Department of Energy
Richland Field Office
P.O. Box 550
Richland, Washington 99352

0023834

9206493

92-RPA-279

SEP 30 1992

RECEIVED
OCT 13 1992
CORRESPONDENCE CONTROL

Mr. David Nylander
State of Washington
Department of Ecology
Kennewick Office
7601 West Clearwater
Suite 102
Kennewick, WA 99336

Dear Mr. Nylander:

TREATMENT OF T PLANT DRUM 221T-92-000100

This letter requests your approval of the following proposal to expedite neutralization of the contents of DRUM 221T-92-000100 ("Drum 100"). This proposal, which was discussed with Mr. Steve Moore, of your staff in Kennewick on September 22, 1992, is necessary to reduce the risk of leakage from a drum containing highly corrosive waste. The action will provide for safe handling and management of the contents of the drum.

In May of this year, T Plant personnel identified that a waste container stored in the T Plant canyon was leaking. The U.S. Department of Energy Richland Field Office (RL) Hazardous Materials Response (HAZMAT) Team was called to respond. The drum was overpacked, and the contents were inventoried and sampled. The sample analysis and the initial inventorying of the container determined that the 55-gallon steel drum contained various containers of laboratory wastes, several of which were highly corrosive. Several internal containers had broken and the contents had dissolved several other internal containers. The corrosive waste had eaten through the drum container.

The drum and its contents must now be repackaged in order to be safely transported to and stored at the Central Waste Complex. RL has determined that neutralization of the waste is necessary to facilitate repackaging. Due to the highly corrosive nature of this waste and the risk that a leak may occur in the overpack container, a prompt response to this request would be greatly appreciated.

The enclosed Fact Sheet contains specific information about Drum 100 and explains the need for prompt action.

OCT 1992
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Should you have any questions regarding this transmittal, please contact Mr. Paul J. Krupin on (509) 372-1112.

Sincerely,

James D. Bauer

James D. Bauer, Acting Program Manager
Office of Environmental Assurance,
Permits, and Policy

EAP:PJK

Enclosure:
T Plant Drum 221T-92-000100
Fact Sheet

cc w/encl:
P. T. Day, EPA
S. Moore, Ecology
B. G. Erlandson, WHC
R. E. Lerch, WHC
G. C. Triner, WHC
D. E. McKenney, WHC

ENCLOSURE

T Plant Drum 221T-92-000100
FACT SHEET

Background:

In May 1992 a leaking drum was found in the T Plant canyon. The U.S. Department of Energy Richland Field Office (RL) Hazardous Materials Response (HAZMAT) Team was called to respond. The HAZMAT Team determined that the drum was not shock sensitive. The drum was overpacked, industrial hygienists used field instrumentation to determine that although there were no immediate hazards, the likelihood of a leak in the overpack increased with time. The contents were inventoried and sampled on June 24, 1992. The sample analysis results were received on August 12, 1992. During the inventorying of the container, it was determined that T Plant was dealing with a labpack containing a variety of containers of laboratory waste, some of which were highly corrosive. Several internal containers had broken and the contents had destroyed several other internal containers. The highly corrosive waste had also eaten through drum container.

Laboratory Analytical Results:

The following is a summary of the analysis results received:

Metals:

aluminum	- 52.6 parts per million (ppm)
chromium	- 56.4 ppm
cobalt	- 10.2 ppm
copper	- 78,100 ppm
iron	- 100,000 ppm
lead	- 285 ppm
manganese	- 773 ppm
mercury	- 24.7 ppm
nickel	- 55.2 ppm
silver	- 8.72 ppm
zinc	- 425 ppm

Anions:

chloride	- 323,000 ppm
fluoride	- 2,120 ppm
sulfate	- 4,860 ppm

pH: 0.18

Flashpoint: did not ignite

Semi-Volatiles:

bis(2-ethylhexyl)phthalate - 1300 ppb (estimated and also in blank)

Volatiles:

trichloroethene	- 21,000 ppb
1,1,1-trichloroethane	- 690 ppb
methylene chloride	- 460 ppb (estimated and also in blank)
ethylbenzene	- 200 ppb (estimated value)
xylene	- 1600 ppb

Total Organic Halides: 13,400 ppb

The analysis results summarized above are based on the laboratory reports provided in Appendix A.

Dangerous Waste Designation:

The waste in the drum is comprised of a variety of mixed concentrated acids. Process knowledge based on other containers from a similar sources suggests that this drum contains HCl, HF, and H_2SO_4 (HNO_3 was not found during field analysis). The metals identified in the analytical results are believed to be from the dissolving of containers in the labpack as well as the original outer 55-gallon drum.

Because of the uncertainties associated with the source contents of the drum, the waste was designated on a worst case scenario (see Appendix B for worksheets) and given the following waste codes:

WT01, WC02, D002, D007, D008, D009, D011, EHW

A worst case anion-cation pairing was used to determine the most restrictive toxicity waste code.

Packaging and Treatment:

The waste form is a thick slime, green/red in color which cannot be pumped into containers. From a long-term storage perspective there is no way to safely package this material without risking harm to the operators and also no way to assure that the waste will not damage the packaging without neutralizing the waste. Due to the highly corrosive characteristic of the waste, immediate neutralization is needed to reduce the risk of a second leak.

Therefore, RL proposes to expedite neutralization using lime to neutralize the acid waste so that it can be safely packaged, handled, and stored. RL will designate, manage, and ship the waste as if it where not neutralized.

Neutralization Process

The neutralization will be performed as follows with the operators using supplied air, wearing acid suits and nitrile gloves [1] in addition to other requirements specified in the Radiation Work Permit. All the neutralization and repackaging will be conducted in the T Plant tunnel:

1. A 55-gallon galvanized drum with a 90-mil liner will have approximately two inch of lime (see Appendix C for documentation on why lime was picked as the neutralization agent) placed in the bottom. Then all the containers with small amounts of liquid will be emptied into the original 55-gallon overpacked drum. The empty plastic containers will be placed in the 55-gallon galvanized drum, covered with lime and diatomaceous earth.

2. Next, lime will be mixed with the sludge at the bottom of the overpacked 55-gallon drum. The drum will then be slightly lifted and absorbent poured between the overpack and the 55-gallon drum.

   If at any time the neutralization reaction becomes excessively active, the operators will step away until the reaction ceases. When the reaction ceases, more lime will then be added.

3. The neutralization process will be allowed to proceed for a minimum of 48 hours, until outside of drum is cool, and no visible reaction can be seen, before any attempt will be made to package the sludge. Upon neutralization the waste will be absorbed with diatomaceous earth until no visible liquid is present and placed in one-gallon wide mouth glass jars. The jars will then be placed in the 55-gallon galvanized drum with the 90-mil liner. During packaging of the waste, diatomaceous earth will be used to surround the containers, sufficient to sorb twice the amount of liquid potentially present.

   This packaging will allow the operators to safely package the waste as well as the Central Waste Complex to safely handle and store the waste.

Comparison with Treatment By Generator (TBG) Criteria

1. Inherent Risk of the Treatment Process

The treatment process, addition of lime to corrosive mixture of acids, is considered a low risk process. The reaction of the lime with the corrosive mixture will be inherently slow. There will be some generation of heat and gases during the process. All of the treatment will be conducted in the T Plant tunnel, in an unconfined, ventilated space. All workers will be properly instructed as to the associated hazards and the appropriate response to any potentially hazardous situation.

---

[1] Nitrile gloves are only good for 130 minutes in this type of environment. Therefore, gloves and suits will be changed every hour during this process.

2. Waste Toxicity

The wastes to be treated pose a risk due to corrosivity, toxicity, and carcinogenicity. As previously noted, this is based on a worse case designation. The corrosivity is the most significant risk, and it is the primary justification for the need to neutralize the waste. The treatment by neutralization will only reduce the corrosive risk. After treatment, the waste will continue to be managed according to all the associated risks.

3. Risk and Probability of Release

The principal avenues of release of waste to the environment would be to the air or secondary containment system of the overpack container. The treatment will generate some gas (primarily hydrogen), but the gas will be drawn directly into the canyon ventilation system. The gas will be released through the canyon high efficiency particulate air filter exhaust system.

The secondary containment for the overpack container will consist of a portable spill pan that is compatible with the wastes. The overpack will be actively monitored throughout the neutralization process. If any leaks are detected, a new container will be used to complete the neutralization and all wastes that have leaked into the spill pan will be collected and placed into the container.

The risk of a leak is more likely without treatment because of the corrosive nature of the waste. One metal container has already destroyed and has leaked.

4. Relative Benefit to the Environment

The wastes have already destroyed the original metal container. The neutralization is necessary to allow the wastes to be made less corrosive and more amenable for long-term storage at a designated mixed waste storage facility. Without treatment, the wastes would be difficult to handle, package and store. The risk to the environment would be greater without neutralizing the waste.

5. Other Criteria

All treatment will be conducted in one container as described in this fact sheet. This process will be conducted only one time. Other wastes will not be treated according to this request.

APPENDIX A

1. Laboratory analytical reports from Roy F. Weston
2. Quality assurance data
3. Chain of custody information

[13] From: Rory Z Steffler at -WHC121 7/27/92 3:23PM (846 bytes: 18 ln)
To: Glen C Triner at -WHC212
Subject: Sample Numbers
---------- Message Contents ----------

Glen,

Heres that information you desire.....

92212-01.F24	Drum 221T-92-000098	Kitty Litter
92212-02.F24	Drum 221T-92-000099	Clear Liquid/Glass Bottle
92212-03.F24	Drum 221T-92-000099	100ml. bottle
92212-04.F24	Drum 221T-92-000099	4 Small bottles
92212-05.F24	Drum 221T-92-000099	NaOH bottles (2)
92212-09.F24	Drum 221T-92-000100	Green Liquid on Bottom

I think that should be all that you need. If you have any more questions, give me a call.

