	
RFW#:	MB1		93SE1829-MB1		93SE1849-MB1		93SE1810-MB1		93SE1829-MB1		93SE1849-MB1	
2,4,6-Trichlorophenol	670	U	330	U	10	U	330	U	330	U	10	U
2,4,5-Trichlorophenol	3300	U	1700	U	50	U	1700	U	1700	U	50	U
2-Chloronaphthalene	670	U	330	U	10	U	330	U	330	U	10	U
2-Nitroaniline	3300	U	1700	U	50	U	1700	U	1700	U	50	U
Dimethylphthalate	670	U	330	U	10	U	330	U	330	U	10	U
Acenaphthylene	670	U	330	U	10	U	330	U	330	U	10	U
2,6-Dinitrotoluene	670	U	330	U	10	U	330	U	330	U	10	U
3-Nitroaniline	3300	U	1700	U	50	U	1700	U	1700	U	50	U
Acenaphthene	670	U	330	U	10	U	85	%	72	%	74	%
2,4-Dinitrophenol	3300	U	1700	U	50	U	1700	U	1700	U	50	U
4-Nitrophenol	3300	U	1700	U	50	U	101	%	75	%	40	%
Dibenzofuran	670	U	330	U	10	U	330	U	330	U	10	U
2,4-Dinitrotoluene	670	U	330	U	10	U	86	%	80	%	76	%
Diethylphthalate	670	U	330	U	10	U	330	U	330	U	10	U
4-Chlorophenyl-phenylether	670	U	330	U	10	U	330	U	330	U	10	U
Fluorene	670	U	330	U	10	U	330	U	330	U	10	U
4-Nitroaniline	3300	U	1700	U	50	U	1700	U	1700	U	50	U
4,6-Dinitro-2-methylphenol	3300	U	1700	U	50	U	1700	U	1700	U	50	U
N-Nitrosodiphenylamine (1)	670	U	330	U	10	U	330	U	330	U	10	U
4-Bromophenyl-phenylether	670	U	330	U	10	U	330	U	330	U	10	U
Hexachlorobenzene	670	U	330	U	10	U	330	U	330	U	10	U
Pentachlorophenol	3300	U	1700	U	50	U	87	%	66	%	63	%
Phenanthrene	670	U	330	U	10	U	330	U	330	U	10	U
Anthracene	670	U	330	U	10	U	330	U	330	U	10	U
Di-n-butylphthalate	670	U	330	U	10	U	330	U	330	U	10	U
Fluoranthene	670	U	330	U	10	U	330	U	330	U	10	U
Pyrene	670	U	330	U	10	U	103	%	72	%	82	%
Butylbenzylphthalate	670	U	330	U	10	U	330	U	330	U	10	U
3,3'-Dichlorobenzidine	1300	U	670	U	20	U	670	U	670	U	20	U
Benzo(a)anthracene	670	U	330	U	10	U	330	U	330	U	10	U
Chrysene	670	U	330	U	10	U	330	U	330	U	10	U
bis(2-Ethylhexyl)phthalate	670	U	330	U	10	U	330	U	330	U	10	U
Di-n-octylphthalate	670	U	330	U	10	U	330	U	330	U	10	U
Benzo(b)fluoranthene	670	U	330	U	10	U	330	U	330	U	10	U
Benzo(k)fluoranthene	670	U	330	U	10	U	330	U	330	U	10	U
Benzo(a)pyrene	670	U	330	U	10	U	330	U	330	U	10	U
Indeno(1,2,3-cd)pyrene	670	U	330	U	10	U	330	U	330	U	10	U
Dibenz(a,h)anthracene	670	U	330	U	10	U	330	U	330	U	10	U
Benzo(g,h,i)perylene	670	U	330	U	10	U	330	U	330	U	10	U

(1) - Cannot be separated from Diphenylamine. *= Outside of Advisory limits.

Roy F. Weston, Inc. Stockton Laboratory
Semivolatiles by GC/MS, HSL List

RFW Batch Number: 93SE1810 Client: LAB Work Order: NONE Report Date: 03/04/93 14:11 Page: 2a

MAR 09 1993

Sample Information	Cust ID:	JCF-01	JCF-02	JCF-03	JCF-04	JCF-05	JCF-05
	RFW#:	099-001	099-002	099-003	099-004	099-005	099-005 DL
	Matrix:	SEDIMENT	SEDIMENT	SOIL	WATER	WATER	WATER
	D.F.:	2.00	2.00	1.00	4.00	4.00	100
	Units:	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L

Surrogate Recovery													
Nitrobenzene-d5	89	%	90	%	87	%	97	%	69	%	D	%
2-Fluorobiphenyl	103	%	101	%	91	%	108	%	103	%	D	%
Terphenyl-d14	97	%	98	%	98	%	139	%	117	%	D	%
Phenol-d5	97	%	95	%	85	%	53	%	20	%	D	%
2-Fluorophenol	75	%	78	%	70	%	61	%	22	%	86	%
2,4,6-Tribromophenol	86	%	93	%	81	%	87	%	62	%	102	%

Phenol	1000	U	990	U	460	U	400	U	270	J	NA	
bis(2-Chloroethyl)ether	1000	U	990	U	460	U	400	U	400	U	NA	
2-Chlorophenol	1000	U	990	U	460	U	400	U	400	U	NA	
1,3-Dichlorobenzene	1000	U	990	U	460	U	400	U	400	U	NA	
1,4-Dichlorobenzene	1000	U	990	U	460	U	400	U	400	U	NA	
Benzyl alcohol	1000	U	990	U	460	U	400	U	400	U	NA	
1,2-Dichlorobenzene	1000	U	990	U	460	U	400	U	400	U	NA	
2-Methylphenol	1000	U	990	U	460	U	400	U	400	U	NA	
bis(2-Chloroisopropyl)ether	1000	U	990	U	460	U	400	U	400	U	NA	
4-Methylphenol	1000	U	990	U	460	U	400	U	400	U	NA	
N-Nitroso-di-n-propylamine	1000	U	990	U	460	U	400	U	400	U	NA	
Hexachloroethane	1000	U	990	U	460	U	400	U	400	U	NA	
Nitrobenzene	1000	U	990	U	460	U	400	U	400	U	NA	
Isophorone	1000	U	990	U	460	U	400	U	400	U	NA	
2-Nitrophenol	1000	U	990	U	460	U	400	U	400	U	NA	
2,4-Dimethylphenol	1000	U	990	U	460	U	400	U	400	U	NA	
Benzoic acid	5000	U	4900	U	2300	U	2000	U	1100	J	2600	
bis(2-Chloroethoxy)methane	1000	U	990	U	460	U	400	U	400	U	NA	
2,4-Dichlorophenol	1000	U	990	U	460	U	400	U	400	U	NA	
1,2,4-Trichlorobenzene	1000	U	990	U	460	U	400	U	400	U	NA	
Naphthalene	1000	U	990	U	460	U	350	J	400	U	NA	
4-Chloroaniline	1000	U	990	U	460	U	400	U	400	U	NA	
Hexachlorobutadiene	1000	U	990	U	460	U	400	U	400	U	NA	
4-Chloro-3-methylphenol	1000	U	990	U	460	U	400	U	400	U	NA	
2-Methylnaphthalene	1000	U	990	U	460	U	350	J	400	U	NA	
Hexachlorocyclopentadiene	1000	U	990	U	460	U	400	U	400	U	NA	

*= Outside of Advisory limits.

RFW Bat Number: 93SE1810 Client: LAB Work Order: NONE P 2b

Cust ID:	JCF-01		JCF-02		JCF-03		JCF-04		JCF-05		JCF-05	
RFW#:	099-001		099-002		099-003		099-004		099-005		099-005 DL	
2,4,6-Trichlorophenol	1000	U	990	U	460	U	400	U	400	U	NA	
2,4,5-Trichlorophenol	5000	U	4900	U	2300	U	2000	U	2000	U	NA	
2-Chloronaphthalene	1000	U	990	U	460	U	400	U	400	U	NA	
2-Nitroaniline	5000	U	4900	U	2300	U	2000	U	2000	U	NA	
Dimethylphthalate	1000	U	990	U	460	U	400	U	400	U	NA	
Acenaphthylene	1000	U	990	U	460	U	400	U	400	U	NA	
2,6-Dinitrotoluene	1000	U	990	U	460	U	400	U	400	U	NA	
3-Nitroaniline	5000	U	4900	U	2300	U	2000	U	2000	U	NA	
Acenaphthene	1000	U	990	U	460	U	400	U	400	U	NA	
2,4-Dinitrophenol	5000	U	4900	U	2300	U	2000	U	2000	U	NA	
4-Nitrophenol	5000	U	4900	U	2300	U	2000	U	2000	U	NA	
Dibenzofuran	1000	U	990	U	460	U	400	U	400	U	NA	
2,4-Dinitrotoluene	1000	U	990	U	460	U	400	U	400	U	NA	
Diethylphthalate	1000	U	990	U	460	U	400	U	400	U	NA	
4-Chlorophenyl-phenylether	1000	U	990	U	460	U	400	U	400	U	NA	
Fluorene	1000	U	990	U	460	U	400	U	400	U	NA	
4-Nitroaniline	5000	U	4900	U	2300	U	2000	U	2000	U	NA	
4,6-Dinitro-2-methylphenol	5000	U	4900	U	2300	U	2000	U	2000	U	NA	
N-Nitrosodiphenylamine (1)	1000	U	990	U	460	U	400	U	400	U	NA	
4-Bromophenyl-phenylether	1000	U	990	U	460	U	400	U	400	U	NA	
Hexachlorobenzene	1000	U	990	U	460	U	400	U	400	U	NA	
Pentachlorophenol	5000	U	4900	U	2300	U	2000	U	2000	U	NA	
Phenanthrene	1000	U	990	U	100	J	200	J	400	U	NA	
Anthracene	1000	U	990	U	460	U	400	U	400	U	NA	
Di-n-butylphthalate	1000	U	990	U	460	U	400	U	400	U	NA	
Fluoranthene	1000	U	990	U	110	J	400	U	400	U	NA	
Pyrene	1000	U	990	U	110	J	400	U	400	U	NA	
Butylbenzylphthalate	1000	U	990	U	460	U	400	U	400	U	NA	
3,3'-Dichlorobenzidine	2000	U	2000	U	920	U	800	U	800	U	NA	
Benzo(a)anthracene	1000	U	990	U	460	U	400	U	400	U	NA	
Chrysene	1000	U	990	U	460	U	400	U	400	U	NA	
bis(2-Ethylhexyl)phthalate	1000	U	990	U	280	J	310	J	400	U	NA	
Di-n-octylphthalate	1000	U	990	U	460	U	400	U	400	U	NA	
Benzo(b)fluoranthene	1000	U	990	U	460	U	400	U	400	U	NA	
Benzo(k)fluoranthene	1000	U	990	U	460	U	400	U	400	U	NA	
Benzo(a)pyrene	1000	U	990	U	460	U	400	U	400	U	NA	
Indeno(1,2,3-cd)pyrene	1000	U	990	U	460	U	400	U	400	U	NA	
Dibenz(a,h)anthracene	1000	U	990	U	460	U	400	U	400	U	NA	
Benzo(g,h,i)perylene	1000	U	990	U	51	J	400	U	400	U	NA	

(1) - Cannot be separated from Diphenylamine. *= Outside of Advisory limits.

MAR 0 9 1993

Roy F. Weston, Inc. Stockton Laboratory
Semivolatiles by GC/MS, HSL List
Report Date: 03/04/93 13:52

RFW Batch Number: 9302S099 Client: JEFFERSON FOREST DRUM ST Work Order: 00000-000-000-0 Page: 1a

MAR 0 9 1993

Sample Information					
Cust ID:	JCF-06	JCF-06	JCF-05/OIL	JCF-05/OIL	SBLK1850
RFW#:	006	006 DL	099-007	099-007 DL	93SE1850-MB1
Matrix:	OIL	OIL	OIL	OIL	SOIL
D.F.:	20.0	100	20.0	100	10.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg

Phenol	200000	U	NA	200000	U	NA	100000	U		
bis(2-Chloroethyl)ether	200000	U	NA	200000	U	NA	100000	U		
2-Chlorophenol	200000	U	NA	200000	U	NA	100000	U		
1,3-Dichlorobenzene	200000	U	NA	200000	U	NA	100000	U		
1,4-Dichlorobenzene	200000	U	NA	200000	U	NA	100000	U		
Benzyl alcohol	200000	U	NA	200000	U	NA	100000	U		
1,2-Dichlorobenzene	200000	U	NA	200000	U	NA	100000	U		
2-Methylphenol	200000	U	NA	200000	U	NA	100000	U		
bis(2-Chloroisopropyl)ether	200000	U	NA	200000	U	NA	100000	U		
4-Methylphenol	200000	U	NA	200000	U	NA	100000	U		
N-Nitroso-di-n-propylamine	200000	U	NA	200000	U	NA	100000	U		
Hexachloroethane	200000	U	NA	200000	U	NA	100000	U		
Nitrobenzene	200000	U	NA	200000	U	NA	100000	U		
Isophorone	200000	U	NA	200000	U	NA	100000	U		
2-Nitrophenol	200000	U	NA	200000	U	NA	100000	U		
2,4-Dimethylphenol	200000	U	NA	200000	U	NA	100000	U		
Benzoic acid	1000000	U	NA	1000000	U	NA	500000	U		
bis(2-Chloroethoxy)methane	200000	U	NA	200000	U	NA	100000	U		
2,4-Dichlorophenol	200000	U	NA	200000	U	NA	100000	U		
1,2,4-Trichlorobenzene	200000	U	NA	200000	U	NA	100000	U		
Naphthalene	200000	U	NA	200000	U	NA	100000	U		
4-Chloroaniline	200000	U	NA	200000	U	NA	100000	U		
Hexachlorobutadiene	200000	U	NA	200000	U	NA	100000	U		
4-Chloro-3-methylphenol	200000	U	NA	200000	U	NA	100000	U		
2-Methylnaphthalene	200000	U	NA	200000	U	NA	100000	U		
Hexachlorocyclopentadiene	200000	U	NA	200000	U	NA	100000	U		
2,4,6-Trichlorophenol	200000	U	NA	200000	U	NA	100000	U		
2,4,5-Trichlorophenol	1000000	U	NA	1000000	U	NA	500000	U		
2-Chloronaphthalene	200000	U	NA	200000	U	NA	100000	U		
2-Nitroaniline	1000000	U	NA	1000000	U	NA	500000	U		
Dimethylphthalate	200000	U	NA	200000	U	NA	100000	U		
Acenaphthylene	200000	U	NA	200000	U	NA	100000	U		

*= Outside of Advisory limits.

