permit file

File

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276, 217-782-3397
JAMES R. THOMPSON CENTER, 100 WEST RANDOLPH, SUITE 11-300, CHICAGO, IL 60601, 312-814-6026

ROD R. BLAGOJEVICH, GOVERNOR RENEE CIPRIANO, DIRECTOR

217/524-3300

December 16, 2004

CERTIFIED MAIL
7002 3150 0000 1110 8414

Clean Harbors Services, Inc.
Attn: Jim Laubsted
11800 South Stony Island Avenue
Chicago, Illinois 60617

US EPA RECORDS CENTER REGION 5
1000894

Re: 0316000051--Cook County
Clean Harbors Services, Inc. (CHSI)
ILD000608471
Log No. #16-TA-6
RCRA Permit File

Dear Mr. Laubsted:

This letter is in response to your request for a Temporary Authorization, pursuant to 35 Ill. Adm. Code 703.280(3), to operate a lamp crusher in accordance with the application dated October 20, 2004. This application was subsequently modified on November 10, 2004.

In accordance with 35 Ill. Adm. Code 703.280(e)(3), the Illinois EPA has approved your request to operate the miscellaneous unit (lamp crusher) at CHSI. Operations must be conducted in accordance with the operating procedures identified in the application for a class III modification dated March 15, 2004 for the lamp crusher, the revisions to the modification request received on August 25, 2004, August 31, 2004 and September 9, 2004, the special conditions in Attachment A to this letter, and the requirements of 35 Ill. Adm. Code 724. This approval shall terminate 180 days from the date of this letter.

If you have any questions regarding this letter, please contact Mark A. Schollenberger, P.E. of my staff at 217/524-3307.

Sincerely,

Joyce L. Munie, P.E.
Manager, Permit Section
Bureau of Land

RELEASABLE
DEC 22 2004
REVIEWER MD

JLM:MAS:bjh\04173s.doc

Attachment

cc: USEPA, Harriet Croke
USEPA, Jim Blough

bcc: Bureau File
Des Plaines
Ted Dragovich
Mark Schollenberger
Hope Wright

ATTACHMENT A

SPECIAL CONDITIONS FOR THE TEMPORARY AUTHORIZATION TO CONSTRUCT

1. This temporary authorization (TA) allows for operation of the following units identified in the application Log No. 16-TA-6:

   a. Lamp Crusher; and

   b. Ancillary Equipment Associated with This Unit (e.g. fire suppression, emission collection and control, residue collection, etc.,)

   The temporary authorization does not allow the operation of any other unit which has not been authorized in the facilities RCRA part b permit, log no.#B-16.

2. The Permittee shall operate the units identified above in accordance with the approved permit applications (Log No. B-16-TA-6), subject to the following modifications:

   a. Only wastes identified in Attachment A of the facility's approved Part B permit for crushing may be placed in the unit.

   b. The waste must be analyzed in accordance with the waste analysis plan contained in the approved Part B permit.

   c. The Permittee shall not operate the lamp crusher unless the air pollution control system unit is operable.

   d. The Permittee shall operate the lamp crusher for 10 minutes following the last feed of lamps for processing before shutting down the unit.

   e. To ensure the unit is operating correctly, each drum of co-products shall be visually inspected daily for signs of cross-contamination. The unit shall be shut down if signs of cross-contamination are present and remain shut down until the reason for the cross-contamination is fixed.

   f. The Permittee shall not operate the lamp crusher unless the mercury monitoring devices are operating. The mercury concentration in the stack shall be monitored daily and the work place air quality shall be monitored continuously.

   g. To ensure breakthrough has not occurred, the permittee shall conduct daily monitoring of the mercury concentration in the air at the inlet and outlet points of the carbon units shall be determined daily. The activated carbon shall be replaced

with new carbon within 24 hours after monitoring indicates the control device did not reduce the total mercury content of the inlet stream by 95%.

h. Personnel shall wear at least a cartridge respirator (Mersob-P100 cartridges or equivalent) and ear protection when the unit is operating.

3. The Permittee shall inspect the lamp crusher unit daily for signs of leaks, spills or releases, and to verify that the safety systems are functioning and inspect the secondary containment system in accordance with the Part B permit. *(Note: these units are located within a permitted container storage unit.)*

4. In the event of a leak or a spill from the lamp crusher or if the unit becomes unfit for continued use, the Permittee shall remove the system from service immediately and complete the following actions:

   a. Take appropriate action to clean up any release of waste from the miscellaneous unit immediately after removing the system from service;

   b. Remove all wastes from the system within 24 hours of the detection of the leak or spill to prevent further releases and to allow inspection and repair of the system;

   c. Determine the cause of the release;

   d. Make any necessary repairs to fully restore the integrity of the system before returning the unit to service; and

   e. Manage all wastes resulting from the cleanup of a spill or leak as a hazardous waste.

5. The Permittee shall implement the facility's contingency plan whenever there is a fire, explosion or spill, which involves hazardous waste. The Permittee shall follow the notification requirements described in Attachment D Section F (contingency plan) Condition 2 of the RCRA Part B permit, Log No.B-16.

6. In the event the lamp crusher is removed from service to correct leaks the Permittee shall submit certification of major repairs to the Illinois EPA within seven days from returning a the unit to use.

7. The actions required in special conditions 3,4,5 and 6 above shall be placed in the facility's operating record.

8. The lamp crusher shall be closed, and all waste and waste residue removed at the expiration of the temporary authorization unless the Permittee has received a RCRA Part B permit to operate these units.

9. The Permittee shall provide and maintain financial assurance to complete closure of these units. Financial assurance must be maintained in accordance with the applicable requirements of 35 Ill. Adm. Code 724 Subpart H.

JLM:MAS:bjh\04173s.doc

Part B Tracking Sheet

Comment By: 1/21/2005

Log #	*Mod Type*	*Type*
16-TA-6	TA	

State ID #	*County*	*USEPA ID #*	*Reviewer*
0316000051	COOK	ILD000608471	MAS

GAU

AMB

Site

CLEAN HARBORS SVCS INC

City

CHICAGO

Status

P

Review Period:

90

Notifications		
FOS	*CMS*	*IHPA*
✓	✓	

Current Submittal:

Received:	Due:	Mailed:	Review:
10/21/2004	1/19/2005	12/16/2004	TA

Submittal 1			
Received	*Due*	*Mailed*	*Review*

Comment

Applicant: Clean Harbors Env. Services, Inc. 120-TA-6 rec'd 10/21/04
11800 South Stony Island Avenue
Chicago, Il 60617
0316000051 / ILD000608471

Submitted by: James Laubsted @ 773-646-6202

Reviewed by: Mark Schollenberger

Proposal: To receive a temporary authorization for a lamp crusher

for a temporary authorization

703.280 (c)(2)(A)(ii) states the Agency may issue a temporary authorization for a class III modification that meets the criteria in (e)(3)(B)(i) or (iii) through (v).

CHSI has submitted a class III modification request for the unit on April 23, 2004

703.280 (e)(2)(C) ...shall send a notice to all persons on the facility's mailing list within seven days of the request.

TA-6 The request was dated 10/20/04 and rec'd 10/21/04. CHSI provided a copy of the notification letter that was mailed. This letter is also dated October 20, 2004. Therefore, CHSI. complied with the 7 day requirement. No copy of the mailing list used was provided. A copy of the facility's mailing list was provided with the class III modification request.

703,280 (e)(3)(B)(iv) states a TA may be granted to enable the permittee to respond to sudden changes in the type or quantities of wastes managed under the facility permit

CHSI states that the Cincinnati facility is shutting down this operation and the universal wastes bulbs are being redirected to the Chicago facility

for the class three's modification requests

703.283 (b)...shall send a notice to all persons on the facility mailing list within seven days of the request and publish within a newspaper of general circulation in the county that hosts the facility, ... a notice which includes:

a) announcement of a 60 day comment period:
b) announcement of the date, time and place for a public meeting:
c) name and # of permittee's contact person
d) name and # of Agency contact person
e) location of request for viewing
f) compliance statement
g) meeting date < than 15 days from request and > 15 day from end of comment period

A copy of the notice, published April 22, 2004 was provided. The notice meets the requirements

above and supplies the necessary information

703.280 (e)(3)(a) ... must demonstrate the units in compliance with the standards of 35 IAC 724

for the lamp crusher 724.701

...must be located, designed, constructed operated, maintained ... in a manner that protects human health or the environment

...must include those provisions of 724 Subpart I thru O and AA thru CC that are appropriate

...must prevent adverse efforts ....from releases ... due to migration of hazardous constituents to groundwater, surface water, the soil or the air

The Agency views this mean to that the following issues should be addressed in the application:

a) containment; The lamp crusher is to be located within an existing RCRA permitted container storage area. Unit 25 is a fully enclosed structure constructed with a reinforced floor structure that is topped with a non-absorbent chemically-resistant sealant. The wastes for the proposed activity do not contain free liquids. The structural integrity of the unit has been previously certified in 1994.

The containment appears adequate and properly designed.

b) inspection;. The secondary containment system surrounding the system is already inspected daily for deterioration, cracks, release and/or spills. CHSI SOP indicates that the unit will be inspected prior to startup including the positioning of the receiving receptacles for the product steams produced by crushing the lamps. The permit will be conditioned to require visual inspection of the product streams for signs of cross-contamination. The application included a maintenance schedule for the unit and CHSI has indicated that they are following this schedule.

The inspection procedures appear to be adequate.

c) closure

Removal of waste	*- prov'd*
Decontamination of the system	*- prov'd*
Removal of the system	*-prov'd*
Proper disposal of waste/residuals	*-prov'd*
Estimate for closure	*- prov'd*

Revised pages to Section I have been provided which provides the above procedures/information

for the lamp crusher. The revised closure cost estimate is lower with the lamp crusher in Unit so the previous closure cost estimate for the unit will be used.

The revisions to the closure plan are adequate.

c) *air emissions – the unit is operated under negative pressure;, the unit draws air for ten minutes after the last lamp is crushed before shutting down; the emissions are sent through a carbon filtration unit, the work-area is continuously monitored for mercury vapor and the stack is monitored daily; compliance testing of the lamp crushing facility at Cincinnati indicates emissions are ~ 0.0020 lbs/hr (0.00031 grains/dry standard cubic foot); An Industrial Hygienist has certified that these levels are below ambient air background levels and pose no health concerns; testing of the unit at the Spring Grove facility indicates that mercury levels are below the ACGIH TLV and OSHA's PEL in the workplace.*

The application has demonstrated that the treatment process is protective of public health and the environment.

f) *design – the design of the unit has been certified by a licensed P.E. that the unit is fit for its intended use; this certification contains the language specified in 35 Ill Adm. Code 702.126.*

The design has been reviewed and approved by a P.E.

The owner, operator and an engineer, using the language in 35 IAC702.126, have certified the application.

Log No. B-16-M-58

Applicant: Clean Harbours Services, Inc.
11800 South Stony Island Ave.
Chicago, IL 60617
0316000051 / ILD 000608471

Submitted by: James R. Laubsted @ (773) 646-6202

Reviewed by: Mark A. Schollenberger

Proposal: to replace/utilize some of the permitted container storage area in Unit 25 to house a lamp crushing machine. This will reduce storage capacity to 4,015 gallons in the alkaline bay

Action:

The unit would be a miscellaneous unit

signed by CHSI ✓ (operator)
signed by Port District ✓ (owner)
signed by engineer ✓

tele conv on 5/21/04
the unit is in the FESHOP application

Added line 20 to Section VIII of the Part A
crushing of haz lamps - 2300 lbs/hr

Model LSS1

2.1 does the proposed unit include the optional equipment to continuously monitor the exhaust vent not on the stack inside the building continuously inside daily outside

How is each stream handled, as a product or waste?

Mercury Waste Solutions will go for retorting
RCRA facility
DUBLAK

the aluminum endcaps
the calcium phosphate powder
the crushed glass
the metallic particles

How long stored ✓
where stored
How much generated in a day
20% endcaps
20% powder
60% glass

Would these streams exhibit the characteristic of a hazardous waste. No yes NO
Hg

Will sodium lamps and metal halide lamps be crushed in the units? Yes

If so, what are the composition/characteristics of the streams produced.
both have phosphate power

3.4-3 Hearing protection must be worned.
3.4 respiratory protection required for certain operations

3.6 Are you proposing direct reading mercury vapor instruments in the:

only 1 monitor
- operator work area
- vapor fan stack
- coproduct's collection area.

evidence of phosphor powder

5.3 How often will the coproduct be monitored to ensure unit is operating properly, i.e., no cross-contamination visually on every drum

6.2 The vapor fan should be allowed to continue to operate ... is this continuously or for a set period of time.
Att 4 7.4 set for 10 minutes

6.3 the unit should run for 10 minutes following the last feed of lamps for processing

What happens to the crushed glass/powder in the HID De-Globing chamber.

this standard comes from? 1.1 $\times 10^{-5}$ lb/hr allowable .11 lb/hr

2.7 ug/dscm .00031 gr/dscf

7.5 $\times 10^{-6}$ lb/hr .0020 lb/hr

MAX 1.3 $\times 10^{-5}$ particulate .0035

Table 2 pg 2

* When do you exchange the Mersorb P100 cartridges in the respirator

Att #6 Is attachment #6 stating that level C is required? yes - see 3.f, if below ACGIH & OSHA std. why is protection required.

What are the standards for? .025 mg/m3

O are you following the scheduled maintenance in Section 7.0.

Dimensions

H 12' L 30' W 11'

Process Rate

2300 lbs fluorescent lamps per hour

Design Stds

meets 29 CFR 1910.212 machine guarding std

Safety Features.

equipped with signs & labels req'd by OSHA CFR 1910.145
equipped with emergency stop buttons
equipped with safety interlocks, i.e,
will not operate without vapor collection system
designed to meet 29 CFR 1910.212
operated under negative pressure
has continuous monitoring for mercury vapor in worker area.

Is there a monitor for this? If not is there a monitor on fan speed?

Description of Wastes to be treated?

fluorescent lamps including metal halides and sodium lamps - see table C-17

prov'd on 9/1/04

Assessment of the Unit

the application has been certified by an engineer but no assessment

have ommission testing by Shaw Environmental, Inc but this is not the engineer that certified the application

Secondary Containment & Detection of Releases

unit is located on a permitted (inside a building) unit with secondary containment, lamps do not contain free liquids, sec. cont not req'd.

would have daily inspections for signs of spilled material

every drum of co-product would be inspected for signs of powder contamination (glass, metal)

the area is monitored continuously for Hg vapor

the stack is monitored daily.

SOP

daily inspection of unit & receiving bin

ensure fan is operational

ensure receiving bins are properly placed.

ATTA 6

Assessment of the Operation of the Unit
had an employee monitoring assessment conducted by Clean Harbors at the Spring Grove Facility
had Shaw Environmental, Inc due emission testing.

has to be a 24 hr 7day week exposure conclusion to the closest residential
engineer certified to structural integrity of the unit

tele conv on 5/25/04

end caps to Victor Metals in Ohio

the vapor fan only runs for 10 minutes after processing stops

✓ co-products will be stored for less than 90 days on a paved surface

No TCLP analysis performed on the co-products

□ Those are the standards for the Spring Grove, Ohio facility. The IEPA standards asked for .33 lbs/hr particulate
Hg limit based on OSHA std

* when the cartridge color changes to red.

○ They are following the mfg's recommendation for the maintenance schedule

\+ they are monitoring the pressure drop across the filter to ensure unit is negative pressure

What do you do with plastic coated lamps?

Answered on 9/9/04

Section 4.1 states "ensure that the four drums around the LSSI are properly positioned"

Section 5.2 states "Proximity sensors are mounted in the lids, attached to the glass fine discharge
the powder discharge
the baghouse discharge
the vacuum container discharge
of the drums.

Are these the same drums?
How do these relate to the four wastes streams described in Section 2?

Section 2 identifies:
- a discharge from the primary trommel – Al
- a discharge from the vibrating screen separator – $CaPO_4$
- a discharge from the magnetic conveyor – Al

What std was used to calculate the 1.1×10^{-5} lb/hr st
- the OSHA PEL
- the NIOSH REL or
- the ACGIH TLV?

Is Attachment 7 accurate when it says the Hg concentration in the air at the inlet and outlet points of the carbon units will be determined using a direct reading vapor monitoring device

Not correct today

Graph

Part B Tracking Sheet

Comment By: 12/18/2004 jm

Log #	*Mod Type*	*Type*
16-TA-6	TA	

State ID #	*County*	*USEPA ID #*	*Reviewer*
0316000051	COOK	ILD000608471	MAS

GAU
AMB

Site
CLEAN HARBORS SVCS INC

City
CHICAGO

Status
A

Review Period:
90

Notifications

FOS	*CMS*	*IHPA*
☑	☑	☐

Current Submittal:

Received:	Due:	Mailed:	Review:
10/21/2004	1/19/2005		TA

Submittal 1

Received	*Due*	*Mailed*	*Review*

Comment

Permit's Financial Assurance Inquiry Report

LPC	0316000051
Site Name	CLEAN HARBORS OF CHICAGO
Date of Last Compliance Review	10/1/2003
Financial Assurance Required	Y
In Compliance	Y

Comments CURRENT COST ESTIMATE: Cost Estimate: Per Part B Log #B-16-M-39, issued 9-18-01, the closure cost estimate for the RCRA Facility = $2,011,997 (1995 dollars). Inflated to 2003 dollars, this cost estimate for closure of the RCRA facility is $2,290,713.41. - Anderson 9/30/03

On 12/23/02 Clean Harbors increased their closure cost estimate by $40,225.00 due to the addition of "Drum Storage Area Expansion (Unit R2). Staging Area only". The entire Drum Storage Area Expansion consists of 240 drums. The Staging Area contains 80 drums (One third of the total). Clean Harbors arrived at $40,225.00 by dividing the total cost estimate for the entire Drum Storage Area Expansion ($98,814.00 in '95 dollars) by one-third and inflating that figure to 2002 dollars. The addition of the Drum Storage Area Expansion brings the total cost estimate for closure of the RCRA facility to $2,356,578.74 in 2003 dollars (see attached calculations) - Anderson 9/30/03

Post Closure of the former surface impoundments = $5,299,593.00. The cost estimate for post closure care inflated to 2003 dollars is $6,100,102.09 (see attached calculations). Anderson 9/30/03

Attachment H from M-39 is in Financial Assurance file for C/PC breakdown. An additional $1,255,337 for closure (in 1995 dollars) is also in attachment H but is for proposed units to be operated in the future and is not required at this time. Blake

The closure cost estimate for the RCRA/TSCA Incinerator per Log No. B-16-M-2 letter dated 5/29/1996 is $1,962,408.00 in 96 dollars, inflated to 2003 dollars this cost estimate is $2,210,207.23. – Anderson 9/30/03

FINANCIAL ASSURANCE HISTORY:

Certificate of Insurance Policy Number PLC 3681588-02 issued by Steadfast Insurance Company provides closure insurance in the amount of $2,330,736.00. - Anderson 1/2/03

7/29/2003 -Received letter from James Laubsted explaining extension of expiration date of its insurance policy for closure to 9/6/2003 in order to set one expiration date for Clean Harbors' various insurance policies. Received Certificate of Insurance for Steadfast Insurance Company Policy #PLC3681588-02 in the amount of $2,359,794.00. - Anderson

6/30/2003 - Received Steadfast Insurance Company Policy #PLC374393603 providing $6,000,000.00 for nonsudden accidental occurences. - Anderson 8/29/03

8/25/2003 - Received a letter from Wallace Bell of Clean Harbors explaining calculation of inflated CCE for the RCRA Facility. The revised total for 2002 was increased by $40,225 which was required in 12/02 due to the addition of a waste management unit (drum storage area) to the CHSI facility, then multiplied by the 2003 inflation factor. The total CCE for the RCRA Facility for 2003 is $2,359,794.00 - Anderson 8/29/03

8/25/2003 - Received a letter from Wallace Bell explaining the calculation for closure costs for the RCRA/TSCA incinerator and a Steadfast Insurance Company Certificate of Insurance for closure costs in the amount of $2,213,697.00 - Anderson 8/29/2003

8/25/2003 - Received a letter from Wallace Bell explaining the calculation for post closure costs for the former surface impoundments and a Certificate of Insurance in the amount of $6,108,537.00 - Anderson 8/29/03

11/12/03 - Received Certificate of Liability Insurance for sudden accidental occurances for an aggregage

amount of $$2,000,00.00

ENVIRONMENTAL PROTECTION AGENCY
STATE OF ILLINOIS
ROUTE SLIP

DATE 12/9/04

TO: Reviewer MAS
Permits

	Remarks
____ Approval	
____ As requested	
____ Comment	
____ Confer	
____ For information	
____ For recommendation	
____ Investigate	
____ Necessary action	
____ Note and destroy	
____ Note and file	

Calvin Harris
Illinois Environmental Protection Agency
Bureau of Land
9511 West Harrison-3rd Floor
Des Plaines, IL 60016

Des Plaines
✓ Calvin

Part B Tracking Sheet

Comment By: 12/18/2004

Log #	Mod Type	Type
16-TA-6	TA	

State ID #	County	USEPA ID #	Reviewer
0316000051	COOK	ILD000608471	MAS

GAU: AMB

Site: CLEAN HARBORS SVCS INC

City: CHICAGO

Status: A

Review Period: 90

Notifications		
FOS	CMS	IHPA
[✓]	[✓]	[ ]

Current Submittal:

Received:	Due:	Mailed:	Review:
10/21/2004	1/19/2005		TA

Submittal 1

Received	Due	Mailed	Review

Comment

No comment
CD 12/9/04

Via E-Mail

November 10, 2004

Mr. Mark A. Schollenberger, P.E.
Illinois Environmental Protection Agency
Bureau of Land – Permit Section
1021 North Grand Avenue East
Springfield, IL 62702

Subject: Temporary Authorization Request
Additional Information

Dear Mr. Schollenberger:

Clean Harbors Services, Inc. (CHSI) is submitting additional information to the October 20, 2004 temporary authorization request for the addition of a lamp crushing machine to Unit 25.

Clean Harbors has been operating the lamp crushing machine at its Cincinnati, OH facility, but the operation is about to cease. Under OH regulations, used light bulbs have recently become universal wastes. Clean Harbors expected these regulations to become final in the fall, and would need additional permits to continue the operation or could relocate this operation to another facility. Last March it was decided to relocate the unit to the CHSI facility and I was requested to submit the necessary permits. At that time it seemed CHSI's permit modifications would be complete prior to used lamps becoming universal waste in OH and additional permits being required. Three of the four necessary permits were secured by August of this year. The Class 3 RCRA permit modification is outstanding. CHSI believes the Part B permit renewal submitted May 7, 2003 which includes the lamp crushing machine will be granted within the next 180 days, prior to the expiration of a temporary authorization. Clean Harbors could submit permit applications in OH, but this would require approximately 90 days for approval after submittal.

CHSI is permitted and currently handles light bulbs as hazardous waste (D003, D005, D006, D008, D009, and universal waste) and non-hazardous waste for storage. These lamps have been shipped to off-site to the Cincinnati, OH facility for subsequent crushing. Under the temporary authorization, these light bulbs will still be stored at the facility, but crushing will occur on-site.

If you have any further questions, please contact me at 773- 646-6202, x233.

Sincerely,

James R. Laubsted
Facility Compliance Manager

B-16 -TA -6

cc: Des Plaines

TJD
MAS

CleanHarbors®
ENVIRONMENTAL SERVICES, INC.

11800 South Stony Island Avenue
Chicago, IL 60617
773.646.6202
Fax 773-646-6381
www.cleanharbors.com

Via Overnight Delivery

October 20, 2004

Mr. Mark A. Schollenberger, P.E.
Illinois Environmental Protection Agency
Bureau of Land – Permit Section
1021 North Grand Avenue East
Springfield, IL 62702

RECEIVED
OCT 21 2004
IEPA-BOL
PERMIT SECTION

Subject: Temporary Authorization Request

Dear Mr. Schollenberger:

Clean Harbors Services, Inc. (CHSI) is submitting a temporary authorization request for the addition of a lamp crushing machine to Unit 25. The temporary authorization for this activity is necessary to prevent the disruption of ongoing waste management activities and to enable the permittee to respond to sudden changes in the types or quantities of wastes managed under the facility permit. Clean Harbors has been operating the light bulb crusher at its Cincinnati, OH facility, but the operation is about to cease. This will cause a large amount of universal waste bulbs to be directed to the Chicago facility. Clean Harbors could store these bulbs until the renewal Part B permit is final, but this would create an extremely large quantity of bulbs being stored. Even when the permit is issued, a huge backlog will exist because bulbs would continue to be shipped to the facility. The alternative of landfilling large amounts of bulbs is environmentally unfriendly from the mercury released to the environment. Granting this temporary authorization will allow Clean Harbors to safely manage mercury contaminated light bulbs with no mercury emissions to the environment thereby protecting human health from mercury exposure. Installation of the mercury bulb recycling unit at Clean Harbors' Chicago facility will support the USEPA and IEPA's goals for abating mercury emissions to the environment – a key goal of the Administrator Leavitt Administration. Temporary authorization to operate the light bulb crusher would keep the quantity of bulbs managed to reasonable numbers and prevent pollution to the environment. This operation was submitted as a Class 3 modification on April 23, 2004. CHSI has complied with all of the permitting requirements. The request with information to ensure compliance with 35 IAC 724 standards is enclosed.

As per 35 IAC 703.280(e)(2)(C), CHSI is notifying all persons on the facility mailing list of this temporary authorization request within seven days. A copy of the notice is enclosed.

Please contact me at (773) 646-6202, x233 if you have any questions.

Sincerely,

James R. Laubsted
Facility Compliance Manager

CleanHarbors®
ENVIRONMENTAL SERVICES, INC.

11800 South Stony Island Avenue
Chicago, IL 60617
773.646.6202
Fax 773-646-6381
www.cleanharbors.com

NOTICE

October 20, 2004

To: Facility Mailing List Addresses

Re: Clean Harbors Services, Inc.
Notification of RCRA Temporary Authorization Request

Clean Harbors Services, Inc. (CHSI) is a permitted hazardous waste treatment, storage, and disposal (TSD) facility located at 11800 South Stony Island Avenue in Chicago, IL. CHSI currently operates under a RCRA Part B permit issued by IEPA on September 30, 1993.

On October 20, 2004 CHSI is requesting a Temporary Authorization to the facility's RCRA Part B permit for the addition of a lamp crushing machine to Unit 25.

This notice is being sent to you in accordance with IEPA's Temporary Authorization regulations in 35 IAC 703.280(e)(2)(C) which requires CHSI to send a notice of the request to all persons on the facility mailing list within 7 days after the authorization request is made.

If you have any questions regarding this notice, please feel free to contact me at (773) 646-6202, x233.

Sincerely,

James R. Laubsted
Facility Compliance Manager

Cc: Facility Mailing List

RECEIVED
OCT 21 2004
IEPA-BOL
PERMIT SECTION

Clean Harbors Services, Inc.
11800 South Stony Island Ave.
Chicago, IL 60617
EPA ID No. ILD000608471

Application for
Temporary Authorization

October 20, 2004

Application For
Temporary authorization

I. OWNER/OPERATOR INFORMATION

Operator: Clean Harbors Services, Inc.
Facility Address: 11800 South Stony Island Avenue
Chicago, IL 60617

EPA ID No: ILD000608471

Facility Contact: James R. Laubsted
(773) 646-6202

II. FOR MORE INFORMATION REGARDING THIS APPLICATION, CONTACT:

Clean Harbors Services, Inc.
11800 South Stony Island Avenue
Chicago, IL 60617
James R. Laubsted - Facility Compliance Manager

III. FACILITY DESCRIPTION

Clean Harbors Services, Inc. (CHSI) operates a hazardous waste treatment and storage facility under the terms of RCRA Part B Permit No. B-16 issued by the Illinois Environmental Protection Agency (IEPA) and United States Environmental Protection Agency on November 4, 1993.

CHSI utilizes a variety of waste handling operations to treat hazardous and non-hazardous wastes onsite, and to store/transfer such wastes, including treatment residuals, for approved offsite reuse, treatment and/or disposal. Wastes are accepted in bulk tanker, railcar, rolloff, and container (e.g., 55-gallon drum) form, and may be liquid, semisolid, and/or solid in nature.

CHSI's waste handling operations include:

1. Storage and primary physical/chemical treatment of aqueous-based, inorganic hazardous and non-hazardous industrial waste streams using chemical precipitation, coagulation, filtration, stabilization, and/or fixation;

2. Storage and liquid waste pretreatment (prior to primary treatment) utilizing neutralization, chemical oxidation, chemical reduction, and other methods such as organic stripping;

3. Storage and blending of hazardous waste for reuse as a supplemental hazardous waste fuel;

4. Storage and transfer of hazardous wastes using tanks and containers; and

5. Specialized waste treatment activities in tanks and/or containers such as phase separation of liquid aqueous/organic layers in tanks, separation of solid/liquid layers in corrosive wastes to remove D002 designation; and

6. Treatment of paints and paint related materials through compaction in a miscellaneous unit; and

7. Shredding of hazardous waste into dispersible non-dispersible materials in a miscellaneous unit; and

8. Metalwashing of metal fragments which can be reclaimed after cleaning.

The waste streams currently authorized for storage and/or treatment at CHSI include: ignitable (D001); corrosive (D002); reactive(D003); and toxic (D004-D043) wastes; and many F-, K-, P- and U-coded wastes.

IV. DESCRIPTION OF PROPOSED PERMIT MODIFICATION

Under this Temporary Authorization request, CHSI seeks authorization to make the following changes:

Addition of a lamp crushing machine to Unit 25

CHSI receives and stores used lamps as hazardous wastes (D003, D005, D006, D008, D009 and universal waste) and non-hazardous waste. These lamps include fluorescent and high-intensity-discharge (HID) (mercury-vapor, metal-halide and high-pressure sodium).

Under this submittal, CHSI seeks temporary authorization to modify Unit 25 with the addition of a lamp crushing machine. Lamps are placed by an employee onto a power feed belt through a negative pressure air chamber. The lamp is crushed and components are separated by a gas and mechanical process into glass, metal and calcium phosphate powder containing mercury. The resulting materials are then sent off-site for further processing/reclamation. The lamp crusher will be located in the alkaline bay of Unit 25, occupying some of the current drum storage. This is a permitted container storage area with impervious containment inside a building. The location of the lamp crusher will displace six rows in the alkaline bay of Unit 25. Although this bay is currently permitted for 13,640 gallons (248 55-gallon drums), this will be limited to 4,015 gallons (73 55-gallon drums) when the lamp crusher is in the unit. This will include one drum connected to the unit for calcium phosphate powder with mercury.

The lamp crusher unit is a Model LSS1 manufactured by Resource Technology Inc. The unit incorporates a multi-stage particulate filter and carbon adsorption to reduce mercury and particulate emissions. The use of the lamp crusher allows volume reduction as well as separation of materials for recycling. CHSI Drawing 4282 is included showing the location of the lamp crusher.

V. The addition of a lamp crushing machine to Unit 25 will require minor changes to the facility's existing management plans and operational procedures. A discussion of the impact of the proposed temporary authorization on the existing RCRA Part B management plans and operating procedures at CHSI is described below.

1. RCRA Part A Application - The permitted storage capacity of the facility and acceptable hazardous waste codes will be unaffected. The bulb crusher has been added to the other processes as a miscellaneous unit. A revised Part A application is enclosed as Attachment 1.

2. Use and Management of Containers - The proposed modifications have a minor impact on the use and management of containers at the facility. The alkaline bay of Unit 25 will be impacted by placement of the bulb crusher. The storage of containers will be limited when the bulb crusher is in that bay. CHSI will only use compatible containers acceptable for shipment by DOT regulations. All containers will be stored in designated container management areas with other chemically-compatible hazardous wastes. All hazardous and non-hazardous containers will be labeled, marked and otherwise managed in the same manner as other hazardous and non-hazardous containers managed at the facility. The Operating Manual for the lamp crusher is included as Attachment 2. Page D-6a, Section D-Tables (Pages 1 and 2), Appendix D-1 (Table of Contents and Page 15) and Appendix D-2 (Pages 2 and 3) have been modified and are included in Attachment 3.

3. Use and Management of Tank Systems - There are no changes in the use and management of tank systems with this modification.

4. Manifest System - All hazardous wastes that are received, consolidated/bulked and/or shipped from the facility, will be accompanied by a properly completed hazardous waste manifest. Universal wastes do not require the use of manifests.

5. Record keeping and Reporting - All hazardous wastes that are received, consolidated/bulked, shredded, crushed and/or shipped from the facility, will be documented in the facility's operating records. All operating records will be maintained on permanent file by CHSI.

6. Ignitable, Reactive, and Incompatible Waste - All hazardous waste received at or shipped from the facility are subject to the waste identification procedures outlined in the facility's Waste Analysis Plan. The Waste Analysis Plan is designed to identify the physical and chemical nature of the waste stream in order to avoid any potential adverse effects caused by ignitable, reactive or incompatible wastes. Although used lamps may be considered reactive (sodium lamps), water is not introduced into the crusher at any point in the process. This proposed modification does affect the facility's existing procedures for managing reactive wastes in that sodium lamps would be crushed. Page F-13D has been modified and is included in Attachment 3.

7. Waste Analysis Plan and Procedures - CHSI's Waste Analysis plan is designed to ensure that all incoming hazardous wastes are properly characterized and identified (by waste code) as part of waste pre-qualification procedures at the site of generation and conformance testing procedures conducted upon arrival at CHSI. The Waste Analysis Plan includes references to standard procedures and test methods for any sampling or analysis that is required to determine the presence of toxic constituents. Used lamps do not require analysis due to the nature and hazards of the lamps being known. This proposed modification does not change the list of codes acceptable for storage or transfer, but does allow treatment through crushing of hazardous waste lamps. Table C-17 listing hazardous waste codes of lamps accepted for crushing has been added to the WAP. Pages C-5, C-5A, C-10B, C-10C, and C-12 have also been modified and are included in Attachment 3.

8. Security Plan and Procedures - The proposed modification has no impact on the security plan and procedures currently in effect at the facility.

9. Facility Inspection Plan and Procedures - All hazardous waste storage/processing areas are subject to a daily inspection to insure the integrity of the container and labeling/markings on the container. Similarly, all bulk storage tanks and treatment units are inspected on a daily basis. This would include daily visual inspection of storage bays for spilled material, containment integrity and container inspection. These inspections would include the area where the lamp crushing machine is located. This bay is currently permitted as a container storage area with impervious containment. There are no changes to the facility inspection plan or procedures.

10. Personal Training Plan and Procedures - The proposed modification has minor impact on the facility's Training Plan. No new staff positions are required from this modification. Since items such as labeling, manifesting and container handling are similar to those which are in use at the facility. Affected personnel will be trained on the Standard Operating Procedure of the lamp crusher and its impacts on processing. The Standard Operating Procedure for lamp crushing is included as Attachment 4.

11. Preparedness and Prevention - The proposed modification has minor impact on the preparedness and prevention measures currently in effect at the facility. A direct reading mercury vapor monitoring device will monitor mercury concentrations daily during operation in the vicinity of the lamp crusher and monitor daily for breakthrough of the carbon. Pages F-21 and F-22 have been modified and are included in Attachment 3.

12. Contingency Plan - The proposed modification has minor impact on the contingency planning measures currently in effect at the facility. Page G-1 and pages 1,7 and 8 of Anticipated Hazards (Appendix G-4) have been modified and are included in Attachment 3.

13. Closure Plan and Procedures - The proposed modification has an impact on the closure plan/procedures currently in effect at the facility. When the lamp crusher is in place in the Alkaline Bay of Unit 25, container storage will be reduced 9,625 gallons (175 55-gallon drums). Closure of the lamp crusher will add to closure costs, but is more than offset by the reduction in container storage. Pages I-4 and I-4A, Section I Tables (Pages 1 and 2) and Appendix I-J (Page 10) have been modified and are included in Attachment 3.

14. Financial Responsibility - The proposed modification has no impact on the financial responsibility requirements already in place. CHSI will continue to fund the higher closure cost associated without the lamp crusher in Unit 25.

15. Subparts AA, BB and CC - The proposed modification has no impact on RCRA air requirements currently in effect at the facility.

CHSI believes this modification will present the same minimal level of potential exposure to humans and the environment as other operations at the facility since these wastes are already handled at the facility and because of the emission control system associated with the lamp crusher. This operation provides containment of hazardous waste or hazardous waste constituents to control releases of solids or liquids to the land, surface water, groundwater or subsurface environment. The unit itself and containers provide primary containment of wastes and are subject to monitoring to assure emissions are not present. Controls monitor equipment operations and shutdown operations when not in acceptable operating ranges. Emissions are collected and controlled to permitted levels.

A Compliance Test Report (PN846142-01) for the lamp crusher conducted by Shaw Environmental, Inc. is included as Attachment 5. An Industrial Hygiene Exposure Monitoring Report was conducted by Clean Harbors Environmental Services, Inc. is included as Attachment 6. A written description on potential pathways of exposure to humans or environmental receptors is included as Attachment 7.

The CHSI facility is located within the corporate limits of the City of Chicago which has a population of over 1,000,000 people. This exempts the CHSI facility from the requirements of 39.2 of the Illinois Environmental Protection Act

VI. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to be the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature Date

10/18/04

John E. Lancaster, VP-General Manager
Clean Harbors Services, Inc.

10/20/04

Signature Date

Anthony G. Ianello, Executive Director
Illinois International Port District

VII. ENGINEER CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to be the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Engineer Seal

Kenneth D. Spaulding 3-25-04

Kenneth D. Spaulding Date

MECA Engineering Corporation of America
5539 Indianapolis Blvd.
East Chicago, IN 46312
219-397-0100

K. KENNETH D. SPAULDING
62-44249
REGISTERED
PROFESSIONAL
ENGINEER
OF
STATE OF ILLINOIS

The appearance of some of the images

following this page is due to

Poor Quality Original Documents

and not the scanning or filming processes.

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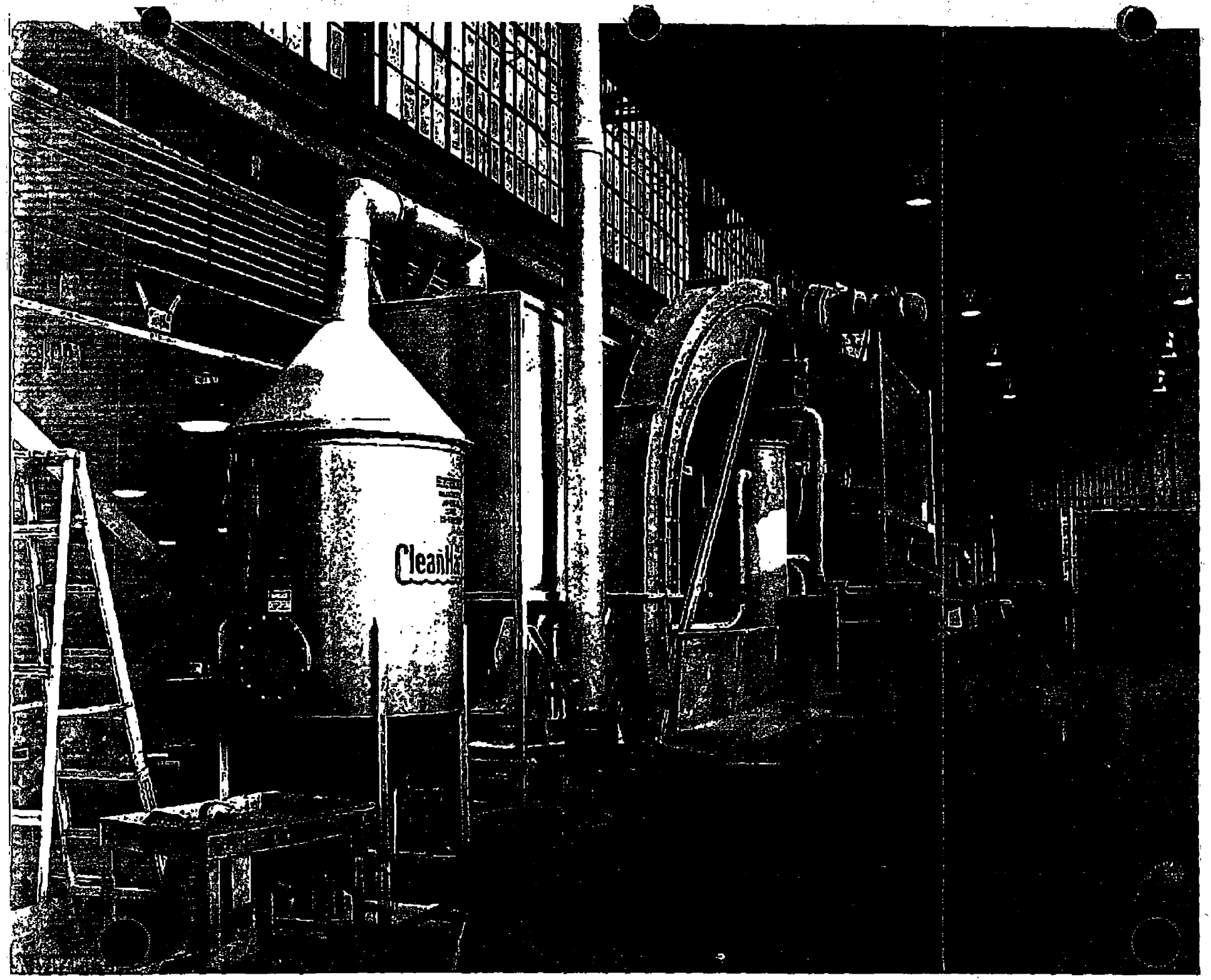
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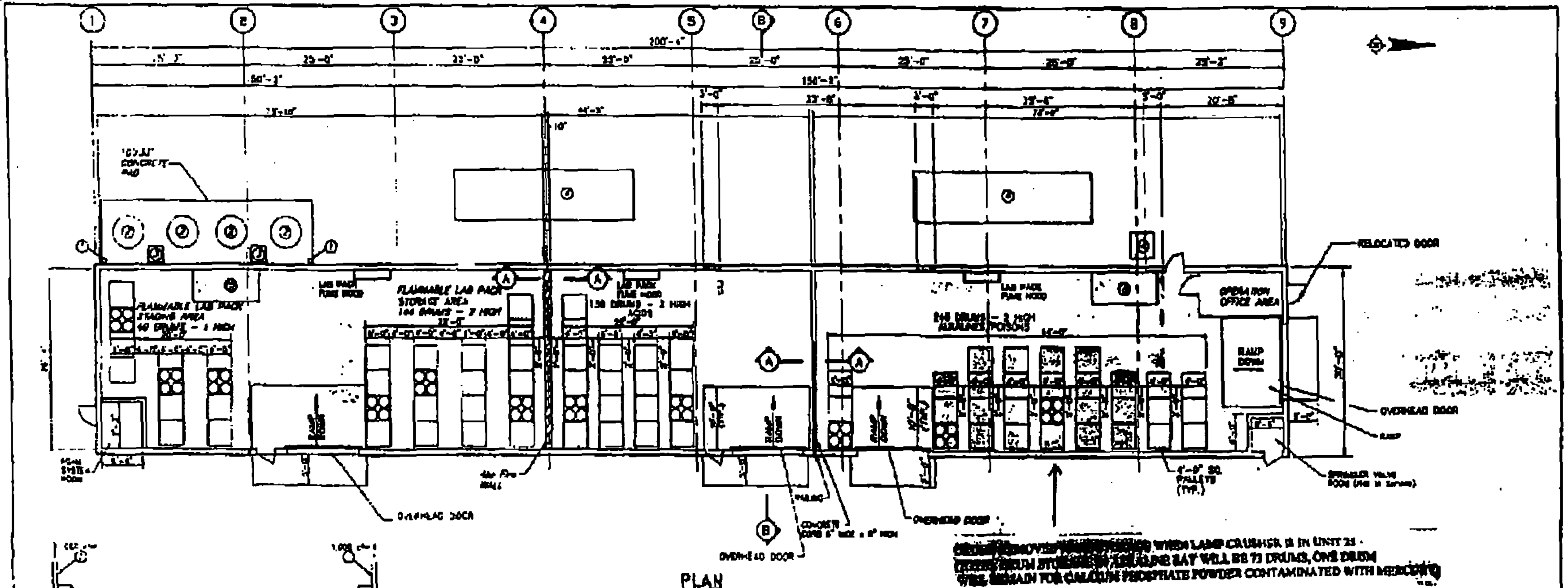
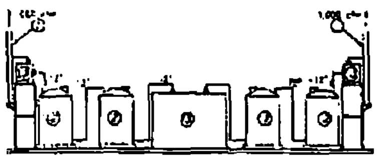


PLAN

SCALE 1/8" = 1'-0"

[illegible] REMOVED [illegible] WHEN LAMP CRUSHER IS IN UNIT 25 - [illegible] DRUM STORAGE IN ALKALINE BAY WILL BE 72 DRUMS, ONE DRUM WILL REMAIN FOR CALCIUM PHOSPHATE POWDER CONTAMINATED WITH MERCURY



ELEVATION

ACTIVATED CARBON ADSORPTION SYSTEM ARRANGEMENT

SCALE: NONE

AREA DESIGNATION	NO. OF DRUMS	TOTAL VOL. OF WASTE IN GALS	CONT. CAP. REQ'D (10%) IN GALS	AREA	AREA LENGTH IN FT	CURB HEIGHT IN FT	CONT. CAP. OF AREA	RAMP WIDTH	RAMP LENGTH IN FT	RAMP HEIGHT IN FT	VOL. OCCUPIED BY RAMP	VOL. OCCUPIED BY BRIDGE/POSTS	TOTAL CAPACITY (GALS)
[illegible]	[illegible]	[illegible]	748	[illegible]	[illegible]	0.5	[illegible] GAL.	[illegible]	[illegible]	0.5	[illegible] GAL.	NONE	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.5	[illegible] GAL.	[illegible] GAL.	[illegible]
FLAMMABLE STAGING AREA / FLAMMABLE STORAGE AREA / TOTAL FLAMMABLES	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] GAL.	[illegible]	[illegible]	0.5	[illegible] GAL.	[illegible] GAL.	[illegible]

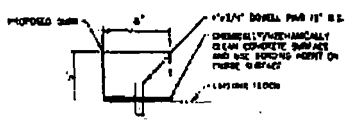
EQUIPMENT		
ITEM NO.	QTY.	DESCRIPTION
1	2	12" STACK
2	4	1,000 lb. CARBON BED [illegible] MODEL VPS-2000 OR EQUAL
3	2	1,000 cfm EXHAUST BLOWER
4	2	[illegible] STORAGE ROLL-OFF
14	1	DUST COLLECTION UNIT 1,000 cfm BLOWER
15	1	LAB PACK FLAMMABLE POUR-OFF HOOD
16	1	LAB PACK [illegible]/SOLIDS POUR-OFF HOOD

NOTES:

1. ALL EXISTING CONCRETE CONTAINMENT FLOORS AND [illegible] HORIZONTAL SURFACES ARE COATED WITH PROTECTO-CRETE 900 SYSTEM 1/4" THICK, AS MANUFACTURED BY DUDICK INC. ALL EXISTING CONCRETE CONTAINMENT CURBS VERTICAL AND HORIZONTAL SURFACES ARE COATED WITH PROTECTO-COAT 900 SYSTEM 30 MILS THICK AS MANUFACTURED BY DUDICK INC OR EQUAL.
2. NEW CONCRETE RAMP IN ALKALINE STORAGE AREA SHALL BE COATED WITH PROTECTO-CRETE 900 SYSTEM 1/4" THICK AS MANUFACTURED BY DUDICK INC OR EQUAL.
3. THIS AREA WILL ALSO BE USED FOR THE MANAGEMENT, STORAGE AND TREATMENT OF COMPRESSED GAS WASTES.
4. [illegible] LAB PACKS WILL BE STORED TWO HIGH. [illegible] FLAMMABLE DRUMS WILL ONLY BE STORED ONE HIGH.

SECTION B-B

SCALE 1/4" = 1'-0"



SECTION A-A

SCALE: [illegible]

C	CHANGED DRAWING TITLE & EQUIPMENT LIST	

CHSI DWG. NO. 4282

REV	DESCRIPTION				
C	SEE REVISION NOTE C	[illegible]	[illegible]	[illegible]	[illegible]
B	AS BUILT	AAA			[illegible]
A	RCRA PART B MODIFICATION	[illegible]	[illegible]	[illegible]	[illegible]

CleanHarbors

ENVIRONMENTAL SERVICES, INC.

[illegible]

CLEAN HARBORS SERVICES, INC.
11800 S. STONY ISLAND AVENUE
CHICAGO, ILLINOIS 60617

CONTAINER MANAGEMENT [illegible] BUILDING #25

CHI114630 | AS NOTED | [illegible]-M-05

CleanHarbors
ENVIRONMENTAL SERVICES, INC.

11800 South Stony Island Avenue
Chicago, IL 60617
773.646.6202
Fax 773.646.6882
www.cleanharbors.com

August 25, 2004

Mr. Mark A Schollenberger, P.E.
Illinois Environmental Protection Agency
Bureau of Land – Permit Section
1021 North Grand Avenue East
Springfield, IL 62702

Dear Mr. Schollenberger:

Clean Harbors Services, Inc. (CHSI) is submitting additional information concerning its application for a Class 3 permit modification for the addition of a lamp crushing machine for Building 25.

The lamp crushing machine is currently operating at Clean Harbors Cincinnati, OH facility. Metal recovered from the crushed bulbs is sent to Victor Metal in Wickliffe, OH for reclamation. Glass recovered from the crushed bulbs is sent to Dublak in PA. For reuse. There is also one additional drum associated with the unit for metal. All containers of recovered material will be kept on-site a maximum of 90 days from when material is placed into them.

For clarification, when the unit is shutdown from normal operation the vapor fan will continue to operate. CHSI will continue to run the fan for at least ten minutes following cessation of all processing. During emergency shutdown, even the vapor fan will stop. CHSI will restart the fan immediately following the treatment of the emergency. This is consistent with the operating manual Nos. 6.1 and 6.2 which was included as Attachment 2 in the original submittal. CHSI will also follow the routine maintenance procedures outlined in Section 7.0 of the operating manual.

CHSI is including a certification by an Industrial Hygienist concerning risks associated with the emissions from the lamp crushing machine to off-site receptors. Also included is a copy of the notification sent to the facility Mailing List Addresses and the Legal Notice published in the Daily Southtown.

If you have any questions concerning this information, please contact me at (773) 646-6202, x233.

Sincerely,

James R. Laubsted
Facility Compliance Manager

The locations are shown in the enclosed drawing. Each drum of hazardous waste will be counted toward the 73-drum storage capacity of the Unit 25 Alkaline Bay.

If you have any questions or require more information concerning the lamp crusher, please contact me at (773) 646-6202, x233.

Sincerely,

James R. Laubsted
Facility Compliance Manager

CleanHarbors
ENVIRONMENTAL SERVICES, INC.

11800 South Stony Island Avenue
Chicago, IL 60617
773.646.6202
Fax 773-646-6381
www.cleanharbors.com

September 9, 2004

Mr. Mark A. Schollenberger, P.E.
Bureau of Land – Permit Section
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, IL 62702

Dear Mr. Schollenberger:

Clean Harbors Services, Inc. (CHSI) is submitting additional information concerning its application for a Class 3 permit modification for the addition of a lamp crushing machine for Building 25.

An engineer certification indicating the lamp crushing machine is fit for its intended use is being sent under separate cover.

Enclosed is a proof of publication of the public notice.

It is noted in the operating manual for the lamp crusher that plastic coated lamps must not be placed directly on feed conveyor #1. Plastic will be removed from these lamps either manually (cut with a razor knife) or by use of the de-globing chamber.

In Attachment 5 (Compliance Test Report), in the Summary of Results (page 2) of mercury emissions, is the statement "The allowable emission rate is 1.1 X 10(-5) lb/h." This allowable emission rate is the permit limit for this unit at Clean Harbors Cincinnati, OH facility.

In the application, CHSI stated one drum would be connected to the unit for calcium phosphate powder with mercury. The actual breakdown is as follows:

Material	Container
Glass	Flex-bin or metal hopper
Glass	5-gallon pail
Glass Fines	55-gallon drum
Phosphate powder/mercury	55-gallon drum
Phosphate powder/mercury	55-gallon drum
Metal	Cubic yard box or 55-gallon drum

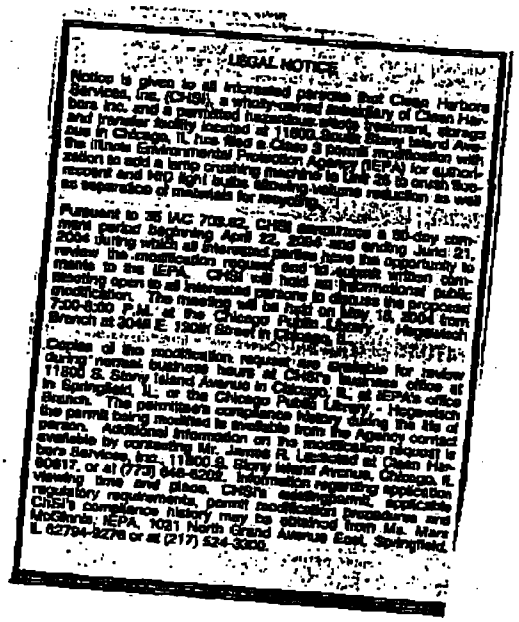
CERTIFICATE OF PUBLICATION

DAILY SOUTHTOWN, INC., NEWSPAPERS

The undersigned corporation does hereby certify that it is the publisher of the DAILY SOUTHTOWN that said DAILY SOUTHTOWN is a secular newspaper that has been published daily in the County of Cook and State of Illinois, continuously for more than one year prior to the first publication of the notice appended, and is of general circulation throughout the said County and State and that - it is a newspaper as defined in "An Act to Revise The Law in Relation to Notices". As amended by an Act approved July 17, 1959 - Illinois Complied Statutes, Chapter 715 (ILCS 5/0.01 *et seq.*)

That the notice appended was published in the DAILY SOUTHTOWN, INC., on

APRIL 22, 2004


LEGAL NOTICE

Notice is given to all interested persons that Clean Harbors Services, Inc. (CHSI), a wholly-owned subsidiary of Clean Harbors Inc. and a permitted hazardous waste treatment, storage and transfer facility located at 11800 South Stony Island Avenue in Chicago, IL has filed a Class 3 permit modification with the Illinois Environmental Protection Agency (IEPA) for authorization to add a lamp crushing machine to Unit 35 to crush fluorescent and HID light bulbs allowing volume reduction as well as separation of materials for recycling.

Pursuant to 35 IAC 703.82, CHSI announces a 30-day comment period beginning April 22, 2004 and ending June 21, 2004 during which all interested parties have the opportunity to review the modification request and to submit written comments to the IEPA. CHSI will hold an informational public meeting open to all interested persons to discuss the proposed modification. The meeting will be held on May 18, 2004 from 7:00-8:00 P.M. at the Chicago Public Library - Hegewisch Branch at 3048 E 130th Street in Chicago, IL.

Copies of the modification request are available for review during normal business hours at CHSI's business office at 11800 S. Stony Island Avenue in Chicago, IL, at IEPA's office in Springfield, IL, or the Chicago Public Library - Hegewisch Branch. The permittee's compliance history during the life of the permit being modified is available from the Agency upon request. Additional information on the modification request is available by contacting Mr. James R. Lazzaro at Clean Harbors Services, Inc., 11800 S. Stony Island Avenue, Chicago, IL 60617, or at (773) 646-6202. Information regarding application viewing time and place, CHSI's establishment, applicable regulatory requirements, permit modification procedures and CHSI's compliance history may be obtained from Ms. Mary McGinnis, IEPA, 1021 North Grand Avenue East, Springfield, IL 62794-9276 or at (217) 524-3300.

IN WITNESS WHEREOF, The DAILY SOUTHTOWN, INC., has caused this certificate to be signed and its corporate seal affixed hereto at Tinley Park, Illinois, this 22ND day of APRIL, A. D., 2004.

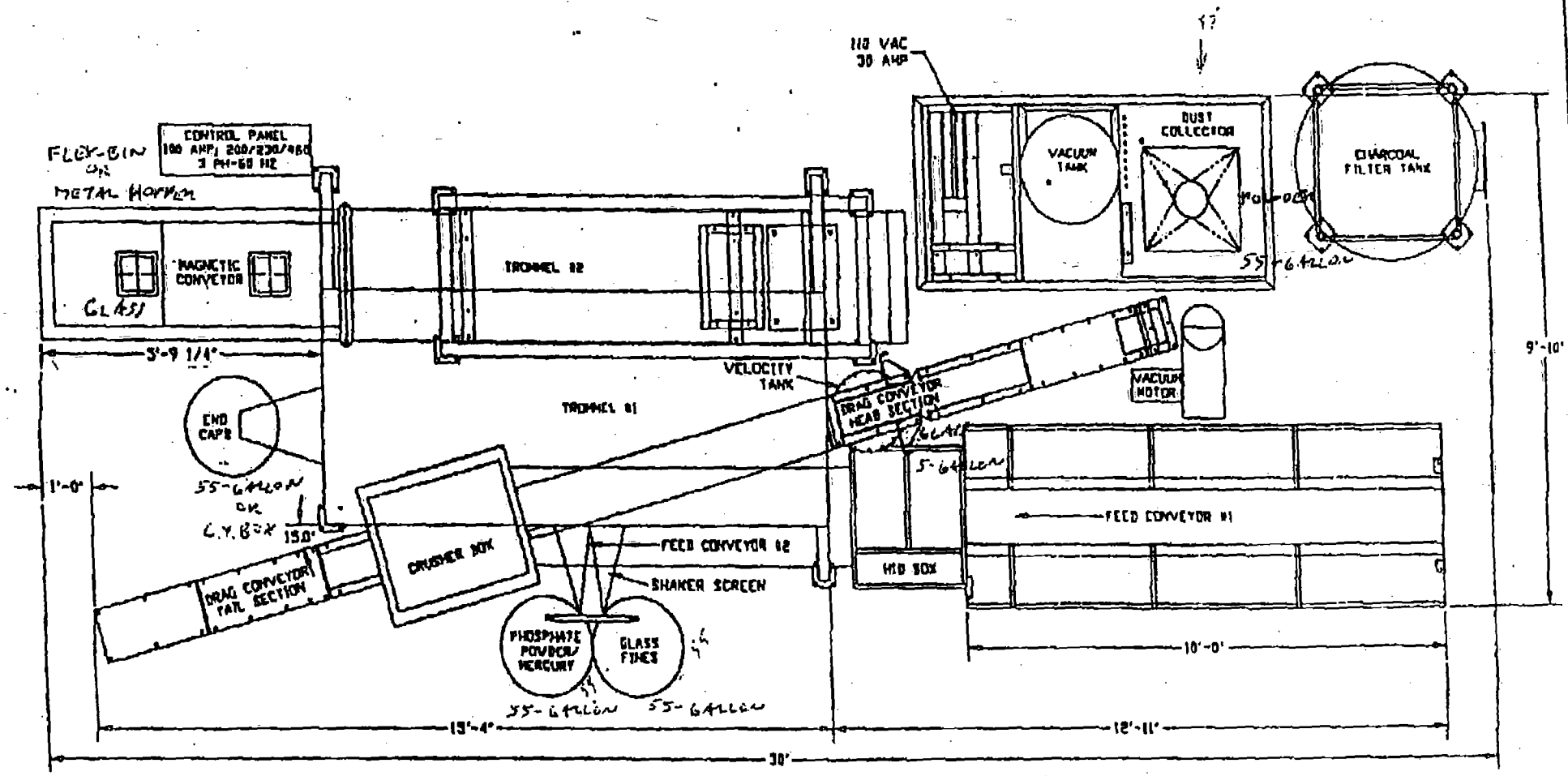
By: _____

Authorized Agent

County of Cook
State of Illinois
Subscribed and sworn to
before me this 22ND day of
APRIL, 2004

_____
Notary Public

OFFICIAL SEAL
L. CONRAD
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 3-2-2008



CONTROL PANEL
100 AMP; 200/230/460
3 PH-60 HZ
FLEX-BIN
OR
METAL HOPPER
MAGNETIC CONVEYOR
GLASS
TROMMEL #2
TROMMEL #1
3'-9 1/4"
1'-0"
END CAPS
55-GALLON
OR
C.Y. BOX
15.0"
DRAG CONVEYOR TAIL SECTION
CRUSHER BOX
FEED CONVEYOR #2
SHAKER SCREEN
PHOSPHATE POWDER/ MERCURY
GLASS FINES
55-GALLON
55-GALLON
VELOCITY TANK
DRAG CONVEYOR HEAD SECTION
GLASS
5-GALLON
HID BOX
FEED CONVEYOR #1
VACUUM MOTOR
110 VAC
30 AMP
VACUUM TANK
DUST COLLECTOR
55-GALLON
CHARCOAL FILTER TANK
9'-10"
10'-0"
15'-4"
12'-11"
30'

MODEL LSS1

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

Form approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0248-EPA-OT

For EPA Regional Use Only

Date Received

Month Year

EPA
United States Environmental Protection Agency
Washington, DC 20460

Hazardous Waste Permit Application Part A

(Read the instructions before starting)

I. Facility's EPA ID Number *(Mark 'X' in the appropriate box)*

[ ] A. First Part A Submission

[X] B. Revised Part A Submission (Amendment # 2

C. Facility's EPA ID Number: ILD000608471

D. Secondary ID Number *(If applicable)*:

II. Name of Facility: CLEAN HARBORS SERVICES INC.

III. Facility Location *(Physical address not P.O. Box or Route Number)*

A. Street: 11800 SOUTH STONY ISLAND AVENUE

Street *(Continued)*:

City or Town: CHICAGO

State: IL

Zip Code: 60617-

County Code (Known):

County Name: COOK

B. Land Type (Enter Code): S

C. Geographic Location

LATITUDE (Degrees, minutes, & seconds): 41 40 54

LONGITUDE (Degrees, minutes & seconds): 087 34 046

D. Facility Existence Date

Month Day Year: 07 29 1980

IV. Facility Mailing Address

Street or P.O. Box: 11800 SOUTH STONY ISLAND AVE

City or Town: CHICAGO

State: IL

Zip Code: 60617

V. Facility Contact *(Person to be contacted regarding waste activities at facility)*

Name *(last)*: LAUBSTED

(First): JAMES

Job Title: COMPLIANCE MGR

Phone Number *(Area Code and Number)*: 773-846 6202

VI. Facility Contact Address *(See Instructions)*

A. Contact Address

Location: [X] Mailing: [X] Other: [ ]

B. Street or P.O. Box:

City or Town:

State:

Zip Code:

1

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

Form approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0246-EPA-OT

EPA ID Number (Enter from page 1)	Secondary ID Number (Enter from page 1)
ILD000608471	

[illegible]perator Information (See instructions)

A. Name of Operator		
CLEAN HARBORS SERVICES INC.		
Street or P.O. Box		
11800 SOUTH STONY ISLAND AVE		
City or Town	**State**	**Zip Code**
CHICAGO	IL	60617

Phone Number (Area Code and Number)	B. Operator Type	C. Change of Operator Indicator	Date Changed Month Day Year
773-646-6202	P	Yes No X	

VIII. Owner Information (See instructions)

A. Name of Owner		
ILLINOIS INTL. PORT DISTRICT		
Street or P.O. Box		
3600 EAST 95TH STREET		
City or Town	**State**	**Zip Code**
CHICAGO	IL	60617

[illegible]ne Number (Area Code and Number)	B. Owner Type	C. Change of Owner Indicator	Date Changed Month Day Year
773-646-4400	P	Yes No X	

IX. NAICS Codes (in order of significance; start in left box)

First	9999	Third	
(Description)	Waste Treatment	(Description)	
Second	4953	Fourth	
(Description)	REFUSE SYSTEMS	(Description)	

X. Other Environmental Permits (See instructions)

A. Permit Type (Enter Code)	B. Permit Number	C. Description
R	B-16	IEPA RCRA PART B
R	ILD000608471	USEPA HSWA PERMIT
R	198036 OP	IEP A LAND (OPERATIONS)
R	1984-EP-0889	IEP.A LAND (OPERATIONS)
P	031600BTE	IEP A AIR
E	1990-EN-1301	IEPA WATER POLLUTION CONTROL

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

Form Approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0248-EPA-01

EPA ID Number *(Enter from page 1)*

I	L	D	0	0	0	6	0	8	4	7	1

Secondary ID Number *(Enter from page 1)*

XI. Nature of Business *(Provide a brief description)*

an Harbors Services, Inc. (CHSI) offers a liquid industrial waste treatment service. CHSI accepts hazardous and non-hazardous wastewaters which do not meet sewer discharge specifications. Through phyiscal and chemical treatment, CHSI produces an effluent acceptable for sewer discharge and a dewatered sludge. The effluent is discharged into the Metropolitan Water Reclamation District of Greater Chicago's sewer system and the sludge is shipped to properly-licensed offsite treatment and/or disposal facilities. CHSI also accepts hazardous and non-hazardous waste, which is stored in tanks and containers and subsequently transferred to properly licensed offsite treatment and/or disposal facilities.

XII. Process Codes and Design Capacities

A. PROCESS CODE - *Enter the code from the list of process codes below that best describes each process to be used at the facility. Thirteen lines are provided for entering codes. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, T04 and X99), describe the process (including its design capacity) in the space provided in item XII.*

B. PROCESS DESIGN CAPACITY - *For each code entered in column A, enter the capacity of the process.*

1 AMOUNT - Enter the amount in a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.

2 UNIT OF MEASURE - for each amount entered in column B(1) enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

C. PROCESS TOTAL NUMBER OF UNITS - *Enter the total number of units used with the corresponding process code.*

PROCESS CODE	PROCESS	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
D79	Underground Injection Well Disposal	Gallons; Liters; Gallons Per Day; or Liters Per Day
D80	Land Fill	Acre-feet; Hectare-meter; Acres; Cubic Meters; Hectares; Cubic Yards
D81	Land Treatment	Acres or Hectares
D82	Ocean Disposal	Gallons Per Day or Liters Per Day
D83	Surface Impoundment Disposal	Gallons; Liters; Cubic Meters; or Cubic Yards
D99	Other Disposal	Any Unit of Measure Listed Below
	Storage:	
S01	Container	Gallons; Liters; Cubic Meters; or Cubic Yards
S02	Tank Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S03	Waste Pile	Cubic Yards or Cubic Meters
S04	Surface Impoundment Storage:	Gallons; Liters; Cubic Meters; or Cubic Yards
S05	Drip Pad	Gallons; Liters; Acres; Cubic Meters Hectares; or Cubic Yards
S06	Containment Building Storage	Cubic Yards or Cubic Meters
S99	Other Storage	Any Unit of Measure Listed Below
	Treatment	
T01	Tank Treatment	Gallons Per Day; Liters Per Day; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons per Day; or Metric Tons Per Hour
T02	Surface Impoundment Treatment	Gallons Per Day; Liters Per Day; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons per Day; or Metric Tons Per Hour
T03	Incinerator	Short Tons Per Hour; Metric Tons Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million Btu Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Gallons Per Day; Liters Per Hour; or Million Btu Per Hour
T80	Boiler	Gallons; Liters; Gallons Per Hour; Liters Per Hour; Btu Per Hour; or Million Btu Per Hour

PROCESS CODE	PROCESS	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
T81	Cement Kiln	Gallons Per Day; Liters Per Day;
T82	Lime Kiln	Pounds Per Hour; Short Tons Per
T83	Aggregate Kiln	Hour; Kilograms Per Hour; Metric
T84	Phosphate Kiln	Tons Per Day; Metric Tons Per Hour
T85	Coke Oven	Short Tons Per Day; Btu Per Hour
T86	Blast Furnace	Liters Per Hour; Kilograms Per Hour; or Million Btu Per Hour
T87	Smelting, Melting Or Refining Furnace	
T88	Titanium Dioxide Chloride Oxidation Reactor	
T89	Methane Reforming Furnace	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Gallons Per Hour; Liters Per Hour; or Million Btu Per Hour
T90	Pulping Liquor Recovery Furnace	
T91	Combustion Device Used In The Recovery Of Sulfur Values From Spent Sulfuric Acid	
T92	Halogen Acid Furnaces	
T93	Other Industrial Furnaces Listed in 40 CFR 260.10	
T94	Containment Building - Treatment	Cubic Yards; Cubic Meters; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Btu Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million Btu Per Hour
	Miscellaneous (Subpart X):	
X01	Open Burning/Open Detonation	Any Unit of Measure Listed Below
X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour; Short Tons Per Day; Metric Tons Per Day; Pounds Per Hour; Liters Per Hour; or Gallons Per Day
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; or Million Btu Per Hour
X04	Geologic Repository	Cubic Yards; Cubic Meters; Acre-feet; Hectare-meter; Gallons; or Liters
X99	Other Subpart X	Any Unit of Measure Listed Below

Unit of Measure	Unit of Measure Code
Gallons	G
Gallons Per Hour	E
Gallons Per Day	U
Liters	L
Liters Per Hour	H
Liters Per Day	V

Unit of Measure	Unit of Measure Code
Short Tons Per Hour	D
Metric Tons Per Hour	W
Short Tons Per Day	N
Metric Tons Per Day	S
Pounds Per Hour	J
Kilograms Per Hour	R
Million Btu Per Hour	A

Unit of Measure	Unit of Measure Code
Cubic Yards	Y
Cubic Meters	C
Acres	B
Acre-feet	A
Hectares	Q
Hectare-meter	F
Btu Per Hour	I

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X. Process Codes and Design

EXAMPLE FOR COMPLETING ITEM XII (shown in line number X-1 below): A facility has a storage tank, which can hold 533,788 gallons

Line Number	Process Code	B. Process Design Capacity 1. Amount (Specify)	2. Unit of Measure (Enter code)	C. Process Total Number Of Units	For Official Use Only
X 1	S 0 2	5 3 3 . 7 8 8	G	0 0 1	
1	S 0 1	164,253 (2969x55-Gal Equivalent 2 X 64 cu.ft.)	G	2 9 7 1	
2	S 0 1	360 (12 x 30 Cubic yards equivalent)	Y	0 1 2	
3	S 0 1	268,800 (TRANSPORTATION VEHICLES)	U	0 3 1	
4	S 0 2	3 0 6 , 3 5 6	G	0 3 7	
5	D 8 3	2 , 0 0 0 , 0 0 0	G	0 0 4	
6	T 0 1	A 2 0 0 , 0 0 0	U	0 0 1	
7					
8					
9					
10					
11					
12					
13					

NOTE: If you need to list more than 13 process codes, attach an additional sheet(s) with the information in the same format as above. Number the lines sequentially, taking into account any lines that will be used for "other" processes (i.e., D99, S99, T04 and X99) in item XIII.

XIII. Other Processes *(Follow Instructions from Item XII for D99, S99, T04 and X99 process codes)*

Line Number (Enter lines in sequential order)	Process Code	B. PROCESS DESIGN CAPACITY 1. Amount (Specify)	2. Unit of Measure (Enter code)	C. Process Total Number Of Units	D. Description of Process
X 1	T 0 4				
0 7	T 0 4	1 2 0 0 0	U	0 0 1	T-04-A Treatment of D002 liquid/solid mixtures in containers by removal of liquid
0 8	T 0 4	3 0 0 0	U	0 0 1	T-04-B Compaction of hazardous waste solids in containers
0 9	T 0 4	5 5 0 0 0	U	0 0 1	T04-C Hazardous waste fuel blending
1 0	T 0 4	6 0 0	U	0 1 0	T-04-D Stabilization/fixation of hazardous waste in rolloff containers.

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XIV. Description of Hazardous Wastes

A. **EPA HAZARDOUS WASTE NUMBER** - *Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR, Part 261 Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.*

B. **ESTIMATED ANNUAL QUANITITY** - *For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.*

C. **UNIT OF MEASURE** - *For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:*

ENGLIS UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. **PROCESSES**

1. **PROCESS CODES:**

For listed hazardous waste: For each listed hazardous waste entered in column A select the code(s) from the list of process codes contained in item XII A. on page 3 to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed hazardous waste: For each characteristic or toxic contaminant entered in column A. select the code(s) from the list of process codes contained in item XII A. on page 3 to indicate all the processes that will be used to store, treat and /or dispose of all the non-listed hazardous wasted that prossess that characteristic or toxic contaminant.

NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:

1 *Enter the first two as described above.*
2 *Enter "000" in the extreme right box of Item XIV-D(1).*
3 *Use additional sheet, enter line number from previous sheet, and enter additional code(s) in item XIV-E.*

2. **PROCESS DESCRIPTION; If a code is not listed for a process that will be used, describe the process in the space provided on the form (D(2).**

NOTE; HAZARDOUS WASTED DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER - Hazardous *wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:*

1 *Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B, C and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.*

2 *In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "Included with above" and make no other entries on that line.*

3 *Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.*

EXAMPLE FOR COMPLETING ITEM XIV (shown in line number X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
X 1	K 0 5 4	900	P	T 0 3 D 8 0	
X 2	D 0 0 2	400	P	T 0 3 D 8 0	
X 3	D 0 0 1	100	P	T 0 3 D 8 0	
X 4	D 0 0 2				Included With Above

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D 0 0 0 6 0 8 4 7 1

Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	D 0 0 1	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HI JK TO 1A X9 9A B
2	D 0 0 2	5,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
3	D 0 0 3	5,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HI J TO 1A X9 9B C
4	D 0 0 4	5,000	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9A B
5	D 0 0 5	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9A BC
6	D 0 0 6	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9A BC
7	D 0 0 7	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9A B
8	D 0 0 8	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9A BC
9	D 0 0 9	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B C
10	D 0 1 0	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B
11	D 0 1 1	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B
12	D 0 1 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	D 0 1 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	D 0 1 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	D 0 1 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	D 0 1 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	D 0 1 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	D 0 1 8	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
19	D 0 1 9	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
20	D 0 2 0	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9A B
21	D 0 2 1	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
22	D 0 2 2	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
23	D 0 2 3	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
24	D 0 2 4	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
25	D 0 2 5	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
26	D 0 2 6	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
27	D 0 2 7	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
28	D 0 2 8	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
29	D 0 2 9	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
30	D 0 3 0	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
31	D 0 3 1	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9A B
32	D 0 3 2	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
33	D 0 3 3	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
34	D 0 3 4	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
35	D 0 3 5	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B

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I L D 0 0 0 6 0 8 4 7 1

V. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	(2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	D 0 3 6	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
2	D 0 3 7	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
3	D 0 3 8	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
4	D 0 3 9	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
5	D 0 4 0	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
6	D 0 4 1	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
7	D 0 4 2	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
8	D 0 4 3	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
9	F 0 0 1	7,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
10	F 0 0 2	7,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
11	F 0 0 3	7,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
12	F 0 0 4	7,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
13	F 0 0 5	7,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
14	F 0 0 6	1,000	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B
15	F 0 0 7	1,000	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B
16	F 0 0 8	1,000	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B
17	F 0 0 9	1,000	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B
18	F 0 1 0	1,000	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B
19	F 0 1 1	1,000	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B
20	F 0 1 2	1,000	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B
21	F 0 1 9	1,000	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B
22	F 0 2 0	1,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ
23	F 0 2 1	1,000	T	S 0 1 S 0 2 T 0 4	AB EF GH J
24	F 0 2 2	1,000	T	S 0 1 S 0 2 T 0 4	AB EF GH J
25	F 0 2 3	1,000	T	S 0 1 S 0 2 T 0 4	AB EF GH J
26	F 0 2 4	250	T	S 0 1 S 0 2 T 0 4	AB EF GH J X9 9B
27	F 0 2 5	15,000	T	S 0 1 S 0 2 T 0 4	AB EF GH J X9 9B
28	F 0 2 6	1,000	T	S 0 1 S 0 2 T 0 4	AB EF GH J
29	F 0 2 7	1,000	T	S 0 1 S 0 2 T 0 4	AB EF GH J
30	F 0 2 8	1,000	T	S 0 1 S 0 2 T 0 4	AB EF GH J
31	F 0 3 2	250	T	S 0 1 S 0 2 T 0 4	AB EF GH J X9 9B
32	F 0 3 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	F 0 3 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	F 0 3 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	F 0 3 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Secondary ID Number *(Enter from page 1)*:

Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	F 0 3 9	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
2	K 0 0 1	1,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	K 0 0 2	1,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
4	K 0 0 3	1,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
5	K 0 0 4	1,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
6	K 0 0 5	1,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
7	K 0 0 6	1,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
8	K 0 0 7	1,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
9	K 0 0 8	1,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
10	K 0 0 9	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	K 0 1 0	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	K 0 1 1	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	K 0 1 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	K 0 1 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	K 0 1 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	K 0 1 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	K 0 1 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	K 0 1 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	K 0 1 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	K 0 2 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	K 0 2 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	K 0 2 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	K 0 2 3	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	K 0 2 4	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	K 0 2 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	K 0 2 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	K 0 2 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	K 0 2 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	K 0 2 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	K 0 3 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	K 0 3 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	K 0 3 2	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	K 0 3 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	K 0 3 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	K 0 3 5	100	T	S 0 1 S 0 9 S 0 4	AB CE FG HJ X9 9B

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I L D 0 0 0 6 0 8 4 7 1

V. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	K 0 3 6	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG H X9 9B
2	K 0 3 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG H X9 9B
3	K 0 3 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	K 0 3 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	K 0 4 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	K 0 4 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	K 0 4 2	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	K 0 4 3	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	K 0 4 4	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	K 0 4 5	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	K 0 4 6	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
12	K 0 4 7	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	K 0 4 8	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
14	K 0 4 9	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	K 0 5 0	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	K 0 5 1	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	K 0 5 2	2,500	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
18	K 0 6 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
19	K 0 6 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
20	K 0 6 2	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B
21	K 0 6 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	K 0 6 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	K 0 6 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	K 0 6 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
25	K 0 7 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	K 0 7 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	K 0 8 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	K 0 8 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	K 0 8 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	K 0 8 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
31	K 0 8 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
32	K 0 8 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	K 0 9 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	K 0 9 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	K 0 9 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Form approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0248-EPA-OT

EPA ID Number *(Enter from page 1)* | **Secondary ID Number** *(Enter from page 1)*

D 0 0 0 6 0 8 4 7 1

Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	K 0 9 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	K 0 9 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	K 0 9 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	K 0 9 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	K 0 9 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	K 0 9 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	K 1 0 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
8	K 1 0 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	K 1 0 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	K 1 0 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	K 1 0 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	K 1 0 5	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	K 1 0 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	K 1 0 7	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	K 1 0 8	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	K 1 0 9	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	K 1 1 0	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	K 1 1 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	K 1 1 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	K 1 1 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	K 1 1 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	K 1 1 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	K 1 1 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	K 1 1 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	K 1 1 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	K 1 2 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	K 1 2 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	K 1 2 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	K 1 2 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	K 1 3 1	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	K 1 3 2	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	K 1 3 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	K 1 4 0	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	K 1 4 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	K 1 4 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Form approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0246-EPA-OT

EPA ID Number *(Enter from page 1)*: I L D 0 0 0 6 0 8 4 7 1

Secondary ID Number *(Enter from page 1)*:

V. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	K 1 4 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	K 1 4 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	K 1 4 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	K 1 4 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	K 1 4 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	K 1 4 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	K 1 5 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	K 1 5 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	K 1 5 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	K 1 5 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	K 1 5 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	K 1 5 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	K 1 6 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	K 1 6 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	K 1 6 9	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	K 1 7 0	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	K 1 7 1	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	K 1 7 2	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	K 1 7 4	15,000	T	S 0 1 S 0 2 T 0 4	AB EF GH J X9 9B
20	K 1 7 5	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	K 1 7 6	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	K 1 7 7	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	K 1 7 8	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	P 0 0 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	P 0 0 2	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	P 0 0 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	P 0 0 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	P 0 0 5	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	P 0 0 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	P 0 0 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	P 0 0 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	P 0 0 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	P 0 1 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	P 0 1 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	P 0 1 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Form Approved, OMB No. 2060-0034 Expires 10/31/02
CSA No. 0248-EPA-OT

EPA ID Number *(Enter from page 1)*: D 0 0 0 6 0 8 4 7 1

Secondary ID Number *(Enter from page 1)*:

Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	P 0 1 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	P 0 1 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	P 0 1 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	P 0 1 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	P 0 1 7	250	T	S 0 1 S 0 2 T 0 1	AB CE FG HJ X9 9B
6	P 0 1 8	250	T	S 0 1 S 0 2 T 0 1	AB CE FG HJ X9 9B
7	P 0 2 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	P 0 2 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	P 0 2 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	P 0 2 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	P 0 2 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	P 0 2 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	P 0 2 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	P 0 2 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	P 0 2 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	P 0 3 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	P 0 3 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	P 0 3 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	P 0 3 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	P 0 3 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	P 0 3 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	P 0 3 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	P 0 3 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	P 0 4 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	P 0 4 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	P 0 4 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	P 0 4 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	P 0 4 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	P 0 4 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	P 0 4 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	P 0 4 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	P 0 4 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	P 0 4 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	P 0 5 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	P 0 5 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Form approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0246-EPA-OT

EPA ID Number *(Enter from page 1)* | **Secondary ID Number** *(Enter from page 1)*

I L D 0 0 0 6 0 8 4 7 1

V. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	P 0 5 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	P 0 5 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	P 0 5 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	P 0 5 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	P 0 5 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	P 0 6 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	P 0 6 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	P 0 6 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	P 0 6 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	P 0 6 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	P 0 6 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	P 0 6 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	P 0 6 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	P 0 6 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	P 0 7 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	P 0 7 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	P 0 7 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	P 0 7 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	P 0 7 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	P 0 7 5	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	P 0 7 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	P 0 7 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	P 0 7 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	P 0 8 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	P 0 8 2	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	P 0 8 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	P 0 8 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	P 0 8 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	P 0 8 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	P 0 8 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	P 0 9 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	P 0 9 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	P 0 9 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	P 0 9 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	P 0 9 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Form approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0246-EPA-OT

EPA ID Number *(Enter from page 1)* | **Secondary ID Number** *(Enter from page 1)*

D 0 0 0 6 0 8 4 7 1

Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	P 0 9 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	P 0 9 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	P 0 9 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	P 1 0 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	P 1 0 2	150	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	P 1 0 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	P 1 0 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	P 1 0 5	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	P 1 0 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	P 1 0 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	P 1 0 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	P 1 1 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	P 1 1 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	P 1 1 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	P 1 1 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	P 1 1 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	P 1 1 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	P 1 1 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	P 1 1 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	P 1 1 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	P 1 2 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	P 1 2 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	P 1 2 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	P 1 2 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	P 1 2 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	P 1 2 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	P 1 8 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	P 1 8 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	P 1 8 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	P 1 9 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	P 1 9 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	P 1 9 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	P 1 9 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	P 1 9 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Form approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0246-EPA-OT

EPA ID Number *(Enter from page 1)* | **Secondary ID Number** *(Enter from page 1)*

I L D 0 0 0 6 0 8 4 7 1

V. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	P 1 9 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	P 1 9 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	P 1 9 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	P 2 0 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	P 2 0 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	P 2 0 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	P 2 0 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	P 2 0 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	U 0 0 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	U 0 0 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	U 0 0 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	U 0 0 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	U 0 0 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	U 0 0 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	U 0 0 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	U 0 0 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	U 0 0 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	U 0 1 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	U 0 1 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	U 0 1 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	U 0 1 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	U 0 1 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	U 0 1 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	U 0 1 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	U 0 1 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	U 0 1 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	U 0 2 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	U 0 2 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	U 0 2 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	U 0 2 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	U 0 2 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	U 0 2 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	U 0 2 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	U 0 2 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	U 0 2 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Form approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0248-EPA-OT

EPA ID Number *(Enter from page 1)* D 0 0 0 6 0 8 4 7 1

Secondary ID Number *(Enter from page 1)*

Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	U 0 2 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	U 0 3 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	U 0 3 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	U 0 3 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	U 0 3 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	U 0 3 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	U 0 3 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	U 0 3 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	U 0 3 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	U 0 3 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	U 0 3 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	U 0 4 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	U 0 4 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	U 0 4 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	U 0 4 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	U 0 4 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	U 0 4 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	U 0 4 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	U 0 4 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	U 0 4 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	U 0 5 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	U 0 5 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	U 0 5 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	U 0 5 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	U 0 5 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	U 0 5 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	U 0 5 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	U 0 5 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	U 0 5 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	U 0 6 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	U 0 6 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	U 0 6 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	U 0 6 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	U 0 6 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	U 0 6 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Form approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0248-EPA-OT

EPA ID Number *(Enter from page 1)*: I L D 0 0 0 6 0 8 4 7 1

Secondary ID Number *(Enter from page 1)*:

V. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	U 0 6 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	U 0 6 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	U 0 6 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	U 0 7 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	U 0 7 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	U 0 7 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	U 0 7 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	U 0 7 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	U 0 7 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	U 0 7 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	U 0 7 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	U 0 7 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	U 0 7 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	U 0 8 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	U 0 8 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	U 0 8 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	U 0 8 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	U 0 8 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	U 0 8 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	U 0 8 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	U 0 8 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	U 0 8 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	U 0 8 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	U 0 9 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	U 0 9 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	U 0 9 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	U 0 9 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	U 0 9 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	U 0 9 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	U 0 9 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	U 0 9 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	U 0 9 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	U 0 9 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	U 1 0 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Form approved, OMB No 2050-0034 Expires 10/31/02
GSA No. 0248-EPA-OT

EPA ID Number *(Enter from page 1)* | **Secondary ID Number** *(Enter from page 1)*

D 0 0 0 6 0 8 4 7 1

Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	U 1 0 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	U 1 0 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	U 1 0 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	U 1 0 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	U 1 0 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	U 1 0 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	U 1 0 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	U 1 1 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	U 1 1 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	U 1 1 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	U 1 1 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	U 1 1 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	U 1 1 5	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	U 1 1 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	U 1 1 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	U 1 1 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	U 1 1 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	U 1 2 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	U 1 2 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	U 1 2 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	U 1 2 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	U 1 2 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	U 1 2 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	U 1 2 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	U 1 2 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	U 1 2 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	U 1 2 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	U 1 3 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	U 1 3 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	U 1 3 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	U 1 3 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	U 1 3 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	U 1 3 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Form approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0246-EPA-OT

EPA ID Number *(Enter from page 1)* | Secondary ID Number *(Enter from page 1)*

I L D 0 0 0 6 0 8 4 7 1

XIV. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. *(Enter Code)*	B. Estimated Annual Quantity of Waste	C. Unit of Measure *(Enter code)*	D. PROCESSES (1) PROCESS CODES *(Enter code)*	D. PROCESSES (2) PROCESS DESCRIPTION *(If a code is not entered in D(1))*
1	U 1 3 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	U 1 3 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	U 1 3 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	U 1 4 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	U 1 4 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	U 1 4 2	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	U 1 4 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	U 1 4 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	U 1 4 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	U 1 4 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	U 1 4 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	U 1 4 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	U 1 4 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	U 1 5 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	U 1 5 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	U 1 5 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	U 1 5 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	U 1 5 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	U 1 5 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	U 1 5 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	U 1 5 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	U 1 5 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	U 1 5 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	U 1 6 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	U 1 6 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	U 1 6 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	U 1 6 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	U 1 6 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	U 1 6 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	U 1 6 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	U 1 6 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	U 1 6 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	U 1 6 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Form approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0248-EPA-OT

EPA ID Number *(Enter from page 1)* | **Secondary ID Number** *(Enter from page 1)*

D 0 0 0 6 0 8 4 7 1

Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	U 1 7 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	U 1 7 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	U 1 7 2	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	U 1 7 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	U 1 7 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	U 1 7 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	U 1 7 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	U 1 7 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	U 1 7 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	U 1 8 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	U 1 8 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	U 1 8 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	U 1 8 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	U 1 8 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	U 1 8 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	U 1 8 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	U 1 8 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	U 1 8 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	U 1 8 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	U 1 9 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	U 1 9 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	U 1 9 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	U 1 9 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	U 1 9 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	U 1 9 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	U 1 9 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	U 2 0 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	U 2 0 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	U 2 0 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	U 2 0 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	U 2 0 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	U 2 0 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	U 2 0 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	U 2 0 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
[illegible]	U 2 0 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Form Approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0249-EPA-OT

EPA ID Number *(Enter from page 1)* I L D 0 0 0 6 0 8 4 7 1

Secondary ID Number *(Enter from page 1)*

XIV. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)									(2) PROCESS DESCRIPTION (If a code is not entered in D(1))							
1	U 2 0 9	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
2	U 2 1 0	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
3	U 2 1 1	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
4	U 2 1 3	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
5	U 2 1 4	100	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
6	U 2 1 5	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
7	U 2 1 6	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
8	U 2 1 7	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
9	U 2 1 8	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
10	U 2 1 9	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
11	U 2 2 0	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
12	U 2 2 1	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
13	U 2 2 2	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
14	U 2 2 3	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
15	U 2 2 5	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
16	U 2 2 6	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
17	U 2 2 7	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
18	U 2 2 8	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
19	U 2 3 4	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
20	U 2 3 5	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
21	U 2 3 6	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
22	U 2 3 7	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
23	U 2 3 8	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
24	U 2 3 9	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
25	U 2 4 0	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
26	U 2 4 3	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
27	U 2 4 4	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
28	U 2 4 6	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
29	U 2 4 7	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
30	U 2 4 8	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
31	U 2 4 9	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
32	U 2 7 1	250	T	S 0 1	S 0 2	T 0 4							AB	EF	GH	J				X9 9B
33	U 2 7 7	250	T	S 0 1	S 0 2	T 0 4							AB	EF	GH	J				X9 9B
34	U 2 7 8	250	T	S 0 1	S 0 2	T 0 4							AB	EF	GH	J				X9 9B
35	U 2 7 9	250	T	S 0 1	S 0 2	T 0 4							AB	EF	GH	J				X9 9B

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EPA ID Number *(Enter from page 1)* | **Secondary ID Number** *(Enter from page 1)*

I	L	D	0	0	0	6	0	8	4	7	1																		

Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number		A. EPA HAZARDOUS WASTE NO. (Enter Code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)									D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))										
	1	U	2	8	0	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
	2	U	3	2	8	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
	3	U	3	5	3	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
	4	U	3	5	9	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
	5	U	3	6	4	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
	6	U	3	6	5	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
	7	U	3	6	6	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
	8	U	3	6	7	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
	9	U	3	7	2	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
1	0	U	3	7	3	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
1	1	U	3	7	5	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
1	2	U	3	7	6	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
1	3	U	3	7	7	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
1	4	U	3	7	8	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
	5	U	3	7	9	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
1	6	U	3	8	1	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
1	7	U	3	8	2	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
1	8	U	3	8	3	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
1	9	U	3	8	4	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
2	0	U	3	8	5	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
2	1	U	3	8	6	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
2	2	U	3	8	7	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
2	3	U	3	8	9	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
2	4	U	3	9	0	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
2	5	U	3	9	1	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
2	6	U	3	9	2	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
2	7	U	3	9	3	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
2	8	U	3	9	4	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
2	9	U	3	9	5	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
3	0	U	3	9	6	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
3	1	U	4	0	0	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
3	2	U	4	0	1	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
3	3	U	4	0	2	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
	4	U	4	0	3	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		
		U	4	0	4	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B		

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I L D 0 0 0 6 0 8 4 7 1	

. Map

Attach to this application a topographic map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in this map area. See instructions for precise requirements.

XVI. Facility Drawing

All existing facilities must include a scale drawing of the facility (See instructions for more detail).

XVII. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

XVIII. Certification(s)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Owner Signature	Date Signed
Name and Official Title (Type or print) Anthony Ianello, Executive Director	
Owner Signature	Date Signed 10/20/04
Name and Official Title (Type or print)	
Operator Signature	Date Signed 10/19/04
Name and Official Title (Type or print) John E. Lancaster, VP-General Manager	
Operator Signature	Date Signed
Name and Official Title (Type or print)	

XIX. Comments

Note: Mail completed form to the appropriate EPA Regional or State Office. (Refer to instructions for more information)

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GSA No. 0248-EPA-OT

EPA ID Number *(Enter from page 1)* D 0 0 0 6 0 8 4 7 1

Secondary ID Number *(Enter from page 1)*

Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number		A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	U	4 0 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	U	4 0 8	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	U	4 0 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	U	4 1 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	U	4 1 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

XIII. Other Processes *(Follow instructions from item XII for D99, S99, T04 and X99 process codes)*

Line Number (Enter as in seq w/XII)	Code (From list above)	A. PROCESS DESIGN CAPACITY A. Amount (specify)	2. Unit of Measure (Enter code)	C. Process Total Number Of Units	D. Description of Process
X	T 0 4	.			
1 1	T 0 4	4 1 6 , 0 7 5 .	U	0 0 1	T04E:Treatment of D002 liquids in containers and tanks.
1 2	T 0 4	5 , 0 0 0 .	U	0 0 1	T04F: Treatment of organic peroxides in containers
1 3	T 0 4	5 , 0 0 0 .	U	0 0 1	T04G: Treatment of acid cyanides in containers
1 4	T 0 4	4 1 6 , 0 7 5 .	U	0 1 0	T04H: Treatment of hazardous waste in containers and tanks using phase separation.

XIII. Other Processes *(Follow instructions from item XII for D99, S99, T04 and X99 process codes)*

Line Number (Enter as in seq w/XII)	Code (From list above)	A. Process Design Capacity 1. Amount (Specify)	2. Unit of Measure (Enter code)	C. Process Total Number Of Units	D. Description of Process
X	T 0 4	.			
1 5	T 0 4	5 0 0 0	U	0 0 1	T0-4-I Treatment of Black Powder in containe
1 6	T 0 4	2 5 0 0 0	U	0 0 1	T0-4-J Treatment by the Addition of Dry Ice in containers
1 7	T 0 4	1 0 0 0	J	0 0 1	T0-4-K Venting of oxygen to the atmosphere

XIII. Other Processes *(Follow instructions from item XII for D99, S99, T04 and X99 process codes)*

Line Number (Enter its in seq w/XII)		A. Process Design Capacity: Code (From list above)			A. Process Design Capacity: 1. Amount (Specify)	A. Process Design Capacity: 2. Unit of Measure (Enter code)	C. Process Total Number Of Units	D. Description of Process
1	8	X	9	9A	7 0 0 0	U	0 0 1	X99-A Consolidated of pain/paint-related material using a compactor
X								
1	9	X	9	9B	4 8 . 0 0 0	J	0 0 1	X99-B Hazardous waste shredding system

	0	X	9	9C	2	3	0	0	J	0 0 1	X98-C Hazardous waste lamp crushing system

Clean Harbors Services, Inc.
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RCRA PART A FORM
ADDITIONAL INFORMATION

Section VIII. Facility Owner

A. Name of Facility's Legal Owner

CHSI is the owner/operator of the hazardous waste facility. The land on which the facility is located is owned by the Illinois International Port District, a government entity.

Section XII. Process Codes and Design Capacity

Line 05. Disposal in Surface Impoundments (D83)

CHSI notes that the four (4) surface impoundments identified by this entry have been certified as closed by the IL EPA. The impoundments no longer accept hazardous waste, and currently operate under an approved Post Closure management plan. A list of the waste codes which were disposed in the impoundments is included in Appendix D-30 of the approved RCRA Part B Application.

Section XIII Additonal Processes

Line 11. T04 E Treatment of D002 Liquids in Containers and Tanks

Treatment of D002 (Corrosive) liquid hazardous waste in containers and tanks by the commingling/mixing of compatible waste streams to adjust pH value. Process design capacity is 416,075 gallons per day in all tank or container systems at the facility.

Line 12. T04F Treatment of Organic Peroxides in Containers

Treatment of organic peroxide hazardous waste in containers through the additon of water. Process design capacity is 5,000 gallons per day in any container at the facility.

Line 13. T04G Treatment of Acid Cyanides in Containers

Treatment of acid cyanide hazardous waste in containers through pH adjustment using sodium hydroxide or other alkaline materials. Process design capacity is 5,000 gallons per day in any container at the facility.

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Clean Harbors Serivces, Inc.
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Sheet 2 of 3

Line 14. T04H Treatment of Hazardous Waste in Containers and Tanks Using Phase Separation

Treatment of hazardous waste in containers and tanks by phase separation using physical (e.g., gravity separation, filtration) and chemical (e.g., addition of demusifiers) techniques. Process design capacity is 416,075 gallons per day in all tank or container systems at the facility.

Line 15. T04I Treatment of Black Powder in Containers

Treatment of black powder hazardous waste in containers through the addition of water. Process design capacity is 5,000 gallons per day in any container at the facility.

Line 16. T04J Treatment by the Addition of Dry Ice in Containers

Treatment of hazardous waste in containers by the additon of dry ice. Process design capacity is 25,000 gallons per day in any container at the facility.

Line 17. T04K Venting of oxygen to the atmosphere.

Process design capacity is 1,000 pounds per hour.

Line 18. X99A Consolidation of Hazardous Waste using a Compactor

Consolidation of hazardous waste paint and paint-related material contained in small metal and glass containers by processing through a can and glass compactor. Process design capacity of the unit is 7,000 pounds per day of cans of paint and paint-related material.

Line 19. X99B Hazardous waste shredding system

Shredding of hazardous waste in containers. Process design capacity is 48,000 pounds per hour.

Line 20. X99C Hazardous waste lamp crushing system

Crushing of hazardous waste lamps. Process design capacity is 2300 pounds per hour.

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Clean Harbors Serivces, Inc.
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Sheet 3 of 3

Section XIV. Description of Hazardous Waste

CHSI notes that Process Code "T01A" in C Column D (2) refers to the Listed Waste Treatment System identified on Line 06 in Section XII.

CHSI also notes that Process Codes "T0A" through "T04K" refers to the various container an/or tank treatment processes described in Lines 07 through 17 in Section XIII.

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ATTACHMENT 2

RESOURCE TECHNOLOGY, INCORPORATED

Model LSS1
Lamp Recycling System

Revised May 31, 2000

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1.0 Introduction

2.0 Process Description

2.1 General Description

The Model LSS1 Lamp Recycling System achieves the goal of setting a new standard for simplicity, safety, and recycling efficiency. Lamps enter this system on a power-feed belt passing through a negative pressure air chamber. Each lamp is crushed, separating glass and metal components into individual coproducts storage bins. Phosphor powder collects in the multi-stage filtration system. This powder should be treated in other equipment to recover elemental mercury for commercial use. Mercury vapors adsorb onto activated carbon filters eliminating fugitive emissions during processing. The Model LSS1 is fully computerized assuring easy operation. A touch screen control module provides one touch start-up for the entire system. This feature also provides operational monitoring of process and coproducts recovery lines. The Model LSS1 may include optional equipment that will continuously monitor the exhaust vent and provide a permanent record of system air quality.

2.2 Capacity and Performance

The Model LSS1 Lamp Recycling System has the capability of processing 2300 pounds (952 kg) of fluorescent lamps per hour. This equates to approximately:

T-12	T-8 lamps
3,500 4-foot	5,250 4-foot
1,750 8-foot	3,075 8-foot

The Model LSS1 also handles circular and U-shaped fluorescent lamps, high intensity discharge lamps, and more.

2.3 Equipment Description

1. **#1 Lamp Feed Conveyor**: The #1 Lamp Feed Conveyor receives the manually loaded fluorescent lamps and transports them to the implosion chamber conveyor. The implosion chamber conveyor consists of a conveyor belt, loading aprons, electric motor, and gear reducer.
2. **#2 Lamp Feed Conveyor**: The #2 Feed Conveyor receives the fluorescent lamps from the #1 Feed Conveyor and transports the bulbs to the breaker bar. The #2 Feed Conveyor and all subsequent components to this system are enclosed and operated under vacuum to collect fugitive mercury emissions.
3. **Breaker Bar**: The Breaker Bar is comprised of rotating steel arms which break the lamps prior to their being gravity-fed into the primary crushing drums.

4. **Primary Crushing Drums**: The Primary Crushing Drums consist of two rotating steel drums which crush the lamp components and deposit the particles on the elevating conveyor.
5. **Elevating Conveyor**: The Elevating Conveyor receives the crushed lamps from the primary crushing drums and transports them to the primary trommel.
6. **Primary Trommel**: The Primary Trommel utilizes a multi-layer screen which separates the components by particle size. Larger (aluminum end-caps) are retained within the screen and are discharged for recycling. Particles between one inch and 1/16 of one inch (glass) are retained by the screen and continue onto the secondary trommel via the vibrating conveyor. Particles less than 1/16 of one inch pass through both screens to a 100 mesh vibrating screen separator. The rotating action of the primary trommel provides enough agitation to scrub the phosphor powder and mercury from the aluminum end-caps and from the glass particles.

   ***Note*: After passing through the Primary Trommel, the aluminum is discharged via a chute to a receiving container which can then be shipped as a commodity for recycling.**

7. **Vibrating Screen Separator**: The Vibrating Screen Separator receives phosphor powder and glass fines from the primary trommel. The Vibrating Screen Conveyor retains clean glass fines and transports them to a drum for recycling. The calcium phosphate powder passes through the vibrating screen and is collected in sealed drums for transport to a mercury retorting facility.
8. **Secondary Trommel**: The Secondary Trommel receives material from the primary trommel via a vibrating conveyor and again agitates and scrub the glass. The glass particles that do not pass through the 1/16 of one inch openings in the outer screen of the secondary trommel are gravity-fed into the secondary crushing drums.
9. **Secondary Crushing Drums**: The Secondary Crushing Drums consists of two rotating steel drums which crush the lamp glass to its final size and deposits the glass on the magnetic conveyor.
10. **Magnetic Conveyor**: The Magnetic Conveyor receives particles of glass from the secondary crushing drums and transports them to a receiving container. Metallic particles (filaments and aluminum end-caps attached to filaments) attract to the magnetic conveyor and are transported to an additional receiving container which can then be shipped for recycling.
11. **HID De-Globing Chamber**:
    The HID de-globing chamber serves to remove the outer glass from the HID lamps. Most all configurations of lamps may be placed socket

loading, the door must be closed and the cycle start button depressed. This will activate the de-globing process. Upon completion of this cycle the door to the chamber may be opened. The HID frames and mercury bearing arc tubes are manually removed from the chamber. Using a wire cutting device the operator should separate the two remaining components. The wire is ready for recycling at a local metals recycler and the mercury bearing arc tube should be sent off for retort.

12. **Vapor Collection System**: The Vapor Collection System is designed to control mercury vapor and dust emissions from the process. The vapor collection system is comprised of a five horsepower fan, a baghouse equipped with a series of particulate filters, an air compressor for filter back purge, and an activated carbon vessel. The blower which produces an air flow of approximately 500 CFM draws mercury vapors and dust from the process equipment into the baghouse. The baghouse incorporates a set of nine cylindrical particulate filters that are in series with a set of two flat rectangular filters. This filter arrangement is designed to trap 99.99% of air-borne particles measuring 0.5 microns or larger. Purge occurs once each hour of running time on the feed belts. The purge opens a diaphram and back purges the filters with a powerful burst of compressed air. When the system computer senses that back purging the filters is no longer effective at reducing the pressure drop across the filters, the process control system will disable the system and display the appropriate alarm signal on the touch screen. The system can be restarted following the replacement of the filters. Dust accumulates in the collection barrel located underneath the baghouse.
13. **Housekeeping Vacuum System**: The LSS1 is supplied with a positive displacement vacuum pump connected to the vapor collection system. Controlled manually at the touch screen it is used for general housecleaning around the system
14. **Process Control System**: The Process Control System incorporates a programmable logic controller, touch screen, main disconnect, fuses, motor starters, and thermal overload protection for the equipment. The system operation is accomplished by following user prompts on the touch screen. Example screens are included in Appendix A and an electrical diagram is included in Appendix D. The system control logic is such that when in automatic mode no component can be operated without the vapor collection system or without the activation of the previous component in the process. The main control panel contains high voltage components and should only be accessed with the main disconnect in the off position and after following proper lock-out/tag-out procedures, located in section 3.5 of this manual.

2.4 System Specifications

Height: 12 feet (3.66 meters)
Length: 30 feet (9.15 meters)
Width: 11 feet (3.35 meters)
Electrical Requirements: 100 AMP, 208/230/460 volt, 3 phase
Electrical control panel is UL approved.

3.0 Safety

3.1 General Safety Awareness

The LSS1 should be used in accordance with the manufacturer's instructions and good safety and health practices. The manufacturer also recommends that a health and safety professional be consulted regarding mandatory personal protective equipment (P.P.E.) and safety practices prior to the operation of the system.

3.1-1 Warning Signs

The LSS1 contains signs and labels required by OSHA 29 CFR 1910.145 and convey pertinent hazard warning information to the operator that is needed during the operation of this equipment.

3.1-2 Emergency Stop Buttons

Emergency stop buttons are located in four areas on the LSS1; three are on the front or operating side of the equipment, and one on the back side. Anytime there is an emergency and the LSS1 must be stopped immediately, an operator can depress any one of the four emergency stop buttons. This will completely shut down the LSS1, including the vapor fan. In order for the LSS1 to restart, the emergency stop button that was activated must be pulled out to deactivate the emergency stop condition, and the system must be restarted at the touch screen.

3.1-3 Safety Interlocks

When operating in the automatic mode, the LSS1 is programmed through the Programmable Logic Controller (PLC) which prevents operation of the system without operating the vapor collection system. Furthermore, no system component can be operated out of sequence. Additional information concerning control logic is included in section 5.2 of this manual.

3.1-4 Machine Guarding

The Model LSS1 is designed and manufactured to provide a safe work environment for the operator. The LSS1 meets the requirements of OSHA 29 CFR1910.212 Machine Guarding Standard.

3.2 Operator Training Requirements

Operators of the LSS1 should be trained in compliance with the requirements of the Occupational Safety and Health Administration (OSHA) 29 CFR1910.120(p) for hazardous waste site workers. Additional training or certifications may be required by state or local agencies and should be researched and obtained prior to operation of this system. Training should include proper emergency response procedures and reporting requirements. Additionally, operators should be informed of the potential for adverse health effects resulting from the improper handling of mercury-containing material. Operators should be familiar with respiratory protection devices and other personal protective equipment which should be worn during the operation and maintenance of this equipment. Finally, operators should be familiar with the lock-out procedures which are outlined in section 3.5 of this manual.

3.3 Chemical Hygiene

While operating the LSS1, operators should follow good chemical hygiene practices. This is done by prohibiting consumption of food or beverage and use of tobacco products in areas where lamps are handled, stored or processed. Operators must use the proper P.P.E. while handling or processing lamps. Operators should wash their hands and face thoroughly with soap and water before breaks and meals, and shower at the end of the work shift.

3.4 Personal Protective Equipment

The LSS1 separates fluorescent lamps into three primary components: clean aluminum end-caps, clean crushed glass, and calcium phosphate powder (phosphor powder) containing mercury. Each of these waste streams has a potential to cause injury or illness if handled improperly. The aluminum end-caps and crushed glass have sharp edges and can produce cuts and puncture wounds in unprotected operators. As a minimum requirement, protective gloves should be worn any time lamps are being handled or loaded. Phosphor powder containing mercury vapor is released from the lamps and collected throughout the system. Mercury can be introduced into the body by inhalation, absorption and ingestion. Care should be exercised in avoiding inhalation of this powder. Use of respiratory protection during certain operations and maintenance of this equipment is required. Specific personal protective equipment which is to be worn will be outlined in the following sub-sections.

3.4-1 Respiratory Protection

Since the primary root of mercury vapor entry into the body is through inhalation, respiratory protection may be required during certain operations and maintenance performed on the LSS1. Respiratory protection should be used anytime mercury vapors are present. Respiratory protection should be worn if a direct reading mercury vapor instrument indicates that mercury vapors are present during operation.

3.4-2 Eye Protection

Safety glasses shall be worn at all times while handling lamps, operating the LSS1, or conducting maintenance on the LSS1.

3.4-3 Hearing Protection

OSHA 29 CFR1910.95 the Occupational Noise Exposure Standard states that any employee exposed to 90 decibels of sound or greater for an eight hour period of time is required to wear hearing protection. The Model LSS1 Lamp Recycling System generates approximately 90 dBA of noise while in full operation. Therefore, all such exposed operators and anyone around the LSS1 while it is operating are required to wear hearing protection.

3.4-4 Body Protection

Since the phosphor powder contained in fluorescent lamps contains mercury, it is important that protective coveralls be worn by all personnel who are operating or conducting maintenance on the LSS1. This is important so that cross contamination does not occur from the phosphor powder collecting on their work uniforms.

3.5 Lock-out Procedure

In order to ensure that employees performing maintenance or repairs on the LSS1 do not become injured by accidental start-up or release of stored energy, all required precautions as outlined in OSHA 29 CFR 1910.147 Lock-Out/Tag-Out Standard should be followed.

The Procedure:

Step 1: Locate the circuit breaker that supplies power to the main control panel. Turn off the circuit breaker and lock-out the circuit breaker.

Step 2: Go to the main control panel for the LSS1 and turn off the knife switch on the outside of the electrical panel and lock that switch in the off position. Following the directions on the front of the panel, open the control panel. Check to ensure that the main breaker has been turned off. Then go to the touch screen and attempt to operate the equipment.

Step 3: Go to the rear of the LSS1 to the electrical switch for the air compressor, turn the switch to the off position , close the lock-out hasp over the switch, and place the lock through the hasp on the switch.

Step 4: Open the air system drain valve on the air compressor, this is to make sure there is no stored pneumatic energy in the LSS1.

Step 5: Turn the air system ball valve to the off position. Close the lock-out hasp over the valve and place a lock through the hasp on the valve.

Step 6: Attempt to operate any part of the LSS1 in order to verify that there is no stored energy within the equipment. After completion of the previous steps, you may perform the required work on the LSS1. In order to return the LSS1 to service, make sure all tools and equipment are removed from the machine and all components are secured back in the machine and follow the lock-out steps in reverse order.

3.6 Air Monitoring

Air monitoring for mercury vapor concentration should be conducted in the area around the LSS1. A direct reading mercury vapor instrument should be used to collect this data. Air monitoring should be conducted in the operator work area, vapor fan stack, and coproduct's collection areas to ensure that all employees working around the LSS1 will not be exposed to mercury vapor concentrations above the ACGIH Threshold Limit Value (TLV). If at any time the mercury vapor readings get close to the TLV, the people working in the affected area should don air purifying respirators, and correct the cause of emission.

4.0 Pre-operation and Start-up

The LSS1 start-up is accomplished by using the touch screen and following the prompts as they appear and as outlined in section 4.2 below.

4.1 Pre-operation Inspection

Prior to start-up of the LSS1, a walk around inspection should be performed to ensure that all coproduct receptacles are empty and in position to receive the co-products as they are discharged from the LSS1. Furthermore, ensure that the four drums around the LSS1 are properly positioned and have straight, unobstructed connection boots and secure connection rings.

4.2 Equipment Start-up

The LSS1 is designed to run in an automatic mode. When the LSS1 runs in its automatic mode, all equipment operations are supervised through the programmable logic controller (PLC). If there is an alarm, the LSS1 will stop and indicate the reason for the alarm. To start the LSS1, make sure the circuit breaker supplying the LSS1 control panel is in the "ON"

position. Proceed to the LSS1 main electrical panel and make sure that the knife switch on the control panel is in the "ON" position. Proceed to the front of the LSS1, turn the key switch on the touch pad to the "ON" position, follow the prompts on the screen, and touch the screen in the areas indicated to make your selection. To run the LSS1 in the Automatic mode press "automatic" in the selection area of the screen. When the automatic screen appears, press the system start to activate a five-second buzzer which indicates that the system will start. When the buzzer shuts off, the system will start in a sequence. When all of the systems are operating all indicator lights of the system, except "Vacuum Bar and H.I.D.", will be lit. It is at this point that you can start feeding lamps into the LSS1.

5.0 Equipment Operation

5.1 Feeding Lamps into Equipment

Lamps are manually placed on the #1 Feed Conveyor by trained operators. The Model LSS1 is designed to process approximately 3,500 lamps per hour. The lamps can be continuously laid end-to-end completely across the conveyor. Be careful not to place the lamps any higher than the guard at the end of the conveyor. This will avoid having the lamp break prior to entry into the implosion chamber conveyor. **DO NOT** feed cardboard, wood, plastic, or other debris into the machine as such will clog the vacuum lines or jam the equipment.

Caution: In order to prevent jamming of the machine, plastic coated lamps must not be placed directly on feed conveyor #1.

5.2 Monitoring Equipment Operation

The process control system incorporates a programmable logic controller (PLC) which monitors equipment operation. Should a motor overload, filters become clogged, or an emergency stop button be depressed, the PLC will shut down that system and alert the operator to the problem. During normal operations it is important to pay attention externally to equipment operation. Look for signs of wear and tear such as leaking or clogged vacuum lines. Listen for any sound abnormalities that may indicate a bearing failure, a motor failure, or a jam in the equipment. It is also important to monitor the levels of glass, aluminum, fines, and powder discharged to containers. Proximity sensors are mounted in the lids of the drums attached to the glass fine discharge, the powder discharge, baghouse discharge and the vacuum container discharge. These switches will shut off equipment operation via the PLC should the containers become full. When full, please check the touch screen alarm screen for indication

as to which drum needs to be changed out. When a new drum is placed back into position, the PLC will allow operation to continue.

5.3 Monitoring Coproduct Quality and Volume

Quality in the lamp recycling business refers to how well the process can separate the hazardous materials from the non-hazardous materials. In order for the process to perform properly, the crush and separation operation must separate the end-caps, glass and contaminated powder from the other components. During normal operation, it is important to inspect the coproducts and coproduct discharge areas to ensure that there is no mixing of coproducts or cross contamination of materials (e.g. visible phosphor powder on the glass or aluminum end-caps, or glass-laden aluminum end caps).

One simple method to inspect glass quality is to put on rubber gloves and pick up a handful of glass gently and return it to the storage container. Inspect the rubber glove for evidence of powder. It may be necessary to sample the clean glass and the clean aluminum in order to maintain compliance with permit regulations.

It is important during operation of the LSS1 to monitor both the glass and aluminum discharge to assure that material is flowing freely and that no back-up of material will occur through the discharge chutes. Glass may be discharged into containers as small as 55 gallon drums or as large as semi trailers with optional equipment. Aluminum may also be discharged in the same manner. It is important to monitor these discharges as often as necessary to ensure that those containers do not get overfilled.

5.4 Using the Housekeeping Vacuum

The LSS1 is supplied with a positive displacement vacuum pump connected to the vapor collection system. The household vacuum system is controlled at the touch screen and is programmed to operate only when the LSS1 is running in the automatic mode. It is used for general housecleaning around the LSS1. Vacuum ports are located at various points around the equipment and are to be used to collect small particles of glass, aluminum, and phosphor powder. These materials will then be separated throughout the remainder of the system . It is important to ensure that a vacuum hose is attached to an open vacuum port prior to initiating the vacuum system. Otherwise, damage may result to the vacuum system. It is important to vacuum only lamp components into the system so that foreign materials do not contaminate recyclable materials or cause blockages when passing through the machine.

6.0 Equipment Shutdown

6.1 Emergency Shutdown

If at anytime the LSS1 needs to be immediately shut down, an operator should depress one of the four emergency stop buttons located on the LSS1. Three emergency stop buttons are located on the front of the machine, and one is located on the back. In order to deactivate the alarm and restart the LSS1, the emergency stop button that was activated must be pulled out from the stop position. Note that the vapor collection system is disabled with an emergency shutdown. To prevent fugitive vapor emissions the vapor collection system must be restarted immediately following the treatment of the emergency.

6.2 Routine Shutdown

At the end of the production day or when you want to shut down the LSS1, simply press the system stop button on the touch screen of the automatic menu. This will shut down all operations of the LSS1 with the exception of the vapor fan.

(The vapor fan should be allowed to continue to operate even though the LSS1 is not actively processing lamps. This will ensure that a negative pressure is maintained within the LSS1, preventing the release of mercury vapors from any residual lamps or phosphor powder that may remain in the system.)

6.3 Daily Clean-up Procedures

At the end of each shift, the LSS1 should be allowed to continue to operate in the automatic mode for at least 10 minutes following the cessation of all processing. During this period the LSS1 equipment and surrounding floors should be swept of all visible calcium phosphate powder (phosphor powder) in order to decontaminate the area of mercury vapor. Coproduct collection containers should also be emptied at this time.

7.0 Routine (Scheduled) Maintenance

Below is a list of scheduled maintenance items:

ITEM	MONTHLY	SIX MONTH	ANNUAL
#1 Feed Conveyor	X	X	X
#2 Feed Conveyor	X	X	X
Elevated Conveyor Flights	X	X	X
Gear Reducers Oil Change		X	X
Carbon			See below
Glass Conveyor	X	X	X
Trommel Rollers	X	X	X
Air Compressor Oil	X	X	X
Vacuum Pump			X
Vacuum Blower Motor			X
All Air Lines	X	X	X

DAILY: *Perform visual equipment inspection, check visible components for visible* wear. Check nuts, bolts for tightness.

#1 Feed Conveyor: Inspect for tracking, wear and tension.
Adjust tracking and tension if necessary, replace if worn.

#2 Feed Conveyor: Inspect for tracking, wear and tension.
Adjust tracking and tension if necessary, replace if worn.

Elevated Conveyor Flights: Inspect the flights for wear, replace if wear is excessive.
Replace if UHMW wear strips are worn down to the metal flite

Gear Reducers: Check seals.
Change oil.

Carbon: Change when exhaust levels exceed regulatory levels.

Air Compressor: Change oil.

Vacuum pump: Change oil.

Air Lines: Check connections for air leaks

Every 100,000 lamps: Inspect clean-out points. Clean as necessary at the following locations: Feed conveyor side doors, Trommell #1 end access, vibrating conveyor port, magnetic conveyor tail.

8.0 Recommended Parts Inventory

SPARE PARTS INVENTORY

PARTS	QUANTITY
Conveyor Belt 1	1
Conveyor Belt 2	1
Cylindrical HEPA Filters	15
Square HEPA Filters	2
Air Compressor Oil	
Elevated Conveyor Flights	1 set
Elevated Conveyor Divider	1

Vacuum Blower Motor Oil - Mobil DTE 88
Texaco R & O 220
Amoco 220, or equal

Vacuum Blower Bearing Grease - Follow Manufacturers Recommended Instructions

Gear Reducer Motor Oil - Mobil 600 W Super
Texaco Honor cyl. Oil 680
Chevron NL Gear Comp 680

Touch-up Paint

Air Line

Gasketing Material (foam)

Gasketing Material (perma gum)

Silicone Sealant (RTV)

5.0 Warranty and Disclaimer

Resource Technology, Inc. ("RTI") warrants that its Model LSS1 Machine will be free from defects in materials and workmanship at the time of RTI's and for a period of 90 days thereafter exclusive of conveyor belts, which are excluded from warranty coverage; and electrical components, which are subject only to applicable manufacturer's warranties, if any.

During this limited warranty period RTI will provide new replacement parts or Equipment on an exchange basis as set forth below. All replaced parts or Equipment become the property of RTI. This limited warranty also does not include service to repair damage resulting from any accident, disaster, misuse, abuse, or any non-RTI installation, modification or attempted repair of the Equipment.

FOR WARRANTY SERVICE OR ASSISTANCE IT IS REQUIRED THAT A SERVICE REQUEST BE MADE WITHIN THE WARRANTY PERIOD. NO EQUIPMENT OR PARTS MAY BE RETURNED TO RTI WITHOUT RTI'S PRIOR WRITTEN AUTHORIZATION, AND ALL SUCH RETURNS WILL BE AT CUSTOMERS SOLE EXPENSE. If shipping is authorized, Customer must also prepay applicable RTI part or Equipment shipping charges and either obtain shipping insurance or assume the risk of loss or damage in transit. RTI reserves the right to charge Customers' account for replacement of parts or Equipment which are subsequently determined to be outside of Limited Warranty coverage, including applicable travel or service call charges.

THIS LIMITED WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY OFFERED BY RTI, AND NEITHER RTI NOR ANY REPRESENTATIVE MAKES ANY OTHER REPRESENTATION OR WARRANTY OF ANY KING, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OR MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow limitations or exclusions of implied warranties, so the above exclusions may not apply to you.

CUSTOMER'S SOLE REMEDY UNDER THIS LIMITED WARRANTY SHALL BE PART OR EQUIPMENT AS PAROVIDED ABOVE. IN NO EVENT WILL RTI BE LIABLE FOR ANY DAMAGES, INCLUDING ANY ALLEGED DOWNTIME; LOST PROFITS, LOST SAVINGS, OR OTHER SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE SUCH EQUIPMENT, EVEN IF RTI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

APPENDIX B:
Trouble Shooting Guide

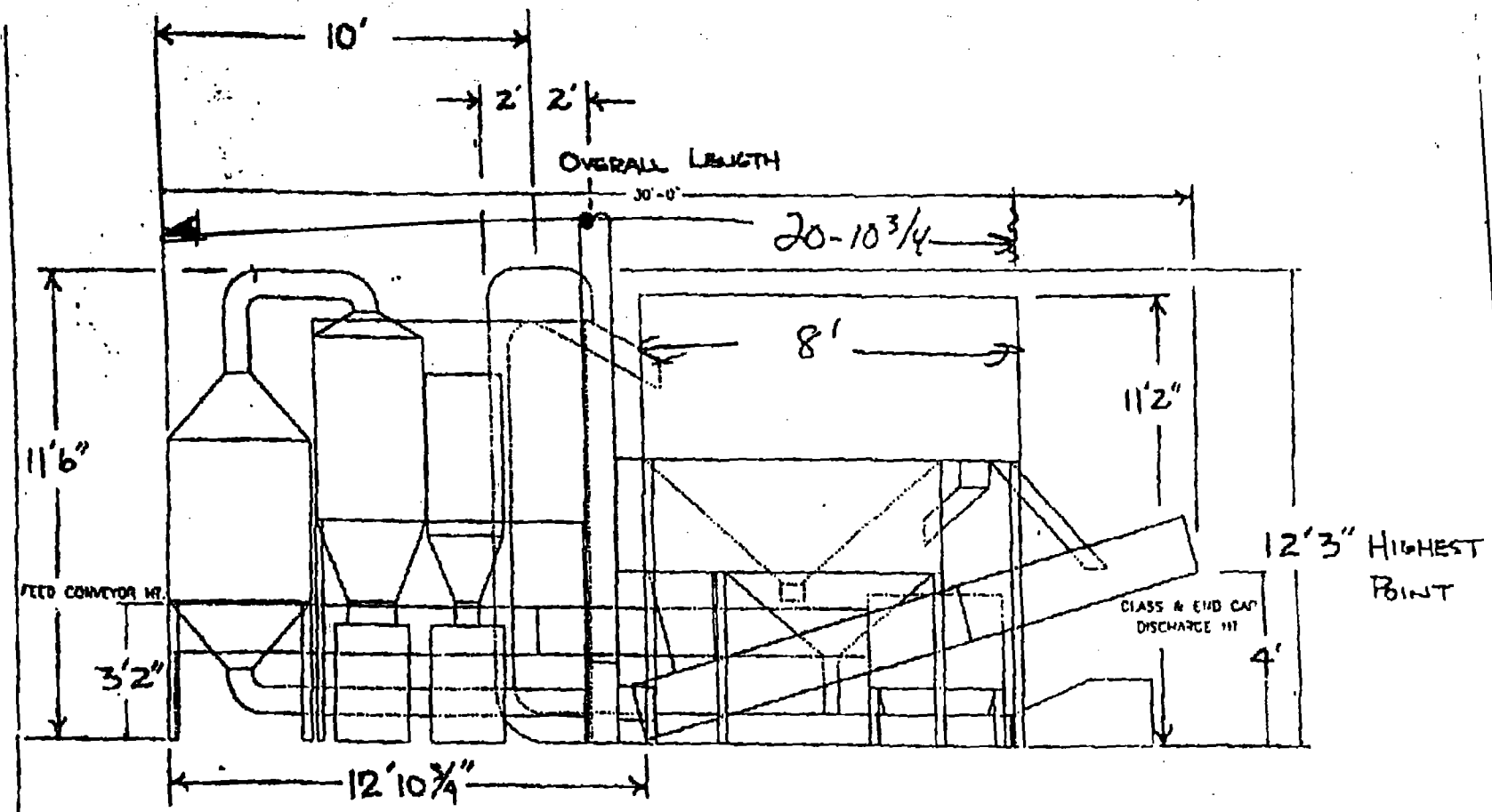
TROUBLESHOOTING GUIDE

Symptom	Possible Causes	Corrective Action
Feed conveyors stop	• Debris between conveyors • Belt is ripped • Debris in systems • Belt tension too loose • Conveyor pulley moved from center • Key is dislodged from shaft or reducer	• Remove debris • Replace belt • Remove debris • Adjust belt tension • Re-position pulley • Replace key in shaft
Crushing drums stop turning	• Debris in system (nuts, bolts, wood, etc.) • Key is dislodged from shaft	• Reverse motor to clear jam • Remove cover to clear debris • Replace key in shaft
Elevated conveyor stops	• Material overload • Debris in system • Key is dislodged from shaft	• Reverse conveyor to clear jams • Open cleanout(s) to remove material/debris
No power	• Main breaker off • Knife switch off • Key switch off	• Turn on main breaker • Turn on knife switch • Turn on key switch
Phosphor powder coming from co-product chute	• Clogged vapor lines	• Check ports • Clear lines
Baghouse filters clogged	• Air pulse system not working • Filters at end of service life	• Turn on air compressor • Ensure valve is open • Change filters
No air pressure	• Air compressor not turned on • Air compressor unplugged • Ball valve not closed • Mechanical problem • Filter has been ruptured and carbon contaminated with phosphor powder • Leak in air line	• Turn on air compressor • Plug in air compressor • Open valve • Replace air line • Replace cylindrical and square particulate filters – replace carbon
High mercury vapor emissions from exhaust stack	• Carbon is saturated	• Replace carbon
Air compressor will not shut off	• Diaphragm valve stuck open • Air line disconnected or damaged	• Disassemble and clean • Reconnect or replace

*Should a component that is commercially available fail, please refer to the component manufacturer's manual

APPENDIX C:
Inspection Form

	YES	NO
Make sure coproduct containers are empty and are ready to receive material.		
Make sure drum connection boots are straight, and connecting rings are secure.		
Make sure the power is turned on to the control panel..		
Turn on the air compressor, open the air valves.		
Walk around and inspect the machine. Look for loose nuts, bolts, fittings. Listen for air leaks. Check air gauges for proper pressure: Compressor 140 psi Top Regulator 95 psi Lower Regulator 65 psi		
Stage material for processing.		
Turn the key switch on the tough screen to the "ON" position.		
Follow the instructions on the touch screen. Proceed to run the equipment in "Automatic" mode.		
Perform air monitoring in the operator area, co-product area, exhaust stack.		
Begin processing lamps.		

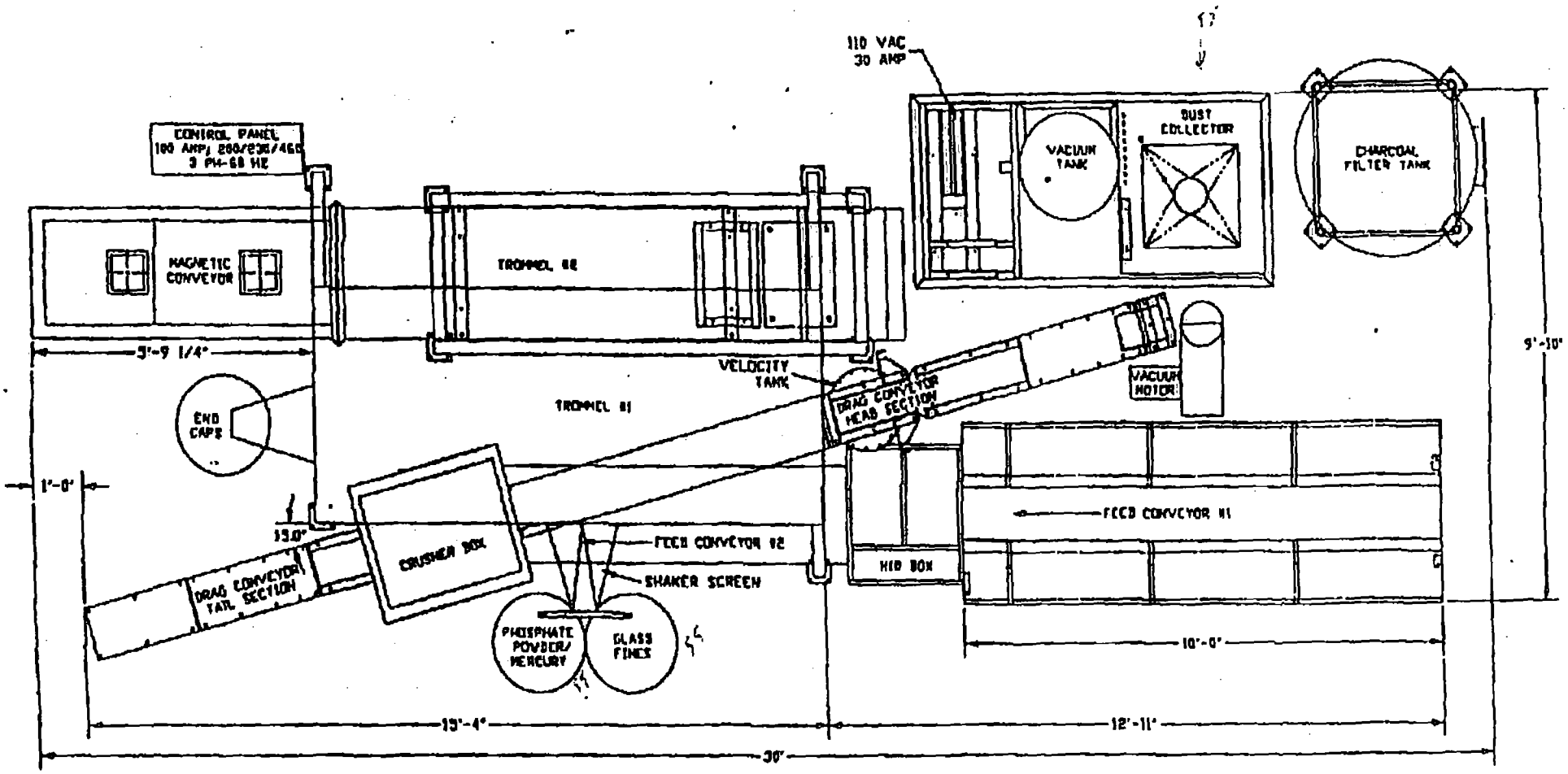


MODEL LSS1

SIDE ELEVATION

ATT: DAN GLENN

RESOURCE TECHNOLOGY INC.
520 WEST ST.
VAN METER, IA.


110 VAC
30 AMP
CONTROL PANEL
100 AMP, 208/230/460
3 PH-60 HZ
MAGNETIC CONVEYOR
TROMMEL #2
TROMMEL #1
VACUUM TANK
DUST COLLECTOR
CHARCOAL FILTER TANK
VELOCITY TANK
DRAG CONVEYOR HEAD SECTION
VACUUM MOTOR
END CAPS
CRUSHER BOX
DRAG CONVEYOR TAIL SECTION
FEED CONVEYOR #2
SHAKER SCREEN
PHOSPHATE POWDER/ MERCURY
GLASS FINES
HIB BOX
FEED CONVEYOR #1
5'-9 1/4"
1'-0"
15.0"
9'-10"
10'-0"
15'-4"
12'-11"
30'

MODEL LSS1

ATTACHMENT 3

3. Storage and transfer of hazardous wastes, including lab packs, using tanks and containers. Storage/transfer activities may include consolidation (i.e., bulking) of compatible waste prior to shipment;

4. Storage and blending of hazardous waste intended for use as a supplemental fuel at authorized offsite hazardous waste fuel burners;

5. Compaction of hazardous wastes prior to shipment to offsite disposal facilities (e.g. landfills);

6. Treatment of D002 liquid/solid mixtures in containers by separation/removal of free liquids from solid materials;

7. Treatment of D002 liquids in containers and tanks through the consolidation/mixing of compatible waste streams;

8. Treatment of organic peroxides in containers through the addition of water;

9. Treatment of acidic cyanide mixtures in containers through addition of sodium hydroxide or other suitable alkaline materials;

10. Treatment of hazardous waste in tanks and containers by phase separation using physical (e.g., gravity) and/or chemical (e.g., demulsifying agents) means;

11. Storage, shredding and metal washing of hazardous wastes intended for use as a supplemental fuel or incineration at offsite facilities;

12. Storage and treatment of black powder by addition of water in containers;

13. Storage and treatment of hazardous waste in containers by the addition of dry ice;

14. Storage and venting of hazardous waste oxygen to the atmosphere.

15. Storage and crushing of hazardous waste lamps for volume reduction and preparation for recycling.

A complete description of the RCRA-regulated hazardous waste operations is presented in section C-1 (iii) below.

Typical waste categories and EPA waste codes which are accepted for hazardous waste storage, consolidation, and/or treatment include, but are not limited to, the following:

1. Acids – D002, D004-D011, F006, F019, K002-K008, K031, K048-K052, K061, K062, K069, K084, K086, K100-K120, K106, P011, P012, U144-U146, and U246.

2. Alkalines - D002, D004-D011, F006, F019, K002-K008, K031, K048-K052, K061, K062, K069, K084, K086, K100-K120, K106, P011, P012, U144-U146, and U246.

3. Flammables/organics - wastes which exhibit a flash point of less than 140°F, halogenated and non-halogenated solvents, pure organics, and/or aqueous wastes containing organic materials. Includes waste codes D001, D012-D043, F001-F005, F020-F024, F026-F028, K001, K009-K030, K032-K043, K060, K073, K083, K085, K086, K051, K052, K093-K099, K103-K105, P004, P005, p022, P037, P048, P050, P051, P059, and most U-codes.

The list of hazardous waste codes accepted for hazardous waste shredding/metalwashing is presented in Table C-10A. These wastes may be accepted in bulk tanker, container (e.g., 55-gallon drum) or lab pack form. Typical sample analysis for hazardous waste shredding/metalwashing are provided in Appendix C-1, data sheets 38 through 69.

L. Storage and Treatment of Black Powder in Containers

CHSI is authorized to treat black powder in containers prior to shipment to an off-site treatment or disposal facility. The treatment operation, the addition of water (wetting) to the black powder, is conducted to prepare the black powder for disposal facility requirements. Many hazardous waste incineration facilities can accept black powder, but only when wetted. Additionally, the water used for wetting the black powder may be mixed with virgin ethylene glycol based antifreeze when temperatures are expected to go below 32 degrees F. US DOT Regulations require antifreeze when a package containing wetted black powder could freeze. This operation is conducted in the staging area of Unit R1. The black powder would carry EPA hazardous waste codes D001 and D003.

M. Storage and Treatment of Hazardous Waste in Containers by the Addition of Dry Ice

CHSI is authorized to treat hazardous waste in containers to lower temperatures by the addition of dry ice prior to shipment to an off-site treatment of disposal facility. CHSI proposes to add blocks of dry ice into roll-offs/intermodals containing wastes which may ignite under extreme high temperatures. During summer months with high daytime temperatures and high dew point temperatures, nighttime temperatures also remain high. During these periods CHSI places blocks of dry ice into roll-offs/intermodals containing flammable solids (greater than 5000 BTUs/lb) of non-fuel blendable materials. This will occur when daytime temperatures are expected to reach 90 degrees F. or higher; the expected nighttime low temperature is 70 degrees F. or higher; and the expected high dew point is at or above 70 degrees F. This placement of dry ice will be conducted in Units Q1 and B, but the container could be stored in other transportation vehicle storage areas. Any hazardous waste that is authorized for storage and transfer is a candidate for this treatment operation. Storage and transfer waste codes are listed in Table C-9.

N. Storage and Venting of RCRA Regulated Oxygen to the Atmosphere

CHSI is authorized to vent compressed gas cylinders of oxygen carrying EPA hazardous waste code D001 in Building 25. CHSI also vents non-hazardous atmospheric gases fro Building 25 and utilizes the same procedures. The oxygen is vented using the lab pack consolidation hoods in the acid and alkaline/poison bays. CHSI monitors with an oxygen meter and will cease the operation unless oxygen concentrations are between 19.5% and 23.5%. No flammable operations are allowed during oxygen venting.

N. Storage and Crushing of Hazardous Waste Lamps

CHSI is requesting authorization to crush used lamps for volume reduction and preparation for recycling in Unit 25.These lamps will include fluorescent and high-intensity-discharge lamps. When the lamps are crushed the components are separated into metal, glass and calcium phosphor powder with mercury.

A list of hazardous waste codes accepted for lamp crushing is presented in Table C-17.

C-1a Containerized Waste 703.201 (b) (1)

All of the container storage areas at the facility are equipped with adequate secondary containment. A demonstration of the adequacy of the secondary containment system in each area is provided in Section D-1 of this Application.

As discussed in Section D-1(b)(1), rolloffs containers with free liquids are not allowed for storage in the rolloff storage area. Each rolloff container is subjected to a test for free liquids using EPA Method 9095 to demonstrate that the waste stored in the rolloff does not contain free liquids.

2. Storage/Transfer Wastes – Wastes in this category are accepted, stored, consolidated, and ultimately shipped to an offsite treatment, disposal, or reuse facility. Wastes accepted as part of the hazardous waste fuel blending program and hazardous waste shredding are considered storage and transfer wastes. Storage and transfer wastes are subject to prequalification and onsite acceptance screening procedures, but the range of parameters is less than that for treatment wastes. Any waste, which undergoes blending/consolidation, is, however, subject to chemical compatibility testing prior to undertaking the blending/consolidation activity.

3 Special Wastes – Special wastes are unique waste streams that are comprised of identifiable, unused, commercial products which are not mixed with other characteristic or listed hazardous wastes. In most cases, special wastes are "lab packs" in their pure commercial form and original container (e.g. a bottle of acid from a laboratory cleanout). Special wastes also include, but are not limited to, the following:

1. Commercial chemical product containers which are empty as defined in 35 IAC 721.107:

2. Single-substance spill material (e.g., absorbent debris);

3. Off-specification or outdated commercial chemical products;

4. Contaminated commercial products;

5. Asbestos waste from demolition or cleaning;

6. Intact manufactured articles (e.g., thermometers, batteries, lamps) which contain a hazardous waste;

7. Containers of hardened solids or highly viscous wastes which cannot be sampled;

8. "RCRA-empty" (per 35 IAC 721.107) containers, drums, barrels, cans, bags, liner, etc. from waste commercial products or chemicals; and

9. Aerosol cans which are in good exterior condition and which have an original label, or a label, which accurately reflects the generator's knowledge and/or testing of the contents of the container.

Given their unique nature, special wastes are not subject to sampling or analyses as part of the prequalification process or onsite waste acceptance procedures. However, lab pack waste undergoing consolidation or treatment is subject to compatibility testing prior to the mixing/treatment activity

Table C-17: Hazardous Wast[illegible] Crushing

Waste Category	EPA Hazardous Waste No.	Waste Stream	Basis for Hazard listing per 40 CFR 261	Hazard Constituent (s)
Reactive	D003	Sodium	Reactive	
Inorganic Metals	D005	Barium	Toxic	Barium
	D006	Cadmium	Toxic	Cadmium
	D008	Lead	Toxic	Lead
	D009	Mercury	Toxic	Mercury
Universal Wastes	None	Sodium	Reactive	
		Barium	Toxic	Barium
		Cadmium	Toxic	Cadmium
		Lead	Toxic	Lead
		Mercury	Toxic	Mercury
Non-Hazardous	None	N/a	Non-Hazardous	Used lamps

C. Proposed Modifications to Drum Container Storage Activities

1. CONTAINER MANAGEMENT BUILDING (UNIT 25)

Under this Request for Permit Modification, CHSI seeks authorization to store flammable and reactive wastes in Building 25. Building 25 is fully enclosed container storage structure located along the west property line adjacent to the eastern edge of Slip No. 6. The Building 25 truck unloading pad for one truck is located on the northeast side of Builoding 25. This pad will only be used for waste going to or coming from Building 25 and is only for van trailers of waste containers. The pad is connected to a dock to facilitate forklift loading/unloading of the trailer. Building 25 includes three main segregated storage bays used for the storage of ignitable, acidic, and alkaline/poison/PCB hazardous wastes in non-bulk containers (e.g., 55-gallon drums) for liquids and solids, as follows:

–	Alkaline/Poisons/PCBs	248	Drums	
–	Acids	136	Drums	
–	Flammable	184	Drums	
–	Truck Pad	88	Drums	
	Total	656	Drums	(or 30,080 gallons)

CHSI intends to locate a hazardous waste lamp crusher in the alkaline bay of Unit 25, occupying some of the current drum storage. Although this bay is currently permitted for 13,640 gallons (248 55-gallon drums), this will be limited to 4,015 gallons (73 55-gallon drums) when the lamp crusher is in the unit.

The Building 25 truck unloading pad is located on the northeast side of Building 25. This pad is for one van trailer of up to 88 drums (4840 gallons equivalent) for waste going to or coming from Building 25. The pad is connected to a dock to facilitate forklift loading/unloading of the trailer.

Design details and pertinent operating data, including unit dimensions, storage capacity, and secondary containment capacity calculations are shown in CHSI DWG. No. 4282.

The Building 25 truck unloading pad design details are shown in CHSI DWG. No. 4283. Secondary containment calculations are included as Appendix D-37.

Table D-1: Container Management Areas

Type	Container Management	Waste Category	Number/Volume	Area
I.	DRUM STORAGE AREAS (55-GALLON DRUMS, OR EQUIVALENT)			
A.	Existing Areas			
	Drum Storage Area (Unit G1)	Acidic – 1	192	
		Acidic – 2	96	
		Alkaline	192	
		Staging	72	
		Subtotal	552	
	Drum Storage Area (Unit R1)	Oxidizer	96	
		Reactive	96	
		Poisons	96	
		Flammable – 1	160	
		Flammable – 2	160	
		Staging (Inbound)	160	
		Subtotal	768	
	Drum Storage Expansion (Unit R2)	Oxidizer	96	
		Reactive	96	
		Poisons	96	
		Staging (outbound)	80	
		Subtotal	368	
	Lab Pack Pour Off Station (Unit F1)	Alkaline/Acids	8	
		Subtotal	8	
	Ignitable Container Management Building (Unit 26)	Ignitable/PCB	192	
		Subtotal	192	
	Container Handling Dock (Unit 61)	Staging	160	
		Subtotal	160	
	Container Management Building (Unit 25)	Alkaline/Poison	248*	
		Acids	136	
		Flammable	184	
		Truck Pad	88	
		Subtotal	656*	

(Continued)

Type	Container Management	Waste Category		Number/Volume
B.	Approved/Not Yet Constructed Areas			
	Drum Storage Expansion (Unit R2)	Flammable –3		160
			Subtotal	160
	Lab Pack Repack & Consolidation Area (Unit U)	Acid/Alkaline		10
		Other		25
			Subtotal	35
	Paint & Paint Related Material Processing Area (Unit 42)	Ignitable/Toxic		52
		Debris		64CF
			Subtotal	52+64CF
	Shredding Operation (Unit 24)	Ignitable/Toxic		17
		Debris		64CF
			Subtotal	17+64CF
	Metalwashing Operation (Unit 68)	Sludge		1
				1
C.	Facility Total			

--------- 2,969 55-Gallon Drums (163,295 Gallons Total), or Equivalent plus 128 Cu. Ft.*
*-With the lamp crusher in Unit 25, the maximum capacities are reduced to 73 (alkaline bay), 481 (Unit 25) and 2,794 plus 128 cu. Ft. (Total)

II Bulk Solids Storage Areas

A. Existing Storage Areas

Bulk container Storage Area (Unit Q1)	All Characteristic and listed wastes (except water-reactive solids)	Three (3) roll offs At 30 CY Per Unit (Or Equivalent)

(Continued)

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1.0 WASTEWATER TREATMENT SYSTEM

1.1 Chemical Precipitation, Coagulation, Filtration
1.2 Oil Recovery System
1.3 Container Storage, Consolidation and Transfer

2.0 PART B ACTIVITIES

2.1 Container Storage, Consolidation and Transfer
2.2 Drum Crushing/Compacting Operation
2.3 Bulking Operations
2.4 Listed Waste Treatment Operation
2.5 Lab Pack Operations
2.6 Fuels Blending Operation
2.61 Hazardous Waste Shredding Operation
2.62 Metal washing Operation
2.7 Rail Car Transfer Operations
2.8 Hazardous Waste Transfer Facility/Truck to Truck Transfer Operations
2.9 Hazardous Waste Lamp Crushing

The Metalwash Tank has a capacity of 3,730 gallons and the Rinse Tank has a capacity of 987 gallons. Both tanks are constructed of carbon steel and are equipped with level alarms. The metalwash Tank has an emergency vent and will be nitrogen blanketed to eliminate the potential for fires or explosion. The feed hopper will vent to the carbon adsorption system (same as the Bulk Flammable Tank Farm) to control organic air emissions.

2.7 Rail Car Transfer Operations

CHSI operates a concrete-lined storage area for railcar transfer operations (Unit 13). The railcar area is located next to the Ignitable Liquids Tank Farm and is sized to accommodate up to two (2) 30,000 – gallons rail tank cars.

Waste materials may be transferred between the railcars and the tank farm, between truck and railcar. All material transfer operations are conducted using the Clean Harbors rail/truck standard operating procedures listed in Appendix-D-2 in Attachment 1.

2.8 Hazardous Waste Transfer Facility/Truck to Truck Transfer

Under the hazardous waste transfer facility requirements of 35 IAC 723.112, a hazardous waste transporter who stores manifested shipments of hazardous waste in containers meeting the requirements of 35 IAC 722.130 for a period of ten days or less is not subject to regulations under 35 IAC 702, 703, 724, 725 or 728 with respect to the storage of those wastes.

CHSI currently operates a transfer facility for hazardous waste in containers and tank trucks, which are in-transit to facilities other than CHSI. Such vehicles are allowed to stop at the facility for a period of up to 10 days.

In addition, CHSI performs truck-to-truck transfers of waste between in-transit vehicles. Truck to truck transfer activities are accomplished by parking two (2) in-transit trailers either at a loading dock or tailgate-to-tailgate and then directly transferring the container (s) from one vehicle to the other, or transferring bulk liquids or solids from one transport vehicle to another for continuing transport offsite. The containers being transferred are not opened or staged on the loading dock or on the ground during the transfer. Once the transfer is complete, the accompanying manifest (s) are modified to reflect the continuing transport of the transferred containers, and the vehicles continue their shipments to there next intended destination.

CHSI documents all in-transit/truck to truck activities. A copy of the log and drum grid sheet used to track these activities are included in Appendix D-2.

2.9 Hazardous Waste Lamp Crushing

CHSI has proposed to construct and operate a hazardous waste lamp crusher in Unit 25. The lamp crushing operation will be utilized for volume reduction and preparation for recycling.

This system segregates the crushed lamps into glass, metal and phosphor powder containing mercury. The filtration system of the unit is designed to filter the particulate phosphor and mercury vapor with a series of high efficiency particulate air filters and activated carbon. As bulbs are fed into the unit, they are crushed and segregated using vibrating mesh conveyors, magnets and air movement. The components are collected into containers for off-site shipment.

Table D-1: Container Management Area

Type	Container Management Area	Waste Category (See Note 1)		Number/Volume
I.	DRUM STORAGE AREAS (55-GALLON DRUMS. OR EQUIVALENT			
	A. Existing Areas			
	DRUM STORAGE ARE (UNIT G1)	- Acidic –1		192
		- Acidic –2		96
		- Alkaline		192
		- Staging		72
			Subtotal	552
	DRUM STORAGE AREA (UNIT R1)	- Oxidizer		96
		- Reactive		96
		- Poisons		96
		- Flammable – 1		160
		- Flammable – 2		160
		- Staging (Inbound)		160
			Subtotal	768
	DRUM Storage Expansion (UNIT R2)	- Oxidizer		96
		- Reactive		96
		- Poisons/PCB's		96
		- Staging (Outbound)		80
			Subtotal	368
	Lab Pack POUROFF STATION (UNIT F1)	- Alkaline/Acids		8
				8
	CONTAINER MANAGEMENT Building (UNIT 25)	- Alkaline/Poison		248*
		- Acids		136
		- Flammable		184
		- Truck Pad		88
			Subtotal	656*
	IGNITABLE CONTAINER MANAGEMENT Building (Unit 26)	- Ignitable/PCB		192
			Subtotal	192
	Container HANDLING Dock (Unit 61)	- Staging		160
			Subtotal	160
	B. Approved/Not Yet Constructed Area			
	DRUM Storage Expansion (UNIT R2)	- Flammable – 3		160
			Subtotal	160
	Lab pack REPACK & CONSOLIDATION AREA (UNIT U)	- Acid/Alkaline		10
		- Other		25
			Subtotal	35

Table D-1: Continued

Paint and Paint Related Processing Area (Unit 42)	- Westside Pad		24
	- Building		28
	- Hopper (405)		64 Cu.Ft
		Subtotal	52 Plus 64 Cu.Ft.
Shredder Process Building (Unit 24)	- Conveyor		16
	- Drum (412)		1
	- Tote (407)		64 Cu.Ft.
		Subtotal	17 Plus 64 Cu.Ft.
Metal Wash Pad (Unit 68)	- Drum (434)		1
		Subtotal	1

C. Facility Total

---- *2,969 55-gallon drums (163,295 gallons total), or equivalent plus 128 Cu.Ft.**

* - When the lamp crusher is in Building 25, the capacity of the alkaline bay will be reduced to 73 55-gallon drums, Unit 25 capacity will be reduced to 481 55-gallon drums and the facility total capacity will be reduced to 2,794 55-gallon drums and 128 cu. Ft.

(continued)

Bulk Truck and Container Vehicle Storage

C. Truck Staging Area (DWG. No. 4218)
Q Truck Unloading Area & Building Area (DWG. No. 4210, 1 of 3)
V. Truck Loading Dock (DWG. No. 4234)
W. Truck to Truck Transfer Dock (DWG. No. 4244)
X. Listed Waste Loading/Unloading Pad (DWG. No. 4216)
13. Rail Car Unloading Area (DWG. No. 4217)
14. Tank Truck Unloading Platform (DWG. No. 4248)
59. Ignitable Bulk Liquid Truck Staging Area (DWG. No. 4247)
62. Truck Pad (DWG. No. 4246)
69. Truck Loading/Unloading Pad (CHSI DWG. No. 4292)

There are three general waste handling operations for reactive wastes as described below. Equipment and layout details for the various activities are shown in the drawings referenced above.

1. Storage and transfer in containers: Containers of reactive waste, typically in lab pack form, are stored in the reactive, alkaline or other chemically-compatible bays identified above, and then prepared for shipment to offsite treatment/ disposal facility. Handling activities may include the repackaging of compatible waste inside the designated consolidation areas in Building 25 (Unit 25), Building 26 (Unit 26), Building U (Unit U) or the ventilation hoods in Unit R1 or Building 2 (Unit G).

2. Storage and transfer to tanks: Containers of reactive waste are held in storage and then pumped directly into a treatment reactor in the listed waste treatment system in process building 3 (Unit Z) or in the RCRA-Exempt CWA treatment system in process building 1 (Unit F). Containers of lab pack waste can be poured-off in Unit F1 into a treatment reactor in the RCRA-exempt CWA treatment system in process building 1. Similarly, bulk liquid transport vehicles are stored and then direct-offloaded to the treatment reactors in building 3 (Unit Z) or Building 1 (Unit 1).

3. Storage and crushing of used lamps: Lamps containing reactive waste are held in storage and then crushed for volume reduction and preparation for recycling. The lamp crusher is located in Building 25. Some used lamps contain sodium and could be considered reactive. Sodium would react with water which is not introduced at any point in processing the used lamps.

All RCRA-Regulated reactive waste management areas are at least 50 feet from the facility's property line. Refer to CHCI DWG. No. 4204 for the location of the units identified above relative to the property boundaries.

SECTION G
CONTINGENCY PLAN

G-1 General Information

Clean Harbors Services, Inc. (CHSI) is a hazardous waste treatment and storage facility. The name, facility address, EPA ID Number, and owner/operator of the facility is:

Facility Name:	Clean Harbors Services, Inc.
Facility Address:	11800 South Stony Island Avenue Chicago, Illinois 60617 (773) 646-6202 (Business Hours) (773) 646-6805 (Non-Business Hours)
EPA ID Number:	ILD00608471
Owner/Operator:	Clean Harbors Services, Inc. 11800 South Stony Island Avenue Chicago, Illinois 60617

CHSI treats inorganic aqueous-based waste streams in an onsite waste water treatment system and stores and consolidates containerized hazardous wastes, including lab packs, which are shipped to approved offsite treatment and disposal facilities. Under its current RCRA Part B License Application, CHSI is authorized to conduct other hazardous waste operations including: storage and treatment of listed hazardous wastes (F- and K-codes); hazardous waste fuel blending/strorage; expanded lab pack capabilities; drum crushing; hazardous waste paint can and paint related material compacting; hazardous waste shredding and metalwashing; rail car transfer operation; cylinder operations; hazardous waste lamp crushing and non-hazardous waste storage and consolidation. Under CHSI's Request for Permit Modification, CHSI received authorization to incorporate and operate select hazardous waste management units located at the CWM Chemical Services, Inc. (CWMCSI) hazardous waste facility located adjacent to the CHSI facility. A site plan for the facility (CHCI Dwg. No 4204B, Sheets 1 through 3), which includes existing, proposed/not yet conducted, and proposed hazardous waste units, is presented in Appendix G-1.

CHSI has developed this Contingency Plan ("the Plan") in accordance with the requirements of 35 IAC 724 Subpart D. The purpose of the Plan is to minimize hazards to human health or the environment of hazardous waste or hazardous waste constituents to air, soil, or surface waters. The actions described in this Plan must be implemented immediately whenever such releases could threaten human health or the environment. The Plan will be reviewed, and immediately amended, whenever:

Clean Harbors Services, Inc.
Anticipated Hazards

1.0 Introduction

Clean Harbors Services, Inc. (CHSI), a wholly-owned subsidiary of Clean Harbors, Inc., owns and operates a hazardous waste storage and treatment facility located at 11800 South Stony Island Avenue in Chicago, IL. The facility has been in operation since 1980 and its present hazardous waste activities include: 1) storage and treatment of aqueous-based waste streams in an onsite waste water treatment system; 2) storage, consolidation, and transfer of containerized hazardous and non-hazardous wastes, including laboratory packed wastes (i.e., "lab packs"); 3) hazardous waste fuel blending; 4) hazardous waste paint and paint related material compacting; 5) hazardous waste shredding and metalwashing; and (6) hazardous waste lamp crushing.