Rory

Cust ID:	92212-09.F24	SBLK	SBLK BS	SBLK BSD
RFW#:	003	92LE1012-MB1	92LE1012-MB1	92LE1012-MB1
2,4,6-Trichlorophenol	8000 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	40000 U	50 U	50 U	50 U
2-Chloronaphthalene	8000 U	10 U	10 U	10 U
2-Nitroaniline	40000 U	50 U	50 U	50 U
Dimethylphthalate	8000 U	10 U	10 U	10 U
Acenaphthylene	8000 U	10 U	10 U	10 U
2,6-Dinitrotoluene	8000 U	10 U	10 U	10 U
3-Nitroaniline	40000 U	50 U	50 U	50 U
Acenaphthene	8000 U	10 U	69 %	61 %
2,4-Dinitrophenol	40000 U	50 U	50 U	50 U
4-Nitrophenol	40000 U	50 U	71 %	61 %
Dibenzofuran	8000 U	10 U	10 U	10 U
2,4-Dinitrotoluene	8000 U	10 U	74 %	69 %
Diethylphthalate	8000 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	8000 U	10 U	10 U	10 U
Fluorene	8000 U	10 U	10 U	10 U
4-Nitroaniline	40000 U	50 U	50 U	50 U
4,6-Dinitro-2-methylphenol	40000 U	50 U	50 U	50 U
N-Nitrosodiphenylamine (1)	8000 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	8000 U	10 U	10 U	10 U
Hexachlorobenzene	8000 U	10 U	10 U	10 U
Pentachlorophenol	40000 U	50 U	54 %	51 %
Phenanthrene	8000 U	10 U	10 U	10 U
Anthracene	8000 U	10 U	10 U	10 U
Di-n-Butylphthalate	8000 U	3 J	3 JB	3 JB
Fluoranthene	8000 U	10 U	10 U	10 U
Pyrene	8000 U	10 U	109 %	102 %
Butylbenzylphthalate	8000 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	16000 U	20 U	20 U	20 U
Benzo(a)anthracene	8000 U	10 U	10 U	10 U
Chrysene	8000 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	1300 JB	24	25 B	26 B
Di-n-Octyl phthalate	8000 U	10 U	10 U	10 U
Benzo(b)fluoranthene	8000 U	10 U	10 U	10 U
Benzo(k)fluoranthene	8000 U	10 U	10 U	10 U
Benzo(a)pyrene	8000 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	8000 U	10 U	10 U	10 U
Dibenzo(a,h)anthracene	8000 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	8000 U	10 U	10 U	10 U

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

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

RFW Batch Number: 9207L880 | Client: WESTINGHOUSE HANFORD | Work Order: 6168-02-01-0000 | Report Date: 08/10/92 16:37 | Page: 1a

	Cust ID:	92212-09.F24		SBLK		SBLK BS		SBLK BSD	
Sample Information	RFW#:	003		92LE1012-MB1		92LE1012-MB1		92LE1012-MB1	
	Matrix:	WATER		WATER		WATER		WATER	
	D.F.:	20.0		1.00		1.00		1.00	
	Units:	ug/L		ug/L		ug/L		ug/L	
Surrogate Recovery	Nitrobenzene-d5	82	%	56	%	59	%	54	%
	2-Fluorobiphenyl	81	%	56	%	57	%	53	%
	p-Terphenyl-d14	41	%	84	%	85	%	80	%
	Phenol-d5	69	%	61	%	72	%	63	%
	2-Fluorophenol	66	%	54	%	65	%	57	%
	2,4,6-Tribromophenol	D	%	73	%	82	%	65	%
Phenol		8000	U	10	U	67	%	59	%
bis(2-Chloroethyl)ether		8000	U	10	U	10	U	10	U
2-Chlorophenol		8000	U	10	U	64	%	56	%
1,3-Dichlorobenzene		8000	U	10	U	10	U	10	U
1,4-Dichlorobenzene		8000	U	10	U	38	%	43	%
Benzyl alcohol		8000	U	10	U	10	U	10	U
1,2-Dichlorobenzene		8000	U	10	U	10	U	10	U
2-Methylphenol		8000	U	10	U	10	U	10	U
bis(2-Chloroisopropyl)ether		8000	U	10	U	10	U	10	U
4-Methylphenol		8000	U	10	U	10	U	10	U
N-Nitroso-Di-n-propylamine		8000	U	10	U	69	%	61	%
Hexachloroethane		8000	U	10	U	10	U	10	U
Nitrobenzene		8000	U	10	U	10	U	10	U
Isophorone		8000	U	10	U	10	U	10	U
2-Nitrophenol		8000	U	10	U	10	U	10	U
2,4-Dimethylphenol		8000	U	10	U	10	U	10	U
Benzoic acid		40000	U	50	U	50	U	50	U
bis(2-Chloroethoxy)methane		8000	U	10	U	10	U	10	U
2,4-Dichlorophenol		8000	U	10	U	10	U	10	U
1,2,4-Trichlorobenzene		8000	U	10	U	42	%	47	%
Naphthalene		8000	U	10	U	10	U	10	U
4-Chloroaniline		8000	U	10	U	10	U	10	U
Hexachlorobutadiene		8000	U	10	U	10	U	10	U
4-Chloro-3-methylphenol		8000	U	10	U	74	%	69	%
2-Methylnaphthalene		8000	U	10	U	10	U	10	U
Hexachlorocyclopentadiene		8000	U	10	U	10	U	10	U

*= Outside of EPA CLP QC limits.

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 07/30/92

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 6168-02-01-0000

WESTON BATCH #: 9207L880

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-001	92212-04.F24	pH	9.0	PH UNITS	0.010
-002	92212-05.F24	pH	13.0	PH UNITS	0.010
-003	92212-09.F24	Chloride by IC	323000	MG/L	125000
		Fluoride by IC	2120	MG/L	250
		Sulfate by IC	4860	MG/L	1250
		pH	0.18	PH UNITS	0.010

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

09.F24

Lab Name: ROY F. WESTON, INC - L372 Contract: 6168-02-01

Lab Code: WESTON Case No.: WEST SAS No.: SDG No.: CLP880

Matrix (soil/water): WATER Lab Sample ID: 920788003

Level (low/med): MED Date Received: 7/02/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	52600.00		N	P
7440-36-0	Antimony	4400.00	U	N	P
7440-38-2	Arsenic	280.00	B	N	F
7440-39-3	Barium	530.00	B		P
7440-41-7	Beryllium	100.00	U		P
7440-43-9	Cadmium	400.00	U	N	P
7440-70-2	Calcium	125000.00	B	E	P
7440-47-3	Chromium	56400.00		E	P
7440-48-4	Cobalt	10200.00		N	P
7440-50-8	Copper	78100.00			P
7439-89-6	Iron	100000.00		E	P
7439-92-1	Lead	285000.00			F
7439-95-4	Magnesium	102000.00	B	E	P
7439-96-5	Manganese	773000.00			P
7439-97-6	Mercury	24700.00		*	CV
7440-02-0	Nickel	55200.00			P
7440-09-7	Potassium	97000.00	U		P
7782-49-2	Selenium	2000.00	U	NW	F
7440-22-4	Silver	8720.00			P
7440-23-5	Sodium	49500.00	B		P
7440-28-0	Thallium	200.00	U	NE	F
7440-62-2	Vanadium	600.00	U	N	P
7440-66-6	Zinc	425000.00		E	P
	Cyanide				NR

Color Before: GREEN Clarity Before: CLEAR Texture:

Color After: GREEN Clarity After: CLEAR Artifacts:

Comments:
E- Tl - Bench spike recovery less than 40% with a 10X dilution.

Roy F. Weston, Inc. - Lionville Laboratory
Volatiles by GC/MS, HSL List

RFW Batch Number: 9207L880 Client: WESTINGHOUSE HANFORD Work Order: 6168-02-01-0000 Report Date: 07/28/92 12:37 Page: 1a

	Cust ID:	92212-09.F24		92212-09.F24		92212-09.F24		92212-09.F24		VBLK		VBLK	
Sample Information	RFW#:	003		003 DL		003 MS		003 MSD		92LVX124-MB1		92LVX125-MB1	
	Matrix:	WATER		WATER		WATER		WATER		WATER		WATER	
	D.F.:	100		200		200		200		1.00		1.00	
	Units:	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Surrogate Recovery	Toluene-d8	104	%	102	%	102	%	101	%	100	%	102	%
	Bromofluorobenzene	108	%	97	%	93	%	92	%	97	%	93	%
	1,2-Dichloroethane-d4	110	%	98	%	88	%	94	%	95	%	88	%
Chloromethane		1000	U	NA		2000	U	2000	U	10	U	10	U
Bromomethane		1000	U	NA		2000	U	2000	U	10	U	10	U
Vinyl Chloride		1000	U	NA		2000	U	2000	U	10	U	10	U
Chloroethane		1000	U	NA		2000	U	2000	U	10	U	10	U
Methylene Chloride		460	JB	NA		2600	B	2400	B	4	J	4	J
Acetone		1000	U	NA		4700		2000	U	10	U	10	U
Carbon Disulfide		500	U	NA		1000	U	1000	U	1	J	5	U
1,1-Dichloroethene		500	U	NA		79	%	82	%	5	U	5	U
1,1-Dichloroethane		500	U	NA		1000	U	1000	U	5	U	5	U
1,2-Dichloroethene (total)		500	U	NA		1000	U	1000	U	5	U	5	U
Chloroform		500	U	NA		1000	U	1000	U	5	U	5	U
1,2-Dichloroethane		500	U	NA		1000	U	1000	U	5	U	5	U
2-Butanone		1000	U	NA		2000	U	2000	U	10	U	10	U
1,1,1-Trichloroethane		690		NA		650	J	660	J	5	U	5	U
Carbon Tetrachloride		500	U	NA		1000	U	1000	U	5	U	5	U
Vinyl Acetate		1000	U	NA		2000	U	2000	U	10	U	10	U
Bromodichloromethane		500	U	NA		1000	U	1000	U	5	U	5	U
1,2-Dichloropropane		500	U	NA		1000	U	1000	U	5	U	5	U
cis-1,3-Dichloropropene		500	U	NA		1000	U	1000	U	5	U	5	U
Trichloroethene			E	21000		101	%	100	%	5	U	5	U
Dibromochloromethane		500	U	NA		1000	U	1000	U	5	U	5	U
1,1,2-Trichloroethane		500	U	NA		1000	U	1000	U	5	U	5	U
Benzene		500	U	NA		91	%	96	%	5	U	5	U
Trans-1,3-Dichloropropene		500	U	NA		1000	U	1000	U	5	U	5	U
Bromoform		500	U	NA		1000	U	1000	U	5	U	5	U
4-Methyl-2-pentanone		1000	U	NA		2000	U	2000	U	10	U	10	U
2-Hexanone		1000	U	NA		2000	U	2000	U	10	U	10	U
Tetrachloroethene		500	U	NA		1000	U	1000	U	1	J	5	U
1,1,2,2-Tetrachloroethane		500	U	NA		1000	U	1000	U	5	U	5	U

** Outside of EPA CLP QC limits.

RFW Batch Number: 9207L880 Client: WESTINGHOUSE HANFORD Work Order: 6168-02-01-0000 Page: 1b

	Cust ID:	92212-09.F24		92212-09.F24		92212-09.F24		92212-09.F24		VBLK		VBLK
	RFW#:	003		003 DL		003 MS		003 MSD		92LVX124-MB1		92LVX125-MB1
Toluene		500	U	NA		101	%	101	%	5	U	5 U
Chlorobenzene		500	U	NA		97	%	95	%	5	U	5 U
Ethylbenzene		200	J	NA		220	J	1000	U	5	U	5 U
Styrene		500	U	NA		1000	U	1000	U	5	U	5 U
Xylene (total)		1500		NA		1600		1300		5	U	5 U

*= Outside of EPA CLP QC limits.