RFW Bat Number: 9302S099 Client: JEFFERSON FORE DRUM ST Work Order: 00000-000-000-0 P. : 1b

Cust ID:	JCF-06		JCF-06	JCF-05/OIL		JCF-05/OIL	SBLK1850	
RFW#	006		006 DL	099-007		099-007 DL	93SE1850-MB1	
2,6-Dinitrotoluene	200000	U	NA	200000	U	NA	100000	U
3-Nitroaniline	1000000	U	NA	1000000	U	NA	500000	U
Acenaphthene	200000	U	NA	200000	U	NA	100000	U
2,4-Dinitrophenol	1000000	U	NA	1000000	U	NA	500000	U
4-Nitrophenol	1000000	U	NA	1000000	U	NA	500000	U
Dibenzofuran	200000	U	NA	200000	U	NA	100000	U
2,4-Dinitrotoluene	200000	U	NA	200000	U	NA	100000	U
Diethylphthalate	200000	U	NA	200000	U	NA	100000	U
4-Chlorophenyl-phenylether	200000	U	NA	200000	U	NA	100000	U
Fluorene	200000	U	NA	200000	U	NA	100000	U
4-Nitroaniline	1000000	U	NA	1000000	U	NA	500000	U
4,6-Dinitro-2-methylphenol	1000000	U	NA	1000000	U	NA	500000	U
N-Nitrosodiphenylamine (1)	200000	U	NA	200000	U	NA	100000	U
4-Bromophenyl-phenylether	200000	U	NA	200000	U	NA	100000	U
Hexachlorobenzene	200000	U	NA	200000	U	NA	100000	U
Pentachlorophenol	1000000	U	NA	1000000	U	NA	500000	U
Phenanthrene	200000	U	NA	200000	U	NA	100000	U
Anthracene	200000	U	NA	200000	U	NA	100000	U
Di-n-butylphthalate	200000	U	NA	200000	U	NA	100000	U
Fluoranthene	200000	U	NA	200000	U	NA	100000	U
Pyrene	200000	U	NA	200000	U	NA	100000	U
Butylbenzylphthalate	200000	U	NA	200000	U	NA	100000	U
3,3'-Dichlorobenzidine	400000	U	NA	400000	U	NA	200000	U
Benzo(a)anthracene	200000	U	NA	200000	U	NA	100000	U
Chrysene	200000	U	NA	200000	U	NA	100000	U
bis(2-Ethylhexyl)phthalate	200000	U	NA	200000	U	NA	100000	U
Di-n-octylphthalate	200000	U	NA	200000	U	NA	100000	U
Benzo(b)fluoranthene	200000	U	NA	200000	U	NA	100000	U
Benzo(k)fluoranthene	200000	U	NA	200000	U	NA	100000	U
Benzo(a)pyrene	200000	U	NA	200000	U	NA	100000	U
Indeno(1,2,3-cd)pyrene	200000	U	NA	200000	U	NA	100000	U
Dibenz(a,h)anthracene	200000	U	NA	200000	U	NA	100000	U
Benzo(g,h,i)perylene	200000	U	NA	200000	U	NA	100000	U

(1) - Cannot be separated from Diphenylamine. *= Outside of Advisory limits.

MAR 09 1993

ROY F. WESTON, INC.
STOCKTON LABORATORY
INORGANIC CASE NARRATIVE

Client: Jefferson Forest Drum ST
RFW#: 9302S099

W.O.#: 00000-000-000-0000-00
Date Rec'd: 02/12/93

Inorganics Case Narrative

1. Analyses completed in accordance with method 9010 with any exceptions noted below.

2. The analytical holding time for these analyses was met.

3. Calibration criteria was met for these analyses.

4. The method blank associated with these samples did not contain any target analyte at, or above, the reporting limits.

5. Blank spike recoveries were within Laboratory QC limits.

T. L. Hammonds
Inorganic Section Manager

February 25, 1993
Date

WESTON

MAR 0 9 1993

Roy F. Weston, Inc. - Stockton Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
JEFFERSON FOREST DRUM ST

DATE RECEIVED: 02/12/93 RFW LOT # :9302S099

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
JCF-01						
% SOLIDS	001	SE	93STS517	02/10/93	02/19/93	02/19/93
TOTAL CYANIDE	001	SE	93SCN024	02/10/93	02/23/93	02/23/93
TOTAL CYANIDE	001 MS	SE	93SCN024	02/10/93	02/23/93	02/23/93
TOTAL CYANIDE	001 MSD	SE	93SCN024	02/10/93	02/23/93	02/23/93
JCF-02						
% SOLIDS	002	SE	93STS517	02/10/93	02/19/93	02/19/93
TOTAL CYANIDE	002	SE	93SCN024	02/10/93	02/23/93	02/23/93
JCF-03						
% SOLIDS	003	S	93STS520	02/10/93	02/23/93	02/23/93
% SOLIDS	003 REP	S	93STS520	02/10/93	02/23/93	02/23/93
TOTAL CYANIDE	003	S	93SCN024	02/10/93	02/23/93	02/23/93
JCF-04						
TOTAL CYANIDE	004	OI	93SCN024	02/10/93	02/23/93	02/23/93
TOTAL CYANIDE	004 MS	OI	93SCN024	02/10/93	02/23/93	02/23/93
TOTAL CYANIDE	004 MSD	OI	93SCN024	02/10/93	02/23/93	02/23/93
JCF-05						
TOTAL CYANIDE	005	OI	93SCN024	02/10/93	02/23/93	02/23/93
JCF-06						
TOTAL CYANIDE	006	OI	93SCN024	02/10/93	02/23/93	02/23/93

LAB QC:

% SOLIDS	MB1	W	93STS517	02/19/93	02/19/93	02/19/93
TOTAL CYANIDE	LC1 L	S	93SCN024	02/23/93	02/23/93	02/23/93
TOTAL CYANIDE	LC2 L	S	93SCN024	02/23/93	02/23/93	02/23/93
TOTAL CYANIDE	MB1	S	93SCN024	02/23/93	02/23/93	02/23/93
% SOLIDS	MB1	W	93STS520	02/23/93	02/23/93	02/23/93

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 02/26/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	JCF-01	% Solids	66.5	%	0.10
		Cyanide, Total	0.50 u	MG/KG	0.50
-002	JCF-02	% Solids	67.6	%	0.10
		Cyanide, Total	0.50 u	MG/KG	0.50
-003	JCF-03	% Solids	72.5	%	0.10
		Cyanide, Total	0.91	MG/KG	0.50
-004	JCF-04	Cyanide, Total	1.4	MG/KG	0.50
-005	JCF-05	Cyanide, Total	0.50 u	MG/KG	0.50
-006	JCF-06	Cyanide, Total	0.50 u	MG/KG	0.50

ROY F. WESTON INC.

INORGANIC METHOD BLANK DATA SUMMARY PAGE 02/26/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
BLANK10	93STS517-MB1	% Solids	0.10 u	%	0.10
BLANK10	93SCN024-MB1	Cyanide, Total	0.50 u	MG/KG	0.50
BLANK10	93STS520-MB1	% Solids	0.10 u	%	0.10

ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 02/26/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE		SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV
-001	JCF-01	Cyanide, Total		4.6	0.50u	5.0	91.1
		Cyanide, Total	MSD	5.0	0.50u	5.0	99.2
-004	JCF-04	Cyanide, Total		6.0	1.4	5.0	92.1
		Cyanide, Total	MSD	5.8	1.4	5.0	88.1

ROY F. WESTON INC.

INORGANIC DUPLICATE SPIKE REPORT 02/26/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%RPD
-001	JCF-01	Cyanide, Total	91.1	99.2	8.5
-004	JCF-04	Cyanide, Total	92.1	88.1	4.5
LCS20	93SCN024-LC2	Cyanide, Total LCS	98.7	99.2	0.51

ROY F. WESTON INC.

INORGANIC PRECISION REPORT 02/26/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	%RPD
-003REP	JCF-03	% Solids	72.5	73.4	1.2

ROY F. WESTON INC.

INORGANIC LABORATORY CONTROL STANDARDS REPORT 02/26/93

MAR 0 9 1993

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS10	93SCN024-LC1	Cyanide, Total LCS	4.9	5.0	MG/KG	98.7
LCS20	93SCN024-LC2	Cyanide, Total LCS	5.0	5.0	MG/KG	99.2

WESTON

MANAGERS DESIGNERS CONSULTANTS

MAR 09 1993

Roy F. Weston, Inc. - Stockton Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
JEFFERSON FOREST DRUM ST

DATE RECEIVED: 02/12/93 RFW LOT # :9302S099

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
JCF-01						
SILVER, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
ALUMINUM, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
ARSENIC, TOTAL	001	SE	93S1370	02/10/93	02/18/93	02/22/93
BARIUM, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
BERYLLIUM, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
CALCIUM, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
CADMIUM, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
COBALT, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
CHROMIUM, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
COPPER, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
IRON, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
MERCURY, TOTAL	001	SE	93SHG316	02/10/93	02/25/93	02/26/93
MERCURY, TOTAL	001 MS	SE	93SHG316	02/10/93	02/25/93	02/26/93
MERCURY, TOTAL	001 MSD	SE	93SHG316	02/10/93	02/25/93	02/26/93
POTASSIUM, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
MAGNESIUM, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
MANGANESE, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
SODIUM, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
NICKEL, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
LEAD, TOTAL	001	SE	93S1370	02/10/93	02/18/93	02/22/93
ANTIMONY, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
SELENIUM, TOTAL	001	SE	93S1370	02/10/93	02/18/93	02/22/93
THALLIUM, TOTAL	001	SE	93S1370	02/10/93	02/18/93	02/22/93
VANADIUM, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
ZINC, TOTAL	001	SE	93S1369	02/10/93	02/18/93	02/24/93
JCF-02						
SILVER, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
ALUMINUM, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
ARSENIC, TOTAL	002	SE	93S1370	02/10/93	02/18/93	02/22/93
BARIUM, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
BERYLLIUM, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
CALCIUM, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
CADMIUM, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
COBALT, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
CHROMIUM, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93

Roy F. Weston, Inc. - Stockton Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
JEFFERSON FOREST DRUM ST

APR 9 1993

DATE RECEIVED: 02/12/93 RFW LOT # :9302S099

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
COPPER, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
IRON, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
MERCURY, TOTAL	002	SE	93SHG316	02/10/93	02/25/93	02/26/93
POTASSIUM, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
MAGNESIUM, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
MANGANESE, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
SODIUM, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
NICKEL, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
LEAD, TOTAL	002	SE	93S1370	02/10/93	02/18/93	02/22/93
ANTIMONY, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
SELENIUM, TOTAL	002	SE	93S1370	02/10/93	02/18/93	02/22/93
THALLIUM, TOTAL	002	SE	93S1370	02/10/93	02/18/93	02/22/93
VANADIUM, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
ZINC, TOTAL	002	SE	93S1369	02/10/93	02/18/93	02/24/93
JCF-03						
SILVER, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
SILVER, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
SILVER, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
ALUMINUM, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
ALUMINUM, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
ALUMINUM, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
ARSENIC, TOTAL	003	S	93S1370	02/10/93	02/18/93	02/22/93
ARSENIC, TOTAL	003 MS	S	93S1370	02/10/93	02/18/93	02/22/93
ARSENIC, TOTAL	003 MSD	S	93S1370	02/10/93	02/18/93	02/22/93
BARIUM, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
BARIUM, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
BARIUM, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
BERYLLIUM, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
BERYLLIUM, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
BERYLLIUM, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
CALCIUM, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
CALCIUM, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
CALCIUM, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
CADMIUM, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
CADMIUM, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
CADMIUM, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
COBALT, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
COBALT, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93

Roy F. Weston, Inc. - Stockton Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
JEFFERSON FOREST DRUM ST

DATE RECEIVED: 02/12/93 RFW LOT # :9302S099

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
COBALT, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
CHROMIUM, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
CHROMIUM, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
CHROMIUM, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
COPPER, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
COPPER, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
COPPER, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
IRON, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
IRON, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
IRON, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
MERCURY, TOTAL	003	S	93SHG316	02/10/93	02/25/93	02/26/93
POTASSIUM, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
POTASSIUM, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
POTASSIUM, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
MAGNESIUM, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
MAGNESIUM, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
MAGNESIUM, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
MANGANESE, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
MANGANESE, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
MANGANESE, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
SODIUM, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
SODIUM, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
SODIUM, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
NICKEL, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
NICKEL, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
NICKEL, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
LEAD, TOTAL	003	S	93S1370	02/10/93	02/18/93	02/22/93
LEAD, TOTAL	003 MS	S	93S1370	02/10/93	02/18/93	02/22/93
LEAD, TOTAL	003 MSD	S	93S1370	02/10/93	02/18/93	02/22/93
ANTIMONY, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
ANTIMONY, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
ANTIMONY, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
SELENIUM, TOTAL	003	S	93S1370	02/10/93	02/18/93	02/22/93
SELENIUM, TOTAL	003 MS	S	93S1370	02/10/93	02/18/93	02/22/93
SELENIUM, TOTAL	003 MSD	S	93S1370	02/10/93	02/18/93	02/22/93
THALLIUM, TOTAL	003	S	93S1370	02/10/93	02/18/93	02/22/93
THALLIUM, TOTAL	003 MS	S	93S1370	02/10/93	02/18/93	02/22/93
THALLIUM, TOTAL	003 MSD	S	93S1370	02/10/93	02/18/93	02/22/93
VANADIUM, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
VANADIUM, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93

Roy F. Weston, Inc. - Stockton Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
JEFFERSON FOREST DRUM ST

MAR 9 1993

DATE RECEIVED: 02/12/93 RFW LOT # :9302S099

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
VANADIUM, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
ZINC, TOTAL	003	S	93S1369	02/10/93	02/18/93	02/24/93
ZINC, TOTAL	003 MS	S	93S1369	02/10/93	02/18/93	02/24/93
ZINC, TOTAL	003 MSD	S	93S1369	02/10/93	02/18/93	02/24/93
JCF-04						
SILVER, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
SILVER, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
SILVER, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
ALUMINUM, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
ALUMINUM, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
ALUMINUM, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
ARSENIC, TOTAL	004	OI	93S1367	02/10/93	02/17/93	02/18/93
BARIUM, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
BARIUM, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
BARIUM, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
BERYLLIUM, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
BERYLLIUM, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
BERYLLIUM, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
CALCIUM, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
CALCIUM, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
CALCIUM, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
CADMIUM, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/24/93
CADMIUM, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/24/93
CADMIUM, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/24/93
COBALT, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
COBALT, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
COBALT, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
CHROMIUM, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
CHROMIUM, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
CHROMIUM, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
COPPER, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
COPPER, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
COPPER, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
IRON, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/24/93
IRON, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/24/93
IRON, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/24/93
MERCURY, TOTAL	004	OI	93SHG316	02/10/93	02/25/93	02/26/93
POTASSIUM, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93

Roy F. Weston, Inc. - Stockton Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
JEFFERSON FOREST DRUM ST

MAR 0 9 1993

DATE RECEIVED: 02/12/93 RFW LOT # :9302S099

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
POTASSIUM, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
POTASSIUM, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
MAGNESIUM, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
MAGNESIUM, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
MAGNESIUM, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
MANGANESE, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
MANGANESE, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
MANGANESE, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
SODIUM, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
SODIUM, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
SODIUM, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
NICKEL, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
NICKEL, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
NICKEL, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
LEAD, TOTAL	004	OI	93S1367	02/10/93	02/17/93	02/18/92
ANTIMONY, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
ANTIMONY, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
ANTIMONY, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
SELENIUM, TOTAL	004	OI	93S1367	02/10/93	02/17/93	02/18/93
THALLIUM, TOTAL	004	OI	93S1367	02/10/93	02/17/93	02/18/93
VANADIUM, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
VANADIUM, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
VANADIUM, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
ZINC, TOTAL	004	OI	93S1366	02/10/93	02/17/93	02/23/93
ZINC, TOTAL	004 MS	OI	93S1366	02/10/93	02/17/93	02/23/93
ZINC, TOTAL	004 MSD	OI	93S1366	02/10/93	02/17/93	02/23/93
JCF-05						
SILVER, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
ALUMINUM, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
ARSENIC, TOTAL	005	OI	93S1367	02/10/93	02/17/93	02/18/93
BARIUM, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
BERYLLIUM, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
CALCIUM, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
CADMIUM, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/24/93
COBALT, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
CHROMIUM, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
COPPER, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
IRON, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/24/93

Roy F. Weston, Inc. - Stockton Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
JEFFERSON FOREST DRUM ST