The existing treatment process utilizes chemical oxidation of aqueous hazardous inorganic and characteristic organic streams, neutralization of concentrated acids and bases, and precipitation of metals and suspended solids. Incoming waste streams, received in bulk and containers, are rendered non-hazardous using chemical oxidation, neutralization, and/or chemical reduction reactions.

The hazardous wastes handled at the facility and the virgin chemicals used in the onsite treatment system are a potential hazard to the personnel at the facility, and, if released, to the environment in general. A summary of the general hazards presented by the hazardous wastes and raw chemicals handled at the site, as well as other types of hazardous, is presented below.

2.0 Hazardous Wastes

The hazardous wastes managed are designated as hazardous because they: 1) exhibit one or more characteristics of a hazardous waste as defined in 40 CFR 261 Subpart C; or 2) are specifically identified (listed) as a hazardous waste per 40 CRF 261 Subpart D. The hazard posed by these wastes include the following properties:

A. Ignitable (D001) – A liquid with a flash point of less than or equals to 140°F; a compressed gas; an oxidizer; or a material capable of causing fire through friction, absorption of moisture, or spontaneous chemical changes, at standard temperature and pressure;

B. Corrosive (D002) – An aqueous liquid with a pH of less than 2 or greater than 12.5 as determined by a pH meter or equivalent test; or a liquid which corrodes steel at a rate greater than 0.250 inches per year at 55°F.

Table 1: Continued

GENERAL DESCRIPTION	HAZARDOUS CHARACTERISTIC**	TYPICAL EPA WASTE NUMBER(S)
Acetic Acids	C	D002
Ammonium Hydroxide < 0.5%	C	D002
Ammonium Hydroxide > 0.5%	C	D002
High Metals Acids	C,T	D002, D004 thru D011
High Metals Bases	C,T	D002, D004 thru D011
Acid With Hexchrome	C,T	D002, D007
Base With Hexchrome	C,T	D002, D007
Acids With Phenol	C	D002
Bases With Phenol	C	D002
Basic Cyanide	C,R,T	D002, D003, F006, F007 F008, F009, F010, F011, F012, F019
Liquid F006	R,T	F006
Liquid F007	R,T	F007
Liquid F008	R,T	F008
Liquid F009	R,T	F009
Liquid F019	R,T	F019
Semi-Solid F006	R,T	F006
Semi-Solid F007	R,T	F007
Semi-Solid F008	R,T	F008
Semi-Solid F009	R,T	F009
Semi-Solid F019	R,T	F019
Lamps	R,T	D003, D005, D006, D008, D009

Table 2: Capacity of Existing/Approved Hazardous Waste Storage/Treatment Units

Hazardous Waste Management Unit		Number/Volume
I. DRUM STORAGE AREAS (BASED ON 55-GALLON DRUMS, OR EQUIVALENT)		
A. Existing Areas		
Indoor Storage Area Building 2	- Acidic – 1	192
	- Acidic –2	96
	- Alkaline	192
	- Staging	72
	Subtotal	552
Outdoor Storage	- Oxidizer	96
	- Reactive	96
	- Poisons	96
	- Flammable – 1	160
	- Flammable – 2	160
	- Staging (Inbound)	160
	Subtotal	768
Lab Pack Processing	- Alkaline/Acids	8
	Subtotal	8
Outdoor Storage Expansion	- Oxidizer	96
	- Reactive	96
	- Poisons	96
	- Staging (Outbound)	80
	Subtotal	368
Building 25	- Alkaline/Poison/PCBs	248*
	- Acids	136
	- Flammable	184
	- Truck Pad	88
	Subtotal	656*
Building 26	- Ignitable	192
	Subtotal	192
Container Dock	- Staging	160
	Subtotal	160
B. Approved/Not Yet Constructed		
Outdoor Storage Expansion	- Flammable - #3	160
	Subtotal	160
Lab Pack Building	- Acid/Alkaline	10
	- Other	25
	Subtotal	35
Building 42	- Westside Pad	24
	- Building	28
	- Hopper (405)	One 64 cu. ft.
	Subtotal	52 plus 64 cu. ft.
Shredder Process Building	- Conveyor to Shredder	16
	- Drum (412)	1
	- Tote (407)	One 64 cu. ft.
	Subtotal	17 plus 64 cu. ft.
Metal Wash Pad	- Drum (434)	1
	Subtotal	1

al - - 2,969 55-gallon drums (163,295 gallons), or equivalent and 128 cu. ft.*

*- With the lamp crusher in Unit 25, the maximum capacities are reduced to 73 (alkaline bay), 481 (Unit 25) and 2,794 plus 128 cu ft. (Total)

After the drums are removed, dust, soil and other residues will be swept or other wise cleaned up and handled as a hazardous waste, The containment floors and walls will be decontaminated as described above and then tested by approved method(s) t o determine whether the decontamination process has been successful. If not, the decontamination process will be repeated or an approved alternative method will be utilized. The rinse waters will be containerized and disposed of at a properly licensed waste disposal facility.

Emptied drums containing hazardous residuals and all other drums to be crushed will be processed prior to closure of the drum crushing units. Following compaction of all containers, the crushed drums will be disposed of by removal of the sealed rolloff container or storage box to a licensed waste disposal facility.

The drum-crushing unit will be decontaminated by washing with a detergent and water solution or a suitable solvent compatible with the materials crushed in the unit, and rinsed according to the procedures specified above. The drum-crushing unit will be tested with approved methods to determine whether the decontamination proceeds has been successful. If not, the decontamination process has been approved alternative method will be used. The reinserts from this process will be containerized and disposed of at a properly licensed waste disposal facility. The decontaminated crusher will be shipped for use at other Clean Harbors' facilitates or will be sold as scrap metal.

The lamp crusher will be decontaminated by washing with a detergent and water solution or suitable mercury cleaning agent (e.g., HgX) compatible with the lamp materials crushed in the unit, and rinsed according to the procedures specified above. The lamp crusher unit will be tested with approved methods (mercury wipe tests) to determine whether the decontamination proceeds has been successful. If not, the decontamination process will be repeated or approved alternative method will be used. The rinsates from this process will be containerized and disposed of at a properly licensed waste disposal facility. The decontaminated crusher will be shipped for use at other Clean Harbors' facilitates or will be sold as scrap metal.

I-1d (2) Closure of Tank System 724.297, 724.410

I-1d (2) (I) General Tank Closure Procedures

The closure of all hazardous waste storage/processing tanks and associated equipment and structures will be conducted in accordance with the tank closure requirements of 35 IAC 724.297.

Waste fuel in the flammable storage tanks will be pumped onto bulk transport vehicles and shipped for use as a supplemental fuel. Other hazardous waste liquids will be loaded onto bulk transport vehicles for shipment to incinerators or other authorized treatment facilities.

All tanks will be decontaminated using the following general procedures:

- Removal of al liquids using pumps/vacuum lines;
- Scrape-down of ceilings and sides to remove hardened residues;
- Squcegee material into vacuum hosc;
- Steam clean inside of tank, and
- Squeegee and vacuum all remaining material.

Table I-1: Closure Units/Maximum Capacity

Hazardous Waste Management Unit		Number/Volume
I. DRUM STORAGE AREAS (Based on 55-gallon drums, or equivalent)		
A. Existing Areas		
Indoor Storage Area	Acidic – 1	192
Building 2	Acidic – 2	96
(Unit G1)	Alkaline	192
	Staging	72
	Subtotal	552
Outdoor Storage	Oxidizer	96
(Unit R1)	Reactive	96
	Poisons	96
	Flammable – 1	160
	Flammable - 2	160
	Staging (Inbound)	160
	Subtotal	768
Drum Storage Expansion	Oxidizer – 2	96
(Unit R2)	Reactive – 2	96
	Poisons	96
	Staging(Outbound)	80
	Subtotal	368
Lab Pack Pour-off Station	Alkaline/Acids	8
(Unit F1)	Subtotal	8
Building 26	Ignitable	192
(Unit 26)	Subtotal	192
Container Handling Dock	Staging	160
(Unit 61)	Subtotal	160
Building 25	Alkaline/Poison	248*
	Acids	136
	Flammable	184
	Truck Pad	88
	Subtotal	656*
B. Approved/Not Yet Constructed		
Outdoor Storage Expansion	Flammable – 3	160
(Unit R2)	Subtotal	160

(Continued)

Lab Pack Building (Unit U)		Acid/Alkaline	10
		Other	25
	Subtotal		35
Building 42		Ignitable/Toxic Paints	64 cu.ft.
			52
(Unit 42)	Subtotal		52 and 64 cu.ft.
Shredding Operation (Unit 24)		Ignitable/Toxic Debris	17
			64 cu.ft
	Subtotal		17 And 64 cu.ft.
Metalwashing Operation		Sludge	1
	Subtotal		1

C. Total - - - 2,969 55-Gallon Drums and 128 cu. ft.(164,253 Gallons Total), or equivalent*

*- With the lamp crusher in Unit 25, the maximum capacities are reduced to 73 (alkaline bay), 481 (Unit 25) and 2,794 plus 128 cu. ft. (154,628 Gallons Total), or equivalent.

(continued)

NOTES:

1) It is assumed that the containers in the poisons/alkaline bay are equally distributed (50% poison, 50% alkaline). Further, it is assumed that the poison drums require RCRA incineration, and that the alkaline drums are suitable for wastewater treatment.

2) All acids, bases and rinsewaters will be shipped off-site for treatment and disposal at Envirite Corporation in Harvey, IL.

3) All chemically-compatible containers of poisons will be consolidated and shipped offsite to Chemical Waste Management, Port Arthur, TX for incineration.

4) Per CHSI Dwg. No. 4282, the containment volume of Building 25 is 18,813 gallons. Therefore, the volume of rinsate water is (0.05) (18,813 gal) or 941 gallons.

5) It is assumed that the 88 drums on the Building 25 pad are split by the same percentages as the drums in Building 25, i.e.,.

Acids	136/568	x	88	=	21
Alkalines	124/568	x	88	=	19
Poisons	124/568	x	88	=	19
Flammables	184/568	x	88	=	29

6) It is assumed at 25% of acids and alkalines are reactive. these will be shipped off-site to Clean Harbors of Connecticut, Inc. in Bristol, CT. for treatment/stabilization.

7) When the lamp crusher is located in the alkaline bay of Unit 25. The maximum storage capacities are reduced to 73 (alkaline bay) and 481 (Unit 25). Decontamination of the lamp crusher will include:

Decontamination of unit	1 crew	1 day	$1200/day	1200
Rinse water	500 gallons	1 unit	$1.51/gallon	755
Analytical	1 sample	1 unit	$900/sample	900
Miscellaneous	1 unit	1 day	$500/day	500
Disposal of unit	1 unit	1000 CF/unit	$1.68/CF	1680
Additional Decontamination Cost				5035

The alkaline bay decontamination does not change with the lamp crusher in the bay. The reduction in disposal because of the lamp crusher will be:

Bases	88 drums	55 gal/dr	$0.75/gal	3630
Poisons	87 drums	55 gal/dr	$6.15/gal	29428
Crushed Drums	175 drums	3 CF/drum	$1.68/CF	882
Reduction in Disposal Cost				33940

The reduction in disposal costs far exceeds the additional decontamination costs with the lamp crusher. CHSI intends to fund closure of Unit 25 at the higher amount. Therefore closure cost is calculated with maximum drum storage.

ATTACHMENT 4

CLEAN HARBORS ENVIRONMENTAL SERVICES
STANDARD OPERATING PROCEDURE
Lamp Recycling System

Cleanharbors Chicago Facility Date: February 16, 2004
Revision 0

1. Purpose:

1.1 The purpose of this document is to provide detailed guidelines and procedures necessary to process Mercury lamps in an appropriate, effective, and safe manner.

2. Scope:

2.1 Lamps enter this system on a power-feed belt conveyor passing through a negative pressure air chamber. Each lamp is crushed, separating glass and metal components into individual co products storage bins. Phosphor powder collects in the multi-storage filtration system. All materials will be stored for subsequent recycling.

3. Pre-Start Up Inspections:

3.1 Inspect the unit and associated parts for defects.
3.2 Ensure fan is operational.
3.3 Ensure all product receptacles are empty and in position to receive the materials as they are discharged.
3.4 Ensure that the four drums around the unit are properly positioned and have straight, unobstructed connection boots and secure connection rings.

4. Start up Operations

4.1 Ensure that the knife switch on the control panel is in the "ON" position.
4.2 Turn the key switch on the touch pad to the "ON" position.
4.3 Unless otherwise stated from your manager, the unit should be run in the **"automatic"** mode. Press the "automatic" selection on the touch screen.
4.4 Press "system start". A five second buzzer will sounds indicating that the machine is ready to start.
4.5 When the buzzer shuts off, the system will start in a sequence.
4.6 When all of the systems are operating all indicator lights of the system will be lit, except "Vacuum Bar and HID".
4.7 The system is now ready to accept lamps.

5. Process

Feeding Conveyor #1

5.1 Lamps are to be placed on the #1 feed conveyor manually end-to-end and stacked no higher than the guard on the end of the conveyor.
5.2 **DO NOT** feed cardboard, wood, plastic, or other debris into the machine.
5.3 Record on the process sheet the volume of boxes of lamps crushed per hour.
5.4 Sign, date, and turn in to department manager. Department manager to process out and file in office.
5.5 **DO NOT** exceed 4000 lamps per hour.
5.6 When any of the co-product material containers are full, an alarm will sound and the system will shut down and will identify the container on the PLC. Replace the full container and restart the system.
5.7 Full containers of Phosphor powder will be handled as a hazardous waste and placed in to the appropriate storage area.
5.8 Full containers of metal end caps and glass will be a non- hazardous waste.
5.9 All containers will need assigned a tracking ID number prior to placing in to storage.

Feeding the Crusher Box

5.1.1 Remove the HID lamps from the container and place them in the crusher box.
5.1.2 Close the box and ensure the latch is shut.
5.1.3. Press the black start button on the side of the crusher box.
5.1.4 Allow 10 seconds for the outer glass to be crushed. The crusher box door will not open until the cycle is fully complete.
5.1.5 Remove the frames and the mercury bearing arc tubes from the unit and place in separate containers.

6. Hazards:

6.1 Chemical exposure to particulate or fumes (phosphor powder, glass fines, mercury vapor)
6.2 Forklift hazard (transporting lamps and material containers to and from the unit)
6.3 Slip, trip, fall hazard
6.4 Cut / laceration / puncture hazard (broken lamps, sharp edges on aluminum pieces)
6.5 Ergonomic stresses (loading of lamps onto conveyor #1)
6.6 Moving parts (conveyors, crushing drums)

7. Shut down Procedure:

7.1 Allow the system to continue running for a minimum of ten minutes after the last lamp has been fed through. This will prevent the release of any residual mercury vapors and/or phosphor powder.

7.2 During this time the operator should use the attached vacuum (positive displacement) and sweep the area thoroughly of any and/or all-residual phosphor powder or glass in the area. DO NOT dry sweep these materials as they likely contain mercury.

7.3 Press the system shut down key on the touch screen panel.

7.4 Allow the vapor fan to continue running to keep the unit under negative pressure.

7.5 Empty co-product material containers if needed.

7.6 **Weekly** – The surrounding work area (hot zone) is to be mopped with a solution of HgX, and the shell of the unit should be wiped completely down with an HgX solution.

7.7 All rags and clothes used for cleaning will be placed in a proper container and staged for subsequent disposal in appropriate area.

8. Emergency shutdown:

8.1 If at any time the machine needs to be immediately shut down and operator should depress one of the four Emergency shutdown buttons located on the machine. Three emergency buttons are located at the front of the machine, and one at the back of the machine.

8.2 To prevent fugitive vapor emissions the vapor collection system must be restarted immediately following the treatment of emergency.

9. Maintenance:

9.1 Maintenance activities conducted during operation of the unit shall be conducted in the personal protective equipment outlined in the section below.

9.2 All other maintenance activities involving opening up a portion of the unit including filter changes, conveyor maintenance, etc. shall be conducted in the PPE listed below unless the unit has been fully decontaminated.

10. Personal Protection Equipment:

10.1 CPF I apron (Chemical Resistant)
10.2 Cut proof outer gloves (Kevlar) with Nitrile inner gloves
10.3 Hard Hat
10.4 Half Face APR with Face shield or full-face respirator
10.5 Mersorb – P100 cartridges
10.6 Kevlar sleeves
10.7 Hearing protection
10.8 Steel Toe Boots

11. Chemical Hygiene:

11.1 Consumption of food, beverage or tobacco is prohibited in areas where lamps are handled, stored or processed.
11.2 All operators will be required to wash their hands and face thoroughly with soap and water before breaks and meals.
11.3 Showers will be required at the end of the work shift.

ATTACHMENT 5

COMPLIANCE TEST REPORT

FLUORESCENT BULB CRUSHER
CLEAN HARBORS ENVIRONMENTAL SERVICES, INC.
CINCINNATI, OHIO

August 2003

by

Shaw Environmental, Inc.
11499 Chester Road
Cincinnati, Ohio 45246

PN 846142-01

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1.0 Introduction

On August 26, 2003, Shaw Environmental, Inc., personnel conducted emission tests on the fluorescent bulb crusher at Clean Harbors Environmental Services in Cincinnati, Ohio. Three test runs were conducted on the exit stack to determine particulate and mercury concentrations and mass emission rates. In addition, flue gas flow rate; temperature; and moisture, carbon dioxide (CO_2), and oxygen (O_2) contents were measured. Sampling and analytical procedures were those described in U.S. Environmental Protection Agency (EPA) Methods 1 through 5 and 29.*

The test team consisted of Messrs. Jerry Neese and Doug Cahill. Mr. Mike Crisenbery of Clean Harbors coordinated plant operations during the test. Ms. Sue Marshall of the Hamilton County Department of Environmental Services observed the test series.

2.0 Summary of Results

Particulate emissions data are presented in Table 1. Particulate concentrations are reported in grains per dry standard cubic foot (gr/dscf) and emission rates in pounds per hour (lb/h). The product of the particulate concentration and the flue gas flow rate yields the mass emission rate in pounds per hour.

Table 1
Filterable Particulate Emissions Data
Clean Harbors – Fluorescent Bulb Crusher (August 26, 2003)
(Shaw PN 846142-01)

Run No.	Time (24-h)	Concentration (gr/dscf)[a]	Emission Rate (lb/h)[b]
CH-1	0900-1003	0.00055	0.0035
CH-2	1043-1145	0.00028	0.0018
CH-3	1250-1351	0.00011	0.0007
Average		0.00031	0.0020

[a] gr/dscf = Grains per dry standard cubic foot at 68°F, 29.92 in.Hg., and zero percent moisture.

[b] lb/h = Pounds per hour.

* 40 CFR 60, Appendix A.

The filterable particulate data reported in Table 1 represent the material collected on the filter and in the probe. The average filterable particulate emission rate was 0.002 lb/h. The allowable emission rate is 0.11 lb/h.

Mercury emissions data are presented in Table 2. Mercury concentrations are reported in micrograms per dry standard cubic meter (µg/dscm) and emission rates in pounds lb/h. The average mercury emission rate was 7.5×10^{-6} lb/h. The allowable emission rate is 1.1×10^{-5} lb/h. Flue gas conditions are summarized in Table 3.

Table 2
Mercury Emissions Data
Clean Harbors – Fluorescent Bulb Crusher (August 26, 2003)
(Shaw PN 846142-01)

Run No.	Time (24-h)	Concentration (µg/dscm)[a]	Emission Rate (lb/h)[b]
CH-1	0900-1003	1.2	3.5×10^{-6}
CH-2	1043-1145	4.7	1.3×10^{-5}
CH-3	1250-1351	2.2	6.1×10^{-6}
Average		2.7	7.5×10^{-6}

a µg/dscm = Micrograms per dry standard cubic meter.

b lb/h = Pounds per hour.

Table 3
Summary of Flue Gas Conditions
Clean Harbors – Fluorescent Bulb Crusher (August 26, 2003))
(Shaw PN 846142-01)

Run No.	Flue Gas Flow Rate acfm[a]	Flue Gas Flow Rate dscfm[b]	Temperature (°F)	Moisture (%)	CO_2 (%)[c]	O_2 (%)[c]
CH-1	820	750	97	2.2	0	21
CH-2	800	730	97	2.3	0	21
CH-3	800	730	100	2.5	0	21
Average	810	740	98	2.3	0	21

a acfm = Actual cubic feet per minute at stack conditions.

b dscfm = Dry standard cubic feet per minute; standard conditions are 68°F and 29.92 in.Hg.

c Determined from Fyrite analysis.

3.0 Quality Assurance

All of the equipment used in the field testing was calibrated in accordance with the guidelines of Quality Assurance Handbook for Air pollution Measurement Systems, Volume III, EPA 600/R-94/038c. The calibration records are contained in Appendix E. All of the equipment used met the specifications of the EPA reference methods for accurate measurement.

Sampling was conducted in strict accordance with EPA reference method procedures. All field leak checks and sampling train temperatures met the specifications of the reference methods. Field data sheets are included in Appendix B of this report.

Table 4 summarizes the results of the particulate reagent blank analyses.

Table 5
Example Filter and Reagent Blank Analyses
Clean Harbors – Fluorescent Bulb Crusher (Shaw PN 846142-01)

Sample Type and Filter No.	Blank Value
Particulate - Reeve Angel 934 AH	0.1 mg
Acetone blank[a]	0.002 mg/g

[a] Maximum allowable blank correction is 0.01 mg/g; the indicated blank value was used.

The mercury level in the reagent blank was less than the practical quantitation limit of the method (0.2 μg).

4.0 Process Operation

This facility recycles fluorescent bulbs. The bulbs are shredded and gravimetrically separated into glass, metal, and calcium phosphate powder for further recycling off site. Emissions are controlled by activated carbon and a particulate filter.

The quantity of bulbs processed was 2,450, 2,400, and 2,775 for Runs CH-1, CH-2, and CH-3, respectively, for an average of 2,542 bulbs per test.

5.0 Sampling Location and Test Procedures

Two sampling ports were located approximately 54 stack diameters downstream and 8.7 stack diameters upstream from the nearest flow disturbances in the 8-inch inside-diameter stack. Eight traverse points (four per port) were used for particulate/mercury sampling. Each point was sampled for 7.5 minutes, for a total sampling time of 60 minutes per test run.

All sampling was conducted isokinetically by regulating the sampling rate relative to the flue gas velocity, as measured by the pitot tube attached to the sampling probe. The test methods are described briefly below. Appendix D contains Shaw Standard Operating Procedures for EPA methods 5 and 29.

5.1 Velocity and Gas Temperature

All gas velocities were measured with a Type-S pitot tube and a 0- to 10-inch inclined manometer. In all cases, velocities were measured at each sampling point across the stack to determine an average value according to procedures described in EPA Method 2. Temperatures were measured at each point with a thermocouple and digital temperature indicator. Due to the small stack diameter, velocity and temperature measurements were made before and after each test run in accordance with EPA Method 1A procedures.

5.2 Molecular Weight

CO_2 and O_2 concentrations were determined by Fyrite analysis during each particulate/mercury test.

5.3 Moisture

The flue gas moisture content was determined using EPA Method 4 procedures. Testing was conducted in conjunction with particulate/mercury testing.

5.4 Particulate/Mercury

Particulate and mercury emissions were measured using EPA Method 5 and 29 procedures. The sampling train used for each test consisted of a glass nozzle, a heated borosilicate glass-lined probe, a heated 3-in.-diameter quartz-fiber filter, and a series of Greenburg-Smith and modified impingers containing 4% potassium permanganate/10% sulfuric acid ($KMnO_4/H_2SO_4$). The nozzle, probe, and filter holder portions of the sampling train were acetone-rinsed at the end of

each test. The acetone rinse and the particulate caught on the filter media were dried at room temperature, desiccated to a constant weight, and weighed on an analytical balance. Total filterable particulate matter was determined by adding these two values.

The contents of the impingers were measured gravimetrically to determine the moisture concentration. The contents of the first three impingers were recovered and the nozzle, probe, filter holder, impingers, and connecting glassware were rinsed with $KMnO_4/H_2SO_4$ solution and then with distilled water. The filters and probe rinse residue (following particulate analysis) and impinger solutions were digested and analyzed for mercury by cold vapor atomic absorption spectroscopy.

APPENDIX A

CALCULATIONS

Nomenclature and Dimensions

A_n = Cross-sectional area of sampling nozzle, sq. ft.

A_s = Cross-sectional area of stack, sq. ft.

B_{wo} = Proportion by volume of water vapor in the gas stream, dimensionless

C = Effluent gas concentration as measured, dry basis, ppm/%

C_{gas} = Effluent gas concentration calibration corrected, dry basis, ppm/%

C_{ma} = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm/%

C_{ma} = Actual concentration of the upscale calibration gas, ppm/%

C_{NO_x} = NO_x concentration, ppm (manual method)

C'_{NO_x} = Nitrogen oxides concentration as NO_2, pounds per dry standard cubic foot (lb/dscf), manual method

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm/%

C_{O_2} = Effluent gas concentration oxygen corrected, ppm volume dry

C_{obs} = Average THC concentration indicated by gas analyzer, wet basis, ppm

C_p = Pitot tube coefficient, dimensionless

C_s = Concentration of pollutant matter in stack gas - dry basis, grains per standard cubic foot (gr/dscf)

C'_s = Concentration of pollutant matter in stack gas - dry basis, micrograms per normal cubic meter ($\mu g/m^3$)

C_{SO_2} = Concentration of sulfur dioxide, ppm volume (manual method)

Cl_s = Amount of Cl^- in sample, milligrams per liter (mg/L)

%C = Percent weight of carbon in fuel, dry basis

%CO = Percent of carbon monoxide by volume, dry basis

$\%CO_2$ = Percent of carbon dioxide by volume, dry basis

D_n = Sampling nozzle diameter, in.

F = Factor representing a ratio of the volume of dry gases generated to the calorific value of the fuel combusted, dry standard cubic feet per million Btu of heat input (dscf/10^6 Btu)

GCV = Gross calorific value of the fuel on dry basis, Btu/lb

%H = Percent weight of hydrogen in fuel, dry basis

ΔH = Average pressure drop across the sampling meter flow orifice, inches of water (in. H_2O)

HHV = Higher heating value on an as-received basis, Btu/lb

ISO = Percent of Isokinetic sampling rate, percent

IFR = Incinerator feed rate, wet tons/h

L_a = Maximum acceptable leakage rate for either a pretest leak check or for a leak check following a component change; equal to 0.020 cubic foot per minute or 4% of the average sampling rate, whichever is less

M_d = Dry molecular weight, lb/lb-mole

M_f = Fuel firing rate (measured coal to boiler), lb of coal per hour

M_n = Total amount of pollutant matter collected, mg

M'_n = Total amount of pollutant matter collected, micrograms (μg)

M_s = Molecular weight of stack gas (wet basis), lb/lb-mole

MW = Molecular weight, lb/lb-mole

N = Normality of titrant, eq/liter

%N = Percent weight of nitrogen in fuel, dry basis

$\%N_2$ = Percent of nitrogen by volume, dry basis

$\%O_2$ = Percent of oxygen by volume, dry basis

ΔP = Velocity head of stack gas, in.H_2O

P_{bar} = Barometric pressure, inches of mercury (in.Hg)

P_i and P_f = Initial and final flask pressure, measured as vacuum, in.Hg

P_s = Absolute stack gas pressure, in.Hg

P_{stat} = Static pressure of stack gas, in.H_2O

P_{std} = Gas pressure at standard conditions, in.Hg (29.92 in.Hg)

ppm = Parts per million

pmr = Pollutant mass emission rate, pounds per hour (lb/h)

pmr´ = Pollutant mass emission rate, pounds per million Btu of heat input (10^6 Btu)

pmr_{100} = Pollutant mass emission rate, pounds per 100 pounds of feed (lb/100)

P_{NO_x} = Micrograms NO_x, μg (manual method)

Q_H = Total heat input, 10^6 Btu/h

Q_s = Volumetric flow rate - stack conditions, actual cubic feet per minute (acfm)

$Q_{s_{std}}$ = Volumetric flow rate - dry basis at standard conditions, dry standard cubic feet per minute (dscfm)

$\%S$ = Percent weight of sulfur in fuel, dry basis

T_i and T_f = Initial and final flask temperature, °F

T_m = Average temperature of dry gas meter, °R

T_s = Average temperature of stack gas, °R

T_{std} = Temperature at standard conditions, (528°R)

V_a = Volume of aliquot titrated, milliliters (mL)

V_f = Flask volume, mL

V_{lc} = Total volume of liquid collected in impingers and silica gel, mL

V_m = Volume of dry gas sampled at meter conditions, cu. ft.

$V_{m_{std}}$ = Volume of dry gas sampled at standard conditions, cu. ft.

V_{NO_x} = NO_x sample volume, mL (manual method)

V_s = Average stack gas velocity at stack conditions, feet per second (ft/s)

V_{sc} = Volume of sample collected, liters (L)

V_{soln} = Volume of sample solution, mL

V_t = Volume of titrant used, mL

V_{tb} = Volume of titrant used for blank, mL

$V_{w_{std}}$ = Volume of water vapor at standard conditions, scf

Y = Dry gas meter calibration factor, dimensionless

θ = Total sampling time, minutes

NOTE: Standard conditions = 68°F and 29.92 in.Hg

Example Calculations for Pollutant Emissions

1. Volume of dry gas samples corrected to standard conditions.
Note: V_m must be corrected for leakage if any leakage rates exceed L_a.

$$V_{m_{std}} = 17.647 \ x \ V_m \ x \ Y \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$$

2. Volume of water vapor at standard conditions, ft^3.

$$V_{w_{std}} = 0.04707 \ x \ V_{lc}$$

3. Moisture content in stack gas, volume fraction.

$$B_{ws} = \frac{V_{w_{std}}}{(V_{w_{std}} + V_{m_{std}})}$$

4. Dry molecular weight of stack gas.

$$M_d = 0.44 \ x \ \%CO_2 + 0.32 \ x \ \%O_2 + 0.28 \ x \ (\%N_2 + \%CO)$$

5. Molecular weight of stack gas.

$$M_s = M_d \ x \ (1 - B_{ws}) + 18 \ x \ B_{ws}$$

6. Stack velocity at stack conditions, ft/s.

$$V_s = 85.49 \ x \ C_p \ x \ (avg \ \sqrt{\Delta P}) \ x \ \sqrt{\frac{T_s}{P_s \ x \ M_s}}$$

7. Stack gas volumetric flow rate at stack conditions, acfm.
Note: A_s = square feet.

$$Q_s = 60 \ x \ V_s \ x \ A_s$$

8. Dry stack gas volumetric flow rate at standard conditions, dscfm.

$$Q_{s_{std}} = 17.647 \ x \ Q_s \ x \ \frac{P_s}{T_s} \ x \ (1 - B_{ws})$$

Correction Factors

$$17.647 = \left(\frac{T_{std}}{P_{std}}\right)$$

$$0.04707 = \left(\frac{ft^3\ H_2O\ vapor}{mL\ liquid}\right)$$

0.44 = molecular weight of CO_2/100

0.32 = molecular weight of O_2/100

0.28 = molecular weight of N_2/100

18 = molecular weight of water (H_2O)

$$85.49 = \frac{ft}{second}\left[\frac{(lb/lb\ -\ mole)(in.Hg)}{(^\circ R)(in.H_2O)}\right]^{1/2\,*}$$

* 40 CFR 60, Appendix A, Method 2.

Generic.app(Laserjet II)/Flow/sm

Pollutant Emission Rate, lb/h

1a. Concentration in gr/dscf. Note: M_n in milligrams.

$$C_s = 0.01543 \ x \ \frac{M_n}{V_{m_{std}}}$$

1b. Concentration in microgram per cubic meter, $\mu g/m^3$. Note: M'_n in micrograms.

$$C_s' = 35.315 \ x \ \frac{M_n', \ \mu g}{V_{m_{std}}}$$

2a. Pollutant mass emission rate, lb/h. Note: C_s in gr/dscf.

$$pmr = \frac{C_s}{7000} \ x \ Q_{s_{std}} \ x \ 60$$

2b. Pollutant mass emission rate, lb/h. Note: C'_s in $\mu g/m^3$.

$$pmr = C_s' \ x \ (6.243 \ x \ 10^{-11}) \ x \ Q_{s_{std}} \ x \ 60$$

3. Isokinetic sampling rate, %.

$$ISO = \frac{100 \ x \ T_s \ x \left[(0.002669 \ x \ V_{lc}) + \left(\frac{V_m}{T_m} \ x \ Y \ x \left(P_{bar} + \frac{\Delta H}{13.6} \right) \right) \right]}{60 \ x \ \theta \ x \ V_s \ x \ P_s \ x \ A_n}$$

Correction Factors

0.01543	= grains per milligram (gr/mg)
35.315	= cubic feet/cubic meter
7000	= grains per pound (gr/lb)
6.243×10^{-11}	$= \left(\frac{lb}{453.6 \times 10^6 \ \mu g}\right) \times \left(\frac{m^3}{35.315 \ ft^3}\right)$
0.002669*	$= \frac{(in.Hg) \ (ft^3)}{(mL) \ (°R)}$

* 40 CFR 60, Appendix A, Method 5.

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validated 5/3/04

EMISSION TEST REPORT

FIELD DATA

Plant: Clean Harbors
Sampling location: Stack
Test time (start-stop): 0900-1003

Date: 8/26/03
Run number: CH-1

Sample type: Partic./Hg
Bar. press. (in. Hg): 29.68
Static press. (in. H2O): 0.33
Filter number(s): 027007
Stack dia. or width (in.): 8.00
Pitot tube coeff.: 0.84
Total H2O collected (ml): 21.1
% O2 by volume (dry): 21.0

Volume correction (cu. ft.):
Meter calibration factor: 0.991
Data interval (min.): 7.5
Nozzle dia. (in.): 0.255
Stack length (if rectangular) (in.):
Number of traverse points: 8
% CO2 by volume (dry): 0.0
% CO by volume (dry):

Sample time (min)		Gas meter reading (cu. ft.)	Velocity head ΔP (in. H2O)	Orifice drop actual ΔH (in. H2O)	Stack Temp. (°F)	Dry gas meter temp. (°F) inlet	Dry gas meter temp. (°F) outlet
Start 0.0	Initial:	918.606					
			0.380	1.73	98	79	77
			0.470	2.15	98	80	78
			0.570	2.60	97	83	79
			0.530	2.44	97	88	81
			0.300	1.39	96	93	82
			0.390	1.81	97	94	84
			0.510	2.37	97	96	85
			0.480	2.24	97	98	86
Stop 60.0	Final:	965.658					
60.0		47.052	0.454	2.09	97	89	82

DW 9/9/03

validated 8/3/94

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EMISSION TEST REPORT

FIELD DATA

Plant: Clean Harbors
Sampling location: Stack
Test time (start-stop): 1043-1145

Date: 8/26/03
Run number: CH-2

Sample type: Partic./Hg
Bar. press. (in. Hg): 29.68
Static press. (in. H20): 0.31
Filter number(s): 027014
Stack dia. or width (in.): 8.00
Pitot tube coeff.: 0.84
Total H2O collected (ml): 21.7
% O2 by volume (dry): 21.0

Volume correction (cu. ft.):
Meter calibration factor: 0.991
Data interval (min.): 7.5
Nozzle dia. (in.): 0.255
Stack length (if rectangular) (in.): 0.00
Number of traverse points: 8
% CO2 by volume (dry): 0.0
% CO by volume (dry):

Sample time (min)		Gas meter reading (cu. ft.)	Velocity head ΔP (in. H2O)	Orifice drop actual ΔH (in. H2O)	Stack Temp. (°F)	Dry gas meter temp. (°F) Inlet	Dry gas meter temp. (°F) outlet
Start 0.0	Initial:	965.955					
			0.370	1.72	96	91	89
			0.420	1.95	97	92	88
			0.520	2.42	98	94	89
			0.450	2.10	98	97	90
			0.320	1.50	96	99	91
			0.410	1.93	97	100	91
			0.490	2.30	98	101	92
			0.460	2.16	98	102	93
Stop 60.0	Final:	1012.108					
60.0		46.153	0.430	2.01	97	97	90

9/9/03

validated 5/3/94

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EMISSION TEST REPORT

FIELD DATA

Plant: Clean Harbors
Sampling location: Stack
Test time (start-stop): 1250-1351

Date: 8/26/03
Run number: CH-3

Sample type: Partic./Hg
Bar. press. (in. Hg): 29.62
Static press. (in. H2O): 0.33
Filter number(s): 027015
Stack dia. or width (in.): 8.00
Pitot tube coeff.: 0.84
Total H2O collected (ml): 23.9
% O2 by volume (dry): 21.0

Volume correction (cu. ft.):
Meter calibration factor: 0.991
Data interval (min.): 7.5
Nozzle dia. (in.): 0.255
Stack length (if rectangular) (in.): 0.00
Number of traverse points: 8
% CO2 by volume (dry): 0.0
% CO by volume (dry):

Sample time (min)		Gas meter reading (cu. ft.)	Velocity head ΔP (in. H2O)	Orifice drop actual ΔH (in. H2O)	Stack Temp. (°F)	Dry gas meter temp. (°F) inlet	Dry gas meter temp. (°F) outlet
Start 0.0	Initial:	12.538					
			0.330	1.54	98	94	92
			0.420	1.96	99	95	92
			0.540	2.52	99	97	93
			0.460	2.15	100	100	94
			0.380	1.69	100	103	95
			0.420	1.98	100	104	95
			0.470	2.22	100	105	96
			0.480	2.27	100	107	97
Stop 60.0	Final:	59.488					
60.0		46.950	0.435	2.04	100	101	94

DPC
9/9/03

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EMISSION TEST REPORT

TEST RESULTS

Plant: Clean Harbors — Test date(s): 8/26/03 8/26/03 8/26/03

Sampling location: Stack

		Run Numbers CH-1	CH-2	CH-3	3-Run AVERAGE
Ø	Net time of test (min)	60.0	60.0	60.0	
NP	Number of sampling points	8	8	8	
Y	Meter calibration factor	0.991	0.991	0.991	
Dn	Sampling nozzle diameter (in)	0.255	0.255	0.255	
Cp	Pitot tube coefficient	0.84	0.84	0.84	
ΔH	Average orifice pressure drop (in. H2O)	2.09	2.01	2.04	2.0
Vm	Volume of dry gas sampled at meter conditions (cu. ft.)	47.052	46.153	46.950	46.72
Tm	Average gas meter temperature (°F)	86.2	93.7	97.4	92.1
Vmstd	Volume of dry gas sampled at standard conditions (scf)	45.028	43.481	43.849	44.12
Vlc	Total H2O collected in impingers and silica gel (ml)	21.1	21.7	23.9	22.2
Vwstd	Volume of water vapor at standard conditions (scf)	0.993	1.021	1.125	1.05
Bws	Percent moisture by volume, as measured	2.16	2.30	2.50	2.32
	Percent moisture by volume, at saturation	5.92	5.99	6.42	6.11
	Percent moisture value used in calculations	2.16	2.30	2.50	2.32
Fmd	Mole fraction of dry gas	0.978	0.977	0.975	0.977
%CO2	Percent CO2 by volume (dry)	0.0	0.0	0.0	0.0
%O2	Percent O2 by volume (dry)	21.0	21.0	21.0	21.0
%CO	Percent CO by volume (dry)	0.0	0.0	0.0	0.0
%N2	Percent N2 by volume (dry)	79.0	79.0	79.0	79.0
Md	Molecular weight - dry stack gas	28.84	28.84	28.84	28.84
Ms	Molecular weight - stack gas	28.61	28.59	28.57	28.59
Pbar	Barometric pressure (in. Hg)	29.68	29.68	29.62	29.66
Psi	Static pressure of stack gas (in. H2O)	0.33	0.31	0.33	0.32
Ps	Stack pressure - absolute (in. Hg)	29.70	29.70	29.64	29.68
Ts	Average stack gas temperature (°F)	96.9	97.3	99.5	97.9
Vh	Average square root of velocity head (in. H2O)	0.6705	0.6541	0.6578	0.6608
Vs	Average stack gas velocity (feet/sec.)	38.98	38.05	38.39	38.47
As	Stack area (sq. in.)	50.3	50.3	50.3	50.3
Qs	Actual stack flow rate (acfm)	816	797	804	806
Qsstd	Stack flow rate - dry (scfm)	752	732	733	739
ISO	Percent isokinetic	98.2	97.4	98.1	97.9

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EMISSION TEST REPORT

TEST RESULTS

Plant: Clean Harbors
Sampling location: Stack

Test date(s): 8/26/03 8/26/03 8/26/03

				Run Numbers CH-1	CH-2	CH-3	3-Run AVERAGE
		Mass of pollutant	=	1.6	0.8	0.3	
		If below detection limits, replace 0 with 1.		0	0	0	
Mn	Filterable particulate	Mass	mg	1.6	0.8	0.3	
Cs		Concentration	gr/dscf	5.483E-04	2.839E-04	1.056E-04	3.126E-04
Pmr		Emission rate	lb/h	3.634E-03	1.782E-03	6.633E-04	1.993E-03

		Mass of pollutant	=	1.59	5.79	2.75	
		If below detection limits, replace 0 with 1.		0	0	0	
Mn	Mercury	Mass	µg	1.59	5.79	2.75	
Cs		Concentration	µg/m3	1.247E+00	4.703E+00	2.215E+00	2.721E+00
Pmr		Emission rate	lb/h	3.512E-06	1.290E-05	6.081E-06	7.497E-06

8/16/03

Shaw
Shaw E & I, Inc.

Validated 05/02/2002

VELOCITY REPORT

FIELD DATA

Plant: Clean Harbors
Sampling location: Stack

Date: 8/28/03
Run number: V-4

Bar. press. (in. Hg): 29.62
Static press. (in. H20): 0.34
Stack dia. or width (in.): 8.000
Stack length (if rectangular) (in.):
Pitot tube coeff.: 0.84

Test time (start-stop): 1354
Number of traverse points: 8
Moisture (%): 2.50
% CO2 by volume (dry): 0.0
% O2 by volume (dry): 21.0

Traverse Pt. No.	Velocity head ΔP (in. H2O)	Stack Temp. (°F)
1	0.320	104
2	0.400	104
3	0.490	103
4	0.440	102
5	0.310	102
6	0.360	102
7	0.480	101
8	0.440	101
	0.405	102

DM 9/9/03

Shaw
Shaw E & I, Inc.

Validated 05/02/2002

VELOCITY REPORT

TEST RESULTS

Plant: Clean Harbors Test date(s): 8/26/03

ampling location: Stack

		Run Numbers V-4	1-Run Average
NP	Number of sampling points	8	
Cp	Pitot tube coefficient	0.84	
Bws	Percent moisture by volume, as measured	2.50	2.50
	Percent moisture by volume, at saturation	7.00	7.00
	Percent moisture by volume, in calculations	2.50	2.50
Fmd	Mole fraction of dry gas	0.975	0.975
%CO2	Percent CO2 by volume (dry)	0.0	0.0
%O2	Percent O2 by volume (dry)	21.0	21.0
%N2	Percent N2 by volume (dry)	79.0	79.0
Md	Molecular weight - dry stack gas	28.84	28.84
Ms	Molecular weight - stack gas	28.57	28.57
Pbar	Barometric pressure (in. Hg)	29.62	29.62
Psi	Static pressure of stack gas (in. H2O)	0.34	0.34
Ps	Stack pressure - absolute (in. Hg)	29.65	29.65
Ts	Average stack gas temperature (°F)	102	102
Vh	Average square root of velocity head (in. H2O)	0.6343	0.6343
Vs	Average stack gas velocity (feet/sec.)	37.117	37.117
As	Stack area (sq. in.)	50.27	
	Stack area (sq. ft.)	0.35	
Qs	Actual stack flow rate (acfm)	777	777
Qsstd	Stack flow rate - dry (scfm)	705	705

APPENDIX B

SAMPLING DATA

Shaw The Shaw Group Inc.

FIELD AUDIT REPORT: DRY GAS METER BY CRITICAL ORIFICE

Date: 8-25-03 Client: Clean Harbors

Barometric Pressure (P_{bar}): 29.63 in.Hg Meter Box No.: FT-10

Orifice No.: 12 Pretest Y: .991 ΔH@ 1.95 in.H_2O

Orifice K Factor: 5.071×10^{-4} Auditor: J. Neese

Orifice Manometer Reading (ΔH), in.H_2O	Dry Gas Meter Reading (V_f/V_i), ft^3	Temperatures (°F)					Duration of Run (θ), min.
		Ambient		Dry Gas Meter			
		Ambient (T_{ai}/T_{af})	Average (T_a)	Inlet (T_{mi}/T_{mf})	Outlet (T_{oi}/T_{of})	Average (T_m)	
2.20	907.0	84	84	86	85	86.25	13 34.21/60
	918.0	84		89	85		

Dry Gas Meter (V_m), ft^3	$V_{m_{std}}$, ft^3	$V_{m_{act}}$, ft^3	Audit, Y	Y Deviation, %	Audit ΔH@, in.H_2O	ΔH@ Deviation, in.H_2O
11.0	10.604	10.534	.993	0.1%	1.96	0.01

$$V_{m_{std}} = \frac{17.647(V_m)(P_{bar} + \Delta H/13.6)}{(T_m + 460)} = 10.604 \ ft^3$$

29.84

$$V_{m_{act}} = \frac{1203(\theta)(K)(P_{bar})}{(T_a + 460)^{1/2}} = 10.534 \ ft^3$$

13.57

23.324

$$Audit\ Y = \frac{V_{m_{act}}}{V_{m_{std}}} = .993 \qquad Y\ deviation = \frac{Audit\ Y - Pretest\ Y}{Pretest\ Y} \times 100 = 0.1\%$$

$$Audit\ \Delta H@ = (0.0317)(\Delta H)(P_{bar})(T_m + 460)\left[\frac{\theta}{Y\,(V_m)(P_{bar} + \Delta H/13.6)}\right]^2 = 1.96 \ in.\ H_2O$$

Audit Y must be in the range, pretest Y ±0.05 Y.
Audit ΔH@ must be in the range pretest ΔH@ ±0.15 in.H_2O.

Shaw The Shaw Group Inc.

DIGITAL INDICATOR AUDIT DATA SHEET

Indicator No.: FT-10
Client: Clean Harbors
Date: 8·25·03

Project No.:
Operator: J. Neese

Test Point No.	Equivalent Temperature (°F)	Digital Indicator Temperature (°F)	% Difference
1	0	1	0.22
2	100	102	0.36
3	200	202	0.30
4	300	303	0.39

Percent difference must be less than or equal to 0.5%.

Percent difference:

$$\frac{\text{(Digital indicator temperature - equivalent temperature)(100)}}{\text{(Equivalent temperature + 460)}}$$

M:\FRM\DIGINDIC.WPD

Shaw The Shaw Group Inc.

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Plant: Clean Harbors Date: 8-25-03

Sampling location: Outlet

Inside of far wall to outside of nipple: 8

Inside of near wall to outside of nipple (nipple length): 0

Stack inside diameter (i.d.), inches: 8

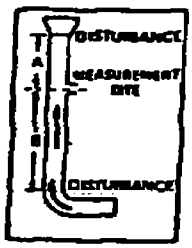
Distance downstream from flow disturbance (Distance B):

432 inches/equivalent diameter = 54 dd

Distance upstream from flow disturbance (Distance A):

69½ inches/equivalent diameter = 8.7 dd

Calculated by: J. Neese



SCHEMATIC OF SAMPLING LOCATION

Traverse Point No.	Fraction of Stack i.d.	Stack i.d.	Product of Columns 2 & 3 (to nearest ⅛ in.)*	Nipple Length (in.)	Traverse Point Location From Outside of Nipple (Sum of Columns 4 & 5)
1	.067	8	½		
2	.250	↓	2		
3	.750		6		
4	.933		7½		

* The first and last points must be no closer than 1 in. from the stack wall for stack diameters >24 in. or no closer than 0.5 in. from the stack wall for stack diameters ≤24 in.

Sha[illegible] The Shaw Group Inc.

Emission Testing Field Data Sheet

Plant and City	Date	Sampling Location	Sample Type	Run Number
Clean Harbors Cinti	8/26/03	Outlet	Part/Hg	CH-1

Operator(s)	Bar. Press. (in.Hg)	Static Press. (in.H_2O)	Amb. Temp. (°F)	Filter Number(s)	Probe Length and Type	Nozzle Dia. (in.)	Nozzle Number
JN, DC	29.68	+0.41.33	76	027007	3' Glass	.255	6-10

Moisture (%)	Meter Box No.	Meter ΔH@	Meter Cal. Factor (Y)	K Factor	Probe Heat (°F)	Box Heat (°F)	Therm. No.	Pitot No.	Imp. Therm. No.	Gas Bag Pump No.	Gas Bag Sys. Leak Check	Train Leak Check (initial) in.Hg	Train Leak Check (initial) cfm	Train Leak Check (final) in.Hg	Train Leak Check (final) cfm	Pitot Leak Check Initial	Pitot Leak Check Final
3	FT-10	1.95	.991	4.769	250	250	412	504	[illegible]	—	— —	16	0.003	6.5	0.003	✓	

Traverse Point No.	Sampling Time (min.)	Clock Time (24-h)	Gas Meter Reading (Vm), ft^3	Velocity Head* (ΔP), in.H_2O	Orifice Pressure Differential (ΔH), in.H_2O Desired	Orifice Pressure Differential (ΔH), in.H_2O Actual	Temperature (°F) Stack (Ts)	Dry Gas Meter Inlet (Tml)	Dry Gas Meter Outlet (Tmo)	Sample Box	Probe	Resin	Impinger	Pump Vac. (in.Hg)	Gas Bag Sample Data
	0	0900	918.606												
A-1	7.5		923.9	.38	1.73	1.73	98	77	77	248	247		74	4	
2	15	0915	930.0	.47	2.15	2.15	96	80	78	247	247	N/A	65	5	N/A
3	22.5		936.5	.57	2.60	2.60	97	83	79	249	246		73	6	
4	30	0930	942.877	.53	2.40	2.40	97	85	81	250	245		71	6	
B-1	37.5		947.6	.30	1.39	1.39	96	93	82	257	247		71	3.5	
2	45	0945	953.1	.39	1.81	1.81	97	94	84	249	247		65	4	
3	52.5		959.6	.51	2.37	2.37	97	96	85	245	250		69	5.5	
4	60	1003	965.655	.45	2.24	2.24	97	98	86	247	266		70	5.5	

* Record pressure differentials to 2 significant figures, e.g., 0.015, 0.88, 1.2, etc. Comments: O2 21% CO2 0%

2,450 BULBS

Shaw The Shaw Group Inc.

PARTICULATE/MERCURY SAMPLE RECOVERY DATA SHEET

Plant Clean Harbors
Sample location Stack
Run No. CH-1
Filter No(s). 027007

Sample date 8/26/03
Recovery date 8/26/03
Recovered by DW

MOISTURE

Impingers	1st	2nd	3rd	4th
Contents	4% $KMnO_4$/10% H_2SO_4		Empty	Silica gel
Final wt/vol	585.9 g	611.9 g	481.8 g	790.4 g
Initial wt/vol	585.8 g	602.9 g	479.7 g	780.5 g
Net gain	0.1 g	9.0 g	2.1 g	9.9 g

Description of impinger water purple

Total moisture 21.1 g

RECOVERED SAMPLE

Filter container number(s) 6831B Sealed ✓

Description of particulate on filter none visible

Blank 6837B #027012

	Sample solution/rinse container numbers	Blanks	Sealed/liquid level marked
Acetone probe rinse	6831A	6837A	✓
$KMnO_4$ solution and H_2O rinse	6832A	6838A	✓
8N HCl and H_2O rinses			

Samples stored and locked ✓

Remarks

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August 25, 2003

Sh[illegible] The Shaw Group Inc.

Emission Testing Field Data Sheet

Plant and City	Date	Sampling Location	Sample Type	Run Number
Clean Harbors Conti	8/26/03	Outlet	Part/Hg	CH-2

Operator(s)	Bar. Press. (in.Hg)	Static Press. (in.H_2O)	Amb. Temp. (°F)	Filter Number(s)	Probe Length and Type	Nozzle Dia. (in.)	Nozzle Number
JW DC	29.68	+0.31	84	027014	3' Glass	.255	G-10

Moisture (%)	Meter Box No.	Meter ΔH@	Meter Cal. Factor (Y)	K Factor	Probe Heat (°F)	Box Heat (°F)	Therm. No.	Pitot No.	Imp. Therm. No.	Gas Bag Pump No.	Gas Bag Sys. Leak Check	Train Leak Check (initial) in.Hg	Train Leak Check (initial) cfm	Train Leak Check (final) in.Hg	Train Leak Check (final) cfm	Pitot Leak Check Initial	Pitot Leak Check Final
3	FT-10	1.95	.991	4.709	250	250	4/12	504	I-95	—	—	16	0.004	10	0.006	✓	

Traverse Point No.	Sampling Time (min)	Clock Time (24-h)	Gas Meter Reading (Vm), ft³	Velocity Head* (ΔP), in.H_2O	Orifice Pressure Differential (ΔH), in.H_2O Desired	Orifice Pressure Differential (ΔH), in.H_2O Actual	Temperature (°F) Stack (Ts)	Dry Gas Meter Inlet (Tmi)	Dry Gas Meter Outlet (Tmo)	Sample Box	Probe	Resin	Impinger	Pump Vac. (in.Hg)	Gas Bag Sample Data
	0	1043	915.955												
A-1	7.5		971.2	.37	1.72	1.72	96	91	89	246	236		75	6	
2	15	1055	977.0	.42	1.95	1.95	97	92	88	246	266	N/A	71	7	N/A
3	22.5		983.2	.52	2.42	2.42	98	94	89	248	265		66	9	
4	30	1113	989.176	.45	2.10	2.10	98	97	90	247	250		66	8	
B-1	37.5		994.3	.32	1.50	1.50	96	99	91	252	262		66	5	
2	45	1130	999.8	.41	1.93	1.93	97	100	91	248	264		70	7	
3	52.5		1006.1	.49	2.30	2.30	98	101	92	248	262		68	8	
4	60	1145	1012.108	.46	2.16	2.16	98	102	93	247	261		67	8	

* Record pressure differentials to 2 significant figures, e.g., 0.015, 0.88, 1.2, etc. Comments:

2400 Bulbs

Shaw The Shaw Group Inc.

PARTICULATE/MERCURY SAMPLE RECOVERY DATA SHEET

Plant: Clean Harbors
Sample date: 8/26/03
Sample location: Stack
Recovery date: 8/26/03
Run No.: CH-2
Recovered by: DPB
Filter No(s).: 027014

MOISTURE

Impingers	1st	2nd	3rd	4th
Contents	4% $KMnO_4$/10% H_2SO_4		Empty	Silica gel
Final wt/vol	572.3 g	688.8 g	475.2 g	766.4 g
Initial wt/vol	571.3 g	682.6 g	474.0 g	758.1 g
Net gain	6.0 g	6.2 g	1.2 g	8.3 g

Description of impinger water: purple

Total moisture: 21.7 g

RECOVERED SAMPLE

Filter container number(s): 6833
Sealed: ✓
Description of particulate on filter: none visible

	Sample solution/rinse container numbers	Sealed/liquid level marked
Acetone probe rinse	6833A	✓
$KMnO_4$ solution and H_2O rinse	6834A	✓
8N HCl and H_2O rinses		

Samples stored and locked: ✓

Remarks:

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August 25, 2003

The Shaw Group Inc.

Emission Testing Field Data Sheet

Plant and City	Date	Sampling Location	Sample Type	Run Number
Clean Harbors	2/26/03	Outlet	Particle	CT-3

Operator(s)	Bar. Press. (in.Hg)	Static Press. (in.H_2O)	Amb. Temp. (°F)	Filter Number(s)	Probe Length and Type	Nozzle Dia. (in.)	Nozzle Number
JW DC	29.62	+0.22	88	027015	3' Glass	.255	G-10

Moisture (%)	Meter Box No.	Meter ΔH@	Meter Cal. Factor (Y)	K Factor	Probe Heat (°F)	Box Heat (°F)	Therm. No.	Pitot No.	Imp. Therm. No.	Gas Bag Pump No.	Gas Bag Sys. Leak Check	Train Leak Check (initial) in.Hg	Train Leak Check (initial) cfm	Train Leak Check (final) in.Hg	Train Leak Check (final) cfm	Pitot Leak Check Initial	Pitot Leak Check Final
3	G-10	1.75	.991	4.100	250	250	1.10	S04	I-99	—	—	4	0.010	4	0.003		

Traverse Point No.	Sampling Time (min.)	Clock Time (24-h)	Gas Meter Reading (Vm), ft^3	Velocity Head* (ΔP), in.H_2O	Orifice Pressure Differential (ΔH), in.H_2O Desired	Orifice Pressure Differential (ΔH), in.H_2O Actual	Temperature (°F) Stack (Ts)	Dry Gas Meter Inlet (Tmi)	Dry Gas Meter Outlet (Tmo)	Sample Box	Probe	Resin	Impinger	Pump Vac. (in.Hg)	Gas Bag Sample Data
A 1	0	1250	12.538												
2	5		17.7	.33	1.54	1.54	98	94	92	246	269	/	74	3	
3	10	1305	23.5	.42	1.96	1.96	99	95	92	241	255	N/A	74	2.5	N/A
4	15		29.3	.54	2.52	2.52	99	97	93	246	259		68	3	
5	20	1320	35.968	.46	2.15	2.15	100	100	94	243	260		73	3	
B 1	25		41.2	.36	1.69	1.69	100	103	95	248	257		69	3	
2	30	1336	47.1	.42	1.95	1.95	100	104	95	247	256		66	3	
3	35		53.7	.47	2.22	2.22	100	105	96	249	257		65	3	
4	40	1350	59.488	.48	2.27	2.27	100	107	97	249	256		67	3	

* Record pressure differentials to 2 significant figures, e.g., 0.015, 0.88, 1.2, etc. Comments:

2,775 bulbs

Shaw The Shaw Group Inc.

PARTICULATE/MERCURY SAMPLE RECOVERY DATA SHEET

Plant: Clean Harbors
Sample date: 8/26/03
Sample location: Stack
Recovery date: 8/26/03
Run No.: CH-3
Recovered by: [illegible]
Filter No(s).: 027015

MOISTURE

Impingers	1st	2nd	3rd	4th
Contents	4% $KMnO_4$/10% H_2SO_4		Empty	Silica gel
Final wt/vol	632.4 g	609.8 g	563.5 g	857.2 g
Initial wt/vol	623.1 g	605.4 g	562.3 g	848.2 g
Net gain	9.3 g	4.4 g	1.2 g	9.0 g

Description of impinger water

Total moisture 23.9 g

RECOVERED SAMPLE

Filter container number(s): 6835B
Sealed: ✓
Description of particulate on filter: none visible

	Sample solution/rinse container numbers	Sealed/liquid level marked
Acetone probe rinse	6835A	✓
$KMnO_4$ solution and H_2O rinse	6836A	✓
8N HCl and H_2O rinses		

Samples stored and locked: ✓

Remarks

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August 23, 2002

SHAW PN: _____

Shaw™ The Shaw Group Inc.

GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant and City: Clean Harbors Cinti Date: 8-26-03

Sampling Location: Outlet Clock Time: 1354

Run No.: CH-4 Operator: DC JN

Barometric Pressure, in.Hg: 29.62 Static Pressure, in.H_2O: +0.34

Manometer Size: 0-10" Pitot Tube, Cp: .84

Stack Dimension, in. Diameter or Side 1: 8" Side 2: _____

CO_2 %: _____ O_2 %: _____ Molecular wt., Dry: _____

Wet Bulb: _____ Dry Bulb: _____ Moisture, %: _____

Pitot No.: 504 Thermocouple No.: 412

FIELD DATA

TRAVERSE POINT NUMBER	VELOCITY HEAD, ΔP_s (in.H_2O)	STACK TEMP. (°F)
A-1	.32	104
2	.40	104
3	.49	103
4	.44	102
B-1	.31	102
2	.36	102
3	.48	101
4	.44	101

CALCULATIONS

$M_s = M_d \times \left(1 - \frac{H_2O}{100}\right) + 18\left(\frac{H_2O}{100}\right)$

$M_s = (\quad) \times (1 - \frac{\quad}{100}) + 18(\frac{\quad}{100})$

$M_s =$

$\bar{T}_s =$ °F = °R = (°F + 460)

$P_s = P_b + \frac{SP}{13.6} = (\quad) + \frac{\quad}{13.6}$

$P_s =$ in.Hg

$(\Delta P^{1/2})_{Avg} =$

$V_s = 85.49 \times Cp \times (\Delta P^{1/2})_{Avg} \left(\frac{T_s \cdot R}{P_s M_s}\right)^{1/2}$

$V_s = 85.49 \times (\quad) \times (\quad) \times \left(\frac{\quad}{\quad}\right)^{1/2}$

$V_s =$ ft/s

$A_s =$ ft^2

$Q_s = V_s \times A_s \times \frac{60 \times}{m}$

$Q_s =$ x x 60

$Q_s =$ acfm

$Q_{std} = Q_s \times 17.647 \times \frac{P_s}{T_s} \times \left(1 - \frac{H_2O\%}{100}\right)$

$Q_{std} =$ x 17.647 x $\frac{\quad}{\quad}$ °R x $(1 - \frac{\quad}{100})$

$Q_{std} =$ dscfm

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October 8, 2002

APPENDIX C

ANALYTICAL DATA

Shaw
Shaw E & I, Inc.

validated 4/14/95

Method 5 Sample Analytical Data
Acetone Rinses and Filters

Plant: Clean Harbors
Run No.: CH-1
Sample Location(s): Outlet
Relative Humidity < 50%: Yes

Sample Type	Sample Identifiable	Liquid level at mark and/or container sealed
Acetone	Yes	Yes
Filter	Yes	Yes

Acetone Sample Container No.: 6831A

Density of Acetone: 0.7899 g/ml (pa)
Volume of Acetone: 150 ml (Va)

Date and time of wt.: 8/29/03 630 am — Beaker Gross wt.: 109.3338 g
Date and time of wt.: 8/29/03 230 pm — Beaker Gross wt.: 109.3336 g
Average Gross wt.: 109.3337 g
Beaker Tare wt.: 109.3320 g

Acetone blank value, (Ca) mg/g: 0.002
Acetone Blank wt., mg = Va x pa x Ca
less Acetone Blank wt.: 0.2 mg
Net wt. particulate in acetone fraction: 1.5 mg

Note: In no case shall a blank residue greater than 0.01 mg/g be subtracted from the sample weight.

Filter Sample Container No.: 6831B

Filter No.: 27007

Date and time of wt.: 8/29/03 630 am — Filter Gross wt.: 0.3139 g
Date and time of wt.: 8/29/03 230 pm — Filter Gross wt.: 0.3140 g
Average Gross wt.: 0.3140 g
Filter Tare wt.: 0.3139 g
Net wt. particulate on filter: 0.0 mg

Total wt. of filterable particulate: 1.6 mg

Note: Constant weight is defined as a difference of less than 0.5 mg or 1% of sample wt., whichever is greater, between two consecutive weighings at least 6 hours apart.

Remarks:

Signature of Analyst: [signature] Date: 9/2/03
Signature of Reviewer: [signature] Date: 9/2/03

Shaw
Shaw E.&I, Inc.

validated 4/14/99

Method 5 Sample Analytical Data
Acetone Rinses and Filters

Plant: Clean Harbors
Sample Location(s): Outlet
Run No.: CH-2
Relative Humidity < 50%: Yes

Sample Type	Sample Identifiable	Liquid level at mark and/or container sealed
Acetone	Yes	Yes
Filter	Yes	Yes

Acetone Sample Container No.: 6833A

Date and time of wt.: 8/29/03 630 am
Date and time of wt.: 8/29/03 230 pm

Acetone blank value, (Ca) mg/g: 0.002
Acetone Blank wt., mg = Va x pa x Ca

Density of Acetone: 0.7899 g/ml (pa)
Volume of Acetone: 125 ml (Va)
Beaker Gross wt.: 109.5598 g
Beaker Gross wt.: 109.5596 g
Average Gross wt.: 109.5597 g
Beaker Tare wt.: 109.5588 g
less Acetone Blank wt.: 0.2 mg
Net wt. particulate in acetone fraction: 0.7 mg

Note: In no case shall a blank residue greater than 0.01 mg/g be subtracted from the sample weight.

Filter Sample Container No.: 6833B

Date and time of wt.: 8/29/03 630 am
Date and time of wt.: 8/29/03 230 pm

Filter No.: 27014
Filter Gross wt.: 0.3098 g
Filter Gross wt.: 0.3098 g
Average Gross wt.: 0.3098 g
Filter Tare wt.: 0.3097 g
Net wt. particulate on filter: 0.1 mg

Total wt. of filterable particulate: 0.8 mg

Note: Constant weight is defined as a difference of less than 0.5 mg or 1% of sample wt., whichever is greater, between two consecutive weighings at least 6 hours apart.

Remarks:

Signature of Analyst: [signature] Date: 9/2/03

Signature of Reviewer: [signature] Date: 9/2/03

Shaw
Shaw E & I, Inc.

validated 4/14/95

Method 5 Sample Analytical Data
Acetone Rinses and Filters

Plant: Clean Harbors
Run No.: CH-3
Sample Location(s): Outlet
Relative Humidity < 50%: Yes

Sample Type	Sample Identifiable	Liquid level at mark and/or container sealed
Acetone	Yes	Yes
Filter	Yes	Yes

Acetone Sample Container No.: 6835A

Density of Acetone: 0.7899 g/ml (pa)
Volume of Acetone: 150 ml (Va)

Date and time of wt.: 8/29/03 630 am — Beaker Gross wt.: 103.9809 g
Date and time of wt.: 8/29/03 230 pm — Beaker Gross wt.: 103.9811 g
Average Gross wt.: 103.9810 g
Beaker Tare wt.: 103.9806 g
Acetone blank value, (Ca) mg/g: 0.002
Acetone Blank wt., mg = Va x pa x Ca
less Acetone Blank wt.: 0.2 mg
Net wt. particulate in acetone fraction: 0.2 mg

Note: In no case shall a blank residue greater than 0.01 mg/g be subtracted from the sample weight.

Filter Sample Container No.: 6835B

Filter No.: 27015
Date and time of wt.: 8/29/03 630 am — Filter Gross wt.: 0.3104 g
Date and time of wt.: 8/29/03 230 pm — Filter Gross wt.: 0.3104 g
Average Gross wt.: 0.3104 g
Filter Tare wt.: 0.3103 g
Net wt. particulate on filter: 0.1 mg

Total wt. of filterable particulate: 0.3 mg

Note: Constant weight is defined as a difference of less than 0.5 mg or 1% of sample wt., whichever is greater, between two consecutive weighings at least 6 hours apart.

Remarks:

Signature of Analyst: [signature] Date: 9/2/03
Signature of Reviewer: [signature] Date: 9/2/03

Shaw
Shaw E & I, Inc.

validated 4/14/95

Method 5 Blank Analytical Data
Acetone Rinses and Filters

Plant: Clean Harbors
Sample Location(s): Outlet
Run No.: Blank
Relative Humidity < 50%: Yes

Blank Type	Sample Identifiable	Liquid level at mark and/or container sealed
Acetone	Yes	Yes
Filter	Yes	Yes

Acetone Blank Container No.: 6837A

Date and time of wt.: 8/29/03 630 am
Date and time of wt.: 8/29/03 230 pm

Density of Acetone: 0.7899 g/ml (ρa)
Volume of Acetone: 150 ml (Va)
Beaker Gross wt.: 109.1518 g
Beaker Gross wt.: 109.1518 g
Average Gross wt.: 109.1518 g
Beaker Tare wt.: 109.1516 g
Blank Net wt.: 0.2 mg (ma)
Acetone Blank Value: 0.002 mg/g (Ca)
Blank value used for calculations: 0.002 mg/g

Acetone Blank value, Ca, mg/g = ma / Va / ρa

Note: In no case shall a blank residue greater than 0.01 mg/g be subtracted from the sample weight.

Filter Blank Container No.: 6837B

Date and time of wt.: 8/29/03 630 am
Date and time of wt.: 8/29/03 230 pm

Filter No.: 27012
Filter Gross wt.: 0.3110 g
Filter Gross wt.: 0.3109 g
Average Gross wt.: 0.3110 g
Filter Tare wt.: 0.3108 g
Filter Blank Difference: 0.1 mg

Note: Difference between filter blank and tare wts. should be less than ± 5 mg or ± 2% of sample wts., whichever is greater.

Note: Constant weight is defined as a difference of less than 0.5 mg or 1% of sample wt., whichever is greater, between two consecutive weighings at least 6 hours apart.

Remarks:

Signature of Analyst: [signature] Date: 9/2/03
Signature of Reviewer: [signature] Date: 9/2/03

Columbia Analytical Services Inc.

Date: September 16, 2003
Number of pages: 4

1 Mustard St., Suite 250
Rochester, NY 14609

To:

Mr. Dave Osterhout
Shaw Environmental
11499 Chester Rd.
Cincinnati, OH 45246

Phone: 513-782-4897

Fax: 513-782-4807

CC:

From:

Michael Perry

Phone: (585) 288-5380

Fax: (585) 288-8475

RUSH REPORT

Submission #: R2318258
Project Reference: CLEAN HARBOR

thanks, Mike

IMPORTANT NOTICE:

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COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6831A/6831B: RUN CH-1

Date Sampled : 08/26/03 Order #: 669006 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	0.0900	UG	09/12/03	0.100

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6832A: RUN CH-1

Date Sampled : 08/26/03 Order #: 669007 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	1.59	UG	09/12/03	0.710

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6833A/6833B: RUN CH-2

Date Sampled : 08/26/03 Order #: 669008 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	0.0440	UG	09/12/03	0.100

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6834A: RUN CH-2

Date Sampled : 08/26/03 Order #: 669009 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	5.79	UG	09/12/03	0.715

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6835A/6835B: RUN CH-3

Date Sampled : 08/26/03 Order #: 669010 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	0.145	UG	09/12/03	0.100

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6836A: RUN CH-3

Date Sampled : 08/26/03 Order #: 669011 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	2.75	UG	09/12/03	0.650

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6837A/6837B: RUN CH-4 Blank

Date Sampled : 08/26/03 Order #: 669012 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	0.100	UG	09/12/03	0.100

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6838A: RUN CH-4 Blank

Date Sampled : 08/26/03
Date Received: 09/03/03
Order #: 669013
Submission #: R2318258
Sample Matrix: AIR

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	0.124 U	UG	09/12/03	0.620

APPENDIX D

SAMPLING AND ANALYTICAL PROCEDURES

1.0 SUBJECT

DETERMINATION OF PARTICULATE EMISSIONS FROM STATIONARY SOURCES (EPA METHOD 5)

2.0 PURPOSE

Particulate matter is withdrawn isokinetically from the source and collected on a glass fiber filter maintained at temperature in the range of 120° ±14°C (248° ±25°F) or such other temperature as specified by an applicable subpart of the 40 Code of Federal Regulations or approved by the Administrator of the applicable EPA Region or equivalent in the authorized State. The particulate mass, which includes any material that condenses at or above the filtration temperature, is determined gravimetrically after removal of uncombined water.

This method is applicable for the determination of particulate emissions from stationary sources.

3.0 SCOPE

This procedure shall be followed when performing compliance testing of stationary sources under the Clean Air Act, or where otherwise required as part of a regulatory compliance demonstration.

This procedure incorporates by reference 40 Code of Federal Regulations (CFR), Part 60, Appendix A, Method 5 in its entirety.

4.0 REFERENCES

4.1 External References

40 Code of Federal Regulations (CFR), Part 60, Appendix A, Method 5.

4.2 Other Internal Procedures

SHAW-SOP-001
SHAW-SOP-002
SHAW-SOP-003
SHAW-SOP-004

5.0 PROCEDURE

5.1 Sampling Procedure

5.1.1 Pretest Preparation. Weigh several 200- to 300-g portions of silica gel in air-tight containers to the nearest 0.5 g. Record the total weight of the silica gel plus container, on each container. As an alternative, the silica gel need not be preweighed, but may be weighed directly in its impinger or sampling holder just prior to train assembly.

Check filters visually against light for irregularities and flaws or pinhole leaks. Label the shipping containers (glass or plastic petri dishes), and keep the filters in these containers at all times except during sampling and weighing.

Desiccate the filters at 20 ± 5.6°C (68 ± 10°F) and ambient pressure for at least 24 hours, and weigh at intervals of at least 6 hours to a constant weight, i.e., ≤0.5-mg change from previous weighing; record results to the nearest 0.1 mg. During each weighing, the filter must not be exposed to the laboratory atmosphere for a period greater than 2 minutes and a relative humidity above 50 percent. Alternatively (unless otherwise specified by the Administrator), the filters may be oven dried at 15°C (220°F) for 2 to 3 hours, desiccated for 2 hours, and weighed. Procedures other than those described, which account for relative humidity effects, may be used, subject to the approval of the Administrator.

General Glassware Cleaning applicable to USEPA Methods 5 and other methods for INORGANIC Analytes.

Wash in Soap and Hot Water
Rinse with Tap Water
Rinse with Deionized (DI) Water-3 times
Rinse with Acetone
Oven Dry
Seal openings with parafilm or Teflon Tape

5.1.2 Preliminary Determinations. Select the sampling site and the minimum number of sampling points according to Method 1 or as specified by the Administrator. Determine the stack pressure, temperature, and the range of velocity heads using Method 2; it is recommended that a leak-check of the pitot lines be performed. Set up the apparatus; capillary tubing or surge tanks installed between the manometer and pitot tube may be used to dampen Δp fluctuations. It is recommended, but not required, that a pretest leak-check be conducted as follows: (1) blow through the pitot impact opening until at least 7.6 cm (3 in.) H_2O velocity pressure registers on the manometer; then, close off the impact opening. The pressure shall remain stable for at least 15 seconds; (2) do the same for the static pressure side, except using suction to obtain the minimum of 7.6 cm (3 in.) H_2O. Other leak-check procedures, subject to the approval of the Administrator, may be used.

Determine the moisture content using Approximation Method 4 or its alternatives for the purpose of making isokinetic sampling rate settings. Determine the stack gas dry molecular weight, as described in Method 2, if integrated Method 3 sampling is used for molecular weight determination, the integrated bag sample shall be taken simultaneously with, and for the same total length of time as, the particulate sample run.

Select a nozzle size based on the range of velocity heads, such that it is not necessary to change the nozzle size in order to maintain isokinetic sampling rates. During the run, do not change the nozzle size. Ensure that the proper differential pressure gauge is chosen for the range of velocity heads encountered.

Select a suitable probe liner and probe length such that all traverse points can be sampled. For large stacks, consider sampling from opposite sides of the stack to reduce the length of probes.

Select a total sampling time greater than or equal to the minimum total sampling time specified in the test procedures for the specific industry such that (1) the sampling time per point is not less than 2 minutes (or some greater time interval as specified by the Administrator), and (2) the sample volume taken (corrected to standard conditions) will exceed the required minimum total gas sample volume. The latter is based on an approximate average sampling rate.

The sampling time at each point shall be the same. It is recommended that the number of minutes sampled at each point be an integer or an integer plus one-half minute, in order to avoid timekeeping errors.

In some circumstances, e.g., batch cycles, it may be necessary to sample for shorter times at the traverse points and to obtain smaller gas sample volumes. In these cases, the Administrator's approval must first be obtained.

5.1.3 Preparation of Collection Train. During preparation and assembly of the sampling train, keep all openings where contamination can occur covered until just prior to assembly or until sampling is about to begin.

Four impingers are normally used. The first, third, and fourth impinger are of the Greenburg-Smith design, modified by replacing the tip with a 1.3-m^3 (½-in.) inside-diameter glass tube extending to approximately 1.3 m^3 (½ in.) from the bottom of the flask. The second impinger is of the Greenburg-Smith design with the standard tip.

Place 100 mL of water in each of the first two impingers, leave the third impinger empty, and transfer approximately 200 to 300 g of preweighed silica gel from its container to the fourth impinger. More silica gel may be used, but care should be taken to ensure that it is not entrained and carried out from the impinger during sampling. Place the silica gel container in a clean place for later use in the sample recovery. Alternatively, the weight of each individual impinger may be determined to the nearest 0.5 g and recorded.

Using a pair of tweezers, place a labeled (identified) and weighed filter in the filter holder. Be sure that the filter is properly centered and the gasket properly placed so as to prevent the sample gas stream from circumventing the filter. Check the filter for tears after assembly is completed.

When glass liners are used, install the selected nozzle using a Teflon ferrule when stack temperatures are less than 260°C (500°F) and a graphite ferrule or an asbestos string gasket when temperatures are higher. When metal liners are used, install the nozzle as above or by a leak-free direct mechanical connection. Mark the probe with heat resistant tape or by some other method to denote the proper distance into the stack or duct for each sampling point.