ROY F. WESTON INC.

INORGANIC DATA SUMMARY REPORT 08/11/92

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 6168-02-01-0000

WESTON BATCH #: 9208L326

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
-003	92212-09.F24	Total Organic Halides	13400	UG/L	500

WESTON

SHEET ____ of ____

CLIENT/SUBJECT _____ W.O. NO. _____

TASK DESCRIPTION _____ TASK NO. _____

PREPARED BY _____ DEPT _____ DATE _____

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY

DEPT _____ DATE _____

92084326

Flashpoint for 92212-09, F24

did not ignite

extinguished at

155°

157°

RFW 10-05-003/A 5/05

ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WESTINGHOUSE HANFORD SAMPLES RECEIVED: 07-02-92
RFW #: 9207L880
W.O. #: 6168-02-01

INORGANIC NARRATIVE

The following is a summary of the quality control results and a description of any problems encountered during the analysis of this batch of samples:

1. Sample holding times as required by 40CFR136 were met with the exception of pH which was received past hold.

2. All preparation blank results were below the required detection limit.

3. All calibration verification checks were within the required control limits of 90-110%. Calibration verification is performed using independent standards.

4. A high matrix interference caused damage to two IC columns and prevented the analysis of Phosphate.

5. Matrix spike recoveries are summarized on the Inorganic Accuracy Report contained within this document. Recoveries were within the 75-125% guidance limits with the exception of Chloride by IC and Sulfate by IC. All %RPD were within the 20% guidance limit.

6. Replicate results are summarized on the Inorganic Precision Report contained within this document. All results were within the 20% RPD guidance limit.

7. The analytical methods applied by the laboratory, unless otherwise requested, for all inorganic analyses are derived from the USEPA Method for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020) and Standard Methods for the Examination of Water and Wastewater 16 ed. Methods for the analysis of solid samples are derived from Test Methods for Evaluating Solid Waste (USEPA SW846).

Margaret M. Berty for 8/3/92
Jack R. Tuschall, Ph.D. Date
Laboratory Manager
Lionville Analytical Laboratory

ncc/i07-880

WESTON.

ADDENDUM

I certify that this data package is in compliance with the terms and conditions of this contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Margaret M. Beaty Name: MARGARET M. Beaty

Date: 8/3/92 Title: Section MANAGER

pas\4-92\addendum

ROY F. WESTON INC.

INORGANIC DUPLICATE SPIKE REPORT 08/11/92

CLIENT: WESTINGHOUSE HANFORD

WESTON BATCH #: 9208L326

WORK ORDER: 6168-02-01-0000

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%RPD
BLANK10	92LTX112-MB1	Total Organic Halides	83.2	88.7	6.4

ROY F. WESTON INC.

INORGANIC PRECISION REPORT 08/11/92

CLIENT: WESTINGHOUSE HANFORD

WESTON BATCH #: 9208L326

WORK ORDER: 6168-02-01-0000

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	%RPD
-003REP	92212-09.F24	Total Organic Halides	13400	11300	17.4

ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 08/11/92

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 6168-02-01-0000

WESTON BATCH #: 9208L326

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV
-003	92212-09.F24	Total Organic Halides	19500	13400	5000	122
BLANK10	92LTX112-MB1	Total Organic Halides	41.6	5.0 u	50.0	83.2
		Total Organic Halides	44.3	5.0 u	50.0	88.7
BLANK20	92LTX112-MB2	Total Organic Halides	48.5	5.0 u	50.0	96.9

Roy F. Weston, Inc. - Lionville Laboratory
VOA ANALYTICAL DATA PACKAGE FOR
WESTINGHOUSE HANFORD

DATE RECEIVED: 07/02/92 RFW LOT # :9207L880

CLIENT ID	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
92212-09.F24	003	W	92LVX124	06/24/92	N/A	07/07/92
92212-09.F24	003 D1	W	92LVX125	06/24/92	N/A	07/08/92
92212-09.F24	003 MS	W	92LVX125	06/24/92	N/A	07/08/92
92212-09.F24	003 MSD	W	92LVX125	06/24/92	N/A	07/08/92

LAB QC:

VBLK	MB1	W	92LVX124	N/A	N/A	07/07/92
VBLK	MB1	W	92LVX125	N/A	N/A	07/08/92

ROY F. WESTON, INC.
GLOSSARY OF TERMS - INORGANIC REPORTS

DATA QUALIFIERS

U - Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* - Indicates that the original sample result is greater than 4x the spike amount added. The USEPA-CLP has determined that spike results on samples where this occurs may be unreliable and therefore, the control limits are not applicable.

ABBREVIATIONS

MB - Method or preparation blank.
MS - Matrix Spike.
MSD - Matrix Spike Duplicate.
REP - Sample Replicate.
LC - Indicates a method LCS or Blank Spike.
NC - Not calculable, result below the detection limit.

A suffix of -R or -S following these codes indicates a replicate or spike analysis respectively.

ANALYTICAL METAL METHODS

As :	EPA 206.2	SE	:	EPA 270.2
Pb :	EPA 239.2	ICP Scan	:	EPA 200.7
Hg :	EPA 245.1	All Others	:	EPA 200.7
Tl :	EPA 279.2	EP Leachates	(except Hg)	200.7

The analytical methods applied by the laboratory for the determination of drinking water are found in 5.2.1.

NOTES

The laboratory prepares a matrix spike at one per 20 frequency for TCLP samples. The Federal Register recommends that all matrix spikes be prepared at greater than 50% of the indigenous analyte concentration.

Holding times for soil samples have not been promulgated by the USEPA.

For solid samples, all results are reported on a dry weight basis.

The range for mercury solid laboratory control standards is 66.9% to 133.8%.

ROY F. WESTON INC.

INORGANIC METHOD BLANK DATA SUMMARY PAGE 07/30/92

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 6168-02-01-0000

WESTON BATCH #: 9207L880

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT
BLANK10	92LIC105-MB1	Chloride by IC	0.25 u	MG/L	0.25
		Fluoride by IC	0.50 u	MG/L	0.50
		Sulfate by IC	0.25 u	MG/L	0.25

ROY F. WESTON INC.

INORGANIC ACCURACY REPORT 07/30/92

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 6168-02-01-0000

WESTON BATCH #: 9207L880

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV
-003	92212-09.F24	Chloride by IC	528000	323000	500000	41.2
		Chloride by IC MSD	529000	323000	500000	41.4
		Fluoride by IC	7730	2120	5000	112
		Fluoride by IC MSD	7380	2120	5000	105
		Sulfate by IC	40300	4860	50000	71.0
		Sulfate by IC MSD	42000	4860	50000	74.4
BLANK10	92LIC105-MB1	Chloride by IC	5.0	0.25u	5.0	100
		Chloride by IC MSD	5.1	0.25u	5.0	101
		Fluoride by IC	9.8	0.50u	10.0	98.0
		Fluoride by IC MSD	9.9	0.50u	10.0	99.0
		Sulfate by IC	5.0	0.25u	5.0	99.3
		Sulfate by IC MSD	5.0	0.25u	5.0	99.6

ROY F. WESTON INC.

INORGANIC DUPLICATE SPIKE REPORT 07/30/92

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 6168-02-01-0000

WESTON BATCH #: 9207L880

SAMPLE	SITE ID	ANALYTE	SPIKE#1 %RECOV	SPIKE#2 %RECOV	%RPD
-003	92212-09.F24	Chloride by IC	41.2	41.4	0.48
		Fluoride by IC	112	105	6.5
		Sulfate by IC	71.0	74.4	4.7
BLANK10	92LIC105-MB1	Chloride by IC	100	101	1.4
		Fluoride by IC	98.0	99.0	1.1
		Sulfate by IC	99.3	99.6	0.34

ROY F. WESTON INC.

INORGANIC PRECISION REPORT 07/30/92

CLIENT: WESTINGHOUSE HANFORD
WORK ORDER: 6168-02-01-0000

WESTON BATCH #: 9207L880

SAMPLE	SITE ID	ANALYTE	INITIAL RESULT	REPLICATE	%RPD
-003REP	92212-09.F24	Chloride by IC	323000	339000	5.0
		Fluoride by IC	2120	2130	0.71
		Sulfate by IC	4860	4930	1.4
		pH	0.18	0.18	0.00

Roy F. Weston, Inc. - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
WESTINGHOUSE HANFORD

DATE RECEIVED: 07/02/92 RFW LOT # :9207L880

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
92212-04.F24						
PH	001	W	92LPH147	06/24/92	07/03/92	07/03/92
92212-05.F24						
PH	002	W	92LPH147	06/24/92	07/03/92	07/03/92
92212-09.F24						
CHLORIDE BY IC	003	W	92LIC105	06/24/92	07/24/92	07/24/92
CHLORIDE BY IC	003 REP	W	92LIC105	06/24/92	07/24/92	07/24/92
CHLORIDE BY IC	003 MS	W	92LIC105	06/24/92	07/24/92	07/24/92
CHLORIDE BY IC	003 MSD	W	92LIC105	06/24/92	07/24/92	07/24/92
FLUORIDE BY IC	003	W	92LIC105	06/24/92	07/24/92	07/24/92
FLUORIDE BY IC	003 REP	W	92LIC105	06/24/92	07/24/92	07/24/92
FLUORIDE BY IC	003 MS	W	92LIC105	06/24/92	07/24/92	07/24/92
FLUORIDE BY IC	003 MSD	W	92LIC105	06/24/92	07/24/92	07/24/92
SULFATE BY IC	003	W	92LIC105	06/24/92	07/24/92	07/24/92
SULFATE BY IC	003 REP	W	92LIC105	06/24/92	07/24/92	07/24/92
SULFATE BY IC	003 MS	W	92LIC105	06/24/92	07/24/92	07/24/92
SULFATE BY IC	003 MSD	W	92LIC105	06/24/92	07/24/92	07/24/92
PH	003	W	92LPH146	06/24/92	07/03/92	07/03/92
PH	003 REP	W	92LPH146	06/24/92	07/03/92	07/03/92
LAB QC:						
BROMIDE BY IC	MB1	W	92LIC105	N/A	07/24/92	07/24/92
BROMIDE BY IC	MB1 BS	W	92LIC105	N/A	07/24/92	07/24/92
BROMIDE BY IC	MB1 BSD	W	92LIC105	N/A	07/24/92	07/24/92
CHLORIDE BY IC	MB1	W	92LIC105	N/A	07/24/92	07/24/92
CHLORIDE BY IC	MB1 BS	W	92LIC105	N/A	07/24/92	07/24/92
CHLORIDE BY IC	MB1 BSD	W	92LIC105	N/A	07/24/92	07/24/92
FLUORIDE BY IC	MB1	W	92LIC105	N/A	07/24/92	07/24/92
FLUORIDE BY IC	MB1 BS	W	92LIC105	N/A	07/24/92	07/24/92
FLUORIDE BY IC	MB1 BSD	W	92LIC105	N/A	07/24/92	07/24/92
NITRITE BY IC	MB1	W	92LIC105	N/A	07/24/92	07/24/92

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a. Reconstructed Ion Chromatogram(s) and Quantitation Report(s)
b. HSL Spectra
c. TIC Spectra
d. GC/MS Library Search for TIC

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2. Raw Data
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b. Quantitation Report(s)

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000011

WESTON

ADDENDUM

I certify that this data package is in compliance with the terms and conditions of this contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Margaret M. Beaty Name: MARGARET M. BEATY

Date: 8/3/92 Title: Section MANAGER

pas\4-92\addendum

A00010A

ROY F. WESTON, INC.
Lionville Laboratory

CLIENT: WESTINGHOUSE HANFORD SAMPLES RECEIVED: 07-02-92
RFW #: 9207L880, GC/MS VOLATILE
W.O. #: 6168-02-01

NARRATIVE

One (1) water sample was collected collected on 06-24-92.