MAR 0 9 1993

DATE RECEIVED: 02/12/93 RFW LOT # :9302S099

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
MERCURY, TOTAL	005	OI	93SHG316	02/10/93	02/25/93	02/26/93
POTASSIUM, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
MAGNESIUM, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
MANGANESE, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
SODIUM, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
NICKEL, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
LEAD, TOTAL	005	OI	93S1367	02/10/93	02/17/93	02/18/92
ANTIMONY, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
SELENIUM, TOTAL	005	OI	93S1367	02/10/93	02/17/93	02/18/93
THALLIUM, TOTAL	005	OI	93S1367	02/10/93	02/17/93	02/18/93
VANADIUM, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
ZINC, TOTAL	005	OI	93S1366	02/10/93	02/17/93	02/23/93
JCF-06						
SILVER, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
ALUMINUM, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
ARSENIC, TOTAL	006	OI	93S1367	02/10/93	02/17/93	02/18/93
ARSENIC, TOTAL	006 MS	OI	93S1367	02/10/93	02/17/93	02/18/93
ARSENIC, TOTAL	006 MSD	OI	93S1367	02/10/93	02/17/93	02/18/93
BARIUM, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
BERYLLIUM, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
CALCIUM, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
CADMIUM, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/24/93
COBALT, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
CHROMIUM, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
COPPER, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
IRON, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/24/93
MERCURY, TOTAL	006	OI	93SHG316	02/10/93	02/25/93	02/26/93
POTASSIUM, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
MAGNESIUM, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
MANGANESE, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
SODIUM, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
NICKEL, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
LEAD, TOTAL	006	OI	93S1367	02/10/93	02/17/93	02/18/92
LEAD, TOTAL	006 MS	OI	93S1367	02/10/93	02/17/93	02/18/92
LEAD, TOTAL	006 MSD	OI	93S1367	02/10/93	02/17/93	02/18/92
ANTIMONY, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
SELENIUM, TOTAL	006	OI	93S1367	02/10/93	02/17/93	02/18/93
SELENIUM, TOTAL	006 MS	OI	93S1367	02/10/93	02/17/93	02/18/93

Roy F. Weston, Inc. - Stockton Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
JEFFERSON FOREST DRUM ST

MAR 0 9 1993

DATE RECEIVED: 02/12/93

RFW LOT # :9302S099

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SELENIUM, TOTAL	006 MSD	OI	93S1367	02/10/93	02/17/93	02/18/93
THALLIUM, TOTAL	006	OI	93S1367	02/10/93	02/17/93	02/18/93
THALLIUM, TOTAL	006 MS	OI	93S1367	02/10/93	02/17/93	02/18/93
THALLIUM, TOTAL	006 MSD	OI	93S1367	02/10/93	02/17/93	02/18/93
VANADIUM, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93
ZINC, TOTAL	006	OI	93S1366	02/10/93	02/17/93	02/23/93

LAB QC:

SILVER LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
ALUMINUM LABORTORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
BARIUM LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
BERYLLIUM LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
CALCIUM LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
CADMIUM LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
COBALT LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
CHROMIUM LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
COPPER LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
IRON LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
POTASSIUM LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
MAGNESIUM LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
MANGANESE LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
SODIUM LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
NICKEL LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
ANTIMONY LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
VANADIUM LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
ZINC LABORATORY	LC1 BS	S	93S1369	02/18/93	02/18/93	02/24/93
SILVER LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
ALUMINUM LABORTORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
BARIUM LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
BERYLLIUM LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
CALCIUM LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
CADMIUM LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
COBALT LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
CHROMIUM LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
COPPER LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
IRON LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
POTASSIUM LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
MAGNESIUM LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
MANGANESE LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93

Roy F. Weston, Inc. - Stockton Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
JEFFERSON FOREST DRUM ST

MAR 0 9 1993

DATE RECEIVED: 02/12/93

RFW LOT # :9302S099

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SODIUM LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
NICKEL LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
ANTIMONY LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
VANADIUM LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
ZINC LABORATORY	LC2 BS	S	93S1369	02/18/93	02/18/93	02/24/93
SILVER, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
ALUMINUM, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
BARIUM, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
BERYLLIUM, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
CALCIUM, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
CADMIUM, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
COBALT, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
CHROMIUM, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
COPPER, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
IRON, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
POTASSIUM, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
MAGNESIUM, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
MANGANESE, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
SODIUM, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
NICKEL, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
ANTIMONY, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
VANADIUM, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
ZINC, TOTAL	MB1	S	93S1369	02/18/93	02/18/93	02/24/93
ARSENIC LABORATORY	LC1 BS	S	93S1370	02/18/93	02/18/93	02/22/93
LEAD LABORATORY	LC1 BS	S	93S1370	02/18/93	02/18/93	02/22/93
SELENIUM LABORATORY	LC1 BS	S	93S1370	02/18/93	02/18/93	02/22/93
THALLIUM LABORATORY	LC1 BS	S	93S1370	02/18/93	02/18/93	02/22/93
ARSENIC LABORATORY	LC2 BS	S	93S1370	02/18/93	02/18/93	02/22/93
LEAD LABORATORY	LC2 BS	S	93S1370	02/18/93	02/18/93	02/22/93
SELENIUM LABORATORY	LC2 BS	S	93S1370	02/18/93	02/18/93	02/22/93
THALLIUM LABORATORY	LC2 BS	S	93S1370	02/18/93	02/18/93	02/22/93
ARSENIC, TOTAL	MB1	S	93S1370	02/18/93	02/18/93	02/22/93
LEAD, TOTAL	MB1	S	93S1370	02/18/93	02/18/93	02/22/93
SELENIUM, TOTAL	MB1	S	93S1370	02/18/93	02/18/93	02/22/93
THALLIUM, TOTAL	MB1	S	93S1370	02/18/93	02/18/93	02/22/93
MERCURY LABORATORY	LC1 BS	S	93SHG316	02/25/93	02/25/93	02/26/93
MERCURY LABORATORY	LC2 BS	S	93SHG316	02/25/93	02/25/93	02/26/93
MERCURY, TOTAL	MB1	S	93SHG316	02/25/93	02/25/93	02/26/93
SILVER LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
ALUMINUM LABORTORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93

MAR 0 9 1993

Roy F. Weston, Inc. - Stockton Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
JEFFERSON FOREST DRUM ST

DATE RECEIVED: 02/12/93 RFW LOT # :9302S099

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
BARIUM LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
BERYLLIUM LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
CALCIUM LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
CADMIUM LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/24/93
COBALT LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
CHROMIUM LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
COPPER LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
IRON LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/24/93
POTASSIUM LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
MAGNESIUM LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
MANGANESE LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
SODIUM LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
NICKEL LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
ANTIMONY LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
VANADIUM LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
ZINC LABORATORY	LC1 BS	S	93S1366	02/17/93	02/17/93	02/23/93
SILVER LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
ALUMINUM LABORTORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
BARIUM LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
BERYLLIUM LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
CALCIUM LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
CADMIUM LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/24/93
COBALT LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
CHROMIUM LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
COPPER LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
IRON LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/24/93
POTASSIUM LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
MAGNESIUM LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
MANGANESE LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
SODIUM LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
NICKEL LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
ANTIMONY LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
VANADIUM LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
ZINC LABORATORY	LC2 BS	S	93S1366	02/17/93	02/17/93	02/23/93
SILVER, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
ALUMINUM, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
BARIUM, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
BERYLLIUM, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
CALCIUM, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
CADMIUM, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/24/93

MAR 0 9 1993

Roy F. Weston, Inc. - Stockton Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
JEFFERSON FOREST DRUM ST

DATE RECEIVED: 02/12/93 RFW LOT # :9302S099

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
COBALT, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
CHROMIUM, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
COPPER, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
IRON, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/24/93
POTASSIUM, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
MAGNESIUM, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
MANGANESE, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
SODIUM, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
NICKEL, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
ANTIMONY, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
VANADIUM, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
ZINC, TOTAL	MB1	S	93S1366	02/17/93	02/17/93	02/23/93
ARSENIC LABORATORY	LC1 BS	S	93S1367	02/17/93	02/17/93	02/18/93
LEAD LABORATORY	LC1 BS	S	93S1367	02/17/93	02/17/93	02/18/92
SELENIUM LABORATORY	LC1 BS	S	93S1367	02/17/93	02/17/93	02/18/93
THALLIUM LABORATORY	LC1 BS	S	93S1367	02/17/93	02/17/93	02/18/93
ARSENIC LABORATORY	LC2 BS	S	93S1367	02/17/93	02/17/93	02/18/93
LEAD LABORATORY	LC2 BS	S	93S1367	02/17/93	02/17/93	02/18/92
SELENIUM LABORATORY	LC2 BS	S	93S1367	02/17/93	02/17/93	02/18/93
THALLIUM LABORATORY	LC2 BS	S	93S1367	02/17/93	02/17/93	02/18/93
ARSENIC, TOTAL	MB1	S	93S1367	02/17/93	02/17/93	02/18/93
LEAD, TOTAL	MB1	S	93S1367	02/17/93	02/17/93	02/18/92
SELENIUM, TOTAL	MB1	S	93S1367	02/17/93	02/17/93	02/18/93
THALLIUM, TOTAL	MB1	S	93S1367	02/17/93	02/17/93	02/18/93

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 03/01/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-001	JCF-01	Silver, Total	1.5	u	MG/KG	1.5
		Aluminum, Total	11000		MG/KG	30.1
		Arsenic, Total	20.5		MG/KG	15.0
		Barium, Total	51.6		MG/KG	30.1
		Beryllium, Total	0.95		MG/KG	0.75
		Calcium, Total	834		MG/KG	752
		Cadmium, Total	0.75	u	MG/KG	0.75
		Cobalt, Total	29.8		MG/KG	7.5
		Chromium, Total	21.0		MG/KG	1.5
		Copper, Total	28.1		MG/KG	3.8
		Iron, Total	62200		MG/KG	15.0
		Mercury, Total	0.04		MG/KG	0.03
		Potassium, Total	1630		MG/KG	752
		Magnesium, Total	3010		MG/KG	752
		Manganese, Total	760		MG/KG	2.3
		Sodium, Total	752	u	MG/KG	752
		Nickel, Total	57.2		MG/KG	6.0
		Lead, Total	29.3		MG/KG	4.5
		Antimony, Total	9.0	u	MG/KG	9.0
		Selenium, Total	0.75	u	MG/KG	0.75
		Thallium, Total	1.5	u	MG/KG	1.5
		Vanadium, Total	35.9		MG/KG	7.5
		Zinc, Total	152		MG/KG	3.0

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 03/01/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-002	JCF-02	Silver, Total	1.5	u	MG/KG	1.5
		Aluminum, Total	8670		MG/KG	29.6
		Arsenic, Total	23.1		MG/KG	14.8
		Barium, Total	39.5		MG/KG	29.6
		Beryllium, Total	0.74		MG/KG	0.74
		Calcium, Total	753		MG/KG	740
		Cadmium, Total	0.74	u	MG/KG	0.74
		Cobalt, Total	26.4		MG/KG	7.4
		Chromium, Total	14.0		MG/KG	1.5
		Copper, Total	17.3		MG/KG	3.7
		Iron, Total	40700		MG/KG	14.8
		Mercury, Total	0.04		MG/KG	0.03
		Potassium, Total	1330		MG/KG	740
		Magnesium, Total	2650		MG/KG	740
		Manganese, Total	658		MG/KG	2.2
		Sodium, Total	740	u	MG/KG	740
		Nickel, Total	46.8		MG/KG	5.9
		Lead, Total	27.1		MG/KG	4.4
		Antimony, Total	8.9	u	MG/KG	8.9
		Selenium, Total	0.74	u	MG/KG	0.74
		Thallium, Total	1.5	u	MG/KG	1.5
		Vanadium, Total	24.9		MG/KG	7.4
		Zinc, Total	103		MG/KG	3.0

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 03/01/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-003	JCF-03	Silver, Total	1.4 u	MG/KG	1.4
		Aluminum, Total	17700	MG/KG	27.6
		Arsenic, Total	7.1	MG/KG	2.8
		Barium, Total	230	MG/KG	27.6
		Beryllium, Total	0.69 u	MG/KG	0.69
		Calcium, Total	8440	MG/KG	690
		Cadmium, Total	2.9	MG/KG	0.69
		Cobalt, Total	10.8	MG/KG	6.9
		Chromium, Total	48.2	MG/KG	1.4
		Copper, Total	157	MG/KG	3.4
		Iron, Total	41400	MG/KG	13.8
		Mercury, Total	0.39	MG/KG	0.14
		Potassium, Total	1720	MG/KG	690
		Magnesium, Total	3400	MG/KG	690
		Manganese, Total	480	MG/KG	2.1
		Sodium, Total	1440	MG/KG	690
		Nickel, Total	38.9	MG/KG	5.5
		Lead, Total	1730	MG/KG	276
		Antimony, Total	15.4	MG/KG	8.3
		Selenium, Total	0.69 u	MG/KG	0.69
		Thallium, Total	1.4 u	MG/KG	1.4
		Vanadium, Total	27.3	MG/KG	6.9
		Zinc, Total	1220	MG/KG	2.8

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 03/01/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-004	JCF-04	Silver, Total	1.0	u	MG/KG	1.0
		Aluminum, Total	92.4		MG/KG	20.0
		Arsenic, Total	1.5		MG/KG	1.0
		Barium, Total	25.3		MG/KG	20.0
		Beryllium, Total	0.50	u	MG/KG	0.50
		Calcium, Total	500	u	MG/KG	500
		Cadmium, Total	0.71		MG/KG	0.50
		Cobalt, Total	5.0	u	MG/KG	5.0
		Chromium, Total	3.5		MG/KG	1.0
		Copper, Total	2.5	u	MG/KG	2.5
		Iron, Total	1300		MG/KG	10.0
		Mercury, Total	0.04		MG/KG	0.02
		Potassium, Total	500	u	MG/KG	500
		Magnesium, Total	500	u	MG/KG	500
		Manganese, Total	7.9		MG/KG	1.5
		Sodium, Total	3020		MG/KG	500
		Nickel, Total	4.0	u	MG/KG	4.0
		Lead, Total	48.6		MG/KG	3.0
		Antimony, Total	6.0	u	MG/KG	6.0
		Selenium, Total	0.50	u	MG/KG	0.50
		Thallium, Total	1.0	u	MG/KG	1.0
		Vanadium, Total	5.0	u	MG/KG	5.0
		Zinc, Total	30.1		MG/KG	2.0

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 03/01/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-005	JCF-05	Silver, Total	1.0	u	MG/KG	1.0
		Aluminum, Total	20.3		MG/KG	20.0
		Arsenic, Total	99.2		MG/KG	20.0
		Barium, Total	25.9		MG/KG	20.0
		Beryllium, Total	0.50	u	MG/KG	0.50
		Calcium, Total	500	u	MG/KG	500
		Cadmium, Total	0.50	u	MG/KG	0.50
		Cobalt, Total	5.0	u	MG/KG	5.0
		Chromium, Total	1.3		MG/KG	1.0
		Copper, Total	2.5	u	MG/KG	2.5
		Iron, Total	95.3		MG/KG	10.0
		Mercury, Total	0.02	u	MG/KG	0.02
		Potassium, Total	4550		MG/KG	500
		Magnesium, Total	500	u	MG/KG	500
		Manganese, Total	1.9		MG/KG	1.5
		Sodium, Total	500	u	MG/KG	500
		Nickel, Total	4.0	u	MG/KG	4.0
		Lead, Total	1.4		MG/KG	0.30
		Antimony, Total	6.0	u	MG/KG	6.0
		Selenium, Total	0.50	u	MG/KG	0.50
		Thallium, Total	1.0	u	MG/KG	1.0
		Vanadium, Total	5.0	u	MG/KG	5.0
		Zinc, Total	131		MG/KG	2.0

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 03/01/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
-006	JCF-06	Silver, Total	1.0	u	MG/KG	1.0
		Aluminum, Total	20.0	u	MG/KG	20.0
		Arsenic, Total	1.0	u	MG/KG	1.0
		Barium, Total	134		MG/KG	20.0
		Beryllium, Total	0.50	u	MG/KG	0.50
		Calcium, Total	500	u	MG/KG	500
		Cadmium, Total	0.50	u	MG/KG	0.50
		Cobalt, Total	5.0	u	MG/KG	5.0
		Chromium, Total	1.0	u	MG/KG	1.0
		Copper, Total	2.5	u	MG/KG	2.5
		Iron, Total	48.0		MG/KG	10.0
		Mercury, Total	0.02	u	MG/KG	0.02
		Potassium, Total	500	u	MG/KG	500
		Magnesium, Total	500	u	MG/KG	500
		Manganese, Total	1.5	u	MG/KG	1.5
		Sodium, Total	500	u	MG/KG	500
		Nickel, Total	4.0	u	MG/KG	4.0
		Lead, Total	12.6		MG/KG	1.5
		Antimony, Total	6.0	u	MG/KG	6.0
		Selenium, Total	0.50	u	MG/KG	0.50
		Thallium, Total	1.0	u	MG/KG	1.0
		Vanadium, Total	5.0	u	MG/KG	5.0
		Zinc, Total	223		MG/KG	2.0

ROY F. WESTON INC.