Set up the train as in Figure 5-I, using (if necessary) a very light coat of silicone grease on all ground glass joints, greasing only the outer portion to avoid the possibility of contamination by the silicone grease. Subject to the approval of the Administrator, a glass cyclone may be used between the probe and filter holder when the total particulate catch is expected to exceed 100 mg or when water droplets are present in the stack gas.

Use temperature sensors to monitor the filter temperature and the temperature of the gas exiting the last impinger. Place the sensing tip of these thermocouples in direct contact with the sample gas. Monitor and regulate the filter temperature throughout the test to maintain the gas temperature at the filter at 120° ±14°C (248° ±25°F). Monitor the gas temperature at the exit of the final impinger so that ice in the impinger bath can be replenished as needed to maintain a gas temperature less than 20°C (68°F).

Place crushed ice around the impingers prior to starting the test run.

5.1.4 Leak-Check Procedures.

5.1.4.1 Pretest Leak-Check. A pretest leak-check is recommended, but not required. If the tester opts to conduct the pretest leak-check, the following procedure shall be used.

After the sampling train has been assembled, turn on and set the filter and probe heating systems at the desired operating temperatures. Allow time for the temperatures to stabilize. If a Viton A O-ring or other leak-free connection is used in assembling the probe nozzle to the probe liner, leak-check the train at the sampling site by plugging the nozzle and pulling a 380 mm (15 in.) Hg vacuum.

NOTE: A lower vacuum may be used, provided that it is not exceeded during the test.

If an asbestos string is used, do not connect the probe to the train during the leak-check. Instead, leak-check the train by first plugging the inlet to the filter holder (cyclone, if applicable) and pulling a 380 mm (15 in.) Hg vacuum (see NOTE immediately above). Then connect the probe to the train, and leak-check at about 25 mm (1 in.) Hg vacuum; alternatively, the probe may be leak-checked with the rest of the sampling train, in one step, at 380 mm (15 in.) Hg vacuum. Leakage rates in excess of 4 percent of the average sampling rate or 0.00057 m^3/min (0.02 cfm), whichever is less, are unacceptable.

The following leak-check instructions for the sampling train may be helpful. Start the pump with bypass valve fully open and coarse adjust valve completely closed. Partially open the coarse adjust valve, and slowly close the bypass valve until the desired vacuum is reached. Do not reverse direction of bypass valve; this will cause water to back up into the filter holder. If the desired vacuum is exceeded, either leak-check at this higher vacuum or end the leak-check as shown below, and start over.

When the leak-check is completed, first slowly remove the plug from the inlet to the probe, filter holder, or cyclone (if applicable), and immediately turn off the vacuum pump. This prevents the water in the impingers from being forced backward into the filter holder and silica gel from being entrained backward into the third impinger.

5.1.4.2 Leak-Checks During Sample Run. If, during the sampling run, a component (e.g., filter assembly or impinger) change becomes necessary, a leak-check shall be conducted immediately before the change is made. The leak-check shall be done according to the procedure outlined above, except that it shall be done at a vacuum equal to or greater than the maximum value recorded up to that point in the test. If the leakage rate is found to be no greater than 0.00057 m^3/min (0.02 cfm) or 4 percent of the average sampling rate (whichever is less), the results are acceptable, and no correction will need to be applied to the total volume of dry gas metered; if, however, a higher leakage rate is obtained, the tester shall either record the leakage rate and plan to correct the sample volume as shown, or shall void the sample run.

Immediately after component changes, leak-checks are optional; if such leak-checks are done, the procedure outlined above shall be used.

5.1.4.3 Post-Test Leak-Check. A leak-check is mandatory at the conclusion of each sampling run. The leak-check shall be done in accordance with the same procedures, except that it shall be conducted at a vacuum equal to or greater than the maximum value reached during the sampling run. If the leakage rate is found to be no greater than 0.00057 m^3/min (0.02 cfm) or 4 percent of the average sampling rate (whichever is less), the results are acceptable, and no correction need be applied to the total volume of dry gas metered. If, however, a higher leakage rate is obtained, the tester shall either record the leakage rate and correct the sample volume as shown, or void the sampling run.

5.1.5 Particulate Train Operation. During the sampling run, maintain an isokinetic sampling rate (within 10 percent of true isokinetic unless otherwise specified by the Administrator) and a temperature around the filter and probe of 120 ± 14°C (248 ± 25°F), or such other temperature as specified by an applicable subpart of the standards or approved by the Administrator.

For each run, record the data required on a data sheet. Be sure to record the initial dry gas meter (DGM) reading. Record the DGM readings at the beginning and end of each sampling time increment, when changes in flow rates are made, before and after each leak-check, and when sampling is halted. Take other readings required at least once at each sample point during each time increment and additional readings when significant changes (20 percent variation in velocity head readings) necessitate additional adjustments in flow rate. Level and zero the manometer. Because the manometer level and zero may drift due to vibrations and temperature changes, make periodic checks during the traverse.

Clean the portholes prior to the test run to minimize the chance of sampling deposited material. To begin sampling, remove the nozzle cap, verify that the filter and probe heating systems are up to temperature, and that the pitot tube and probe are properly positioned. Position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump, and adjust the flow to isokinetic conditions.

When the stack is under significant negative pressure (height of impinger stem), the sample pump must be started and the control valve opened as the probe is placed in the sampling port. This will prevent water from backing into the filter holder.

When the probe is in position, block off the openings around the probe and porthole to prevent unrepresentative dilution of the gas stream.

Traverse the stack cross-section, as required by Method I or as specified by the Administrator, being careful not to bump the probe nozzle into the stack walls when sampling near the walls or when removing or inserting the probe through the portholes; this minimizes the chance of extracting deposited material.

During the test run, make periodic adjustments to keep the temperature around the filter holder at the proper level; add more ice as necessary to maintain a temperature of less than 20°C (68°F) at the condenser/silica gel outlet. Also, periodically check the level and zero of the manometer.

If the pressure drop across the filter becomes too high, making isokinetic sampling difficult to maintain, the filter may be replaced in the midst of the sample run. It is recommended that another complete filter assembly be used rather than attempting to change the filter itself. Before a new filter assembly is installed, conduct a leak-check. The total PM weight shall include the summation of the filter assembly catches.

A single train shall be used for the entire sample run, except in cases where simultaneous sampling is required in two or more separate ducts or at two or more different locations within the same duct, or, in cases where equipment failure necessitates a change of trains. In all other situations, the use of two or more trains will be subject to the approval of the Administrator.

Note that when two or more trains are used, separate analyses of the front-half and (if applicable) impinger catches from each train shall be performed, unless identical nozzle sizes were used on all trains, in which case, the front-half catches from the individual trains may be combined (as may the impinger catches) and one analysis of front-half catch and one analysis of impinger catch may be performed. Consult with the Administrator for details concerning the calculation of results when two or more trains are used.

At the end of the sample run, turn off the coarse adjust valve (with the exception of a high vacuum source in which case the valve should be closed after extraction), remove the probe and nozzle from the stack, turn off the pump, record the final DGM meter reading, and conduct a post-test leak-check. Also, leak-check the pitot lines; the lines must pass this leak-check, in order to validate the velocity head data.

5.1.6 Calculation of Percent Isokinetic. Calculate percent isokinetic to determine whether the run was valid or another test run should be made. If there was difficulty in maintaining isokinetic rates because of source conditions, consult with the Administrator for possible variance on the isokinetic rates.

5.2 Sample Recovery. Proper cleanup procedure begins as soon as the probe is removed from the stack at the end of the sampling period. Allow the probe to cool.

When the probe can be safely handled, wipe off all external PM near the tip of the probe nozzle, and place a cap over it to prevent losing or gaining PM. Do not cap off the probe tip tightly while the sampling train is cooling down as this would create a vacuum in the filter holder, thus drawing water from the impingers into the filter holder.

Before moving the sample train to the cleanup site, remove the probe from the sample train, wipe off the silicone grease, and cap the open outlet of the probe. Be careful not to lose any condensate that might be present. Wipe off the silicone grease from the filter inlet where the probe was fastened, and cap it. Remove the umbilical cord from the last impinger, and cap the impinger. If a flexible line is used between the first impinger or condenser and the filter holder, disconnect the line at the filter holder, and let any condensed water or liquid drain into the impingers or condenser. After wiping off the silicone grease, cap off the filter holder outlet and impinger inlet. Either ground-glass stoppers, plastic caps, serum caps, Teflon tape, or Parafilm may be used to close these openings.

Transfer the probe and filter-impinger assembly to the cleanup area. This area should be clean and protected from the wind so that the chances of contaminating or losing the sample will be minimized.

Save a portion of the acetone used for cleanup as a blank. Take 200 mL of this acetone directly from the wash bottle being used, and place it in a sample container labeled "acetone blank."

Inspect the train prior to and during disassembly, and note any abnormal conditions. Treat the samples as follows:

Container No. 1. Carefully remove the filter from the filter holder, and place it in its identified petri dish container. Use a pair of tweezers to handle the filter. If it is necessary to fold the filter, do so such that the PM cake is inside the fold. Carefully transfer to the petri dish any PM and/or filter fibers that adhere to the filter holder gasket, by using a dry Nylon bristle brush and/or a sharp-edged blade. Seal the container with Teflon tape or Parafilm.

Container No. 2. Taking care to see that dust on the outside of the probe or other exterior surfaces does not get into the sample, quantitatively recover PM or any condensate from the probe nozzle, probe fitting, probe liner, and front half of the filter holder by washing these components with acetone and placing the wash in a sample container. Deionized distilled water may be used instead of acetone when approved by the Administrator and shall be used when specified by the Administrator; in these cases, save a water blank, and follow the Administrator's directions on analysis. Perform the acetone rinse as follows:

Carefully remove the probe nozzle, and clean the inside surface by rinsing with acetone from a wash bottle and brushing with a Nylon bristle brush. Brush until the acetone rinse shows no visible particles, after which make a final rinse of the inside surface with acetone.

Brush and rinse the inside parts of the Swagelok fitting with acetone in a similar way until no visible particles remain.

Rinse the probe liner with acetone by tilting and rotating the probe while squirting acetone into its upper end so that all inside surfaces will be wetted with acetone. Let the acetone drain from the lower end into the sample container. A funnel (glass or polyethylene) may be used to aid in transferring liquid washes to the container. Follow the acetone rinse with a probe brush. Hold the probe in an inclined position, squirt acetone into the upper end as the probe brush is being pushed with a twisting action through the probe; hold a sample container underneath the lower end of the probe, and catch any acetone and particulate matter that is brushed from the probe. Run the brush through the probe three times or more until no visible PM is carried out with the acetone or until none remains in the probe liner on visual inspection. With stainless steel or other metal probes, run the brush through in the above prescribed manner at least six times since metal probes have small crevices in which particulate matter can be entrapped. Rinse the brush with acetone, and quantitatively collect these washings in the sample container. After the brushing, make a final acetone rinse of the probe as described above.

It is recommended that two people clean the probe to minimize sample losses. Between sampling runs, keep brushes clean and protected from contamination.

After ensuring that all joints have been wiped clean of silicone grease, clean the inside of the front half of the filter holder by rubbing the surfaces with a Nylon bristle brush and rinsing with acetone. Rinse each surface three times or more if needed to remove visible particulate. Make a final rinse of the brush and filter holder. Carefully rinse out the glass cyclone bypass, also (or cyclone if applicable). After all acetone washings and particulate matter have been collected in the sample container, tighten the lid on the sample container so that acetone will not leak out when it is shipped to the laboratory. Mark the height of the fluid level to determine whether leakage occurred during transport. Label the container to identify clearly its contents.

Container No. 3. Note the color of the indicating silica gel to determine whether it has been completely spent, and make a notation of its condition. Transfer the silica gel from the fourth impinger to its original container, and seal. A funnel may make it easier to pour the silica gel without spilling. A rubber policeman may be used as an aid in removing the silica gel from the impinger. It is not necessary to remove the small amount of dust particles that may adhere to the impinger wall and are difficult to remove. Since the gain in weight is to be used for moisture calculations, do not use any water or other liquids to transfer the silica gel. If the initial weight of the silica gel was taken while in the impinger, the post weight should be taken likewise.

Impinger Water. Treat the impingers as follows: Make a notation of any color or film in the liquid catch. Measure the liquid that is in the first three impingers to within 1 mL by using a graduated cylinder or by weighing it to within 0.5 g by using a balance (if one is available). Record the volume or weight of liquid present. This information is required to calculate the moisture content of the effluent gas.

Discard the liquid after measuring and recording the volume or weight, unless analysis of the impinger catch is required.

If a different type of condenser is used, measure the amount of moisture condensed either volumetrically or gravimetrically.

Whenever possible, containers should be shipped in such a way that they remain upright at all times.

5.3 Sample Recovery Equipment.

5.3.1 Probe-Liner and Probe-Nozzle Brushes. Nylon bristle brushes with stainless steel wire handles. The probe brush shall have extensions (at least as long as the probe) of stainless steel, Nylon, Teflon, or

similarly inert material. The brushes shall be properly sized and shaped to brush out the probe liner and nozzle.

5.3.2 Wash Bottle. One. A polyethylene or Teflon wash bottle may be used. It is recommended that the acetone be poured directly from the glass reagent bottle into the wash bottle.

5.3.3 Sample Storage Containers. Chemically resistant, borosilicate glass bottles, for acetone washes, 500-mL or 1000-mL. Screw cap liners shall either be rubber-backed Teflon or be constructed so as to be leak-free and resistant to chemical attack by acetone. (Narrow mouth glass bottles have been found to be less prone to leakage.) Alternatively, polyethylene bottles may be used.

5.3.4 Petri Dishes. For filter samples, glass or polyethylene, unless otherwise specified by the Administrator.

5.3.5 Graduated Cylinder and/or Balance. To measure condensed water to within 1 mL or 1 g. Graduated cylinders shall have subdivisions no greater than 2 mL. Most laboratory balances are capable of weighing to the nearest 0.5 g or less.

5.3.6 Plastic Storage Containers. Air-tight containers to store silica gel.

5.3.7 Funnel and Rubber Policeman. To aid in transfer of silica gel to container; not necessary if silica gel is weighed in the field.

5.3.8 Funnel. Glass or polyethylene, to aid in sample recovery.

5.4 Analysis Equipment:

5.4.1 Glass Weighing Dishes.

5.4.2 Desiccator.

5.4.3 Analytical Balance. To measure to within 0.1 mg.

5.4.4 Balance. To measure to within 0.5 g.

5.4.5 Beakers. 250-mL.

5.4.6 Hygrometer. To measure the relative humidity of the laboratory environment.

5.4.7 Temperature Gauge. To measure the temperature of the laboratory environment.

5.5 REAGENTS

5.5.1 Sampling. The reagents used in sampling are as follows:

5.5.2 Filters. Glass fiber filters, without organic binder, exhibiting at least 99.95 percent efficiency (<0.05 percent penetration) on 0.3-micron dioctyl phthalate smoke particles.

5.5.3 Silica Gel. Indicating type, 6- to 16-mesh. If previously used, dry at 175°C (350°F) for 2 hours. New silica gel may be used as received. Alternatively, other types of desiccants (equivalent or better) may be used, subject to the approval of the Administrator.

5.5.4 Water. When analysis of the material caught in the impingers is required, deionized distilled water shall be used. Run blanks prior to field use to eliminate a high blank on test samples.

5.5.5 Crushed Ice.

5.5.6 Stopcock Grease. Acetone-insoluble, heat-stable silicone grease. This is not necessary if screw-on-connectors with Teflon sleeves, or similar, are used. Alternatively, other types of stopcock grease may be used, subject to the approval of the Administrator.

5.6 Sample Recovery. Acetone—reagent grade, ≤0.001 percent residue, in glass bottles—is required. Acetone from metal containers generally has a high residue blank and should not be used. Sometimes, suppliers transfer acetone to glass bottles from metal containers; thus, acetone blanks shall be run prior to field use and only acetone with low blank values (≤0.001 percent) shall be used. In no case shall a blank value of greater than 0.001 percent of the weight of acetone used be subtracted from the sample weight.

5.7 Analysis. Two reagents are required for the analysis:

5.7.1 Acetone. Same as sample recovery:

5.7.2 Desiccant. Anhydrous calcium sulfate, indicating type. Alternatively, other types of desiccants may be used, subject to the approval of the Administrator.

6.0 PERFORMANCE FREQUENCY

This procedure is to be used as necessary to conduct testing specified in SECTION 3.0.

7.0 RESPONSIBILITIES

This procedure is owned by the Shaw Air Quality Services Group. It is the responsibility of the Air Quality Services Group, Field Engineering, to update this manual every January, on an annual basis.

8.0 DOCUMENTATION AND REPORTING

All sample and traverse documentation required by this procedure shall be placed in project files.

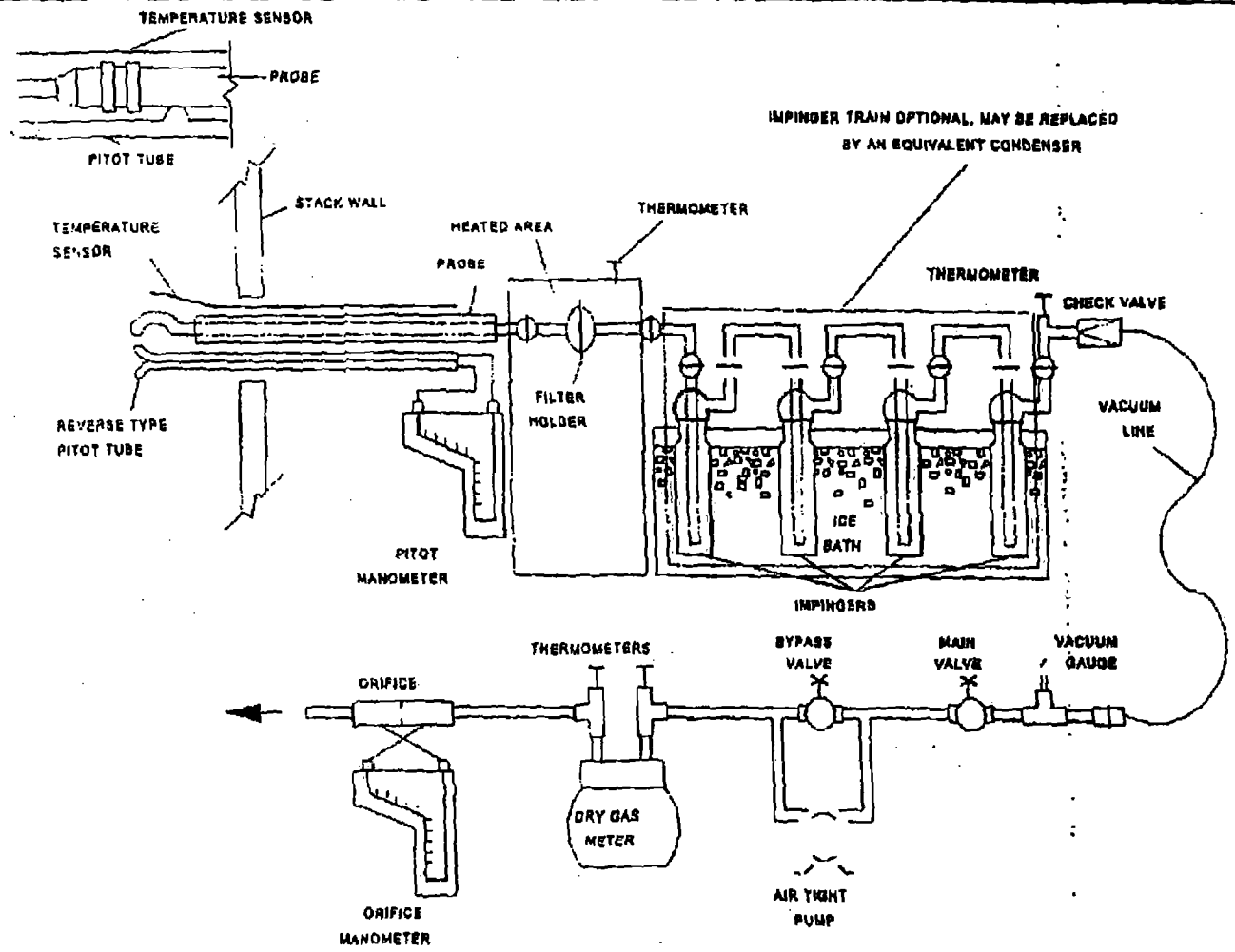


Figure 5-1. Particulate Sampling Train

1.0 SUBJECT

DETERMINATION OF METALS EMISSIONS FROM STATIONARY SOURCES (EPA METHOD 29)

2.0 PURPOSE

This method is applicable to the determination of antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), manganese (Mn), mercury (Hg), nickel (Ni), phosphorus (P), selenium (Se), silver (Ag), thallium (Tl), and zinc (Zn) emissions from stationary sources. This method may be used to determine particulate emissions in addition to the metals' emissions if the prescribed procedures and precautions are followed.

Hg emissions can be measured, alternatively, using EPA Method 101A of Appendix B, 40 CFR Part 61. Method 101-A measures only Hg but it can be of special interest to sources which need to measure both Hg and Mn emissions. A stack sample is withdrawn isokinetically from the source, particulate emissions are collected in the probe and on a heated filter, and gaseous emissions are then collected in an aqueous acidic solution of hydrogen peroxide (analyzed for all metals including Hg) and an aqueous acidic solution of potassium permanganate (analyzed only for Hg). The recovered samples are digested, and appropriate fractions are analyzed for Hg by cold vapor atomic absorption spectroscopy (CVAAS) and for Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Ni, P, Se, Ag, Tl, and Zn by inductively coupled argon plasma emission spectroscopy (ICAP) or atomic absorption spectroscopy (AAS). Graphite furnace atomic absorption spectroscopy (GFAAS) is used for analysis of Sb, As, Cd, Co, Pb, Se, and Tl if these elements require greater analytical sensitivity than can be obtained by ICAP. If one so chooses, AAS may be used for analysis of all listed metals if the resulting in-stack method detection limits meet the goal of the testing program. Similarly, inductively coupled plasma-mass spectroscopy (ICP-MS) may be used for analysis of Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Ni, As, Tl and Zn.

3.0 SCOPE

This procedure shall be followed when performing compliance testing of stationary sources under the Clean Air Act, or where otherwise required as part of a regulatory compliance demonstration.

This procedure incorporates by reference 40 Code of Federal Regulations (CFR), Part 60, Appendix A, Method 29 in its entirety.

Any test-specific modification to this method must be specifically documented in a written request or report (e.g., Trial Burn Plan, Compliance Test Plan), and that request must be approved by the governing regulatory agency.

4.0 REFERENCES

4.1 External References

40 Code of Federal Regulations (CFR), Part 60, Appendix A, Method 29.

4.2 Related SOPs

SHAW-SOP-005
SHAW-SOP-201

5.0 PROCEDURE

5.1 Pretest Preparation. Follow the same general procedure given in Method 5 (SHAW-SOP-005), except that, unless particulate emissions are to be determined, the filter need not be desiccated or weighed.

5.1.1 Special Glassware Cleaning Procedures for Metals Sampling Trains applicable to this, or any other Metals Test Method.

Rinse with Hot Tap Water
Wash in Hot Soapy Water
Rinse with Tap Water 3 times
Rinse with DI Water
Soak in 10% Nitric Acid for a minimum of 4 hours
Rinse with DI Water 3 times
Rinse with Acetone
Air Dry
Seal Openings with Parafilm

5.1.2 Equipment and Supplies

5.1.2.1 Reagents

Filters - Use filters without organic binders and containing less than 1.3 µg/in.^{2} of each of the metals to be measured. High-purity quartz-fiber filters are recommended.

HNO_3/H_2O_2 Absorbing Solution, 5 Percent HNO_3/10 Percent H_2O_2 - While stirring, carefully add 50 mL of concentrated HNO_3 to a 1000-mL volumetric flask containing approximately 500 mL of water; then, while stirring, carefully add 333 mL of 30 percent H_2O_2. Dilute to volume with water. Mix well. This reagent shall contain less than 2 ng/mL of each target metal.

Acid $KMnO_4$ Absorbing Solution, 4 Percent $KMnO_4$ (W/V), 10 percent H_2/SO_4 (V/V) - Prepare fresh daily. While stirring, carefully mix 100 mL of concentrated H_2/SO_4 into approximately 800 mL of water; then add water while stirring to make a volume of 1 liter; this solution is 10 percent H_2/SO_4 (V/V). Dissolve, while stirring, 40 g of $KMnO_4$ into 10 percent H_2/SO_4 (V/V) and add 10 percent H_2/SO_4 (V/V) while stirring to make a volume of 1 liter. Prepare and store in glass bottles to prevent degradation. This reagent shall contain less than 2 ng/mL of Hg.

Precaution: To prevent autocatalytic decomposition of the permanganate solution, filter the solution through Whatman 451 filter paper.

NOTE: The storage bottle must have a No. 70-72 hole drilled in the cap to vent the bottle and prevent pressure buildup.

HNO_3, 0.1 N - While stirring, add 6.3 mL of concentrated HNO_3 (70 percent) to a flask containing approximately 900 mL of water. Dilute to 1000 mL with water. Mix well. This reagent shall contain less than 2 ng/mL of each target metal.

HCl, 8 N - While stirring, carefully add 690 mL of concentrated HCl to a flask containing 250 mL of water. Dilute to 1000 mL with water. Mix well. This reagent shall contain less than 2 ng/mL of Hg.

5.1.2.2 Sample Train Components - Same as Method 5, except use glass or quartz-glass nozzles to prevent contamination.

5.1.3 Preliminary Determinations. Same as Method 5 (refer to SHAW-SOP-005).

5.1.3.1 Preparation of Sampling Train.
Set up the sampling train as shown in Figure 29-1. Follow the same general procedures given in Method 5, except place 100 mL of the HNO_3/H_2O_2 solution in each of the second and third impingers (if the optional empty first impinger is used) as shown in Figure 29-1. Place 100 mL of the acidic $KMnO_4$ absorbing solution in each of the fifth and sixth impingers as shown in Figure 29-1, and transfer approximately 200 to 300 g of pre-weighed silica gel from its container to the last impinger. After the train is constructed, weigh each impinger to within 0.5 grams. Record the weights on field lab data sheets.

Based on the specific source sampling conditions, the use of an empty first impinger can be eliminated if the moisture to be collected in the impingers will be less than approximately 100 mL.

If Hg analysis will not be performed, the fourth, fifth, and sixth impingers as shown in Figure 29-1 are not required.

To insure leak-free sampling train connections and to prevent possible sample contamination problems, use Teflon tape or other non-contaminating material instead of silicone grease.

Precaution: Exercise extreme care to prevent contamination within the train. Prevent the acidic $KMnO_4$ from contacting any glassware that contains sample material to be analyzed for Mn. Prevent acidic H_2O_2 from mixing with the acidic $KMnO_4$.

Leak-Check Procedures. Follow the leak-check procedures given in Method 5 (Refer to SHAW-SOP-005), Pretest Leak-Check, Leak-Checks During the Sample Run, and Post-Test Leak-Checks.

5.2 Sampling Train Operation. Follow the procedures given in Method 5 (refer to SHAW-SOP-005). When sampling for Hg, use a procedure analogous to that described in Section 7.1.1 of Method 101A, 40 CFR Part 61, Appendix B, if necessary to maintain the desired color in the last acidified permanganate impinger. For each run, record the data required.

5.3 Calculation of Percent Isokinetic. Same as Method 5 (refer to SHAW-SOP-005).

5.4 Sample Recovery

5.4.1 Begin cleanup procedures as soon as the probe is removed from the stack at the end of a sampling period. The probe should be allowed to cool prior to sample recovery. When it can be safely handled, wipe off all external particulate matter near the tip of the probe nozzle and place a rinsed, non-contaminating cap over the probe nozzle to prevent losing or gaining particulate matter. Do not cap the probe tip tightly while the sampling train is cooling; a vacuum can form in the filter holder with the undesired result of drawing liquid from the impingers onto the filter.

Before moving the sampling train to the cleanup site, remove the probe from the sampling train and cap the open outlet. Be careful not to lose any condensate that might be present. Cap the filter inlet where the probe was fastened. Remove the umbilical cord from the last impinger and cap the impinger. Cap the filter holder outlet and impinger inlet. Use non-contaminating caps, whether ground-glass stoppers, plastic caps, serum caps, or Teflon tape to close these openings.

Alternatively, the following procedure may be used to disassemble the train before the probe and filter holder/oven are completely cooled: Initially disconnect the filter holder outlet/impinger inlet and loosely cap the open ends. Then disconnect the probe from the filter holder or cyclone inlet and loosely cap the open ends. Cap the probe tip and remove the umbilical cord as previously described.

Transfer the probe and filter-impinger assembly to a cleanup area that is clean and protected from the wind and other potential causes of contamination or loss of the sample. Inspect the train before and during disassembly and note any abnormal conditions. Take special precautions to assure that all the items necessary for recovery do not contaminate the samples. The sample is recovered and treated as follows (see schematic in Figures 29-2a and 29-2b):

5.4.2 Container No. 1 (Sample Filter) Plastic Petri Dish. Carefully remove the filter from the filter holder and place it in its labeled petri dish container. To handle the filter, use either acid-washed polypropylene or Teflon coated tweezers. If it is necessary to fold the filter, make certain the particulate cake is inside the fold. Carefully transfer the filter and any particulate matter or filter fibers that adhere to the filter holder gasket to the petri dish by using a dry (acid-cleaned) nylon bristle brush. Do not use any metal-containing materials when recovering this train. Seal the labeled petri dish.

5.4.3 Container No. 2 (Acetone Rinse) Amber Glass Bottle with Teflon-Lined Lid. Perform this procedure only if a determination of particulate emissions is to be made. Quantitatively recover particulate matter and any condensate from the probe nozzle, probe fitting, probe liner, and front half of the filter holder by washing these components with a total of 100 mL of acetone, while simultaneously taking great care to see that no dust on the outside of the probe or other surfaces gets in the sample. The use of exactly 100 mL is necessary for the subsequent blank correction procedures. Distilled water may be used instead of acetone when approved by the Administrator and shall be used when specified by the governing regulatory agency; in these cases, save a water blank and follow the governing regulatory agency's directions on analysis.

Carefully remove the probe nozzle, and clean the inside surface by rinsing with acetone from a wash bottle while brushing with a non-metallic brush. Brush until the acetone rinse shows no visible particles, then make a final rinse of the inside surface with acetone.

Brush and rinse the sample exposed inside parts of the probe fitting with acetone in a similar way until no visible particles remain. Rinse the probe liner with acetone by tilting and rotating the probe while squirting acetone into its upper end so that all inside surfaces will be wetted with acetone. Allow the acetone to drain from the lower end into the sample container. A funnel may be used to aid in transferring liquid washes to the container. Follow the acetone rinse with a non-metallic probe brush. Hold the probe in an inclined position, squirt acetone into the upper end as the probe brush is being pushed with a twisting action three times through the probe. Hold a sample container underneath the lower end of the probe, and catch any acetone and particulate matter which is brushed through the probe until no visible particulate matter is carried out with the acetone or until none remains in the probe liner on visual inspection. Rinse the brush with acetone, and quantitatively collect these washes in the sample container. After the brushing, make a final acetone rinse of the probe as described above.

It is recommended that two people clean the probe to minimize sample losses. Between sampling runs, keep brushes clean and protected from contamination. Clean the inside of the front-half of the filter holder by rubbing the surfaces with a non-metallic brush and rinsing with acetone. Rinse each surface three times or more if needed to remove visible particulate. Make a final rinse of the brush and filter holder. After all acetone washes and particulate matter have been collected in the sample container, tighten the lid so that acetone will not leak out when shipped to the laboratory. Mark the height of the fluid level to determine whether or not leakage occurred during transport. Clearly label the container to identify its contents.

5.4.4 Container No. 3 (Probe Rinse) Polyethylene Bottle. Keep the probe assembly clean and free from contamination during the probe rinse. Rinse the probe nozzle and fitting, probe liner, and front-half of the filter holder thoroughly with a total of 100 mL of 0.1 N HNO_3, and place the wash into a sample storage container.

NOTE:
Perform the rinses as applicable and generally as described. Taking care that dust on the outside of the probe or other exterior surfaces does not get into the sample.

Carefully remove the probe nozzle, and rinse the inside surfaces with 0.1 N HNO_3 from a wash bottle while brushing with a Nylon-bristle brush. Brush until the 0.1 N HNO_3 rinse shows no visible particles, then make a final rinse of the inside surface.

Brush and rinse with 0.1 N HNO_3 the inside parts of the Swagelok fitting in a similar way until no visible particles remain.

Rinse the probe liner with 0.1 N HNO_3. While rotating the probe so that all inside surfaces will be rinsed with 0.1 N HNO_3, tilt the probe, and squirt 0.1 N HNO_3 into its upper end. Let the 0.1 N HNO_3 drain from the lower end into the sample container. The tester may use a glass funnel to aid in transferring liquid washes to the container. Follow the rinse with a probe brush. Hold the probe in an inclined position, squirt 0.1 N HNO_3 into the upper end of the probe as the probe brush is being pushed with a twisting action through the probe; hold the sample container underneath the lower end of the probe, and catch any 0.1 N HNO_3 and sample matter that is brushed from the probe. Run the brush through the probe three times or more until no visible sample matter is carried out with the 0.1 N HNO_3 and none remains on the probe liner on visual inspection. Rinse the brush with 0.1 N HNO_3, and quantitatively collect these washes in the sample container. After the brushing, make a final rinse of the probe as described above.

It is recommended that two people clean the probe to minimize loss of the sample. Between sampling runs, keep brushes clean and protected from contamination.

Brush and rinse with 0.1 N HNO_3 the inside of the front half of the filter holder. Brush and rinse each surface three times or more, if needed, to remove visible sample matter. Make a final rinse of the brush and filter holder. After all 0.1 N HNO_3 washes and sample matter are collected in the sample container, tighten the lid on the sample container so that the fluid will not leak out when it is shipped to the laboratory. Mark the height of the fluid level to determine whether leakage occurs during transport. Label the container to identify its contents clearly.

Record the volume of the rinses. Mark the height of the fluid level on the outside of the storage container and use this mark to determine if leakage occurs during transport. Seal the container, and clearly label the contents. Finally, rinse the nozzle, probe liner, and front-half of the filter holder with water followed by acetone, and discard these rinses.

Prior to sample recovery, weigh each impinger to within 0.5 grams to determine moisture gain.

5.4.5 Container No. 4 (Impingers 1 through 3, Moisture Knockout Impinger, when used, HNO_3/H_2O_2 Impingers Contents and Rinses). Due to the potentially large quantity of liquid involved, the tester may place the impinger solutions from Impingers 1 through 3 in more than one container, if necessary. Record the weight. This information is required to calculate the moisture content of the sampled flue gas. Transfer contents of each impinger to a sample container. Clean each of the first three impingers, the filter

support, the back half of the filter housing, and connecting glassware by thoroughly rinsing with 100 mL of 0.1 N HNO_3.

5.4.6 Container Nos. 5A (0.1 N HNO_3) Polyethylene Bottle, 5B ($KMnO_4/H_2SO_4$ absorbing solution) Amber Glass Bottle with Teflon-Lined Lid, and 5C (8 N HCl rinse and dilution) Polyethylene Bottle.

When sampling for Hg, pour all the liquid from the impinger (normally impinger No. 4) that immediately preceded the two permanganate impingers into Container No. 5A. Rinse the impinger with 0.1 N HNO_3 and place this rinse in Container No. 5A.

Pour all the liquid from the two permanganate impingers into Container No. 5B. Using fresh acidified $KMnO_4$ solution for all rinses (approximately 33 mL per rinse), rinse the two permanganate impingers and connecting glassware a minimum of three times. Pour the rinses into Container No. 5B, carefully assuring transfer of all loose precipitated materials from the two impingers. Similarly, using 100 mL total of water, rinse the permanganate impingers and connecting glass a minimum of three times, and pour the rinses into Container 5B, carefully assuring transfer of any loose precipitated material. Mark the height of the fluid level, and clearly label the contents. NOTE: Because of the potential reaction of $KMnO_4$ with acid, pressure buildup can occur in the storage bottles. Drill a No. 70-72 hole in the cap and liner to vent the bottle and relieve pressure buildup.

If no visible deposits remain after the water rinse, no further rinse is necessary. However, if deposits remain on the impinger surfaces, wash them with 25 mL of 8 N HCl, and place the wash in a separate sample container labeled No. 5C containing 200 mL of water. First, place 200 mL of water in the container. Then wash the impinger walls and stem with the HCl by turning the impinger on its side and rotating it so that the HCl contacts all inside surfaces. Use a total of only 25 mL of 8 N HCl for rinsing both permanganate impingers combined. Rinse the first impinger, then pour the actual rinse used for the first impinger into the second impinger for its rinse. Finally, pour the 25 mL of 8 N HCl rinse carefully into the container. Mark the height of the fluid level on the outside of the container to determine if leakage occurs during transport.

5.4.7 Container No. 6 (Silica Gel). Note the color of the indicating silica gel to determine whether it has been completely spent and make a notation of its condition. Transfer the silica gel from its impinger to its original container and seal it.

5.4.8 Container No. 7 (Acetone Blank). If particulate emissions are to be determined, at least once during each field test, place a 100-mL portion of the acetone used in the sample recovery process into a labeled container and seal the container.

5.4.9 Container No. 8 (0.1 N HNO_3 Blank). At least once during each field test, place 300 mL of the 0.1 N HNO_3 solution used in the sample recovery process into a labeled container and seal the container.

5.4.10 Container No. 9 (8N Hcl). At least once during each field test, place 100 mL of the 8N Hcl solution used in the sample recovery process into a labeled container and seal the container.

5.5 Calibration
Maintain a laboratory log of all calibrations.

5.5.1 Sampling Train Calibration. Calibrate the sampling train components according to the indicated sections of Method 5(Refer to SHAW-SOP-005): Probe Nozzle; Pitot Tube; Metering System; Probe Heater; Temperature Gauges; Leak-Check of the Metering System; and Barometer.

6.0 PERFORMANCE FREQUENCY

This procedure is to be used as necessary to conduct testing specified in SECTION 3.0.

7.0 RESPONSIBILITIES

This procedure is owned by the Shaw Air Quality Services Group. It is the responsibility of the Air Quality Services Group - Field Engineering, to update this manual in January, on an annual basis.

8.0 DOCUMENTATION AND REPORTING

All test documentation required by this procedure shall be placed in project files.

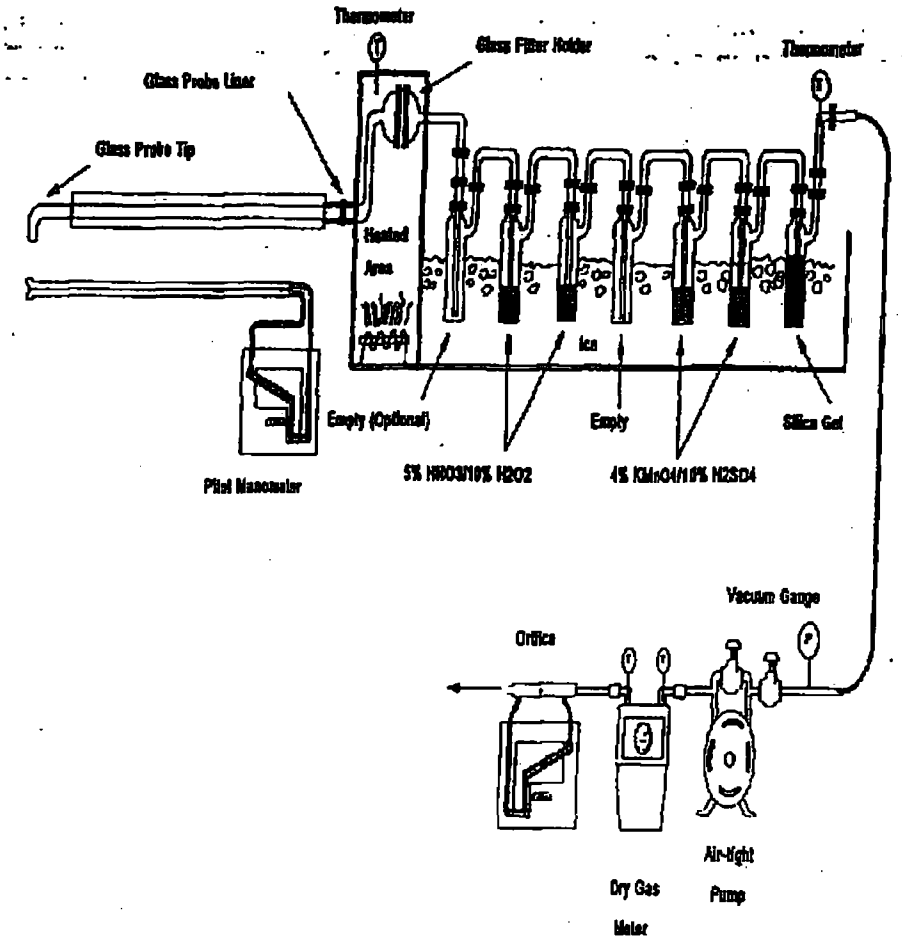
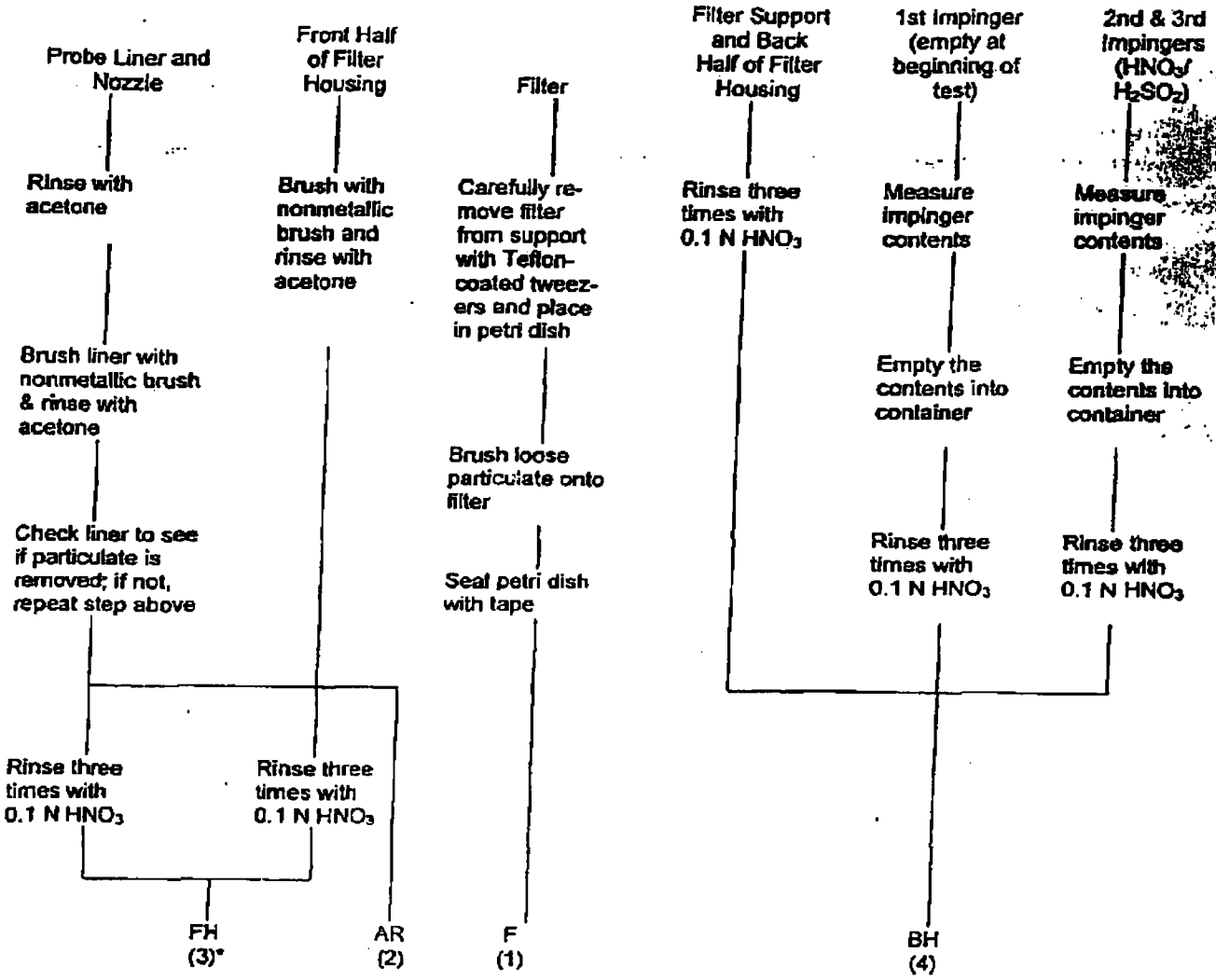


Figure 29-1 Sampling train.



* Number is parentheses indicates container number.

Figure 29-2a. Sample recovery scheme.

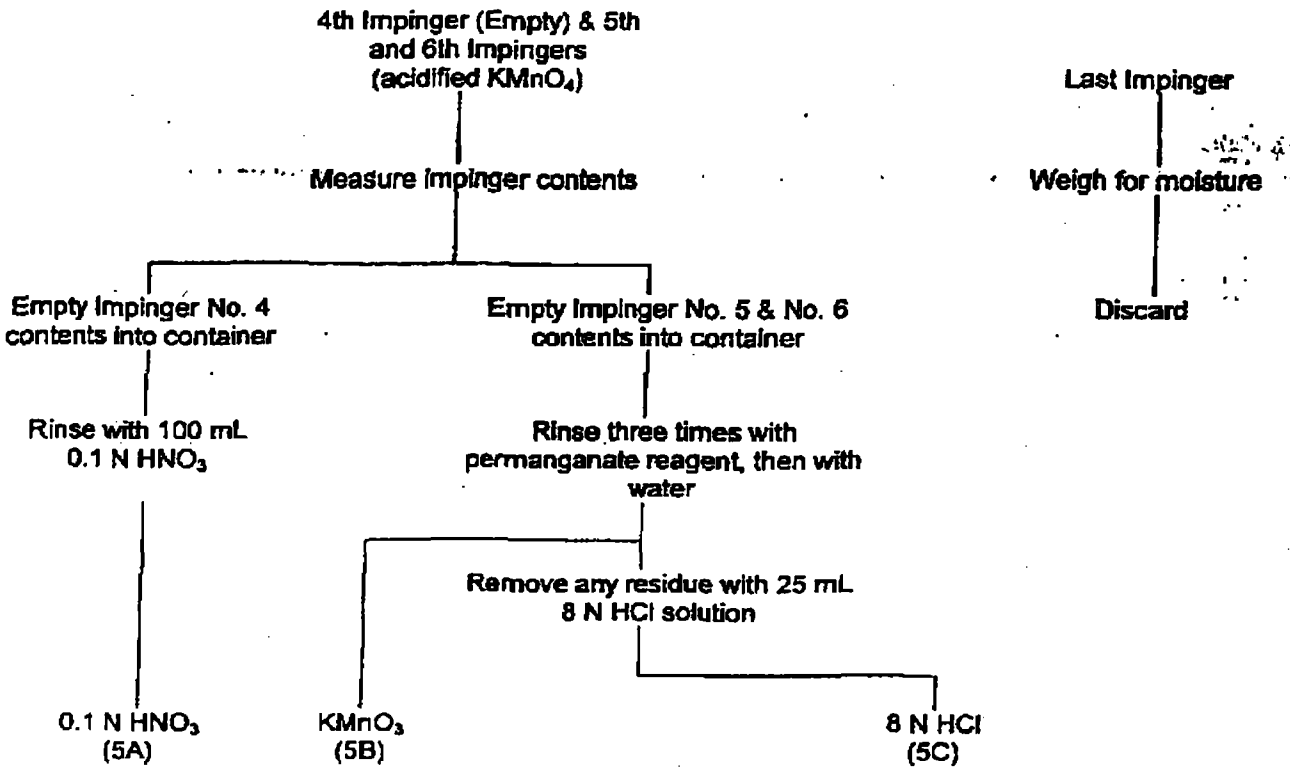


Figure 29-2b. Sample recovery scheme

APPENDIX E

CALIBRATION PROCEDURES AND RESULTS

CALIBRATION PROCEDURES AND RESULTS

All of the equipment used is calibrated in accordance with the procedures outlined in the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III.* The following pages describe these procedures and include the data sheets.

*EPA 600/R-94/038c.

Nozzle Diameter

Each nozzle used in these tests is calibrated by making three separate measurements and calculating the average. If a deviation of more than 0.004 inch is found between any two measurements, the nozzle is either discarded or reamed out and remeasured. A micrometer is used for measuring. These calibration data are shown in the following Nozzle Calibration data sheet(s).

Shaw The Shaw Group Inc.

NOZZLE CALIBRATION

Client: Clean Harbors Project No.:

Date: 8-25-03 Calibrated by: J. Neese

Nozzle I.D.	D1 in.	D2 in.	D3 in.	ΔD in.	D Avg.
G-10	.256	.255	.255	.001	.255

Where:

D 1, 2, 3 = nozzle diameter measured on a different diameter, in.
Tolerance = measure within 0.001 in.

ΔD = maximum difference in any two measurements, in.
Tolerance = 0.004 in.

D Avg. = average of D1, D2, and D3

Pitot Tube Calibration

Each pitot tube used in sampling is constructed by ITAQS and meets all requirements of EPA Method 2, Section 4.1.* Therefore, a baseline coefficient of 0.84 is assigned to each pitot tube. The following pages show the alignment requirements of Method 2 and the Pitot Tube Inspection Data Sheet(s) for each pitot tube used during the test program.

*40 CFR 60, Appendix A.

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Shaw E & I, Inc.

PITOT TUBE INSPECTION DATA SHEET

Pitot Tube No. 504
Date: 1/2/03 Inspector J. Neese

α_1 degrees	α_2 degrees	β_1 degrees	β_2 degrees
0	2	2	1
< 10°	< 10°	< 5°	< 5°

D_t inches	P inches	1.05 D_t inches	1.50 D_t inches
0.376	0.902	0.3948	0.564
0.185 ≤ Dt < 0.380	—	—	—

γ degrees	φ degrees	P sin (γ) inches	P sin (φ) inches
0	0	0	0
—	—	< 0.125	< 0.03125

P_1 inches	P_2 inches	[P_1 - P_2] inches	Meet Specification?
0.442	0.445	-0.003	YES
1.05 D_t < P_1 < 1.50 D_t	1.05 D_t < P_1 < 1.50 D_t	≤ 0.010	

Checked by: [illegible] Date: 1/27/03

Dry Gas Meter and Orifice Meter

The following page shows the Calibration Setup used for the initial and post-test calibration. A wet-test meter with a 2-cubic-feet-per-minute capacity and ±1 percent accuracy is used. The pump is run for approximately 15 minutes at an orifice manometer setting of 0.5 in.H_2O to heat up the pump and wet the interior surface of the wet-test meter. The information in the following example Calibration Data Sheet is gathered for the initial calibration; the ratio of accuracy of the wet-test meter to the dry-test meter and the ΔH@ are then calculated.

Post-Test Meter Calibration Check

A post-test meter calibration check is made on each meter box used during the test to check its accuracy against the last calibration check. This post-test calibration must be within ±5 percent of the initial calibration. The initial calibration is performed as described in APTD-0576. The post-test calibration is performed by the same method. Three calibration runs are made by using the average orifice setting obtained during each test run and setting the vacuum at the maximum value obtained during each test run. The post-test calibration check indicated that all three runs for each meter box were within the ± 5 percent range allowed by EPA Method 5.*

The Particulate Sampling Meter Box Initial Calibration and Post-Test Calibration data sheets are included in the following pages.

* 40 CFR 60, Appendix A.

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METER BOX INITIAL CALIBRATION

validated 3/31/95

Date: 12/10/02 Meter Box No.: FT-10

Barometric Pressure, (Pbar): 29.68 Calibrator: Nease

Run No.	Orifice manometer setting* ΔH in. H2O	Wet test meter volume Vw ft3	Dry gas meter volume Vd ft3	Temperatures: Wet test meter Tw °F	Temperatures: Dry gas meter Inlet Tdi °F	Temperatures: Dry gas meter Outlet Tdo °F	Temperatures: Dry gas meter Average Td °F	Vacuum setting** in. Hg	Duration of run, Ø min.	Duration of run, Ø sec
1	0.50	5.000	433.607	71	75	71	73.3	10	13	4
			438.670	71	76	71				
2	1.00	10.000	439.119	71	76	71	74.5	10	18	34
			449.246	71	79	72				
3	1.50	10.000	449.615	71	79	72	75.8	10	15	28
			459.743	71	80	72				
4	2.00	11.000	460.027	71	80	72	75.8	10	14	32
			471.159	71	80	71				
5	3.00	10.000	471.732	71	80	71	75.0	10	10	34
			481.822	71	79	70				
6	4.00	10.000	482.364	71	79	70	75.3	10	9	12
			492.461	71	81	71				

Run No.	Y	ΔH@
1	0.991	1.94
2	0.992	1.95
3	0.993	2.02
4	0.992	1.97
5	0.991	1.90
6	0.989	1.92
Pretest average	0.991	1.95
Difference**	0.003	0.07

$$y = \frac{(Vw)(Pbar)(Td+460)}{(Vd)(Pbar+\Delta H/13.6)(Tw+460)}$$

$$\Delta H@ = \frac{(0.0319)\Delta H)}{(Pbar)(Td+460)} \times \left|\frac{(Tw+460)\ (Ø)}{Vw}\right|^2$$

*: Y must not deviate by more than ±0.02Y.
ΔH@ must not deviate by more than ±0.15 ΔH@ average.

Data checked by: D Cahill
Date: 12/11/02

12/11/02, 9:05 AM

Shaw
Shaw E & I, Inc.

METER BOX POST-TEST CALIBRATION

validated 3/31/98

Date:	9/3/03	Meter Box No.:	FT-10
Barometric Pressure, (Pbar):	29.48	Initial Y:	0.991
Plant:	Clean Harbors	Project No.:	846142-01
Project Manager:	DO	Calibrator:	GT

ΔH@: 1.95

Run No.	Orifice manometer setting* ΔH in. H2O	Wet test meter volume Vw ft3	Dry gas meter volume Vd ft3	Temperatures: Wet test meter Tw °F	Dry gas meter Inlet Tdi °F	Dry gas meter Outlet Tdo °F	Dry gas meter Average Td °F	Vacuum setting** in. Hg	Duration of run, Ø min.	sec
			78.952	72	81	74				
1	1.90	10.000	89.106	72	87	76	79.5	9	13	38
			89.106	72	87	76				
2	1.90	10.000	99.283	72	91	78	83.0	9	13	39
			99.283	72	91	78				
3	1.90	10.500	110.014	72	93	80	85.5	9	14	21

Run No.	Y	ΔH@
1	0.994	2.00
2	0.998	2.00
3	0.999	1.99
Post-test average***	0.997	2.00
Difference from Pretest ***=	0.006	0.05

$$y = \frac{(Vw)(Pbar)(Td+460)}{(Vd)(Pbar+\Delta H/13.6)(Tw+460)}$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{(Pbar)(Td+460)} \times \left[\frac{(Tw+460)\ (Ø)}{Vw}\right]^2$$

* To be the average ΔH used during the test series.
** To be the highest vacuum used during the test series.
*** Post-test Y must be within ±0.05 initial Y.
ΔY = (Posttest Y - Initial Y) / Initial Y
Post-test ΔH@ must be within ±0.15 in.H2O of the initial ΔH@.
ΔH@ difference = Posttest ΔH@ - Initial ΔH@

Data checked by: BH
Date: 9-3-03

9/3/03, 2:48 PM

Stack Thermocouples

Each thermocouple is calibrated by comparing it with an ASTM-3F thermometer at approximately 32°F, ambient temperature, 100°F, and 500°F. The thermocouple read within 1.5 percent of the reference thermometer throughout the entire range when expressed in degrees Rankine. If the stack gas is saturated with moisture, the thermocouple is calibrated at 10° intervals between 70° and 180°F using a water bath. The thermocouple agreed within ±2°F of the reference thermometer over the entire range. The thermocouples may be checked at ambient temperature at the test site to verify the calibration. Calibration data are included in the following Thermocouple Calibration Data Sheet(s).

Shaw
Shaw E & I, Inc.

Stack Thermocouple
Calibration Data Sheet

Date: 1/3/03 Thermocouple Number: 412
Calibrator: Neese Reference: ASTM 3-F

Reference Point Number	Source *	Reference Thermometer Temperature (Degrees F)	Thermocouple Temperature (Degrees F)	Difference (Degrees F)	Percent Difference**
1	1	34	34	0	0.00
2	2	72	71	1	-0.19
3	3	163	162	1	-0.16
4	4	448	446	2	-0.22

*Source 1. Ice Bath
2. Ambient
3. Water Bath
4. Oil bath

** Each percent difference must be less than or equal to 1.5%

Checked By: BJS Date: 1-29-03

Digital Indicators for Thermocouple Readout

A digital indicator is calibrated by feeding a series of millivolt signals to the input and comparing the indicator reading with the reading the signal should have generated. Error did not exceed 0.5 percent when the temperatures were expressed in degrees Rankine. Calibration data are included in the following Thermocouple Digital Indicator Calibration Data Sheet(s).

Shaw
Shaw E & I, Inc.

Date: 12/10/02 Indicator: FT-10

Operator: J. Neese

Digital Indicator Calibration Data Sheet

Test Point Number	Equivalent Temperature, (T_e) °F	Digital Indicator Temperature, (T_{di}) °F	Difference, *%
1	0	2	-0.43
2	100	102	-0.36
3	200	203	-0.45
4	300	302	-0.26
5	400	401	-0.12
6	500	502	-0.21
7	1000	1003	-0.21
8	1300	1303	-0.17
9	1600	1603	-0.15
10	1900	1902	-0.08

* Percent difference must be less than or equal to 0.5%

$$\% \ Difference = \frac{(T_e, °F - T_{di}, °F)}{(T_e, °F + 460)} * 100$$

Checked by: [illegible] Date: 1/27/03

Dry Gas Thermocouples and Impinger Thermocouples

The dry gas thermocouples are calibrated by comparing them with an ASTM-3F thermometer at approximately 32°F, ambient temperature, and a higher temperature between approximately 100° and 200°F. The thermocouples agreed within 5°F of the reference thermometer. The impinger thermocouples are checked in a similar manner at approximately 32°F and ambient temperature, and they agreed within 2°F. The thermocouples may be checked at ambient temperature prior to the test series to verify calibration. Calibration data are included in the following Dry Gas Thermometer and Impinger Thermocouple Calibration Data Sheet(s).

Shaw
Shaw E & I, Inc.

Dry Gas Thermocouple
Calibration Data Sheet

Date: 12/10/02 Thermocouple Number: FT-10
Calibrator: J. Neese Reference: ASTM 3-F

Inlet

Reference Point Number	Source *	Reference Thermometer Temperature (Degrees F)	Thermocouple Temperature (Degrees F)	Difference ** (Degrees F)	Percent Difference
1	1	72	72	0	0.00
2	2	34	35	-1	0.20
3	3	147	146	1	-0.16

Outlet

Reference Point Number	Source *	Reference Thermometer Temperature (Degrees F)	Thermocouple Temperature (Degrees F)	Difference ** (Degrees F)	Percent Difference
1	1	72	71	1	-0.19
2	2	34	35	-1	0.20
3	3	147	145	2	-0.33

*Source 1. Ambient
2. Ice Bath
3. Water Bath

** Difference must be less than 5 Degrees F at both points.

Checked by: MJ Date: 1/27/03

Shaw
Shaw E & I, Inc.

Impinger Thermocouple
Calibration Data Sheet

Date: 1/2/03 Thermocouple Number: I - 98
Calibrator: J. Neese Reference: ASTM 3-F

Reference Point Number	Source *	Reference Thermometer Temperature (Degrees F)	Thermocouple Temperature (Degrees F)	Difference ** (Degrees F)	Percent Difference
1	1	74	73	1	-1.35
2	2	35	34	1	-2.86

*Source 1. Ambient
2. Ice Bath

** Difference must be less than 2 Degrees F at both points.

Checked by: [illegible] Date: 1/27/03

Field Balance

The field balance is calibrated by comparing it with Class-S standard weights, and it agreed within 0.5 g. Calibration data are shown in the following Field Balance Calibration Data Sheet(s).

Shaw
Shaw E & I, Inc.

Field Balance Calibration Data Sheet

Balance No.	Date	Calibrator:	Mass Determined for: 5g	Error	50g	Error	100g	Error	500g	Error
AND-1	1/6/03	G. Thress	5.00	0.00	50.00	0.00	100.00	0.00	500.00	0.00
AND-2	1/6/03	G. Thress	5.00	0.00	50.00	0.00	100.00	0.00	499.90	-0.10
199	1/6/03	G. Thress	5.00	0.00	50.20	0.20	99.90	-0.10	500.20	0.20

Error must not exceed 0.5 gram at at each point.

Checked by: MJ Date: 1/27/03

Barometer

The field barometer is calibrated to within 0.1 in.Hg of an NBS-traceable mercury-in-glass barometer before the test series. It is checked against the reference barometer after each test series to determine if it reads within 0.2 in.Hg. The barometer read within the allowable limits each time. Calibration data are included in the following Barometer Calibration Log(s).

Shaw™ The Shaw Group Inc.

BAROMETER CALIBRATION LOG

	Barometer No.	N-1	(-120)	N-2				
	Client	Weisner	Clean Harbors	Cognis				
	Project No.	841557						
PRETEST	Barometer Reading	29.75	29.62	29.52				
	Reference Barometer Reading	29.75	29.62	29.56				
	Difference*	0.00	0.00	0.04				
	Date	8-13-03	8-20-03	9/2/03				
	Calibration	BA	BA	BA				

	Barometer Reading	29.53	29.52					
POSTTEST	Reference Barometer Reading	29.50	29.50					
	Difference**	0.03	0.02					
	Date	9/3/03	9/3/03					
	Calibrator	BA	BA					

* Barometer is adjusted so that the difference does not exceed 0.05 in.Hg.

** Barometer is <u>not</u> adjusted. If the difference exceeds 0.10 in.Hg, inform the project manager immediately.

ATTACHMENT 6

Industrial Hygiene Exposure Monitoring
Spring Grove Resource Recovery
Lamp Recycling System

Summary

In July 2003, a set of employee exposure monitoring samples was collected from personnel working at the Spring Grove Resource Recovery (SGRR) Lamp Recycling System (LRS) and receiving areas adjacent to the LRS. Samples were collected to assess exposure to inorganic mercury and noise during routine operations. Five employees (Shana Shaffer, Jeff Davison, Mike Fultz, John Heiert, and Phil Sterchi) were selected for airborne mercury sampling. Jeff Davison and Shana Shaffer were also selected for noise exposure monitoring. Airborne mercury sampling results showed levels below the established ACGIH TLV and OSHA PEL (0.025 mg/m^3 and 0.1 mg/m^3 respectively), and all within the protective limitations of the personal protective equipment worn by the employees: including that which is worn by LRS operations personnel and the receiving operation occurring adjacent to the LRS. Noise exposure monitoring showed levels under the OSHA PEL of 90 dB. Recommendations for follow-up actions include: 1) conduct periodic sampling to measure specifically for inorganic mercury in order to gather additional data with the intent to verify that the proper personal protective equipment specified for the operations monitored is adequate, 2) evaluate the necessity of a lateral ventilation system on feed conveyor #1 that may allow a downgrade of personal protective equipment to a modified level D.

Operations Overview

CHES personnel provide treatment, storage, and disposal services for this facility. The operations involved in this IH survey include the Lamp Recycling System and the receiving operations at Spring Grove Resource Recovery.

The Lamp Recycling System segregates all components of various sized fluorescent lamps, HID lamps, etc. and prepares them for recycling. Lamps are fed into one of two areas, either a conveyor (for 4ft. and 8ft. lamps) or a "crusher box" (for HID lamps). Once the lamps are fed into the machine, the glass, phosphor powder (mercury containing), and metal parts are segregated using vibrating mesh conveyors, magnets, and air movement. The filtration system in the unit is designed to filter the particulate phosphor and the mercury vapor with a series of high efficiency particulate air filters and activated charcoal. This filtration system allows very little mercury vapor to be dispelled out of the machine via lamp part outlets (chutes). The unit is also under constant negative pressure, reducing the opportunity for mercury vapor to escape the closed system. The most prevalent release point for mercury vapor is at the operation point at feed conveyor #1, where the operators load the lamps. Occasionally, the lamps arrive at the facility already broken in the boxes during shipment, making exposure possible. Also, if the lamps are fed incorrectly (e.g. stacked higher than the guard on feed conveyor #1) the bulbs break before entering the machine allowing the mercury containing phosphor powder to be released prior to the ventilation system. In addition to the engineering controls, operators are in level C personal protective equipment which includes a CPF 1 apron, half face APR with Mersorb P100 cartridges, and cut resistant outer gloves with Kevlar sleeves.

The receiving operation takes place adjacent to the LRS. It includes staging containers (loading/off-loading trailers) and sampling of those containers by receiving chemists. The receiving personnel were included in this IH survey due to the close proximity to the LRS operation. The individuals sampled were primarily operating a fork lift loading/off-loading trailers and staging containers for the receiving chemists. The path the fork truck operators take brings them within 10-15 ft. of the LRS. The samples taken served to verify the direct reading results that had demonstrated that mercury vapor did not spread into the receiving area.

Sampling Procedure

Three employees (Shana Shaffer, Jeff Davison, Mike Fultz, John Heiert, and Phil Sterchi) were selected for assessment. All five employees were equipped with an SKC Badge 520 – 02A + capsule holder with a charcoal disk (520 – 03) at the start of their work shift, and these remained on throughout the day. Galson

Laboratories, Syracuse NY, analyzed the samples for mercury vapor in accordance with Occupational Safety and Health Administration methods (OSHA ID-140). Airborne concentrations were also measured using a Lumex mercury vapor analyzer. Results showed levels ranging from 8000 – 25,000 ng/m^3 in the operators breathing zone.

Results/Discussions

Sample results are presented in the accompanying tables. All full shift exposure levels were low and well within current occupational exposure level criteria. All concentrations were also well within the protection factor of the respirator being worn (Half mask Air Purifying Respirator) and the hearing protection being utilized. Sound level measurements were collected in several areas around the LRS and are shown in Diagram 1.

Recommendations

The following recommendations are made based on these results:

1. Conduct periodic sampling to measure specifically for inorganic mercury in order to gather additional data with the intent to verify that the proper personal protective equipment specified for the operations monitored is adequate;
2. Evaluate the necessity of a lateral ventilation system that may allow a downgrade of personal protective equipment to a modified level D.

Report Prepared by:

Mitchell A. Pence
Clean Harbors Environmental Services
Health and Safety Manager

Report Reviewed by:

Mark R. Arriens, MS, CIH, CSP
Clean Harbors Environmental Services
Director, Health and Safety

CHESI EXPOSURE MONITORING RESULTS

Lamp Recycling System

Employee / Location	Date / Total Sampling Time	Sample #	Analysis conducted	SAMPLING RESULTS-CONCENTRATION (ppm OR mg/m³)	OEL (ppm OR mg/m³)	% of OSHA PEL or ACGIH criteria (whichever is less)
Shana Shaffer - LRS operator	7/11/2003 475 min.	71103-01	mercury	0.016 mg/m3	.025 (TLV)	64.00%
Phil Sterchi - LRS operator	7/11/2003 472 min.	71103-02	mercury	0.019 mg/m3	.025 (TLV)	76.00%
Jeff Davison - LRS operator	7/14/2003 388 min.	71103-02	mercury	0.009 mg/m3	.025 (TLV)	36.00%
Mike Fultz - receiving – load/unload trailers	7/14/2003 380 min.	71103-03	mercury	<0.01 mg/m3	.025 (TLV)	<4.00%
Shana Shaffer - LRS operator	7/14/2003 389 min.	71403-01	mercury	0.011 mg/m3	.025 (TLV)	44.00%
Shana Shaffer - LRS operator	7/16/2003 501 min.	71603-01	mercury	0.021 mg/m3	.025 (TLV)	84.00%
Jeff Davison - LRS operator	7/16/2003 500 min	71603-02	mercury	0.019 mg/m3	.025 (TLV)	76.00%
John Heiert - receiving – load/unload trailers	7/16/2003 495 min.	71603-03	mercury	<0.01 mg/m3	.025 (TLV)	<4.00%
Jeff Davison - LRS operator	7/14/2003 377 min.	N/A	noise	85.3 dB	90 dB	95.00%
Shana Shaffer - LRS operator	7/16/2003 501 min.	N/A	noise	88.0 dB	90 dB	98.00%
Jeff Davison - LRS operator	7/21/2003 486 min.	N/A	noise	89.0 dB	90 dB	99.00%

ppm - parts per million

mg/m³ - milligrams/cubic meter

OEL - Occupational Exposure Limit - this denotes the lower of the OSHA or ACGIH exposure criteria. Clean Harbors uses the lower (more protective) of these values.

STEL Short Term Exposure Limit - this denotes an airborne concentration as measured over a 15 minute time period w/out use of respiratory equipment

The ACGIH specifies that excursions above the STEL should not occur more than 4 times per day and there should be at least 60 minutes between successive excursions.

C or Ceiling limit - this denotes an airborne concentration not to be exceeded for any time period in an 8 hour work shift.

Sound Level Meter readings around the LRS:

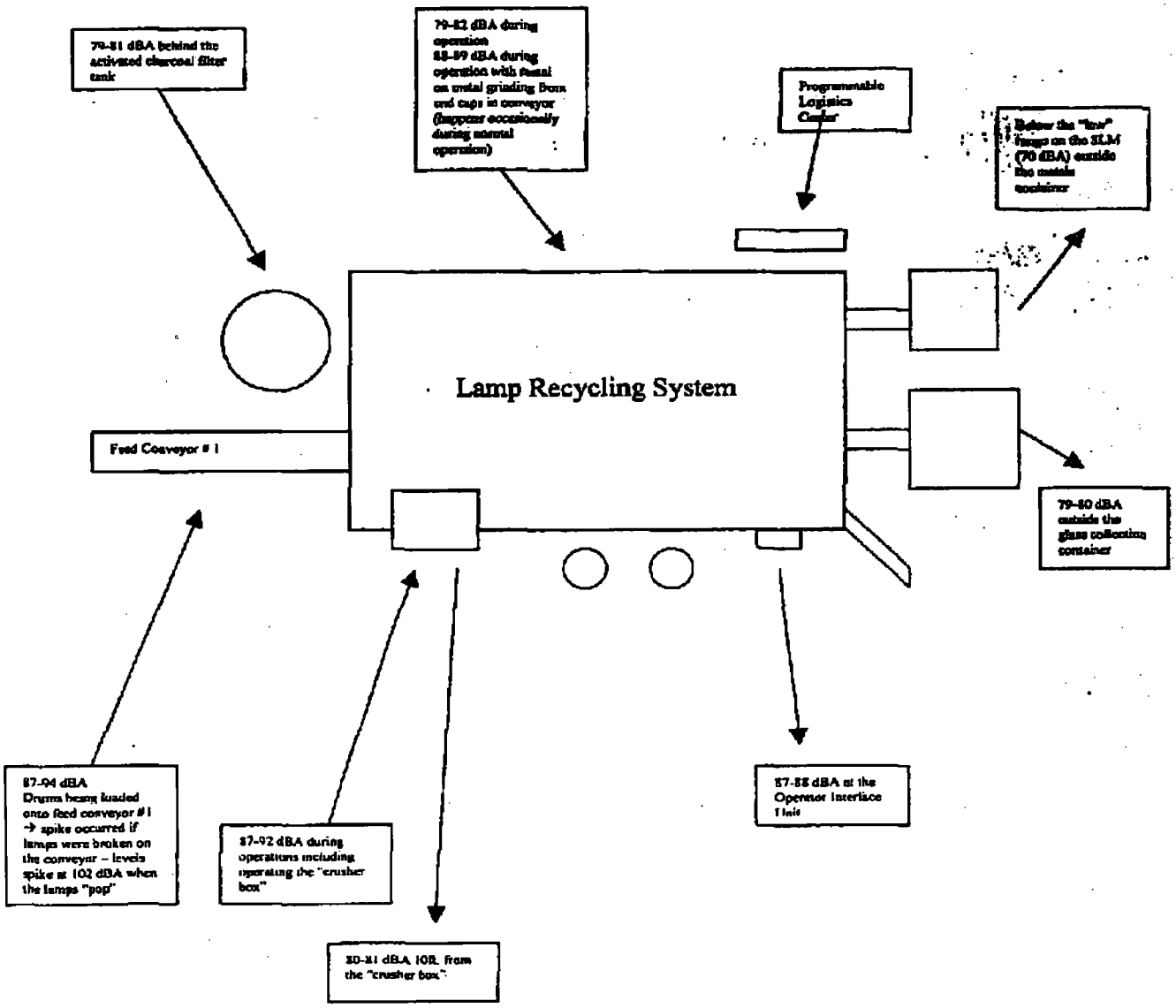

Diagram 1
Sound Level Measurements Around LRS Equipment

POTENTIAL PATHWAYS OF EXPOSURE TO HUMANS OR ENVIRONMENTAL RECEPTO

CHSI believes that operating the lamp crushing system will present the same minimal level of potential exposure to humans and the environment as other operations at the facility (e.g., waste consolidation, waste stabilization, fuels blending, lab pack pour off, bulk liquid flammable tank farm, truck loading/unloading pad, hazardous waste shredding system, metalwashing system, etc.). A number of factors significantly minimize any potential exposure of on-site and off-site personnel or the environment to hazardous and non-hazardous waste lamps processed in the operation. These factors and the types of material to be managed and the potential exposure pathways, environmental receptors and magnitude and nature of exposures are discussed below.

(1) WASTES TO BE MANAGED

CHSI will use the Lamp Crushing System to manage hazardous and non-hazardous waste lamps. CHSI receives material such as fluorescent, mercury-vapor, metal-halide and high-pressure sodium lamps other inorganic materials. These materials will contain a variety of inorganic compounds including mercury, barium, cadmium, lead and sodium. The types of chemical constituents and their concentrations will vary based on the type of lamp that is managed.

There is minor variability in the types of lamps to be managed and their concentrations. For the purposes of this document, CHSI assumed a "worst case" scenario. The assumptions that were made include:

* Inorganic materials to be managed in the unit would be similar to those lamp wastes already being managed in CHSI's on going storage operations;

* Lamps to be managed would consist primarily of inorganic compounds including heavy metals, glass, and calcium phosphate powder. In general, mercury would be more toxic than other organic or inorganic constituents thereby presenting a worst case scenario when considering the potential impacts associating with inhalation;

* CHSI used the results of an analysis performed by Shaw Environmental, Inc. (Compliance Test Report, Fluorescent Bulb Crusher, Clean Harbors Environmental Services, Inc. Facility, Cincinnati, Ohio) as part of its assessment of potential off-site air impacts. As part of Shaw's assessment, it assumed mercury and particulate are present in typical on-site operations;

* Potential pathways and impacts considered normal operation of the unit and spill events; and

* Industrial Hygiene Exposure Monitoring conducted by Clean Harbors Environmental Services, Inc. at the Cincinnati, Ohio facility on the Lamp Recycling System. As part of the assessment, it assumed mercury and particulate are present in typical on-site operations.

(2) POTENTIAL PATHWAYS OF HUMAN EXPOSURE

CHSI considered three (3) different scenarios when assessing potential human exposures: (1) on-site worker operating/working crushing operations; (2) on-site worker working immediately outside the operating areas; and (3) person located off-site.

The typical potential pathways of human exposure for this activity could include:

* Absorption of inorganic material through direct contact with the skin, eyes, etc. (direct absorption) or absorption by contact with inorganic (indirect absorption)

* Ingestion of inorganic material (direct ingestion) or ingestion of soil, groundwater or surface water contaminated with inorganic (indirect ingestion)

* Inhalation of vapors and particulate associated with the management of inorganic materials

These human exposure pathways were evaluated for each of three (3) scenarios. The results of this assessment are provided below.

(A) On-site Worker at the Lamp Crusher

<u>Absorption</u>

Like the waste management activities already taking place at CHSI, all employees working at the lamp crushing operations will wear the appropriate personnel protective equipment (PPE) for the materials being managed and the operations to be performed. This equipment will include: hard hat; steel toed shoes; chemical resistant apron; Kevlar sleeves; cut proof outer gloves (e.g., Kevlar) with Nitrile inner gloves; hearing protection and half-face, cartridge respirator with face shield or full face, cartridge respirator (Mersorb-P100 cartridges or equivalent).

All moving parts of the crusher are enclosed, making the unit safe to operate.

Using the appropriate PPE and following CHSI's existing standard operation procedures for donning and doffing PPE and personal and equipment decontamination will prevent or significantly minimize any worker exposure to or contact with inorganic materials to be managed in the crushing operations via absorption pathways. In the unlikely event inorganic materials came into contact with an employees' skin, eyes, etc., the employee would immediately wash/flush the affected area with water and/or and appropriate cleaner (e.g., soap). The employee would then be directed to seek proper medical attention off-site, if appropriate.