The sample and its associated QC samples were analyzed according to criteria set forth in CLP SOW 02/88 (Rev. 5/89) for TCL Volatile target compounds on 07-07,08-92.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. Non-target compounds were not detected in these samples.

2. Sample 92212-09.F24 and its associated matrix spike samples required 200-fold dilutions because they contained high levels of target compounds.

3. All surrogate recoveries were within EPA QC limits.

4. All matrix spike recoveries were within EPA QC limits.

5. The laboratory blanks contained the common contaminant Methylene Chloride at levels less than the CRQL. The laboratory blank 92LVX124-MB1 also contained the target compounds Carbon Disulfide and Tetrachloroethene at levels less than CRQL.

6. All internal standard area and retention time criteria were met.

Margaret M. Beaty for 8/3/92
Jack R. Tuschall, Ph.D. Date
Laboratory Manager
Lionville Analytical Laboratory

mmz/voa/07-880v.cn

CASE NARRATIVE

DATA SUMMARY

07/01/92 1111

PCO 04/25/92 UCH 57587 447-027584 104 T

WESTINGHOUSE HANFORD / DOE
PO BOX 1970 02-02
RICHLAND WA 99352

WHC-1761

9207L880

WESTON LAB
200 WELSH POOL RD
PITTSTOWN PA 18353

ZCP-5KH

This is your receiving copy, not an invoice, except when charges are collected by the company's driver. Then this copy, when receipted by him, becomes your original (paid) freight bill.

[redacted]

//POLY COOLER OXIDIZER, NOS, (SODIUM 27
//NITRITE & NITRATE), OXIDIZER,
//UN-1479, LIMITED QUANTITY,
//OXIDIZER LABELS APPLIED
//DOT EMERGENCY RESPONSE GUIDE #35
//(COD MAY BE CASH OR CERTIFIED CHECK ONLY)

CTD SEE PAGE 2 OF 027584

RECEIVED PAYMENT $ _____ BY _____
YELLOW FREIGHT SYSTEM, INC., YELLOW FORWARDING CO.,

YELLOW

YELLOW FREIGHT SYSTEM, INC. (YFSI)
FED ID #44-0694708

FOR INFORMATION ONLY
CORPORATE HEADQUARTERS
10990 ROE AVENUE
OVERLAND PARK, KANSAS 66211

3 CONSIGNEE COPY

07/01/92 1111

PCO CTD 04/25/92 UCH 57587 447-027584 104 T

WESTINGHOUSE HANFORD / DOE
PO BOX 1970 02-02
RICHLAND WA 99352

WHC-1761

WESTON LAB
200 WELSH POOL RD
PITTSTOWN PA 18353

ZCP-5KH

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[redacted]

//POLY COOLER SODIUM HYDROXIDE, 27
//SOLUTION (CORROSIVE MATERIAL,
//UN-1824, LIMITED QUANTITY,
//CORROSIVE LABELS APPLIED
//POLY COOLER FLAMMABLE LIQUID, 65
//NOS, (METHANOL) (COD MAY BE CASH OR CERTIFIED CHECK ONLY)

SEE PAGE 3 OF 027584

RECEIVED PAYMENT $ _____ BY _____
YELLOW FREIGHT SYSTEM, INC., YELLOW FORWARDING CO.,

YELLOW

YELLOW FREIGHT SYSTEM, INC. (YFSI)
FED ID #44-0694708

FOR INFORMATION ONLY
CORPORATE HEADQUARTERS
10990 ROE AVENUE
OVERLAND PARK, KANSAS 66211

3 CONSIGNEE COPY

07/01/92 1111

PCO CTD 04/25/92 UCH 57587 447-027584 104 T

WESTINGHOUSE HANFORD / DOE
PO BOX 1970 02-02
RICHLAND WA 99352

WHC-1761

WESTON LAB
200 WELSH POOL RD
PITTSTOWN PA 18353

ZCP-5KH

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[redacted]

//LIQUID, UN-1993, LIMITED
//QUANTITY FLAMMABLE LABELS APPLIED,

Westinghouse Hanford Company

CHAIN OF CUSTODY

002673

Custody Form Initiator RZ STEFFLER

Company Contact GLEN TRINER/LARRY ZUCK

Telephone 376-4852/373-4369

Project Designation/Sampling Locations SAF#92-212

Collection Date 6-24-92

T PLANT UNKNOWN WASTE DRUMS

Ice Chest No.

Field Logbook No. WHC-N-205-19

Bill of Lading/Airbill No.

Offsite Property No.

Method of Shipment FEDERAL EXPRESS

Shipped to WESTON LAB

Possible Sample Hazards/Remarks CORROSIVE

Sample Identification

92212-09.F24

RZS 6-25-92

RZS 6-25-92

☐ Field Transfer of Custody	CHAIN OF POSSESSION	(Sign and Print Names)
Relinquished by: RZ STEFFLER	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by: Yellow	Received by:	Date/Time: 7-2-92 10:45
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/9

Westinghouse Hanford Company

CHAIN OF CUSTODY

002674

Custody Form Initiator RZ STEFFLER

Company Contact GLEN TRINER / LARRY ZUCK

Telephone 376-4852/373-4369

Project Designation/Sampling Locations SAF#92-212

Collection Date 6-24-92

T PLANT UNKNOWN WASTE DRUMS

Ice Chest No. PNL #5

Field Logbook No. WHC-N-205-19

Bill of Lading/Airbill No.

Offsite Property No.

Method of Shipment FEDERAL EXPRESS

Shipped to WESTON LAB

Possible Sample Hazards/Remarks SODIUM HYDROXIDE SOLUTION

Sample Identification

92212-05.F24

RZS 6-25-92

RZS 6-25-92

☐ Field Transfer of Custody

CHAIN OF POSSESSION (Sign and Print Names)		
Relinquished by: RZ STEFFLER	Received by:	Date/Time:
Relinquished by: Yellow	Received by:	Date/Time: 7-2-92 10:45
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

A-6000-407 (12/90)

[redacted]

720 7L8K0

Westinghouse Hanford Company	CHAIN OF CUSTODY	002675

Custody Form Initiator RZ STEFFLER

Company Contact GLEN TRINER / LARRY ZUCK — Telephone 376-4852/373-4369

Project Designation/Sampling Locations SAF# 92-212 — Collection Date 6-24-92

T PLANT UNKNOWN WASTE DRUMS

Ice Chest No. — Field Logbook No. WHC-N-205-19

Bill of Lading/Airbill No. — Offsite Property No.

Method of Shipment FEDERAL EXPRESS

Shipped to WESTON LAB

Possible Sample Hazards/Remarks OXIDIZER

Sample Identification

92212-04.F24

RZS 6-25-92

RZS 6-25-92

☐ Field Transfer of Custody	CHAIN OF POSSESSION	(Sign and Print Names)
Relinquished by: RZ STEFFLER	Received by:	Date/Time:
Relinquished by: Yellow	Received by:	Date/Time: 7-2-92 10:45
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

WESTON Analytics Use Only

9207L88

Custody Transfer Record/Lab Work Request

WESTON

Page 1 of 1

Client: Westinghouse Hanford
Est. Final Proj. Sampling Date:
Work Order #: 6168-0201-0000
Project Contact/Phone #:
AD Project Manager: Jerri King
QC: CLP Del: CLP TAT: 35-Days
Date Rec'd: 7-2-92 Date Due: ~~8-6-92~~
Account #: WS-HANFORD

Refrigerator #		1	5						4	4			4			4	
# Type Container	Liquid	2G	2G						1P	4P			1P			1G	
	Solid																
Volume	Liquid	4L	500						500	500			250			500	
	Solid																
Preservatives		—	—						—	—			—			—	
ANALYSES REQUESTED		ORGANIC								INORG							
		VOA	BNA	Pest/PCB	Herb					Metal	CN						

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	WESTON Analytics Use Only									
S - Soil	001	92212-04.F24			WATER	6-29-92					✓			✓			
BE - Sediment	002	92212-05.F24									✓			✓			
SO - Solid	003	92212-09.F24						✓	✓		✓	✓				✓	✓
SL - Sludge																	
W - Water																	
O - Oil																	
A - Air																	
DS - Drum Solids																	
DL - Drum Liquids																	
L - EP/TCLP Leachate																	
WI - Wipe																	
X - Other																	
F - Fish																	

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions: Project: 92-212
Matrix
Water - Logged in Time But is Unknown
Drum possible corrosive liquid

DATE/REVISIONS: RAD INFO TO FOLLOW
7-7-92 1. Change matrix to Drum per Jerri King
7/8/92 2. change matrix back to Water
3
4
5
6

Original Recorded

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
Yolanda Wright	[illegible]	7-2-92	10:45		[illegible]	7-2-92	

WESTON Analytics Use Only

Samples were: 1) Shipped ✓ or Hand Delivered ___ Airbill # ___
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was: 1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N
COC Record Present Upon Sample Rec'd Y or N

Discrepancies Between Samples Labels and COC Record? Y or N
NOTES:

Rh, Sr90

RFW 21-21-001/A-7/91 ___ L372 ___ L373 ___ L375 ___ L377 ___ L378 Ref# ___ Cooler# PUL 381-596a

000001

CHAIN OF CUSTODY

WESTON
MANAGERS DESIGNERS/CONSULTANTS

208 WELSH POOL ROAD
LIONVILLE, PA 19341-1313

PHONE: (215) 524-7360
TELECOPY: 1ST FLOOR (215) 524-1723
2ND FLOOR (215) 524-7503

DATE: 8/11/92

TELECOPY COVER PAGE

TOTAL NUMBER OF PAGES: 12
(INCLUDING COVER PAGE)

PLEASE DELIVER THE FOLLOWING INFORMATION TO:

NAME: Karl Pool

LOCATION: OSM

fax # (509) 373-3992

TELECOPY SENT FROM:

NAME: Josie King

LOCATION: WESTON

NOTE: If you do not receive all of the pages, please call us at the above phone number as soon as possible.