MAR 0 9 1993

INORGANIC METHOD BLANK DATA SUMMARY PAGE 03/01/93

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
BLANK1	93S1369-MB1	Silver, Total	1.0	u	MG/KG	1.0
		Aluminum, Total	20.0	u	MG/KG	20.0
		Barium, Total	20.0	u	MG/KG	20.0
		Beryllium, Total	0.50	u	MG/KG	0.50
		Calcium, Total	500	u	MG/KG	500
		Cadmium, Total	0.50	u	MG/KG	0.50
		Cobalt, Total	5.0	u	MG/KG	5.0
		Chromium, Total	1.0	u	MG/KG	1.0
		Copper, Total	2.5	u	MG/KG	2.5
		Iron, Total	10.0	u	MG/KG	10.0
		Potassium, Total	500	u	MG/KG	500
		Magnesium, Total	500	u	MG/KG	500
		Manganese, Total	1.5	u	MG/KG	1.5
		Sodium, Total	500	u	MG/KG	500
		Nickel, Total	4.0	u	MG/KG	4.0
		Antimony, Total	6.0	u	MG/KG	6.0
		Vanadium, Total	5.0	u	MG/KG	5.0
		Zinc, Total	2.0	u	MG/KG	2.0
BLANK1	93S1370-MB1	Arsenic, Total	1.0	u	MG/KG	1.0
		Lead, Total	0.30	u	MG/KG	0.30
		Selenium, Total	0.50	u	MG/KG	0.50
		Thallium, Total	1.0	u	MG/KG	1.0
BLANK10	93SHG316-MB1	Mercury, Total	0.02	u	MG/KG	0.02
BLANK1	93S1366-MB1	Silver, Total	1.0	u	MG/KG	1.0
		Aluminum, Total	20.0	u	MG/KG	20.0
		Barium, Total	20.0	u	MG/KG	20.0
		Beryllium, Total	0.50	u	MG/KG	0.50
		Calcium, Total	500	u	MG/KG	500
		Cadmium, Total	0.50	u	MG/KG	0.50
		Cobalt, Total	5.0	u	MG/KG	5.0
		Chromium, Total	1.0	u	MG/KG	1.0
		Copper, Total	2.5	u	MG/KG	2.5
		Iron, Total	10.0	u	MG/KG	10.0
		Potassium, Total	500	u	MG/KG	500
		Magnesium, Total	500	u	MG/KG	500
		Manganese, Total	1.5	u	MG/KG	1.5
		Sodium, Total	500	u	MG/KG	500

ROY F. WESTON INC.

MAR 0 9 1993

INORGANIC METHOD BLANK DATA SUMMARY PAGE 03/01/93

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	RESULT		UNITS	REPORTING LIMIT
BLANK1	93S1366-MB1	Nickel, Total	4.0	u	MG/KG	4.0
		Antimony, Total	6.0	u	MG/KG	6.0
		Vanadium, Total	5.0	u	MG/KG	5.0
		Zinc, Total	2.0	u	MG/KG	2.0
BLANK1	93S1367-MB1	Arsenic, Total	1.0	u	MG/KG	1.0
		Lead, Total	0.30	u	MG/KG	0.30
		Selenium, Total	0.50	u	MG/KG	0.50
		Thallium, Total	1.0	u	MG/KG	1.0

ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 03/01/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV
-001	JCF-01	Mercury, Total	0.22	0.04	0.15	121
		Mercury, Total MSD	0.20	0.04	0.15	112

WESTON

MANAGERS DESIGNERS CONSULTANTS

MAR 09 1993

ROY F. WESTON, INC.
STOCKTON LABORATORY
METALS CASE NARRATIVE

Client: Jefferson Forest Drum St
RFW#: 9302S099

W.O.#: 00000-000-000-0000-00
Date Rec'd: 02/12/93

1. This narrative covers the analysis of two sediment, one soil, and three oil samples for the following metals: Aluminum, Antimony, Arsenic, Barium, Beryllium, Calcium, Cadmium, Cobalt, Chromium, Copper, Iron, Lead, Mercury, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc.

2. The samples were prepared and analyzed in accordance with the following protocols: 6010, 7060, 7421, 7471, 7740, and 7841.

3. All analyses were performed within the required holding times.

4. All Initial and Continuing Calibration Verifications (ICV/CCV's) were within control limits.

5. All Initial and Continuing Calibration Blanks (ICB/CCB's) were within control limits.

6. All Preparation/Method Blanks were below Reporting Limits.

7. All ICP Interference Check Samples (ICSAB) were within control limits.

8. All Laboratory Control Samples (LCS) were within the 80-120% control limits (exceptions allowed for Ag and Sb).

9. All Serial Dilution percent differences were within the 90-110% control limit except for Aluminum, Calcium, Iron, Sodium, and Zinc.

10. All Matrix Spike recoveries were within the 75-125% control limits except for Arsenic, Antimony, Calcium, Chromium, Magnesium, Selenium, Thallium, and Zinc (exception allowed when sample concentration exceeds the spike added concentration by a factor of 4 or more).

    Matrix spike analyses not required for Ca, Mg, Na, and K.

WESTON

MAR 0 9 1993

Metals Case Narrative
RFW#: 9302S099

11. All Duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits for samples values greater than 5X Reporting Limit, or +/- the Reporting Limits for sample values less than 5X Reporting Limit except for Aluminum, Antimony, Arsenic, Calcium, Lead, and Magnesium.

12. Method of Standard Additions (MSA) analyses were not required.

T. L. Hammonds
Inorganic Section Manager

March 4, 1993
Date

MAR 0 9 1993

ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 03/01/93

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	
-003	JCF-03	Silver, Total	7.0	1.4 u	6.9	101	
		Silver, Total MSD	7.4	1.4 u	6.9	107	
		Aluminum, Total	21300	17700	276	1290	*
		Aluminum, Total MSD	16600	17700	276	-390.	*
		Arsenic, Total	10.3	7.1	5.5	58.2	
		Arsenic, Total MSD	13.7	7.1	5.5	120	
		Barium, Total	461	230	276	84.1	
		Barium, Total MSD	528	230	276	108	
		Beryllium, Total	6.7	0.69u	6.9	97.1	
		Beryllium, Total MSD	6.5	0.69u	6.9	94.2	
		Calcium, Total	11900	8440	2760	124	*
		Calcium, Total MSD	45000	8440	2760	1330	*
		Cadmium, Total	9.2	2.9	6.9	91.3	
		Cadmium, Total MSD	8.3	2.9	6.9	78.3	
		Cobalt, Total	70.9	10.8	68.9	87.2	
		Cobalt, Total MSD	66.5	10.8	68.9	80.8	
		Chromium, Total	73.4	48.2	27.6	91.3	
		Chromium, Total MSD	60.0	48.2	27.6	42.8	
		Copper, Total	176	157	34.5	56.2	*
		Copper, Total MSD	209	157	34.5	151	*
		Iron, Total	48600	41400	138	5210	*
		Iron, Total MSD	32500	41400	138	6500.	*
		Potassium, Total	4160	1720	2760	88.2	
		Potassium, Total MSD	4190	1720	2760	89.4	
		Magnesium, Total	6020	3400	2760	95.0	
		Magnesium, Total MSD	10800	3400	2760	267	*
		Manganese, Total	500	480	68.9	27.9	*
		Manganese, Total MSD	430	480	68.9	-74.	*
		Sodium, Total	3890	1440	2760	88.8	
		Sodium, Total MSD	4250	1440	2760	102	
		Nickel, Total	110	38.9	68.9	104	
		Nickel, Total MSD	90.9	38.9	68.9	75.5	
		Lead, Total	1030	866	2.8	6010	*
		Lead, Total MSD	863	866	2.8	-96.	*
		Antimony, Total	41.2	15.4	68.9	37.4	
		Antimony, Total MSD	50.7	15.4	68.9	51.2	
		Selenium, Total	0.23	0.69u	1.4	16.4	
		Selenium, Total MSD	0.22	0.69u	1.4	15.7	
		Thallium, Total	6.5	1.4 u	6.9	94.2	
		Thallium, Total MSD	6.6	1.4 u	6.9	95.7	

ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 03/01/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV
-003	JCF-03	Vanadium, Total	89.7	27.3	68.9	90.6
		Vanadium, Total MSD	85.5	27.3	68.9	84.5
		Zinc, Total	1230	1220	68.9	20.0 *
		Zinc, Total MSD	1020	1220	68.9	-290. *

ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 03/01/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV
-004	JCF-04	Silver, Total	4.8	1.0 u	5.0	96.0
		Silver, Total MSD	4.8	1.0 u	5.0	96.0
		Aluminum, Total	275	92.4	200	91.2
		Aluminum, Total MSD	278	92.4	200	92.6
		Barium, Total	204	25.3	200	89.6
		Barium, Total MSD	209	25.3	200	92.0
		Beryllium, Total	4.7	0.50u	5.0	94.0
		Beryllium, Total MSD	4.7	0.50u	5.0	94.0
		Calcium, Total	2160	500 u	2000	108
		Calcium, Total MSD	2210	500 u	2000	111
		Cadmium, Total	4.8	0.71	5.0	81.8
		Cadmium, Total MSD	5.0	0.71	5.0	85.8
		Cobalt, Total	46.5	5.0 u	50.0	93.0
		Cobalt, Total MSD	47.0	5.0 u	50.0	94.0
		Chromium, Total	22.0	3.5	20.0	92.5
		Chromium, Total MSD	21.9	3.5	20.0	92.0
		Copper, Total	25.3	2.5 u	25.0	101
		Copper, Total MSD	25.8	2.5 u	25.0	103
		Iron, Total	971	1300	100	-330. *
		Iron, Total MSD	1060	1300	100	-240. *
		Potassium, Total	2150	500 u	2000	108
		Potassium, Total MSD	2170	500 u	2000	109
		Magnesium, Total	1950	500 u	2000	97.5
		Magnesium, Total MSD	1980	500 u	2000	99.2
		Manganese, Total	51.9	7.9	50.0	88.0
		Manganese, Total MSD	53.1	7.9	50.0	90.4
		Sodium, Total	4840	3020	2000	90.9
		Sodium, Total MSD	4930	3020	2000	95.2
		Nickel, Total	46.9	4.0 u	50.0	93.8
		Nickel, Total MSD	46.7	4.0 u	50.0	93.4
		Antimony, Total	45.3	6.0 u	50.0	90.6
		Antimony, Total MSD	45.7	6.0 u	50.0	91.4
		Vanadium, Total	49.4	5.0 u	50.0	98.8
		Vanadium, Total MSD	50.0	5.0 u	50.0	100
		Zinc, Total	64.8	30.1	50.0	69.4
		Zinc, Total MSD	68.1	30.1	50.0	76.0

ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 03/01/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	
-006	JCF-06	Arsenic, Total	3.6	1.0 u	4.0	90.0	
		Arsenic, Total MSD	3.4	1.0 u	4.0	85.0	
		Lead, Total	13.0	12.6	2.0	20.0	*
		Lead, Total MSD	14.9	12.6	2.0	115	*
		Selenium, Total	0.92	0.50u	1.0	92.0	
		Selenium, Total MSD	0.90	0.50u	1.0	90.0	
		Thallium, Total	3.4	1.0 u	5.0	68.0	
		Thallium, Total MSD	4.2	1.0 u	5.0	84.0	

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ROY F. WESTON INC.

INORGANIC DUPLICATE SPIKE REPORT 03/01/93

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%RPD
-001	JCF-01	Mercury, Total	121	112	7.5

ROY F. WESTON INC.

INORGANIC DUPLICATE SPIKE REPORT 03/01/93

MAR 09 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV		%RPD
-003	JCF-03	Silver, Total	101	107		5.6
		Aluminum, Total	1290	-390.	*	NC
		Arsenic, Total	58.2	120		69.4
		Barium, Total	84.1	108		25.3
		Beryllium, Total	97.1	94.2		3.0
		Calcium, Total	124	1330		166
		Cadmium, Total	91.3	78.3		15.4
		Cobalt, Total	87.2	80.8		7.6
		Chromium, Total	91.3	42.8		72.4
		Copper, Total	56.2	151	*	NC
		Iron, Total	5210	6500.	*	NC
		Potassium, Total	88.2	89.4		1.4
		Magnesium, Total	95.0	267		95.0
		Manganese, Total	27.9	-74.	*	NC
		Sodium, Total	88.8	102		13.6
		Nickel, Total	104	75.5		31.4
		Lead, Total	6010	-96.	*	NC
		Antimony, Total	37.4	51.2		31.1
		Selenium, Total	16.4	15.7		4.4
		Thallium, Total	94.2	95.7		1.5
		Vanadium, Total	90.6	84.5		7.0
		Zinc, Total	20.0	-290.	*	NC

MAR 0 9 1993

ROY F. WESTON INC.

INORGANIC DUPLICATE SPIKE REPORT 03/01/93

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV		%RPD
-004	JCF-04	Silver, Total	96.0	96.0		0.00
		Aluminum, Total	91.2	92.6		1.5
		Barium, Total	89.6	92.0		2.6
		Beryllium, Total	94.0	94.0		0.00
		Calcium, Total	108	111		2.3
		Cadmium, Total	81.8	85.8		4.8
		Cobalt, Total	93.0	94.0		1.1
		Chromium, Total	92.5	92.0		0.54
		Copper, Total	101	103		2.0
		Iron, Total	-330.	-240.	*	NC
		Potassium, Total	108	109		0.97
		Magnesium, Total	97.5	99.2		1.7
		Manganese, Total	88.0	90.4		2.7
		Sodium, Total	90.9	95.2		4.7
		Nickel, Total	93.8	93.4		0.43
		Antimony, Total	90.6	91.4		0.88
		Vanadium, Total	98.8	100		1.2
		Zinc, Total	69.4	76.0		9.1

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ROY F. WESTON INC.