In addition to contact with inorganic material during normal, routine activities associated with operating the lamp crushing system, contact during non-routine activities (i.e., spills) must also be considered. In the event of a spill of inorganic material within the building, the spill will be cleaned up by personnel wearing the appropriate PPE to minimize the potential for contact with contaminants.

Ingestion

All workers involved with hazardous waste management activities have been trained in hazardous waste operations, the appropriate use of PPE, the proper means of PPE, equipment and personal decontamination. Because of this, the chance for exposure either through direct ingestion of inorganic materials is extremely unlikely to non-existent.

Since the crushing operation will be located within an enclosed building the possibility of a worker ingesting an environmental media (e.g., soil, groundwater, surface water) contaminated with inorganic material is non-existent. The lamp crusher is located in an imperviously-coated containment area. This would also restrict the possibility of a worker ingesting and environmental media. In addition to wearing the appropriate PPE and personal decontamination, eating, chewing gum or tobacco, and smoking cigarettes is restricted to designated areas on-site thereby significantly reducing any possibility for a worker to indirectly ingest contaminants.

Inhalation

A full face respirator equipped with cartridges specifically selected for the types of materials being managed or a half-face respirator with face shield will protect crusher workers from potential inhalation exposure. In addition to PPE, CHSI will also use institutional controls to limit the accumulation of inorganic vapors and particulate in the immediate area surrounding the lamp crushing operation.

Fugitive emissions from these operations will be vented to a particulate filter followed by activated carbon. According to the carbon manufacturer, these units will remove nearly 100% of the mercury from the vented air prior to discharge to the atmosphere through a stack until breakthrough occurs (see discussion on carbon units in (2)(B), below).

The combination of wearing the appropriate respirator, using the appropriate respirator cartridges and removal of fugitive emissions will prevent and/or significantly minimize worker exposure to inorganic vapors and particulate.

The results of an analysis performed by Shaw Environmental, Inc. (Compliance Test Report, Fluorescent Bulb Crusher, Clean Harbors Environmental Services, Inc. Facility, Cincinnati, Ohio) show average particulate emissions of 0.0020 pounds per hour and average mercury emissions of 0.0000075 pounds per hour during lamp crushing operations. These emissions are low and well within required criteria.

Industrial Hygiene Exposure Monitoring was conducted by Clean Harbors Environmental Services, Inc. at the Cincinnati, Ohio facility on employees during lamp crushing activities. All full shift exposure levels were low and well within current occupational exposure level criteria.

(B) On-site Worker Outside Unit 25

Absorption/Ingestion

Because lamp crushing operations will take place within secondary containment in an enclosed building, the only means for personnel working outside this unit to come into contact with inorganic material would be in the event of a spill or release. Building 25 alkaline bay will provide approximately 7,871 gallons of secondary containment. As a result of the potential for a spill of inorganic material to escape Building 25 is minimal. Spill clean up personnel would wear PPE appropriate to the material spilled to minimize the potential for contact with spilled material and clean up debris.

Inhalation

Personnel working outside these units could potentially come into contact with inorganic materials by inhalation. As previously discussed, the area in which lamp crushing operations occur is ventilated and vapors and particulate from the operation is vented to a particulate filter and activated carbon. Removal of particulates from a particulate filter and mercury vapors in air using carbon are recognized air pollution control technologies that are utilized in many industrial and commercial applications. CHSI currently operates several particulate filters and carbon units to control emissions from a number of on-site operations. These units have been permitted by the Illinois Environmental Protection Agency.

According to the carbon vendor, the carbon will continue to remove close to 100% of the mercury vapors from the ventilated air until breakthrough occurs. Once breakthrough of the carbon occurs, the removal efficiency of the carbon for mercury will decrease.

Carbon breakthrough will be determined by monitoring the mercury concentrations in air at the inlet and outlet points of the carbon unit using a direct reading mercury vapor monitoring device. Breakthrough will be determined when the carbon unit approaches a 95% mercury removal efficiency.

In the event breakthrough of the carbon canister, the canister will be removed and replaced with a canister of fresh carbon.

CHSI believes that operating the air pollution control units will prevent any exposure to workers to particulate and mercury vapors emitted from lamp crushing operations.

The results of an analysis performed by Shaw Environmental, Inc. (Compliance Test Report, Fluorescent Bulb Crusher, Clean Harbors Environmental Services, Inc. Facility, Cincinnati, Ohio) show average particulate emissions of 0.0020 pounds per hour and average mercury emissions of 0.0000075 pounds per hour during lamp crushing operations. These emissions are low and well within required criteria.

Industrial Hygiene Exposure Monitoring was conducted by Clean Harbors Environmental Services, Inc. at the Cincinnati, Ohio facility on employees outside the operation during lamp crushing activities. All full shift exposure levels were low and well within current occupational exposure level criteria.

(C) Potential Exposure Pathways to Off-Site Personnel

Absorption/Ingestion

Because the CHSI facility is a secure facility (e.g., fences and gates restricting access), the potential for direct or indirect exposure of off-site personnel to inorganic materials through absorption is extremely unlikely to non-existent.

The potential for ingestion of inorganic material by off-site personnel is also extremely unlikely. The unit will be located within the secure facility within an area equipped with impervious secondary containment in an enclosed building. The area surrounding the unit will be inspected daily for spills and releases. All spills will be cleaned up immediately upon detection. As a result, the potential for spills of inorganic material to exit the containment is very unlikely. In the unlikely event organic material escaped secondary containment, CHSI personnel would immediately cleanup any spilled material thereby minimizing the impact, if any, to the environment. Impervious secondary containment and immediate cleanup of spills would make the significantly limit the potential for groundwater contamination caused by operating the unit. Since the nearest drinking water well is located approximately three (3) miles from the facility, the potential for someone to drink water contaminated by a release form the unit is extremely unlikely to non-existent.

Inhalation

As discussed in Section (B), above, emissions from lamp crushing operations will be vented through particulate filters and carbon prior discharge to the atmosphere. The units are designed and will be operated to remove up to 100% of the particulates and mercury vapors prior to its discharge to the atmosphere. The carbon units will be monitored and replaced when breakthrough occurs.

The results of an analysis performed by Shaw Environmental, Inc. (Compliance Test Report, Fluorescent Bulb Crusher, Clean Harbors Environmental Services, Inc. Facility, Cincinnati, Ohio) show average particulate emissions of 0.0020 pounds per hour and average mercury emissions of 0.0000075 pounds per hour during lamp crushing operations. These emissions are low and well within required criteria.

As part of CHSI's RCRA Part B permit application, Carlson Environmental, Inc. performed and analysis titled "Evaluation of Potential Hazardous Material Emergencies through atmospheric Transport from the Current and Proposed Clean Harbors Facility, Chicago, Illinois" (see Appendix 7-A). According to that analysis, the land use in the immediate vicinity of the CHSI facility is heavy industrial. Land surrounding use the facility and some potential receptors are listed below:

* 0.5 miles from the CHSI facility
    - North - Undeveloped recreational areas
    - South - EmEs Company, Lake Calumet Slip #2
    - East - Land and Lake Landfill
    - West - Lake Calumet

* 1.0 miles from the CHSI facility
  North - North turning basin of Lake Calumet, undeveloped recreational areas
  South - Lake Calumet, bulk terminal plant
  East - Land and Lake Landfill, Norfolk & Western Railway
  West - Calumet Expressway

* 1.5 miles from the CHSI facility
  North - Undeveloped recreational areas
  South - 130th Street, rail yard
  East - Rail yard
  West - Arcade Park residential area, rail yard

* 2.0 miles from the CHSI facility
  North - Stony Island Expressway, 103rd Street
  South - Beaubien Woods Forest Preserve, Carver Area High
  East - Calumet Fiver, Buffalo Street
  West - Palmar Park residential areas, St. Martin de Porres High School

The predominant wind direction is to the south. The nearest sensitive receptors (e.g., schools, hospitals) to the CHSI facility are located approximately two (2) miles away. Due to the nature of the materials managed and the air pollution control system that will be in place, the potential adverse impact to a person off-site from lamp crushing activities is non-existent. The potential off-site inhalation impact to humans associated with a "worst case" spill (i.e., containment) is extremely unlikely to non-existent.

(3) POTENTIAL ENVIRONMENTAL RECEPTORS

There are four (4) potential contaminant migration pathways: soils, groundwater, surface water, and air. Environmental receptors would include aquatic life in Lake Calumet and birds.

Because lamp crushing activities will occur within an area equipped with impervious secondary containment in an enclosed building and because this area will be inspected on a daily basis for spills/released, the potential for spills/releases of inorganic material to enter the soil and groundwater is extremely minimal. As a result, any impact to aquatic life in Lake Calumet from groundwater impacts from lamp crushing activities would also be extremely unlikely to non-existent.

The potential for direct contamination of Lake Calumet from spills or releases of inorganic material is non-existent due to the containment provided by these units and the proximity of these units in relation to the lake.

Emissions from lamp crushing activities would be treated prior to discharge through a stack. As previously discussed, due to the removal efficiency of the particulate filters and carbon, impacts to on-site birds (including sea gulls) are also considered extremely unlikely to non-existent. CHSI believes that these operations pose no greater risk than other activities currently permitted and taking place on-site.

The results of an analysis performed by Shaw Environmental, Inc. (Compliance Test Report, Fluorescent Bulb Crusher, Clean Harbors Environmental Services, Inc. Facility, Cincinnati, Ohio) show average particulate emissions of 0.0020 pounds per hour and average mercury emissions of 0.0000075 pounds per hour during lamp crushing operations. These emissions are low and well within required criteria.

Appendix 7-B contains a document titled "Environmental Assessment Report" prepared by Carlson Environmental, Inc. as part of CHSI's RCRA Part B permit application. This report contains an assessment of potential off-site environmental impacts associated with operation of the CHSI facility.

(4) POTENTIAL MAGNITUDE AND NATURE OF EXPOSURES

Workers in Unit 25 have the greatest potential for exposure to the inorganic materials to be managed. The proper use of PPE and in place engineering controls (e.g., respiratory protection, ventilation and treatment of fugitive emissions associated with the operations will significantly minimize any risk for potential exposure to the chemicals being managed.

In the event a worker is exposed to inorganic materials, either through dermal contact, inhalation, or ingestion CHSI will follow the procedures currently in place for responding to worker exposure to chemicals. These procedures include, but are not limited to: (1) flushing the affected areas as may be appropriate using on-site showers/eyes washes; (2) providing any other first aid that might be appropriate; and (3) sending the worker to a local hospital for examination and/or treatment.

Impacts associated with other on-site and off-site personnel and impacts to the environment are considered extremely minimal and would have no more impact than other waste management activities currently taking place at the facility.

4879 Spring Grove Avenue
Cincinnati, Ohio 45232

August 20, 2004

RE: Lamp Crushing Machine

James Laubsted
Environmental Compliance Manager
Clean Harbors Environmental Services, Inc.
11800 South Stoney Island Avenue
Chicago, Illinois 60617

Dear Mr. Laubsted,

I have reviewed the accompanying dispersion calculation for potential mercury air emissions during operation of the Lamp Crushing Machine at the South Stoney Island facility. The calculation, based on stack sampling conducted by Shaw Environmental, estimated a concentration of .00024 micrograms of mercury per cubic meter at a distance of one mile (1609 meters) from the facility and an estimated maximum concentration of .00064 micrograms of mercury per cubic meter at a distance of 274 yards (300 meters) from the facility. Both of these values are well below accepted background ambient air levels that are considered to be safe to the public. The Agency for Toxic Substances and Disease Registry (ATSDR), an agency within the Department of Health and Human Services, has reported in their March 1999 Toxicological Profile for Mercury that normal ambient air background levels of Mercury are as high as .01 to .02 micrograms of mercury per cubic meter. These levels are considered several magnitudes lower than currently acceptable safe concentrations and, when used to compare concentrations computed from the dispersion calculation, it is reasonable to conclude that there are no acute or chronic health effects due to mercury that should be anticipated among nearby residents from the Lamp Crushing Machine operations.

If you have any questions or additional concerns, please contact me at our Spring Grove facility in Cincinnati, Ohio.

Thank you,

William J. Hetrick, CIH
Director of Industrial Hygiene
Clean Harbors Environmental Services, Inc.

wjh

THE AMERICAN BOARD OF INDUSTRIAL HYGIENE
INCORPORATED
CERT. NO. 1105 C
EXPIRES 01-2008
WILLIAM J. HETRICK

08/11/04
10:54:51

*** SCREEN3 MODEL RUN ***
** VERSION DATED 96043 ***

Clean Harbors Chicago Facility Mercury Dispersion Calculation

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	.945800E-06
STACK HEIGHT (M)	=	7.6000
STK INSIDE DIAM (M)	=	.2026
STK EXIT VELOCITY (M/S)	=	11.7600
STK GAS EXIT TEMP (K)	=	293.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	.0000
URBAN/RURAL OPTION	=	RURAL
BUILDING HEIGHT (M)	=	.0000
MIN HORIZ BLDG DIM (M)	=	.0000
MAX HORIZ BLDG DIM (M)	=	.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = 1.419 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
100.	.5664E-03	2	1.0	1.0	320.0	14.75	19.37	10.80	NO
200.	.5319E-03	4	1.5	1.5	480.0	12.37	15.62	8.61	NO
300.	.6479E-03	5	1.0	1.0	10000.0	13.30	16.97	8.85	NO
400.	.5954E-03	5	1.0	1.0	10000.0	13.30	22.07	10.93	NO
500.	.6356E-03	6	1.0	1.0	10000.0	12.79	18.03	8.53	NO
600.	.6156E-03	6	1.0	1.0	10000.0	12.79	21.29	9.80	NO
700.	.5686E-03	6	1.0	1.0	10000.0	12.79	24.50	11.03	NO
800.	.5140E-03	6	1.0	1.0	10000.0	12.79	27.67	12.07	NO
900.	.4631E-03	6	1.0	1.0	10000.0	12.79	30.81	13.07	NO
1000.	.4175E-03	6	1.0	1.0	10000.0	12.79	33.92	14.03	NO
1100.	.3779E-03	6	1.0	1.0	10000.0	12.79	36.99	14.89	NO
1200.	.3434E-03	6	1.0	1.0	10000.0	12.79	40.04	15.73	NO
1300.	.3134E-03	6	1.0	1.0	10000.0	12.79	43.07	16.54	NO
1400.	.2872E-03	6	1.0	1.0	10000.0	12.79	46.07	17.32	NO
1500.	.2642E-03	6	1.0	1.0	10000.0	12.79	49.05	18.09	NO
1600.	.2440E-03	6	1.0	1.0	10000.0	12.79	52.02	18.84	NO
1700.	.2261E-03	6	1.0	1.0	10000.0	12.79	54.96	19.57	NO
1800.	.2101E-03	6	1.0	1.0	10000.0	12.79	57.89	20.29	NO
1900.	.1959E-03	6	1.0	1.0	10000.0	12.79	60.80	20.99	NO
2000.	.1832E-03	6	1.0	1.0	10000.0	12.79	63.69	21.68	NO

IMUM 1-HR CONCENTRATION AT OR BEYOND 100. M:

301.	.6479E-03	5	1.0	1.0	10000.0	13.30	17.08	8.89	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

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**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************
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*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1605.	.2430E-03	6	1.0	1.0	10000.0	12.79	52.16	18.88	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

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****************************************
*** SUMMARY OF SCREEN MODEL RESULTS ***
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LCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	.6479E-03	301.	0.

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***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```

CleanHarbors®
ENVIRONMENTAL SERVICES, INC.

1[redacted] South Stony Island Avenue
Chicago, IL 60617
773.646.6202
Fax 773.646.6381

April 21, 2004

RECE[illegible]D
APR 2[illegible] 2004
IEPA-BOL
PERMIT SECTION

To: Facility Mailing List Addresses

RECEIVED
APR 26 2004
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Re: Notice of Class 3 Modification

Notice is given to all interested persons that Clean Harbors Services, Inc. (CHSI), a wholly-owned subsidiary of Clean Harbors Inc. and a permitted hazardous waste treatment, storage and transfer facility located at 11800 South Stony Island Avenue in Chicago, IL has filed a Class 3 permit modification with the Illinois Environmental Protection Agency (IEPA) for authorization to add a lamp crushing machine to Unit 25 to crush fluorescent and HID light bulbs allowing volume reduction as well as separation of materials for recycling.

Pursuant to 35 IAC 703.82, CHSI announces a 60-day comment period beginning April 22, 2004 and ending June 21, 2004 during which all interested parties have the opportunity to review the modification request and to submit written comments to the IEPA. CHSI will hold an informational public meeting open to all interested persons to discuss the proposed modification. The meeting will be held on May 18, 2004 from 7:00-8:00 P.M. at the Chicago Public Library - Hegewisch Branch at 3048 E. 130th Street in Chicago, IL.

Copies of the modification request are available for review during normal business hours at CHSI's business office at 11800 S. Stony Island Avenue in Chicago, IL, at IEPA's office in Springfield, IL, or the Chicago Public Library - Hegewisch Branch. The permittee's compliance history during the life of the permit being modified is available from the Agency contact person. Additional information on the modification request is available by contacting Mr. James R. Laubsted at Clean Harbors Services, Inc., 11800 S. Stony Island Avenue, Chicago, IL 60617, or at (773) 646-6202. Information regarding application viewing time and place, CHSI's existingpermit, applicable regulatory requirements, permit modification procedures and ChSI's compliance history may

be obtained from Ms. Mara McGinnis, IEPA, 1021 North Grand Avenue East, Springfield, IL 62794-9276 or at (217) 524-3300.

This notice is provided to you as an addressee on the CHSI mailing list maintained by IEPA. A copy of the notice will appear in the Daily Southtown by April 22, 2004.

If you have any questions regarding this notice or the proposed modification, please contact me at (773) 646-6202.

Sincerely,

James R. Laubsted

James R. Laubsted

Facility Compliance Manager

B-16 M-58 XC

Clean Harbors Services, Inc.
11800 South Stony Island Ave.
Chicago, IL 60617
EPA ID No. ILD000608471

Application for
Class 3
Permit Modification

March 15, 2004

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Application For
Class 3
Permit Modification

I. OWNER/OPERATOR INFORMATION

Operator: Clean Harbors Services, Inc.
Facility Address: 11800 South Stony Island Avenue
Chicago, IL 60617

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EPA ID No: ILD000608471

Facility Contact: James R. Laubsted
(773) 646-6202

II. FOR MORE INFORMATION REGARDING THIS APPLICATION, CONTACT:

Clean Harbors Services, Inc.
11800 South Stony Island Avenue
Chicago, IL 60617
James R. Laubsted - Facility Compliance Manager

III. FACILITY DESCRIPTION

Clean Harbors Services, Inc. (CHSI) operates a hazardous waste treatment and storage facility under the terms of RCRA Part B Permit No. B-16 issued by the Illinois Environmental Protection Agency (IEPA) and United States Environmental Protection Agency on November 4, 1993.

CHSI utilizes a variety of waste handling operations to treat hazardous and non-hazardous wastes onsite, and to store/transfer such wastes, including treatment residuals, for approved offsite reuse, treatment and/or disposal. Wastes are accepted in bulk tanker, railcar, rolloff, and container (e.g., 55-gallon drum) form, and may be liquid, semisolid, and/or solid in nature.

CHSI's waste handling operations include:

1. Storage and primary physical/chemical treatment of aqueous-based, inorganic hazardous and non-hazardous industrial waste streams using chemical precipitation, coagulation, filtration, stabilization, and/or fixation;

2. Storage and liquid waste pretreatment (prior to primary treatment) utilizing neutralization, chemical oxidation, chemical reduction, and other methods such as organic stripping;

3. Storage and blending of hazardous waste for reuse as a supplemental hazardous waste fuel;

4. Storage and transfer of hazardous wastes using tanks and containers; and

5. Specialized waste treatment activities in tanks and/or containers such as phase separation of liquid aqueous/organic layers in tanks, separation of solid/liquid layers in corrosive wastes to remove D002 designation; and

6. Treatment of paints and paint related materials through compaction in a miscellaneous unit; and

7. Shredding of hazardous waste into dispersible non-dispersible materials in a miscellaneous unit; and

8. Metalwashing of metal fragments which can be reclaimed after cleaning.

The waste streams currently authorized for storage and/or treatment at CHSI include: ignitable (D001); corrosive (D002); reactive(D003); and toxic (D004-D043) wastes; and many F-, K-, P- and U-coded wastes.

IV. DESCRIPTION OF PROPOSED PERMIT MODIFICATION

Under this Permit Modification request, CHSI seeks authorization to make the following changes:

Addition of a lamp crushing machine to Unit 25

CHSI receives and stores used lamps as hazardous wastes (D003, D005, D006, D008, D009 and universal waste) and non-hazardous waste. These lamps include fluorescent and high-intensity-discharge (HID) (mercury-vapor, metal-halide and high-pressure sodium).

Under this modification, CHSI seeks authorization to modify Unit 25 with the addition of a lamp crushing machine. Lamps are placed by an employee onto a power feed belt through a negative pressure air chamber. The lamp is crushed and components are separated by a gas and mechanical process into glass, metal and calcium phosphate powder containing mercury. The resulting materials are then sent off-site for further processing/reclamation. The lamp crusher will be located in the alkaline bay of Unit 25, occupying some of the current drum storage. This is a permitted container storage area with impervious containment inside a building. The location of the lamp crusher will displace six rows in the alkaline bay of Unit 25. Although this bay is currently permitted for 13,640 gallons (248 55-gallon drums), this will be limited to 4,015 gallons (73 55-gallon drums) when the lamp crusher is in the unit. This will include one drum connected to the unit for calcium phosphate powder with mercury.

The lamp crusher unit is a Model LSS1 manufactured by Resource Technology Inc. The unit incorporates a multi-stage particulate filter and carbon adsorption to reduce mercury and particulate emissions. The use of the lamp crusher allows volume reduction as well as separation of materials for recycling. CHSI Drawing 4282 is included showing the location of the lamp crusher.

V. This modification listed above will require minor changes to the facility's existing management plans and operational procedures. A discussion of the impact of the proposed modifications on the existing RCRA Part B management plans and operating procedures at CHSI is described below.

1. RCRA Part A Application - The permitted storage capacity of the facility and acceptable hazardous waste codes will be unaffected. The bulb crusher has been added to the other processes as a miscellaneous unit. A revised Part A application is enclosed as Attachment 1.

2. Use and Management of Containers - The proposed modifications have a minor impact on the use and management of containers at the facility. The alkaline bay of Unit 25 will be impacted by placement of the bulb crusher. The storage of containers will be limited when the bulb crusher is in that bay. CHSI will only use compatible containers acceptable for shipment by DOT regulations. All containers will be stored in designated container management areas with other chemically-compatible hazardous wastes. All hazardous and non-hazardous containers will be labeled, marked and otherwise managed in the same manner as other hazardous and non-hazardous containers managed at the facility. The Operating Manual for the lamp crusher is included as Attachment 2. Page D-6a, Section D Tables (Pages 1 and 2), Appendix D-1 (Table of Contents and Page 15) and Appendix D-2 (Pages 2 and 3) have been modified and are included in Attachment 3.

3. Use and Management of Tank Systems - There are no changes in the use and management of tank systems with this modification.

4. Manifest System - All hazardous wastes that are received, consolidated/bulked and/or shipped from the facility, will be accompanied by a properly completed hazardous waste manifest. Universal wastes do not require the use of manifests.

5. Record keeping and Reporting - All hazardous wastes that are received, consolidated/bulked, shredded, crushed and/or shipped from the facility, will be documented in the facility's operating records. All operating records will be maintained on permanent file by CHSI.

6. Ignitable, Reactive, and Incompatible Waste - All hazardous waste received at or shipped from the facility are subject to the waste identification procedures outlined in the facility's Waste Analysis Plan. The Waste Analysis Plan is designed to identify the physical and chemical nature of the waste stream in order to avoid any potential adverse effects caused by ignitable, reactive or incompatible wastes. Although used lamps may be considered reactive (sodium lamps), water is not introduced into the crusher at any point in the process. This proposed modification does affect the facility's existing procedures for managing reactive wastes in that sodium lamps would be crushed. Page F-13D has been modified and is included in Attachment 3.

7. Waste Analysis Plan and Procedures - CHSI's Waste Analysis plan is designed to ensure that all incoming hazardous wastes are properly characterized and identified (by waste code) as part of waste pre-qualification procedures at the site of generation and conformance testing procedures conducted upon arrival at CHSI. The Waste Analysis Plan includes references to standard procedures and test methods for any sampling or analysis that is required to determine the presence of toxic constituents. Used lamps do not require analysis due to the nature and hazards of the lamps being known. This proposed modification does not change the list of codes acceptable for storage or transfer, but does allow treatment through crushing of hazardous waste lamps. Table C-17 listing hazardous waste codes of lamps accepted for crushing has been added to the WAP. Pages C-5, C-5A, C-10B, C-10C, and C-12 have also been modified and are included in Attachment 3.

8. Security Plan and Procedures - The proposed modification has no impact on the security plan and procedures currently in effect at the facility.

9. Facility Inspection Plan and Procedures - All hazardous waste storage/processing areas are subject to a daily inspection to insure the integrity of the container and labeling/markings on the container. Similarly, all bulk storage tanks and treatment units are inspected on a daily basis. This would include daily visual inspection of storage bays for spilled material, containment integrity and container inspection. These inspections would include the area where the lamp crushing machine is located. This bay is currently permitted as a container storage area with impervious containment. There are no changes to the facility inspection plan or procedures.

10. Personal Training Plan and Procedures - The proposed modification has minor impact on the facility's Training Plan. No new staff positions are required from this modification. Since items such as labeling, manifesting and container handling are similar to those which are in use at the facility. Affected personnel will be trained on the Standard Operating Procedure of the lamp crusher and its impacts on processing. The Standard Operating Procedure for lamp crushing is included as Attachment 4.

11. Preparedness and Prevention - The proposed modification has minor impact on the preparedness and prevention measures currently in effect at the facility. A direct reading mercury vapor monitoring device will monitor mercury concentrations daily during operation in the vicinity of the lamp crusher and monitor daily for breakthrough of the carbon. Pages F-21 and F-22 have been modified and are included in Attachment 3.

12. Contingency Plan - The proposed modification has minor impact on the contingency planning measures currently in effect at the facility. Page G-1 and pages 1,7 and 8 of Anticipated Hazards (Appendix G-4) have been modified and are included in Attachment 3.

13. Closure Plan and Procedures - The proposed modification has an impact on the closure plan/procedures currently in effect at the facility. When the lamp crusher is in place in the Alkaline Bay of Unit 25, container storage will be reduced 9,625 gallons (175 55-gallon drums). Closure of the lamp crusher will add to closure costs, but is more than offset by the reduction in container storage. Pages I-4 and I-4A, Section I Tables (Pages 1 and 2) and Appendix I-3 (Page 10) have been modified and are included in Attachment 3.

14. Financial Responsibility - The proposed modification has no impact on the financial responsibility requirements already in place. CHSI will continue to fund the higher closure cost associated without the lamp crusher in Unit 25.

15. Subparts AA, BB and CC - The proposed modification has no impact on RCRA air requirements currently in effect at the facility.

CHSI believes this modification will present the same minimal level of potential exposure to humans and the environment as other operations at the facility since these wastes are already handled at the facility and because of the emission control system associated with the lamp crusher. This operation provides containment of hazardous waste or hazardous waste constituents to control releases of solids or liquids to the land, surface water, groundwater or subsurface environment. The unit itself and containers provide primary containment of wastes and are subject to monitoring to assure emissions are not present. Controls monitor equipment operations and shutdown operations when not in acceptable operating ranges. Emissions are collected and controlled to permitted levels.

A Compliance Test Report (PN846142-01) for the lamp crusher conducted by Shaw Environmental, Inc. is included as Attachment 5. An Industrial Hygiene Exposure Monitoring Report was conducted by Clean Harbors Environmental Services, Inc. is included as Attachment 6. A written description on potential pathways of exposure to humans or environmental receptors is included as Attachment 7.

The CHSI facility is located within the corporate limits of the City of Chicago which has a population of over 1,000,000 people. This exempts the CHSI facility from the requirements of 39.2 of the Illinois Environmental Protection Act

VI. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to be the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature Date 3/25/04

John E. Lancaster, VP-General Manager
Clean Harbors Services, Inc.

Signature Date 3/25/04

Anthony G. Ianello, Executive Director
Illinois International Port District

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VII. ENGINEER CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to be the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Engineer Seal

Kenneth D. Spaulding 3-25-04

Kenneth D. Spaulding Date

MECA Engineering Corporation of America
5539 Indianapolis Blvd.
East Chicago, IN 46312
219-397-0100

KENNETH D. SPAULDING
62-44249
REGISTERED
PROFESSIONAL
ENGINEER
OF
STATE OF ILLINOIS

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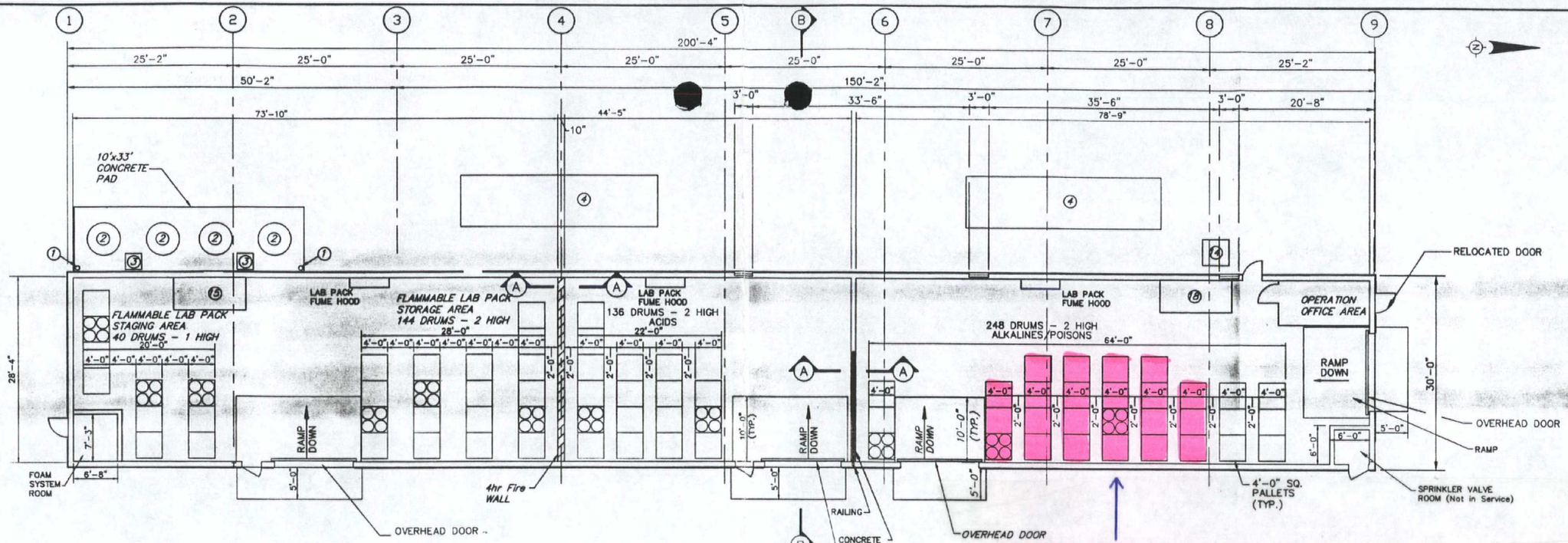
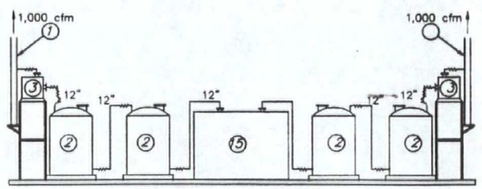
CleanHa



DRUMS REMOVED FROM STORAGE WHEN LAMP CRUSHER IS IN UNIT 25
(TOTAL DRUM STORAGE IN ALKALINE BAY WILL BE 73 DRUMS, ONE DRUM WILL REMAIN FOR CALCIUM PHOSPHATE POWDER CONTAMINATED WITH MERCURY)

PLAN

SCALE 1/8" = 1'-0"

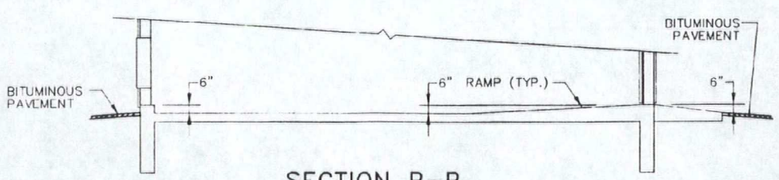


ELEVATION

ACTIVATED CARBON ADSORPTION SYSTEM ARRANGEMENT
SCALE: NONE

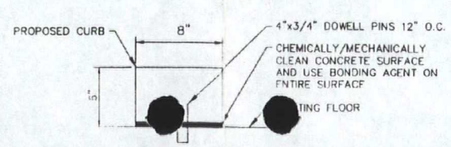
EQUIPMENT		
ITEM NO.	QTY.	DESCRIPTION
1	2	12" STACK
2	4	1,800 lb. CARBON BED ENVIROTROL MODEL VPM-3000 OR EQUAL
3	2	1,000 cfm EXHAUST BLOWER
4	2	SPENT ABSORBENT STORAGE ROLL-OFF
14	1	DUST COLLECTOR WITH 2,000 scfm BLOWER
15	1	LAB PACK FLAMMABLE POUR-OFF HOOD #1
18	1	LAB PACK POWDERED/SOLIDS POUR-OFF HOOD #4

AREA DESCRIPTION	REQ'D. CONTAINMENT PER RCRA			RECTANGULAR VOLUME OF AREA				VOLUME OCCUPIED BY RAMP				VOL. OCCUPIED BY INSIDE ROOMS	TOTAL CAPACITY (GALS.) Vt=A-RA-IR
	D	V	R	W	L	H	A	RW	RL	RH	RA	IR	
	NO. OF DRUMS	TOTAL VOL. OF WASTE IN GALS.	CONT. CAP REQ'D. (D.I.V.) IN GALS.	AREA WIDTH IN FT.	AREA LENGTH IN FT.	CURB HEIGHT IN FT.	CONT. CAP OF AREA (W)(L)(H)7.48	RAMP WIDTH IN FT.	RAMP LENGTH IN FT.	RAMP HEIGHT IN FT.	VOL. OCCUPIED BY RAMP 1/2 (RW)(RL)(RH)7.48	VOL. OCCUPIED (LENGHT)(WIDTH)(0.5)7.48	
ACIDS	136	7,480	748	44.00	28.33	0.5	4,662 GAL.	18.16	10	0.5	340 GAL.	NONE	4,322
ALKALINE/POISONS	248	13,640	1,364	78.75	28.33	0.5	8,343 GAL.	(1) 14 (2) 18	10 10	0.5 0.5	262 GAL. 337 GAL.	(1) (16)(7)(0.5)7.48 = 420 GAL. (2) (6)(6)(0.5)7.48 = 135 GAL.	7,189
FLAMMABLES STAGING AREA	40	2,200	220	74.0	28.33	0.5	7,840 GAL.	19.08	10	0.5	357 GAL.	(6.68)(7.25)(0.5)7.48 = 181 GAL.	7,302
FLAMMABLES STORAGE AREA	144	7,920	792										
TOTAL FLAMMABLES	184	10,120	1,012										



SECTION B-B

SCALE 1/4" = 1'-0"



SECTION A-A

SCALE: NONE

NOTES:

1. ALL EXISTING CONCRETE CONTAINMENT FLOORS AND RAMPS HORIZONTAL SURFACES ARE COATED WITH PROTECTO-CRETE 900 SYSTEM 1/4" THICK, AS MANUFACTURED BY DUDICK INC. ALL EXISTING CONCRETE CONTAINMENT CURBS VERTICAL AND HORIZONTAL SURFACES ARE COATED WITH PROTECTO-COAT 900 SYSTEM, 30 MILS THICK AS MANUFACTURED BY DUDICK INC. OR EQUAL
2. NEW CONCRETE RAMP IN ALKALINE STORAGE AREA SHALL BE COATED WITH PROTECTO-CRETE 900 SYSTEM 1/4" THICK, AS MANUFACTURED BY DUDICK INC. OR EQUAL
3. THIS AREA WILL ALSO BE USED FOR THE MANAGEMENT, STORAGE AND TREATMENT OF COMPRESSED GAS WASTES.
4. IN FLAMMABLE STORAGE AREA LAB PACKS WILL BE STORED TWO HIGH. LIQUID FLAMMABLE DRUMS WILL ONLY BE STORED ONE HIGH.

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CHSI DWG. NO. 4282

ISSUE	DESCRIPTION	DRWN.	CHKD.	APPR.	DATE
C	SEE REVISION NOTE C	K.M.C.	J.L.	J.L.	4/15/03
B	AS BUILT	AAA			3/8/01
A	RCRA PART B MODIFICATION	K.M.C.	A.M.L.	A.M.L.	8/11/99

CleanHarbors
ENVIRONMENTAL SERVICES, INC.
1501 Washington Street
Braintree, Massachusetts 02185
Telephone (781) 849-1800

TITLE
CLEAN HARBORS SERVICES, INC.
11800 S. STONY ISLAND AVENUE
CHICAGO, ILLINOIS 60617

CONTAINER MANAGEMENT LAYOUT BUILDING #25

REV #	REVISION NOTES
C	CHANGED DRAWING TITLE & EQUIPMENT LIST

PROJECT NO. CH114630
SCALE AS NOTED
DRAWING NO. 4630-M-05

ATTACHMENT 1

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

Form approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0248-EPA-OT

For EPA Regional Use Only

Date Received

Month Year

EPA
United States Environmental Protection Agency
Washington, DC 20460

Hazardous Waste Permit Application Part A

(Read the Instructions before starting)

I. Facility's EPA ID Number ***(Mark 'X' in the appropriate box)***

[ ] **A. First Part A Submission**

[X] **B. Revised Part A Submission (Amendment #** 2

C. Facility's EPA ID Number

ILD000608471

D. Secondary ID Number ***(If applicable)***

II. Name of Facility

CLEAN HARBORS SERVICES INC.

III. Facility Location ***(Physical address not P.O. Box or Route Number)***

A. Street

11800 SOUTH STONY ISLAND AVENUE

Street ***(Continued)***

City or Town

CHICAGO

State IL

Zip Code 60617-

County Code *(If known)*

County Name COOK

B. Land Type (Enter Code) S

C. Geographic Location

LATITUDE (Degrees, minutes, & seconds) 41 40 54

LONGITUDE (Degrees, minutes & seconds) 087 34 046

D. Facility Existence Date

Month Day Year 07 29 1980

IV. Facility Mailing Address

Street or P.O. Box

11800 SOUTH STONY ISLAND AVE

City or Town

CHICAGO

State IL

Zip Code 60617

V. Facility Contact ***(Person to be contacted regarding waste activities at facility)***

Name ***(last)*** LAUBSTED

(First) JAMES

Job Title COMPLIANCE MGR

Phone Number ***(Area Code and Number)*** 773-646 6202

VI. Facility Contact Address ***(See Instructions)***

A. Contact Address

Location	Mailing	Other
X	X	

B. Street or P.O. Box

City or Town

State

Zip Code -

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EPA ID Number *(Enter from page 1)*	Secondary ID Number *(Enter from page 1)*
ILDO006084 71	

VII. Operator Information *(See instructions)*

A. Name of Operator

CLEAN HARBORS SERVICES INC.

Street or P.O. Box

11800 SOUTH STONY ISLAND AVE

City or Town	State	Zip Code
CHICAGO	IL	60617

Phone Number *(Area Code and Number)*	B. Operator Type	C. Change of Operator Indicator	Date Changed (Month Day Year)
773-646-6202	P	Yes [ ] No [X]	

VIII. Owner Information *(See instructions)*

A. Name of Owner

ILLINOIS INTL. PORT DISTRICT

Street or P.O. Box

3600 EAST 95TH STREET

City or Town	State	Zip Code
CHICAGO	IL	60617

Phone Number *(Area Code and Number)*	B. Owner Type	C. Change of Owner Indicator	Date Changed (Month Day Year)
773-646-4400	P	Yes [ ] No [X]	

IX. NAICS Codes *(in order of significance; start in left box)*

First	9999	**Third**	
(Description)	Waste Treatment	*(Description)*	
Second	4953	**Fourth**	
(Description)	REFUSE SYSTEMS	*(Description)*	

X. Other Environmental Permits *(See instructions)*

A. Permit Type *(Enter Code)*	B. Permit Number	C. Description
R	B-16	IEPA RCRA PART B
R	ILD000608471	USEPA HSWA PERMIT
R	1980 36 OP	IEP A LAND (OPERATIONS)
R	1984-EP-0889	IEP A LAND (OPERATIONS)
P	0316 00 BTE	IEP A AIR
E	1990 -EN-1301	IEPA WATER POLLUTION CONTROL

EPA ID Number *(Enter from page 1)* | I L D 0 0 0 6 0 8 4 7 1

Secondary ID Number *(Enter from page 1)*

XI. Nature of Business *(Provide a brief description)*

C[illegible] Harbors Services, Inc. (CHSI) offers a liquid industrial waste treatment service. CHSI accepts hazardous and non-hazardous wastewaters which do not meet sewer discharge specifications. Through phyiscal and chemical treatment, CHSI produces an effluent acceptable for sewer discharge and a dewatered sludge. The effluent is discharged into the Metropolitan Water Reclamation District of Greater Chicago's sewer system and the sludge is shipped to properly-licensed offsite treatment and/or disposal facilities. CHSI also accepts hazardous and non-hazardous waste, which is stored in tanks and containers and subsequently transferred to properly licensed offsite treatment and/or disposal facilities.

XII. Process Codes and Design Capacities

A. PROCESS CODE - *Enter the code from the list of process codes below that best describes each process to be used at the facility. Thirteen lines are provided for entering codes. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, T04 and X99), describe the process (including its design capacity) in the space provided in item XII.*

B. PROCESS DESIGN CAPACITY - *For each code entered in column A, enter the capacity of the process.*

1 AMOUNT - Enter the amount in a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.

2 UNIT OF MEASURE - for each amount entered in column B(1) enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

C. PROCESS TOTAL NUMBER OF UNITS - *Enter the total number of units used with the corresponding process code.*

PROCESS CODE	PROCESS	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
D79	Underground Injection Well Disposal	Gallons; Liters; Gallons Per Day; or Liters Per Day
D80	Land Fill	Acre-feet; Hectare-meter; Acres; Cubic Meters; Hectares; Cubic Yards
D81	Land Treatment	Acres or Hectares
D82	Ocean Disposal	Gallons Per Day or Liters Per Day
D83	Surface Impoundment Disposal	Gallons; Liters; Cubic Meters; or Cubic Yards
D99	Other Disposal	Any Unit of Measure Listed Below
	Storage:	
S01	Container	Gallons; Liters; Cubic Meters; or Cubic Yards
S02	Tank Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S03	Waste Pile	Cubic Yards or Cubic Meters
S04	Surface Impoundment Storage:	Gallons; Liters; Cubic Meters; or Cubic Yards
S05	Drip Pad	Gallons; Liters; Acres; Cubic Meters Hectares; or Cubic Yards
S06	Containment Building Storage	Cubic Yards or Cubic Meters
S99	Other Storage	Any Unit of Measure Listed Below
	Treatment	
T01	Tank Treatment	Gallons Per Day; Liters Per Day; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons per Day; or Metric Tons Per Hour
T02	Surface Impoundment Treatment	Gallons Per Day; Liters Per Day; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons per Day; or Metric Tons Per Hour
T03	Incinerator	Short Tons Per Hour;Metric Tons Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million Btu Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Gallons Per Day; Liters Per Hour; or Million Btu Per Hour
T80	Boiler	Gallons; Liters; Gallons Per Hour; Liters Per Hour; Btu Per Hour; or Million Btu Per Hour
T81	Cement Kiln	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour
T82	Lime Kiln	
T83	Aggregate Kiln	
T84	Phosphate Kiln	
T85	Coke Oven	Short Tons Per Day; Btu Per Hour
T86	Blast Furnace	Liters Per Hour;Kilograms Per Hour; or Million Btu Per Hour
T87	Smelting, Melting Or Refining Furnace	
T88	Titanium Dioxide Chloride Oxidation Reactor	
T89	Methane Reforming Furnace	Gallons Per Day; Liters Per Day; Ppounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Gallons Per Hour; Liters Per Hour; or Million Btu Per Hour
T90	Pulping Liquor Recovery Furnace	
T91	Combustion Device Used In The Recovery Of Sulfur Values From Spent Sulfuric Acid	
T92	Halogen Acid Furnaces	
T93	Other Industrial Furnaces Listed in 40 CFR 260.10	
T94	Containment Building - Treatment	Cubic Yards; Cubic Meters; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Btu Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million Btu Per Hour
	Miscellaneous (Subpart X):	
X01	Open Burning/Open Detonation	Any Unit of Measure Listed Below
X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour; Short Tons Per Day; Metric Tons Per Day;Pounds Per Hour;Liters Per Hour; or Gallons Per Day
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour;Kilograms Per Hour;Metric Tons Per Day; Metric Tons Per Hour;Short Tons Per Day;Btu Per Hour; or Million Btu Per Hour
X04	Geologic Repository	Cubic Yards;Cubic Meters;Acre-feet; Hectare-meter;Gallons; or Liters
X99	Other Subpart X	Any Unit of Measure Listed Below

Unit of Measures	Unit of Measure Code
Gallons	G
Gallons Per Hour	E
Gallons Per Day	U
Liters	L
Liters Per Hour	H
Liters Per Day	V

Unit of Measure	Unit of Measure Code
Short Tons Per Hour	D
Metric Tons Per Hour	W
Short Tons Per Day	N
Metric Tons Per Day	S
Pounds Per Hour	J
Kilograms Per Hour	R
Million Btu Per Hour	X

Unit of Measure	Unit of Measure Code
Cubic Yards	Y
Cubic Meters	C
Acres	B
Acre-feet	A
Hectares	Q
Hectare-meter	F
Btu Per Hour	I

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EPA ID Number ***(Enter from page 1)*** I L D 0 0 0 6 0 8 4 7 1

Secondary ID Number ***(Enter from page 1)***

XII. Process Codes and Desig

EXAMPLE FOR COMPLETING ITEM XII (shown in line number X-1 below): A facility has a storage tank, which can hold 533.788 gallons

Line Number	Process Code	B. Process Design Capacity 1. Amount *(Specify)*	2. Unit of Measure *(Enter code)*	C. Process Total Number Of Units	For Official Use Only
x 1	S 0 2	5 3 3 . 7 8 8	G	0 0 1	
1	S 0 1	164,253 (2969x55-Gal Equivalent 2 X 64 cu.ft.)	G	2 9 7 1	
2	S 0 1	360 (12 x 30 Cubic yards equivalent)	Y	0 1 2	
3	S 0 1	268,800 (TRANSPORTATION VEHICLES)	U	0 3 1	
4	S 0 2	3 0 6 , 3 5 6	G	0 3 7	
5	D 8 3	2 , 0 0 0 , 0 0 0	G	0 0 4	
6	T 0 1	A 2 0 0 , 0 0 0	U	0 0 1	
7		.			
8		.			
9		.			
10		.			
11		.			
12		.			
13		.			

NOTE: If you need to list more than 13 process codes, attach an additional sheet(s) with the information in the same format as above. Number the lines sequentially, taking into account any lines that will be used for "other" processes (i.e., D99, S99, T04 and X99) in item XIII.

XIII. Other Processes ***(Follow instructions from item XII for D99, S99, T04 and X99 process codes)***

Line Number *(Enter #s in seq w/XII)*	Process Code	B. PROCESS DESIGN CAPACITY 1. Amount *(Specify)*	2. Unit of Measure *(Enter code)*	C. Process Total Number Of Units	D. Description of Process
X 1	T 0 4	.			
0 7	T 0 4	1 2 0 0 0	U	0 0 1	T-04-A Treatment of D002 liquid/solid mixtures in containers by removal of liquid
0 8	T 0 4	3 0 0 0	U	0 0 1	T-04-B Compaction of hazardous waste solids in containers
0 9	T 0 4	5 5 0 0 0	U	0 0 1	T04-C Hazardous waste fuel blending
1 0	T 0 4	6 0 0	U	0 1 0	T-04-D Stabilization/fixation of hazardous waste in rolloff containers,

EPA ID Number *(Enter from page 1)*	Secondary ID Number *(Enter from page 1)*
I L D 0 0 0 6 0 8 4 7 1	

XIV. Description of Hazardous Wastes

A. EPA HAZARDOUS WASTE NUMBER - ***Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR, Part 261 Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.***

B. ESTIMATED ANNUAL QUANITITY - ***For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.***

C. UNIT OF MEASURE - ***For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:***

ENGLIS UNIT OF MEASURE	*CODE*	*METRIC UNIT OF MEASURE*	*CODE*
POUNDS	*P*	*KILOGRAMS*	*K*
TONS	*T*	*METRIC TONS*	*M*

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed hazardous waste: For each listed hazardous waste entered in column A select the code(s) from the list of process codes contained in item XII A. on page 3 to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed hazardous waste: For each characteristic or toxic contaminant entered in column A. select the code(s) from the list of process codes contained in item XII A. on page 3 to indicate all the processes that will be used to store, treat and /or dispose of all the non-listed hazardous wasted that prossess that characteristic or toxic contaminant.

NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:

1 ***Enter the first two as described above.***
2 ***Enter "000" in the extreme right box of item XIV-D(1).***
3 ***Use additional sheet, enter line number from previous sheet, and enter additional code(s) in item XIV-E.***

2. PROCESS DESCRIPTION; If a code is not listed for a process that will be used, describe the process in the space provided on the form (D(2).

NOTE; HAZARDOUS WASTED DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER - Hazardous ***wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:***

1 ***Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B, C and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.***

2 ***In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.***

3 ***Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.***

EXAMPLE FOR COMPLETING ITEM XIV (shown in line number X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number	A. EPA HAZARDOUS WASTE NO. *(Enter Code)*	B. Estimated Annual Quantity of Waste	C. Unit of Measure *(Enter code)*	D. PROCESSES (1) PROCESS CODES *(Enter code)*	D. PROCESSES (2) PROCESS DESCRIPTION *(If a code is not entered in D(1))*
X 1	K 0 5 4	900	P	T 0 3 D 8 0	
X 2	D 0 0 2	400	P	T 0 3 D 8 0	
X 3	D 0 0 1	100	P	T 0 3 D 8 0	
X 4	D 0 0 2				Included With Above

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EPA ID Number *(Enter from page 1)* I L D 0 0 0 6 0 8 4 7 1

Secondary ID Number *(Enter from page 1)*

XIV. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	D 0 0 1	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HI JK TO 1A X9 9A B
2	D 0 0 2	5,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
3	D 0 0 3	5,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HI J TO 1A X9 9B C
4	D 0 0 4	5,000	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9A B
5	D 0 0 5	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9A BC
6	D 0 0 6	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9A BC
7	D 0 0 7	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9A B
8	D 0 0 8	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9A BC
9	D 0 0 9	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B C
10	D 0 1 0	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B
11	D 0 1 1	250	T	S 0 1 S 0 2 T 0 4	AB CD EF GH J TO 1A X9 9B
12	D 0 1 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	D 0 1 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	D 0 1 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	D 0 1 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	D 0 1 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	D 0 1 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	D 0 1 8	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
19	D 0 1 9	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
20	D 0 2 0	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9A B
21	D 0 2 1	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
22	D 0 2 2	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
23	D 0 2 3	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
24	D 0 2 4	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
25	D 0 2 5	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
26	D 0 2 6	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
27	D 0 2 7	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
28	D 0 2 8	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
29	D 0 2 9	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
30	D 0 3 0	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
31	D 0 3 1	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9A B
32	D 0 3 2	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
33	D 0 3 3	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
34	D 0 3 4	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B
35	D 0 3 5	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9A B

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I	L	D	0	0	0	6	0	8	4	7	1

XIV. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	D036	15,000	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9A B
2	D037	15,000	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9A B
3	D038	15,000	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9A B
4	D039	15,000	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9A B
5	D040	15,000	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9A B
6	D041	15,000	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
7	D042	15,000	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
8	D043	15,000	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9A B
9	F001	7,500	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
10	F002	7,500	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
11	F003	7,500	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
12	F004	7,500	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
13	F005	7,500	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
14	F006	1,000	T	S01 S02 T04	AB CD EF GH J TO 1A X9 9B
15	F007	1,000	T	S01 S02 T04	AB CD EF GH J TO 1A X9 9B
16	F008	1,000	T	S01 S02 T04	AB CD EF GH J TO 1A X9 9B
17	F009	1,000	T	S01 S02 T04	AB CD EF GH J TO 1A X9 9B
18	F010	1,000	T	S01 S02 T04	AB CD EF GH J TO 1A X9 9B
19	F011	1,000	T	S01 S02 T04	AB CD EF GH J TO 1A X9 9B
20	F012	1,000	T	S01 S02 T04	AB CD EF GH J TO 1A X9 9B
21	F019	1,000	T	S01 S02 T04	AB CD EF GH J TO 1A X9 9B
22	F020	1,000	T	S01 S02 T04	AB CE FG HJ
23	F021	1,000	T	S01 S02 T04	AB EF GH J
24	F022	1,000	T	S01 S02 T04	AB EF GH J
25	F023	1,000	T	S01 S02 T04	AB EF GH J
26	F024	250	T	S01 S02 T04	AB EF GH J X9 9B
27	F025	15,000	T	S01 S02 T04	AB EF GH J X9 9B
28	F026	1,000	T	S01 S02 T04	AB EF GH J
29	F027	1,000	T	S01 S02 T04	AB EF GH J
30	F028	1,000	T	S01 S02 T04	AB EF GH J
31	F032	250	T	S01 S02 T04	AB EF GH J X9 9B
32	F034	250	T	S01 S02 T04	AB CE FG HJ X9 9B
33	F035	250	T	S01 S02 T04	AB CE FG HJ X9 9B
34	F037	250	T	S01 S02 T04	AB CE FG HJ X9 9B
35	F038	250	T	S01 S02 T04	AB CE FG HJ X9 9B

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XIV. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)									D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))							
1	F 0 3 9	15,000	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ		TO	1A	X9 9B
2	K 0 0 1	1,000	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
3	K 0 0 2	1,000	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ		TO	1A	X9 9B
4	K 0 0 3	1,000	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ		TO	1A	X9 9B
5	K 0 0 4	1,000	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ		TO	1A	X9 9B
6	K 0 0 5	1,000	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ		TO	1A	X9 9B
7	K 0 0 6	1,000	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ		TO	1A	X9 9B
8	K 0 0 7	1,000	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ		TO	1A	X9 9B
9	K 0 0 8	1,000	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ		TO	1A	X9 9B
10	K 0 0 9	2,500	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
11	K 0 1 0	2,500	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
12	K 0 1 1	2,500	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
13	K 0 1 3	100	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
14	K 0 1 4	100	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
15	K 0 1 5	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
16	K 0 1 6	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
17	K 0 1 7	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
18	K 0 1 8	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
19	K 0 1 9	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
20	K 0 2 0	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
21	K 0 2 1	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
22	K 0 2 2	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
23	K 0 2 3	2,500	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
24	K 0 2 4	2,500	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
25	K 0 2 5	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
26	K 0 2 6	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
27	K 0 2 7	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
28	K 0 2 8	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
29	K 0 2 9	100	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
30	K 0 3 0	100	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
31	K 0 3 1	100	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
32	K 0 3 2	100	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
33	K 0 3 3	100	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
34	K 0 3 4	100	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9 9B
35	K 0 3 5	100	T	S 0 1	S 0 9	S 0 4							AB	CE	FG	HJ				X9 9B

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EPA ID Number ***(Enter from page 1)*** **Secondary ID Number** ***(Enter from page 1)***

I	L	D	0	0	0	6	0	8	4	7	1

XIV. Description of Hazardous Wastes ***(Continued; use additional sheets as necessary)***

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	K036	2,500	T	S01 S02 T04	AB CE FG H X9 9B
2	K037	100	T	S01 S02 T04	AB CE FG H X9 9B
3	K038	100	T	S01 S02 T04	AB CE FG HJ X9 9B
4	K039	100	T	S01 S02 T04	AB CE FG HJ X9 9B
5	K040	100	T	S01 S02 T04	AB CE FG HJ X9 9B
6	K041	100	T	S01 S02 T04	AB CE FG HJ X9 9B
7	K042	2,500	T	S01 S02 T04	AB CE FG HJ X9 9B
8	K043	2,500	T	S01 S02 T04	AB CE FG HJ X9 9B
9	K044	2,500	T	S01 S02 T04	AB CE FG HJ X9 9B
10	K045	2,500	T	S01 S02 T04	AB CE FG HJ X9 9B
11	K046	2,500	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
12	K047	2,500	T	S01 S02 T04	AB CE FG HJ X9 9B
13	K048	2,500	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
14	K049	2,500	T	S01 S02 T04	AB CE FG HJ X9 9B
15	K050	2,500	T	S01 S02 T04	AB CE FG HJ X9 9B
16	K051	2,500	T	S01 S02 T04	AB CE FG HJ X9 9B
17	K052	2,500	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
18	K060	250	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
19	K061	250	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
20	K062	250	T	S01 S02 T04	AB CD EF GH J TO 1A X9 9B
21	K064	250	T	S01 S02 T04	AB CE FG HJ X9 9B
22	K065	250	T	S01 S02 T04	AB CE FG HJ X9 9B
23	K066	250	T	S01 S02 T04	AB CE FG HJ X9 9B
24	K069	250	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
25	K071	250	T	S01 S02 T04	AB CE FG HJ X9 9B
26	K073	100	T	S01 S02 T04	AB CE FG HJ X9 9B
27	K083	250	T	S01 S02 T04	AB CE FG HJ X9 9B
28	K084	250	T	S01 S02 T04	AB CE FG HJ X9 9B
29	K085	250	T	S01 S02 T04	AB CE FG HJ X9 9B
30	K086	250	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
31	K087	250	T	S01 S02 T04	AB CE FG HJ TO 1A X9 9B
32	K088	250	T	S01 S02 T04	AB CE FG HJ X9 9B
33	K090	250	T	S01 S02 T04	AB CE FG HJ X9 9B
34	K091	250	T	S01 S02 T04	AB CE FG HJ X9 9B
35	K093	250	T	S01 S02 T04	AB CE FG HJ X9 9B

EPA ID Number *(Enter from page 1)* I L D 0 0 0 6 0 8 4 7 1

Secondary ID Number *(Enter from page 1)*

XIV. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	K 0 9 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	K 0 9 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	K 0 9 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	K 0 9 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	K 0 9 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	K 0 9 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	K 1 0 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ TO 1A X9 9B
8	K 1 0 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	K 1 0 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	K 1 0 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	K 1 0 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	K 1 0 5	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	K 1 0 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	K 1 0 7	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	K 1 0 8	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	K 1 0 9	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	K 1 1 0	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	K 1 1 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	K 1 1 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	K 1 1 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	K 1 1 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	K 1 1 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	K 1 1 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	K 1 1 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	K 1 1 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	K 1 2 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	K 1 2 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	K 1 2 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	K 1 2 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	K 1 3 1	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	K 1 3 2	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	K 1 3 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	K 1 4 0	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	K 1 4 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	K 1 4 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

EPA ID Number *(Enter from page 1)* | **Secondary ID Number** *(Enter from page 1)*

I L D 0 0 0 6 0 8 4 7 1

XIV. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	K 1 4 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	K 1 4 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	K 1 4 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	K 1 4 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	K 1 4 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	K 1 4 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	K 1 5 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	K 1 5 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	K 1 5 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	K 1 5 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	K 1 5 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	K 1 5 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	K 1 6 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	K 1 6 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	K 1 6 9	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	K 1 7 0	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	K 1 7 1	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	K 1 7 2	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	K 1 7 4	15,000	T	S 0 1 S 0 2 T 0 4	AB EF GH J X9 9B
20	K 1 7 5	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	K 1 7 6	15,000	T	S O 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	K 1 7 7	15,000	T	S O 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	K 1 7 8	15,000	T	S O 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	P 0 0 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	P 0 0 2	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	P 0 0 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	P 0 0 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	P 0 0 5	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	P 0 0 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	P 0 0 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	P 0 0 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	P 0 0 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	P 0 1 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	P 0 1 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	P 0 1 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

EPA ID Number *(Enter from page 1)* | **Secondary ID Number** *(Enter from page 1)*

I L D 0 0 0 6 0 8 4 7 1

XIV. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	P 0 1 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	P 0 1 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	P 0 1 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	P 0 1 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	P 0 1 7	250	T	S 0 1 S 0 2 T 0 1	AB CE FG HJ X9 9B
6	P 0 1 8	250	T	S 0 1 S 0 2 T 0 1	AB CE FG HJ X9 9B
7	P 0 2 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	P 0 2 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	P 0 2 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	P 0 2 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	P 0 2 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	P 0 2 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	P 0 2 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	P 0 2 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	P 0 2 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	P 0 3 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	P 0 3 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	P 0 3 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	P 0 3 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	P 0 3 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	P 0 3 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	P 0 3 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	P 0 3 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	P 0 4 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	P 0 4 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	P 0 4 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	P 0 4 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	P 0 4 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	P 0 4 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	P 0 4 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	P 0 4 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	P 0 4 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	P 0 4 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	P 0 5 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	P 0 5 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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GSA No. 0248-EPA-OT

EPA ID Number *(Enter from page 1)* | **Secondary ID Number** *(Enter from page 1)*

I L D 0 0 0 6 0 8 4 7 1

XIV. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	P 0 5 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	P 0 5 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	P 0 5 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	P 0 5 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	P 0 5 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	P 0 6 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	P 0 6 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	P 0 6 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	P 0 6 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	P 0 6 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	P 0 6 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	P 0 6 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	P 0 6 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	P 0 6 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	P 0 7 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	P 0 7 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	P 0 7 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	P 0 7 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	P 0 7 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	P 0 7 5	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	P 0 7 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	P 0 7 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	P 0 7 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	P 0 8 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	P 0 8 2	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	P 0 8 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	P 0 8 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	P 0 8 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	P 0 8 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	P 0 8 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	P 0 9 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	P 0 9 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	P 0 9 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	P 0 9 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	P 0 9 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

EPA ID Number *(Enter from page 1)* I L D 0 0 0 6 0 8 4 7 1

Secondary ID Number *(Enter from page 1)*

XIV. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	P 0 9 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	P 0 9 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	P 0 9 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	P 1 0 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	P 1 0 2	150	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	P 1 0 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	P 1 0 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	P 1 0 5	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	P 1 0 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	P 1 0 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	P 1 0 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	P 1 1 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	P 1 1 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	P 1 1 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	P 1 1 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	P 1 1 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	P 1 1 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	P 1 1 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	P 1 1 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	P 1 1 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	P 1 2 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	P 1 2 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	P 1 2 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	P 1 2 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	P 1 2 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	P 1 2 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	P 1 8 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	P 1 8 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	P 1 8 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	P 1 9 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	P 1 9 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	P 1 9 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	P 1 9 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	P 1 9 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Form approved, OMB No. 2050-0034 Expires 10/31/02
GSA No. 0248-EPA-OT

EPA ID Number ***(Enter from page 1)*** | **Secondary ID Number** ***(Enter from page 1)***

I L D 0 0 0 6 0 8 4 7 1

XIV. Description of Hazardous Wastes ***(Continued; use additional sheets as necessary)***

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	P 1 9 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	P 1 9 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	P 1 9 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	P 2 0 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	P 2 0 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	P 2 0 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	P 2 0 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	P 2 0 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	U 0 0 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	U 0 0 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	U 0 0 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	U 0 0 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	U 0 0 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	U 0 0 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	U 0 0 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	U 0 0 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	U 0 0 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	U 0 1 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	U 0 1 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	U 0 1 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	U 0 1 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	U 0 1 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	U 0 1 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	U 0 1 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	U 0 1 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	U 0 1 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	U 0 2 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	U 0 2 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	U 0 2 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	U 0 2 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	U 0 2 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	U 0 2 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	U 0 2 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	U 0 2 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	U 0 2 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

EPA ID Number *(Enter from page 1)* I L D 0 0 0 6 0 8 4 7 1

Secondary ID Number *(Enter from page 1)*

XIV. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	U 0 2 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	U 0 3 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	U 0 3 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	U 0 3 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	U 0 3 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	U 0 3 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	U 0 3 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	U 0 3 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	U 0 3 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	U 0 3 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	U 0 3 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	U 0 4 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	U 0 4 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	U 0 4 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	U 0 4 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	U 0 4 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	U 0 4 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	U 0 4 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	U 0 4 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	U 0 4 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	U 0 5 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	U 0 5 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	U 0 5 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	U 0 5 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	U 0 5 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	U 0 5 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	U 0 5 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	U 0 5 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	U 0 5 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	U 0 6 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	U 0 6 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	U 0 6 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	U 0 6 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	U 0 6 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	U 0 6 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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EPA ID Number ***(Enter from page 1)*** **Secondary ID Number** ***(Enter from page 1)***

I	L	D	0	0	0	6	0	8	4	7	1

XIV. Description of Hazardous Wastes ***(Continued; use additional sheets as necessary)***

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	U 0 6 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	U 0 6 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	U 0 6 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	U 0 7 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	U 0 7 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	U 0 7 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	U 0 7 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	U 0 7 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	U 0 7 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	U 0 7 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	U 0 7 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	U 0 7 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	U 0 7 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	U 0 8 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	U 0 8 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	U 0 8 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	U 0 8 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	U 0 8 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	U 0 8 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	U 0 8 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	U 0 8 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	U 0 8 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	U 0 8 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	U 0 9 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	U 0 9 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	U 0 9 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	U 0 9 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	U 0 9 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	U 0 9 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	U 0 9 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	U 0 9 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	U 0 9 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	U 0 9 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	U 1 0 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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I	L	D	0	0	0	6	0	8	4	7	1

XI. Description of Hazardous Wastes ***(Continued; use additional sheets as necessary)***

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	U 1 0 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	U 1 0 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	U 1 0 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	U 1 0 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	U 1 0 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	U 1 0 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	U 1 0 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	U 1 1 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	U 1 1 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	U 1 1 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	U 1 1 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	U 1 1 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	U 1 1 5	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	U 1 1 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	U 1 1 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	U 1 1 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	U 1 1 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	U 1 2 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	U 1 2 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	U 1 2 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	U 1 2 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	U 1 2 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	U 1 2 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	U 1 2 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	U 1 2 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	U 1 2 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	U 1 2 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	U 1 3 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	U 1 3 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	U 1 3 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	U 1 3 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	U 1 3 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	U 1 3 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

EPA ID Number *(Enter from page 1)* I L D 0 0 0 6 0 8 4 7 1

Secondary ID Number *(Enter from page 1)*

XII. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	U 1 3 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	U 1 3 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	U 1 3 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	U 1 4 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	U 1 4 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	U 1 4 2	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	U 1 4 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	U 1 4 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	U 1 4 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	U 1 4 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	U 1 4 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	U 1 4 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	U 1 4 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	U 1 5 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	U 1 5 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	U 1 5 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	U 1 5 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	U 1 5 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	U 1 5 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	U 1 5 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	U 1 5 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	U 1 5 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	U 1 5 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	U 1 6 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	U 1 6 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	U 1 6 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	U 1 6 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	U 1 6 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	U 1 6 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	U 1 6 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	U 1 6 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	U 1 6 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	U 1 6 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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GSA No. 0248-EPA-OT

EPA ID Number ***(Enter from page 1)*** | **Secondary ID Number** ***(Enter from page 1)***

I L D 0 0 0 6 0 8 4 7 1

X. Description of Hazardous Wastes ***(Continued; use additional sheets as necessary)***

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	U 1 7 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	U 1 7 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	U 1 7 2	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	U 1 7 3	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	U 1 7 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
6	U 1 7 6	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
7	U 1 7 7	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
8	U 1 7 8	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
9	U 1 7 9	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
10	U 1 8 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
11	U 1 8 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
12	U 1 8 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
13	U 1 8 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
14	U 1 8 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
15	U 1 8 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
16	U 1 8 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
17	U 1 8 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
18	U 1 8 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
19	U 1 8 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
20	U 1 9 0	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
21	U 1 9 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
22	U 1 9 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
23	U 1 9 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
24	U 1 9 4	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
25	U 1 9 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
26	U 1 9 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
27	U 2 0 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
28	U 2 0 1	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
29	U 2 0 2	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
30	U 2 0 3	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
31	U 2 0 4	100	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
32	U 2 0 5	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
33	U 2 0 6	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
34	U 2 0 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
35	U 2 0 8	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

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Secondary ID Number *(Enter from page 1)*

X. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number	A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)									D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))								
1	U 2 0 9	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
2	U 2 1 0	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
3	U 2 1 1	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
4	U 2 1 3	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
5	U 2 1 4	100	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
6	U 2 1 5	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
7	U 2 1 6	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
8	U 2 1 7	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
9	U 2 1 8	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
10	U 2 1 9	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
11	U 2 2 0	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
12	U 2 2 1	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
13	U 2 2 2	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
14	U 2 2 3	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
15	U 2 2 5	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
16	U 2 2 6	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
17	U 2 2 7	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
18	U 2 2 8	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
19	U 2 3 4	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
20	U 2 3 5	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
21	U 2 3 6	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
22	U 2 3 7	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
23	U 2 3 8	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
24	U 2 3 9	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
25	U 2 4 0	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
26	U 2 4 3	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
27	U 2 4 4	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
28	U 2 4 6	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
29	U 2 4 7	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
30	U 2 4 8	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
31	U 2 4 9	250	T	S 0 1	S 0 2	T 0 4							AB	CE	FG	HJ				X9	9B
32	U 2 7 1	250	T	S 0 1	S 0 2	T 0 4							AB	EF	GH	J				X9	9B
33	U 2 7 7	250	T	S 0 1	S 0 2	T 0 4							AB	EF	GH	J				X9	9B
34	U 2 7 8	250	T	S 0 1	S 0 2	T 0 4							AB	EF	GH	J				X9	9B
35	U 2 7 9	250	T	S 0 1	S 0 2	T 0 4							AB	EF	GH	J				X9	9B

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XII. Description of Hazardous Wastes ***(Continued; use additional sheets as necessary)***

Line Number		A. EPA HAZARDOUS WASTE NO. (Enter Code)			B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)									(2) PROCESS DESCRIPTION (If a code is not entered in D(1))								
1	U	2	8	0	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
2	U	3	2	8	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
3	U	3	5	3	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
4	U	3	5	9	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
5	U	3	6	4	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
6	U	3	6	5	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
7	U	3	6	6	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
8	U	3	6	7	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
9	U	3	7	2	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
10	U	3	7	3	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
11	U	3	7	5	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
12	U	3	7	6	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
13	U	3	7	7	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
14	U	3	7	8	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
15	U	3	7	9	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
16	U	3	8	1	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
17	U	3	8	2	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
18	U	3	8	3	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
19	U	3	8	4	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
20	U	3	8	5	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
21	U	3	8	6	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
22	U	3	8	7	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
23	U	3	8	9	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
24	U	3	9	0	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
25	U	3	9	1	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
26	U	3	9	2	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
27	U	3	9	3	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
28	U	3	9	4	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
29	U	3	9	5	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
30	U	3	9	6	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
31	U	4	0	0	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
32	U	4	0	1	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
33	U	4	0	2	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
34	U	4	0	3	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B
35	U	4	0	4	250	T	S	0	1	S	0	2	T	0	4	AB	CE	FG	HJ				X9	9B

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EPA ID Number *(Enter from page 1)*	Secondary ID Number *(Enter from page 1)*
I L D 0 0 0 6 0 8 4 7 1	

XV. Map

Attach to this application a topographic map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in this map area. See instructions for precise requirements.

XVI. Facility Drawing

All existing facilities must include a scale drawing of the facility (See instructions for more detail).

XVII. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

XVIII. Certification(s)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Owner Signature	Date Signed 3/25/04
Name and Official Title (Type or print) Anthony Ianello, Executive Director	
Owner Signature	Date Signed
Name and Official Title (Type or print)	
Operator Signature	Date Signed 3/25/04
Name and Official Title (Type or print) John E. Lancaster, VP-General Manager	
Operator Signature	Date Signed
Name and Official Title (Type or print)	

XIX. Comments

Note: Mail completed form to the appropriate EPA Regional or State Office. (Refer to instructions for more information)

EPA ID Number *(Enter from page 1)* I L D 0 0 0 6 0 8 4 7 1

Secondary ID Number *(Enter from page 1)*

XII. Description of Hazardous Wastes *(Continued; use additional sheets as necessary)*

Line Number		A. EPA HAZARDOUS WASTE NO. (Enter Code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	U	4 0 7	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
2	U	4 0 8	15,000	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
3	U	4 0 9	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
4	U	4 1 0	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B
5	U	4 1 1	250	T	S 0 1 S 0 2 T 0 4	AB CE FG HJ X9 9B

XIII. Other Processes *(Follow instructions from item XII for D99, S99, T04 and X99 process codes)*

Line Number (Enter #s in seg w/XII)	Code (From list above)	A. PROCESS DESIGN CAPACITY A. Amount (specify)	2. Unit of Measure (Enter code)	C. Process Total Number Of Units	D. Description of Process
X	T 0 4	.			
1 1	T 0 4	4 1 6 , 0 7 5 .	U	0 0 1	TO4E:Treatment of D002 liquids in containers and tanks.
1 2	T 0 4	5 , 0 0 0 .	U	0 0 1	T04F: Treatment of organic peroxides in containers
1 3	T 0 4	5 , 0 0 0 .	U	0 0 1	T04G: Treatment of acid cyanides in containers
1 4	T 0 4	4 1 6 , 0 7 5 .	U	0 1 0	T04H: Treatment of hazardous waste in containers and tanks using phase separation.

XIII. Other Processes *(Follow instructions from item XII for D99, S99, T04 and X99 process codes)*

Line Number (Enter #s in seg w/XII)	Code (From list above)	A. Process Design Capacity 1. Amount (Specify)	2. Unit of Measure (Enter code)	C. Process Total Number Of Units	D. Description of Process
X	T 0 4	.			
1 5	T O 4	5 0 0 0	U	0 0 1	T0-4-I Treatment of Black Powder in containe
1 6	T 0 4	2 5 0 0 0	U	0 0 1	T0-4-J Treatment by the Addition of Dry Ice in containers
1 7	T 0 4	1 0 0 0	J	0 0 1	T0-4-K Venting of oxygen to the atmosphere

XIII. Other Processes ***(Follow instructions from item XII for D99, S99, T04 and X99 process codes)***

Line Number (Enter #s in seq w/XII)		A. Process Design Capacity: Code (From list above)			1. Amount (Specify)	2. Unit of Measure (Enter code)	C. Process Total Number Of Units	D. Description of Process
1	8	X	9	9A	7 0 0 0	U	0 0 1	X99-A Consolidated of pain/paint-related material using a compactor
X					.			
1	9	X	9	9B	4 8 , 0 0 0	J	0 0 1	X99-B Hazardous waste shredding system

X								
2	0	X	9	9C	2 3 0 0	J	0 0 1	X99-C Hazardous waste lamp crushing system

Clean Harbors Services, Inc.
EPA ID No. ILD000608471
Sheet 1 of 3

RCRA PART A FORM
ADDITIONAL INFORMATION

Section VIII. Facility Owner

A. Name of Facility's Legal Owner

CHSI is the owner/operator of the hazardous waste facility. The land on which the facility is located is owned by the Illinois International Port District, a government entity.

Section XII. Process Codes and Design Capacity

Line 05. Disposal in Surface Impoundments (D83)

CHSI notes that the four (4) surface impoundments identified by this entry have been certified as closed by the IL EPA. The impoundments no longer accept hazardous waste, and currently operate under an approved Post Closure management plan. A list of the waste codes which were disposed in the impoundments is included in Appendix D-30 of the approved RCRA Part B Application.

Section XIII Additonal Processes

Line 11. T04 E Treatment of D002 Liquids in Containers and Tanks

Treatment of D002 (Corrosive) liquid hazardous waste in containers and tanks by the commingling/mixing of compatible waste streams to adjust pH value. Process design capacity is 416,075 gallons per day in all tank or container systems at the facility.

Line 12. T04F Treatment of Organic Peroxides in Containers

Treatment of organic peroxide hazardous waste in containers through the additon of water. Process design capacity is 5,000 gallons per day in any container at the facility.

Line 13. T04G Treatment of Acid Cyanides in Containers

Treatment of acid cyanide hazardous waste in containers through pH adjustment using sodium hydroxide or other alkaline materials. Process design capacity is 5,000 gallons per day in any container at the facility.

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Clean Harbors Serivces, Inc.
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Sheet 2 of 3

Line 14. T04H Treatment of Hazardous Waste in Containers and Tanks Using Phase Separation

Treatment of hazardous waste in containers and tanks by phase separation using physical (e.g., gravity separation, filtration) and chemical (e.g., addition of demusifiers) techniques. Process design capacity is 416,075 gallons per day in all tank or container systems at the facility.

Line 15. T04I Treatment of Black Powder in Containers

Treatment of black powder hazardous waste in containers through the addition of water. Process design capacity is 5,000 gallons per day in any container at the facility.

Line 16. T04J Treatment by the Addition of Dry Ice in Containers

Treatment of hazardous waste in containers by the additon of dry ice. Process design capacity is 25,000 gallons per day in any container at the facility.