APPENDIX B

1. Worst case toxicity information
2. Waste designation information
3. Cation-anion worksheeet for worst case

ITEM #B DATE: 8/19/92 DESIGNATOR - GCT MATERIAL DESCRIPTION: ACID WASTE PHYSICAL STATE - L WASTE STATUS - O
TC PHYSICAL STATE - L DENSITY - pH - .18 FLASHPOINT - °F CONTAINER DESCRIPTION: WEIGHT: K

CONSTITUENT LIST FOR ITEM #B

CAS# MSDS#/RGN	CHEMICAL NAME	PERCENT	TOX	EC %	PERS/ LDR	IARC	SOURCES Use-Code-cls	SOURCES LDR (WW/OT)	PRODUCT	D1	D2	D3	TOXICITY CHARACTERISTIC Code-DW conc.-EHW conc.-LDR conc.	GENERAL INFORMATION
100-41-4	ETHYLBENZENE	.0000	C	.0000	N/A	-	S-F003-DW - -DW	0.05ppm 0.053ppm	CODE - CLASS - LDR- -	F			- - - - - -	RQ-454 K FP-64 °F RD-10/25/91
TOT. % OF CHEMICAL IN WASTE MATRIX		.0000												
1330-20-7	XYLENE	.0002	C	.0000	N/A	-	S-F003-DW - -DW	0.05ppm 0.15ppm	CODE - U239 CLASS - EHW LDR-LDR-1	F			- - - - - -	RQ-454 K FP-85 °F RD-11/01/91
TOT. % OF CHEMICAL IN WASTE MATRIX		.0002												
71-55-6	1,1,1-TRICHLOROETHANE	.0001	C	.0000	HH	-	D-F001-EHW S-F002-EHW	1.05ppm 0.41ppm	CODE - U226 CLASS - EHW LDR-LDR-1				- - - - - -	RQ-454 K FP-NONE °F RD-11/01/91
TOT. % OF CHEMICAL IN WASTE MATRIX		.0001												
7439-92-1	LEAD	.0285	N	0.0000	N/A	-	- - - -		CODE - CLASS - LDR- -				D008-5ppm -500ppm -5ppm - - - 285 ppm	RQ-.454 K FP- °F RD-11/11/91
TOT. % OF CHEMICAL IN WASTE MATRIX		.0285												
7439-97-6	MERCURY, METAL	.0025	X	.0025	N/A	-	- - - -		CODE - U151 CLASS - EHW LDR-LDR-1				D009-0.2ppm -20ppm -0.2ppm - - 24.7 ppm	RQ-.454 K FP- °F RD-11/11/91
TOT. % OF CHEMICAL IN WASTE MATRIX		.0025												
7440-02-0	NICKEL	.0055	N	0.0000	N/A	-	- - - -		CODE - CLASS - LDR- -				NIKL-N/A -N/A -134ppm - - - 55.2 ppm	RQ-45.4 K FP- °F RD-11/11/91
TOT. % OF CHEMICAL IN WASTE MATRIX		.0055												
7440-22-4	SILVER	.0009	N	0.0000	N/A	-	- - - -		CODE - CLASS - LDR- -				D011-5ppm -500ppm -5ppm - - - 8.72 ppm	RQ-454 K FP- °F RD-11/11/91
TOT. % OF CHEMICAL IN WASTE MATRIX		.0009												
7440-47-3	CHROMIUM	.0056	N	0.0000	N/A	-	- - - -		CODE - CLASS - LDR- -				D007-5ppm -500ppm -5ppm - - - 56.4 ppm	RQ-4.54 K FP- °F RD-11/11/91
TOT. % OF CHEMICAL IN WASTE MATRIX		.0056												
7647-01-0	Hydrochloric Acid	33.2000	D	.0033	N/A	-	- - - -		CODE - CLASS - LDR- -		X		- - - - - -	RQ-2270 K FP- °F RD-11/11/91
TOT. % OF CHEMICAL IN WASTE MATRIX		33.2000												

ITEM #B DATE: 8/19/92 DESIGNATOR - GCT MATERIAL DESCRIPTION: ACID WASTE PHYSICAL STATE - L WASTE STATUS - O
TC PHYSICAL STATE - L DENSITY - pH - .18 FLASHPOINT - °F CONTAINER DESCRIPTION: WEIGHT: K

CONSTITUENT LIST FOR ITEM #B

CAS# MSDS#/RGN	CHEMICAL NAME	PERCENT	TOX	EC %	PERS/ LDR	IARC	SOURCES Use-Code-cls	SOURCES LDR (WW/OT)	PRODUCT	D1	D2	D3	TOXICITY CHARACTERISTIC Code-DW conc.-EHW conc.-LDR conc.	GENERAL INFORMATION
7664-39-3	HYDROFLUORIC ACID	.2230	D	.0000	N/A		- - - -		CODE - U134 CLASS - DW LDR-LDR-1		X		- - - - - -	RQ-45.4 K FP- °F RD-12/11/91
TOT. % OF CHEMICAL IN WASTE MATRIX		.2230												
7664-93-9	SULFURIC ACID	.5200	C	.0005	N/A	-	- - - -		CODE - CLASS - LDR- -		X		- - - - - -	RQ-454 K FP- °F RD-11/01/91
TOT. % OF CHEMICAL IN WASTE MATRIX		.5200												
7697-37-2	~~NITRIC ACID~~	40.0000	C	.0400	N/A	-	- - - -		CODE - CLASS - LDR- -	O	X		Test to Determine if present	RQ-45.4 K FP- °F RD-10/24/91
TOT. ~~% OF~~ CHEMICAL IN WASTE MATRIX		40.0000												
79-01-6	TRICHLOROETHYLENE	.0021	C	.0000	HH	L	D-F001-EHW ~~S-F002-EHW~~	~~0.062ppm~~ 0.091ppm	CODE - U228 CLASS - EHW LDR-LDR-1				D040-0.5ppm -50ppm - - - 21ppm	RQ-45.4 K FP- °F RD-7/02/92
TOT. % OF CHEMICAL IN WASTE MATRIX		.0021												

None found during field Analysis

WT01-EHW ✓ WT02-DW ____ TOTAL EC% .04633
NON REGULATED: EC% <0.001 ____ NO DATA ____
(WAC-173-303-101)

HH >1.0%: EHW-WP01 ____ 0.01%< HH ≤1.0%: DW-WP02 ____
PAH > 1.0%: EHW-WP03 ____ NON REG. ____
(WAC-173-303-102) LDR-LAND BAN HH>1000 ppm, IF FED. REGULATED

>1.0% SUFFICIENT (S) EHW-WC01 ____
>0.01% SUFFICIENT (S) OR >1% LIMITED (L) AND (S) DW-WC02 ✓
(WAC-173-303-103) NON-REGULATED ____

NOTES: 1-NOTIFICATION MADE TO RA
2-NOTIFN. NOT REQD. REFER TO TABLE C

Flashpoint (FP) <100°F FLAMMABLE (F) ____
100°F > FP < 140°F COMBUSTIBLE(C) ____
OXIDIZER (O) ?
(WAC-173-303-090,5), DW-D001, ALL ARE LDR

pH ≤ 2 OR ≥ 12.5 DW-D002 ____
(WAC-173-303-090,6) ALL LIQUIDS ARE LDR

(WAC-173-303-090,7) ALWAYS LDR DW-D003 ____

TC CODES D008, D007, D011 D007, D040
EHW X DW ____
LDRs D007, D008, D007 D011, D040
(WAC 173-303-090,8)

WASTE SHIPPING SUMMARY
DOT REG. ✓ IS WASTE RQ? 1 lb
TSCA REG. ____ RCRA REG. ✓ STATE REG. ✓

~~DOT~~ DESIGNATION INFORMATION FOR ITEM # B OF REQUEST #T-100 ~~DOT~~

APPLICABLE WASTE CODES WT01, WC02, D002, D007, D008, D009, D011, D040 WASTE CLASS EHW LDR CODES D002, D007, D008, D009
PROPER SHIPPING NAME Waste Acid, n.o.s ~~or Oxidizer~~ HAZARD CLASS ____ DOT ID NO ____
LABELS ____ PACKAGING REQUIREMENTS ____
SHIP TO ____ CELL (IF APPLICABLE) ____

Cation-Anion Worst Case

SOLID WASTE ENGINEERING ANALYSIS

Hazardous Analysis Smart System (HAS System)

8/19/92 HAS System Output Report For Request #T-100

ITEM #A DATE: 8/19/92 DESIGNATOR - GCT MATERIAL DESCRIPTION: WORST CASE TOXICITY SCENERIO PHYSICAL STATE - L WASTE STATUS - O
TC PHYSICAL STATE - L DENSITY - pH - .18 FLASHPOINT - °F CONTAINER DESCRIPTION: WEIGHT: K

CONSTITUENT LIST FOR ITEM #A

CAS# MSDS#/RGN	CHEMICAL NAME	PERCENT	TOX	EC %	PERS/ LDR	IARC	SOURCES Use-Code-cls	LDR (WW/OT)	PRODUCT	D1	D2	D3	TOXICITY CHARACTERISTIC Code-DW conc.	-EHW conc.	-LDR conc.	GENERAL INFORMATION
10025-73-7	CHROMIC CHLORIDE	32.3000	D	.0032	N/A	-	- -		CODE -				D007-5ppm	-500ppm	-5ppm	RQ-NONE K
							- -		CLASS -				-	-	-	FP- °F
									LDR- -							RD-10/25/91
TOT. % OF CHEMICAL IN WASTE MATRIX		32.3000														
13446-34-9	MANGANESE (II) CHLORIDE, TETRAHYDRATE	32.3000	D	.0032	N/A	-	- -		CODE -				-	-	-	RQ- K
							- -		CLASS -				-	-	-	FP- °F
									LDR- -							RD-11/11/91
TOT. % OF CHEMICAL IN WASTE MATRIX		32.3000														
20667-12-3	SILVER (1+) OXIDE	.0010	D	.0000	N/A	-	- -		CODE -				D011-5ppm	-500ppm	-5ppm	RQ- K
							- -		CLASS -				-	-	-	FP- °F
									LDR- -							RD-10/24/91
TOT. % OF CHEMICAL IN WASTE MATRIX		.0010														
7487-94-7	MERCURIC CHLORIDE	32.3000	A	3.2300	N/A	-	- -		CODE -				D009-0.2ppm	-20ppm	-0.2ppm	RQ-.454 K
							- -		CLASS -				-	-	-	FP- °F
									LDR- -							RD-10/23/91
TOT. % OF CHEMICAL IN WASTE MATRIX		32.3000														
7646-79-9	COBALT CHLORIDE	32.3000	C	.0323	N/A	-	- -		CODE -				-	-	-	RQ-NONE K
							- -		CLASS -				-	-	-	FP- °F
									LDR- -							RD-11/01/91
TOT. % OF CHEMICAL IN WASTE MATRIX		32.3000														
7646-85-7	ZINC CHLORIDE (REFERENCE MERCK INDEX)(pH = 2.5 of	32.3000	C	.0323	N/A	-	- -		CODE -				-	-	-	RQ-454 K
							- -		CLASS -				-	-	-	FP- °F
									LDR- -							RD-11/01/91
TOT. % OF CHEMICAL IN WASTE MATRIX		32.3000														
7758-89-6	CUPROUS CHLORIDE	40.0000	C	.0400	N/A	-	- -		CODE -				-	-	-	RQ-NONE K
							- -		CLASS -				-	-	-	FP- °F
									LDR- -							RD-11/01/91
TOT. % OF CHEMICAL IN WASTE MATRIX		40.0000														
7758-94-3	IRON (II) CHLORIDE (1:2)	42.3000	B	.4230	N/A	-	- -		CODE -		X		-	-	-	RQ-45.4 K
							- -		CLASS -				-	-	-	FP- °F
									LDR- -							RD-12/06/91
TOT. % OF CHEMICAL IN WASTE MATRIX		42.3000														