INORGANIC DUPLICATE SPIKE REPORT 03/01/93

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%RPD
-006	JCF-06	Arsenic, Total	90.0	85.0	5.7
		Lead, Total	20.0	115 *	NC
		Selenium, Total	92.0	90.0	2.2
		Thallium, Total	68.0	84.0	21.1
LCS2	93S1369-LC2	Silver, LCS	90.0	92.0	2.2
		Aluminum, LCS	99.4	96.6	2.8
		Barium, LCS	90.8	91.3	0.60
		Beryllium, LCS	88.0	88.0	0.00
		Calcium, LCS	94.9	94.5	0.41
		Cadmium, LCS	88.0	88.0	0.00
		Cobalt, LCS	88.6	88.4	0.23
		Chromium, LCS	92.0	91.0	1.1
		Copper, LCS	92.4	92.0	0.43
		Iron, LCS	92.1	92.1	0.00
		Potassium, LCS	93.8	91.8	2.1
		Magnesium, LCS	92.0	92.0	0.011
		Manganese, LCS	90.2	90.0	0.22
		Sodium, LCS	94.5	94.2	0.27
		Nickel, LCS	101	99.8	0.80
		Antimony, LCS	86.8	87.6	0.92
		Vanadium, LCS	92.0	92.0	0.00
		Zinc, LCS	88.0	87.6	0.46
LCS2	93S1370-LC2	Arsenic, LCS	102	102	0.00
		Lead, LCS	95.0	100	5.1
		Selenium, LCS	95.0	93.0	2.1
		Thallium, LCS	88.0	92.0	4.4
LCS20	93SHG316-LC2	Mercury, LCS	90.0	94.0	4.3
LCS2	93S1366-LC2	Silver, LCS	94.0	96.0	2.1
		Aluminum, LCS	99.4	102	2.6
		Barium, LCS	94.6	97.4	2.8
		Beryllium, LCS	92.0	94.0	2.2
		Calcium, LCS	97.9	99.8	2.0
		Cadmium, LCS	90.0	90.0	0.00
		Cobalt, LCS	92.8	94.6	1.9
		Chromium, LCS	102	100	2.5
		Copper, LCS	94.4	96.8	2.5
		Iron, LCS	94.5	94.2	0.32
		Potassium, LCS	96.6	98.7	2.2
		Magnesium, LCS	94.5	96.6	2.2
		Manganese, LCS	94.2	96.0	1.9

ROY F. WESTON INC.

INORGANIC DUPLICATE SPIKE REPORT 03/01/93

MAR 0 9 1993

CLIENT: JEFFERSON FOREST DRUM ST
WORK ORDER: 00000-000-000-0000-00

WESTON BATCH #: 9302S099

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%RPD
LCS2	93S1366-LC2	Sodium, LCS	98.6	101	2.2
		Nickel, LCS	92.6	93.6	1.1
		Antimony, LCS	89.0	90.8	2.0
		Vanadium, LCS	98.6	101	2.2
		Zinc, LCS	90.8	93.0	2.4
LCS2	93S1367-LC2	Arsenic, LCS	90.0	92.5	2.7
		Lead, LCS	90.0	120	28.6
		Selenium, LCS	96.0	96.0	0.00
		Thallium, LCS	86.0	84.0	2.4

MAR 0 9 1993

ROY F. WESTON INC.

INORGANIC LABORATORY CONTROL STANDARDS REPORT 03/01/93

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	93S1369-LC1	Silver, LCS	4.5	5.0	MG/KG	90.0
		Aluminum, LCS	199	200	MG/KG	99.4
		Barium, LCS	182	200	MG/KG	90.8
		Beryllium, LCS	4.4	5.0	MG/KG	88.0
		Calcium, LCS	1900	2000	MG/KG	94.9
		Cadmium, LCS	4.4	5.0	MG/KG	88.0
		Cobalt, LCS	44.3	50.0	MG/KG	88.6
		Chromium, LCS	18.4	20.0	MG/KG	92.0
		Copper, LCS	23.1	25.0	MG/KG	92.4
		Iron, LCS	92.1	100	MG/KG	92.1
		Potassium, LCS	1880	2000	MG/KG	93.8
		Magnesium, LCS	1840	2000	MG/KG	92.0
		Manganese, LCS	45.1	50.0	MG/KG	90.2
		Sodium, LCS	1890	2000	MG/KG	94.5
		Nickel, LCS	50.3	50.0	MG/KG	101
		Antimony, LCS	43.4	50.0	MG/KG	86.8
		Vanadium, LCS	46.0	50.0	MG/KG	92.0
		Zinc, LCS	44.0	50.0	MG/KG	88.0
LCS2	93S1369-LC2	Silver, LCS	4.6	5.0	MG/KG	92.0
		Aluminum, LCS	193	200	MG/KG	96.6
		Barium, LCS	183	200	MG/KG	91.3
		Beryllium, LCS	4.4	5.0	MG/KG	88.0
		Calcium, LCS	1890	2000	MG/KG	94.5
		Cadmium, LCS	4.4	5.0	MG/KG	88.0
		Cobalt, LCS	44.2	50.0	MG/KG	88.4
		Chromium, LCS	18.2	20.0	MG/KG	91.0
		Copper, LCS	23.0	25.0	MG/KG	92.0
		Iron, LCS	92.1	100	MG/KG	92.1
		Potassium, LCS	1840	2000	MG/KG	91.8
		Magnesium, LCS	1840	2000	MG/KG	92.0
		Manganese, LCS	45.0	50.0	MG/KG	90.0
		Sodium, LCS	1880	2000	MG/KG	94.2
		Nickel, LCS	49.9	50.0	MG/KG	99.8
		Antimony, LCS	43.8	50.0	MG/KG	87.6
		Vanadium, LCS	46.0	50.0	MG/KG	92.0
		Zinc, LCS	43.8	50.0	MG/KG	87.6
LCS1	93S1370-LC1	Arsenic, LCS	4.1	4.0	MG/KG	102
		Lead, LCS	1.9	2.0	MG/KG	95.0

ROY F. WESTON INC.

INORGANIC LABORATORY CONTROL STANDARDS REPORT 03/01/93

MAR 0 9 1993

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS1	93S1370-LC1	Selenium, LCS	0.95	1.0	MG/KG	95.0
		Thallium, LCS	4.4	5.0	MG/KG	88.0
LCS2	93S1370-LC2	Arsenic, LCS	4.1	4.0	MG/KG	102
		Lead, LCS	2.0	2.0	MG/KG	100
		Selenium, LCS	0.93	1.0	MG/KG	93.0
		Thallium, LCS	4.6	5.0	MG/KG	92.0
LCS10	93SHG316-LC1	Mercury, LCS	0.09	0.1	MG/KG	90.0
LCS20	93SHG316-LC2	Mercury, LCS	0.09	0.1	MG/KG	94.0
LCS1	93S1366-LC1	Silver, LCS	4.7	5.0	MG/KG	94.0
		Aluminum, LCS	199	200	MG/KG	99.4
		Barium, LCS	189	200	MG/KG	94.6
		Beryllium, LCS	4.6	5.0	MG/KG	92.0
		Calcium, LCS	1960	2000	MG/KG	97.9
		Cadmium, LCS	4.5	5.0	MG/KG	90.0
		Cobalt, LCS	46.4	50.0	MG/KG	92.8
		Chromium, LCS	20.5	20.0	MG/KG	102
		Copper, LCS	23.6	25.0	MG/KG	94.4
		Iron, LCS	94.5	100	MG/KG	94.5
		Potassium, LCS	1930	2000	MG/KG	96.6
		Magnesium, LCS	1890	2000	MG/KG	94.5
		Manganese, LCS	47.1	50.0	MG/KG	94.2
		Sodium, LCS	1970	2000	MG/KG	98.6
		Nickel, LCS	46.3	50.0	MG/KG	92.6
		Antimony, LCS	44.5	50.0	MG/KG	89.0
		Vanadium, LCS	49.3	50.0	MG/KG	98.6
		Zinc, LCS	45.4	50.0	MG/KG	90.8
LCS2	93S1366-LC2	Silver, LCS	4.8	5.0	MG/KG	96.0
		Aluminum, LCS	204	200	MG/KG	102
		Barium, LCS	195	200	MG/KG	97.4
		Beryllium, LCS	4.7	5.0	MG/KG	94.0
		Calcium, LCS	2000	2000	MG/KG	99.8
		Cadmium, LCS	4.5	5.0	MG/KG	90.0
		Cobalt, LCS	47.3	50.0	MG/KG	94.6
		Chromium, LCS	20.0	20.0	MG/KG	100
		Copper, LCS	24.2	25.0	MG/KG	96.8

ROY F. WESTON INC.

INORGANIC LABORATORY CONTROL STANDARDS REPORT 03/01/93

MAR 0 9 1993

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	SPIKED AMOUNT	UNITS	%RECOV
LCS2	93S1366-LC2	Iron, LCS	94.2	100	MG/KG	94.2
		Potassium, LCS	1970	2000	MG/KG	98.7
		Magnesium, LCS	1930	2000	MG/KG	96.6
		Manganese, LCS	48.0	50.0	MG/KG	96.0
		Sodium, LCS	2020	2000	MG/KG	101
		Nickel, LCS	46.8	50.0	MG/KG	93.6
		Antimony, LCS	45.4	50.0	MG/KG	90.8
		Vanadium, LCS	50.4	50.0	MG/KG	101
		Zinc, LCS	46.5	50.0	MG/KG	93.0
LCS1	93S1367-LC1	Arsenic, LCS	3.6	4.0	MG/KG	90.0
		Lead, LCS	1.8	2.0	MG/KG	90.0
		Selenium, LCS	0.96	1.0	MG/KG	96.0
		Thallium, LCS	4.3	5.0	MG/KG	86.0
LCS2	93S1367-LC2	Arsenic, LCS	3.7	4.0	MG/KG	92.5
		Lead, LCS	2.4	2.0	MG/KG	120
		Selenium, LCS	0.96	1.0	MG/KG	96.0
		Thallium, LCS	4.2	5.0	MG/KG	84.0

FEDERAL REGISTER

PART 1926.650 (AMENDED)

SENT BY:WESTON REGION IV TAT ;12-23-92 9:48AM ; 4043520659→ 502 499 9019;#13

PART 1926—[AMENDED]

Subpart M—[Amended]

1. By revising the authority citation for subpart M of part 1926 to read as follows:

Authority: Sec. 107, Contract Work Hours and Safety Standards Act (Construction Safety Act) (40 U.S.C. 333); Secs. 4, 6, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), or 9-83 (48 FR 35736), as applicable, and 29 CFR part 1911.

2. By revising subpart P of part 1926 to read as follows:

Subpart P—Excavations

Sec.

1926.650 Scope, application, and definitions applicable to this subpart.

1926.651 General requirements.

1926.652 Requirements for protective systems.

Appendix A to Subpart P—Soil Classification

Appendix B to Subpart P—Sloping and Benching

Appendix C to Subpart P—Timber Shoring for Trenches

Appendix D to Subpart P—Aluminum Hydraulic Shoring for Trenches

Appendix E to Subpart P—Alternatives to Timber Shoring

Appendix F to Subpart P—Selection of Protective Systems

Subpart P—Excavations

Authority: Sec. 107, Contract Worker Hours and Safety Standards Act (Construction Safety Act) (40 U.S.C. 333); Secs. 4, 6, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), or 9-83 (48 FR 35736), as applicable, and 29 CFR part 1911.

§ 1926.650 Scope, application, and definitions applicable to this subpart.

(a) *Scope and application.* This subpart applies to all open excavations made in the earth's surface. Excavations are defined to include trenches.

(b) *Definitions applicable to this subpart.*

Accepted engineering practices means those requirements which are compatible with standards of practice required by a registered professional engineer.

Aluminum Hydraulic Shoring means a pre-engineered shoring system comprised of aluminum hydraulic cylinders (crossbraces) used in conjunction with vertical rails (uprights) or horizontal rails (walers). Such system is designed, specifically to support the sidewalls of an excavation and prevent cave-ins.

Bell-bottom pier hole means a type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a belled shape.

Benching (Benching system) means a method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Cave-in means the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

Competent person means one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Cross braces mean the horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or walers.

Excavation means any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

Faces or *sides* means the vertical or inclined earth surfaces formed as a result of excavation work.

Failure means the breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

Hazardous atmosphere means an atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

Kickout means the accidental release or failure of a cross brace.

Protective system means a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

Ramp means an inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.

Registered Professional Engineer means a person who is registere professional engineer in the stat the work is to be performed. Howeve professional engineer, registered in a state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated dat to be used in interstate commerce.

Sheeting means the members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield (Shield system) means a structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either premanufactured or job-built in accordance with § 1926.652 (c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

Shoring (Shoring system) means a structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavatio and which is designed to prevent e ins.

Sides. See "Faces."

Sloping (Sloping system) means a method of protecting employees from cave-ins by excavating to form sides o an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Stable rock means natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by anoth protective system that has been designed by a registered professional engineer.

Structural ramp means a ramp built steel or wood, usually used for vehicle access. Ramps made of soil or rock are not considered structural ramps.

Support system means a structure such as underpinning, bracing, or shoring, which provides support adjacent structure, underground

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installation, or the sides of an excavation.

Tabulated data means tables and charts approved by a registered professional engineer and used to design and construct a protective system.

Trench (Trench excavation) means a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

Trench box. See "Shield."

Trench shield. See "Shield."

Uprights means the vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called "sheeting."

Wales means horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

§ 1926.651 General requirements.

(a) *Surface encumbrances.* All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

(b) *Underground installations.* (1) The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation.

(2) Utility companies or owners shall be contacted within established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation. When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours (unless a longer period is required by state or local law), or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used.

(3) When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means.

(4) While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees.

(c) *Access and egress*—(1) *Structural ramps.* (i) Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

(ii) Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement.

(iii) Structural members used for ramps and runways shall be of uniform thickness.

(iv) Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.

(v) Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.

(2) *Means of egress from trench excavations.* A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet (1.22 m) or more in depth so as to require no more than 25 feet (7.62 m) of lateral travel for employees.

(d) *Exposure to vehicular traffic.* Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

(e) *Exposure to falling loads.* No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with § 1926.601(b)(6), to provide adequate protection for the operator during loading and unloading operations.

(f) *Warning system for mobile equipment.* When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

(g) *Hazardous atmospheres*—(1) *Testing and controls.* In addition to the requirements set forth in subparts D and E of this part (29 CFR 1926.50–1926.107) to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements shall apply:

(i) Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet (1.22 m) in depth.

(ii) Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation in accordance with subparts D and E of this part respectively.

(iii) Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.

(iv) When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

(2) *Emergency rescue equipment.* (i) Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.

(ii) Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wea a harness with a life-line securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually

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attended at all times while the employee wearing the lifeline is in the excavation.

(h) *Protection from hazards associated with water accumulation.* (1) Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

(2) If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.

(3) If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person and compliance with paragraphs (h)(1) and (h)(2) of this section.

(i) *Stability of adjacent structures.* (1) Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

(2) Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted except when:

(i) A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or

(ii) The excavation is in stable rock; or

(iii) A registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or

(iv) A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

(3) Sidewalks, pavements, and appurtenant structure shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

(j) *Protection of employees from loose rock or soil.* (1) Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection.

(2) Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet (.61 m) from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

(k) *Inspections.* (1) Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

(2) Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

(l) *Fall protection.* (1) Where employees or equipment are required or permitted to cross over excavations, walkways or bridges with standard guardrails shall be provided.

(2) Adequate barrier physical protection shall be provided at all remotely located excavations. All wells, pits, shafts, etc., shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc., shall be backfilled.

§ 1926.652 Requirements for protective systems.

(a) *Protection of employees in excavations.* (1) Each employee in an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with paragraph (b) or (c) of this section except when:

(i) Excavations are made entirely in stable rock; or

(ii) Excavations are less than 5 feet (1.52m) in depth and examination of the ground by a competent person provides no indication of a potential cave-in.

(2) Protective systems shall have a capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

(b) *Design of sloping and benching systems.* The slopes and configurations of sloping and benching systems shall be selected and constructed by the employer or his designee and shall be in accordance with the requirements of paragraph (b)(1); or, in the alternative, paragraph (b)(2); or, in the alternative, paragraph (b)(3); or, in the alternative, paragraph (b)(4), as follows:

(1) *Option (1)—Allowable configurations and slopes.* (i) Excavations shall be sloped at an angle not steeper than one and one-half horizontal to one vertical (34 degrees measured from the horizontal), unless the employer uses one of the other options listed below.

(ii) Slopes specified in paragraph (b)(1)(i) of this section, shall be excavated to form configurations that are in accordance with the slopes shown for Type C soil in Appendix B to this subpart.

(2) *Option (2)—Determination of slopes and configurations using Appendices A and B.* Maximum allowable slopes, and allowable configurations for sloping and benching systems, shall be determined in accordance with the conditions and requirements set forth in appendices A and B to this subpart.