Line 17. T04K Venting of oxygen to the atmosphere.

Process design capacity is 1,000 pounds per hour.

Line 18. X99A Consolidation of Hazardous Waste using a Compactor

Consolidation of hazardous waste paint and paint-related material contained in small metal and glass containers by processing through a can and glass compactor. Process design capacity of the unit is 7,000 pounds per day of cans of paint and paint-related material.

Line 19. X99B Hazardous waste shredding system

Shredding of hazardous waste in containers. Process design capacity is 48,000 pounds per hour.

Line 20. X99C Hazardous waste lamp crushing system

Crushing of hazardous waste lamps. Process design capacity is 2300 pounds per hour.

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Clean Harbors Serivces, Inc.
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Sheet 3 of 3

Section XIV. Description of Hazardous Waste

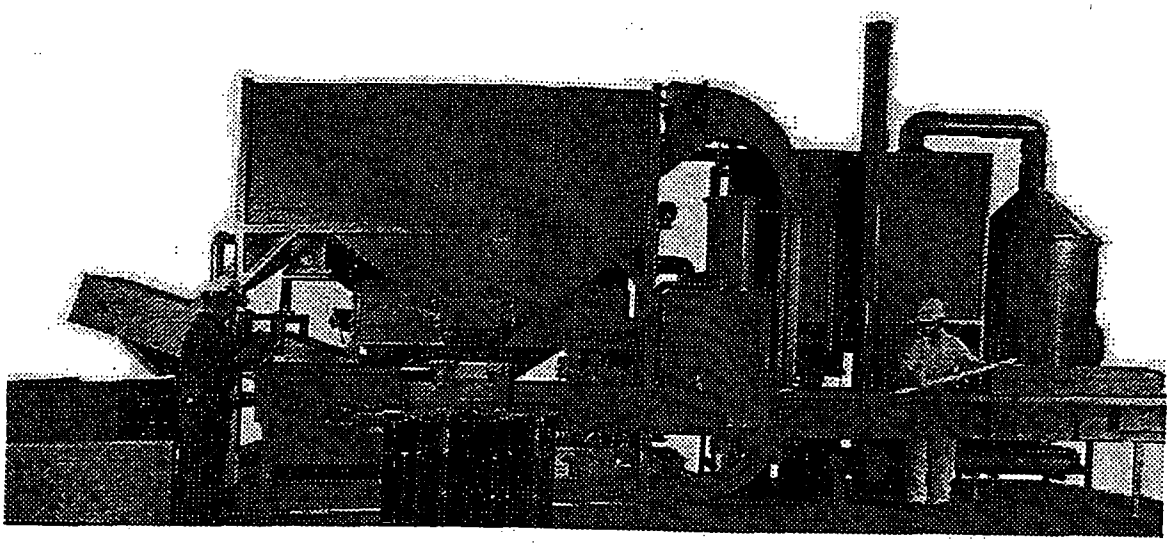
CHSI notes that Process Code "T01A" in C Column D (2) refers to the Listed Waste Treatment System identified on Line 06 in Section XII.

CHSI also notes that Process Codes "T0A" through "T04K" refers to the various container an/or tank treatment processes described in Lines 07 through 17 in Section XIII.

Rev. March 15, 2004

ATTACHMENT 2

RESOURCE TECHNOLOGY, INCORPORATED



Model LSS1
Lamp Recycling System

Revised May 31, 2000

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1.0 Introduction

2.0 Process Description

2.1 General Description

The Model LSS1 Lamp Recycling System achieves the goal of setting a new standard for simplicity, safety, and recycling efficiency. Lamps enter this system on a power-feed belt passing through a negative pressure air chamber. Each lamp is crushed, separating glass and metal components into individual coproducts storage bins. Phosphor powder collects in the multi-stage filtration system. This powder should be treated in other equipment to recover elemental mercury for commercial use. Mercury vapors adsorb onto activated carbon filters eliminating fugitive emissions during processing. The Model LSS1 is fully computerized assuring easy operation. A touch screen control module provides one touch start-up for the entire system. This feature also provides operational monitoring of process and coproducts recovery lines. The Model LSS1 may include optional equipment that will continuously monitor the exhaust vent and provide a permanent record of system air quality.

2.2 Capacity and Performance

The Model LSS1 Lamp Recycling System has the capability of processing 2300 pounds (952 kg) of fluorescent lamps per hour. This equates to approximately:

T-12	T-8 lamps
3,500 4-foot	5,250 4-foot
1,750 8-foot;,	3,075 8-foot

The Model LSS1 also handles circular and U-shaped fluorescent lamps, high intensity discharge lamps, and more.

2.3 Equipment Description

1. **#1 Lamp Feed Conveyor**: The #1 Lamp Feed Conveyor receives the manually loaded fluorescent lamps and transports them to the implosion chamber conveyor. The implosion chamber conveyor consists of a conveyor belt, loading aprons, electric motor, and gear reducer.
2. **#2 Lamp Feed Conveyor**: The #2 Feed Conveyor receives the fluorescent lamps from the #1 Feed Conveyor and transports the bulbs to the breaker bar. The #2 Feed Conveyor and all subsequent components to this system are enclosed and operated under vacuum to collect fugitive mercury emissions.
3. **Breaker Bar**: The Breaker Bar is comprised of rotating steel arms which break the lamps prior to their being gravity-fed into the primary crushing drums.

4. **Primary Crushing Drums**: The Primary Crushing Drums consist of two rotating steel drums which crush the lamp components and deposit the particles on the elevating conveyor.
5. **Elevating Conveyor**: The Elevating Conveyor receives the crushed lamps from the primary crushing drums and transports them to the primary trommel.
6. **Primary Trommel**: The Primary Trommel utilizes a multi-layer screen which separates the components by particle size. Larger (aluminum end-caps) are retained within the screen and are discharged for recycling. Particles between one inch and 1/16 of one inch (glass) are retained by the screen and continue onto the secondary trommel via the vibrating conveyor. Particles less than 1/16 of one inch pass through both screens to a 100 mesh vibrating screen separator. The rotating action of the primary trommel provides enough agitation to scrub the phosphor powder and mercury from the aluminum end-caps and from the glass particles.

   ***Note*: After passing through the Primary Trommel, the aluminum is discharged via a chute to a receiving container which can then be shipped as a commodity for recycling.**

7. **Vibrating Screen Separator**: The Vibrating Screen Separator receives phosphor powder and glass fines from the primary trommel. The Vibrating Screen Conveyor retains clean glass fines and transports them to a drum for recycling. The calcium phosphate powder passes through the vibrating screen and is collected in sealed drums for transport to a mercury retorting facility.
8. **Secondary Trommel**: The Secondary Trommel receives material from the primary trommel via a vibrating conveyor and again agitates and scrub the glass. The glass particles that do not pass through the 1/16 of one inch openings in the outer screen of the secondary trommel are gravity-fed into the secondary crushing drums.
9. **Secondary Crushing Drums**: The Secondary Crushing Drums consists of two rotating steel drums which crush the lamp glass to its final size and deposits the glass on the magnetic conveyor.
10. **Magnetic Conveyor**: The Magnetic Conveyor receives particles of glass from the secondary crushing drums and transports them to a receiving container. Metallic particles (filaments and aluminum end-caps attached to filaments) attract to the magnetic conveyor and are transported to an additional receiving container which can then be shipped for recycling.
11. **HID De-Globing Chamber**:
    The HID de-globing chamber serves to remove the outer glass from the HID lamps. Most all configurations of lamps may be placed socket

... rate of five lamps per cycle. After loading, the door must be closed and the cycle start button depressed. This will activate the de-globing process. Upon completion of this cycle the door to the chamber may be opened. The HID frames and mercury bearing arc tubes are manually removed from the chamber. Using a wire cutting device the operator should separate the two remaining components. The wire is ready for recycling at a local metals recycler and the mercury bearing arc tube should be sent off for retort.

12. **Vapor Collection System**: The Vapor Collection System is designed to control mercury vapor and dust emissions from the process. The vapor collection system is comprised of a five horsepower fan, a baghouse equipped with a series of particulate filters, an air compressor for filter back purge, and an activated carbon vessel. The blower which produces an air flow of approximately 500 CFM draws mercury vapors and dust from the process equipment into the baghouse. The baghouse incorporates a set of nine cylindrical particulate filters that are in series with a set of two flat rectangular filters. This filter arrangement is designed to trap 99.99% of air-borne particles measuring 0.5 microns or larger. Purge occurs once each hour of running time on the feed belts. The purge opens a diaphram and back purges the filters with a powerful burst of compressed air. When the system computer senses that back purging the filters is no longer effective at reducing the pressure drop across the filters, the process control system will disable the system and display the appropriate alarm signal on the touch screen. The system can be restarted following the replacement of the filters. Dust accumulates in the collection barrel located underneath the baghouse.
13. **Housekeeping Vacuum System**: The LSS1 is supplied with a positive displacement vacuum pump connected to the vapor collection system. Controlled manually at the touch screen it is used for general housecleaning around the system
14. **Process Control System**: The Process Control System incorporates a programmable logic controller, touch screen, main disconnect, fuses, motor starters, and thermal overload protection for the equipment. The system operation is accomplished by following user prompts on the touch screen. Example screens are included in Appendix A and an electrical diagram is included in Appendix D. The system control logic is such that when in automatic mode no component can be operated without the vapor collection system or without the activation of the previous component in the process. The main control panel contains high voltage components and should only be accessed with the main disconnect in the off position and after following proper lock-out/tag-out procedures, located in section 3.5 of this manual.

2.4 System Specifications

Height: 12 feet (3.66 meters)
Length: 30 feet (9.15 meters)
Width: 11 feet (3.35 meters)
Electrical Requirements: 100 AMP, 208/230/460 volt, 3 phase
Electrical control panel is UL approved.

3.0 Safety

3.1 General Safety Awareness

The LSS1 should be used in accordance with the manufacturer's instructions and good safety and health practices. The manufacturer also recommends that a health and safety professional be consulted regarding mandatory personal protective equipment (P.P.E.) and safety practices prior to the operation of the system.

3.1-1 Warning Signs

The LSS1 contains signs and labels required by OSHA 29 CFR 1910.145 and convey pertinent hazard warning information to the operator that is needed during the operation of this equipment.

3.1-2 Emergency Stop Buttons

Emergency stop buttons are located in four areas on the LSS1; three are on the front or operating side of the equipment, and one on the back side. Anytime there is an emergency and the LSS1 must be stopped immediately, an operator can depress any one of the four emergency stop buttons. This will completely shut down the LSS1, including the vapor fan. In order for the LSS1 to restart, the emergency stop button that was activated must be pulled out to deactivate the emergency stop condition, and the system must be restarted at the touch screen.

3.1-3 Safety Interlocks

When operating in the automatic mode, the LSS1 is programmed through the Programmable Logic Controller (PLC) which prevents operation of the system without operating the vapor collection system. Furthermore, no system component can be operated out of sequence. Additional information concerning control logic is included in section 5.2 of this manual.

3.1-4 Machine Guarding

The Model LSS1 is designed and manufactured to provide a safe work environment for the operator. The LSS1 meets the requirements of OSHA 29 CFR1910.212 Machine Guarding Standard.

3.2 Operator Training Requirements

Operators of the LSS1 should be trained in compliance with the requirements of the Occupational Safety and Health Administration (OSHA) 29 CFR1910.120(p) for hazardous waste site workers. Additional training or certifications may be required by state or local agencies and should be researched and obtained prior to operation of this system. Training should include proper emergency response procedures and reporting requirements. Additionally, operators should be informed of the potential for adverse health effects resulting from the improper handling of mercury-containing material. Operators should be familiar with respiratory protection devices and other personal protective equipment which should be worn during the operation and maintenance of this equipment. Finally, operators should be familiar with the lock-out procedures which are outlined in section 3.5 of this manual.

3.3 Chemical Hygiene

While operating the LSS1, operators should follow good chemical hygiene practices. This is done by prohibiting consumption of food or beverage and use of tobacco products in areas where lamps are handled, stored or processed. Operators must use the proper P.P.E. while handling or processing lamps. Operators should wash their hands and face thoroughly with soap and water before breaks and meals, and shower at the end of the work shift.

3.4 Personal Protective Equipment

The LSS1 separates fluorescent lamps into three primary components: clean aluminum end-caps, clean crushed glass, and calcium phosphate powder (phosphor powder) containing mercury. Each of these waste streams has a potential to cause injury or illness if handled improperly. The aluminum end-caps and crushed glass have sharp edges and can produce cuts and puncture wounds in unprotected operators. As a minimum requirement, protective gloves should be worn any time lamps are being handled or loaded. Phosphor powder containing mercury vapor is released from the lamps and collected throughout the system. Mercury can be introduced into the body by inhalation, absorption and ingestion. Care should be exercised in avoiding inhalation of this powder. Use of respiratory protection during certain operations and maintenance of this equipment is required. Specific personal protective equipment which is to be worn will be outlined in the following sub-sections.

3.4-1 Respiratory Protection

Since the primary root of mercury vapor entry into the body is through inhalation, respiratory protection may be required during certain operations and maintenance performed on the LSS1. Respiratory protection should be used anytime mercury vapors are present. Respiratory protection should be worn if a direct reading mercury vapor instrument indicates that mercury vapors are present during operation.

3.4-2 Eye Protection

Safety glasses shall be worn at all times while handling lamps, operating the LSS1, or conducting maintenance on the LSS1.

3.4-3 Hearing Protection

OSHA 29 CFR1910.95 the Occupational Noise Exposure Standard states that any employee exposed to 90 decibels of sound or greater for an eight hour period of time is required to wear hearing protection. The Model LSS1 Lamp Recycling System generates approximately 90 dBA of noise while in full operation. Therefore, all such exposed operators and anyone around the LSS1 while it is operating are required to wear hearing protection.

3.4-4 Body Protection

Since the phosphor powder contained in fluorescent lamps contains mercury, it is important that protective coveralls be worn by all personnel who are operating or conducting maintenance on the LSS1. This is important so that cross contamination does not occur from the phosphor powder collecting on their work uniforms.

3.5 Lock-out Procedure

In order to ensure that employees performing maintenance or repairs on the LSS1 do not become injured by accidental start-up or release of stored energy, all required precautions as outlined in OSHA 29 CFR 1910.147 Lock-Out/Tag-Out Standard should be followed.

The Procedure:

Step 1: Locate the circuit breaker that supplies power to the main control panel. Turn off the circuit breaker and lock-out the circuit breaker.

Step 2: Go to the main control panel for the LSS1 and turn off the knife switch on the outside of the electrical panel and lock that switch in the off position. Following the directions on the front of the panel, open the control panel. Check to ensure that the main breaker has been turned off. Then go to the touch screen and attempt to operate the equipment .

Step 3: Go to the rear of the LSS1 to the electrical switch for the air compressor, turn the switch to the off position , close the lock-out hasp over the switch, and place the lock through the hasp on the switch.

Step 4: Open the air system drain valve on the air compressor, this is to make sure there is no stored pneumatic energy in the LSS1.

Step 5: Turn the air system ball valve to the off position. Close the lock-out hasp over the valve and place a lock through the hasp on the valve.

Step 6: Attempt to operate any part of the LSS1 in order to verify that there is no stored energy within the equipment. After completion of the previous steps, you may perform the required work on the LSS1. In order to return the LSS1 to service, make sure all tools and equipment are removed from the machine and all components are secured back in the machine and follow the lock-out steps in reverse order.

3.6 Air Monitoring

Air monitoring for mercury vapor concentration should be conducted in the area around the LSS1. A direct reading mercury vapor instrument should be used to collect this data. Air monitoring should be conducted in the operator work area, vapor fan stack, and coproduct's collection areas to ensure that all employees working around the LSS1 will not be exposed to mercury vapor concentrations above the ACGIH Threshold Limit Value (TLV). If at any time the mercury vapor readings get close to the TLV, the people working in the affected area should don air purifying respirators, and correct the cause of emission.

4.0 Pre-operation and Start-up

The LSS1 start-up is accomplished by using the touch screen and following the prompts as they appear and as outlined in section 4.2 below.

4.1 Pre-operation Inspection

Prior to start-up of the LSS1, a walk around inspection should be performed to ensure that all coproduct receptacles are empty and in position to receive the co-products as they are discharged from the LSS1. Furthermore, ensure that the four drums around the LSS1 are properly positioned and have straight, unobstructed connection boots and secure connection rings.

4.2 Equipment Start-up

The LSS1 is designed to run in an automatic mode. When the LSS1 runs in its automatic mode, all equipment operations are supervised through the programmable logic controller (PLC). If there is an alarm, the LSS1 will stop and indicate the reason for the alarm. To start the LSS1, make sure the circuit breaker supplying the LSS1 control panel is in the "ON"

position. Proceed to the LSS1 main electrical panel and make sure that the knife switch on the control panel is in the "ON" position. Proceed to the front of the LSS1, turn the key switch on the touch pad to the "ON" position, follow the prompts on the screen, and touch the screen in the areas indicated to make your selection. To run the LSS1 in the Automatic mode press "automatic" in the selection area of the screen. When the automatic screen appears, press the system start to activate a five-second buzzer which indicates that the system will start. When the buzzer shuts off, the system will start in a sequence. When all of the systems are operating all indicator lights of the system, except "Vacuum Bar and H.I.D.", will be lit. It is at this point that you can start feeding lamps into the LSS1.

5.0 Equipment Operation

5.1 Feeding Lamps into Equipment

Lamps are manually placed on the #1 Feed Conveyor by trained operators. The Model LSS1 is designed to process approximately 3,500 lamps per hour. The lamps can be continuously laid end-to-end completely across the conveyor. Be careful not to place the lamps any higher than the guard at the end of the conveyor. This will avoid having the lamp break prior to entry into the implosion chamber conveyor. **DO NOT** feed cardboard, wood, plastic, or other debris into the machine as such will clog the vacuum lines or jam the equipment.

Caution: In order to prevent jamming of the machine, plastic coated lamps must not be placed directly on feed conveyor #1.

5.2 Monitoring Equipment Operation

The process control system incorporates a programmable logic controller (PLC) which monitors equipment operation. Should a motor overload, filters become clogged, or an emergency stop button be depressed, the PLC will shut down that system and alert the operator to the problem. During normal operations it is important to pay attention externally to equipment operation. Look for signs of wear and tear such as leaking or clogged vacuum lines. Listen for any sound abnormalities that may indicate a bearing failure, a motor failure, or a jam in the equipment. It is also important to monitor the levels of glass, aluminum, fines, and powder discharged to containers. Proximity sensors are mounted in the lids of the drums attached to the glass fine discharge, the powder discharge, baghouse discharge and the vacuum container discharge. These switches will shut off equipment operation via the PLC should the containers become full. When full, please check the touch screen alarm screen for indication

as to which drum needs to be changed out. When a new drum is placed back into position, the PLC will allow operation to continue.

5.3 Monitoring Coproduct Quality and Volume

Quality in the lamp recycling business refers to how well the process can separate the hazardous materials from the non-hazardous materials. In order for the process to perform properly, the crush and separation operation must separate the end-caps, glass and contaminated powder from the other components. During normal operation, it is important to inspect the coproducts and coproduct discharge areas to ensure that there is no mixing of coproducts or cross contamination of materials (e.g. visible phosphor powder on the glass or aluminum end-caps, or glass-laden aluminum end caps).

One simple method to inspect glass quality is to put on rubber gloves and pick up a handful of glass gently and return it to the storage container. Inspect the rubber glove for evidence of powder. It may be necessary to sample the clean glass and the clean aluminum in order to maintain compliance with permit regulations.

It is important during operation of the LSS1 to monitor both the glass and aluminum discharge to assure that material is flowing freely and that no back-up of material will occur through the discharge chutes. Glass may be discharged into containers as small as 55 gallon drums or as large as semi trailers with optional equipment. Aluminum may also be discharged in the same manner. It is important to monitor these discharges as often as necessary to ensure that those containers do not get overfilled.

5.4 Using the Housekeeping Vacuum

The LSS1 is supplied with a positive displacement vacuum pump connected to the vapor collection system. The household vacuum system is controlled at the touch screen and is programmed to operate only when the LSS1 is running in the automatic mode. It is used for general housecleaning around the LSS1. Vacuum ports are located at various points around the equipment and are to be used to collect small particles of glass, aluminum, and phosphor powder. These materials will then be separated throughout the remainder of the system . It is important to ensure that a vacuum hose is attached to an open vacuum port prior to initiating the vacuum system. Otherwise, damage may result to the vacuum system. It is important to vacuum only lamp components into the system so that foreign materials do not contaminate recyclable materials or cause blockages when passing through the machine.

6.0 Equipment Shutdown

6.1 Emergency Shutdown

If at anytime the LSS1 needs to be immediately shut down, an operator should depress one of the four emergency stop buttons located on the LSS1. Three emergency stop buttons are located on the front of the machine, and one is located on the back. In order to deactivate the alarm and restart the LSS1, the emergency stop button that was activated must be pulled out from the stop position. Note that the vapor collection system is disabled with an emergency shutdown. To prevent fugitive vapor emissions the vapor collection system must be restarted immediately following the treatment of the emergency.

6.2 Routine Shutdown

At the end of the production day or when you want to shut down the LSS1, simply press the system stop button on the touch screen of the automatic menu. This will shut down all operations of the LSS1 with the exception of the vapor fan.

(The vapor fan should be allowed to continue to operate even though the LSS1 is not actively processing lamps. This will ensure that a negative pressure is maintained within the LSS1, preventing the release of mercury vapors from any residual lamps or phosphor powder that may remain in the system.)

6.3 Daily Clean-up Procedures

At the end of each shift, the LSS1 should be allowed to continue to operate in the automatic mode for at least 10 minutes following the cessation of all processing. During this period the LSS1 equipment and surrounding floors should be swept of all visible calcium phosphate powder (phosphor powder) in order to decontaminate the area of mercury vapor. Coproduct collection containers should also be emptied at this time.

7.0 Routine (Scheduled) Maintenance

Below is a list of scheduled maintenance items:

ITEM	MONTHLY	SIX MONTH	ANNUAL
#1 Feed Conveyor	X	X	X
#2 Feed Conveyor	X	X	X
Elevated Conveyor Flights	X	X	X
Gear Reducers Oil Change		X	X
Carbon			See below
Glass Conveyor	X	X	X
Trommel Rollers	X	X	X
Air Compressor Oil	X	X	X
Vacuum Pump			X
Vacuum Blower Motor			X
All Air Lines	X	X	X

DAILY: Perform visual equipment inspection, check visible components for visible wear. Check nuts, bolts for tightness.

#1 Feed Conveyor: Inspect for tracking, wear and tension.
Adjust tracking and tension if necessary, replace if worn.

#2 Feed Conveyor: Inspect for tracking, wear and tension.
Adjust tracking and tension if necessary, replace if worn.

Elevated Conveyor Flights: Inspect the flights for wear, replace if wear is excessive.
Replace if UHMW wear strips are worn down to the metal flite

Gear Reducers: Check seals.
Change oil.

Carbon: Change when exhaust levels exceed regulatory levels.

Air Compressor: Change oil.

Vacuum pump: Change oil.

Air Lines: Check connections for air leaks

Every 100,000 lamps: Inspect clean-out points. Clean as necessary at the following locations: Feed conveyor side doors, Trommell #1 end access, vibrating conveyor port, magnetic conveyor tail.

8.0 Recommended Parts Inventory

SPARE PARTS INVENTORY

PARTS	QUANTITY
Conveyor Belt 1	1
Conveyor Belt 2	1
Cylindrical HEPA Filters	15
Square HEPA Filters	2
Air Compressor Oil	
Elevated Conveyor Flights	1 set
Elevated Conveyor Divider	1

Vacuum Blower Motor Oil - Mobil DTE BB
Texaco R & O 220
Amoco 220, or equal

Vacuum Blower Bearing Grease - Follow Manufacturers Recommended Instructions

Gear Reducer Motor Oil - Mobil 600 W Super
Texaco Honor cyl. Oil 680
Chevron NL Gear Comp 680

Touch-up Paint

Air Line

Gasketing Material (foam)

Gasketing Material (perma gum)

Silicone Sealant (RTV)

9.0 Warranty and Disclaimer

Resource Technology, Inc. ("RTI") warrants that its Model LSS1 Machine will be free from defects in materials and workmanship at the time of RTI's and for a period of 90 days thereafter exclusive of conveyor belts, which are excluded from warranty coverage; and electrical components, which are subject only to applicable manufacturer's warranties, if any.

During this limited warranty period RTI will provide new replacement parts or Equipment on an exchange basis as set forth below. All replaced parts or Equipment become the property of RTI. This limited warranty also does not include service to repair damage resulting from any accident, disaster, misuse, abuse, or any non-RTI installation, modification or attempted repair of the Equipment.

FOR WARRANTY SERVICE OR ASSISTANCE IT IS REQUIRED THAT A SERVICE REQUEST BE MADE WITHIN THE WARRANTY PERIOD. NO EQUIPMENT OR PARTS MAY BE RETURNED TO RTI WITHOUT RTI'S PRIOR WRITTEN AUTHORIZATION, AND ALL SUCH RETURNS WILL BE AT CUSTOMERS SOLE EXPENSE. If shipping is authorized, Customer must also prepay applicable RTI part or Equipment shipping charges and either obtain shipping insurance or assume the risk of loss or damage in transit. RTI reserves the right to charge Customers' account for replacement of parts or Equipment which are subsequently determined to be outside of Limited Warranty coverage, including applicable travel or service call charges.

THIS LIMITED WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY OFFERED BY RTI, AND NEITHER RTI NOR ANY REPRESENTATIVE MAKES ANY OTHER REPRESENTATION OR WARRANTY OF ANY KING, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OR MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow limitations or exclusions of implied warranties, so the above exclusions may not apply to you.

CUSTOMER'S SOLE REMEDY UNDER THIS LIMITED WARRANTY SHALL BE PART OR EQUIPMENT AS PAROVIDED ABOVE. IN NO EVENT WILL RTI BE LIABLE FOR ANY DAMAGES, INCLUDING ANY ALLEGED DOWNTIME, LOST PROFITS, LOST SAVINGS, OR OTHER SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE SUCH EQUIPMENT, EVEN IF RTI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

APPENDIX B:
Trouble Shooting Guide

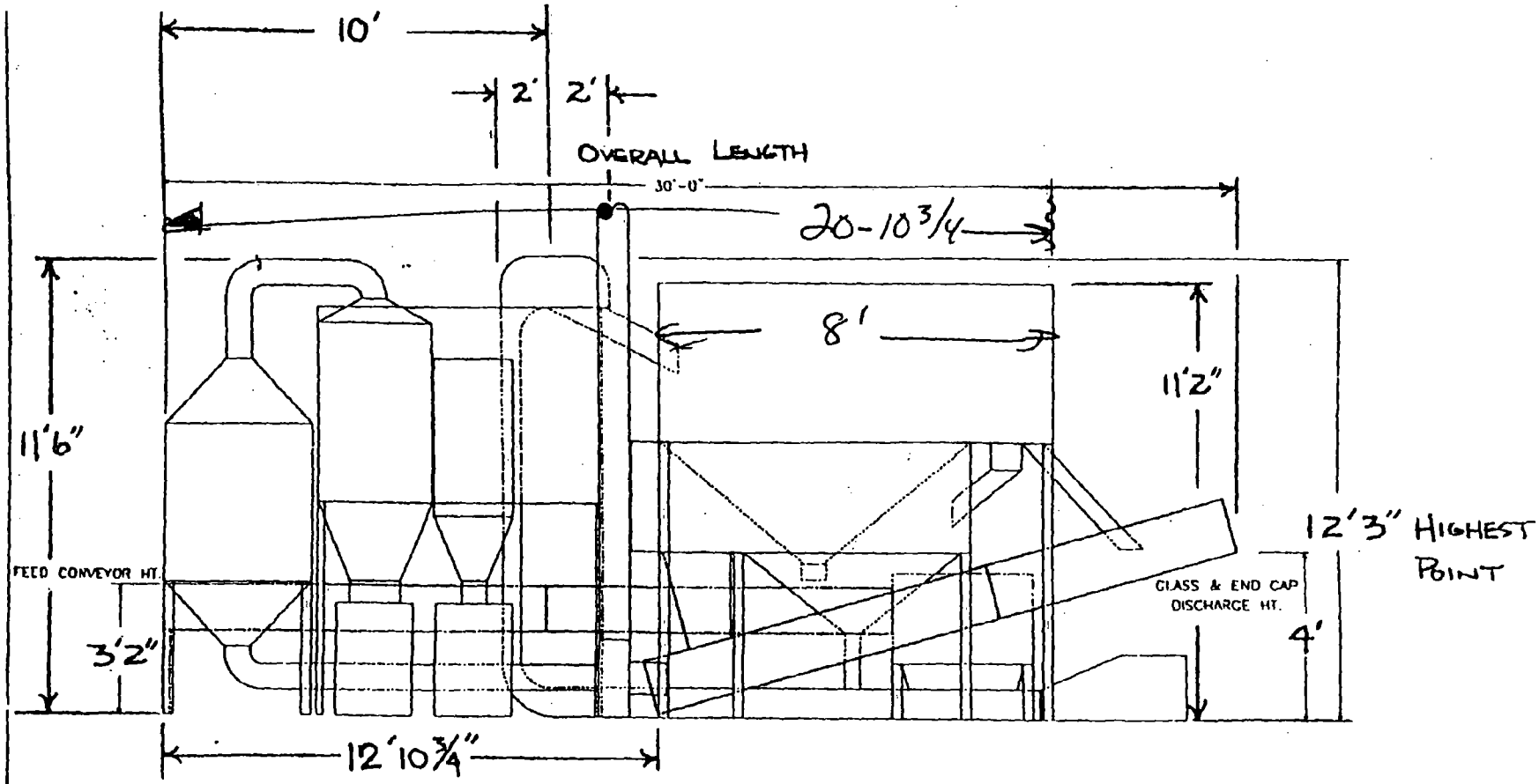
TROUBLE SHOOTING GUIDE

Symptom	Possible Causes	Corrective Action
Feed conveyors stop	• Debris between conveyors • Belt is ripped • Debris in systems • Belt tension too loose • Conveyor pulley moved from center • Key is dislodged from shaft or reducer	• Remove debris • Replace belt • Remove debris • Adjust belt tension • Re-position pulley • Replace key in shaft
Crushing drums stop turning	• Debris in system (nuts, bolts, wood, etc.) • Key is dislodged from shaft	• Reverse motor to clear jam • Remove cover to clear debris • Replace key in shaft
Elevated conveyor stops	• Material overload • Debris in system • Key is dislodged from shaft	• Reverse conveyor to clear jams • Open cleanout(s) to remove material/debris
No power	• Main breaker off • Knife switch off • Key switch off	• Turn on main breaker • Turn on knife switch • Turn on key switch
Phosphor powder coming from co-product chute	• Clogged vapor lines	• Check ports • Clear lines
Baghouse filters clogged	• Air pulse system not working • Filters at end of service life	• Turn on air compressor • Ensure valve is open • Change filters
No air pressure	• Air compressor not turned on • Air compressor unplugged • Ball valve not closed • Mechanical problem • Filter has been ruptured and carbon contaminated with phosphor powder • Leak in air line	• Turn on air compressor • Plug in air compressor • Open valve • Replace air line • Replace cylindrical and square particulate filters – replace carbon
High mercury vapor emissions from exhaust stack	• Carbon is saturated	• Replace carbon
Air compressor will not shut off	• Diaphragm valve stuck open • Air line disconnected or damaged	• Disassemble and clean • Reconnect or replace

*Should a component that is commercially available fail, please refer to the component manufacturer's manual

APPENDIX C:
Inspection Form

	YES	NO
Make sure coproduct containers are empty and are ready to receive material.		
Make sure drum connection boots are straight, and connecting rings are secure.		
Make sure the power is turned on to the control panel..		
Turn on the air compressor, open the air valves.		
Walk around and inspect the machine. Look for loose nuts, bolts, fittings. Listen for air leaks. Check air gauges for proper pressure: Compressor 140 psi Top Regulator 95 psi Lower Regulator 65 psi		
Stage material for processing.		
Turn the key switch on the tough screen to the "ON" position.		
Follow the instructions on the touch screen. Proceed to run the equipment in "Automatic" mode.		
Perform air monitoring in the operator area, co-product area, exhaust stack.		
Begin processing lamps.		

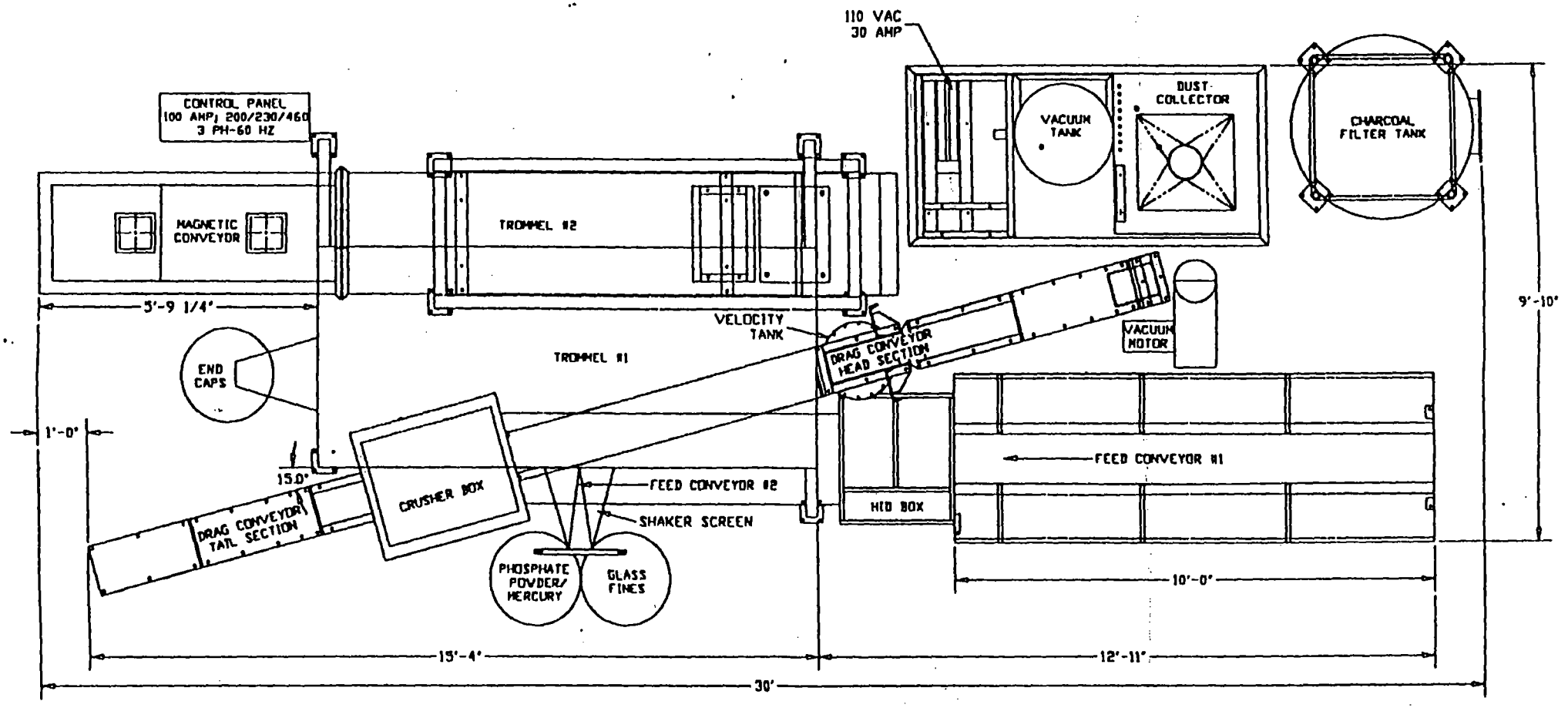


MODEL LSS1

SIDE ELEVATION

ATT: DAN GLENN

RESOURCE TECHNOLOGY INC.
520 WEST ST.
VAN METER, IA.


110 VAC
30 AMP
CONTROL PANEL
100 AMP; 200/230/460
3 PH-60 HZ
MAGNETIC CONVEYOR
TROMMEL #2
VACUUM TANK
DUST COLLECTOR
CHARCOAL FILTER TANK
5'-9 1/4"
9'-10"
VELOCITY TANK
DRAG CONVEYOR HEAD SECTION
VACUUM MOTOR
END CAPS
TROMMEL #1
1'-0"
15.0°
CRUSHER BOX
FEED CONVEYOR #1
FEED CONVEYOR #2
SHAKER SCREEN
HID BOX
DRAG CONVEYOR TAIL SECTION
PHOSPHATE POWDER/ MERCURY
GLASS FINES
10'-0"
15'-4"
12'-11"
30'

MODEL LSS1

ATTACHMENT 3

3. Storage and transfer of hazardous wastes, including lab packs, using tanks and containers. Storage/transfer activities may include consolidation (i.e., bulking) of compatible waste prior to shipment;

4. Storage and blending of hazardous waste intended for use as a supplemental fuel at authorized offsite hazardous waste fuel burners;

5. Compaction of hazardous wastes prior to shipment to offsite disposal facilities (e.g. landfills);

6. Treatment of D002 liquid/solid mixtures in containers by separation/removal of free liquids from solid materials;

7. Treatment of D002 liquids in containers and tanks through the consolidation/mixing of compatible waste streams;

8. Treatment of organic peroxides in containers through the addition of water;

9. Treatment of acidic cyanide mixtures in containers through addition of sodium hydroxide or other suitable alkaline materials;

10. Treatment of hazardous waste in tanks and containers by phase separation using physical (e.g., gravity) and/or chemical (e.g., demulsifying agents) means;

11. Storage, shredding and metal washing of hazardous wastes intended for use as a supplemental fuel or incineration at offsite facilities;

12. Storage and treatment of black powder by addition of water in containers;

13. Storage and treatment of hazardous waste in containers by the addition of dry ice;

14. Storage and venting of hazardous waste oxygen to the atmosphere,

15. Storage and crushing of hazardous waste lamps for volume reduction and preparation for recycling.

A complete description of the RCRA-regulated hazardous waste operations is presented in section C-1 (iii) below.

Typical waste categories and EPA waste codes which are accepted for hazardous waste storage, consolidation, and/or treatment include, but are not limited to, the following:

1. Acids – D002, D004-D011, F006, F019, K002-K008, K031, K048-K052, K061, K062, K069, K084, K086, K100-K120, K106, P011, P012, U144-U146, and U246.

2. Alkalines - D002, D004-D011, F006, F019, K002-K008, K031, K048-K052, K061, K062, K069, K084, K086, K100-K120, K106, P011, P012, U144-U146, and U246.

3. Flammables/organics – wastes which exhibit a flash point of less than 140°F, halogenated and non-halogenated solvents, pure organics, and/or aqueous wastes containing organic materials. Includes waste codes D001, D012-D043, F001-F005, F020-F024, F026-F028, K001, K009-K030, K032-K043, K060, K073, K083, K085, K086, K051, K052, K093-K099, K103-K105, P004, P005, p022, P037, P048, P050, P051, P059, and most U-codes.

The list of hazardous waste codes accepted for hazardous waste shredding/metalwashing is presented in Table C-10A. These wastes may be accepted in bulk tanker, container (e.g., 55-gallon drum) or lab pack form. Typical sample analysis for hazardous waste shredding/metalwashing are provided in Appendix C-1, data sheets 38 through 69.

L. Storage and Treatment of Black Powder in Containers

CHSI is authorized to treat black powder in containers prior to shipment to an off-site treatment or disposal facility. The treatment operation, the addition of water (wetting) to the black powder, is conducted to prepare the black powder for disposal facility requirements. Many hazardous waste incineration facilities can accept black powder, but only when wetted. Additionally, the water used for wetting the black powder may be mixed with virgin ethylene glycol based antifreeze when temperatures are expected to go below 32 degrees F. US DOT Regulations require antifreeze when a package containing wetted black powder could freeze. This operation is conducted in the staging area of Unit R1. The black powder would carry EPA hazardous waste codes D001 and D003.

M. Storage and Treatment of Hazardous Waste in Containers by the Addition of Dry Ice

CHSI is authorized to treat hazardous waste in containers to lower temperatures by the addition of dry ice prior to shipment to an off-site treatment of disposal facility. CHSI proposes to add blocks of dry ice into roll-offs/intermodals containing wastes which may ignite under extreme high temperatures. During summer months with high daytime temperatures and high dew point temperatures, nighttime temperatures also remain high. During these periods CHSI places blocks of dry ice into roll-offs/intermodals containing flammable solids (greater than 5000 BTUs/lb) of non-fuel blendable materials. This will occur when daytime temperatures are expected to reach 90 degrees F. or higher; the expected nighttime low temperature is 70 degrees F. or higher; and the expected high dew point is at or above 70 degrees F. This placement of dry ice will be conducted in Units Q1 and B, but the container could be stored in other transportation vehicle storage areas. Any hazardous waste that is authorized for storage and transfer is a candidate for this treatment operation. Storage and transfer waste codes are listed in Table C-9.

N. Storage and Venting of RCRA Regulated Oxygen to the Atmosphere

CHSI is authorized to vent compressed gas cylinders of oxygen carrying EPA hazardous waste code D001 in Building 25. CHSI also vents non-hazardous atmospheric gases fro Building 25 and utilizes the same procedures. The oxygen is vented using the lab pack consolidation hoods in the acid and alkaline/poison bays. CHSI monitors with an oxygen meter and will cease the operation unless oxygen concentrations are between 19.5% and 23.5%. No flammable operations are allowed during oxygen venting.

N. Storage and Crushing of Hazardous Waste Lamps

CHSI is requesting authorization to crush used lamps for volume reduction and preparation for recycling in Unit 25.These lamps will include fluorescent and high-intensity-discharge lamps. When the lamps are crushed the components are separated into metal, glass and calcium phosphor powder with mercury.

A list of hazardous waste codes accepted for lamp crushing is presented in Table C-17.

C-1a Containerized Waste 703.201 (b) (1)

All of the container storage areas at the facility are equipped with adequate secondary containment. A demonstration of the adequacy of the secondary containment system in each area is provided in Section D-1 of this Application.

As discussed in Section D-1(b)(1), rolloffs containers with free liquids are not allowed for storage in the rolloff storage area. Each rolloff container is subjected to a test for free liquids using EPA Method 9095 to demonstrate that the waste stored in the rolloff does not contain free liquids.

2. Storage/Transfer Wastes – Wastes in this category are accepted, stored, consolidated, and ultimately shipped to an offsite treatment, disposal, or reuse facility. Wastes accepted as part of the hazardous waste fuel blending program and hazardous waste shredding are considered storage and transfer wastes. Storage and transfer wastes are subject to prequalification and onsite acceptance screening procedures, but the range of parameters is less than that for treatment wastes. Any waste, which undergoes blending/consolidation, is, however, subject to chemical compatibility testing prior to undertaking the blending/consolidation activity.

3 Special Wastes – Special wastes are unique waste streams that are comprised of identifiable, unused, commercial products which are not mixed with other characteristic or listed hazardous wastes. In most cases, special wastes are "lab packs" in their pure commercial form and original container (e.g. a bottle of acid from a laboratory cleanout). Special wastes also include, but are not limited to, the following:

1. Commercial chemical product containers which are empty as defined in 35 IAC 721.107:

2. Single-substance spill material (e.g., absorbent debris);

3. Off-specification or outdated commercial chemical products;

4. Contaminated commercial products;

5. Asbestos waste from demolition or cleaning;

6. Intact manufactured articles (e.g., thermometers, batteries, lamps) which contain a hazardous waste;

7. Containers of hardened solids or highly viscous wastes which cannot be sampled;

8. "RCRA-empty" (per 35 IAC 721.107) containers, drums, barrels, cans, bags, liner, etc. from waste commercial products or chemicals; and

9. Aerosol cans which are in good exterior condition and which have an original label, or a label, which accurately reflects the generator's knowledge and/or testing of the contents of the container.

Given their unique nature, special wastes are not subject to sampling or analyses as part of the prequalification process or onsite waste acceptance procedures. However, lab pack waste undergoing consolidation or treatment is subject to compatibility testing prior to the mixing/treatment activity

Table C-17: Hazardous Waste Lamp Crushing

Waste Category	EPA Hazardous Waste No.	Waste Stream	Basis for Hazard listing per 40 CFR 261	Hazard Constituent (s)
Reactive	D003	Sodium	Reactive	
Inorganic Metals	D005	Barium	Toxic	Barium
	D006	Cadmium	Toxic	Cadmium
	D008	Lead	Toxic	Lead
	D009	Mercury	Toxic	Mercury
Universal Wastes	None	Sodium	Reactive	
		Barium	Toxic	Barium
		Cadmium	Toxic	Cadmium
		Lead	Toxic	Lead
		Mercury	Toxic	Mercury
Non-Hazardous	None	N/a	Non-Hazardous	Used lamps

C. Proposed Modifications to Drum Container Storage Activities

1. CONTAINER MANAGEMENT BUILDING (UNIT 25)

Under this Request for Permit Modification, CHSI seeks authorization to store flammable and reactive wastes in Building 25. Building 25 is fully enclosed container storage structure located along the west property line adjacent to the eastern edge of Slip No. 6. The Building 25 truck unloading pad for one truck is located on the northeast side of Builoding 25. This pad will only be used for waste going to or coming from Building 25 and is only for van trailers of waste containers. The pad is connected to a dock to facilitate forklift loading/unloading of the trailer. Building 25 includes three main segregated storage bays used for the storage of ignitable, acidic, and alkaline/poison/PCB hazardous wastes in non-bulk containers (e.g., 55-gallon drums) for liquids and solids, as follows:

~	Alkaline/Poisons/PCBs	248	Drums	
~	Acids	136	Drums	
~	Flammable	184	Drums	
~	Truck Pad	88	Drums	
	Total	656	Drums	(or 30,080 gallons)

CHSI intends to locate a hazardous waste lamp crusher in the alkaline bay of Unit 25, occupying some of the current drum storage. Although this bay is currently permitted for 13,640 gallons (248 55-gallon drums), this will be limited to 4,015 gallons (73 55-gallon drums) when the lamp crusher is in the unit.

The Building 25 truck unloading pad is located on the northeast side of Building 25. This pad is for one van trailer of up to 88 drums (4840 gallons equivalent) for waste going to or coming from Building 25. The pad is connected to a dock to facilitate forklift loading/unloading of the trailer.

Design details and pertinent operating data, including unit dimensions, storage capacity, and secondary containment capacity calculations are shown in CHSI DWG. No. 4282.

The Building 25 truck unloading pad design details are shown in CHSI DWG. No. 4283. Secondary containment calculations are included as Appendix D-37.

Table D-1: Container Management Areas

Type	Container Management	Waste Category	Number/Volume	Area	(See Not
I.	DRUM STORAGE AREAS (55-GALLON DRUMS, OR EQUIVALENT)				
A.	Existing Areas				
	Drum Storage Area (Unit G1)	Acidic – 1	192		
		Acidic – 2	96		
		Alkaline	192		
		Staging	72		
		Subtotal	552		
	Drum Storage Area (Unit R1)	Oxidizer	96		
		Reactive	96		
		Poisons	96		
		Flammable – 1	160		
		Flammable – 2	160		
		Staging (Inbound)	160		
		Subtotal	768		
	Drum Storage Expansion (Unit R2)	Oxidizer	96		
		Reactive	96		
		Poisons	96		
		Staging (outbound)	80		
		Subtotal	368		
	Lab Pack Pour Off Station (Unit F1)	Alkaline/Acids	8		
		Subtotal	8		
	Ignitable Container Management Building (Unit 26)	Ignitable/PCB	192		
		Subtotal	192		
	Container Handling Dock (Unit 61)	Staging	160		
		Subtotal	160		
	Container Management Building (Unit 25)	Alkaline/Poison	248*		
		Acids	136		
		Flammable	184		
		Truck Pad	88		
		Subtotal	656*		

(Continued)

Type	Container Management	Waste Category	Number/Volume	Area	(See Note 1)
B.	Approved/Not Yet Constructed Areas				
	Drum Storage Expansion (Unit R2)	Flammable –3	160		
		Subtotal	160		
	Lab Pack Repack & Consolidation Area (Unit U)	Acid/Alkaline	10		
		Other	25		
		Subtotal	35		
	Paint & Paint Related Material Processing Area (Unit 42)	Ignitable/Toxic	52		
		Debris	64CF		
		Subtotal	52+64CF		
	Shredding Operation (Unit 24)	Ignitable/Toxic	17		
		Debris	64CF		
		Subtotal	17+64CF		
	Metalwashing Operation (Unit 68)	Sludge	1		
			1		

C. Facility Total

---------- 2,969 55-Gallon Drums (163,295 Gallons Total), or Equivalent plus 128 Cu. Ft.*
*-With the lamp crusher in Unit 25, the maximum capacities are reduced to 73 (alkaline bay), 481 (Unit 25) and 2,794 plus 128 cu. Ft. (Total)

II Bulk Solids Storage Areas

A. Existing Storage Areas

Bulk container Storage Area (Unit Q1)	All Characteristic and listed wastes (except water-reactive solids)	Three (3) roll offs At 30 CY Per Unit (Or Equivalent)

(Continued)

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1.0 WASTEWATER TREATMENT SYSTEM

1.1 Chemical Precipitation, Coagulation, Filtration
1.2 Oil Recovery System
1.3 Container Storage, Consolidation and Transfer

2.0 PART B ACTIVITIES

2.1 Container Storage, Consolidation and Transfer
2.2 Drum Crushing/Compacting Operation
2.3 Bulking Operations
2.4 Listed Waste Treatment Operation
2.5 Lab Pack Operations
2.6 Fuels Blending Operation
2.61 Hazardous Waste Shredding Operation
2.62 Metal washing Operation
2.7 Rail Car Transfer Operations
2.8 Hazardous Waste Transfer Facility/Truck to Truck Transfer Operations
2.9 Hazardous Waste Lamp Crushing

The Metalwash Tank has a capacity of 3,730 gallons and the Rinse Tank has a capacity of 987 gallons. Both tanks are constructed of carbon steel and are equipped with level alarms. The metalwash Tank has an emergency vent and will be nitrogen blanketed to eliminate the potential for fires or explosion. The feed hopper will vent to the carbon adsorption system (same as the Bulk Flammable Tank Farm) to control organic air emissions.

2.7 Rail Car Transfer Operations

CHSI operates a concrete-lined storage area for railcar transfer operations (Unit 13). The railcar area is located next to the Ignitable Liquids Tank Farm and is sized to accommodate up to two (2) 30,000 – gallons rail tank cars.

Waste materials may be transferred between the railcars and the tank farm, between truck and railcar. All material transfer operations are conducted using the Clean Harbors rail/truck standard operating procedures listed in Appendix-D-2 in Attachment 1.

2.8 Hazardous Waste Transfer Facility/Truck to Truck Transfer

Under the hazardous waste transfer facility requirements of 35 IAC 723.112, a hazardous waste transporter who stores manifested shipments of hazardous waste in containers meeting the requirements of 35 IAC 722.130 for a period of ten days or less is not subject to regulations under 35 IAC 702, 703, 724, 725 or 728 with respect to the storage of those wastes.

CHSI currently operates a transfer facility for hazardous waste in containers and tank trucks, which are in-transit to facilities other than CHSI. Such vehicles are allowed to stop at the facility for a period of up to 10 days.

In addition, CHSI performs truck-to-truck transfers of waste between in-transit vehicles. Truck to truck transfer activities are accomplished by parking two (2) in-transit trailers either at a loading dock or tailgate-to-tailgate and then directly transferring the container (s) from one vehicle to the other, or transferring bulk liquids or solids from one transport vehicle to another for continuing transport offsite. The containers being transferred are not opened or staged on the loading dock or on the ground during the transfer. Once the transfer is complete, the accompanying manifest (s) are modified to reflect the continuing transport of the transferred containers, and the vehicles continue their shipments to there next intended destination.

CHSI documents all in-transit/truck to truck activities. A copy of the log and drum grid sheet used to track these activities are included in Appendix D-2.

2.9 Hazardous Waste Lamp Crushing

CHSI has proposed to construct and operate a hazardous waste lamp crusher in Unit 25. The lamp crushing operation will be utilized for volume reduction and preparation for recycling.

This system segregates the crushed lamps into glass, metal and phosphor powder containing mercury. The filtration system of the unit is designed to filter the particulate phosphor and mercury vapor with a series of high efficiency particulate air filters and activated carbon. As bulbs are fed into the unit, they are crushed and segregated using vibrating mesh conveyors, magnets and air movement. The components are collected into containers for off-site shipment.

Table D-1: Container Management Area

Type	Container Management Area	Waste Category (See Note 1)		Number/Volume
I.	DRUM STORAGE AREAS (55-GALLON DRUMS, OR EQUIVALENT			
A.	Existing Areas			
	DRUM STORAGE ARE (UNIT G1)	- Acidic –1		192
		- Acidic –2		96
		- Alkaline		192
		- Staging		72
			Subtotal	552
	DRUM STORAGE AREA (UNIT R1)	- Oxidizer		96
		- Reactive		96
		- Poisons		96
		- Flammable – 1		160
		- Flammable – 2		160
		- Staging (Inbound)		160
			Subtotal	768
	DRUM Storage Expansion (UNIT R2)	- Oxidizer		96
		- Reactive		96
		- Poisons/PCB's		96
		- Staging (Outbound)		80
			Subtotal	368
	Lab Pack POUROFF STATION (UNIT F1)	- Alkaline/Acids		8
				8
	CONTAINER MANAGEMENT Building (UNIT 25)	- Alkaline/Poison		248*
		- Acids		136
		- Flammable		184
		- Truck Pad		88
			Subtotal	656*
	IGNITABLE CONTAINER MANAGEMENT Building (Unit 26)	- Ignitable/PCB		192
			Subtotal	192
	Container HANDLING Dock (Unit 61)	- Staging		160
			Subtotal	160
B.	Approved/Not Yet Constructed Area			
	DRUM Storage Expansion (UNIT R2)	- Flammable – 3		160
			Subtotal	160
	Lab pack REPACK & CONSOLIDATION AREA (UNIT U)	- Acid/Alkaline		10
		- Other		25
			Subtotal	35

Table D-1: Continued

Paint and Paint Related Processing Area (Unit 42)	- Westside Pad		24
	- Building		28
	- Hopper (405)		64 Cu.Ft
		Subtotal	52 Plus 64 Cu.Ft.
Shredder Process Building (Unit 24)	- Conveyor		16
	- Drum (412)		1
	- Tote (407)		64 Cu.Ft.
		Subtotal	17 Plus 64 Cu.Ft.
Metal Wash Pad (Unit 68)	- Drum (434)		1
		Subtotal	1

C. Facility Total

---- 2,969 55-gallon drums (163,295 gallons total), or equivalent plus 128 Cu.Ft.*

* - When the lamp crusher is in Building 25, the capacity of the alkaline bay will be reduced to 73 55-gallon drums, Unit 25 capacity will be reduced to 481 55-gallon drums and the facility total capacity will be reduced to 2,794 55-gallon drums and 128 cu. Ft.

(continued)

Bulk Truck and Container Vehicle Storage

C. Truck Staging Area (DWG. No. 4218)
Q Truck Unloading Area & Building Area (DWG. No. 4210, 1 of 3)
V. Truck Loading Dock (DWG. No. 4234)
W. Truck to Truck Transfer Dock (DWG. No. 4244)
X. Listed Waste Loading/Unloading Pad (DWG. No. 4216)
13. Rail Car Unloading Area (DWG. No. 4217)
14. Tank Truck Unloading Platform (DWG. No. 4248)
59. Ignitable Bulk Liquid Truck Staging Area (DWG. No. 4247)
62. Truck Pad (DWG. No. 4246)
69. Truck Loading/Unloading Pad (CHSI DWG. No. 4292)

There are three general waste handling operations for reactive wastes as described below. Equipment and layout details for the various activities are shown in the drawings referenced above.

1. Storage and transfer in containers: Containers of reactive waste, typically in lab pack form, are stored in the reactive, alkaline or other chemically-compatible bays identified above, and then prepared for shipment to offsite treatment/ disposal facility. Handling activities may include the repackaging of compatible waste inside the designated consolidation areas in Building 25 (Unit 25), Building 26 (Unit 26), Building U (Unit U) or the ventilation hoods in Unit R1 or Building 2 (Unit G).

2. Storage and transfer to tanks: Containers of reactive waste are held in storage and then pumped directly into a treatment reactor in the listed waste treatment system in process building 3 (Unit Z) or in the RCRA-Exempt CWA treatment system in process building 1 (Unit F). Containers of lab pack waste can be poured-off in Unit F1 into a treatment reactor in the RCRA-exempt CWA treatment system in process building 1. Similarly, bulk liquid transport vehicles are stored and then direct-offloaded to the treatment reactors in building 3 (Unit Z) or Building 1 (Unit 1).

3. Storage and crushing of used lamps: Lamps containing reactive waste are held in storage and then crushed for volume reduction and preparation for recycling. The lamp crusher is located in Building 25. Some used lamps contain sodium and could be considered reactive. Sodium would react with water which is not introduced at any point in processing the used lamps.

All RCRA-Regulated reactive waste management areas are at least 50 feet from the facility's property line. Refer to CHCI DWG. No. 4204 for the location of the units identified above relative to the property boundaries.

SECTION G
CONTINGENCY PLAN

G-1 General Information

Clean Harbors Services, Inc. (CHSI) is a hazardous waste treatment and storage facility. The name, facility address, EPA ID Number, and owner/operator of the facility is:

Facility Name:	Clean Harbors Services, Inc.
Facility Address:	11800 South Stony Island Avenue Chicago, Illinois 60617 (773) 646-6202 (Business Hours) (773) 646-6805 (Non-Business Hours)
EPA ID Number:	ILD00608471
Owner/Operator:	Clean Harbors Services, Inc. 11800 South Stony Island Avenue Chicago, Illinois 60617

CHSI treats inorganic aqueous-based waste streams in an onsite waste water treatment system and stores and consolidates containerized hazardous wastes, including lab packs, which are shipped to approved offsite treatment and disposal facilities. Under its current RCRA Part B License Application, CHSI is authorized to conduct other hazardous waste operations including: storage and treatment of listed hazardous wastes (F- and K-codes); hazardous waste fuel blending/strorage; expanded lab pack capabilities; drum crushing; hazardous waste paint can and paint related material compacting; hazardous waste shredding and metalwashing; rail car transfer operation; cylinder operations; hazardous waste lamp crushing and non-hazardous waste storage and consolidation. Under CHSI's Request for Permit Modification, CHSI received authorization to incorporate and operate select hazardous waste management units located at the CWM Chemical Services, Inc. (CWMCSI) hazardous waste facility located adjacent to the CHSI facility. A site plan for the facility (CHCI Dwg. No 4204B, Sheets 1 through 3), which includes existing, proposed/not yet conducted, and proposed hazardous waste units, is presented in Appendix G-1.

CHSI has developed this Contingency Plan ("the Plan") in accordance with the requirements of 35 IAC 724 Subpart D. The purpose of the Plan is to minimize hazards to human health or the environment of hazardous waste or hazardous waste constituents to air, soil, or surface waters. The actions described in this Plan must be implemented immediately whenever such releases could threaten human health or the environment. The Plan will be reviewed, and immediately amended, whenever:

Clean Harbors Services, Inc.
Anticipated Hazards

1.0 Introduction

Clean Harbors Services, Inc. (CHSI), a wholly-owned subsidiary of Clean Harbors, Inc., owns and operates a hazardous waste storage and treatment facility located at 11800 South Stony Island Avenue in Chicago, IL. The facility has been in operation since 1980 and its present hazardous waste activities include: 1) storage and treatment of aqueous-based waste streams in an onsite waste water treatment system; 2) storage, consolidation, and transfer of containerized hazardous and non-hazardous wastes, including laboratory packed wastes (i.e., "lab packs"); 3) hazardous waste fuel blending; 4) hazardous waste paint and paint related material compacting; 5) hazardous waste shredding and metalwashing; and (6) hazardous waste lamp crushing.

The existing treatment process utilizes chemical oxidation of aqueous hazardous inorganic and characteristic organic streams, neutralization of concentrated acids and bases, and precipitation of metals and suspended solids. Incoming waste streams, received in bulk and containers, are rendered non-hazardous using chemical oxidation, neutralization, and/or chemical reduction reactions.

The hazardous wastes handled at the facility and the virgin chemicals used in the onsite treatment system are a potential hazard to the personnel at the facility, and, if released, to the environment in general. A summary of the general hazards presented by the hazardous wastes and raw chemicals handled at the site, as well as other types of hazardous, is presented below.

2.0 Hazardous Wastes

The hazardous wastes managed are designated as hazardous because they: 1) exhibit one or more characteristics of a hazardous waste as defined in 40 CFR 261 Subpart C; or 2) are specifically identified (listed) as a hazardous waste per 40 CRF 261 Subpart D. The hazard posed by these wastes include the following properties:

A. Ignitable (D001) – A liquid with a flash point of less than or equals to 140°F; a compressed gas; an oxidizer; or a material capable of causing fire through friction, absorption of moisture, or spontaneous chemical changes, at standard temperature and pressure;

B. Corrosive (D002) – An aqueous liquid with a pH of less than 2 or greater than 12.5 as determined by a pH meter or equivalent test; or a liquid which corrodes steel at a rate greater than 0.250 inches per year at 55°F.

Table 1: Continued

GENERAL DESCRIPTION	HAZARDOUS CHARACTERISTIC**	TYPICAL EPA WASTE NUMBER(S)
Acetic Acids	C	D002
Ammonium Hydroxide < 0.5%	C	D002
Ammonium Hydroxide > 0.5%	C	D002
High Metals Acids	C,T	D002, D004 thru D011
High Metals Bases	C,T	D002, D004 thru D011
Acid With Hexchrome	C,T	D002, D007
Base With Hexchrome	C,T	D002, D007
Acids With Phenol	C	D002
Bases With Phenol	C	D002
Basic Cyanide	C,R,T	D002, D003, F006, F007 F008, F009, F010, F011, F012, F019
Liquid F006	R,T	F006
Liquid F007	R,T	F007
Liquid F008	R,T	F008
Liquid F009	R,T	F009
Liquid F019	R,T	F019
Semi-Solid F006	R,T	F006
Semi-Solid F007	R,T	F007
Semi-Solid F008	R,T	F008
Semi-Solid F009	R,T	F009
Semi-Solid F019	R,T	F019
Lamps	R,T	D003, D005, D006, D008, D009

Table 2: Capacity of Existing/Approved Hazardous Waste Storage/Treatment Units

Hazardous Waste Management Unit		Number/Volume
1. DRUM STORAGE AREAS (BASED ON 55-GALLON DRUMS, OR EQUIVALENT)		
A. Existing Areas		
Indoor Storage Area Building 2	- Acidic – 1	192
	- Acidic –2	96
	- Alkaline	192
	- Staging	72
	Subtotal	552
Outdoor Storage	- Oxidizer	96
	- Reactive	96
	- Poisons	96
	- Flammable – 1	160
	- Flammable – 2	160
	- Staging (Inbound)	160
	Subtotal	768
Lab Pack Processing	- Alkaline/Acids	8
	Subtotal	8
Outdoor Storage Expansion	- Oxidizer	96
	- Reactive	96
	- Poisons	96
	- Staging (Outbound)	80
	Subtotal	368
Building 25	- Alkaline/Poison/PCBs	248*
	- Acids	136
	- Flammable	184
	- Truck Pad	88
	Subtotal	656*
Building 26	- Ignitable	192
	Subtotal	192
Container Dock	- Staging	160
	Subtotal	160
B. Approved/Not Yet Constructed		
Outdoor Storage Expansion	- Flammable - #3	160
	Subtotal	160
Lab Pack Building	- Acid/Alkaline	10
	- Other	25
	Subtotal	35
Building 42	- Westside Pad	24
	- Building	28
	- Hopper (405)	One 64 cu. ft.
	Subtotal	52 plus 64 cu. ft.
Shredder Process Building	- Conveyor to Shredder	16
	- Drum (412)	1
	- Tote (407)	One 64 cu. ft.
	Subtotal	17 plus 64 cu. ft.
Metal Wash Pad	- Drum (434)	1
	Subtotal	1

C. Total - - 2,969 55-gallon drums (163,295 gallons), or equivalent and 128 cu. ft.*

*- With the lamp crusher in Unit 25, the maximum capacities are reduced to 73 (alkaline bay), 481 (Unit 25) and 2,794 plus 128 cu ft. (Total)

After the drums are removed, dust, soil and other residues will be swept or other wise cleaned up and handled as a hazardous waste, The containment floors and walls will be decontaminated as described above and then tested by approved method(s) t o determine whether the decontamination process has been successful. If not, the decontamination process will be repeated or an approved alternative method will be utilized. The rinse waters will be containerized and disposed of at a properly licensed waste disposal facility.

Emptied drums containing hazardous residuals and all other drums to be crushed will be processed prior to closure of the drum crushing units. Following compaction of all containers, the crushed drums will be disposed of by removal of the sealed rolloff container or storage box to a licensed waste disposal facility.

The drum-crushing unit will be decontaminated by washing with a detergent and water solution or a suitable solvent compatible with the materials crushed in the unit, and rinsed according to the procedures specified above. The drum-crushing unit will be tested with approved methods to determine whether the decontamination proceeds has been successful. If not, the decontamination process has been approved alternative method will be used. The reinserts from this process will be containerized and disposed of at a properly licensed waste disposal facility. The decontaminated crusher will be shipped for use at other Clean Harbors' facilitates or will be sold as scrap metal.

The lamp crusher will be decontaminated by washing with a detergent and water solution or suitable mercury cleaning agent (e.g., HgX) compatible with the lamp materials crushed in the unit, and rinsed according to the procedures specified above. The lamp crusher unit will be tested with approved methods (mercury wipe tests) to determine whether the decontamination proceeds has been successful. If not, the decontamination process will be repeated or approved alternative method will be used. The rinsates from this process will be containerized and disposed of at a properly licensed waste disposal facility. The decontaminated crusher will be shipped for use at other Clean Harbors' facilitates or will be sold as scrap metal.

I-1d (2) Closure of Tank System 724.297, 724.410

I-1d (2) (I) General Tank Closure Procedures

The closure of all hazardous waste storage/processing tanks and associated equipment and structures will be conducted in accordance with the tank closure requirements of 35 IAC 724.297.

Waste fuel in the flammable storage tanks will be pumped onto bulk transport vehicles and shipped for use as a supplemental fuel. Other hazardous waste liquids will be loaded onto bulk transport vehicles for shipment to incinerators or other authorized treatment facilities.

All tanks will be decontaminated using the following general procedures:

- Removal of al liquids using pumps/vacuum lines;
- Scrape-down of ceilings and sides to remove hardened residues;
- Squeegee material into vacuum hose;
- Steam clean inside of tank, and
- Squeegee and vacuum all remaining material.

Table I-1: Closure Units/Maximum Capacity

Hazardous Waste Management Unit		Number/Volume
I. DRUM STORAGE AREAS (Based on 55-gallon drums, or equivalent)		
A. Existing Areas		
Indoor Storage Area	Acidic – 1	192
Building 2	Acidic – 2	96
(Unit G1)	Alkaline	192
	Staging	72
	Subtotal	552
Outdoor Storage	Oxidizer	96
(Unit R1)	Reactive	96
	Poisons	96
	Flammable – 1	160
	Flammable - 2	160
	Staging (Inbound)	160
	Subtotal	768
Drum Storage Expansion	Oxidizer – 2	96
(Unit R2)	Reactive – 2	96
	Poisons	96
	Staging(Outbound)	80
	Subtotal	368
Lab Pack Pour-off Station	Alkaline/Acids	8
(Unit F1)	Subtotal	8
Building 26	Ignitable	192
(Unit 26)	Subtotal	192
Container Handling Dock	Staging	160
(Unit 61)	Subtotal	160
Building 25	Alkaline/Poison	248*
	Acids	136
	Flammable	184
	Truck Pad	88
	Subtotal	656*
B. Approved/Not Yet Constructed		
Outdoor Storage Expansion	Flammable – 3	160
(Unit R2)	Subtotal	160

(Continued)

Lab Pack Building (Unit U)		Acid/Alkaline	10
		Other	25
	Subtotal		35
Building 42		Ignitable/Toxic Paints	64 cu.ft.
			52
(Unit 42)	Subtotal		52 and 64 cu.ft.
Shredding Operation (Unit 24)		Ignitable/Toxic	17
		Debris	64 cu.ft
	Subtotal		17 And 64 cu.ft.
Metalwashing Operation		Sludge	1
	Subtotal		1

C. Total - - - 2,969 55-Gallon Drums and 128 cu. ft.(164,253 Gallons Total), or equivalent*

*- With the lamp crusher in Unit 25, the maximum capacities are reduced to 73 (alkaline bay), 481 (Unit 25) and 2,794 plus 128 cu. ft. (154,628 Gallons Total), or equivalent.

(continued)

NOTES;

1) It is assumed that the containers in the poisons/alkaline bay are equally distributed (50% poison, 50% alkaline). Further, it is assumed that the poison drums require RCRA incineration, and that the alkaline drums are suitable for wastewater treatment.

2) All acids, bases and rinsewaters will be shipped off-site for treatment and disposal at Envirite Corporation in Harvey, IL.

3) All chemically-compatible containers of poisons will be consolidated and shipped offsite to Chemical Waste Management, Port Arthur, TX for incineration.

4) Per CHSI Dwg. No. 4282, the containment volume of Building 25 is 18,813 gallons. Therefore, the volume of rinsate water is (0.05) (18,813 gal) or 941 gallons.

5) It is assumed that the 88 drums on the Building 25 pad are split by the same percentages as the drums in Building 25, i.e.,.

Acids	136/568	x	88	=	21
Alkalines	124/568	x	88	=	19
Poisons	124/568	x	88	=	19
Flammables	184/568	x	88	=	29

6) It is assumed at 25% of acids and alkalines are reactive. these will be shipped off-site to Clean Harbors of Connecticut, Inc. in Bristol, CT. for treatment/stabilization.

7) When the lamp crusher is located in the alkaline bay of Unit 25, The maximum storage capacities are reduced to 73 (alkaline bay) and 481 (Unit 25). Decontamination of the lamp crusher will include:

Decontamination of unit	1 crew	1 day	$1200/day	1200
Rinse water	500 gallons	1 unit	$1.51/gallon	755
Analytical	1 sample	1 unit	$900/sample	900
Miscellaneous	1 unit	1 day	$500/day	500
Disposal of unit	1 unit	1000 CF/unit	$1.68/CF	1680
Additional Decontamination Cost				5035

The alkaline bay decontamination does not change with the lamp crusher in the bay. The reduction in disposal because of the lamp crusher will be:

Bases	88 drums	55 gal/dr	$0.75/gal	3630
Poisons	87 drums	55 gal/dr	$6.15/gal	29428
Crushed Drums	175 drums	3 CF/drum	$1.68/CF	882
Reduction in Disposal Cost				33940

The reduction in disposal costs far exceeds the additional decontamination costs with the lamp crusher. CHSI intends to fund closure of Unit 25 at the higher amount. Therefore closure cost is calculated with maximum drum storage.

ATTACHMENT 4

CLEAN HARBORS ENVIRONMENTAL SERVICES
STANDARD OPERATING PROCEDURE
Lamp Recycling System

Cleanharbors Chicago Facility Date: February 16, 2004
Revision 0

1. Purpose:

1.1 The purpose of this document is to provide detailed guidelines and procedures necessary to process Mercury lamps in an appropriate, effective, and safe manner.

2. Scope:

2.1 Lamps enter this system on a power-feed belt conveyor passing through a negative pressure air chamber. Each lamp is crushed, separating glass and metal components into individual co products storage bins. Phosphor powder collects in the multi-storage filtration system. All materials will be stored for subsequent recycling.

3. Pre-Start Up Inspections:

3.1 Inspect the unit and associated parts for defects.
3.2 Ensure fan is operational.
3.3 Ensure all product receptacles are empty and in position to receive the materials as they are discharged.
3.4 Ensure that the four drums around the unit are properly positioned and have straight, unobstructed connection boots and secure connection rings.

4. Start up Operations

4.1 Ensure that the knife switch on the control panel is in the "ON" position.
4.2 Turn the key switch on the touch pad to the "ON" position.
4.3 Unless otherwise stated from your manager, the unit should be run in the **"automatic"** mode. Press the "automatic" selection on the touch screen.
4.4 Press "system start". A five second buzzer will sounds indicating that the machine is ready to start.
4.5 When the buzzer shuts off, the system will start in a sequence.
4.6 When all of the systems are operating all indicator lights of the system will be lit, except "Vacuum Bar and HID",
4.7 The system is now ready to accept lamps.

5. Process

Feeding Conveyor #1

5.1 Lamps are to be placed on the #1 feed conveyor manually end-to-end and stacked no higher than the guard on the end of the conveyor.
5.2 **DO NOT** feed cardboard, wood, plastic, or other debris into the machine.
5.3 Record on the process sheet the volume of boxes of lamps crushed per hour.
5.4 Sign, date, and turn in to department manager. Department manager to process out and file in office.
5.5 **DO NOT** exceed 4000 lamps per hour.
5.6 When any of the co-product material containers are full, an alarm will sound and the system will shut down and will identify the container on the PLC. Replace the full container and restart the system.
5.7 Full containers of Phosphor powder will be handled as a hazardous waste and placed in to the appropriate storage area.
5.8 Full containers of metal end caps and glass will be a non- hazardous waste.
5.9 All containers will need assigned a tracking ID number prior to placing in to storage.

Feeding the Crusher Box

5.1.1 Remove the HID lamps from the container and place them in the crusher box.
5.1.2 Close the box and ensure the latch is shut.
5.1.3. Press the black start button on the side of the crusher box.
5.1.4 Allow 10 seconds for the outer glass to be crushed. The crusher box door will not open until the cycle is fully complete.
5.1.5 Remove the frames and the mercury bearing arc tubes from the unit and place in separate containers.

6. Hazards:

6.1 Chemical exposure to particulate or fumes (phosphor powder, glass fines, mercury vapor)
6.2 Forklift hazard (transporting lamps and material containers to and from the unit)
6.3 Slip, trip, fall hazard
6.4 Cut / laceration / puncture hazard (broken lamps, sharp edges on aluminum pieces)
6.5 Ergonomic stresses (loading of lamps onto conveyor #1)
6.6 Moving parts (conveyors, crushing drums)

7. Shut down Procedure:

7.1 Allow the system to continue running for a minimum of ten minutes after the last lamp has been fed through. This will prevent the release of any residual mercury vapors and/or phosphor powder.
7.2 During this time the operator should use the attached vacuum (positive displacement) and sweep the area thoroughly of any and/or all-residual phosphor powder or glass in the area. DO NOT dry sweep these materials as they likely contain mercury.
7.3 Press the system shut down key on the touch screen panel.
7.4 Allow the vapor fan to continue running to keep the unit under negative pressure.
7.5 Empty co-product material containers if needed.
7.6 **Weekly** – The surrounding work area (hot zone) is to be mopped with a solution of HgX, and the shell of the unit should be wiped completely down with an HgX solution.
7.7 All rags and clothes used for cleaning will be placed in a proper container and staged for subsequent disposal in appropriate area.

8. Emergency shutdown:

8.1 If at any time the machine needs to be immediately shut down and operator should depress one of the four Emergency shutdown buttons located on the machine. Three emergency buttons are located at the front of the machine, and one at the back of the machine.
8.2 To prevent fugitive vapor emissions the vapor collection system must be restarted immediately following the treatment of emergency.

9. Maintenance:

9.1 Maintenance activities conducted during operation of the unit shall be conducted in the personal protective equipment outlined in the section below.
9.2 All other maintenance activities involving opening up a portion of the unit including filter changes, conveyor maintenance, etc. shall be conducted in the PPE listed below unless the unit has been fully decontaminated.

10. Personal Protection Equipment:

10.1 CPF I apron (Chemical Resistant)
10.2 Cut proof outer gloves (Kevlar) with Nitrile inner gloves
10.3 Hard Hat
10.4 Half Face APR with Face shield or full-face respirator
10.5 Mersorb – P100 cartridges
10.6 Kevlar sleeves
10.7 Hearing protection
10.8 Steel Toe Boots

11. **Chemical Hygiene:**

11.1 Consumption of food, beverage or tobacco is prohibited in areas where lamps are handled, stored or processed.
11.2 All operators will be required to wash their hands and face thoroughly with soap and water before breaks and meals.
11.3 Showers will be required at the end of the work shift.

ATTACHMENT 5

COMPLIANCE TEST REPORT

FLUORESCENT BULB CRUSHER
CLEAN HARBORS ENVIRONMENTAL SERVICES, INC.
CINCINNATI, OHIO

August 2003

by

Shaw Environmental, Inc.
11499 Chester Road
Cincinnati, Ohio 45246

PN 846142-01

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1.0 Introduction

On August 26, 2003, Shaw Environmental, Inc., personnel conducted emission tests on the fluorescent bulb crusher at Clean Harbors Environmental Services in Cincinnati, Ohio. Three test runs were conducted on the exit stack to determine particulate and mercury concentrations and mass emission rates. In addition, flue gas flow rate; temperature; and moisture, carbon dioxide (CO_2), and oxygen (O_2) contents were measured. Sampling and analytical procedures were those described in U.S. Environmental Protection Agency (EPA) Methods 1 through 5 and 29.*

The test team consisted of Messrs. Jerry Neese and Doug Cahill. Mr. Mike Crisenbery of Clean Harbors coordinated plant operations during the test. Ms. Sue Marshall of the Hamilton County Department of Environmental Services observed the test series.