ITEM #A DATE: 8/19/92 DESIGNATOR - GCT MATERIAL DESCRIPTION: WORST CASE TOXICITY SCENERIO PHYSICAL STATE - L WASTE STATUS - O
TC PHYSICAL STATE - L DENSITY - pH - .18 FLASHPOINT - °F CONTAINER DESCRIPTION: WEIGHT: K

CONSTITUENT LIST FOR ITEM #A

CAS# MSDS#/RGN	CHEMICAL NAME	PERCENT	TOX	EC %	PERS/ LDR	IARC	SOURCES Use-Code-cls	SOURCES LDR (WW/OT)	PRODUCT	D1	D2	D3	TOXICITY CHARACTERISTIC Code-DW conc.-EHW conc.-LDR conc.	GENERAL INFORMATION
7758-95-4	LEAD CHLORIDE	32.3000	D	.0032	N/A	-	- - / - -		CODE - CLASS - LDR- -				D008-5ppm -500ppm -5ppm / - - -	RQ-45.4 K FP- °F RD-10/24/91
TOT. % OF CHEMICAL IN WASTE MATRIX		32.3000												
7791-20-0	NICKEL (II) CHLORIDE	32.3000	C	.0323	N/A	L	- - / - -		CODE - CLASS - LDR- -				NIKL-N/A -N/A -134ppm / - - -	RQ- K FP- °F RD-10/24/91
TOT. % OF CHEMICAL IN WASTE MATRIX		32.3000												
96-10-6	ALUMINUM CHLORODIETHYL	57.9000	C	.0579	N/A	-	- - / - -		CODE - CLASS - LDR- -	F		X	- - - / - - -	RQ- K FP- °F RD-12/10/91
TOT. % OF CHEMICAL IN WASTE MATRIX		57.9000												

WT01-EHW X WT02-DW ____ TOTAL EC% 3.85749
NON REGULATED: EC% <0.001 NO DATA ____
(WAC-173-303-101)

HH >1.0%: EHW-WP01 ____ 0.01%< HH ≤1.0%: DW-WP02 ____
PAH > 1.0%: EHW-WP03 ____ NON REG. ____
(WAC-173-303-102) LDR-LAND BAN HH>1000 ppm, IF FED. REGULATED

>1.0% SUFFICIENT (S) EHW-WC01 ____
>0.01% SUFFICIENT (S) OR >1% LIMITED (L) AND (S) DW-WC02 X
(WAC-173-303-103) NON-REGULATED ____

NOTES: 1-NOTIFICATION MADE TO RA
2-NOTIFN. NOT REQD. REFER TO TABLE C

Flashpoint (FP) <100°F FLAMMABLE (F) ____
100°F > FP < 140°F COMBUSTIBLE(C) ____
OXIDIZER (O) ____
(WAC-173-303-090,5), DW-D001, ALL ARE LDR

pH ≤ 2 OR ≥ 12.5 DW-D002 ____
(WAC-173-303-090,6) ALL LIQUIDS ARE LDR

(WAC-173-303-090,7) ALWAYS LDR DW-D003 ____

TC CODES ____
EHW ____ DW ____
LDRs ____
(WAC 173-303-090,8)

WASTE SHIPPING SUMMARY

DOT REG. ____ IS WASTE RQ? ____
TSCA REG. ____ RCRA REG. ____ STATE REG. ____

DESIGNATION INFORMATION FOR ITEM # A OF REQUEST #T-100

APPLICABLE WASTE CODES ____ WASTE CLASS ____ LDR CODES ____
PROPER SHIPPING NAME ____ HAZARD CLASS ____ DOT ID NO ____
LABELS ____ PACKAGING REQUIREMENTS ____
SHIP TO ____ CELL (IF APPLICABLE) ____

This work sheet is only to determine worst case toxicity as well Carcinogenicity.

Worst Case Scenerio
Chemicals listed are not thought to be in waste

CATION-ANION COMBINATIONS

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
7789-12-0	SODIUM DICHROMATE DEHYDARTE	ppm or WT% X =	N - NONE	- - - -	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10043-01-3	ALUMINUM SULFATE	ppm or WT% X 1 =	D - NONE	- - - -	-			
13473-90-0	ALUMINUM (111) NITRATE (1:3)	ppm or WT% X 1 =	D - 100,000 pp	- - - -	-	O		
7429-90-5	ALUMINUM METAL	ppm or WT% X 1 =	N - NONE	- - - -	-	F		X
7784-18-1	ALUMINUM FLUORIDE HYDRATE	ppm or WT% X 1 =	N - NONE	- - - -	-			
7784-30-7	ALUMINUM PHOSPHATE MONOBASIC	ppm or WT% X 1 =	N - NONE	- - - -	-		X	
96-10-6	ALUMINUM CHLORODIETHYL	32.3 ppm or (WT%) X 1.79 = 57.9	C - 10,000 ppm	- - - -	-	F		X

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10025-91-9	ANTIMONY TRICHLORIDE	ppm or WT% X 1 =	C - 100,000 pp	- - - -	-		X	X
594-31-0	ANTIMONY DICHLOROTRIPHENYL	ppm or WT% X 1.61 =	C - 10,000 ppm	- - - -	-			
7440-36-0	ANTIMONY METAL	ppm or WT% X 1 =	N - NONE	- - - -	-			
7446-32-4	ANTIMONY (III) SULFATE (2:3)	ppm or WT% X 1 =	N - NONE	- - - -	-			
7783-70-2	ANTIMONY PENTAFLUORIDE	ppm or WT% X 1 =	N - NONE	- - - -	-		X	

CATION-ANION COMBINATIONS

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE	- LIQUID TRD	- SOLID TRD	CARCINOGEN	D001	D002	D003
1303-28-2	ARSENIC PENTOXIDE	ppm or WT% X 1.54 =	B - 1,000 ppm	D004	- 5 ppm	- 100 ppm	S			
7440-38-2	ARSENIC	ppm or WT% X 1 =	D - 100,000 pp	D004	- 5 ppm	- 100 ppm	S			
7784-34-1	ARSENIC CHLORIDE	ppm or WT% X 1 =	B - NONE	D004	- 5 ppm	- 100 ppm	-			
7784-35-2	ARSENOUS TRIFLOURIDE	ppm or WT% X 1 =	N - NONE	D004	- 5 ppm	- 100 ppm	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE	- LIQUID TRD	- SOLID TRD	CARCINOGEN	D001	D002	D003
10022-31-8	BARIUM NITRATE	ppm or WT% X 1 =	C - 10,000 ppm	D005	- 100 ppm	- 2,000 ppm	-	O		
10361-37-2	BARIUM CHLORIDE	ppm or WT% X 1 =	C - 10,000 ppm	D005	- 100 ppm	- 2,000 ppm	-			
513-77-9	BARIUM CARBONATE	ppm or WT% X 1.43 =	C - 10,000 ppm	D005	- 100 ppm	- 2,000 ppm	-			
7440-39-3	BARIUM	ppm or WT% X 1 =	N - NONE	D005	- 100 ppm	- 2,000 ppm	-	F		X
7727-43-7	BARIUM SULFATE	ppm or WT% X 1 =	N - NONE	D005	- 100 ppm	- 2,000 ppm	-			
7787-32-8	BARIUM FLUORIDE	ppm or WT% X 1 =	C - 10,000 ppm	D005	- 100 ppm	- 2,000 ppm	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE	- LIQUID TRD	- SOLID TRD	CARCINOGEN	D001	D002	D003
13510-49-1	BERYLLIUM SULFATE	ppm or WT% X 1 =	C - 10,000 ppm		-	-	S			
13597-99-4	BERYLLIUM NITRATE	ppm or WT% X 1 =	D - NONE		-	-	-	O		
7440-41-7	BERRRYLIUM DUST	ppm or WT% X 1 =	C - NONE		-	-	S			
7787-47-5	BERYLLIUM CHLORIDE	ppm or WT% X 1 =	C - 10,000 ppm		-	-	S	F		

CATION-ANION COMBINATIONS

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
7787-49-7	BERYLLIUM FLUORIDE	ppm or WT% X 1 =	C - 10,000 ppm	- - - -	S			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10043-35-3	BORIC ACID	ppm or WT% X 5.6 =	D - 100,000 pp	- - - -	-			
10294-34-5	TRICHLOROBORANE	ppm or WT% X 1 =	N - NONE	- - - -	-		X	
7440-42-8	BORON	ppm or WT% X 1 =	D - 100,000 pp	- - - -	-			
7637-07-2	TRIFLUOROBORANE	ppm or WT% X 1 =	B - 1,000 ppm	- - - -	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10108-64-2	CADMIUM CHLORIDE	ppm or WT% X 1 =	B - 10,000 ppm	D006 - 1 ppm - 20 ppm - -	S			
10124-36-4	CADMIUM SULFATE	ppm or WT% X 1 =	C - 10,000 ppm	D006 - 1 ppm - 20 ppm - -	S			
10325-94-7	CADMIUM NITRATE	ppm or WT% X 1 =	C - 10,000 ppm	D006 - 1 ppm - 20 ppm - -	L			
1306-19-0	CADMIUM OXIDE	ppm or WT% X 1.14 =	C - 10,000 ppm	D006 - 1 ppm - 20 ppm - -	S			
13477-17-3	CADMIUM PHOSPHATE	ppm or WT% X 1 =	N - NONE	D006 - 1 ppm - 20 ppm - -	-			
7440-43-9	CADMIUM	ppm or WT% X 1 =	C - 10,000 ppm	D006 - 1 ppm - 20 ppm - -	S			
7790-79-6	CADMIUM FLOURIDE	ppm or WT% X 1 =	N - NONE	D006 - 1 ppm - 20 ppm - -	L			