(3) *Option (3)—Designs using other tabulated data.* (i) Designs of sloping or benching systems shall be selected from and be in accordance with tabulated data, such as tables and charts.

(ii) The tabulated data shall be in written form and shall include all of the following:

(A) Identification of the parameters that affect the selection of a sloping or benching system drawn from such data;

(B) Identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe;

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(C) Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

(iii) At least one copy of the tabulated data which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data shall be made available to the Secretary upon request.

(4) *Option (4)—Design by a registered professional engineer.* (i) Sloping and benching systems not utilizing Option (1) or Option (2) or Option (3) under paragraph (b) of this section shall be approved by a registered professional engineer.

(ii) Designs shall be in written form and shall include at least the following:

(A) The magnitude of the slopes that were determined to be safe for the particular project;

(B) The configurations that were determined to be safe for the particular project; and

(C) The identity of the registered professional engineer approving the design.

(iii) At least one copy of the design shall be maintained at the jobsite while the slope is being constructed. After that time the design need not be at the jobsite, but a copy shall be made available to the Secretary upon request.

(c) *Design of support systems, shield systems, and other protective systems.* Designs of support systems shield systems, and other protective systems shall be selected and constructed by the employer or his designee and shall be in accordance with the requirements of paragraph (c)(1); or, in the alternative, paragraph (c)(2); or, in the alternative, paragraph (c)(3); or, in the alternative, paragraph (c)(4) as follows:

(1) *Option (1)—Designs using appendices A, C and D.* Designs for timber shoring in trenches shall be determined in accordance with the conditions and requirements set forth in appendices A and C to this subpart. Designs for aluminum hydraulic shoring shall be in accordance with paragraph (c)(2) of this section, but if manufacturer's tabulated data cannot be utilized, designs shall be in accordance with appendix D.

(2) *Option (2)—Designs Using Manufacturer's Tabulated Data.* (i) Design of support systems, shield systems, or other protective systems that are drawn from manufacturer's tabulated data shall be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

(ii) Deviation from the specifications, recommendations, and limitations issued or made by the manufacturer shall only be allowed after the manufacturer issues specific written approval.

(iii) Manufacturer's specifications, recommendations, and limitations, and manufacturer's approval to deviate from the specifications, recommendations, and limitations shall be in written form at the jobsite during construction of the protective system. After that time this data may be stored off the jobsite, but a copy shall be made available to the Secretary upon request.

(3) *Option (3)—Designs using other tabulated data.* (i) Designs of support systems, shield systems, or other protective systems shall be selected from and be in accordance with tabulated data, such as tables and charts.

(ii) The tabulated data shall be in written form and include all of the following:

(A) Identification of the parameters that affect the selection of a protective system drawn from such data;

(B) Identification of the limits of use of the data;

(C) Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

(iii) At least one copy of the tabulated data, which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data shall be made available to the Secretary upon request.

(4) *Option (4)—Design by a registered professional engineer.* (i) Support systems, shield systems, and other protective systems not utilizing Option 1, Option 2 or Option 3, above, shall be approved by a registered professional engineer.

(ii) Designs shall be in written form and shall include the following:

(A) A plan indicating the sizes, types, and configurations of the materials to be used in the protective system; and

(B) The identity of the registered professional engineer approving the design.

(iii) At least one copy of the design shall be maintained at the jobsite during construction of the protective system. After that time, the design may be stored off the jobsite, but a copy of the design shall be made available to the Secretary upon request.

(d) *Materials and equipment.* (1) Materials and equipment used for protective systems shall be free from damage or defects that might impair their proper function.

(2) Manufactured materials and equipment used for protective systems shall be used and maintained in a manner that is consistent with the recommendations of the manufacturer, and in a manner that will prevent employee exposure to hazards.

(3) When material or equipment that is used for protective systems is damaged, a competent person shall examine the material or equipment and evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service, and shall be evaluated and approved by a registered professional engineer before being returned to service.

(e) *Installation and removal of support*—(1) *General.* (i) Members of support systems shall be securely connected together to prevent sliding, falling, kickouts, or other predictable failure.

(ii) Support systems shall be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system.

(iii) Individual members of support systems shall not be subjected to loads exceeding those which those members were designed to withstand.

(iv) Before temporary removal of individual members begins, additional precautions shall be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system.

(v) Removal shall begin at, and progress from, the bottom of the excavation. Members shall be released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation.

(vi) Backfilling shall progress together with the removal of support systems from excavations.

(2) *Additional requirements for support systems for trench excavations.* (i) Excavation of material to a level no greater than 2 feet (.61 m) below the bottom of the members of a support system shall be permitted, but only if the system is designed to resist the force calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system.

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(ii) Installation of a support system shall be closely coordinated with the excavation of trenches.

(f) *Sloping and benching systems.* Employees shall not be permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.

(g) *Shield systems*—(1) *General.* (i) Shield systems shall not be subjected to loads exceeding those which the system was designed to withstand.

(ii) Shields shall be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.

(iii) Employees shall be protected from the hazard of cave-ins when entering or exiting the areas protected by shields.

(iv) Employees shall not be allowed in shields when shields are being installed, removed, or moved vertically.

(2) *Additional requirement for shield systems used in trench excavations.* Excavations of earth material to a level not greater than 2 feet (.61 m) below the bottom of a shield shall be permitted, but only if the shield is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield.

Appendix A to Subpart P

Soil Classification

(a) *Scope and application*—(1) *Scope.* This appendix describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. The appendix contains definitions, sets forth requirements, and describes acceptable visual and manual tests for use in classifying soils.

(2) *Application.* This appendix applies when a sloping or benching system is designed in accordance with the requirements set forth in § 1926.652(b)(2) as a method of protection for employees from cave-ins. This appendix also applies when timber shoring for excavations is designed as a method of protection from cave-ins in accordance with appendix C in subpart P of part 1926, and when aluminum hydraulic shoring is designed in accordance with appendix D. This Appendix also applies if other protective systems are designed and selected for use from data prepared in accordance with the requirements set forth in § 1926.652(c), and the use of the data is indicated on the use of the soil classification system set forth in this appendix.

(b) *Definitions.* The definitions and examples given below are based on, in whole or in part, the following: American Society for Testing Materials (ASTM) Standards D653–85 and D2488; The Unified Soils Classification System, The U.S. Department of Agriculture (USDA) Textural Classification Scheme; and The National Bureau of Standards Report BSS–121.

Cemented soil means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

Cohesive soil means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sideslopes, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

Dry soil means soil that does not exhibit visible signs of moisture content.

Fissured means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

Granular soil means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

Layered system means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

Moist soil means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

Plastic means a property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.

Saturated soil means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or shear vane.

Soil classification system means, for the purpose of this subpart, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the environmental conditions of exposure.

Stable rock means natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

Submerged soil means soil which is underwater or is free seeping.

Type A means cohesive soils with an unconfined compressive strength of 1.5 tons per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:

(i) The soil is fissured; or

(ii) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or

(iii) The soil has been previously disturbed; or

(iv) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or

(v) The material is subject to other factors that would require it to be classified as a less stable material.

Type B means:

(i) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or

(ii) Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.

(iii) Previously disturbed soils except those which would otherwise be classed as Type C soil.

(iv) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or

(v) Dry rock that is not stable; or

(vi) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified Type B.

Type C means:

(i) Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or

(ii) Granular soils including gravel, sand, and loamy sand; or

(iii) Submerged soil or soil from which water is freely seeping; or

(iv) Submerged rock that is not stable, or

(v) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

Unconfined compressive strength means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.

Wet soil means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

(c) *Requirements*—(1) *Classification of soil and rock deposits.* Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in paragraph (b) of this appendix.

(2) *Basis of classification.* The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis. Such analyses

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shall be conducted by a competent person using tests described in paragraph (d) below, or to other recognized methods of soil classification and testing such as those adopted by the America Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.

(3) *Visual and manual analyses.* The visual and manual analyses, such as those noted as being acceptable in paragraph (d) of this appendix, shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the deposits.

(4) *Layered systems.* In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.

(5) *Reclassification.* If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

(d) *Acceptable visual and manual tests.*—(1) *Visual tests.* Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

(i) Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.

(ii) Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.

(iii) Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.

(iv) Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.

(v) Observe the opened side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.

(vi) Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.

(vii) Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

(2) *Manual tests.* Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

(i) *Plasticity.* Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as ⅛-inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of ⅛-inch thread can be held on one end without tearing, the soil is cohesive.

(ii) *Dry strength.* If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

(iii) *Thumb penetration.* The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. (This test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designation D2488—"Standard Recommended Practice for Description of Soils (Visual—Manual Procedure).") Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.

(iv) *Other strength tests.* Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand-operated shearvane.

(v) *Drying test.* The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.54 cm) and six inches (15.24 cm) in diameter until it is thoroughly dry:

(A) If the sample develops cracks as it dries, significant fissures are indicated.

(B) Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as a unfissured cohesive material and the unconfined compressive strength should be determined.

(C) If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

Appendix B to Subpart P

Sloping and Benching

(a) *Scope and application.* This appendix contains specifications for sloping and benching when used as methods of protection employees working in excavations from cave-ins. The requirements of this appendix apply when the design of sloping and benching protective systems is to be performed in accordance with the requirements set forth in § 1926.652(b)(2).

(b) *Definitions.*

Actual slope means the slope to which an excavation face is excavated.

Distress means that the soil is in a condition where a cave-in is imminent or is likely to occur. Distress is evidenced by such phenomena as the development of fissures in the face of or adjacent to an open excavation; the subsidence of the edge of an excavation; the slumping of material from the face or the bulging or heaving of material from the bottom of an excavation; the spalling of material from the face of an excavation; and raveling, i.e., small amounts of material such as pebbles or little clumps of material suddenly separating from the face of an excavation and trickling or rolling down into the excavation.

Maximum allowable slope means the steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V).

Short term exposure means a period of time less than or equal to 24 hours that an excavation is open.

(c) *Requirements.*—(1) *Soil classification.* Soil and rock deposits shall be classified in accordance with appendix A to subpart P of part 1926.

(2) *Maximum allowable slope.* The maximum allowable slope for a soil or rock deposit shall be determined from Table B-1 of this appendix.

(3) *Actual slope.* (i) The actual slope shall not be steeper than the maximum allowable slope.

(ii) The actual slope shall be less steep than the maximum allowable slope, when there are signs of distress. If that situation occurs, the slope shall be cut back to an actual slope which is at least ½ horizontal to one vertical (½H:1V) less steep than the maximum allowable slope.

(iii) When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such reduction is achieved. Surcharge loads from adjacent structures shall be evaluated in accordance with § 1926.651(i).

(4) *Configurations.* Configurations of sloping and benching systems shall be in accordance with Figure B-1.

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TABLE B-1

MAXIMUM ALLOWABLE SLOPES

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V) [1] FOR EXCAVATIONS LESS THAN 20 FEET DEEP [3]
STABLE ROCK TYPE A [2] TYPE B TYPE C	VERTICAL (90°) 3/4 : 1 (53°) 1:1 (45°) 1½: 1 (34)

NOTES:

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
2. A short-term maximum allowable slope of 1/2H:1V (63°) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4H:1V (53°).
3. Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

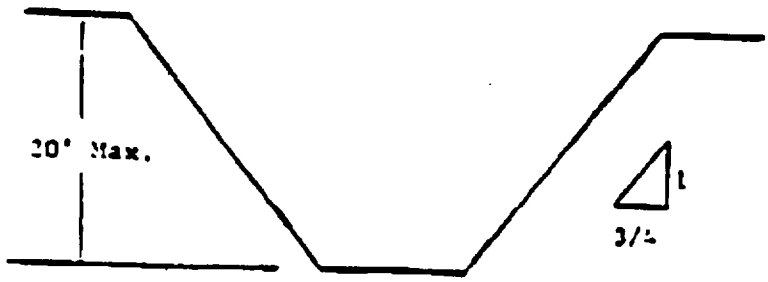
Figure B-1

Slope Configurations

(All slopes stated below are in the horizontal to vertical ratio)

B-1.1 Excavations made in Type A soil.

1. All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of ¾:1.



Simple Slope—General

Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have a maximum allowable slope of ½:1.

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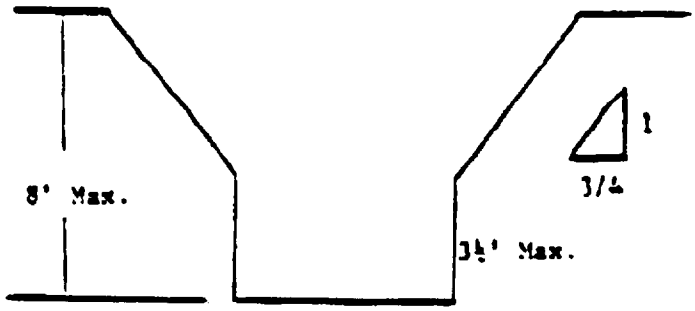
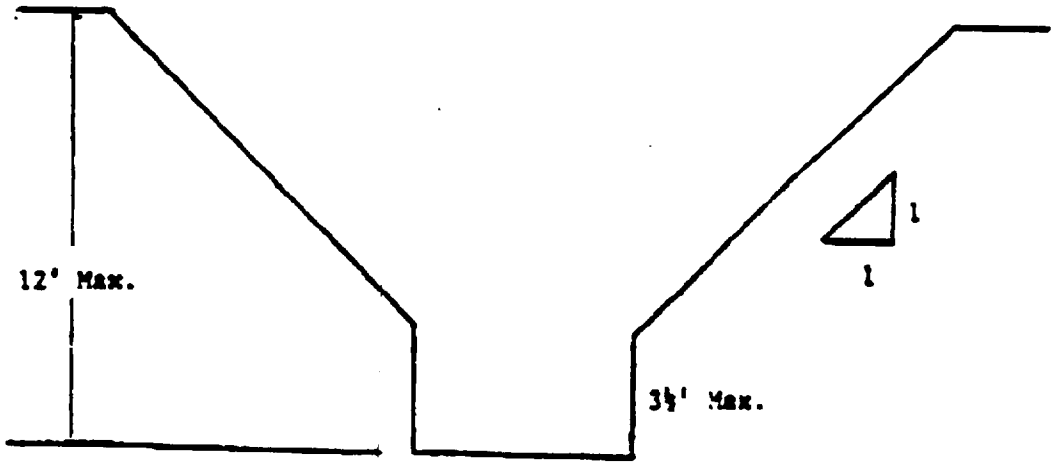


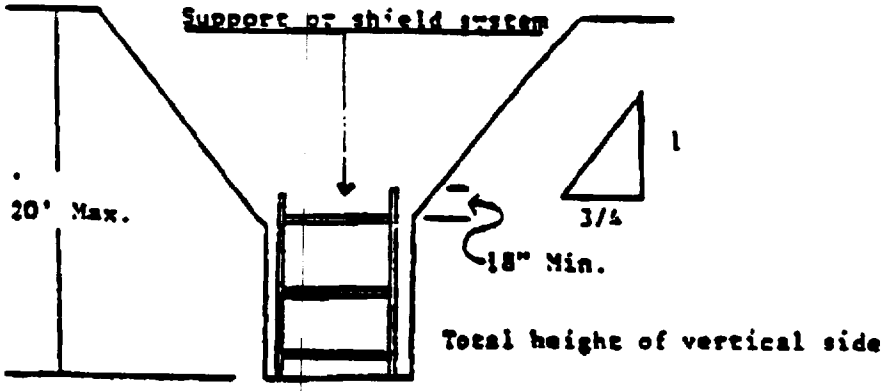
Unsupported Vertically Sided Lower Portion—Maximum 8 Feet in Depth

All excavations more than 8 feet but not more than 12 feet in depth which unsupported vertically sided lower portions shall have a maximum allowable slope of 1:1 and a maximum vertical side of 3½ feet.



Unsupported Vertically Sided Lower Portion—Maximum 12 Feet in Depth

All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of ¾:1. The support or shield system must extend at least 18 inches above the top of the vertical side.