2.0 Summary of Results

Particulate emissions data are presented in Table 1. Particulate concentrations are reported in grains per dry standard cubic foot (gr/dscf) and emission rates in pounds per hour (lb/h). The product of the particulate concentration and the flue gas flow rate yields the mass emission rate in pounds per hour.

Table 1
Filterable Particulate Emissions Data
Clean Harbors – Fluorescent Bulb Crusher (August 26, 2003)
(Shaw PN 846142-01)

Run No.	Time (24-h)	Concentration (gr/dscf)[a]	Emission Rate (lb/h)[b]
CH-1	0900-1003	0.00055	0.0035
CH-2	1043-1145	0.00028	0.0018
CH-3	1250-1351	0.00011	0.0007
Average		0.00031	0.0020

[a] gr/dscf = Grains per dry standard cubic foot at 68°F, 29.92 in.Hg., and zero percent moisture.

[b] lb/h = Pounds per hour.

* 40 CFR 60, Appendix A.

The filterable particulate data reported in Table 1 represent the material collected on the filter and in the probe. The average filterable particulate emission rate was 0.002 lb/h. The allowable emission rate is 0.11 lb/h.

Mercury emissions data are presented in Table 2. Mercury concentrations are reported in micrograms per dry standard cubic meter (µg/dscm) and emission rates in pounds lb/h. The average mercury emission rate was 7.5×10^{-6} lb/h. The allowable emission rate is 1.1×10^{-5} lb/h. Flue gas conditions are summarized in Table 3.

Table 2
Mercury Emissions Data
Clean Harbors – Fluorescent Bulb Crusher (August 26, 2003)
(Shaw PN 846142-01)

Run No.	Time (24-h)	Concentration (µg/dscm)[a]	Emission Rate (lb/h)[b]
CH-1	0900-1003	1.2	3.5×10^{-6}
CH-2	1043-1145	4.7	1.3×10^{-5}
CH-3	1250-1351	2.2	6.1×10^{-6}
Average		2.7	7.5×10^{-6}

a µg/dscm = Micrograms per dry standard cubic meter.
b lb/h = Pounds per hour.

Table 3
Summary of Flue Gas Conditions
Clean Harbors – Fluorescent Bulb Crusher (August 26, 2003))
(Shaw PN 846142-01)

Run No.	Flue Gas Flow Rate acfm[a]	Flue Gas Flow Rate dscfm[b]	Tempera-ture (°F)	Moisture (%)	CO_2 (%)[c]	O_2 (%)[c]
CH-1	820	750	97	2.2	0	21
CH-2	800	730	97	2.3	0	21
CH-3	800	730	100	2.5	0	21
Average	810	740	98	2.3	0	21

a acfm = Actual cubic feet per minute at stack conditions.
b dscfm = Dry standard cubic feet per minute; standard conditions are 68°F and 29.92 in.Hg.
c Determined from Fyrite analysis.

3.0 Quality Assurance

All of the equipment used in the field testing was calibrated in accordance with the guidelines of Quality Assurance Handbook for Air pollution Measurement Systems, Volume III, EPA 600/R-94/038c. The calibration records are contained in Appendix E. All of the equipment used met the specifications of the EPA reference methods for accurate measurement.

Sampling was conducted in strict accordance with EPA reference method procedures. All field leak checks and sampling train temperatures met the specifications of the reference methods. Field data sheets are included in Appendix B of this report.

Table 4 summarizes the results of the particulate reagent blank analyses.

Table 5
Example Filter and Reagent Blank Analyses
Clean Harbors – Fluorescent Bulb Crusher (Shaw PN 846142-01)

Sample Type and Filter No.	Blank Value
Particulate - Reeve Angel 934 AH	0.1 mg
Acetone blank[a]	0.002 mg/g

[a] Maximum allowable blank correction is 0.01 mg/g; the indicated blank value was used.

The mercury level in the reagent blank was less than the practical quantitation limit of the method (0.2 μg).

4.0 Process Operation

This facility recycles fluorescent bulbs. The bulbs are shredded and gravimetrically separated into glass, metal, and calcium phosphate powder for further recycling off site. Emissions are controlled by activated carbon and a particulate filter.

The quantity of bulbs processed was 2,450, 2,400, and 2,775 for Runs CH-1, CH-2, and CH-3, respectively, for an average of 2,542 bulbs per test.

5.0 Sampling Location and Test Procedures

Two sampling ports were located approximately 54 stack diameters downstream and 8.7 stack diameters upstream from the nearest flow disturbances in the 8-inch inside-diameter stack. Eight traverse points (four per port) were used for particulate/mercury sampling. Each point was sampled for 7.5 minutes, for a total sampling time of 60 minutes per test run.

All sampling was conducted isokinetically by regulating the sampling rate relative to the flue gas velocity, as measured by the pitot tube attached to the sampling probe. The test methods are described briefly below. Appendix D contains Shaw Standard Operating Procedures for EPA methods 5 and 29.

5.1 Velocity and Gas Temperature

All gas velocities were measured with a Type-S pitot tube and a 0- to 10-inch inclined manometer. In all cases, velocities were measured at each sampling point across the stack to determine an average value according to procedures described in EPA Method 2. Temperatures were measured at each point with a thermocouple and digital temperature indicator. Due to the small stack diameter, velocity and temperature measurements were made before and after each test run in accordance with EPA Method 1A procedures.

5.2 Molecular Weight

CO_2 and O_2 concentrations were determined by Fyrite analysis during each particulate/mercury test.

5.3 Moisture

The flue gas moisture content was determined using EPA Method 4 procedures. Testing was conducted in conjunction with particulate/mercury testing.

5.4 Particulate/Mercury

Particulate and mercury emissions were measured using EPA Method 5 and 29 procedures. The sampling train used for each test consisted of a glass nozzle, a heated borosilicate glass-lined probe, a heated 3-in.-diameter quartz-fiber filter, and a series of Greenburg-Smith and modified impingers containing 4% potassium permanganate/10% sulfuric acid ($KMnO_4/H_2SO_4$). The nozzle, probe, and filter holder portions of the sampling train were acetone-rinsed at the end of

each test. The acetone rinse and the particulate caught on the filter media were dried at room temperature, desiccated to a constant weight, and weighed on an analytical balance. Total filterable particulate matter was determined by adding these two values.

The contents of the impingers were measured gravimetrically to determine the moisture concentration. The contents of the first three impingers were recovered and the nozzle, probe, filter holder, impingers, and connecting glassware were rinsed with $KMnO_4/H_2SO_4$ solution and then with distilled water. The filters and probe rinse residue (following particulate analysis) and impinger solutions were digested and analyzed for mercury by cold vapor atomic absorption spectroscopy.

APPENDIX A

CALCULATIONS

Nomenclature and Dimensions

A_n = Cross-sectional area of sampling nozzle, sq. ft.

A_s = Cross-sectional area of stack, sq. ft.

B_{ws} = Proportion by volume of water vapor in the gas stream, dimensionless

C = Effluent gas concentration as measured, dry basis, ppm/%

C_{gas} = Effluent gas concentration calibration corrected, dry basis, ppm/%

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm/%

C_{ma} = Actual concentration of the upscale calibration gas, ppm/%

C_{NO_x} = NO_x concentration, ppm (manual method)

C'_{NO_x} = Nitrogen oxides concentration as NO_2, pounds per dry standard cubic foot (lb/dscf), manual method

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm/%

C_{O_2} = Effluent gas concentration oxygen corrected, ppm volume dry

C_{obs} = Average THC concentration indicated by gas analyzer, wet basis, ppm

C_p = Pitot tube coefficient, dimensionless

C_s = Concentration of pollutant matter in stack gas - dry basis, grains per standard cubic foot (gr/dscf)

C'_s = Concentration of pollutant matter in stack gas - dry basis, micrograms per normal cubic meter ($\mu g/m^3$)

C_{SO_2} = Concentration of sulfur dioxide, ppm volume (manual method)

Cl_s = Amount of Cl^- in sample, milligrams per liter (mg/L)

$\%C$ = Percent weight of carbon in fuel, dry basis

%CO = Percent of carbon monoxide by volume, dry basis

$\%CO_2$ = Percent of carbon dioxide by volume, dry basis

D_n = Sampling nozzle diameter, in.

F = Factor representing a ratio of the volume of dry gases generated to the calorific value of the fuel combusted, dry standard cubic feet per million Btu of heat input (dscf/10^6 Btu)

GCV = Gross calorific value of the fuel on dry basis, Btu/lb

%H = Percent weight of hydrogen in fuel, dry basis

ΔH = Average pressure drop across the sampling meter flow orifice, inches of water (in. H_2O)

HHV = Higher heating value on an as-received basis, Btu/lb

ISO = Percent of Isokinetic sampling rate, percent

IFR = Incinerator feed rate, wet tons/h

L_a = Maximum acceptable leakage rate for either a pretest leak check or for a leak check following a component change; equal to 0.020 cubic foot per minute or 4% of the average sampling rate, whichever is less

M_d = Dry molecular weight, lb/lb-mole

M_f = Fuel firing rate (measured coal to boiler), lb of coal per hour

M_n = Total amount of pollutant matter collected, mg

M'_n = Total amount of pollutant matter collected, micrograms (μg)

M_s = Molecular weight of stack gas (wet basis), lb/lb-mole

MW = Molecular weight, lb/lb-mole

N = Normality of titrant, eq/liter

%N = Percent weight of nitrogen in fuel, dry basis

$\%N_2$ = Percent of nitrogen by volume, dry basis

$\%O_2$ = Percent of oxygen by volume, dry basis

ΔP = Velocity head of stack gas, in.H_2O

P_{bar} = Barometric pressure, inches of mercury (in.Hg)

P_i and P_f = Initial and final flask pressure, measured as vacuum, in.Hg

P_s = Absolute stack gas pressure, in.Hg

P_{stat} = Static pressure of stack gas, in.H_2O

P_{std} = Gas pressure at standard conditions, in.Hg (29.92 in.Hg)

ppm = Parts per million

pmr = Pollutant mass emission rate, pounds per hour (lb/h)

pmr´ = Pollutant mass emission rate, pounds per million Btu of heat input (10^6 Btu)

pmr_{100} = Pollutant mass emission rate, pounds per 100 pounds of feed (lb/100)

P_{NO_x} = Micrograms NO_x, μg (manual method)

Q_H = Total heat input, 10^6 Btu/h

Q_s = Volumetric flow rate - stack conditions, actual cubic feet per minute (acfm)

$Q_{s_{std}}$ = Volumetric flow rate - dry basis at standard conditions, dry standard cubic feet per minute (dscfm)

$\%S$ = Percent weight of sulfur in fuel, dry basis

T_i and T_f = Initial and final flask temperature, °F

T_m = Average temperature of dry gas meter, °R

T_s = Average temperature of stack gas, °R

T_{std} = Temperature at standard conditions, (528°R)

V_a = Volume of aliquot titrated, milliliters (mL)

V_f = Flask volume, mL

V_{lc} = Total volume of liquid collected in impingers and silica gel, mL

V_m = Volume of dry gas sampled at meter conditions, cu. ft.

$V_{m_{std}}$ = Volume of dry gas sampled at standard conditions, cu. ft.

V_{NO_x} = NO_x sample volume, mL (manual method)

V_s = Average stack gas velocity at stack conditions, feet per second (ft/s)

V_{sc} = Volume of sample collected, liters (L)

V_{soln} = Volume of sample solution, mL

V_t = Volume of titrant used, mL

V_{tb} = Volume of titrant used for blank, mL

$V_{w_{std}}$ = Volume of water vapor at standard conditions, scf

Y = Dry gas meter calibration factor, dimensionless

θ = Total sampling time, minutes

NOTE: Standard conditions = 68°F and 29.92 in.Hg

Example Calculations for Pollutant Emissions

1. Volume of dry gas samples corrected to standard conditions.
Note: V_m must be corrected for leakage if any leakage rates exceed L_a.

$$V_{m_{std}} = 17.647 \ x \ V_m \ x \ Y \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$$

2. Volume of water vapor at standard conditions, ft^3.

$$V_{w_{std}} = 0.04707 \ x \ V_{lc}$$

3. Moisture content in stack gas, volume fraction.

$$B_{ws} = \frac{V_{w_{std}}}{(V_{w_{std}} + V_{m_{std}})}$$

4. Dry molecular weight of stack gas.

$$M_d = 0.44 \ x \ \%CO_2 + 0.32 \ x \ \%O_2 + 0.28 \ x \ (\%N_2 + \%CO)$$

5. Molecular weight of stack gas.

$$M_s = M_d \ x \ (1 - B_{ws}) + 18 \ x \ B_{ws}$$

6. Stack velocity at stack conditions, ft/s.

$$V_s = 85.49 \ x \ C_p \ x \ (avg \ \sqrt{\Delta P}) \ x \ \sqrt{\frac{T_s}{P_s \ x \ M_s}}$$

7. Stack gas volumetric flow rate at stack conditions, acfm.
Note: A_s = square feet.

$$Q_s = 60 \ x \ V_s \ x \ A_s$$

8. Dry stack gas volumetric flow rate at standard conditions, dscfm.

$$Q_{s_{std}} = 17.647 \ x \ Q_s \ x \ \frac{P_s}{T_s} \ x \ (1 - B_{ws})$$

Correction Factors

$$17.647 = \left(\frac{T_{std}}{P_{std}}\right)$$

$$0.04707 = \left(\frac{ft^3\ H_2O\ vapor}{mL\ liquid}\right)$$

0.44 = molecular weight of CO_2/100

0.32 = molecular weight of O_2/100

0.28 = molecular weight of N_2/100

18 = molecular weight of water (H_2O)

$$85.49 = \frac{ft}{second}\left[\frac{(lb/lb\ -\ mole)(in.Hg)}{(°R)(in.H_2O)}\right]^{1/2}$$*

* 40 CFR 60, Appendix A, Method 2.

Generic.app(LaserJet II)/Flow/sm

Pollutant Emission Rate, lb/h

1a. Concentration in gr/dscf. Note: M_n in milligrams.

$$C_s = 0.01543 \ x \ \frac{M_n}{V_{m_{std}}}$$

1b. Concentration in microgram per cubic meter, $\mu g/m^3$. Note: M'_n in micrograms.

$$C_s' = 35.315 \ x \ \frac{M_n', \ \mu g}{V_{m_{std}}}$$

2a. Pollutant mass emission rate, lb/h. Note: C_s in gr/dscf.

$$pmr = \frac{C_s}{7000} \ x \ Q_{s_{std}} \ x \ 60$$

2b. Pollutant mass emission rate, lb/h. Note: C'_s in $\mu g/m^3$.

$$pmr = C_s' \ x \ (6.243 \ x \ 10^{-11}) \ x \ Q_{s_{std}} \ x \ 60$$

3. Isokinetic sampling rate, %.

$$ISO = \frac{100 \ x \ T_s \ x \left[(0.002669 \ x \ V_{lc}) + \left(\frac{V_m}{T_m} \ x \ Y \ x \left(P_{bar} + \frac{\Delta H}{13.6} \right) \right) \right]}{60 \ x \ \theta \ x \ V_s \ x \ P_s \ x \ A_n}$$

Correction Factors

0.01543	= grains per milligram (gr/mg)
35.315	= cubic feet/cubic meter
7000	= grains per pound (gr/lb)
6.243×10^{-11}	$= \left(\frac{lb}{453.6 \times 10^6 \ \mu g}\right) \times \left(\frac{m^3}{35.315 \ ft^3}\right)$
0.002669*	$= \frac{(in.Hg) \ (ft^3)}{(mL) \ (°R)}$

* 40 CFR 60, Appendix A, Method 5.

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EMISSION TEST REPORT

FIELD DATA

Plant: **Clean Harbors**
Sampling location: **Stack**
Test time (start-stop): **0900-1003**

Date: **8/26/03**
Run number: **CH-1**

Sample type: **Partic./Hg**
Bar. press. (in. Hg): **29.68**
Static press. (in. H20): **0.33**
Filter number(s): **027007**
Stack dia. or width (in.): **8.00**
Pitot tube coeff.: **0.84**
Total H2O collected (ml): **21.1**
% O2 by volume (dry): **21.0**

Volume correction (cu. ft.):
Meter calibration factor: **0.991**
Data interval (min.): **7.5**
Nozzle dia. (in.): **0.255**
Stack length (if rectangular) (in.):
Number of traverse points: **8**
% CO2 by volume (dry): **0.0**
% CO by volume (dry):

Sample time (min)		Gas meter reading (cu. ft.)	Velocity head ΔP (in. H2O)	Orifice drop actual ΔH (in. H2O)	Stack Temp. (°F)	Dry gas meter temp. (°F) inlet	outlet
Start 0.0	Initial:	918.606					
			0.380	1.73	98	79	77
			0.470	2.15	96	80	78
			0.570	2.60	97	83	79
			0.530	2.44	97	88	81
			0.300	1.39	96	93	82
			0.390	1.81	97	94	84
			0.510	2.37	97	96	85
			0.480	2.24	97	98	86
Stop 60.0	Final:	965.658					
60.0		**47.052**	**0.454**	**2.09**	**97**	**89**	**82**

9/9/03

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EMISSION TEST REPORT

FIELD DATA

Plant: **Clean Harbors**
Sampling location: **Stack**
Test time (start-stop): **1043-1145**

Date: **8/26/03**
Run number: **CH-2**

Sample type: **Partic./Hg**
Bar. press. (in. Hg): **29.68**
Static press. (in. H20): **0.31**
Filter number(s): **027014**
Stack dia. or width (in.): **8.00**
Pitot tube coeff.: **0.84**
Total H2O collected (ml): **21.7**
% O2 by volume (dry): **21.0**

Volume correction (cu. ft.):
Meter calibration factor: **0.991**
Data interval (min.): **7.5**
Nozzle dia. (in.): **0.255**
Stack length (if rectangular) (in.): **0.00**
Number of traverse points: **8**
% CO2 by volume (dry): **0.0**
% CO by volume (dry):

Sample time (min)		Gas meter reading (cu. ft.)	Velocity head ΔP (in. H2O)	Orifice drop actual ΔH (in. H2O)	Stack Temp. (°F)	Dry gas meter temp. (°F) inlet	outlet
Start 0.0	Initial:	965.955					
			0.370	1.72	96	91	89
			0.420	1.95	97	92	88
			0.520	2.42	98	94	89
			0.450	2.10	98	97	90
			0.320	1.50	96	99	91
			0.410	1.93	97	100	91
			0.490	2.30	98	101	92
			0.460	2.16	98	102	93
Stop 60.0	Final:	1012.108					
60.0		**46.153**	**0.430**	**2.01**	**97**	**97**	**90**

9/2/03

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EMISSION TEST REPORT

FIELD DATA

Plant: **Clean Harbors**
Sampling location: **Stack**
Test time (start-stop): **1250-1351**

Date: **8/26/03**
Run number: **CH-3**

Sample type: **Partic./Hg**
Bar. press. (in. Hg): **29.62**
Static press. (in. H20): **0.33**
Filter number(s): **027015**
Stack dia. or width (in.): **8.00**
Pitot tube coeff.: **0.84**
Total H2O collected (ml): **23.9**
% O2 by volume (dry): **21.0**

Volume correction (cu. ft.):
Meter calibration factor: **0.991**
Data interval (min.): **7.5**
Nozzle dia. (in.): **0.255**
Stack length (if rectangular) (in.): **0.00**
Number of traverse points: **8**
% CO2 by volume (dry): **0.0**
% CO by volume (dry):

Sample time (min)		Gas meter reading (cu. ft.)	Velocity head ΔP (in. H2O)	Orifice drop actual ΔH (in. H2O)	Stack Temp. (°F)	Dry gas meter temp. (°F) inlet	outlet
Start 0.0	Initial:	12.538					
			0.330	1.54	98	94	92
			0.420	1.96	99	95	92
			0.540	2.52	99	97	93
			0.460	2.15	100	100	94
			0.360	1.69	100	103	95
			0.420	1.98	100	104	95
			0.470	2.22	100	105	96
			0.480	2.27	100	107	97
Stop 60.0	Final:	59.488					
60.0		**46.950**	**0.435**	**2.04**	**100**	**101**	**94**

DRW
9/9/03

Shaw
Shaw E & I, Inc.

validated 8/3/94

EMISSION TEST REPORT

TEST RESULTS

Plant: Clean Harbors Test date(s): 8/26/03 8/26/03 8/26/03

Sampling location: Stack

		Run Numbers CH-1	CH-2	CH-3	3-Run AVERAGE
Ø	Net time of test (min)	60.0	60.0	60.0	
NP	Number of sampling points	8	8	8	
Y	Meter calibration factor	0.991	0.991	0.991	
Dn	Sampling nozzle diameter (in)	0.255	0.255	0.255	
Cp	Pitot tube coefficient	0.84	0.84	0.84	
ΔH	Average orifice pressure drop (in. H2O)	2.09	2.01	2.04	**2.0**
Vm	Volume of dry gas sampled at meter conditions (cu. ft.)	47.052	46.153	46.950	**46.72**
Tm	Average gas meter temperature (°F)	85.2	93.7	97.4	**92.1**
Vmstd	Volume of dry gas sampled at standard conditions (scf)	45.028	43.481	43.849	**44.12**
Vlc	Total H2O collected in impingers and silica gel (ml)	21.1	21.7	23.9	**22.2**
Vwstd	Volume of water vapor at standard conditions (scf)	0.993	1.021	1.125	**1.05**
Bws	Percent moisture by volume, as measured	2.16	2.30	2.50	**2.32**
	Percent moisture by volume, at saturation	5.92	5.99	6.42	**6.11**
	Percent moisture value used in calculations	2.16	2.30	2.50	**2.32**
Fmd	Mole fraction of dry gas	0.978	0.977	0.975	**0.977**
%CO2	Percent CO2 by volume (dry)	0.0	0.0	0.0	**0.0**
%O2	Percent O2 by volume (dry)	21.0	21.0	21.0	**21.0**
%CO	Percent CO by volume (dry)	0.0	0.0	0.0	**0.0**
%N2	Percent N2 by volume (dry)	79.0	79.0	79.0	**79.0**
Md	Molecular weight - dry stack gas	28.84	28.84	28.84	**28.84**
Ms	Molecular weight - stack gas	28.61	28.59	28.57	**28.59**
Pbar	Barometric pressure (in. Hg)	29.68	29.68	29.62	**29.66**
Psi	Static pressure of stack gas (in. H2O)	0.33	0.31	0.33	**0.32**
Ps	Stack pressure - absolute (in. Hg)	29.70	29.70	29.64	**29.68**
Ts	Average stack gas temperature (°F)	96.9	97.3	99.5	**97.9**
Vh	Average square root of velocity head (in. H2O)	0.6705	0.6541	0.6578	**0.6608**
Vs	Average stack gas velocity (feet/sec.)	38.98	38.05	38.39	**38.47**
As	Stack area (sq. in.)	50.3	50.3	50.3	**50.3**
Qs	Actual stack flow rate (acfm)	816	797	804	**806**
Qsstd	Stack flow rate - dry (scfm)	752	732	733	**739**
ISO	Percent isokinetic	98.2	97.4	98.1	**97.9**

Shaw
Shaw E & I, Inc.

validated 8/3/94

EMISSION TEST REPORT

TEST RESULTS

Plant: **Clean Harbors** Test date(s): **8/26/03** **8/26/03** **8/26/03**
Sampling location: **Stack**

				Run Numbers CH-1	CH-2	CH-3	3-Run AVERAGE
		Mass of pollutant	=	1.6	0.8	0.3	
		If below detection limits, replace 0 with 1.		0	0	0	
Mn	**Filterable particulate**	Mass	mg	1.6	0.8	0.3	
Cs		Concentration	gr/dscf	5.483E-04	2.839E-04	1.056E-04	**3.126E-04**
Pmr		Emission rate	lb/h	3.534E-03	1.782E-03	6.633E-04	**1.993E-03**

		Mass of pollutant	=	1.59	5.79	2.75	
		If below detection limits, replace 0 with 1.		0	0	0	
Mn	**Mercury**	Mass	µg	1.59	5.79	2.75	
Cs		Concentration	µg/m3	1.247E+00	4.703E+00	2.215E+00	**2.721E+00**
Pmr		Emission rate	lb/h	3.512E-06	1.290E-05	6.081E-06	**7.497E-06**

8/16/03

Shaw
Shaw E & I, Inc.

Validated 05/02/2002

VELOCITY REPORT

FIELD DATA

Plant: **Clean Harbors**
Sampling location: **Stack**

Date: **8/26/03**
Run number: **V-4**

Bar. press. (in. Hg): **29.62**
Static press. (in. H20): **0.34**
Stack dia. or width (in.): **8.000**
Stack length (if rectangular) (in.):
Pitot tube coeff.: **0.84**

Test time (start-stop): **1354**
Number of traverse points: **8**
Moisture (%): **2.50**
% CO2 by volume (dry): **0.0**
% O2 by volume (dry): **21.0**

Traverse Pt. No.	Velocity head ΔP (in. H2O)	Stack Temp. (°F)
1	0.320	104
2	0.400	104
3	0.490	103
4	0.440	102
5	0.310	102
6	0.360	102
7	0.480	101
8	0.440	101
	0.405	**102**

DJB 9/5/03

Shaw
Shaw E & I, Inc.

Validated 05/02/2002

VELOCITY REPORT

TEST RESULTS

Plant: **Clean Harbors** Test date(s): **8/26/03**

ampling location: **Stack**

		Run Numbers V-4	1-Run Average
NP	Number of sampling points	8	
Cp	Pitot tube coefficient	0.84	
Bws	Percent moisture by volume, as measured	2.50	**2.50**
	Percent moisture by volume, at saturation	7.00	**7.00**
	Percent moisture by volume, in calculations	2.50	**2.50**
Fmd	Mole fraction of dry gas	0.975	**0.975**
%CO2	Percent CO2 by volume (dry)	0.0	**0.0**
%O2	Percent O2 by volume (dry)	21.0	**21.0**
%N2	Percent N2 by volume (dry)	79.0	**79.0**
Md	Molecular weight - dry stack gas	28.84	**28.84**
Ms	Molecular weight - stack gas	28.57	**28.57**
Pbar	Barometric pressure (in. Hg)	29.62	**29.62**
Psi	Static pressure of stack gas (in. H2O)	0.34	**0.34**
Ps	Stack pressure - absolute (in. Hg)	29.65	**29.65**
Ts	Average stack gas temperature (°F)	102	**102**
Vh	Average square root of velocity head (in. H2O)	0.6343	**0.6343**
Vs	Average stack gas velocity (feet/sec.)	37.117	**37.117**
As	Stack area (sq. in.)	50.27	
	Stack area (sq. ft.)	0.35	
Qs	Actual stack flow rate (acfm)	777	**777**
Qsstd	Stack flow rate - dry (scfm)	705	**705**

APPENDIX B

SAMPLING DATA

Shaw™ The Shaw Group Inc.

FIELD AUDIT REPORT: DRY GAS METER BY CRITICAL ORIFICE

Date: 8-25-03 Client: Clean Harbors

Barometric Pressure (P_{bar}): 29.68 in.Hg Meter Box No.: FT-10

Orifice No.: 12 Pretest Y: .991 ΔH@ 1.95 in.H_2O

Orifice K Factor: 5.071×10^{-4} Auditor: J. Neese

Orifice Manometer Reading (ΔH), in.H_2O	Dry Gas Meter Reading (V_i/V_f), ft^3	Temperatures (°F)					Duration of Run (⌀), min.
		Ambient		Dry Gas Meter			
		Ambient (T_{ai}/T_{af})	Average (T_a)	Inlet (T_{ii}/T_{if})	Outlet (T_{oi}/T_{of})	Average (T_m)	
2.20	907.0	84	84	86	85	86.25	$13\frac{34.21}{60}$
	918.0	84		89	85		

Dry Gas Meter (V_m), ft^3	$V_{m_{std}}$, ft^3	$V_{m_{act}}$, ft^3	Audit, Y	Y Deviation, %	Audit ΔH@, in.H_2O	ΔH@ Deviation, in.H_2O
11.0	10.604	10.534	.993	0.1%	1.96	0.01

$$V_{m_{std}} = \frac{17.647(V_m)(\overset{29.84}{P_{bar}} + \Delta H/13.6)}{(T_m + 460)} = 10.604 \ ft^3$$

$$V_{m_{act}} = \frac{1203(\varnothing)(K)(\overset{13.57}{P_{bar}})}{(\underset{23.324}{T_a} + 460)^{1/2}} = 10.534 \ ft^3$$

$$Audit\ Y = \frac{V_{m_{act}}}{V_{m_{std}}} = .993 \qquad Y\ deviation = \frac{Audit\ Y - Pretest\ Y}{Pretest\ Y} \times 100 = 0.1\%$$

$$Audit\ \Delta H@ = (0.0317)(\Delta H)(P_{bar})(T_m + 460)\left[\frac{\varnothing}{Y\,(V_m)(P_{bar} + \Delta H/13.6)}\right]^2 = 1.96 \ in.\ H_2O$$

Audit Y must be in the range, pretest Y ±0.05 Y.
Audit ΔH@ must be in the range pretest ΔH@ ±0.15 in.H_2O.

Shaw™ The Shaw Group Inc.

DIGITAL INDICATOR AUDIT DATA SHEET

Indicator No.: FT-10
Client: Clean Harbors
Date: 8·25·03

Project No.:
Operator: J. Neese

Test Point No.	Equivalent Temperature (°F)	Digital Indicator Temperature (°F)	% Difference
1	0	1	0.22
2	100	102	0.36
3	200	202	0.30
4	300	303	0.39

Percent difference must be less than or equal to 0.5%.

Percent difference:

$$\frac{(\text{Digital indicator temperature - equivalent temperature})(100)}{(\text{Equivalent temperature} + 460)}$$

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Shaw The Shaw Group Inc.

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Plant: Clean Harbors Date: 8-25-03

Sampling location: Outlet

Inside of far wall to outside of nipple: 8

Inside of near wall to outside of nipple (nipple length): 0

Stack inside diameter (i.d.) , inches: 8

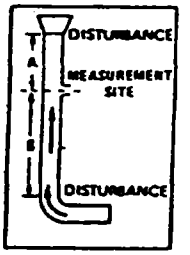
Distance downstream from flow disturbance (Distance B):

432 inches/equivalent diameter = 54 dd

Distance upstream from flow disturbance (Distance A):

69 1/2 inches/equivalent diameter = 8.7 dd

Calculated by: J. Neese



SCHEMATIC OF SAMPLING LOCATION

Traverse Point No.	Fraction of Stack i.d.	Stack i.d.	Product of Columns 2 & 3 (to nearest ⅛ in.)*	Nipple Length (in.)	Traverse Point Location From Outside of Nipple (Sum of Columns 4 & 5)
1	.067	8	1/2		
2	.250	↓	2		
3	.750		6		
4	.933		7 1/2		

* The first and last points must be no closer than 1 in. from the stack wall for stack diameters >24 in. or no closer than 0.5 in. from the stack wall for stack diameters ≤24 in.

Shaw™ The Shaw Group Inc.

Emission Testing Field Data Sheet

Plant and City	Date	Sampling Location	Sample Type	Run Number
Clean Harbors Cinti	8/26/03	Outlet	Part/Hg	CH-1

Operator(s)	Bar. Press. (in.Hg)	Static Press. (in.H_2O)	Amb. Temp. (°F)	Filter Number(s)	Probe Length and Type	Nozzle Dia. (in.)	Nozzle Number
JN, DC	29.68	+0.33	76	027007	3' Glass	.255	6-10

Moisture (%)	Meter Box No.	Meter ΔH@	Meter Cal. Factor (Y)	K Factor	Probe Heat (°F)	Box Heat (°F)	Therm. No.	Pitot No.	Imp. Therm. No.	Gas Bag Pump No.	Gas Bag Sys. Leak Check	Train Leak Check (initial) in.Hg	Train Leak Check (initial) cfm	Train Leak Check (final) in.Hg	Train Leak Check (final) cfm	Pitot Leak Check Initial	Pitot Leak Check Final
3	FT-6	1.95	.991	4.769	250	250	412	504	2.98	—	—	16	0.003	6.5	0.003	✓	

Traverse Point No.	Sampling Time (min.)	Clock Time (24-h)	Gas Meter Reading (Vm), ft^3	Velocity Head* (ΔP), in.H_2O	Orifice Pressure Differential (ΔH), in.H_2O Desired	Orifice Pressure Differential (ΔH), in.H_2O Actual	Temperature (°F) Stack (Ts)	Dry Gas Meter Inlet (Tmi)	Dry Gas Meter Outlet (Tmo)	Sample Box	Probe	Resin	Impinger	Pump Vac. (in.Hg)	Gas Bag Sample Data
A-1	0	0900	918.606												
	7.5		923.9	.38	1.73	1.73	98	79	77	253	247		74	4	
2	15	0915	928.0	.47	2.15	2.15	96	80	78	247	247	N/A	65	5	N/A
3	22.5		936.5	.57	2.60	2.60	97	83	79	248	248		73	6	
4	30	0930	942.877	.53	2.44	2.44	97	85	81	250	248		71	6	
B-1	37.5		949.6	.30	1.39	1.39	96	93	88	257	247		71	3.5	
2	45	0945	953.1	.34	1.51	1.51	97	94	84	247	247		68	4	
3	52.5		956.6	.51	2.37	2.37	97	96	85	245	240		68	5.5	
4	60	1000	962.658	.45	2.24	2.24	97	98	86	247	246		70	5.5	

* Record pressure differentials to 2 significant figures, e.g., 0.015, 0.88, 1.2, etc. Comments: O_2 5.1% CO_2 0%

2,450 BULBS

Shaw™ The Shaw Group Inc.

PARTICULATE/MERCURY SAMPLE RECOVERY DATA SHEET

Plant: Clean Harbors
Sample date: 8/26/03
Sample location: Stack
Recovery date: 8/26/03
Run No.: CH-1
Recovered by: DJW
Filter No(s).: 027007

MOISTURE

Impingers	1st	2nd	3rd	4th
Contents	4% $KMnO_4$/10% H_2SO_4		Empty	Silica gel
Final wt/vol	585.9 g	611.9 g	481.8 g	790.4 g
Initial wt/vol	585.8 g	602.9 g	479.7 g	780.5 g
Net gain	0.1 g	9.0 g	2.1 g	9.9 g

Description of impinger water: purple

Total moisture: 21.1 g

RECOVERED SAMPLE

Filter container number(s): 6831B
Sealed: ✓
Description of particulate on filter: none visible

Blank 6837B #027012

	Sample solution/rinse container numbers	Blanks	Sealed/liquid level marked
Acetone probe rinse	6831A	6837A	✓
$KMnO_4$ solution and H_2O rinse	6832A	6838A	✓
8N HCl and H_2O rinses			

Samples stored and locked: ✓

Remarks:

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August 25, 2003

Shaw™ The Shaw Group Inc.

Emission Testing Field Data Sheet

Plant and City	Date	Sampling Location	Sample Type	Run Number
Clean Harbors Corti	8/26/03	Outlet	Part/Hg	CH-2

Operator(s)	Bar. Press. (in.Hg)	Static Press. (in.H_2O)	Amb. Temp. (°F)	Filter Number(s)	Probe Length and Type	Nozzle Dia. (in.)	Nozzle Number
JN DC	29.68	+0.31	84	027014	3' Glass	.255	G-10

Moisture (%)	Meter Box No.	Meter ΔH@	Meter Cal. Factor (Y)	K Factor	Probe Heat (°F)	Box Heat (°F)	Therm. No.	Pitot No.	Imp. Therm. No.	Gas Bag Pump No.	Gas Bag Sys. Leak Check	Train Leak Check (initial) in.Hg	Train Leak Check (initial) cfm	Train Leak Check (final) in.Hg	Train Leak Check (final) cfm	Pitot Leak Check Initial	Pitot Leak Check Final
3	FT-10	1.95	.991	4.709	250	250	412	504	I-95	—	—	16	0.004	10	0.006	✓	

Traverse Point No.	Sampling Time (min.)	Clock Time (24-h)	Gas Meter Reading (Vm), ft^3	Velocity Head* (ΔP), in.H_2O	Orifice Pressure Differential (ΔH), in.H_2O Desired	Orifice Pressure Differential (ΔH), in.H_2O Actual	Temperature (°F) Stack (Ts)	Dry Gas Meter Inlet (Tmi)	Dry Gas Meter Outlet (Tmo)	Sample Box	Probe	Resin	Im-pinger	Pump Vac. (in.Hg)	Gas Bag Sample Data
	0	1043	965.955												
A-1	7.5		971.2	.39	1.72	1.72	96	91	89	246	236		75	6	
2	15	1055	977.0	.42	1.95	1.95	97	92	88	246	266	N/A	71	7	N/A
3	22.5		983.2	.52	2.42	2.42	98	94	89	248	265		66	9	
4	30	1113	989.176	.45	2.10	2.10	98	97	90	247	250		66	8	
B-1	37.5		994.3	.32	1.50	1.50	96	99	91	252	262		66	5	
2	45	1130	999.8	.41	1.93	1.93	97	100	91	245	261		70	7	
3	52.5		1006.1	.49	2.30	2.30	98	101	92	248	262		68	8	
4	60	1145	1012.108	.46	2.16	2.16	98	102	93	247	261		67	8	

* Record pressure differentials to 2 significant figures, e.g., 0.015, 0.88, 1.2, etc. Comments:

2400 Bulbs

Shaw™ The Shaw Group Inc.

PARTICULATE/MERCURY SAMPLE RECOVERY DATA SHEET

Plant: Clean Harbors
Sample date: 8/26/03
Sample location: Stack
Recovery date: 8/26/03
Run No.: CH-2
Recovered by: DRW
Filter No(s).: 027014

MOISTURE

Impingers	1st	2nd	3rd	4th
Contents	4% $KMnO_4$/10% H_2SO_4		Empty	Silica gel
Final wt/vol	577.3 g	688.8 g	475.2 g	766.4 g
Initial wt/vol	571.3 g	682.6 g	474.0 g	758.1 g
Net gain	6.0 g	6.2 g	1.2 g	8.3 g

Description of impinger water: purple

Total moisture: 21.7 g

RECOVERED SAMPLE

Filter container number(s): 6833
Sealed: ✓
Description of particulate on filter: none visible

	Sample solution/rinse container numbers	Sealed/liquid level marked
Acetone probe rinse	6834	✓
$KMnO_4$ solution and H_2O rinse	6834	✓
8N HCl and H_2O rinses		

Samples stored and locked: ✓

Remarks:

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August 25, 2003

Shaw™ The Shaw Group Inc.

Emission Testing Field Data Sheet

Plant and City	Date	Sampling Location	Sample Type	Run Number
Clean Harbors	8/26/03	Outlet	Part/Hg	CH-3

Operator(s)	Bar. Press. (in.Hg)	Static Press. (in.H_2O)	Amb. Temp. (°F)	Filter Number(s)	Probe Length and Type	Nozzle Dia. (in.)	Nozzle Number
JN DC	29.62	+0.33	88	027015	3' Glass	.255	G-10

Moisture (%)	Meter Box No.	Meter ΔH@	Meter Cal. Factor (Y)	K Factor	Probe Heat (°F)	Box Heat (°F)	Therm. No.	Pitot No.	Imp. Therm. No.	Gas Bag Pump No.	Gas Bag Sys. Leak Check	Train Leak Check (initial) in.Hg	Train Leak Check (initial) cfm	Train Leak Check (final) in.Hg	Train Leak Check (final) cfm	Pitot Leak Check Initial	Pitot Leak Check Final
3	17-10	1.95	.991	4.709	250	250	412	504	I-98	—	—	16	0.010	4	0.003		

Traverse Point No.	Sampling Time (min.)	Clock Time (24-h)	Gas Meter Reading (Vm), ft^3	Velocity Head* (ΔP), in.H_2O	Orifice Pressure Differential (ΔH), in.H_2O Desired	Orifice Pressure Differential (ΔH), in.H_2O Actual	Temperature (°F) Stack (Ts)	Dry Gas Meter Inlet (Tmi)	Dry Gas Meter Outlet (Tmo)	Sample Box	Probe	Resin	Im-pinger	Pump Vac. (in.Hg)	Gas Bag Sample Data
	0	1250	12.538												
A-1	7.5		17.7	.33	1.54	1.54	98	94	92	246	269		74	2	
2	13	1305	23.5	.42	1.96	1.96	99	95	92	247	258	N/A	74	2.5	N/A
3	22.5		29.8	.54	2.52	2.52	99	97	93	246	259		68	3	
4	30	1320	35.968	.46	2.15	2.15	100	100	94	243	260		73	3	
B-1	37.5		41.2	.36	1.69	1.69	100	103	95	248	257		67	2	
2	45	1336	47.1	.42	1.95	1.95	100	104	95	247	256		66	2.5	
3	52.5		53.7	.47	2.22	2.22	100	105	96	249	257		65	3	
4	60	1356	59.488	.48	2.27	2.27	100	107	97	249	256		67	3	

* Record pressure differentials to 2 significant figures, e.g., 0.015, 0.88, 1.2, etc. Comments:

2,775 bulbs

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Shaw™ The Shaw Group Inc.

PARTICULATE/MERCURY SAMPLE RECOVERY DATA SHEET

Plant: Clean Harbors
Sample date: 8/26/03
Sample location: Stack
Recovery date: 8/26/03
Run No.: CH-3
Recovered by: [illegible]
Filter No(s).: 027015

MOISTURE

Impingers	1st	2nd	3rd	4th
Contents	4% $KMnO_4$/10% H_2SO_4		Empty	Silica gel
Final wt/vol	632.4 g	609.8 g	563.5 g	857.2 g
Initial wt/vol	623.1 g	605.4 g	562.3 g	848.2 g
Net gain	9.3 g	4.4 g	1.2 g	9.0 g

Description of impinger water

Total moisture 23.9 g

RECOVERED SAMPLE

Filter container number(s): 6835B
Sealed: ✓
Description of particulate on filter: none visible

	Sample solution/rinse container numbers	Sealed/liquid level marked
Acetone probe rinse	6835A	✓
$KMnO_4$ solution and H_2O rinse	6836A	✓
8N HCl and H_2O rinses		

Samples stored and locked: ✓
Remarks

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August 25, 2003

SHAW PN: _____

Shaw™ The Shaw Group Inc.

GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant and City Clean Harbors Cinti Date 8-26-03

Sampling Location Outlet Clock Time 1354

Run No. CH-4 Operator DC JN

Barometric Pressure, in.Hg 29.62 Static Pressure, in.H_2O +0.34

Manometer Size 0-10" Pitot Tube, Cp .84

Stack Dimension, in. Diameter or Side 1 8" Side 2 _____

CO_2 % _____ O_2 % _____ Molecular wt., Dry _____

Wet Bulb _____ Dry Bulb _____ Moisture, % _____

Pitot No. 504 Thermocouple No. 412

FIELD DATA

TRAVERSE POINT NUMBER	VELOCITY HEAD, ΔP_s (in.H_2O)	STACK TEMP. (°F)
A-1	.32	104
2	.40	104
3	.49	103
4	.44	102
B-1	.31	102
2	.36	102
3	.48	101
4	.44	101

CALCULATIONS

$M_s = M_d \times \left(1 - \frac{H_2O}{100}\right) + 18\left(\frac{H_2O}{100}\right)$

$M_s = (\quad) \times (1 - \frac{\quad}{100}) + 18 (\frac{\quad}{100})$

$M_s =$

$\bar{T}_s =$ °F = °R = (°F + 460)

$P_s = P_b + \frac{S.P.}{13.6} = (\quad) + \frac{\quad}{13.6}$

$P_s =$ in.Hg

$(\Delta P^{1/2})_{Avg} =$

$V_s = 85.49 \times Cp \times (\Delta P^{1/2})_{Avg} \left(\frac{T_s{}^{\circ}R}{P_s M_s}\right)^{1/2}$

$V_s = 85.49 \times (\quad) \times (\quad) \times \left(\frac{\quad}{x}\right)^{1/2}$

$V_s =$ ft/s

$A_s =$ ft^2

$Q_s = V_s \times A_s \times \frac{60\ s}{m}$

$Q_s =$ x x 60

$Q_s =$ acfm

$Q_{s_{std}} = Q_s \times 17.647 \times \frac{P_s}{T_s} \times \left(1 - \frac{H_2O\%}{100}\right)$

$Q_{s_{std}} =$ x 17.647 x $\frac{\quad}{°R}$ x $(1 - \frac{\quad}{100})$

$Q_{s_{std}} =$ dscfm

APPENDIX C

ANALYTICAL DATA

Shaw
Shaw E & I, Inc.

validated 4/14/95

Method 5 Sample Analytical Data
Acetone Rinses and Filters

Plant: Clean Harbors
Run No.: CH-1
Sample Location(s): Outlet
Relative Humidity < 50%: Yes

Sample Type	Sample Identifiable	Liquid level at mark and/or container sealed
Acetone	Yes	Yes
Filter	Yes	Yes

Acetone Sample Container No.: 6831A

Date and time of wt.: 8/29/03 630 am
Date and time of wt.: 8/29/03 230 pm

Acetone blank value, (Ca) mg/g: 0.002
Acetone Blank wt., mg = Va x pa x Ca

Density of Acetone: 0.7899 g/ml (pa)
Volume of Acetone: 150 ml (Va)
Beaker Gross wt.: 109.3338 g
Beaker Gross wt.: 109.3336 g
Average Gross wt.: 109.3337 g
Beaker Tare wt.: 109.3320 g
less Acetone Blank wt.: 0.2 mg
Net wt. particulate in acetone fraction: 1.5 mg

Note: In no case shall a blank residue greater than 0.01 mg/g be subtracted from the sample weight.

Filter Sample Container No.: 6831B

Date and time of wt.: 8/29/03 630 am
Date and time of wt.: 8/29/03 230 pm

Filter No.: 27007
Filter Gross wt.: 0.3139 g
Filter Gross wt.: 0.3140 g
Average Gross wt.: 0.3140 g
Filter Tare wt.: 0.3139 g
Net wt. particulate on filter: 0.0 mg

Total wt. of filterable particulate: 1.6 mg

Note: Constant weight is defined as a difference of less than 0.5 mg or 1% of sample wt., whichever is greater, between two consecutive weighings at least 6 hours apart.

Remarks:

Signature of Analyst: [illegible] Date: 9/2/03
Signature of Reviewer: [illegible] Date: 9/2/03

Shaw
Shaw E & I, Inc.

validated 4/14/95

Method 5 Sample Analytical Data
Acetone Rinses and Filters

Plant: Clean Harbors
Run No.: CH-2
Sample Location(s): Outlet
Relative Humidity < 50%: Yes

Sample Type	Sample Identifiable	Liquid level at mark and/or container sealed
Acetone	Yes	Yes
Filter	Yes	Yes

Acetone Sample Container No.: 6833A

Density of Acetone: 0.7899 g/ml (pa)
Volume of Acetone: 125 ml (Va)

Date and time of wt.: 8/29/03 630 am — Beaker Gross wt.: 109.5598 g
Date and time of wt.: 8/29/03 230 pm — Beaker Gross wt.: 109.5596 g
Average Gross wt.: 109.5597 g
Acetone blank value, (Ca) mg/g: 0.002 — Beaker Tare wt.: 109.5588 g
Acetone Blank wt., mg = Va x pa x Ca — less Acetone Blank wt.: 0.2 mg
Net wt. particulate in acetone fraction: 0.7 mg

Note: In no case shall a blank residue greater than 0.01 mg/g be subtracted from the sample weight.

Filter Sample Container No.: 6833B — Filter No.: 27014

Date and time of wt.: 8/29/03 630 am — Filter Gross wt.: 0.3098 g
Date and time of wt.: 8/29/03 230 pm — Filter Gross wt.: 0.3098 g
Average Gross wt.: 0.3098 g
Filter Tare wt.: 0.3097 g
Net wt. particulate on filter: 0.1 mg

Total wt. of filterable particulate: 0.8 mg

Note: Constant weight is defined as a difference of less than 0.5 mg or 1% of sample wt., whichever is greater, between two consecutive weighings at least 6 hours apart.

Remarks:

Signature of Analyst: [signature] Date: 9/2/03

Signature of Reviewer: [signature] Date: 9/2/03

Shaw
Shaw E & I, Inc.

validated 4/14/95

Method 5 Sample Analytical Data
Acetone Rinses and Filters

Plant: Clean Harbors | Run No.: CH-3

Sample Location(s): Outlet | Relative Humidity < 50%: Yes

Sample Type	Sample Identifiable	Liquid level at mark and/or container sealed
Acetone	Yes	Yes
Filter	Yes	Yes

Acetone Sample Container No.: 6835A

Date and time of wt.: 8/29/03 630 am

Date and time of wt.: 8/29/03 230 pm

Acetone blank value, (Ca) mg/g: 0.002

Acetone Blank wt., mg = Va x pa x Ca

Density of Acetone:	0.7899	g/ml (pa)
Volume of Acetone:	150	ml (Va)
Beaker Gross wt.:	103.9809	g
Beaker Gross wt.:	103.9811	g
Average Gross wt.:	103.9810	g
Beaker Tare wt.:	103.9806	g
less Acetone Blank wt.:	0.2	mg
Net wt. particulate in acetone fraction:	0.2	mg

Note: In no case shall a blank residue greater than 0.01 mg/g be subtracted from the sample weight.

Filter Sample Container No.: 6835B

Date and time of wt.: 8/29/03 630 am

Date and time of wt.: 8/29/03 230 pm

Filter No.:	27015	
Filter Gross wt.:	0.3104	g
Filter Gross wt.:	0.3104	g
Average Gross wt.:	0.3104	g
Filter Tare wt.:	0.3103	g
Net wt. particulate on filter:	0.1	mg
Total wt. of filterable particulate:	0.3	mg

Note: Constant weight is defined as a difference of less than 0.5 mg or 1% of sample wt., whichever is greater, between two consecutive weighings at least 6 hours apart.

Remarks:

Signature of Analyst: [signature] Date: 9/2/03

Signature of Reviewer: [signature] Date: 9/2/03

Shaw
Shaw E & I, Inc.

validated 4/14/95

Method 5 Blank Analytical Data
Acetone Rinses and Filters

Plant: Clean Harbors
Run No.: **Blank**
Sample Location(s): Outlet
Relative Humidity < 50%: Yes

Blank Type	Sample Identifiable	Liquid level at mark and/or container sealed
Acetone	Yes	Yes
Filter	Yes	Yes

Acetone Blank Container No.: 6837A

Date and time of wt.: 8/29/03 630 am
Date and time of wt.: 8/29/03 230 pm

Acetone Blank value, Ca, mg/g = ma / Va / pa

Density of Acetone:	0.7899	g/ml (pa)
Volume of Acetone:	150	ml (Va)
Beaker Gross wt.:	109.1518	g
Beaker Gross wt.:	109.1518	g
Average Gross wt.:	109.1518	g
Beaker Tare wt.:	109.1516	g
Blank Net wt.:	0.2	mg (ma)
Acetone Blank Value:	0.002	mg/g (Ca)
Blank value used for calculations:	0.002	mg/g

Note: In no case shall a blank residue greater than 0.01 mg/g be subtracted from the sample weight.

Filter Blank Container No.: 6837B

Date and time of wt.: 8/29/03 630 am
Date and time of wt.: 8/29/03 230 pm

Filter No.:	27012	
Filter Gross wt.:	0.3110	g
Filter Gross wt.:	0.3109	g
Average Gross wt.:	0.3110	g
Filter Tare wt.:	0.3108	g
Filter Blank Difference:	0.1	mg

Note: Difference between filter blank and tare wts. should be less than ± 5 mg or ± 2% of sample wts., whichever is greater.

Note: Constant weight is defined as a difference of less than 0.5 mg or 1% of sample wt., whichever is greater, between two consecutive weighings at least 6 hours apart.

Remarks:

Signature of Analyst: [signature] Date: 9/2/03

Signature of Reviewer: [signature] Date: 9/2/03

Columbia Analytical Services inc.

Date: September 16, 2003
Number of pages: 9

1 Mustard St., Suite 250
Rochester, NY 14609

To:

Mr. Dave Osterhout
Shaw Environmental
11499 Chester Rd.
Cncinnatiton, OH 45246

Phone: 513-782-4897

Fax: 513-782-4807

CC:

From:

Michael Perry

Phone: (585) 288-5380

Fax: (585) 288-8475

RUSH REPORT

Submission #: R2318258
Project Reference: CLEAN HARBOR

thanks, Mike

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COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6831A/6831B: RUN CH-1

Date Sampled : 08/26/03 Order #: 669006 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	0.0900	UG	09/12/03	0.100

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6832A: RUN CH-1

Date Sampled : 08/26/03 Order #: 669007 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	1.59	UG	09/12/03	0.710

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6833A/6833B: RUN CH-2

Date Sampled : 08/26/03 Order #: 669008 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	0.0440	UG	09/12/03	0.100

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6834A: RUN CH-2

Date Sampled : 08/26/03 Order #: 669009 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	5.79	UG	09/12/03	0.715

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6835A/6835B: RUN CH-3

Date Sampled : 08/26/03 Order #: 669010 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	0.145	UG	09/12/03	0.100

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6836A: RUN CH-3

Date Sampled : 08/26/03 Order #: 669011 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	2.75	UG	09/12/03	0.650

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6837A/6837B: RUN CH-4 Blank

Date Sampled : 08/26/03 Order #: 669012 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	0.100	UG	09/12/03	0.100

COLUMBIA ANALYTICAL SERVICES

Reported: 09/16/03

Shaw Environmental
Project Reference:CLEAN HARBOR
Client Sample ID :6838A: RUN CH-4 Blank

Date Sampled : 08/26/03 Order #: 669013 Sample Matrix: AIR
Date Received: 09/03/03 Submission #: R2318258

ANALYTE	PQL	RESULT	UNITS	DATE ANALYZED	ANALYTICAL DILUTION
METALS					
MERCURY	0.200	0.124 U	UG	09/12/03	0.620

APPENDIX D

SAMPLING AND ANALYTICAL PROCEDURES

M:\DJONES\DOCS\Osterhout\COMPTEST Clean Harbors.doc/dj

1.0 SUBJECT

DETERMINATION OF PARTICULATE EMISSIONS FROM STATIONARY SOURCES (EPA METHOD 5)

2.0 PURPOSE

Particulate matter is withdrawn isokinetically from the source and collected on a glass fiber filter maintained at temperature in the range of 120° ±14°C (248° ±25°F) or such other temperature as specified by an applicable subpart of the 40 Code of Federal Regulations or approved by the Administrator of the applicable EPA Region or equivalent in the authorized State. The particulate mass, which includes any material that condenses at or above the filtration temperature, is determined gravimetrically after removal of uncombined water.

This method is applicable for the determination of particulate emissions from stationary sources.

3.0 SCOPE

This procedure shall be followed when performing compliance testing of stationary sources under the Clean Air Act, or where otherwise required as part of a regulatory compliance demonstration.

This procedure incorporates by reference 40 Code of Federal Regulations (CFR), Part 60, Appendix A, Method 5 in its entirety.

4.0 REFERENCES

4.1 External References

40 Code of Federal Regulations (CFR), Part 60, Appendix A, Method 5.

4.2 Other Internal Procedures

SHAW-SOP-001
SHAW-SOP-002
SHAW-SOP-003
SHAW-SOP-004

5.0 PROCEDURE

5.1 Sampling Procedure

5.1.1 Pretest Preparation. Weigh several 200- to 300-g portions of silica gel in air-tight containers to the nearest 0.5 g. Record the total weight of the silica gel plus container, on each container. As an alternative, the silica gel need not be preweighed, but may be weighed directly in its impinger or sampling holder just prior to train assembly.

Check filters visually against light for irregularities and flaws or pinhole leaks. Label the shipping containers (glass or plastic petri dishes), and keep the filters in these containers at all times except during sampling and weighing.

Desiccate the filters at 20 ± 5.6°C (68 ± 10°F) and ambient pressure for at least 24 hours, and weigh at intervals of at least 6 hours to a constant weight, i.e., ≤0.5-mg change from previous weighing; record results to the nearest 0.1 mg. During each weighing, the filter must not be exposed to the laboratory atmosphere for a period greater than 2 minutes and a relative humidity above 50 percent. Alternatively (unless otherwise specified by the Administrator), the filters may be oven dried at 15°C (220°F) for 2 to 3 hours, desiccated for 2 hours, and weighed. Procedures other than those described, which account for relative humidity effects, may be used, subject to the approval of the Administrator.

General Glassware Cleaning applicable to USEPA Methods 5 and other methods for INORGANIC Analytes.

Wash in Soap and Hot Water
Rinse with Tap Water
Rinse with Deionized (DI) Water-3 times
Rinse with Acetone
Oven Dry
Seal openings with parafilm or Teflon Tape

5.1.2 Preliminary Determinations. Select the sampling site and the minimum number of sampling points according to Method I or as specified by the Administrator. Determine the stack pressure, temperature, and the range of velocity heads using Method 2; it is recommended that a leak-check of the pitot lines be performed. Set up the apparatus; capillary tubing or surge tanks installed between the manometer and pitot tube may be used to dampen Δp fluctuations. It is recommended, but not required, that a pretest leak-check be conducted as follows: (1) blow through the pitot impact opening until at least 7.6 cm (3 in.) H_20 velocity pressure registers on the manometer; then, close off the impact opening. The pressure shall remain stable for at least 15 seconds; (2) do the same for the static pressure side, except using suction to obtain the minimum of 7.6 cm (3 in.) H_20. Other leak-check procedures, subject to the approval of the Administrator, may be used.

Determine the moisture content using Approximation Method 4 or its alternatives for the purpose of making isokinetic sampling rate settings. Determine the stack gas dry molecular weight, as described in Method 2, if integrated Method 3 sampling is used for molecular weight determination, the integrated bag sample shall be taken simultaneously with, and for the same total length of time as, the particulate sample run.

Select a nozzle size based on the range of velocity heads, such that it is not necessary to change the nozzle size in order to maintain isokinetic sampling rates. During the run, do not change the nozzle size. Ensure that the proper differential pressure gauge is chosen for the range of velocity heads encountered.

Select a suitable probe liner and probe length such that all traverse points can be sampled. For large stacks, consider sampling from opposite sides of the stack to reduce the length of probes.

Select a total sampling time greater than or equal to the minimum total sampling time specified in the test procedures for the specific industry such that (I) the sampling time per point is not less than 2 minutes (or some greater time interval as specified by the Administrator), and (2) the sample volume taken (corrected to standard conditions) will exceed the required minimum total gas sample volume. The latter is based on an approximate average sampling rate.

The sampling time at each point shall be the same. It is recommended that the number of minutes sampled at each point be an integer or an integer plus one-half minute, in order to avoid timekeeping errors.

In some circumstances, e.g., batch cycles, it may be necessary to sample for shorter times at the traverse points and to obtain smaller gas sample volumes. In these cases, the Administrator's approval must first be obtained.

5.1.3 Preparation of Collection Train. During preparation and assembly of the sampling train, keep all openings where contamination can occur covered until just prior to assembly or until sampling is about to begin.

Four impingers are normally used. The first, third, and fourth impinger are of the Greenburg-Smith design, modified by replacing the tip with a 1.3-m^3 (½-in.) inside-diameter glass tube extending to approximately 1.3 m^3 (½ in.) from the bottom of the flask. The second impinger is of the Greenburg-Smith design with the standard tip.

Place 100 mL of water in each of the first two impingers, leave the third impinger empty, and transfer approximately 200 to 300 g of preweighed silica gel from its container to the fourth impinger. More silica gel may be used, but care should be taken to ensure that it is not entrained and carried out from the impinger during sampling. Place the silica gel container in a clean place for later use in the sample recovery. Alternatively, the weight of each individual impinger may be determined to the nearest 0.5 g and recorded.

Using a pair of tweezers, place a labeled (identified) and weighed filter in the filter holder. Be sure that the filter is properly centered and the gasket properly placed so as to prevent the sample gas stream from circumventing the filter. Check the filter for tears after assembly is completed.

When glass liners are used, install the selected nozzle using a Teflon ferrule when stack temperatures are less than 260°C (500°F) and a graphite ferrule or an asbestos string gasket when temperatures are higher. When metal liners are used, install the nozzle as above or by a leak-free direct mechanical connection. Mark the probe with heat resistant tape or by some other method to denote the proper distance into the stack or duct for each sampling point.

Set up the train as in Figure 5-l, using (if necessary) a very light coat of silicone grease on all ground glass joints, greasing only the outer portion to avoid the possibility of contamination by the silicone grease. Subject to the approval of the Administrator, a glass cyclone may be used between the probe and filter holder when the total particulate catch is expected to exceed 100 mg or when water droplets are present in the stack gas.

Use temperature sensors to monitor the filter temperature and the temperature of the gas exiting the last impinger. Place the sensing tip of these thermocouples in direct contact with the sample gas. Monitor and regulate the filter temperature throughout the test to maintain the gas temperature at the filter at 120° ±14°C (248° ±25°F). Monitor the gas temperature at the exit of the final impinger so that ice in the impinger bath can be replenished as needed to maintain a gas temperature less than 20°C (68°F).

Place crushed ice around the impingers prior to starting the test run.

5.1.4 Leak-Check Procedures.

5.1.4.1 Pretest Leak-Check. A pretest leak-check is recommended, but not required. If the tester opts to conduct the pretest leak-check, the following procedure shall be used.

After the sampling train has been assembled, turn on and set the filter and probe heating systems at the desired operating temperatures. Allow time for the temperatures to stabilize. If a Viton A 0-ring or other leak-free connection is used in assembling the probe nozzle to the probe liner, leak-check the train at the sampling site by plugging the nozzle and pulling a 380 mm (15 in.) Hg vacuum.

NOTE: A lower vacuum may be used, provided that it is not exceeded during the test.

If an asbestos string is used, do not connect the probe to the train during the leak-check. Instead, leak-check the train by first plugging the inlet to the filter holder (cyclone, if applicable) and pulling a 380 mm (15 in.) Hg vacuum (see **NOTE** immediately above). Then connect the probe to the train, and leak-check at about 25 mm (l in.) Hg vacuum; alternatively, the probe may be leak-checked with the rest of the sampling train, in one step, at 380 mm (15 in.) Hg vacuum. Leakage rates in excess of 4 percent of the average sampling rate or 0.00057 m^3/min (0.02 cfm), whichever is less, are unacceptable.

The following leak-check instructions for the sampling train may be helpful. Start the pump with bypass valve fully open and coarse adjust valve completely closed. Partially open the coarse adjust valve, and slowly close the bypass valve until the desired vacuum is reached. Do not reverse direction of bypass valve; this will cause water to back up into the filter holder. If the desired vacuum is exceeded, either leak-check at this higher vacuum or end the leak-check as shown below, and start over.

When the leak-check is completed, first slowly remove the plug from the inlet to the probe, filter holder, or cyclone (if applicable), and immediately turn off the vacuum pump. This prevents the water in the impingers from being forced backward into the filter holder and silica gel from being entrained backward into the third impinger.

5.1.4.2 Leak-Checks During Sample Run. If, during the sampling run, a component (e.g., filter assembly or impinger) change becomes necessary, a leak-check shall be conducted immediately before the change is made. The leak-check shall be done according to the procedure outlined above, except that it shall be done at a vacuum equal to or greater than the maximum value recorded up to that point in the test. If the leakage rate is found to be no greater than 0.00057 m^3/min (0.02 cfm) or 4 percent of the average sampling rate (whichever is less), the results are acceptable, and no correction will need to be applied to the total volume of dry gas metered; if, however, a higher leakage rate is obtained, the tester shall either record the leakage rate and plan to correct the sample volume as shown, or shall void the sample run.

Immediately after component changes, leak-checks are optional; if such leak-checks are done, the procedure outlined above shall be used.

5.1.4.3 Post-Test Leak-Check. A leak-check is mandatory at the conclusion of each sampling run. The leak-check shall be done in accordance with the same procedures, except that it shall be conducted at a vacuum equal to or greater than the maximum value reached during the sampling run. If the leakage rate is found to be no greater than 0.00057 m^3/min (0.02 cfm) or 4 percent of the average sampling rate (whichever is less), the results are acceptable, and no correction need be applied to the total volume of dry gas metered. If, however, a higher leakage rate is obtained, the tester shall either record the leakage rate and correct the sample volume as shown, or void the sampling run.

5.1.5 Particulate Train Operation. During the sampling run, maintain an isokinetic sampling rate (within 10 percent of true isokinetic unless otherwise specified by the Administrator) and a temperature around the filter and probe of 120 ± l4°C (248 ± 25°F), or such other temperature as specified by an applicable subpart of the standards or approved by the Administrator.

For each run, record the data required on a data sheet. Be sure to record the initial dry gas meter (DGM) reading. Record the DGM readings at the beginning and end of each sampling time increment, when changes in flow rates are made, before and after each leak-check, and when sampling is halted. Take other readings required at least once at each sample point during each time increment and additional readings when significant changes (20 percent variation in velocity head readings) necessitate additional adjustments in flow rate. Level and zero the manometer. Because the manometer level and zero may drift due to vibrations and temperature changes, make periodic checks during the traverse.

Clean the portholes prior to the test run to minimize the chance of sampling deposited material. To begin sampling, remove the nozzle cap, verify that the filter and probe heating systems are up to temperature, and that the pitot tube and probe are properly positioned. Position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump, and adjust the flow to isokinetic conditions.

When the stack is under significant negative pressure (height of impinger stem), the sample pump must be started and the control valve opened as the probe is placed in the sampling port. This will prevent water from backing into the filter holder.

When the probe is in position, block off the openings around the probe and porthole to prevent unrepresentative dilution of the gas stream.

Traverse the stack cross-section, as required by Method I or as specified by the Administrator, being careful not to bump the probe nozzle into the stack walls when sampling near the walls or when removing or inserting the probe through the portholes; this minimizes the chance of extracting deposited material.

During the test run, make periodic adjustments to keep the temperature around the filter holder at the proper level; add more ice as necessary to maintain a temperature of less than 20°C (68°F) at the condenser/silica gel outlet. Also, periodically check the level and zero of the manometer.

If the pressure drop across the filter becomes too high, making isokinetic sampling difficult to maintain, the filter may be replaced in the midst of the sample run. It is recommended that another complete filter assembly be used rather than attempting to change the filter itself. Before a new filter assembly is installed, conduct a leak-check. The total PM weight shall include the summation of the filter assembly catches.

A single train shall be used for the entire sample run, except in cases where simultaneous sampling is required in two or more separate ducts or at two or more different locations within the same duct, or, in cases where equipment failure necessitates a change of trains. In all other situations, the use of two or more trains will be subject to the approval of the Administrator.

Note that when two or more trains are used, separate analyses of the front-half and (if applicable) impinger catches from each train shall be performed, unless identical nozzle sizes were used on all trains, in which case, the front-half catches from the individual trains may be combined (as may the impinger catches) and one analysis of front-half catch and one analysis of impinger catch may be performed. Consult with the Administrator for details concerning the calculation of results when two or more trains are used.

At the end of the sample run, turn off the coarse adjust valve (with the exception of a high vacuum source in which case the valve should be closed after extraction), remove the probe and nozzle from the stack, turn off the pump, record the final DGM meter reading, and conduct a post-test leak-check. Also, leak-check the pitot lines; the lines must pass this leak-check, in order to validate the velocity head data.

5.1.6 Calculation of Percent Isokinetic. Calculate percent isokinetic to determine whether the run was valid or another test run should be made. If there was difficulty in maintaining isokinetic rates because of source conditions, consult with the Administrator for possible variance on the isokinetic rates.

5.2 Sample Recovery. Proper cleanup procedure begins as soon as the probe is removed from the stack at the end of the sampling period. Allow the probe to cool.

When the probe can be safely handled, wipe off all external PM near the tip of the probe nozzle, and place a cap over it to prevent losing or gaining PM. Do not cap off the probe tip tightly while the sampling train is cooling down as this would create a vacuum in the filter holder, thus drawing water from the impingers into the filter holder.

Before moving the sample train to the cleanup site, remove the probe from the sample train, wipe off the silicone grease, and cap the open outlet of the probe. Be careful not to lose any condensate that might be present. Wipe off the silicone grease from the filter inlet where the probe was fastened, and cap it. Remove the umbilical cord from the last impinger, and cap the impinger. If a flexible line is used between the first impinger or condenser and the filter holder, disconnect the line at the filter holder, and let any condensed water or liquid drain into the impingers or condenser. After wiping off the silicone grease, cap off the filter holder outlet and impinger inlet. Either ground-glass stoppers, plastic caps, serum caps, Teflon tape, or Parafilm may be used to close these openings.

Transfer the probe and filter-impinger assembly to the cleanup area. This area should be clean and protected from the wind so that the chances of contaminating or losing the sample will be minimized.

Save a portion of the acetone used for cleanup as a blank. Take 200 mL of this acetone directly from the wash bottle being used, and place it in a sample container labeled "acetone blank."

Inspect the train prior to and during disassembly, and note any abnormal conditions. Treat the samples as follows:

Container No. 1. Carefully remove the filter from the filter holder, and place it in its identified petri dish container. Use a pair of tweezers to handle the filter. If it is necessary to fold the filter, do so such that the PM cake is inside the fold. Carefully transfer to the petri dish any PM and/or filter fibers that adhere to the filter holder gasket, by using a dry Nylon bristle brush and/or a sharp-edged blade. Seal the container with Teflon tape or Parafilm.

Container No. 2. Taking care to see that dust on the outside of the probe or other exterior surfaces does not get into the sample, quantitatively recover PM or any condensate from the probe nozzle, probe fitting, probe liner, and front half of the filter holder by washing these components with acetone and placing the wash in a sample container. Deionized distilled water may be used instead of acetone when approved by the Administrator and shall be used when specified by the Administrator; in these cases, save a water blank, and follow the Administrator's directions on analysis. Perform the acetone rinse as follows:

Carefully remove the probe nozzle, and clean the inside surface by rinsing with acetone from a wash bottle and brushing with a Nylon bristle brush. Brush until the acetone rinse shows no visible particles, after which make a final rinse of the inside surface with acetone.

Brush and rinse the inside parts of the Swagelok fitting with acetone in a similar way until no visible particles remain.

Rinse the probe liner with acetone by tilting and rotating the probe while squirting acetone into its upper end so that all inside surfaces will be wetted with acetone. Let the acetone drain from the lower end into the sample container. A funnel (glass or polyethylene) may be used to aid in transferring liquid washes to the container. Follow the acetone rinse with a probe brush. Hold the probe in an inclined position, squirt acetone into the upper end as the probe brush is being pushed with a twisting action through the probe; hold a sample container underneath the lower end of the probe, and catch any acetone and particulate matter that is brushed from the probe. Run the brush through the probe three times or more until no visible PM is carried out with the acetone or until none remains in the probe liner on visual inspection. With stainless steel or other metal probes, run the brush through in the above prescribed manner at least six times since metal probes have small crevices in which particulate matter can be entrapped. Rinse the brush with acetone, and quantitatively collect these washings in the sample container. After the brushing, make a final acetone rinse of the probe as described above.

It is recommended that two people clean the probe to minimize sample losses. Between sampling runs, keep brushes clean and protected from contamination.

After ensuring that all joints have been wiped clean of silicone grease, clean the inside of the front half of the filter holder by rubbing the surfaces with a Nylon bristle brush and rinsing with acetone. Rinse each surface three times or more if needed to remove visible particulate. Make a final rinse of the brush and filter holder. Carefully rinse out the glass cyclone bypass, also (or cyclone if applicable). After all acetone washings and particulate matter have been collected in the sample container, tighten the lid on the sample container so that acetone will not leak out when it is shipped to the laboratory. Mark the height of the fluid level to determine whether leakage occurred during transport. Label the container to identify clearly its contents.

Container No. 3. Note the color of the indicating silica gel to determine whether it has been completely spent, and make a notation of its condition. Transfer the silica gel from the fourth impinger to its original container, and seal. A funnel may make it easier to pour the silica gel without spilling. A rubber policeman may be used as an aid in removing the silica gel from the impinger. It is not necessary to remove the small amount of dust particles that may adhere to the impinger wall and are difficult to remove. Since the gain in weight is to be used for moisture calculations, do not use any water or other liquids to transfer the silica gel. If the initial weight of the silica gel was taken while in the impinger, the post weight should be taken likewise.

Impinger Water. Treat the impingers as follows: Make a notation of any color or film in the liquid catch. Measure the liquid that is in the first three impingers to within 1 mL by using a graduated cylinder or by weighing it to within 0.5 g by using a balance (if one is available). Record the volume or weight of liquid present. This information is required to calculate the moisture content of the effluent gas.

Discard the liquid after measuring and recording the volume or weight, unless analysis of the impinger catch is required.

If a different type of condenser is used, measure the amount of moisture condensed either volumetrically or gravimetrically.

Whenever possible, containers should be shipped in such a way that they remain upright at all times.

5.3 Sample Recovery Equipment.

5.3.1 Probe-Liner and Probe-Nozzle Brushes. Nylon bristle brushes with stainless steel wire handles. The probe brush shall have extensions (at least as long as the probe) of stainless steel, Nylon, Teflon, or

similarly inert material. The brushes shall be properly sized and shaped to brush out the probe liner and nozzle.

5.3.2 Wash Bottle. One. A polyethylene or Teflon wash bottle may be used. It is recommended that the acetone be poured directly from the glass reagent bottle into the wash bottle.

5.3.3 Sample Storage Containers. Chemically resistant, borosilicate glass bottles, for acetone washes, 500-mL or 1000-mL. Screw cap liners shall either be rubber-backed Teflon or be constructed so as to be leak-free and resistant to chemical attack by acetone. (Narrow mouth glass bottles have been found to be less prone to leakage.) Alternatively, polyethylene bottles may be used.

5.3.4 Petri Dishes. For filter samples, glass or polyethylene, unless otherwise specified by the Administrator.

5.3.5 Graduated Cylinder and/or Balance. To measure condensed water to within 1 mL or 1 g. Graduated cylinders shall have subdivisions no greater than 2 mL. Most laboratory balances are capable of weighing to the nearest 0.5 g or less.

5.3.6 Plastic Storage Containers. Air-tight containers to store silica gel.

5.3.7 Funnel and Rubber Policeman. To aid in transfer of silica gel to container; not necessary if silica gel is weighed in the field.

5.3.8 Funnel. Glass or polyethylene, to aid in sample recovery.

5.4 Analysis Equipment:

5.4.1 Glass Weighing Dishes.

5.4.2 Desiccator.

5.4.3 Analytical Balance. To measure to within 0.l mg.

5.4.4 Balance. To measure to within 0.5 g.

5.4.5 Beakers. 250-mL.

5.4.6 Hygrometer. To measure the relative humidity of the laboratory environment.

5.4.7 Temperature Gauge. To measure the temperature of the laboratory environment.

5.5 REAGENTS

5.5.1 Sampling. The reagents used in sampling are as follows:

5.5.2 Filters. Glass fiber filters, without organic binder, exhibiting at least 99.95 percent efficiency (<0.05 percent penetration) on 0.3-micron dioctyl phthalate smoke particles.

5.5.3 Silica Gel. Indicating type, 6- to l6-mesh. If previously used, dry at 175°C (350°F) for 2 hours. New silica gel may be used as received. Alternatively, other types of desiccants (equivalent or better) may be used, subject to the approval of the Administrator.

5.5.4 Water. When analysis of the material caught in the impingers is required, deionized distilled water shall be used. Run blanks prior to field use to eliminate a high blank on test samples.

5.5.5 Crushed Ice.

5.5.6 Stopcock Grease. Acetone-insoluble, heat-stable silicone grease. This is not necessary if screw-on connectors with Teflon sleeves, or similar, are used. Alternatively, other types of stopcock grease may be used, subject to the approval of the Administrator.

5.6 Sample Recovery. Acetone--reagent grade, ≤0.001 percent residue, in glass bottles--is required. Acetone from metal containers generally has a high residue blank and should not be used. Sometimes, suppliers transfer acetone to glass bottles from metal containers; thus, acetone blanks shall be run prior to field use and only acetone with low blank values (≤0.001 percent) shall be used. In no case shall a blank value of greater than 0.001 percent of the weight of acetone used be subtracted from the sample weight.

5.7 Analysis. Two reagents are required for the analysis:

5.7.1 Acetone. Same as sample recovery:

5.7.2 Desiccant. Anhydrous calcium sulfate, indicating type. Alternatively, other types of desiccants may be used, subject to the approval of the Administrator.

6.0 PERFORMANCE FREQUENCY

This procedure is to be used as necessary to conduct testing specified in SECTION 3.0.

7.0 RESPONSIBILITIES

This procedure is owned by the Shaw Air Quality Services Group. It is the responsibility of the Air Quality Services Group, Field Engineering, to update this manual every January, on an annual basis.

8.0 DOCUMENTATION AND REPORTING

All sample and traverse documentation required by this procedure shall be placed in project files.