CATION-ANION COMBINATIONS

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10043-52-4	CALCIUM CHLORIDE	ppm or WT% X 1 =	D - 100,000 pp	- - - -	-			
10124-37-5	CALCIUM NITRATE	ppm or WT% X 1 =	N - NONE	- - - -	-	O		X
7440-70-2	CALCIUM METAL	ppm or WT% X 1 =	N - NONE	- - - -	-	F		X
7758-23-8	CALCIUM PHOSPHATE	ppm or WT% X 1.6 =	N - NONE	- - - -	-			
7778-18-9	CALCIUM SULFATE	ppm or WT% X 1 =	N - NONE	- - - -	-			
7789-75-5	CALCIUM FLUORIDE	ppm or WT% X 1 =	D - 100,000 pp	- - - -	-			
8012-75-7	CHROMIC ACID, CALCIUM SALT (1:1), DIHYDRATE	ppm or WT% X 1.47 =	D - 100,000 pp	D007 - 5 ppm - 100 ppm - -	S		X	

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10025-73-7	CHROMIC CHLORIDE	32.3 ppm or WT% X 1 = 32.3	D - 100,000 pp	D007 - 5 ppm - 100 ppm - -	-			
10101-53-8	CHROMIC SULFATE	ppm or WT% X 1 =	C - ~~NONE~~	D007 - 5 ppm - 100 ppm - -	-			
13548-38-4	CHROMIUM NITRATE	ppm or WT% X 1 =	D - 100,000 pp	D007 - 5 ppm - 100 ppm - -	-	O		
7440-47-3	CHROMIUM	ppm or WT% X 1 =	N - NONE	D007 - 5 ppm - 100 ppm - -	-			
7788-97-8	CHROMIUM (III) FLUORIDE	ppm or WT% X 1 =	N - NONE	D007 - 5 ppm - 100 ppm - -	-		X	
GCN007	CHROMIUM-ACID-YELLOW-K	ppm or WT% X 1 =	B - 1,000 ppm	D007 - 5 ppm - 100 ppm - -				

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10124-43-3	COBALTOUS SULFATE	ppm or WT% X 1 =	C - 10,000 ppm	- - - -	-			

CATION-ANION COMBINATIONS

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10141-05-6	COBALTOUS NITRATE	ppm or WT% X 1 =	C - 10,000 ppm	- - - -	-	O		
1307-96-6	COBALT (2+) OXIDE	ppm or WT% X 1.27 =	C - 10,000 ppm	- - - -				
7440-48-4	COBALT METAL	ppm or WT% X 1 =	N - NONE	- - - -	-			
7646-79-9	COBALT CHLORIDE	32.3 ppm or WT% X 1 = 32.3	C - 10,000 ppm	- - - -	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
1317-38-0	COPPER OXIDE	ppm or WT% X 1.25 =	N - 10,000 ppm	- - - -	-			
3251-23-8	CUPRIC NITRATE	ppm or WT% X 1 =	B - 100,000 pp	- - - -	-	O		
7440-50-8	COPPER	ppm or WT% X 1 =	N - NONE	- - - -	-			
7758-89-6	CUPROUS CHLORIDE	40 ppm or WT% X 1 = 40	C - 10,000 ppm	- - - -	-			
7758-98-7	CUPRIC SULFATE	ppm or WT% X 1 =	A - 10,000 ppm	- - - -	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
7439-89-6	IRON METAL	ppm or WT% X 1 =	N - NONE	- - - -	-			
7720-78-7	FERROUS SULFATE	ppm or WT% X 1 =	C - 10,000 ppm	- - - -	-			
7758-94-3	IRON (II) CHLORIDE (1:2)	42.3 ppm or WT% X 1 = 42.3	B - NONE	- - - -	-		X	
7782-61-8	FERRIC NITRATE	ppm or WT% X 1 =	D - 100,000 pp	- - - -	-	O		
7783-50-8	FERRIC FLUORIDE	ppm or WT% X 1 =	B - NONE	- - - -	-			

CATION-ANION COMBINATIONS

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10099-74-8	LEAD NITRATE	____ ppm or WT% X 1 = ____	D - NONE	D008 - 5 ppm - 100 ppm - -	-	O		
7439-92-1	LEAD	____ ppm or WT% X 1 = ____	N - NONE	D008 - 5 ppm - 100 ppm - -	-			
7446-14-2	LEAD SULFATE	____ ppm or WT% X 1 = ____	D - NONE	D008 - 5 ppm - 100 ppm - -	-		X	
7446-27-7	LEAD PHOSPHATE	____ ppm or WT% X 1 = ____	N - NONE	D008 - 5 ppm - 100 ppm - -	S			
7645-25-2	ARSENIC ACID, LEAD SALT	____ ppm or WT% X 1.042 = ____	C - 10,000 ppm	D004 - 5 ppm - 100 ppm D008 - 5 ppm - 100 ppm	-			
7758-95-4	LEAD CHLORIDE	32.3 ppm or WT% X 1 = 32.3	D - NONE	D008 - 5 ppm - 100 ppm - -	-			
7783-46-2	LEAD (II) FLUORIDE	____ ppm or WT% X 1 = ____	C - NONE	D008 - 5 ppm - 100 ppm - -	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10103-50-1	ARSENIC ACID, MAGNESIUM SALT	____ ppm or WT% X 1.27 = ____	C - 10,000 ppm	D004 - 5 ppm - 100 ppm - -	-			
10377-60-3	MAGNESIUM NITRATE	____ ppm or WT% X 1 = ____	N - NONE	- - - -	-	O		
7439-95-4	MAGNESIUM METAL	____ ppm or WT% X 1 = ____	N - NONE	- - - -	-	F		X
7487-88-9	MAGNESIUM SULFATE	____ ppm or WT% X 1 = ____	N - NONE	- - - -	-			
7783-40-6	MAGNESIUM FLUORIDE	____ ppm or WT% X 1 = ____	N - NONE	- - - -	-			
7786-30-3	MAGNESIUM CHLORIDE	____ ppm or WT% X 1 = ____	D - 100,000 pp	- - - -	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10377-66-9	MANGANESE DINITRATE	____ ppm or WT% X 1 = ____	N - NONE	- - - -	-	O		

CATION-ANION COMBINATIONS

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
13446-34-9	MANGANESE (II) CHLORIDE, TETRAHYDRATE	32.3 X 1 = ppm or WT% 32.3	D - 100,000 pp	- - - -	-			
7439-96-5	MANGANESE	X 1 = ppm or WT%	N - NONE	- - - -	-			
7782-64-1	MANGANESE DIFLUORIDE	X 1 = ppm or WT%	N - NONE	- - - -	-			
7785-87-7	MANGANOUS SULFATE	X 1 = ppm or WT%	N - NONE	- - - -	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10045-94-0	MERCURIC NITRATE	X 1 = ppm or WT%	A - 1,000 ppm	D009 - 0.2 ppm - 4 ppm - -	-	O		
2440-45-1	MERCURY, (HYDROGEN PHOSPHATO)BIS(ETHYL-	X 1.14 = ppm or WT%	B - 1,000 ppm	D009 - 0.2 ppm - 4 ppm - -	-			
7439-97-6	MERCURY, METAL	.0024 X 1 = ppm or WT% .0024	X - NONE	D009 - 0.2 ppm - 4 ppm - -	-			
7487-94-7	MERCURIC CHLORIDE	32.3 X 1 = ppm or WT% 32.3	A - 100 ppm	D009 - 0.2 ppm - 4 ppm - -	-			
7783-35-9	MERCURIC SULFATE	X 1 = ppm or WT%	A - 10,000 ppm	D009 - 0.2 ppm - 4 ppm - -	-			
7783-39-3	MERCURIC FLUORIDE	X 1 = ppm or WT%	N - NONE	D009 - 0.2 ppm - 4 ppm - -	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
12656-85-8	LEAD CHROMATE MOLYBDATE	X 1 = ppm or WT%	N - NONE	D007 - 5 ppm - 100 ppm D008 - 5 ppm - 100 ppm	S			
1313-27-5	MOLYBDENUM TRIOXIDE	X 1.5 = ppm or WT%	D - 100,000 pp	- - - -	-			
7439-98-7	MOLYBDENUM	X 1 = ppm or WT%	N - NONE	- - - -	-			

CATION-ANION COMBINATIONS

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10028-18-9	NICKEL FLUORIDE	ppm or WT% X 1 =	N - NONE	NIKL - N/A - N/A	-			
12054-48-7	NICKEL HYDROXIDE	ppm or WT% X 1.59 =	C - 100,000 pp	NIKL - N/A - N/A	S			
13138-45-9	NICKEL (II) NITRATE (1:2)	ppm or WT% X 1 =	N - NONE	NIKL - N/A - N/A	-	O		
7440-02-0	NICKEL	ppm or WT% X 1 =	N - NONE	NIKL - N/A - N/A	-			
7786-81-4	NICKEL SULFATE	ppm or WT% X 1 =	D - NONE	NIKL - N/A - N/A	S			
7791-20-0	NICKEL (II) CHLORIDE	32.3 ppm or WT% X 1 = 32.3	C - 10,000 ppm	NIKL - N/A - N/A	L			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
1310-58-3	POTASSIUM HYDROXIDE	ppm or WT% X 1.43 =	C - 10,000 ppm	- -	-		X	
7440-09-7	POTASSIUM	ppm or WT% X 1 =	N - NONE	- -	-	F	X	X
7447-40-7	POTASSIUM CHLORIDE	ppm or WT% X 1 =	D - 100,000 pp	- -	-			
7757-79-1	POTASSIUM NITRATE	ppm or WT% X 1 =	D - 100,000 pp	- -	-	O		
7778-80-5	POTASSIUM SULFATE	ppm or WT% X 1 =	N - NONE	- -	-			
7789-23-3	POTASSIUM FLUORIDE	ppm or WT% X 1 =	C - 10,000 ppm	- -	-		X	

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10025-68-0	SELENIUM CHLORIDE	ppm or WT% X 1 =	N - NONE	D010 - 1 ppm - 20 ppm	-		X	
7446-08-4	SELENIUM DIOXIDE	ppm or WT% X 1.16 =	N - NONE	D010 - 1 ppm - 20 ppm				