Supported or Shielded Vertically Sided Lower Portion

4. All other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with the other options permitted under § 1926.652(b).

B-1.2 Excavations Made in Type B Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

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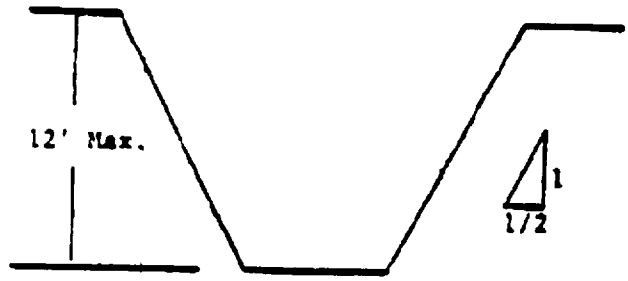
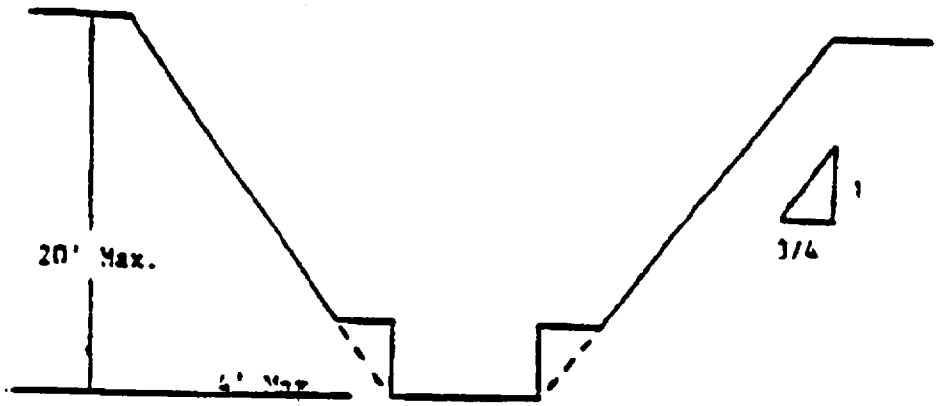
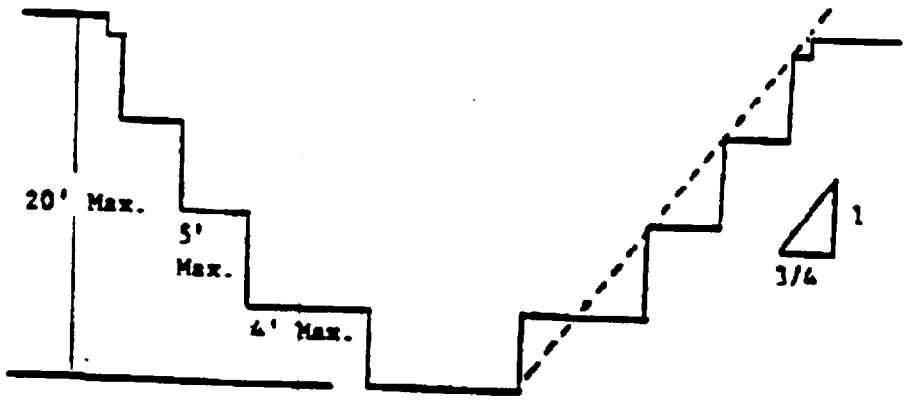


Simple Slope—Short Term

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of ¾ to 1 and maximum bench dimensions as follows:



Simple Bench



Multiple Bench

3. All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical side of 3½ feet.

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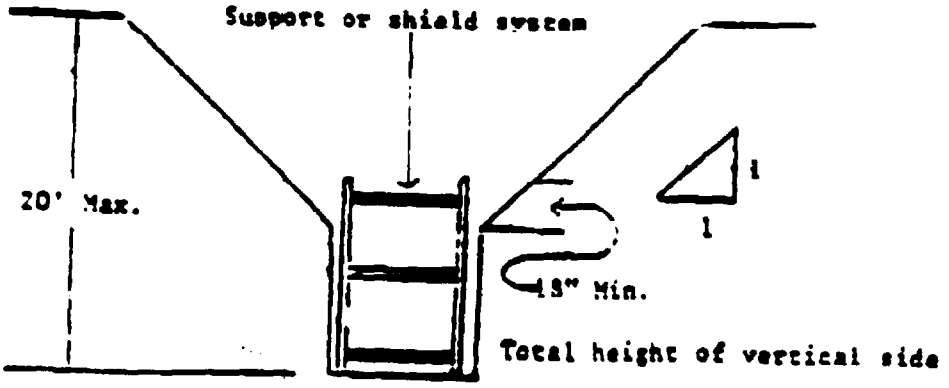
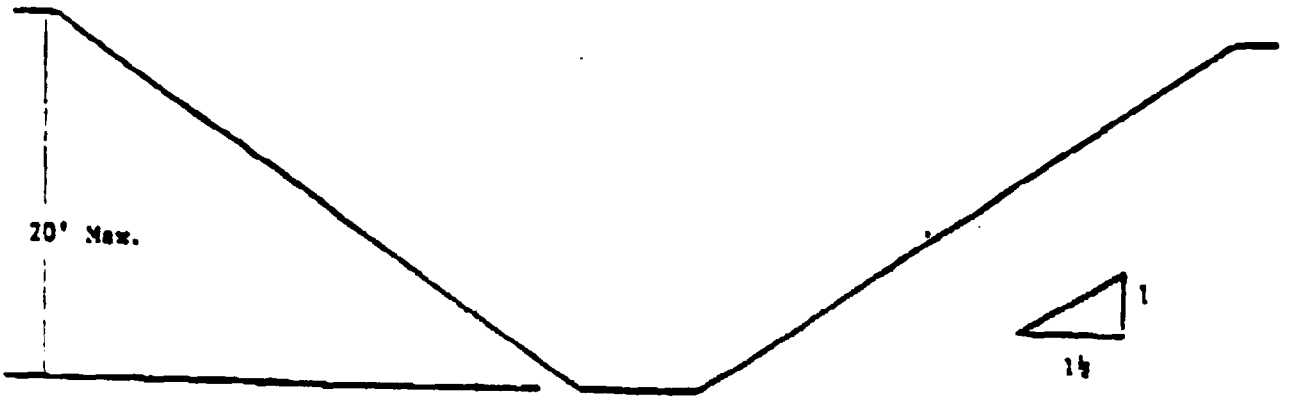


Vertically Sided Lower Portion

4. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

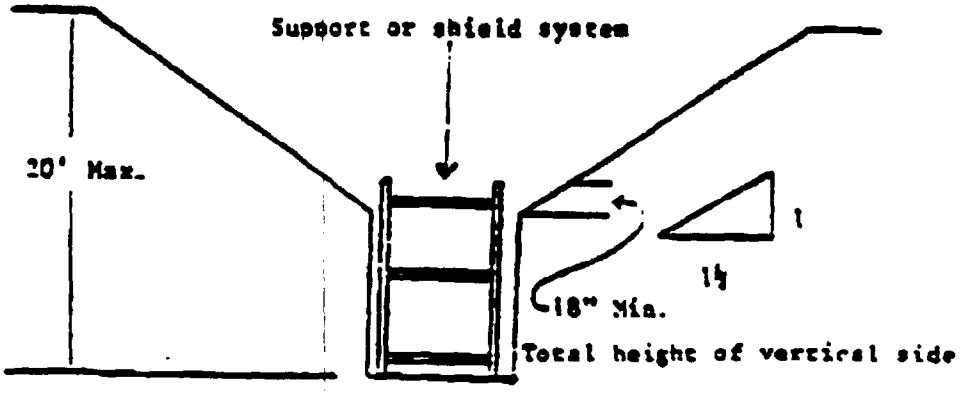
B-1.3 Excavations Made in Type C Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1½:1.



Simple Slope

2. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1½:1.



Vertical Sided Lower Portion

3. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

B-1.4 Excavations Made in Layered Soils

1. All excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth below.

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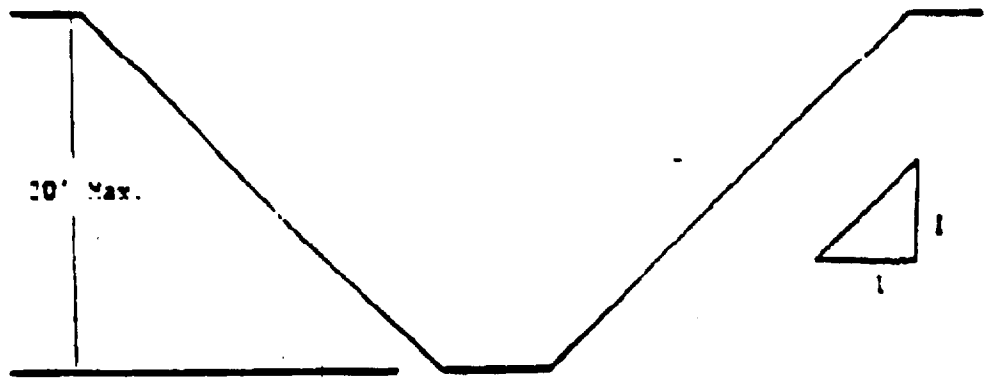
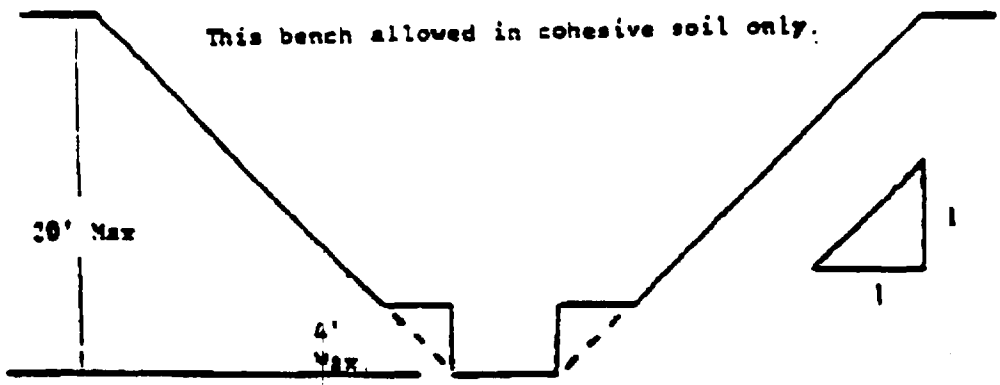
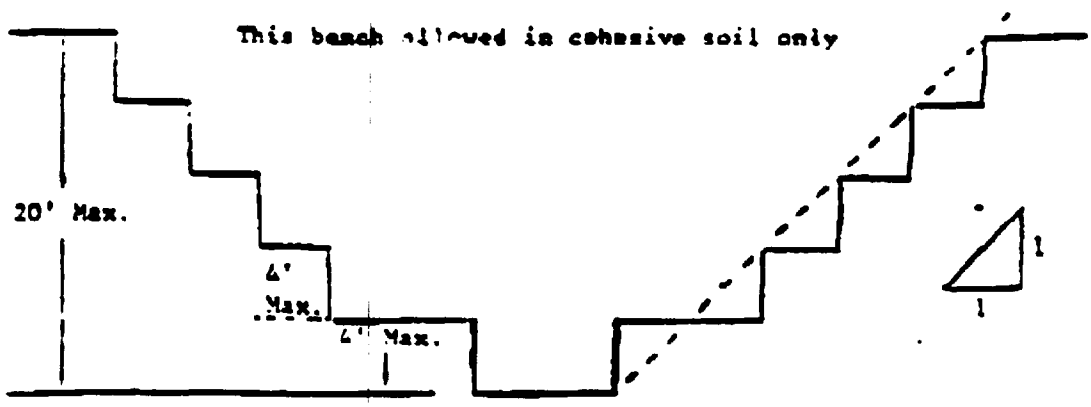


Simple Slope

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions as follows:



Single Bench



Multiple Bench

3. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.

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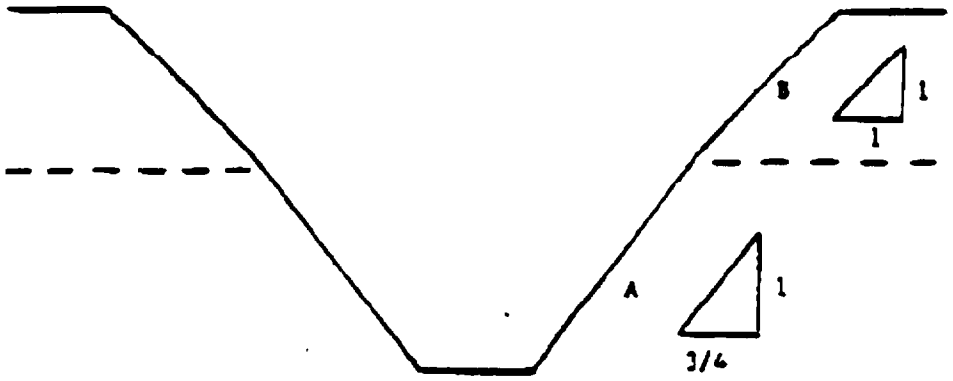
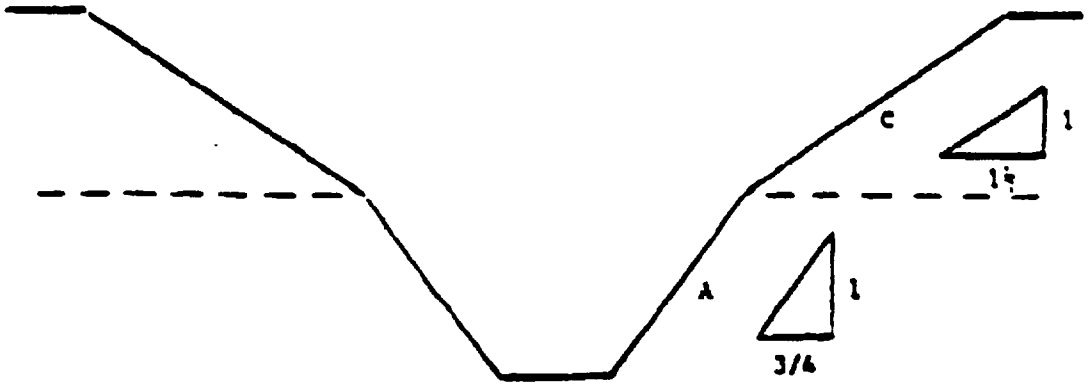
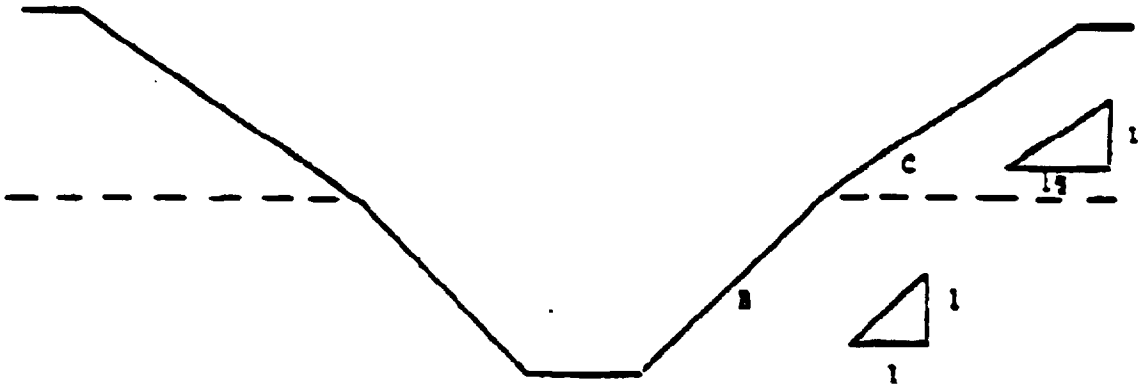