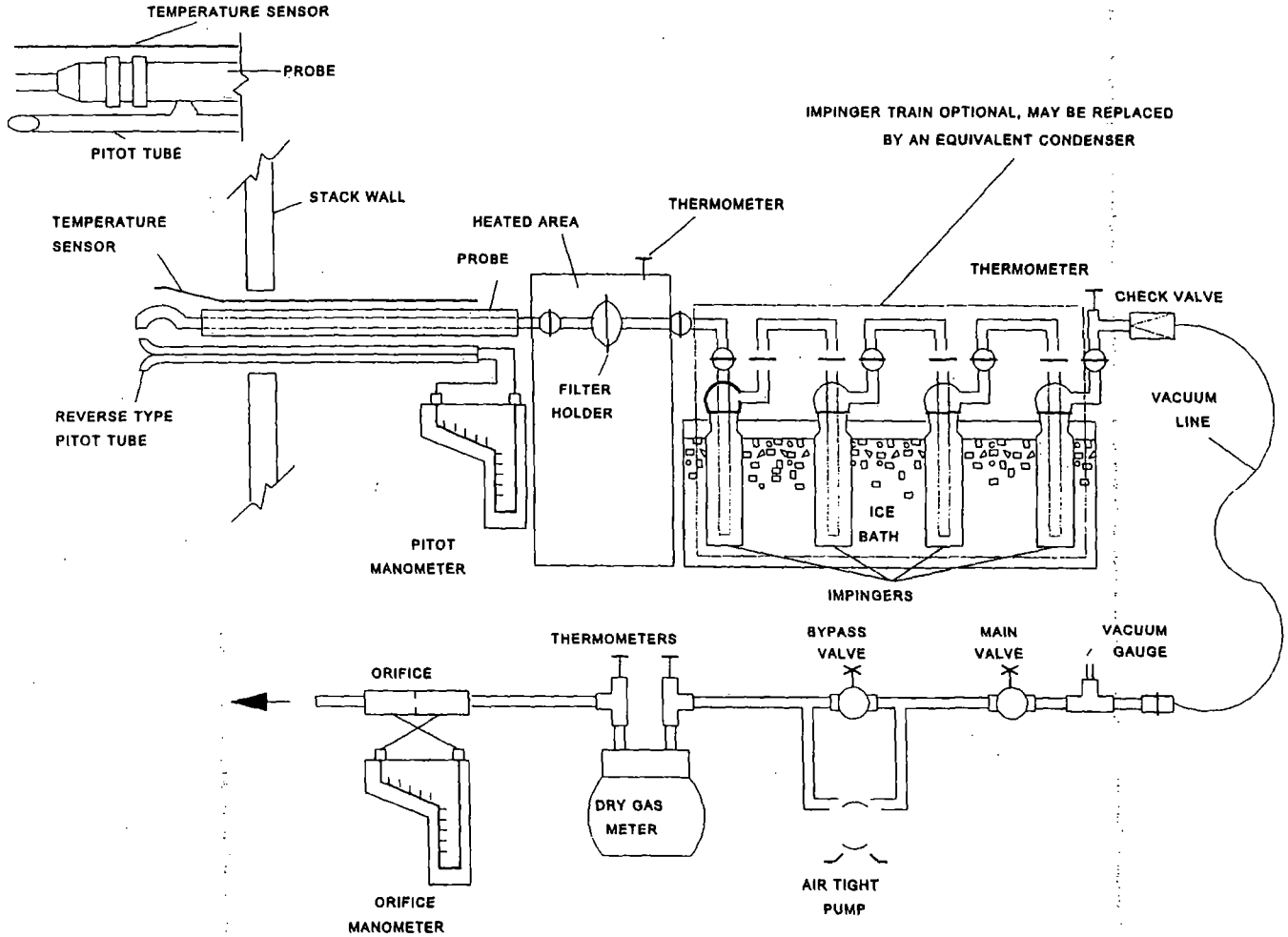


Figure 5-1. Particulate Sampling Train

1.0 SUBJECT

DETERMINATION OF METALS EMISSIONS FROM STATIONARY SOURCES (EPA METHOD 29)

2.0 PURPOSE

This method is applicable to the determination of antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), manganese (Mn), mercury (Hg), nickel (Ni), phosphorus (P), selenium (Se), silver (Ag), thallium (Tl), and zinc (Zn) emissions from stationary sources. This method may be used to determine particulate emissions in addition to the metals' emissions if the prescribed procedures and precautions are followed.

Hg emissions can be measured, alternatively, using EPA Method 101A of Appendix B, 40 CFR Part 61. Method 101-A measures only Hg but it can be of special interest to sources which need to measure both Hg and Mn emissions. A stack sample is withdrawn isokinetically from the source, particulate emissions are collected in the probe and on a heated filter, and gaseous emissions are then collected in an aqueous acidic solution of hydrogen peroxide (analyzed for all metals including Hg) and an aqueous acidic solution of potassium permanganate (analyzed only for Hg). The recovered samples are digested, and appropriate fractions are analyzed for Hg by cold vapor atomic absorption spectroscopy (CVAAS) and for Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Ni, P, Se, Ag, Tl, and Zn by inductively coupled argon plasma emission spectroscopy (ICAP) or atomic absorption spectroscopy (AAS). Graphite furnace atomic absorption spectroscopy (GFAAS) is used for analysis of Sb, As, Cd, Co, Pb, Se, and Tl if these elements require greater analytical sensitivity than can be obtained by ICAP. If one so chooses, AAS may be used for analysis of all listed metals if the resulting in-stack method detection limits meet the goal of the testing program. Similarly, inductively coupled plasma-mass spectroscopy (ICP-MS) may be used for analysis of Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Ni, As, Tl and Zn.

3.0 SCOPE

This procedure shall be followed when performing compliance testing of stationary sources under the Clean Air Act, or where otherwise required as part of a regulatory compliance demonstration.

This procedure incorporates by reference 40 Code of Federal Regulations (CFR), Part 60, Appendix A, Method 29 in its entirety.

Any test-specific modification to this method must be specifically documented in a written request or report (e.g., Trial Burn Plan, Compliance Test Plan), and that request must be approved by the governing regulatory agency.

4.0 REFERENCES

4.1 External References

40 Code of Federal Regulations (CFR), Part 60, Appendix A, Method 29.

4.2 Related SOPs

SHAW-SOP-005
SHAW-SOP-201

5.0 PROCEDURE

5.1 Pretest Preparation. Follow the same general procedure given in Method 5 (SHAW-SOP-005), except that, unless particulate emissions are to be determined, the filter need not be desiccated or weighed.

5.1.1 Special Glassware Cleaning Procedures for Metals Sampling Trains applicable to this, or any other Metals Test Method.

Rinse with Hot Tap Water
Wash in Hot Soapy Water
Rinse with Tap Water 3 times
Rinse with DI Water
Soak in 10% Nitric Acid for a minimum of 4 hours
Rinse with DI Water 3 times
Rinse with Acetone
Air Dry
Seal Openings with Parafilm

5.1.2 Equipment and Supplies

5.1.2.1 Reagents
Filters - Use filters without organic binders and containing less than 1.3 μg/in.^{2} of each of the metals to be measured. High-purity quartz-fiber filters are recommended.

HNO_3/H_2O_2 Absorbing Solution, 5 Percent HNO_3/10 Percent H_2O_2 - While stirring, carefully add 50 mL of concentrated HNO_3 to a 1000-mL volumetric flask containing approximately 500 mL of water; then, while stirring, carefully add 333 mL of 30 percent H_2O_2. Dilute to volume with water. Mix well. This reagent shall contain less than 2 ng/mL of each target metal.

Acid $KMnO_4$ Absorbing Solution, 4 Percent $KMnO_4$ (W/V), 10 percent H_2/SO_4 (V/V) - Prepare fresh daily. While stirring, carefully mix 100 mL of concentrated H_2/SO_4 into approximately 800 mL of water; then add water while stirring to make a volume of 1 liter; this solution is 10 percent H_2/SO_4 (V/V). Dissolve, while stirring, 40 g of $KMnO_4$ into 10 percent H_2/SO_4 (V/V) and add 10 percent H_2/SO_4 (V/V) while stirring to make a volume of 1 liter. Prepare and store in glass bottles to prevent degradation. This reagent shall contain less than 2 ng/mL of Hg.

Precaution: To prevent autocatalytic decomposition of the permanganate solution, filter the solution through Whatman 451 filter paper.

NOTE: The storage bottle must have a No. 70-72 hole drilled in the cap to vent the bottle and prevent pressure buildup.

HNO_3, 0.1 N - While stirring, add 6.3 mL of concentrated HNO_3 (70 percent) to a flask containing approximately 900 mL of water. Dilute to 1000 mL with water. Mix well. This reagent shall contain less than 2 ng/mL of each target metal.

HCl, 8 N - While stirring, carefully add 690 mL of concentrated HCl to a flask containing 250 mL of water. Dilute to 1000 mL with water. Mix well. This reagent shall contain less than 2 ng/mL of Hg.

5.1.2.2 Sample Train Components - Same as Method 5, except use glass or quartz-glass nozzles to prevent contamination.

5.1.3 Preliminary Determinations. Same as Method 5 (refer to SHAW-SOP-005).

5.1.3.1 Preparation of Sampling Train.
Set up the sampling train as shown in Figure 29-1. Follow the same general procedures given in Method 5, except place 100 mL of the HNO_3/H_2O_2 solution in each of the second and third impingers (if the optional empty first impinger is used) as shown in Figure 29-1. Place 100 mL of the acidic $KMnO_4$ absorbing solution in each of the fifth and sixth impingers as shown in Figure 29-1, and transfer approximately 200 to 300 g of pre-weighed silica gel from its container to the last impinger. After the train is constructed, weigh each impinger to within 0.5 grams. Record the weights on field lab data sheets.

Based on the specific source sampling conditions, the use of an empty first impinger can be eliminated if the moisture to be collected in the impingers will be less than approximately 100 mL.

If Hg analysis will not be performed, the fourth, fifth, and sixth impingers as shown in Figure 29-1 are not required.

To insure leak-free sampling train connections and to prevent possible sample contamination problems, use Teflon tape or other non-contaminating material instead of silicone grease.

Precaution: Exercise extreme care to prevent contamination within the train. Prevent the acidic $KMnO_4$ from contacting any glassware that contains sample material to be analyzed for Mn. Prevent acidic H_2O_2 from mixing with the acidic $KMnO_4$.

Leak-Check Procedures. Follow the leak-check procedures given in Method 5 (Refer to SHAW-SOP-005), Pretest Leak-Check, Leak-Checks During the Sample Run, and Post-Test Leak-Checks.

5.2 Sampling Train Operation. Follow the procedures given in Method 5 (refer to SHAW-SOP-005). When sampling for Hg, use a procedure analogous to that described in Section 7.1.1 of Method 101A, 40 CFR Part 61, Appendix B, if necessary to maintain the desired color in the last acidified permanganate impinger. For each run, record the data required.

5.3 Calculation of Percent Isokinetic. Same as Method 5 (refer to SHAW-SOP-005).

5.4 Sample Recovery

5.4.1 Begin cleanup procedures as soon as the probe is removed from the stack at the end of a sampling period. The probe should be allowed to cool prior to sample recovery. When it can be safely handled, wipe off all external particulate matter near the tip of the probe nozzle and place a rinsed, non-contaminating cap over the probe nozzle to prevent losing or gaining particulate matter. Do not cap the probe tip tightly while the sampling train is cooling; a vacuum can form in the filter holder with the undesired result of drawing liquid from the impingers onto the filter.

Before moving the sampling train to the cleanup site, remove the probe from the sampling train and cap the open outlet. Be careful not to lose any condensate that might be present. Cap the filter inlet where the probe was fastened. Remove the umbilical cord from the last impinger and cap the impinger. Cap the filter holder outlet and impinger inlet. Use non-contaminating caps, whether ground-glass stoppers, plastic caps, serum caps, or Teflon tape to close these openings.

Alternatively, the following procedure may be used to disassemble the train before the probe and filter holder/oven are completely cooled: Initially disconnect the filter holder outlet/impinger inlet and loosely cap the open ends. Then disconnect the probe from the filter holder or cyclone inlet and loosely cap the open ends. Cap the probe tip and remove the umbilical cord as previously described.

Transfer the probe and filter-impinger assembly to a cleanup area that is clean and protected from the wind and other potential causes of contamination or loss of the sample. Inspect the train before and during disassembly and note any abnormal conditions. Take special precautions to assure that all the items necessary for recovery do not contaminate the samples. The sample is recovered and treated as follows (see schematic in Figures 29-2a and 29-2b):

5.4.2 Container No. 1 (Sample Filter) Plastic Petri Dish. Carefully remove the filter from the filter holder and place it in its labeled petri dish container. To handle the filter, use either acid-washed polypropylene or Teflon coated tweezers. If it is necessary to fold the filter, make certain the particulate cake is inside the fold. Carefully transfer the filter and any particulate matter or filter fibers that adhere to the filter holder gasket to the petri dish by using a dry (acid-cleaned) nylon bristle brush. Do not use any metal-containing materials when recovering this train. Seal the labeled petri dish.

5.4.3 Container No. 2 (Acetone Rinse) Amber Glass Bottle with Teflon-Lined Lid. Perform this procedure only if a determination of particulate emissions is to be made. Quantitatively recover particulate matter and any condensate from the probe nozzle, probe fitting, probe liner, and front half of the filter holder by washing these components with a total of 100 mL of acetone, while simultaneously taking great care to see that no dust on the outside of the probe or other surfaces gets in the sample. The use of exactly 100 mL is necessary for the subsequent blank correction procedures. Distilled water may be used instead of acetone when approved by the Administrator and shall be used when specified by the governing regulatory agency; in these cases, save a water blank and follow the governing regulatory agency's directions on analysis.

Carefully remove the probe nozzle, and clean the inside surface by rinsing with acetone from a wash bottle while brushing with a non-metallic brush. Brush until the acetone rinse shows no visible particles, then make a final rinse of the inside surface with acetone.

Brush and rinse the sample exposed inside parts of the probe fitting with acetone in a similar way until no visible particles remain. Rinse the probe liner with acetone by tilting and rotating the probe while squirting acetone into its upper end so that all inside surfaces will be wetted with acetone. Allow the acetone to drain from the lower end into the sample container. A funnel may be used to aid in transferring liquid washes to the container. Follow the acetone rinse with a non-metallic probe brush. Hold the probe in an inclined position, squirt acetone into the upper end as the probe brush is being pushed with a twisting action three times through the probe. Hold a sample container underneath the lower end of the probe, and catch any acetone and particulate matter which is brushed through the probe until no visible particulate matter is carried out with the acetone or until none remains in the probe liner on visual inspection. Rinse the brush with acetone, and quantitatively collect these washes in the sample container. After the brushing, make a final acetone rinse of the probe as described above.

It is recommended that two people clean the probe to minimize sample losses. Between sampling runs, keep brushes clean and protected from contamination. Clean the inside of the front-half of the filter holder by rubbing the surfaces with a non-metallic brush and rinsing with acetone. Rinse each surface three times or more if needed to remove visible particulate. Make a final rinse of the brush and filter holder. After all acetone washes and particulate matter have been collected in the sample container, tighten the lid so that acetone will not leak out when shipped to the laboratory. Mark the height of the fluid level to determine whether or not leakage occurred during transport. Clearly label the container to identify its contents.

5.4.4 Container No. 3 (Probe Rinse) Polyethylene Bottle. Keep the probe assembly clean and free from contamination during the probe rinse. Rinse the probe nozzle and fitting, probe liner, and front-half of the filter holder thoroughly with a total of 100 mL of 0.1 N HNO_3, and place the wash into a sample storage container.

NOTE:
Perform the rinses as applicable and generally as described. Taking care that dust on the outside of the probe or other exterior surfaces does not get into the sample.

Carefully remove the probe nozzle, and rinse the inside surfaces with 0.1 N $HN0_3$ from a wash bottle while brushing with a Nylon-bristle brush. Brush until the 0.1 N $HN0_3$ rinse shows no visible particles, then make a final rinse of the inside surface.

Brush and rinse with 0.1 N $HN0_3$ the inside parts of the Swagelok fitting in a similar way until no visible particles remain.

Rinse the probe liner with 0.1 N $HN0_3$. While rotating the probe so that all inside surfaces will be rinsed with 0.1 N $HN0_3$, tilt the probe, and squirt 0.1 N $HN0_3$ into its upper end. Let the 0.1 N $HN0_3$ drain from the lower end into the sample container. The tester may use a glass funnel to aid in transferring liquid washes to the container. Follow the rinse with a probe brush. Hold the probe in an inclined position, squirt 0.1 N $HN0_3$ into the upper end of the probe as the probe brush is being pushed with a twisting action through the probe; hold the sample container underneath the lower end of the probe, and catch any 0.1 N $HN0_3$ and sample matter that is brushed from the probe. Run the brush through the probe three times or more until no visible sample matter is carried out with the 0.1 N $HN0_3$ and none remains on the probe liner on visual inspection. Rinse the brush with 0.1 N $HN0_3$, and quantitatively collect these washes in the sample container. After the brushing, make a final rinse of the probe as described above.

It is recommended that two people clean the probe to minimize loss of the sample. Between sampling runs, keep brushes clean and protected from contamination.

Brush and rinse with 0.1 N $HN0_3$ the inside of the front half of the filter holder. Brush and rinse each surface three times or more, if needed, to remove visible sample matter. Make a final rinse of the brush and filter holder. After all 0.1 N $HN0_3$ washes and sample matter are collected in the sample container, tighten the lid on the sample container so that the fluid will not leak out when it is shipped to the laboratory. Mark the height of the fluid level to determine whether leakage occurs during transport. Label the container to identify its contents clearly.

Record the volume of the rinses. Mark the height of the fluid level on the outside of the storage container and use this mark to determine if leakage occurs during transport. Seal the container, and clearly label the contents. Finally, rinse the nozzle, probe liner, and front-half of the filter holder with water followed by acetone, and discard these rinses.

Prior to sample recovery, weigh each impinger to within 0.5 grams to determine moisture gain.

5.4.5 Container No. 4 (Impingers 1 through 3, Moisture Knockout Impinger, when used, HNO_3/H_2O_2 Impingers Contents and Rinses). Due to the potentially large quantity of liquid involved, the tester may place the impinger solutions from Impingers 1 through 3 in more than one container, if necessary. Record the weight. This information is required to calculate the moisture content of the sampled flue gas. Transfer contents of each impinger to a sample container. Clean each of the first three impingers, the filter

support, the back half of the filter housing, and connecting glassware by thoroughly rinsing with 100 mL of 0.1 N HNO_3.

5.4.6 Container Nos. 5A (0.1 N HNO_3) Polyethylene Bottle, 5B ($KMnO_4/H_2SO_4$ absorbing solution) Amber Glass Bottle with Teflon-Lined Lid, **and 5C** (8 N HCl rinse and dilution) Polyethylene Bottle.

When sampling for Hg, pour all the liquid from the impinger (normally impinger No. 4) that immediately preceded the two permanganate impingers into Container No. 5A. Rinse the impinger with 0.1 N HNO_3 and place this rinse in Container No. 5A.

Pour all the liquid from the two permanganate impingers into Container No. 5B. Using fresh acidified $KMnO_4$ solution for all rinses (approximately 33 mL per rinse), rinse the two permanganate impingers and connecting glassware a minimum of three times. Pour the rinses into Container No. 5B, carefully assuring transfer of all loose precipitated materials from the two impingers. Similarly, using 100 mL total of water, rinse the permanganate impingers and connecting glass a minimum of three times, and pour the rinses into Container 5B, carefully assuring transfer of any loose precipitated material. Mark the height of the fluid level, and clearly label the contents. **NOTE:** Because of the potential reaction of $KMnO_4$ with acid, pressure buildup can occur in the storage bottles. Drill a No. 70-72 hole in the cap and liner to vent the bottle and relieve pressure buildup.

If no visible deposits remain after the water rinse, no further rinse is necessary. However, if deposits remain on the impinger surfaces, wash them with 25 mL of 8 N HCl, and place the wash in a separate sample container labeled No. 5C containing 200 mL of water. First, place 200 mL of water in the container. Then wash the impinger walls and stem with the HCl by turning the impinger on its side and rotating it so that the HCl contacts all inside surfaces. Use a total of only 25 mL of 8 N HCl for rinsing <u>both permanganate impingers combined</u>. Rinse the first impinger, then pour the actual rinse used for the first impinger into the second impinger for its rinse. Finally, pour the 25 mL of 8 N HCl rinse carefully into the container. Mark the height of the fluid level on the outside of the container to determine if leakage occurs during transport.

5.4.7 Container No. 6 (Silica Gel). Note the color of the indicating silica gel to determine whether it has been completely spent and make a notation of its condition. Transfer the silica gel from its impinger to its original container and seal it.

5.4.8 Container No. 7 (Acetone Blank). If particulate emissions are to be determined, at least once during each field test, place a 100-mL portion of the acetone used in the sample recovery process into a labeled container and seal the container.

5.4.9 Container No. 8 (0.1 N HNO_3 Blank). At least once during each field test, place 300 mL of the 0.1 N HNO_3 solution used in the sample recovery process into a labeled container and seal the container.

5.4.10 Container No. 9 (8N Hcl). At least once during each field test, place 100 mL of the 8N Hcl solution used in the sample recovery process into a labeled container and seal the container.

5.5 Calibration
Maintain a laboratory log of all calibrations.

5.5.1 Sampling Train Calibration. Calibrate the sampling train components according to the indicated sections of Method 5(Refer to SHAW-SOP-005): Probe Nozzle; Pitot Tube; Metering System; Probe Heater; Temperature Gauges; Leak-Check of the Metering System; and Barometer.

6.0 PERFORMANCE FREQUENCY

This procedure is to be used as necessary to conduct testing specified in SECTION 3.0.

7.0 RESPONSIBILITIES

This procedure is owned by the Shaw Air Quality Services Group. It is the responsibility of the Air Quality Services Group - Field Engineering, to update this manual in January, on an annual basis.

8.0 DOCUMENTATION AND REPORTING

All test documentation required by this procedure shall be placed in project files.

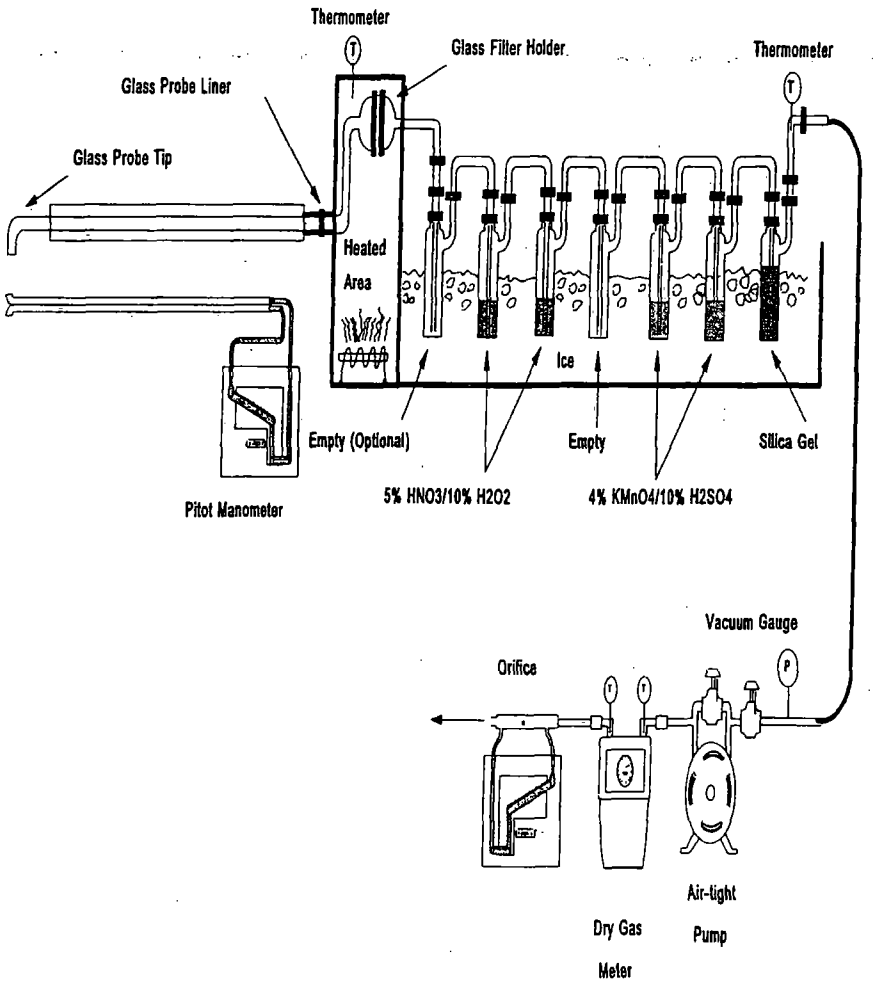
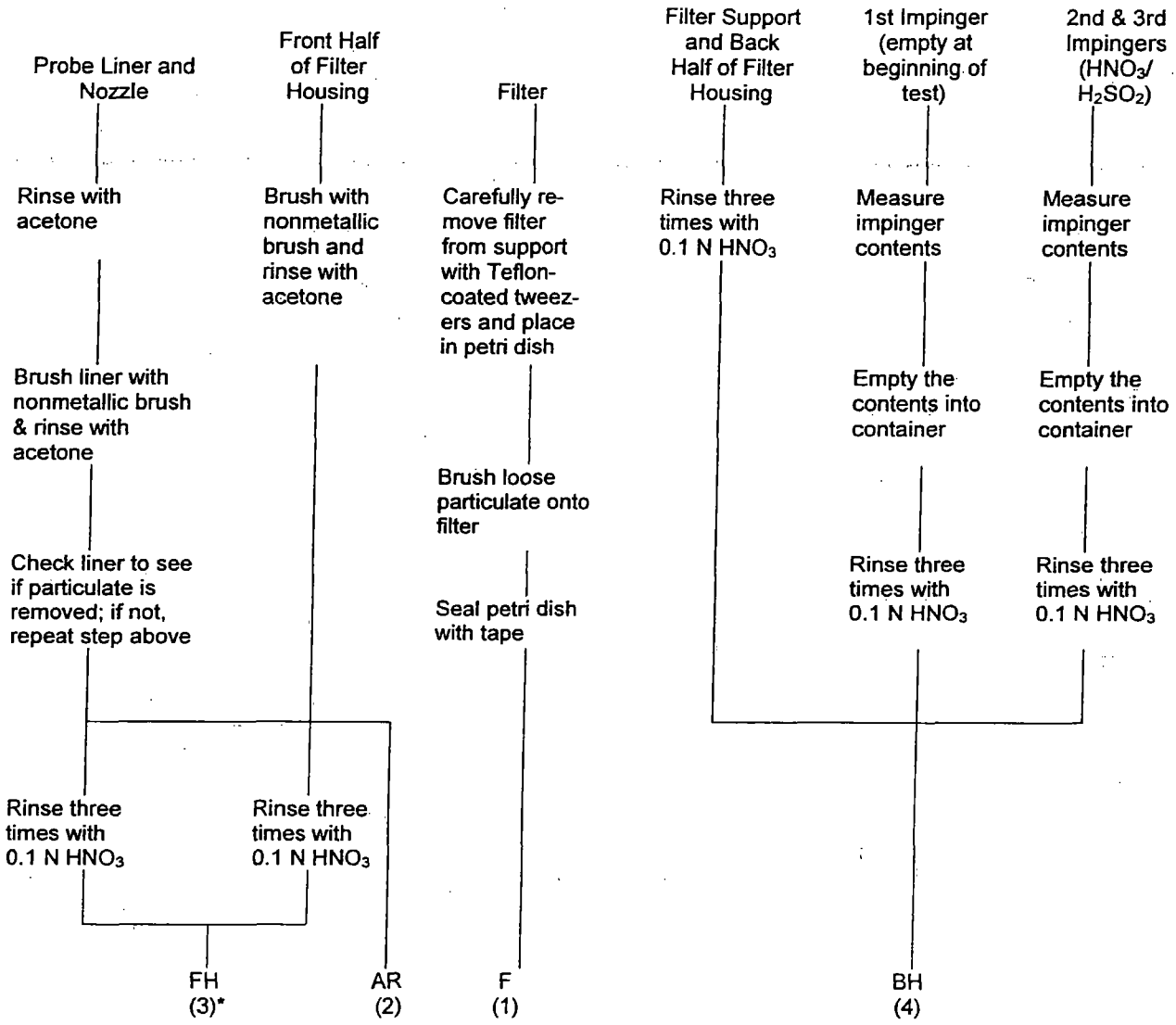


Figure 29-1 Sampling train.



* Number is parentheses indicates container number.

Figure 29-2a. Sample recovery scheme.

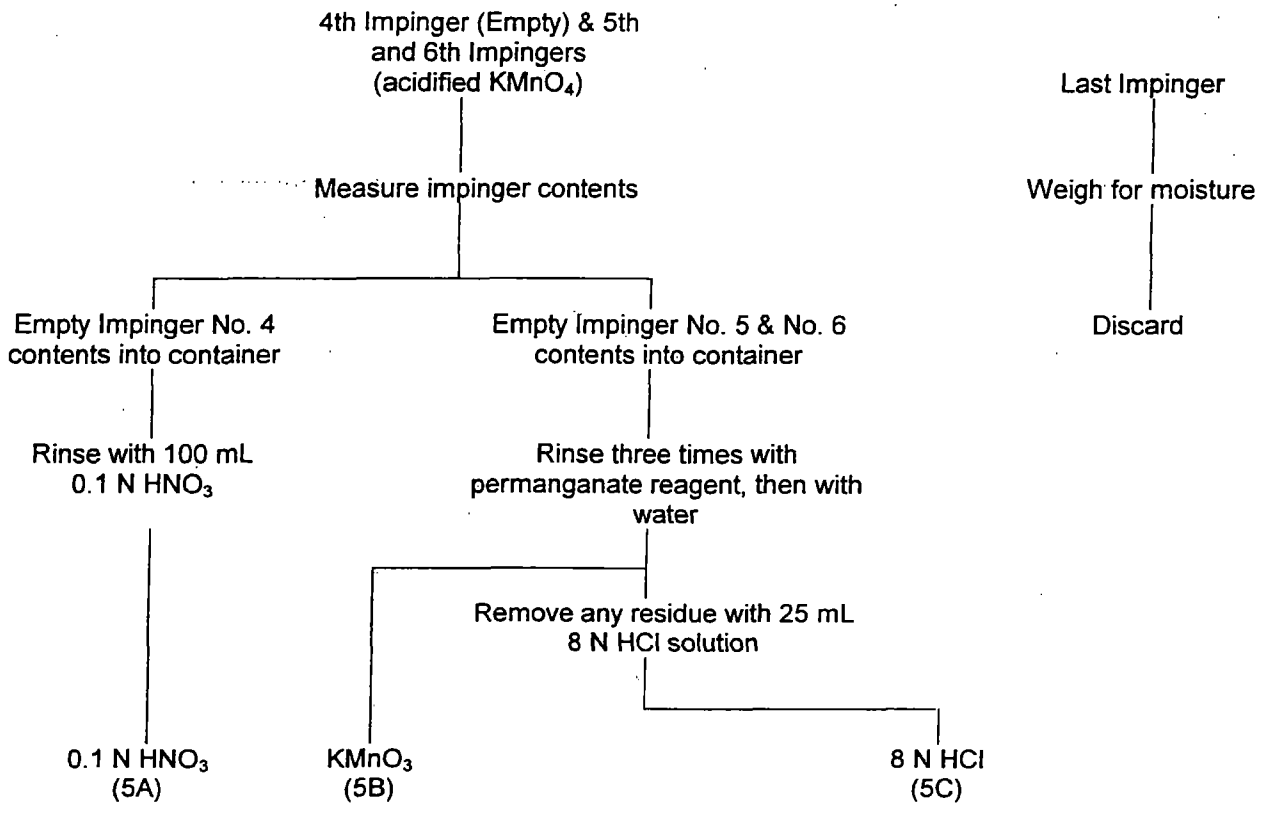


Figure 29-2b. Sample recovery scheme

APPENDIX E

CALIBRATION PROCEDURES AND RESULTS

CALIBRATION PROCEDURES AND RESULTS

All of the equipment used is calibrated in accordance with the procedures outlined in the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III.* The following pages describe these procedures and include the data sheets.

*EPA 600/R-94/038c.

Nozzle Diameter

Each nozzle used in these tests is calibrated by making three separate measurements and calculating the average. If a deviation of more than 0.004 inch is found between any two measurements, the nozzle is either discarded or reamed out and remeasured. A micrometer is used for measuring. These calibration data are shown in the following Nozzle Calibration data sheet(s).

Shaw The Shaw Group Inc.

NOZZLE CALIBRATION

Client: Clean Harbors Project No.:

Date: 8-25-03 Calibrated by: J. Neese

Nozzle I.D.	D1 in.	D2 in.	D3 in.	ΔD in.	D Avg.
G-10	.256	.255	.255	.001	.255

Where:

D 1, 2, 3 = nozzle diameter measured on a different diameter, in.
Tolerance = measure within 0.001 in.

ΔD = maximum difference in any two measurements, in.
Tolerance = 0.004 in.

D Avg. = average of D1, D2, and D3

Pitot Tube Calibration

Each pitot tube used in sampling is constructed by ITAQS and meets all requirements of EPA Method 2, Section 4.1.* Therefore, a baseline coefficient of 0.84 is assigned to each pitot tube. The following pages show the alignment requirements of Method 2 and the Pitot Tube Inspection Data Sheet(s) for each pitot tube used during the test program.

*40 CFR 60, Appendix A.

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PITOT TUBE INSPECTION DATA SHEET

Pitot Tube No. 504
Date: 1/2/03 Inspector J. Neese

α_1 degrees	α_2 degrees	β_1 degrees	β_2 degrees
0	2	2	1
< 10°	< 10°	< 5°	< 5°

D_t inches	P inches	1.05 D_t inches	1.50 D_t inches
0.376	0.902	0.3948	0.564
$0.185 \leq Dt < 0.380$	—	—	—

γ degrees	φ degrees	P sin (γ) inches	P sin (φ) inches
0	0	0	0
—	—	< 0.125	< 0.03125

P_1 inches	P_2 inches	$[P_1 - P_2]$ inches	Meet Specification?
0.442	0.445	-0.003	YES
$1.05\ D_t < P_1 < 1.50\ D_t$	$1.05\ D_t < P_1 < 1.50\ D_t$	≤ 0.010	

Checked by: [illegible] Date: 1/27/03

Dry Gas Meter and Orifice Meter

The following page shows the Calibration Setup used for the initial and post-test calibration. A wet-test meter with a 2-cubic-feet-per-minute capacity and ±1 percent accuracy is used. The pump is run for approximately 15 minutes at an orifice manometer setting of 0.5 in.H_2O to heat up the pump and wet the interior surface of the wet-test meter. The information in the following example Calibration Data Sheet is gathered for the initial calibration; the ratio of accuracy of the wet-test meter to the dry-test meter and the ΔH@ are then calculated.

Post-Test Meter Calibration Check

A post-test meter calibration check is made on each meter box used during the test to check its accuracy against the last calibration check. This post-test calibration must be within ±5 percent of the initial calibration. The initial calibration is performed as described in APTD-0576. The post-test calibration is performed by the same method. Three calibration runs are made by using the average orifice setting obtained during each test run and setting the vacuum at the maximum value obtained during each test run. The post-test calibration check indicated that all three runs for each meter box were within the ± 5 percent range allowed by EPA Method 5.*

The Particulate Sampling Meter Box Initial Calibration and Post-Test Calibration data sheets are included in the following pages.

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* 40 CFR 60, Appendix A.

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METER BOX INITIAL CALIBRATION

validated 3/31/95

Date: 12/10/02 Meter Box No.: FT-10

Barometric Pressure, (Pbar): 29.68 Calibrator: Neese

Run No.	Orifice manometer setting* ΔH in. H2O	Wet test meter volume Vw ft3	Dry gas meter volume Vd ft3	Temperatures: Wet test meter Tw °F	Temperatures: Dry gas meter Inlet Tdi °F	Temperatures: Dry gas meter Outlet Tdo °F	Temperatures: Dry gas meter Average Td °F	Vacuum setting** in. Hg	Duration of run, Ø min.	Duration of run, Ø sec
1	0.50	5.000	433.607	71	75	71	73.3	10	13	4
			438.670	71	76	71				
2	1.00	10.000	439.119	71	76	71	74.5	10	18	34
			449.246	71	79	72				
3	1.50	10.000	449.615	71	79	72	75.8	10	15	26
			459.743	71	80	72				
4	2.00	11.000	460.027	71	80	72	75.8	10	14	32
			471.159	71	80	71				
5	3.00	10.000	471.732	71	80	71	75.0	10	10	34
			481.822	71	79	70				
6	4.00	10.000	482.364	71	79	70	75.3	10	9	12
			492.461	71	81	71				

Run No.	Y	ΔH@
1	0.991	1.94
2	0.992	1.95
3	0.993	2.02
4	0.992	1.97
5	0.991	1.90
6	0.989	1.92
Pretest average	0.991	1.95
Difference*=	0.003	0.07

$$y = \frac{(Vw)(Pbar)(Td+460)}{(Vd)(Pbar+\Delta H/13.6)(Tw+460)}$$

$$\Delta H@ = \frac{(0.0319)\Delta H)}{(Pbar)(Td+460)} \times \left|\frac{(Tw+460)\ (Ø)}{Vw}\right|^2$$

Data checked by: D Cahill
Date: 12/11/02

* Y must not deviate by more than ±0.02Y.
ΔH@ must not deviate by more than ±0.15 ΔH@ average.

12/11/02, 9:05 AM

Shaw
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METER BOX POST-TEST CALIBRATION

validated 3/31/95

Date:	9/3/03	Meter Box No.:	FT-10
Barometric Pressure, (Pbar):	29.48	Initial Y:	0.991
Plant:	Clean Harbors	Project No.:	848142-01
Project Manager:	DO	Calibrator:	GT

ΔH@: 1.95

Run No.	Orifice manometer setting* ΔH in. H2O	Wet test meter volume Vw ft3	Dry gas meter volume Vd ft3	Temperatures: Wet test meter Tw °F	Dry gas meter: Inlet Tdi °F	Dry gas meter: Outlet Tdo °F	Dry gas meter: Average Td °F	Vacuum setting** in. Hg	Duration of run, Ø min.	Duration of run, Ø sec
			78.952	72	81	74				
1	1.90	10.000	89.106	72	87	76	79.5	9	13	38
			89.106	72	87	76				
2	1.90	10.000	99.283	72	91	78	83.0	9	13	39
			99.283	72	91	78				
3	1.90	10.500	110.014	72	93	80	85.5	9	14	21

Run No.	Y	ΔH@
1	0.994	2.00
2	0.998	2.00
3	0.999	1.99
Post-test average***	0.997	2.00
Difference from Pretest ***=	0.006	0.05

$$y = \frac{(Vw)(Pbar)(Td+460)}{(Vd)(Pbar+\Delta H/13.6)(Tw+460)}$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)\ x}{(Pbar)(Td+460)} \left| \frac{(Tw+460)\ (Ø)}{Vw} \right|^2$$

* To be the average ΔH used during the test series.
** To be the highest vacuum used during the test series.
*** Post-test Y must be within ±0.05 initial Y.
ΔY = (Posttest Y - Initial Y) / Initial Y
Post-test ΔH@ must be within ±0.15 in.H2O of the intial ΔH@.
ΔH@ difference = Posttest ΔH@ - Initial ΔH@

Data checked by: BLH
Date: 9-3-03

9/3/03, 2:48 PM

Stack Thermocouples

Each thermocouple is calibrated by comparing it with an ASTM-3F thermometer at approximately 32°F, ambient temperature, 100°F, and 500°F. The thermocouple read within 1.5 percent of the reference thermometer throughout the entire range when expressed in degrees Rankine. If the stack gas is saturated with moisture, the thermocouple is calibrated at 10° intervals between 70° and 180°F using a water bath. The thermocouple agreed within ±2°F of the reference thermometer over the entire range. The thermocouples may be checked at ambient temperature at the test site to verify the calibration. Calibration data are included in the following Thermocouple Calibration Data Sheet(s).

Shaw
Shaw E & I, Inc.

Stack Thermocouple
Calibration Data Sheet

Date: 1/3/03 Thermocouple Number: 412
Calibrator: Neese Reference: ASTM 3-F

Reference Point Number	Source *	Reference Thermometer Temperature (Degrees F)	Thermocouple Temperature (Degrees F)	Difference (Degrees F)	Percent Difference**
1	1	34	34	0	0.00
2	2	72	71	1	-0.19
3	3	163	162	1	-0.16
4	4	448	446	2	-0.22

*Source 1. Ice Bath
2. Ambient
3. Water Bath
4. Oil bath

** Each percent difference must be less than or equal to 1.5%

Checked By: BJS Date: 1-29-03

Digital Indicators for Thermocouple Readout

A digital indicator is calibrated by feeding a series of millivolt signals to the input and comparing the indicator reading with the reading the signal should have generated. Error did not exceed 0.5 percent when the temperatures were expressed in degrees Rankine. Calibration data are included in the following Thermocouple Digital Indicator Calibration Data Sheet(s).

Shaw
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Date: 12/10/02 Indicator: FT-10

Operator: J. Neese

Digital Indicator Calibration Data Sheet

Test Point Number	Equivalent Temperature, (T_e) °F	Digital Indicator Temperature, (T_{di}) °F	Difference, *%
1	0	2	-0.43
2	100	102	-0.36
3	200	203	-0.45
4	300	302	-0.26
5	400	401	-0.12
6	500	502	-0.21
7	1000	1003	-0.21
8	1300	1303	-0.17
9	1600	1603	-0.15
10	1900	1902	-0.08

* Percent difference must be less than or equal to 0.5%

$$\% \text{ Difference} = \frac{(T_e, °F - T_{di}, °F)}{(T_e, °F + 460)} * 100$$

Checked by: [illegible] Date: 1/27/03

Dry Gas Thermocouples and Impinger Thermocouples

The dry gas thermocouples are calibrated by comparing them with an ASTM-3F thermometer at approximately 32°F, ambient temperature, and a higher temperature between approximately 100° and 200°F. The thermocouples agreed within 5°F of the reference thermometer. The impinger thermocouples are checked in a similar manner at approximately 32°F and ambient temperature, and they agreed within 2°F. The thermocouples may be checked at ambient temperature prior to the test series to verify calibration. Calibration data are included in the following Dry Gas Thermometer and Impinger Thermocouple Calibration Data Sheet(s).

Shaw
Shaw E & I, Inc.

Dry Gas Thermocouple
Calibration Data Sheet

Date: 12/10/02 Thermocouple Number: FT-10
Calibrator: J. Neese Reference: ASTM 3-F

Inlet

Reference Point Number	Source *	Reference Thermometer Temperature (Degrees F)	Thermocouple Temperature (Degrees F)	Difference ** (Degrees F)	Percent Difference
1	1	72	72	0	0.00
2	2	34	35	-1	0.20
3	3	147	146	1	-0.16

Outlet

Reference Point Number	Source *	Reference Thermometer Temperature (Degrees F)	Thermocouple Temperature (Degrees F)	Difference ** (Degrees F)	Percent Difference
1	1	72	71	1	-0.19
2	2	34	35	-1	0.20
3	3	147	145	2	-0.33

***Source** 1. Ambient
2. Ice Bath
3. Water Bath

**** Difference must be less than 5 Degrees F at both points.**

Checked by: MJ **Date:** 1/27/03

Shaw
Shaw E & I, Inc.

Impinger Thermocouple
Calibration Data Sheet

Date: 1/2/03 Thermocouple Number: I - 98
Calibrator: J. Neese Reference: ASTM 3-F

Reference Point Number	Source *	Reference Thermometer Temperature (Degrees F)	Thermocouple Temperature (Degrees F)	Difference ** (Degrees F)	Percent Difference
1	1	74	73	1	-1.35
2	2	35	34	1	-2.86

*Source 1. Ambient
2. Ice Bath

** Difference must be less than 2 Degrees F at both points.

Checked by: [illegible] Date: 1/27/03

Field Balance

The field balance is calibrated by comparing it with Class-S standard weights, and it agreed within 0.5 g. Calibration data are shown in the following Field Balance Calibration Data Sheet(s).

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Shaw E & I, Inc.

Field Balance Calibration Data Sheet

Balance No.	Date	Calibrator:	Mass Determined for: 5g	Error	50g	Error	100g	Error	500g	Error
AND-1	1/6/03	G. Thress	5.00	0.00	50.00	0.00	100.00	0.00	500.00	0.00
AND-2	1/6/03	G. Thress	5.00	0.00	50.00	0.00	100.00	0.00	499.90	-0.10
199	1/6/03	G. Thress	5.00	0.00	50.20	0.20	99.90	-0.10	500.20	0.20

Error must not exceed 0.5 gram at at each point.

Checked by: MJ Date: 1/27/03

Barometer

The field barometer is calibrated to within 0.1 in.Hg of an NBS-traceable mercury-in-glass barometer before the test series. It is checked against the reference barometer after each test series to determine if it reads within 0.2 in.Hg. The barometer read within the allowable limits each time. Calibration data are included in the following Barometer Calibration Log(s).

Shaw™ The Shaw Group Inc.

BAROMETER CALIBRATION LOG

	Barometer No.	N-1	120	N-2				
	Client	Werner	Clean Harbors	Cognis				
	Project No.	841557						
PRETEST	Barometer Reading	29.75	29.62	29.52				
	Reference Barometer Reading	29.75	29.62	29.56				
	Difference*	0.00	0.00	0.04				
	Date	8-13-03	8-20-03	9/2/03				
	Calibration	BJ	BJ	BJ				

	Barometer Reading	29.53	29.52					
POSTTEST	Reference Barometer Reading	29.50	29.50					
	Difference**	0.03	0.02					
	Date	9/3/03	9/3/03					
	Calibrator	BJ	BJ					

* Barometer is adjusted so that the difference does not exceed 0.05 in.Hg.

** Barometer is <u>not</u> adjusted. If the difference exceeds 0.10 in.Hg, inform the project manager immediately.

ATTACHMENT 6

Industrial Hygiene Exposure Monitoring
Spring Grove Resource Recovery
Lamp Recycling System

Summary

In July 2003, a set of employee exposure monitoring samples was collected from personnel working at the Spring Grove Resource Recovery (SGRR) Lamp Recycling System (LRS) and receiving areas adjacent to the LRS. Samples were collected to assess exposure to inorganic mercury and noise during routine operations. Five employees (Shana Shaffer, Jeff Davison, Mike Fultz, John Heiert, and Phil Sterchi) were selected for airborne mercury sampling. Jeff Davison and Shana Shaffer were also selected for noise exposure monitoring. Airborne mercury sampling results showed levels below the established ACGIH TLV and OSHA PEL (0.025 mg/m^3 and 0.1 mg/m^3 respectively), and all within the protective limitations of the personal protective equipment worn by the employees: including that which is worn by LRS operations personnel and the receiving operation occurring adjacent to the LRS. Noise exposure monitoring showed levels under the OSHA PEL of 90 dB. Recommendations for follow-up actions include: 1) conduct periodic sampling to measure specifically for inorganic mercury in order to gather additional data with the intent to verify that the proper personal protective equipment specified for the operations monitored is adequate, 2) evaluate the necessity of a lateral ventilation system on feed conveyor #1 that may allow a downgrade of personal protective equipment to a modified level D.

Operations Overview

CHES personnel provide treatment, storage, and disposal services for this facility. The operations involved in this IH survey include the Lamp Recycling System and the receiving operations at Spring Grove Resource Recovery.

The Lamp Recycling System segregates all components of various sized fluorescent lamps, HID lamps, etc. and prepares them for recycling. Lamps are fed into one of two areas, either a conveyor (for 4ft. and 8ft. lamps) or a "crusher box" (for HID lamps). Once the lamps are fed into the machine, the glass, phosphor powder (mercury containing), and metal parts are segregated using vibrating mesh conveyors, magnets, and air movement. The filtration system in the unit is designed to filter the particulate phosphor and the mercury vapor with a series of high efficiency particulate air filters and activated charcoal. This filtration system allows very little mercury vapor to be dispelled out of the machine via lamp part outlets (chutes). The unit is also under constant negative pressure, reducing the opportunity for mercury vapor to escape the closed system. The most prevalent release point for mercury vapor is at the operation point at feed conveyor #1, where the operators load the lamps. Occasionally, the lamps arrive at the facility already broken in the boxes during shipment, making exposure possible. Also, if the lamps are fed incorrectly (e.g. stacked higher than the guard on feed conveyor #1) the bulbs break before entering the machine allowing the mercury containing phosphor powder to be released prior to the ventilation system. In addition to the engineering controls, operators are in level C personal protective equipment which includes a CPF I apron, half face APR with Mersorb P100 cartridges, and cut resistant outer gloves with Kevlar sleeves.

The receiving operation takes place adjacent to the LRS. It includes staging containers (loading/off-loading trailers) and sampling of those containers by receiving chemists. The receiving personnel were included in this IH survey due to the close proximity to the LRS operation. The individuals sampled were primarily operating a fork lift loading/off-loading trailers and staging containers for the receiving chemists. The path the fork truck operators take brings them within 10-15 ft. of the LRS. The samples taken served to verify the direct reading results that had demonstrated that mercury vapor did not spread into the receiving area.

Sampling Procedure

Three employees (Shana Shaffer, Jeff Davison, Mike Fultz, John Heiert, and Phil Sterchi) were selected for assessment. All five employees were equipped with an SKC Badge 520 – 02A + capsule holder with a charcoal disk (520 – 03) at the start of their work shift, and these remained on throughout the day. Galson

Laboratories, Syracuse NY, analyzed the samples for mercury vapor in accordance with Occupational Safety and Health Administration methods (OSHA ID-140). Airborne concentrations were also measured using a Lumex mercury vapor analyzer. Results showed levels ranging from 8000 – 25,000 ng/m^3 in the operators breathing zone.

Results/Discussions

Sample results are presented in the accompanying tables. All full shift exposure levels were low and well within current occupational exposure level criteria. All concentrations were also well within the protection factor of the respirator being worn (Half mask Air Purifying Respirator) and the hearing protection being utilized. Sound level measurements were collected in several areas around the LRS and are shown in Diagram 1.

Recommendations

The following recommendations are made based on these results:

1. Conduct periodic sampling to measure specifically for inorganic mercury in order to gather additional data with the intent to verify that the proper personal protective equipment specified for the operations monitored is adequate;
2. Evaluate the necessity of a lateral ventilation system that may allow a downgrade of personal protective equipment to a modified level D.

Report Prepared by:

_____

Mitchell A. Pence
Clean Harbors Environmental Services
Health and Safety Manager

Report Reviewed by:

_____

Mark R. Arriens, MS, CIH, CSP
Clean Harbors Environmental Services
Director, Health and Safety

CHESI EXPOSURE MONITORING RESULTS

Lamp Recycling System

Employee / Location	Date / Total Sampling Time	Sample #	Analysis conducted	SAMPLING RESULTS-CONCENTRATION (ppm OR mg/m^3)	OEL (ppm OR mg/m^3)	% of OSHA PEL or ACGIH criteria (whichever is less)
Shana Shaffer - LRS operator	7/11/2003 475 min.	71103-01	mercury	0.016 mg/m3	.025 (TLV)	64.00%
Phil Sterchi - LRS operator	7/11/2003 472 min.	71103-02	mercury	0.019 mg/m3	.025 (TLV)	76.00%
Jeff Davison - LRS operator	7/14/2003 388 min.	71103-02	mercury	0.009 mg/m3	.025 (TLV)	36.00%
Mike Fultz - receiving -- lodd/unload trailers	7/14/2003 380 min.	71103-03	mercury	<0.01 mg/m3	.025 (TLV)	<4.00%
Shana Shaffer - LRS operator	7/14/2003 389 min.	71403-01	mercury	0.011 mg/m3	.025 (TLV)	44.00%
Shana Shaffer - LRS operator	7/16/2003 501 min.	71603-01	mercury	0.021 mg/m3	.025 (TLV)	84.00%
Jeff Davison - LRS operator	7/16/2003 500 min.	71603-02	mercury	0.019 mg/m3	.025 (TLV)	76.00%
John Heiert - receiving -- load/unload trailers	7/16/2003 495 min.	71603-03	mercury	<0.01 mg/m3	.025 (TLV)	<4.00%
Jeff Davison - LRS operator	7/14/2003 377 min.	N/A	noise	85.3 dB	90 dB	95.00%
Shana Shaffer - LRS operator	7/16/2003 501 min.	N/A	noise	88.0 dB	90 dB	98.00%
Jeff Davison - LRS operator	7/21/2003 486 min.	N/A	noise	89.0 dB	90 dB	99.00%

ppm - parts per million

mg/m^3 - milligrams/cubic meter

OEL - Occupational Exposure Limit - this denotes the lower of the OSHA or ACGIH exposure criteria. Clean Harbors uses the lower (more protective) of these values.

STEL- Short Term Exposure Limit - this denotes an airborne concentration as measured over a 15 minute time period w/out use of respiratory equipment.

The ACGIH specifies that excurisons above the STEL should not occur more than 4 times per day and there should be at least 60 minutes between successive excursions.

C or Ceiling limit - this denotes an airborne concentration not to be exceeded for any time period in an 8 hour work shift.

Sound Level Meter readings around the LRS:

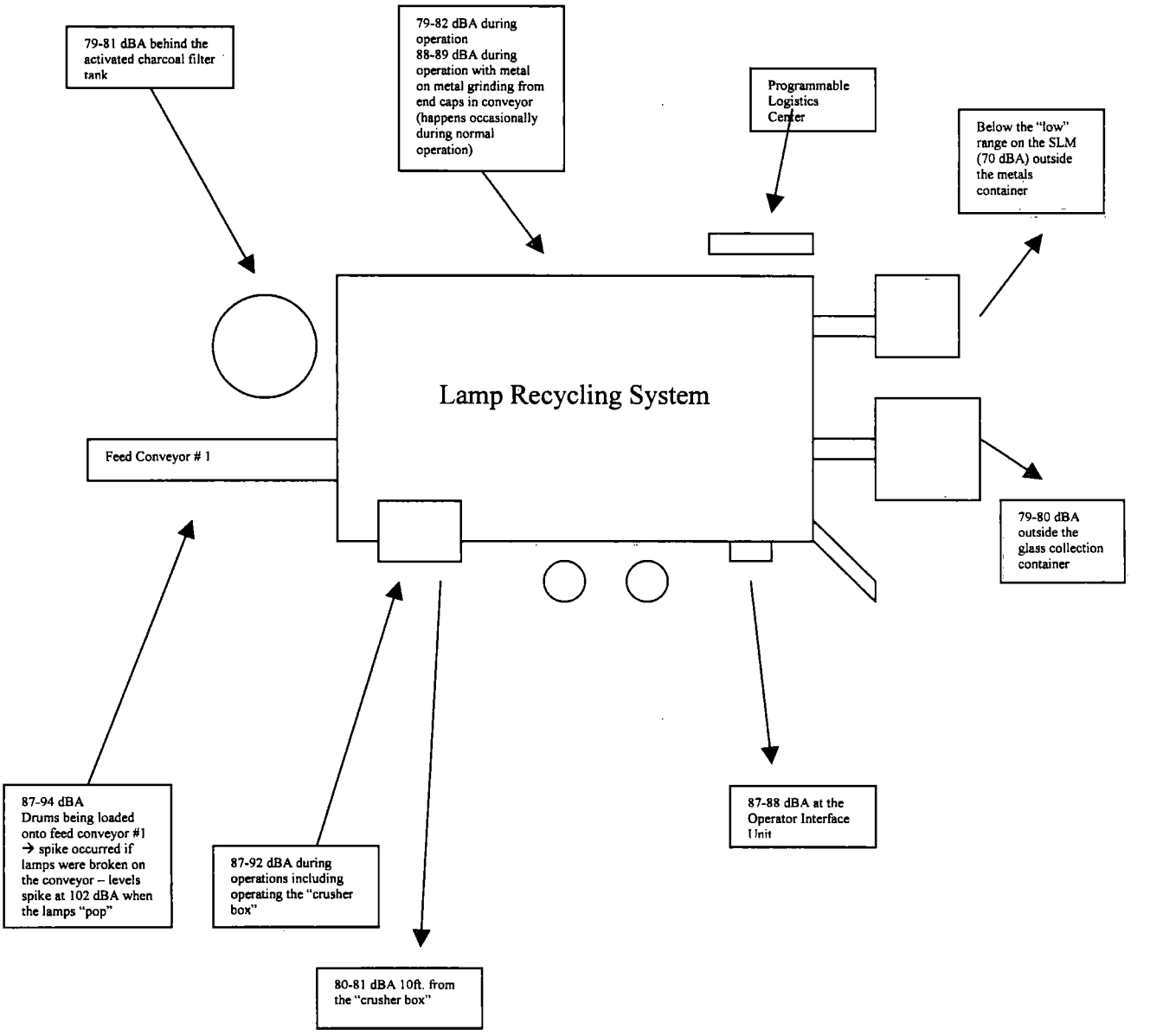

Diagram 1
Sound Level Measurements Around LRS Equipment

ATTACHMENT 7

POTENTIAL PATHWAYS OF EXPOSURE TO HUMANS OR ENVIRONMENTAL RECEPTORS

CHSI believes that operating the lamp crushing system will present the same minimal level of potential exposure to humans and the environment as other operations at the facility (e.g., waste consolidation, waste stabilization, fuels blending, lab pack pour off, bulk liquid flammable tank farm, truck loading/unloading pad, hazardous waste shredding system, metalwashing system, etc.). A number of factors significantly minimize any potential exposure of on-site and off-site personnel or the environment to hazardous and non-hazardous waste lamps processed in the operation. These factors and the types of material to be managed and the potential exposure pathways, environmental receptors and magnitude and nature of exposures are discussed below.

(1) WASTES TO BE MANAGED

CHSI will use the Lamp Crushing System to manage hazardous and non-hazardous waste lamps. CHSI receives material such as fluorescent, mercury-vapor, metal-halide and high-pressure sodium lamps other inorganic materials. These materials will contain a variety of inorganic compounds including mercury, barium, cadmium, lead and sodium. The types of chemical constituents and their concentrations will vary based on the type of lamp that is managed.

There is minor variability in the types of lamps to be managed and their concentrations. For the purposes of this document, CHSI assumed a "worst case" scenario. The assumptions that were made include:

* Inorganic materials to be managed in the unit would be similar to those lamp wastes already being managed in CHSI's on going storage operations;

* Lamps to be managed would consist primarily of inorganic compounds including heavy metals, glass, and calcium phosphate powder. In general, mercury would be more toxic than other organic or inorganic constituents thereby presenting a worst case scenario when considering the potential impacts associating with inhalation;

* CHSI used the results of an analysis performed by Shaw Environmental, Inc. (Compliance Test Report, Fluorescent Bulb Crusher, Clean Harbors Environmental Services, Inc. Facility, Cincinnati, Ohio) as part of its assessment of potential off-site air impacts. As part of Shaw's assessment, it assumed mercury and particulate are present in typical on-site operations;

* Potential pathways and impacts considered normal operation of the unit and spill events; and

* Industrial Hygiene Exposure Monitoring conducted by Clean Harbors Environmental Services, Inc. at the Cincinnati, Ohio facility on the Lamp Recycling System. As part of the assessment, it assumed mercury and particulate are present in typical on-site operations.

(2) POTENTIAL PATHWAYS OF HUMAN EXPOSURE

CHSI considered three (3) different scenarios when assessing potential human exposures: (1) on-site worker operating/working crushing operations; (2) on-site worker working immediately outside the operating areas; and (3) person located off-site.

The typical potential pathways of human exposure for this activity could include:

* Absorption of inorganic material through direct contact with the skin, eyes, etc. (direct absorption) or absorption by contact with inorganic (indirect absorption)

* Ingestion of inorganic material (direct ingestion) or ingestion of soil, groundwater or surface water contaminated with inorganic (indirect ingestion)

* Inhalation of vapors and particulate associated with the management of inorganic materials

These human exposure pathways were evaluated for each of three (3) scenarios. The results of this assessment are provided below.

(A) On-site Worker at the Lamp Crusher

<u>Absorption</u>

Like the waste management activities already taking place at CHSI, all employees working at the lamp crushing operations will wear the appropriate personnel protective equipment (PPE) for the materials being managed and the operations to be performed. This equipment will include: hard hat; steel toed shoes; chemical resistant apron; Kevlar sleeves; cut proof outer gloves (e.g., Kevlar) with Nitrile inner gloves; hearing protection and half-face, cartridge respirator with face shield or full face, cartridge respirator (Mersorb-P100 cartridges or equivalent).

All moving parts of the crusher are enclosed, making the unit safe to operate.

Using the appropriate PPE and following CHSI's existing standard operation procedures for donning and doffing PPE and personal and equipment decontamination will prevent or significantly minimize any worker exposure to or contact with inorganic materials to be managed in the crushing operations via absorption pathways. In the unlikely event inorganic materials came into contact with an employees' skin, eyes, etc., the employee would immediately wash/flush the affected area with water and/or and appropriate cleaner (e.g., soap). The employee would then be directed to seek proper medical attention off-site, if appropriate.

In addition to contact with inorganic material during normal, routine activities associated with operating the lamp crushing system, contact during non-routine activities (i.e., spills) must also be considered. In the event of a spill of inorganic material within the building, the spill will be cleaned up by personnel wearing the appropriate PPE to minimize the potential for contact with contaminants.

Ingestion

All workers involved with hazardous waste management activities have been trained in hazardous waste operations, the appropriate use of PPE, the proper means of PPE, equipment and personal decontamination. Because of this, the chance for exposure either through direct ingestion of inorganic materials is extremely unlikely to non-existent.

Since the crushing operation will be located within an enclosed building the possibility of a worker ingesting an environmental media (e.g., soil, groundwater, surface water) contaminated with inorganic material is non-existent. The lamp crusher is located in an imperviously-coated containment area. This would also restrict the possibility of a worker ingesting and environmental media. In addition to wearing the appropriate PPE and personal decontamination, eating, chewing gum or tobacco, and smoking cigarettes is restricted to designated areas on-site thereby significantly reducing any possibility for a worker to indirectly ingest contaminants.

Inhalation

A full face respirator equipped with cartridges specifically selected for the types of materials being managed or a half-face respirator with face shield will protect crusher workers from potential inhalation exposure. In addition to PPE, CHSI will also use institutional controls to limit the accumulation of inorganic vapors and particulate in the immediate area surrounding the lamp crushing operation.

Fugitive emissions from these operations will be vented to a particulate filter followed by activated carbon. According to the carbon manufacturer, these units will remove nearly 100% of the mercury from the vented air prior to discharge to the atmosphere through a stack until breakthrough occurs (see discussion on carbon units in (2)(B), below).

The combination of wearing the appropriate respirator, using the appropriate respirator cartridges and removal of fugitive emissions will prevent and/or significantly minimize worker exposure to inorganic vapors and particulate.

The results of an analysis performed by Shaw Environmental, Inc. (Compliance Test Report, Fluorescent Bulb Crusher, Clean Harbors Environmental Services, Inc. Facility, Cincinnati, Ohio) show average particulate emissions of 0.0020 pounds per hour and average mercury emissions of 0.0000075 pounds per hour during lamp crushing operations. These emissions are low and well within required criteria.

Industrial Hygiene Exposure Monitoring was conducted by Clean Harbors Environmental Services, Inc. at the Cincinnati, Ohio facility on employees during lamp crushing activities. All full shift exposure levels were low and well within current occupational exposure level criteria.

(B) On-site Worker Outside Unit 25

Absorption/Ingestion

Because lamp crushing operations will take place within secondary containment in an enclosed building, the only means for personnel working outside this unit to come into contact with inorganic material would be in the event of a spill or release. Building 25 alkaline bay will provide approximately 7,871 gallons of secondary containment. As a result of the potential for a spill of inorganic material to escape Building 25 is minimal. Spill clean up personnel would wear PPE appropriate to the material spilled to minimize the potential for contact with spilled material and clean up debris.

Inhalation

Personnel working outside these units could potentially come into contact with inorganic materials by inhalation. As previously discussed, the area in which lamp crushing operations occur is ventilated and vapors and particulate from the operation is vented to a particulate filter and activated carbon. Removal of particulates from a particulate filter and mercury vapors in air using carbon are recognized air pollution control technologies that are utilized in many industrial and commercial applications. CHSI currently operates several particulate filters and carbon units to control emissions from a number of on-site operations. These units have been permitted by the Illinois Environmental Protection Agency.

According to the carbon vendor, the carbon will continue to remove close to 100% of the mercury vapors from the ventilated air until breakthrough occurs. Once breakthrough of the carbon occurs, the removal efficiency of the carbon for mercury will decrease.

Carbon breakthrough will be determined by monitoring the mercury concentrations in air at the inlet and outlet points of the carbon unit using a direct reading mercury vapor monitoring device. Breakthrough will be determined when the carbon unit approaches a 95% mercury removal efficiency.

In the event breakthrough of the carbon canister, the canister will be removed and replaced with a canister of fresh carbon.

CHSI believes that operating the air pollution control units will prevent any exposure to workers to particulate and mercury vapors emitted from lamp crushing operations.

The results of an analysis performed by Shaw Environmental, Inc. (Compliance Test Report, Fluorescent Bulb Crusher, Clean Harbors Environmental Services, Inc. Facility, Cincinnati, Ohio) show average particulate emissions of 0.0020 pounds per hour and average mercury emissions of 0.0000075 pounds per hour during lamp crushing operations. These emissions are low and well within required criteria.

Industrial Hygiene Exposure Monitoring was conducted by Clean Harbors Environmental Services, Inc. at the Cincinnati, Ohio facility on employees outside the operation during lamp crushing activities. All full shift exposure levels were low and well within current occupational exposure level criteria.

(C) Potential Exposure Pathways to Off-Site Personnel

Absorption/Ingestion

Because the CHSI facility is a secure facility (e.g., fences and gates restricting access), the potential for direct or indirect exposure of off-site personnel to inorganic materials through absorption is extremely unlikely to non-existent.

The potential for ingestion of inorganic material by off-site personnel is also extremely unlikely. The unit will be located within the secure facility within an area equipped with impervious secondary containment in an enclosed building. The area surrounding the unit will be inspected daily for spills and releases. All spills will be cleaned up immediately upon detection. As a result, the potential for spills of inorganic material to exit the containment is very unlikely. In the unlikely event organic material escaped secondary containment, CHSI personnel would immediately cleanup any spilled material thereby minimizing the impact, if any, to the environment. Impervious secondary containment and immediate cleanup of spills would make the significantly limit the potential for groundwater contamination caused by operating the unit. Since the nearest drinking water well is located approximately three (3) miles from the facility, the potential for someone to drink water contaminated by a release form the unit is extremely unlikely to non-existent.

Inhalation

As discussed in Section (B), above, emissions from lamp crushing operations will be vented through particulate filters and carbon prior discharge to the atmosphere. The units are designed and will be operated to remove up to 100% of the particulates and mercury vapors prior to its discharge to the atmosphere. The carbon units will be monitored and replaced when breakthrough occurs.

The results of an analysis performed by Shaw Environmental, Inc. (Compliance Test Report, Fluorescent Bulb Crusher, Clean Harbors Environmental Services, Inc. Facility, Cincinnati, Ohio) show average particulate emissions of 0.0020 pounds per hour and average mercury emissions of 0.0000075 pounds per hour during lamp crushing operations. These emissions are low and well within required criteria.

As part of CHSI's RCRA Part B permit application, Carlson Environmental, Inc. performed and analysis titled "Evaluation of Potential Hazardous Material Emergencies through atmospheric Transport from the Current and Proposed Clean Harbors Facility, Chicago, Illinois" (see Appendix 7-A). According to that analysis, the land use in the immediate vicinity of the CHSI facility is heavy industrial. Land surrounding use the facility and some potential receptors are listed below:

* 0.5 miles from the CHSI facility
    - North - Undeveloped recreational areas
    - South - EmEs Company, Lake Calumet Slip #2
    - East - Land and Lake Landfill
    - West - Lake Calumet

* 1.0 miles from the CHSI facility
  North - North turning basin of Lake Calumet, undeveloped recreational areas
  South - Lake Calumet, bulk terminal plant
  East - Land and Lake Landfill, Norfolk & Western Railway
  West - Calumet Expressway

* 1.5 miles from the CHSI facility
  North - Undeveloped recreational areas
  South - 130th Street, rail yard
  East - Rail yard
  West - Arcade Park residential area, rail yard

* 2.0 miles from the CHSI facility
  North - Stony Island Expressway, 103rd Street
  South - Beaubien Woods Forest Preserve, Carver Area High
  East - Calumet Fiver, Buffalo Street
  West - Palmar Park residential areas, St. Martin de Porres High School

The predominant wind direction is to the south. The nearest sensitive receptors (e.g., schools, hospitals) to the CHSI facility are located approximately two (2) miles away. Due to the nature of the materials managed and the air pollution control system that will be in place, the potential adverse impact to a person off-site from lamp crushing activities is non-existent. The potential off-site inhalation impact to humans associated with a "worst case" spill (i.e., containment) is extremely unlikely to non-existent.

(3) POTENTIAL ENVIRONMENTAL RECEPTORS

There are four (4) potential contaminant migration pathways: soils, groundwater, surface water, and air. Environmental receptors would include aquatic life in Lake Calumet and birds.

Because lamp crushing activities will occur within an area equipped with impervious secondary containment in an enclosed building and because this area will be inspected on a daily basis for spills/released, the potential for spills/releases of inorganic material to enter the soil and groundwater is extremely minimal. As a result, any impact to aquatic life in Lake Calumet from groundwater impacts from lamp crushing activities would also be extremely unlikely to non-existent.

The potential for direct contamination of Lake Calumet from spills or releases of inorganic material is non-existent due to the containment provided by these units and the proximity of these units in relation to the lake.

Emissions from lamp crushing activities would be treated prior to discharge through a stack. As previously discussed, due to the removal efficiency of the particulate filters and carbon, impacts to on-site birds (including sea gulls) are also considered extremely unlikely to non-existent. CHSI believes that these operations pose no greater risk than other activities currently permitted and taking place on-site.

The results of an analysis performed by Shaw Environmental, Inc. (Compliance Test Report, Fluorescent Bulb Crusher, Clean Harbors Environmental Services, Inc. Facility, Cincinnati, Ohio) show average particulate emissions of 0.0020 pounds per hour and average mercury emissions of 0.0000075 pounds per hour during lamp crushing operations. These emissions are low and well within required criteria.

Appendix 7-B contains a document titled "Environmental Assessment Report" prepared by Carlson Environmental, Inc. as part of CHSI's RCRA Part B permit application. This report contains an assessment of potential off-site environmental impacts associated with operation of the CHSI facility.

(4) POTENTIAL MAGNITUDE AND NATURE OF EXPOSURES

Workers in Unit 25 have the greatest potential for exposure to the inorganic materials to be managed. The proper use of PPE and in place engineering controls (e.g., respiratory protection, ventilation and treatment of fugitive emissions associated with the operations will significantly minimize any risk for potential exposure to the chemicals being managed.

In the event a worker is exposed to inorganic materials, either through dermal contact, inhalation, or ingestion CHSI will follow the procedures currently in place for responding to worker exposure to chemicals. These procedures include, but are not limited to: (1) flushing the affected areas as may be appropriate using on-site showers/eyes washes; (2) providing any other first aid that might be appropriate; and (3) sending the worker to a local hospital for examination and/or treatment.

Impacts associated with other on-site and off-site personnel and impacts to the environment are considered extremely minimal and would have no more impact than other waste management activities currently taking place at the facility.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

AUG 27 2001

REPLY TO THE ATTENTION OF DW-8J

CERTIFIED MAIL: 7000 0520 0020 5136 8304
RETURN RECEIPT REQUESTED

Mr. Anthony G. Ianello
Illinois International Port District.
3600 East 95th Street
Chicago, Illinois 60617

RE: Modified Federal RCRA Permit
Clean Harbors Services, Inc.
ILD 000 608 471

Dear Mr. Ianello:

Enclosed is a copy of the modified Federal portion of a Resource Conservation and Recovery Act (RCRA) Hazardous Waste permit for the above-referenced facility. On January 31, 2000 Clean Harbors Services, Inc. requested a Class 3 permit modification to incorporate a major equipment modification to its operating system.

The United States Environmental Protection Agency initiated the permit modification in accordance with Title 40 Code of Federal Regulations (40 CFR) § 270.41(a)(1). This modified Federal permit is effective on the date indicated on the signature page of the Federal permit. Eligibility to appeal the Federal permit is discussed further in 40 CFR § 124.19. The original and one copy of the petition must be received by the United States Environmental Protection Agency in Washington, D.C., at the address indicated below within 30 days after service of notice of the final permit decision.

United States Environmental Protection Agency
Environmental Appeals Board
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Submissions can also be made by hand-delivery (including Federal Express) at the following address:

United States Environmental Protection Agency
Environmental Appeals Board
Westory Building
607 14th Street, NW
Suite 500
Washington, D.C. 20005

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A copy of the petition should also be sent to:

Waste Management Branch (DW-8J)
U.S. EPA Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604

The procedures for filing an appeal are found in 40 CFR § 124.19. The administrative appeal procedures must be completed prior to any action seeking judicial review.

This modified Federal permit is effective August 27, 2001. It shall remain valid until November 4, 2003, unless the Federal permit is revoked and reissued, or terminated pursuant to 40 CFR § 270.41, § 270.42 and § 270.43. Failure to comply with any conditions of the Federal permit may result in civil and/or criminal penalties.

Sincerely,

Robert Springer

Robert Springer, Director
Waste, Pesticides and Toxics Division

Enclosures

cc: Mark Schollenberger, IEPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

AUG 27 2001

REPLY TO THE ATTENTION OF:

DW-8J

CERTIFIED MAIL: 7000 0520 0020 5136 8281
RETURN RECEIPT REQUESTED

Mr. James Laubsted
Clean Harbors Services, Inc.
11800 South Stony Island Ave.
Chicago, Illinois 60617

RE: Modified Federal RCRA Permit
Clean Harbors Services, Inc.
ILD 000 608 471

Dear Mr. Laubsted:

Enclosed is a copy of the modified Federal portion of a Resource Conservation and Recovery Act (RCRA) Hazardous Waste permit for the above-referenced facility. On January 31, 2000 Clean Harbors Services, Inc. requested a Class 3 permit modification to incorporate a major equipment modification to its operating system.

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Sincerely,

Robert Springer

Robert Springer, Director
Waste, Pesticides and Toxics Division

Enclosures

cc: Mark Schollenberger, IEPA

CleanHarbors®
SERVICES, INC.
11800 SOUTH STONY ISLAND AVENUE • CHICAGO, IL 60617
(773) 646-6202 • FAX (773) 646-6381
Visit our Website at www.cleanharbors.com

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NOV 13 2000
MNOHWI PERMIT SECTION - WMD
Waste, Pesticides & Toxics DIVISION
U.S. EPA - REGION 5
Am-09

November 9, 2000

Ms. Harriet Croke, DW-8J
U.S. Environmental Protection Agency - Region V
RCRA Permitting Branch/IL
77 West Jackson Boulevard
Chicago, IL 60604

Dear Ms. Croke:

This letter is to provide additional information to the Class 3 permit modification request to add a bulk flammable liquid tankfarm, addition of a truck loading/unloading pad for two trucks, addition of a hazardous waste shredding system and addition of a metalwashing system.

Minimum thickness calculations for tanks which are newly permitted under this modification with P.E. certification are enclosed. P.E. assessment of the existing tank TK-417 is also enclosed.

CHSI intends to stage a 64 cubic foot hopper (9 drums) in Unit 42 for non-dispersible materials from the shredder and 18 drums on the conveyor/drum lift to the shredder in Unit 24. After discussions with yourself, it was decided to add these as container storage. Unit 42 has impervious containment greater than the total volume of waste to be stored in the unit. Unit 24 also has impervious containment, but a portion of the conveyor hangs outside the containment. A steel pan 22 feet long, 5 feet wide and 8 inches deep will be positioned below the conveyor/drum lift. CHSI has also modified closure costs to include the waste added to storage. Table I-1 (maximum closure volumes), Table 2 (unit capacities), Appendix I-3 (closure cost calculations and summary closure costs) and Table D-1 (container management areas) have been modified to reflect these changes. The revised pages and containment calculations are enclosed.

If you have any questions concerning this information, please contact me at (773) 646-6202, x233.

Sincerely,

James R. Laubsted
Facility Compliance Manager

CleanHarbors
SERVICES, INC.
11800 SOUTH STONY ISLAND AVENUE • CHICAGO, IL 60617
(773) 646-6202 • FAX (773) 646-6381
Visit our Website at www.cleanharbors.com

Am-08

November 8, 2000

Mr. Mark A. Schollenberger, P.E.
Illinois Environmental Protection Agency
Bureau of Land - Permit Section
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Dear Mr. Schollenberger:

This letter is to provide additional information to the Class 3 permit modification request to add a bulk flammable liquid tankfarm, addition of a truck loading/unloading pad for two trucks, addition of a hazardous waste shredding system and addition of a metalwashing system.

Minimum thickness calculations for tanks which are newly permitted under this modification with P.E. certification are enclosed. P.E. assessment of the existing tank TK-417 is also enclosed.

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If you have any questions concerning this information, please contact me at (773) 646-6202, x233.

Sincerely,

James R. Laubsted
Facility Compliance Manager