CATION-ANION COMBINATIONS

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE	LIQUID TRD	SOLID TRD	CARCINOGEN	D001	D002	D003
7446-34-6	SELENIUM SULFIDE	ppm or WT% X 1.4 =	B - 1,000 ppm	D010	- 1 ppm	- 20 ppm	-			X
7488-56-4	SELENIUM DISULFIDE	ppm or WT% X 1.82 =	C - 10,000 ppm	D010	- 1 ppm	- 20 ppm	-			X
7782-49-2	SELENIUM	ppm or WT% X 1 =	N - NONE	D010	- 1 ppm	- 20 ppm	-			
7783-79-1	SELENIUM FLUORIDE	ppm or WT% X 1 =	N - NONE	D010	- 1 ppm	- 20 ppm	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE	LIQUID TRD	SOLID TRD	CARCINOGEN	D001	D002	D003
10294-26-5	SILVER SULFATE	ppm or WT% X 1 =	N - NONE	D011	- 5 ppm	- 100 ppm				
20667-12-3	SILVER (1+) OXIDE	.0009 ppm or WT% X 1.08 = .00097	D - 100,000 pp	D011	- 5 ppm	- 100 ppm	-			
7440-22-4	SILVER	ppm or WT% X 1 =	N - NONE	D011	- 5 ppm	- 100 ppm	-			
7761-88-8	SILVER NITRATE	ppm or WT% X 1 =	X - NONE	D011	- 5 ppm	- 100 ppm	-	O		
7775-41-9	SILVER FLUORIDE	ppm or WT% X 1 =	N - NONE	D011	- 5 ppm	- 100 ppm	-			
7783-90-6	SILVER CHLORIDE	ppm or WT% X 1 =	N - NONE	D011	- 5 ppm	- 100 ppm	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE	LIQUID TRD	SOLID TRD	CARCINOGEN	D001	D002	D003
13464-37-4	ARSENOUS ACID, TRISODIUM SALT	ppm or WT% X 1.37 =	B - 1,000 ppm	D004	- 5 ppm	- 100 ppm	-			
7440-23-5	SODIUM	ppm or WT% X 1 =	C - NONE		-	-	-	F	X	X
7631-99-4	SODIUM NITRATE	ppm or WT% X 1 =	D - 100,000 pp		-	-	-	O		
7647-14-5	SODIUM CHLORIDE	ppm or WT% X 1 =	D - 100,000 pp		-	-	-			

CATION-ANION COMBINATIONS

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
7681-49-4	SODIUM FLUORIDE	____ X 1 = ppm or WT% ____	C - 10,000 ppm	- - - -	-		X	
7757-82-6	SODIUM SULFATE	____ X 1 = ppm or WT% ____	N - NONE	- - - -	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
10213-09-9	VANADIUM OXYDICHLORIDE	____ X 1 = ppm or WT% ____	N - NONE	- - - -	-			
27774-13-6	VANDYL SULFATE	____ X 1 = ppm or WT% ____	C - NONE	- - - -	-			
7440-62-2	VANADIUM	____ X 1 = ppm or WT% ____	N - NONE	- - - -	-			
7783-72-4	VANADIUM FLUORIDE	____ X 1 = ppm or WT% ____	N - NONE	- - - -	-			

CAS#	CHEMICAL NAME	CONCENTRATION	TOXICITY - THRESHOLD	TOXICITY CHARACTERISTIC CODE - LIQUID TRD - SOLID TRD	CARCINOGEN	D001	D002	D003
22323-45-1	ZINC MERCURY CHROMATE COMPLEX	____ X 1.39 = ppm or WT% ____	D - 100,000 pp	D007 - 5 ppm - 100 ppm D009 - 0.2 ppm - 4 ppm	-			
7440-66-6	ZINC	____ X 1 = ppm or WT% ____	N - NONE	- - - -	-			X
7646-85-7	ZINC CHLORIDE (REFERENCE MERCK INDEX)(pH = 2.5 of 1:1 soln)	32.3 X 1 = ppm or WT% 32.3	C - 10,000 ppm	- - - -	-			
7733-02-0	ZINC SULFATE (1:1)	____ X 1 = ppm or WT% ____	C - 100,000 pp	- - - -	-			
7779-88-6	ZINC NITRATE	____ X 1 = ppm or WT% ____	D - NONE	- - - -	-	O		
7783-49-5	ZINC FLUORIDE	____ X 1 = ppm or WT% ____	C - NONE	- - - -	-			

APPENDIX C

1. Material Safety Data Sheet of Hydrofluoric Acid

MATERIAL SAFETY DATA SHEET

CORPORATE RESEARCH & DEVELOPMENT

SCHENECTADY, N. Y. 12305

MATERIALS · INFORMATION · SERVICES

No. 6

HYDROFLUORIC ACID, ANHYDROUS

Revision B

Date May 1981

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: HYDROFLUORIC ACID, ANHYDROUS
DESCRIPTION: This material is a low boiling, hazardous liquid which is usually shipped in sealed steel pressure containers.
OTHER DESIGNATIONS: Hydrogen Fluoride, HF, Anhydrous Hydrogen Fluoride, Anhydrous HF, AHF, HF-A, CAS #007 664 393
MANUFACTURER: Available from many suppliers, including:
E.I. duPont de Nemours
Wilmington, DE 19898 Emergency Telephone: (302) 774-2421

SECTION II. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Hydrogen fluoride (HF) *Current OSHA standard and ACGIH (1980) TLV. NIOSH recommends a 10-hr TWA of 2.5 mg/m^3 and a ceiling level of 5.0 mg/m^3 (15 minute sample) TLV set at a level to minimize irritation of eyes and nose and to prevent fluorosis.	99.0 min	TLV 3 ppm* or 2 mg/m^3 Man, Inhalation TCLo 110 ppm/1 min (Systemic, Irritant Effects) Human, Inhalation LCLo 50 ppm/30 min

SECTION III. PHYSICAL DATA

Boiling point, 1 atm , deg F (C)	67.1 (19.5)	Specific gravity (25/4 C)	0.97
Vapor pressure at 20 C	775 mm Hg	Volatiles, %	ca 100
Vapor density (Air=1)	Variable*	Solubility in H_2O	Complete
		Freezing point	-118 F (-83 C)

Appearance & Odor: Colorless, or nearly colorless, fuming liquid or gas with a pungent, irritating odor; perceptible by smell above about 5 ppm in air. Overexposed if odor detected!

*Vapor density @ 21 C is ca 2.1; @60 C is ca 0.7. Vapor phase HF molecules "clump together" at low temperature and dissociate as the temperature increases.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
Nonflammable	N/A	N/A	--	--

Extinguishing Media: Water or carbon dioxide. Keep upwind of fire.

Hydrogen fluoride itself is nonflammable, but in this concentrated form it can attack certain metals, i.e. yellow brass, lead, stainless steel, aluminum, cast iron, etc. and release explosive hydrogen gas from the chemical reaction. Moisture contamination may also facilitate hydrogen generation.

Respiratory and body protection is required for fighting fires in which this material is involved. Also provide eye protection.

SECTION V. REACTIVITY DATA

HF is stable when stored and used under proper conditions. Hazardous polymerization will not occur. It is hygroscopic, with a high heat release as an acid solution is formed with water. Water contamination of pressurized containers or piping systems could allow hydrogen generation by acid attack on metal. AHF will attack glass, concrete, certain metals, silica containing materials, natural rubber, leather and many organics. Arsenic trioxide and AHF react with incandescence. Phosphorous pentoxide reacts vigorously with HF, even at 19.5 C. When it reacts with silica, SiF_4, a hazardous colorless gas, is produced. Reaction with cyanides, sulfides, may release poisonous cyanide or hydrogen sulfide gas. Does not corrode wax, polyethylene or platinum.

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SECTION VI. HEALTH HAZARD INFORMATION

TLV 3 ppm or 2 mg/m^3

HF is not detected by smell at 3 ppm but is immediately irritating to mucous membranes at over 5 ppm. Inhalation of vapors can cause extreme irritation of respiratory tract, pulmonary edema, congestion, and fluorosis. Breathing 50 ppm for 30-60 min. may be fatal. Eye contact can cause permanent damage. Skin contact gives immediate burns that intensify with continued contact. Ingestion unlikely, but could result in tissue destruction of the digestive tract and severe irritation in the respiratory tract.

FIRST AID:

Eye Contact: Immediately flush with water for 15 min, including under eyelids.*

Skin Contact: Wash acid from the skin. Remove contaminated clothing. Continue washing 2-4 hours with water; or preferably if available, soak in iced zephiran (0.13%), epsom salt, or 70% denatured ethyl alcohol solution for 1-4 hours, depending on severity of burns.*

Inhalation: Immediately remove to fresh air. Administer 100% oxygen and repeat at half-hour intervals.*

Ingestion: Do not induce vomiting. Give large quantities of milk or water with milk of magnesia.*

*Get medical attention promptly for all affected persons.
First aid procedures should be planned before beginning work with HF.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel, provide adequate ventilation, and remove ignition sources since hydrogen may be generated by reactions with metals.

HF vapor should be passed through a packed tower scrubber. Spills should be covered with lime to form a slurry.

DISPOSAL: The neutralized slurry can be scraped up for disposal in an approved landfill. Liquid wastes may be neutralized in a trench with lime in a remote location away from buildings and people. Then fill the trench with earth and cover with lumber or sheet metal until the earth settles. Follow Federal, State, and Local regulations.

NOTE: Porous materials (concrete, wood, plastic, etc.) will absorb AHF and become a hazard for an indefinite time. Such spills to be cleaned and neutralized immediately.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Exhaust hoods should be an non-corrosive construction, with a face velocity minimum of 100 lfm. Respirators should be available for nonroutine and emergency use above the TLV. An air-supplied respirator or a self-contained breathing apparatus with full facepiece is recommended when vapors/fumes are below 20 ppm.

Wear protective clothing, including boots or safety shoes with polyvinyl chloride (PVC), neoprene or composition soles; chemical goggles and/or a full face shield; coveralls with long sleeves; gauntlets and gloves of PVC or neoprene. A high degree of protection obtained with an air-inflated suit with mask and safety belt. Protective clothing not to be worn or carried beyond operation areas. Use protection suitable for conditions.

Chemical showers and eyewash stations to be readily available to areas of use. Immediately shower with copious amounts of water within seconds after contact, and completely remove all clothing while in shower.

Contact with dilute HF solutions (below 20% in water) may not produce immediate pain or visible damage; but after several hours, the burns will be manifest.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Maintain adequate ventilation. Use forced draft ventilation and scrubbers for fume control. Keep containers tightly closed. Storage facilities to be constructed for containment and dilution/neutralization of spills.

Use nonsparking tools around tanks & pipes where hydrogen gas may collect.

Handling and storage of AHF requires special materials technology for containers, pipes, valves, gaskets, etc., which is available from suppliers. Mild steel resists AHF up to 150 F; PTFE plastic, up to 500 F.

Do not inhale HF mists or vapors! Preclude from exposure workers with kidney disease, osteofluorosis, or impaired pulmonary function.

DOT Classification - CORROSIVE MATERIAL. I.D. No. UN1052

DATA SOURCE(S) CODE: 1-11,17,20,26,31,37,38,43

APPROVALS: MIS J. M. Nielsen
CRD

Industrial Hygiene and Safety DW 5-5-81

MEDICAL REVIEW: 30 May 1981

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