B OVER A



C OVER A



C OVER B

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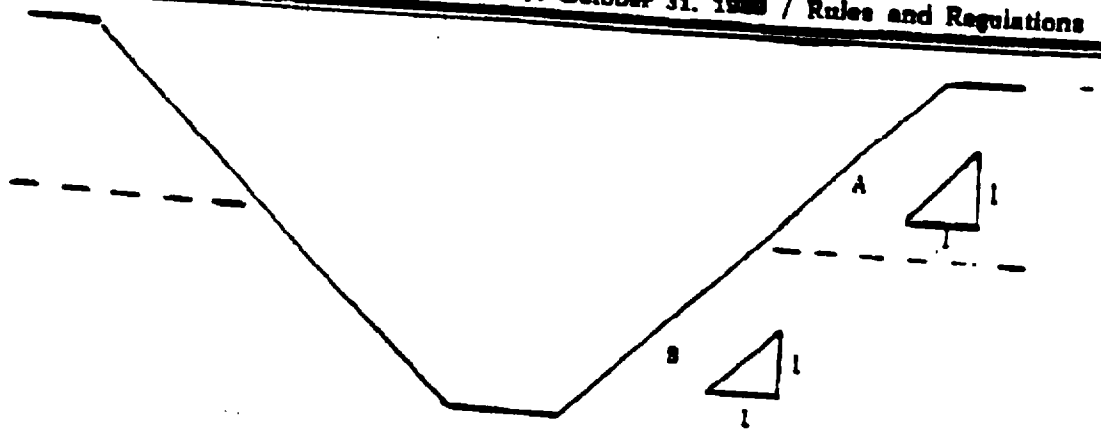
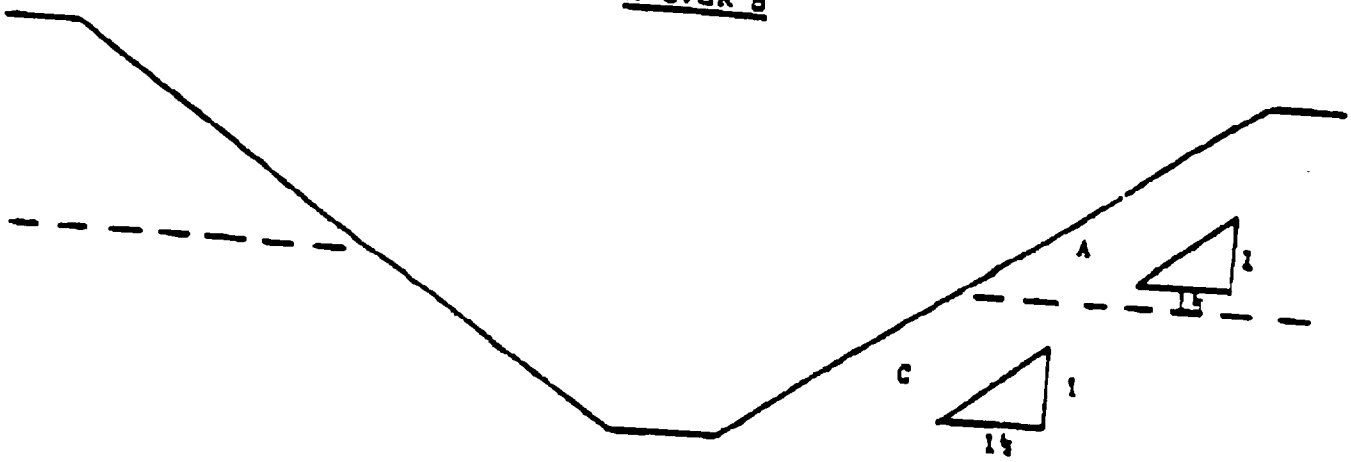
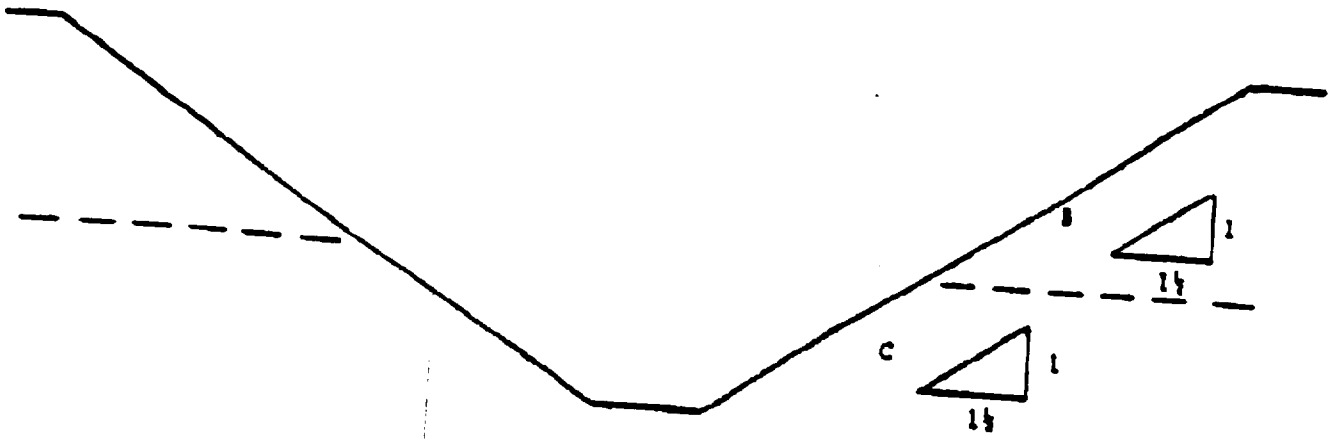


A OVER B



A OVER C



B OVER C

2. All other sloped excavations shall be in accordance with the other options permitted in § 1926.652(b).

Appendix C to Subpart P

Timber Shoring for Trenches

(a) *Scope.* This appendix contains information that can be used timber shoring as provided as a method of protection from cave-ins in trenches that do not exceed 20 feet (6.1 m) in depth. This appendix must be used when design of timber shoring protective systems is to be performed in accordance with § 1926.652(c)(1). Other timber shoring configurations; other systems of support such as hydraulic and pneumatic systems; and other protective systems such as sloping, benching, shielding, and freezing systems must be designed in accordance with the requirements set forth in § 1926.652(b) and § 1926.652(c).

(b) *Soil Classification.* In order to use the data presented in this appendix, the soil type or types in which the excavation is made must first be determined using the soil

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classification method set forth in appendix A of subpart P of this part.

(c) *Presentation of Information.* Information is presented in several forms as follows:

(1) Information is presented in tabular form in Tables C-1.1, C-1.2, and C-1.3, and Tables C-2.1, C-2.2 and C-2.3 following paragraph (g) of the appendix. Each table presents the minimum sizes of timber members to use in a shoring system, and each table contains data only for the particular soil type in which the excavation or portion of the excavation is made. The data are arranged to allow the user the flexibility to select from among several acceptable configurations of members based on varying the horizontal spacing of the crossbraces. Stable rock is exempt from shoring requirements and therefore, no data are presented for this condition.

(2) Information concerning the basis of the tabular data and the limitations of the data is presented in paragraph (d) of this appendix, and on the tables themselves.

(3) Information explaining the use of the tabular data is presented in paragraph (e) of this appendix.

(4) Information illustrating the use of the tabular data is presented in paragraph (f) of this appendix.

(5) Miscellaneous notations regarding Tables C-1.1 through C-1.3 and Tables C-2.1 through C-2.3 are presented in paragraph (g) of this Appendix.

(d) *Basis and limitations of the data.*—(1) *Dimensions of timber members.* (i) The sizes of the timber members listed in Tables C-1.1 through C-1.3 are taken from the National Bureau of Standards (NBS) report, "Recommended Technical Provisions for Construction Practice in Shoring and Sloping of Trenches and Excavations." In addition, where NBS did not recommend specific sizes of members, member sizes are based on an analysis of the sizes required for use by existing codes and on empirical practice.

(ii) The required dimensions of the members listed in Tables C-1.1 through C-1.3 refer to actual dimensions and not nominal dimensions of the timber. Employers wanting to use nominal size shoring are directed to Tables C-2.1 through C-2.3, or have this choice under § 1926.652(c)(3), and are referred to The Corps of Engineers, The Bureau of Reclamation or data from other acceptable sources.

(2) *Limitation of application.* (i) It is not intended that the timber shoring specification apply to every situation that may be experienced in the field. These data were developed to apply to the situations that are most commonly experienced in current trenching practice. Shoring systems for use in situations that are not covered by the data in this appendix must be designed as specified in § 1926.652(c).

(ii) When any of the following conditions are present, the members specified in the tables are not considered adequate. Either an alternate timber shoring system must be designed or another type of protective system designed in accordance with § 1926.652.

(A) When loads imposed by structures or by stored material adjacent to the trench weigh in excess of the load imposed by a two-foot soil surcharge. The term "adjacent" as used here means the area within a horizontal distance from the edge of the trench equal to the depth of the trench.

(B) When vertical loads imposed on cross braces exceed a 240-pound gravity load distributed on a one-foot section of the center of the crossbrace.

(C) When surcharge loads are present from equipment weighing in excess of 20,000 pounds.

(D) When only the lower portion of a trench is shored and the remaining portion of the trench is sloped or benched unless: The sloped portion is sloped at an angle less steep than three horizontal to one vertical; or the members are selected from the tables for use at a depth which is determined from the top of the overall trench, and not from the toe of the sloped portion.

(e) *Use of Tables.* The members of the shoring system that are to be selected using this information are the cross braces, the uprights, and the wales, where wales are required. Minimum sizes of members are specified for use in different types of soil. There are six tables of information, two for each soil type. The soil type must first be determined in accordance with the soil classification system described in appendix A to subpart P of part 1926. Using the appropriate table, the selection of the size and spacing of the members is then made. The selection is based on the depth and width of the trench where the members are to be installed and, in most instances, the selection is also based on the horizontal spacing of the crossbraces. Instances where a choice of horizontal spacing of crossbracing is available, the horizontal spacing of the crossbraces must be chosen by the user before the size of any member can be determined. When the soil type, the width and depth of the trench, and the horizontal spacing of the crossbraces are known, the size and vertical spacing of the crossbraces, the size and vertical spacing of the wales, and the size and horizontal spacing of the uprights can be read from the appropriate table.

(f) *Examples to illustrate the Use of Tables C-1.1 through C-1.3.*

(1) *Example 1.*

A trench dug in Type A soil is 13 feet deep and five feet wide.

From *Table C-1.1*, for acceptable arrangements of timber can be used.

Arrangement #1

Space 4 × 4 crossbraces at six feet horizontally and four feet vertically.

Wales are not required.

Space 3 × 8 uprights at six feet horizontally. This arrangement is commonly called "skip shoring."

Arrangement #2

Space 4 × 6 crossbraces at eight feet horizontally and four feet vertically.

Space 6 × 6 wales at four feet vertically.

Space 2 × 6 uprights at four feet horizontally.

Arrangement #3

Space 6 × 6 crossbraces at 10 feet horizontally and four feet vertically.

Space 6 × 10 wales at four feet vertically.

Space 2 × 6 uprights at five feet horizontally.

Arrangement #4

Space 6 × 6 crossbraces at 12 feet horizontally and four feet vertically.

Space 10 × 10 wales at four feet vertically.

Spaces 3 × 6 uprights at six feet horizontally.

(2) *Example 2.*

A trench dug in Type B soil in 13 feet deep and five feet wide. From Table C-1.2 three acceptable arrangements of members are listed.

Arrangement #1

Space 6 × 6 crossbraces at six feet horizontally and five feet vertically.

Space 6 × 8 wales at five feet vertically.

Space 2 × 6 uprights at two feet horizontally.

Arrangement #2

Space 6 × 8 crossbraces at eight feet horizontally and five feet vertically.

Space 10 × 10 wales at five feet vertically.

Space 2 × 6 uprights at two feet horizontally.

Arrangement #3

Space 6 × 8 crossbraces at 10 feet horizontally and five feet vertically.

Space 10 × 12 wales at five feet vertically.

Space 2 × 6 uprights at two feet vertically.

(3) *Example 3.*

A trench dug in Type C soil is 13 feet deep and five feet wide.

From Table C-1.3 two acceptable arrangements of members can be used.

Arrangement #1

Space 6 × 8 crossbraces at six feet horizontally and five feet vertically.

Space 10 × 12 wales at five feet vertically.

Position 2 × 6 uprights as closely together as possible.

If water must be retained use special tongue and groove uprights to form tight sheeting.

Arrangement #2

Space 6 × 10 crossbraces at eight feet horizontally and five feet vertically.

Space 12 × 12 wales at five feet vertically.

Position 2 × 6 uprights in a close sheeting configuration unless water pressure must be resisted. Tight sheeting must be used where water must be retained.

(4) *Example 4.*

A trench dug in Type C soil is 20 feet deep and 11 feet wide. The size and spacing of members for the section of trench that is over 15 feet in depth is determined using Table C-1.3. Only one arrangement of members is provided.

Space 6 × 10 crossbraces at six feet horizontally and five feet vertically.

Space 12 × 12 wales at five feet vertically.

Use 3 × 6 tight sheeting.

Use of Tables C-2.1 through C-2.3 would follow the same procedures.

(g) *Notes for all Tables.*

1. Member sizes at spacings other than indicated are to be determined as specified in § 1926.652(c), "Design of Protective Systems."

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2. When conditions are saturated or submerged use Tight Sheeting. Tight Sheeting refers to the use of specially-edged timber planks (e.g., tongue and groove) at least three inches thick, steel sheet piling, or similar construction that when driven or placed in position provide a tight wall to resist the lateral pressure of water and to prevent the loss of backfill material. Close Sheeting refers to the placement of planks side-by-side allowing as little space as possible between them.

3. All spacing indicated is measured center to center.

4. Waler to be installed with greater dimension horizontal.

5. If the vertical distance from the center of the lowest crossbrace to the bottom of the trench exceeds two and one-half feet, uprights shall be firmly embedded or a mudsill shall be used. Where uprights are embedded, the vertical distance from the center of the lowest crossbrace to the bottom of the trench shall not exceed 30 inches. When mudsills are used, the vertical distance shall not exceed 42 inches. Mudsills are waler that are installed at the toe of the trench side.

6. Trench jacks may be used in lieu of a combination with timber crossbraces.

7. Placement of crossbraces. When the vertical spacing of crossbraces is four feet, place the top crossbrace no more than two feet below the top of the trench. When the vertical spacing of crossbraces is five feet, place the top crossbrace no more than 2.5 feet below the top of the trench.

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ATTACHMENT E

Drum Log

WESTON MAJOR PROGRAMS DIVISION

MANAGERS DESIGNERS/CONSULTANTS

REGION IV TECHNICAL ASSISTANCE TEAM

DRUM LOG

Page 1 / 1

Site Name: Jefferson Co. Forest

TDD #: 04-9212-0012

Location: Brooks, Bullitt Co, Ky

Weather: 64°F, clear skies, 72% humidity

Samplers: J Maybner, M. Manka

Date: 10 February 1992

DRUM #	DRUM DESCRIPTION	CONTENT DESCRIPTION	FIELD CHARACTERISTICS: pH	HNU / OVA	% LEL	~~SOL~~ O2	SP GR* <,=,>	REAC*	FLM	~~POB~~ color	COMMENTS/REMARKS	TIME
JCF-04	Several bullet holes, severely rusted	5-8 gallons		45	Ø	20.8	NA				Gray liq	1555
JCF-05	"	8-10 gallons		Ø	Ø	20.8	NA				Bright green liq	1610
JCF-06	"	15-20 gallons		Ø	Ø	20.8	NA				appears to be motor oil.	1620

* Reference is water

ATTACHMENT F

Laboratory Analysis

OVERSIZED

DOCUMENT